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FROM THE EDITOR

The future of Internet-driven innovation remains a difficult topic to assess. On February 10-11, 2013, the Silicon Flatirons Center at the University of Colorado Law School along with the Journal on Telecommunications and High Technology Law, brought together some of the leaders in the industry to discuss some of the difficulties with navigating this changing topic and how to approach the inevitable emerging issues surrounding the innovation of the Internet environment.

The Journal on Telecommunications and High Technology Law is pleased to present the following five articles from this conference: James Speta, An Appropriate Interconnection Backstop; Pierre de Vris, Harm Claim Thresholds: Facilitating More Intensive Spectrum use Through More Explicit Interference Protection Rights, Gabor Molnar along with Scott Savage and Douglas Sicker, Measuring Broadband Internet Prices; Gregory Rosston, Increasing Wireless Value: Technology, Spectrum, and Incentives; and Mark Cooper, The Long History and Increasing Importance of Public Service Principles for 21st Century Public Digital Communications. We thank all of the authors who have contributed to this issue and issues in the past. You are the reason we maintain our reputation as a leader in the field of telecommunications and technology law.

In this issue I am also extremely proud to present five student notes from my brilliant peers here at Colorado Law. Jean Pyun, Tyler Boschert, Jaclyn Freeman, Andy Evans, Kellen O'Brien, and Stephanie Ryder, have worked tirelessly to create articles that are innovative and interesting, and I am honored that our Journal has the opportunity to publish them.

I would like to thank the incredible JTHTL staff. I am continually amazed by the dedication, motivation, and passion of the students on the Journal. All of the members this year have gone above and beyond what they are required to do and are the reason we continue to be recognized as one of the best journals in this field. Executive Editor Margaret Macdonald has truly been foundational in the production of the Journal this year. Her passion, drive, and dedication are traits I personally aspire to. Lead Production Editor Andy Evans has continually sacrificed his time, energy, and in many instances, sanity to get out high quality issues. His keen eye for detail and relentless perfectionism is an incredible asset to the Journal. Lead Articles Editor Austin Chambers, along with fellow Articles Editors such as Ian Kuliasha have ensured that the articles we publish are impeccable and have

worked to improve and streamline the production process. Managing Editor Jaclyn Freeman has done a wonderful job of keeping the Journal on track financially and always making sure that our events are organized and classy. Lead Student Note Editor Stephanie Ryder, along with Student Note Editors Lauren Ramirez, David DiGiacomo, Steve Martyn, and Jean Pyun have done a wonderful job working with student note writers, and after reading all of the student notes I can say with conviction that the notes that have been chosen for publication next year are outstanding.

I also want to thank our Resource Editor Garrett Anderson and Associate Editors Nick Grice and Nick Herrick, who on numerous occasions stepped up and saved the day. We honestly could not have accomplished what we did this year without them. Finally, I want to thank all of our members for their contributions and hard work.

The Journal would not be possible without our outstanding faculty at the University of Colorado Law School. Our faculty advisors Harry Surden, Paul Ohm, and Blake Reid have continually been there for support and to offer advice. We are so fortunate to have some of the most esteemed faculty at CU Law as our advisors. Our dean, Philip J. Weiser, has not only made sure that our Journal as a whole continues on its upward trajectory, but also that the members of the Journal are supported in their future career paths. I also cannot say thank you enough to our Journal office manager Sara Schnittgrund. Managing three journals is not an easy task, but she does it with patience and grace. Thank you for always knowing what we did not know.

Finally, I want to thank everyone at Silicon Flatirons. Anna Noschese, Cactus Flower Woodworth-Lies, and Jamie Stewart make sure the conferences run smoothly and in turn ensure that we continue to bring in the most prominent panelists, moderators, and guests. In addition, they have all been a wonderful source of support and enthusiasm over this past year.

To everyone who has supported the Journal this year, thank you.

Arielle Brown
Editor-in-Chief

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THE LONG HISTORY AND INCREASING IMPORTANCE OF PUBLIC-SERVICE PRINCIPLES FOR 21ST CENTURY PUBLIC DIGITAL COMMUNICATIONS NETWORKS

MARK COOPER*

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INTRODUCTION

The day after the 2012 presidential election, AT&T filed a petition asking the Federal Communications Commission (the "FCC" or "Commission") to consider how telecommunications would be regulated under the Communications Act of 1934 (the "1934 Act") as the architecture of the communications network is transformed from primary reliance on analog technology and copper wires to digital technology and fiber optic cable. This has become known as the "sunset" of the public switched telecommunications network ("PSTN").

Less than six months later, in response to Hurricane Sandy, Verizon announced that it would not repair the copper telephone wires that the storm had destroyed on Fire Island. Instead, it proposed to use a wireless, digital service to provide basic telephone service. This triggered an intense debate, as many in the community objected to what was perceived to be a significant reduction in the quality of service. The New York State Attorney General strenuously opposed the move, and public interest groups demanded a full proceeding.[1]

What AT&T is asking for and Verizon sought to implement is a dramatic change in the policies and principles that had governed the communications network for over 100 years; a change that is tantamount

1. Emergency Petition of New York Attorney General Eric T. Schneiderman for an Order Preventing Verizon from Illegally Installing Voice Link Service in Violation of its Tariff and the Commission's May 16, 2013 Order, No. 13-C-0197 (N.Y. Pub. Serv. Comm. June 27, 2013), *available at* http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={A3F0A269-8613-4437-AEB3-35ACCF6E5A47}.

to administrative repeal of the public-service principles at the heart of the 1934 Act. This paper shows that the change is unwarranted and unnecessary. Rather than abandon the public-service principles that have successfully guided the U.S. telecommunications sector, history, law, policy, technology, and economics all suggest that the commitment to these principles should be affirmed and the scope of the principles expanded in the age of digital communications.

Section I identifies the six public-service principles that have guided telecommunications policy in the U.S. in the long history of the development of transportation and communications networks in the capitalist era. Section II shows that pseudo-access competition in communications and transportation networks does not support the public-service principles. These principles must be imposed and enforced externally to ensure that these vital infrastructure industries support economic development and democratic discourse in the polity. Section III reviews the legal grounds on which the Commission can ensure that the public-service principles that have guided the successful deployment of the PSTN in the twentieth century transfer into the public digital communications network ("PDCN") that is rapidly becoming the dominant means of communication in the twenty-first century.

I. PUBLIC-SERVICE PRINCIPLES IN THE TRANSPORTATION AND COMMUNICATIONS SECTORS[2]

A. The Origin of the Principle of Activities that are "Affected with the Public Interest"

The legal principle that some activities constitute a public service and therefore incur obligations in the way they are offered to the public stretches back to the mid-fourteenth century. Over the ensuing centuries, the specific activities that are considered to be "affected with the public interest" and the nature of the obligations have varied.[3] One area where the march of history has consistently been to strengthen and expand public-service principles, however, has involved the means of communication and commerce.[4]

2. *See generally* Mark Cooper, From the Public Switched Telephone Network to the Public Digital Communications Network: The Role of Interconnection, Interoperability, Universal Service and Innovation at the Edge in the Digital Revolution (Feb. 10, 2013) (unpublished manuscript), *available at* http://www.fordham.edu/images/undergraduate/communications/cooper%20interconnection%201-26-13.pdf.

3. ALAN STONE, PUBLIC SERVICE LIBERALISM: TELECOMMUNICATIONS AND TRANSITIONS IN PUBLIC POLICY 29 (1991).

4. *See* EXHIBIT I-1, *infra*.

> Although the original economic reasons for the idea of a "common" calling disappeared, the concept underwent an important transformation . . . . [S]ometime during the latter part of the seventeenth century, most trades began to do business generally with the public. Accordingly, the idea of a common calling began to lose significance in most kinds of businesses. Certain kinds of businesses, however, most notably common carriers by land and water and innkeepers, were treated differently. This treatment marks the beginning of the idea of a public service company.[5]

Reflecting this historical and legal pattern of development, discussions that deal with the public-service principles that govern telecommunications services and attach to telecommunications service providers reach back to the eighteenth century. They point to how the common-law dealt with services that were provided in the transportation sector. A mid-eighteenth century Blackstone commentary described the principle as it applied to innkeepers:

> [I]f an inn-keeper, or other victualler, hangs out a sign and opens his house for travelers [sic], it is an implied engagement to entertain all persons who travel that way; and upon this universal assumpsit, an action on the case will lie against him for damages, if he without good reason refuses to admit a traveler.[6]

A 1701 court decision that used the blacksmith as an example offered similar reasoning:

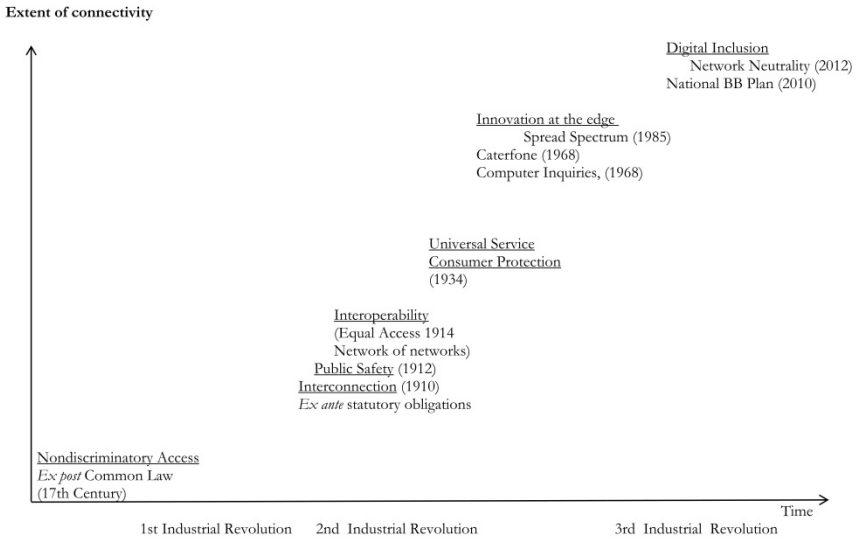
> Whenever any subject takes upon himself a Publick [sic] Trust for the Benefit of the rest of his fellow Subjects, he is . . . bound to serve the Subject in all the Things that are within the Reach and Comprehension of such an Office . . . . If on the Road a Shoe fall off my Horse, and I come to a Smith to have one put on and the Smith refuse to do it, an Action will lie against him, because he has made Profession of a trade which is for the Publick Good . . . . One that has made Profession of a Publick Employment is bound to the utmost Extension of that Employment to serve the Publick.[7]

5. STONE, *supra* note 3, at 29-30.

6. 3 WILLIAM BLACKSTONE, COMMENTARIES *164, *cited in* James B. Speta, *A Common Carrier Approach to Internet Interconnection*, 54 FED. COMM. L. J. 225, 254 n. 142 (2002).

7. Lane v. Cotton, 12 Mod. 472, 484 (1701), *cited in* STONE, *supra* note 3, at 30.

EXHIBIT I-1: THE PROGRESSIVE EVOLUTION OF PUBLIC-SERVICE PRINCIPLES IN THE COMMUNICATIONS SECTOR



It is important to note that, while activities that were associated with transportation, like innkeepers and blacksmiths, incurred the public-service obligation under common-law, the underlying transportation facilities actually incurred even stronger obligations under statute.[8] Navigation projects, canals, and turnpike trusts, chartered under obligations of providing service to the public, were the early vehicles of the emerging capitalist political economy to provide for transportation infrastructure.[9] Created in the fifteenth through eighteenth centuries, and building on principles of common-law, these were private undertakings with a public franchise to collect tolls on the section of a road or waterway whose upkeep was the responsibility of the franchise holder as a trustee for the public. Fees were assessed and access provided on a nondiscriminatory basis. While different rates could be charged to

8. *Turnpike Trusts,* WIKIPEDIA (Jan. 31, 2014, 3:38 AM), http://en.wikipedia.org/wiki/Turnpike_trusts.

9. Mark N. Cooper, *Making the Network Connection: Using Network Theory to Explain the Link Between Open Digital Platforms and Innovation*, *in* OPEN ARCHITECTURE AS COMMUNICATIONS POLICY: PRESERVING INTERNET FREEDOM IN THE BROADBAND ERA 95, 111-12 (Mark N. Cooper ed., 2004); Andrew Odlyzko, Pricing and Architecture of the Internet: Historical Perspectives from Telecommunications and Transportation (Aug. 29, 2004) (unpublished manuscript), *available at* http://www.dtc.umn.edu/~odlyzko/doc/pricing.architecture.pdf.

different types of traffic, discrimination within categories was forbidden.[10]

Thus, it is historically correct to say that the principle of nondiscriminatory access to the means of communications and commerce has been part of the DNA of capitalism since its birth. It is analytically important to make this statement strong and broad because the movement of goods and ideas is essential to the success of the capitalist economy and the democratic polity.[11] As capitalism was dissolving feudalism, the emerging social order discovered an important new social, political, and economic function: mobility. Physical and social mobility were anathema to feudalism but essential to capitalism and democracy. Providing for open and adequate highways of commerce and means of communications were critical to allow commerce to flow, to support a more complex division of labor, and to weave small, distant places into a national and later global economy. This principle came to the new world with the Anglo-Saxon settlers who ultimately dominated the American continent.[12]

B. The Preservation and Extension of Public-service principles for the Transportation and Communications Sectors in the Industrial Era

With the rate of economic change accelerating throughout the industrial era, pressures mounted on the institutional legal structure that governed nondiscriminatory access to the means of communications and commerce. By the late nineteenth century, direct public responsibility for roads, as opposed to franchise trusts, became the norm and provided nondiscriminatory access.[13] Maintaining a network of transcontinental roads became a governmental responsibility, first city, then state, then national.[14] Other means of communications and commerce, railroad, canals, telegraph, telephone, tended to remain in private hands with substantial public support and public service obligations.[15]

The institutional structure grappled with the emerging industrial mode of production throughout the nineteenth century, as the nature and scale of economic activity changed. Public service obligations on the means of communications and commerce increased.

10. Odlyzko, *supra* note 9.

11. Cooper, *supra* note 9.

12. STONE, *supra* note 3, at 17 (noting that things might have been very different if the French and Indian Wars had gone the other way).

13. *Turnpike Trusts*, *supra* note 8.

14. *History of Turnpikes and Canals in the U.S.,* WIKIPEDIA (Jan. 27, 2014, 2:40 PM), http://en.wikipedia.org/wiki/History_of_turnpikes_and_canals_in_the_United_States.

15. *Id.*

> It was originally supposed that [the railroads] would add, and . . . they have added, vastly, and almost immeasurably, to the general business, the commercial prosperity, and the pecuniary resources of the inhabitants of cities, towns, villages, and rural districts through which they pass, and with which they are connected. It is, in view of these results, the public good thus produced, and the *benefits thus conferred upon the persons and property of all the individuals composing the community,* the courts have been able to pronounce them matters of public concern.[16]

Here there is an interesting contrast between England and the U.S. In England, the common-law approach allowed central authority to expand rapidly, moving beyond regulation to nationalization.[17] In the U.S., common-law was cabined by constitutional law. Expanding the scope of central authority required much more compelling evidence to fit within constitutional constraints. It was only when the expanding economy and increasingly complex division of labor drove interstate commerce to the heart of the economy that the federal role could expand.[18] It did so by the end of the nineteenth century.[19]

Moreover, in a typical American pattern, the Interstate Commerce Act did not spring *sui generis* into existence. The field had been well plowed by the states in the American federalist system, which had been grappling with and extending their oversight over the burgeoning industrial economy.[20] State promotion and regulation of canals and railroads began in the mid-nineteenth century and progressed steadily over the course of the century.[21] More local utility services—water, gas, electricity, telephone—were promoted and regulated at the municipal level.[22]

The important role of state and local activity in the development of the uniquely American institutional approach to public-service principles should not be overlooked. Not only was the legal field plowed at the state and local levels, but a significant public sector was built up to deliver local services in a variety of contexts where the regulated private sector had failed to live up to the public-service expectations.[23] While electronic

16. Olcott v. Supervisors, 83 U.S. 678, 692 (1872), *cited in* STONE, *supra* note 3, at 35 (emphasis original).

17. Mark Cooper, *Why Growing up is Hard to Do: Institutional Challenges for Internet Governance in the "Quarter-life Crisis" of the Digital Revolution*, 11 J. ON TELECOMM. & HIGH TECH. L. 45 (2013).

18. *Id.*

19. *Id.*

20. *Progressive Era,* WIKIPEDIA (Mar. 26, 2014, 3:13 AM), http://en.wikipedia.org/wiki/Progressive_era.

21. Odlyzko, *supra* note 9.

22. *Id.*

23. STONE, *supra* note 3, at 159.

communications have been predominantly privately owned in America, there has been a substantial local public sector for a number of utility services, with electricity having one of the larger sectors. The institutional diversity was important.[24]

By the end of the nineteenth century, as the Second Industrial Revolution pushed the scale and complexity of the economy to a much higher level and spilled across state borders, law and practice had paved the way for the institutionalization of public service obligations.[25] The evolving relationship between the private firms delivering these uniquely public services and the state and local governments had laid the foundation for the federalization of this policy

The railroads, which had become the dominant means of commerce and communications in the nineteenth century, were the focal point of economic and legal activity. The recognition of the importance of the railroads was the basis for the extension of public-service principles:

> The railroad, as an improved means of communication and transportation, has produced indescribable changes in all the manifold transactions of every-day life which go to make up what is called commerce. Successful commerce brings prosperity, which in turn makes possible the cultivation and development of the graces and attributes of the highest civilization.[26]

The positive contribution of the railroads to economic progress was the primary justification for imposing public service obligations, but the harmful effects of failing to provide service on a nondiscriminatory basis was the proximate cause of a more direct and aggressive enforcement of the public service obligation on carriers.[27] The Cullum Commission Report outlined the immense benefit of the railroads, explored the interstate nature of commerce, recounted state efforts to deal with railroad abuses and recommended national legislation to address a lengthy list of complaints.[28]

Electronic communications entered the picture in the mid-nineteenth century and rapidly joined the railroads as a critically

24. John E. Kwoka Jr., *The comparative advantage of public ownership: evidence from U.S. electric utilities*, 38 CANADIAN J. ECONOMICS/REVUE CANADIENNE D'ÉCONOMIQUE, 622–640 (2005), *available at* http://onlinelibrary.wiley.com/doi/10.1111/j.0008-4085.2005.00296.x/abstract (discussing the benefits of public power); Andrew Stirling, *On the Economics and Analysis of Diversity* (Univ. Sussex Sci. Police Research Unit, Working Paper No. 28, 2000), *available at* http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.144.8865&rep=rep1&type=pdf (discussing the broader role of diversity).

25. STONE, *supra* note 3.

26. S. REP. No. 49-46, at 4 (1886).

27. STONE, *supra* note 3, at 31-38.

28. S. REP. No. 49-46, at 180.

important public service infrastructure.[29] The state courts that had been grappling directly with the new means of communications and commerce drew strong analogies between transportation and communications.[30] A quote from *Hockett v. State*, an 1886 Indiana court case links the past to the present:

> [The telephone] has become as much a matter of public convenience and of public necessity as were the stagecoach and sailing vessel a hundred years ago, or as the steam-boat, the railroad, and the telegraph have become in later years. It has already become an important instrument of commerce. No other known device can supply the extraordinary facilities which it affords. It may therefore be regarded, when relatively considered, as an indispensable instrument of commerce. The relations which it has assumed towards the public make it a common carrier of news, – a common carrier in the sense in which the telegraph is a common carrier, – and impose upon it certain well-defined obligations of a public character. All the instruments and appliances used by a telephone company in the prosecution of its business are consequently, in legal contemplation, devoted to a public use.[31]

This quote captures the long history of the concept of public obligation that attached to services that play the vital role of supporting the flow of commerce and communications. The early date of this observation, 1886, is notable, since the telephone had just begun to be adopted.[32] Traditional practice did not excuse it from public service obligations because it was new. The quote points to several transportation carriers—stagecoaches, sailing vessels, and steamboats—that were not infrastructure industries and were likely competitive but still were required to shoulder public service obligations. Thus, competition did not excuse important activities from the public-service principles, reminding us that it is the nature of the service, not the conditions of supply that creates the pubic obligations. This citation also suggests the dual nature of communications networks as both a means of commerce and a means of democratic expression.

Interestingly, the above legal characterization came the year before the passage of the first piece of progressive federal legislation, the Interstate Commerce Act, which underscores the clear shift in the approach to nondiscrimination that was about to take place. The quarter

29. Kwoka, *supra* note 24; Stirling, *supra* note 24.

30. *See, e.g.*, Hockett v. State, 5 N.E. 178 (Ind. 1886), *cited in* Speta, *supra* note 6, at 262 n. 187.

31. *Id*.

32. BUREAU OF THE CENSUS, U.S. DEP'T COMMERCE, HISTORICAL STATISTICS OF THE UNITED STATES: COLONIAL TIMES TO 1970, PART 2 784 (1975) (penetration of the telephone in 1886 was 2.9 telephones per 1000 people in the United States).

century after the Interstate Commerce Act saw the creation of a federal, statutory basis for direct oversight over the public-service principles in the railroad industry; these principles were extended to electronic communications, by the enactment of the Mann-Elkins Act of 1910, which placed interstate telecommunications under the Interstate Commerce Act,[33] stating: "[n]ow the telegraph line and the telephone line are becoming rapidly as much a part of the instruments of commerce and as much a necessity in commercial life as the railroad."[34]

C. The Expansion of the Public-service principles during the Quarter-life Crisis of the 2nd Industrial Revolution

Hockett, decided in 1886, and the other activities around nondiscriminatory access and the expanding concept of public-service principles (identified in Exhibit I-1) all took place in a period that we have called the quarter-life crisis of the Second Industrial Revolution,[35] which spans the Progressive Era and the New Deal.[36] What we see in those policy changes is the adoption of a new approach to ensuring that important traditional principles are preserved as the dominant mode of production in a changing society. This is the moment when the mode of production that is rising to dominance and maturing is asked to shoulder the burdens of social goals and public aspirations that are deeply embedded in society. And, in a progressive society, it is the moment to move those social goals to a higher level.

The response to the maturation challenges of the Second Industrial Revolution went well beyond simply reaffirming the importance of and commitment to nondiscriminatory access. The Progressive Era approach to nondiscrimination exhibited other important characteristics that indicate a new, more far-reaching approach, as discussed below. The following are the key characteristics that public-service principles were to embody in the twenty-first century:

1) It shifted from *ex post* to *ex ante* regulation of nondiscrimination.[37]

2) It layered oversight across sector specific regulation and general antitrust law.[38]

33. *Mann-Elkins Act*, WIKIPEDIA (Feb. 19, 2014, 6:13 PM), http://en.wikipedia.org/wiki/Mann-Elkins_Act.

34. 45 CONG. REC. 5,534 (1910), *cited in* STONE, *supra* note 3, at 33.

35. Cooper, *supra* note 17.

36. *See* EXHIBIT I-2, *infra.*

37. Mann-Elkins Act, ch. 309, 36 Stat. 539 (1910).

38. The Sherman Act and the Interstate Commerce Act apply to interstate commerce. *See* Sherman Act, 15 U.S.C. §§ 1-7 (2013); Interstate Commerce Act, 49 U.S.C. §§ 1-80504

3) It introduced the concept of equal access between network operators, thereby highlighting the fact that society was becoming a network of networks—a concept that the digital revolution would take to a much higher level.[39]

The latter point deserves emphasis. The economic value of interconnection and interoperability of networks in a continental economy was compelling. One-and-a-quarter centuries ago, in one of the first and most important acts of the Progressive Era at the federal level, the United States adopted the Interstate Commerce Act, which shifted the nation from an *ex post*, harm-based theory of nondiscrimination under common-law to an *ex ante*, prophylactic theory of nondiscrimination under sector-specific law.[40] The approach was first applied to the railroads, the dominant means of transportation.[41] Twenty-five years later and in spite of the promises of AT&T executives, Vail and Kingsbury,[42] the new approach to public-service principles was extended by statute and statutory enforcement to electronic telecommunication.[43] Private carriers were to provide nondiscriminatory access as a matter of law; individuals did not have to prove they had been harmed by the denial of service.[44]

(1994).

39. United States v. Am. Telephone &Telegraph Co., 552 F. Supp. 131 (D.D.C. 1982), *aff'd* Maryland v. United States, 460 U.S. 1001 (1983).

40. It is more than mere historical coincidence that the U.S. railroad system achieved full, national standardization at exactly this moment. *See Standard Gauge*, WIKIPEDIA (Oct. 30, 2013, 3:58 PM), http://en.wikipedia.org/wiki/Standard_gauge.

41. *Id*.

42. *A Brief History: The Bell System*, AT&T, http://www.corp.att.com/history/history3.html (last visited Mar. 29, 2014).

43. 47 U.S.C. § 251 (2013).

44. *Id*.

EXHIBIT I-2: LIFE CYCLE OF INDUSTRIAL REVOLUTIONS[45]

Invention	Date	Political Turmoil	Primary Mass Communications
1st Industrial Revolution			
Flying Shuttle	1733		
Cotton Mills	1742		
Water Frame	1764		
Spinning Jenny	1765		
Steam Engine	1769		
Steam Ship	1775	Age of	
Threshing Machine	1784	Revolution	
Power Loom	1785	1775	
Cotton Gin,	1793	↓	
Interchangeable Musket Parts	1798		
Steam Locomotive	1804	Luddism	
Steamboat Service on the Hudson River	1807		
Typewriter	1829	↓	
Telegraph, revolver	1836		Penny Press
Sewing Machine	1844, 1851	1848	Telegraph
	1860s		Photography
2nd Industrial Revolution			
Bessemer Steel	1855		
Synthetic Dye	1856		
Machine Gun	1862		
Transatlantic Cable, dynamite	1866		
Modern Typewriter	1867		
Tungsten Steel	1868		
Barbed Wire	1873		
Telephone	1876		
Phonograph,	1877		Telephone
Incandescent Light bulb	1879	Progressive Era	
Induction Electric Motor	1888	State	
Diesel Engine	1892	Regulation	
Radio	1901	↓	
Airplane	1903		
Model T Ford, Assembly Line	1908, 1913	↓	Radio
	1930s	New Deal	
	1940s		Television
3rd Industrial Revolution			
Transistor	1947		
Integrated Circuit	1958		
Micro Computer	1968	Caterfone/	
Internet	1969	Computer Inquiries	
Microprocessor, E-mail	1971	↓	
Modem	1997		
PC-IBM	1980		
Commercial Internet	1986		
Commercial Wireless Service	1984		
WorldWideWeb	1991	↓	
ISOC	1992	CALEA, DMCA,	
	1996	Telecom Act	Broadband
	1998	ICANN	
	1999	COPA,	
	2000		YouTube
	2003	WSIS	
	2004		Social media
	2012	SOPA.PIPA	

The Progressive Era not only shifted from *ex post* to *ex ante* oversight of nondiscriminatory electronic communications, it layered public *ex ante* and *ex post* oversight on the industry. Some of the most important federal actions in the telecommunications space have been initiated by the Department of Justice ("DOJ") under the Sherman Act, not the FCC and its predecessor agencies, including the consent decree of 1914, the final judgment of 1956, and the modification of final judgment in 1984.[46]

45. Cooper, *supra* note 17.

46. ALFRED E. KAHN, THE ECONOMICS OF REGULATION: PRINCIPLES AND

Moreover, while the Sherman Act is overwhelmingly based on an *ex post*, harm-based approach, one extremely important exception involves business conduct that threatens to fundamentally alter the market structure to the detriment of competition.[47] In merger review under the Clayton Act, the DOJ routinely acts in an *ex ante*, prophylactic manner, blocking mergers that raise significant competitive concerns.[48] At roughly the same time, legislation explicitly gave the sector-specific federal regulatory agency oversight over telecommunications mergers.[49] In the 1934 Act, Congress required the FCC to review mergers under a much broader public interest standard than the DOJ applies.[50] Thus, *ex ante* regulation at the FCC, including merger review, is reinforced by *ex ante* merger review at the DOJ and backstopped by *ex post* regulation at the DOJ.

The quintessential expression of the expanding public-service principles and obligations of the carriers who make up the PSTN is the 1934 Act. In its first sentence, the purpose is defined as follows:

> [T]o make available, so far as possible, to all people of the United States a rapid, efficient nationwide and world-wide wire and radio communications service with adequate facilities at reasonable charges, for the purposes of national defense, for the purpose of promoting safety of life and property through the use of wire and radio communications, and for the purpose of securing a more effective execution of this policy by centralizing authority heretofore granted by law to several agencies and by granting additional authority with respect to interstate and foreign commerce in wire and radio communications.[51]

The commitment was broad and pragmatic, involved wired and wireless communications, and recognized the centrality of communications to a number of social goals. The definition of the goals was inclusive and evolutionary, and the commitment to the form of governance was secondary to the statement of goals. It chose the form of governance that dominated the response to the quarter-life crisis of the Second Industrial Revolution—expert agency regulation—but regulation is for the purpose of achieving the goals, not as an end in itself. The

INSTITUTIONS 140-45, 295-306 (1988).

47. *See* Sherman Antitrust Act, 15 U.S.C. §§ 1-7 (2013).

48. Clayton Antitrust Act, 15 U.S.C. §§ 14-19 (2013).

49. STONE, *supra* note 3, at 193, 201 (pointing out that the Interstate Commerce Commission was inserted and the DOJ removed from merger review by the Willis Graham Act from 1920 to 1934, when the dual jurisdiction was created).

50. ADVISORY COMM. ON PUB. INTEREST OBLIGATIONS OF DIGITAL TELEVISION BROADCASTERS, THE PUBLIC INTEREST STANDARD IN TELEVISION BROADCASTING (1998), *available at* http://govinfo.library.unt.edu/piac/novmtg/pubint.htm.

51. 47 U.S.C. § 151 (1996).

public-service principles broadly stated in the first paragraph of the Act are then given specificity in later titles of the Act, as suggested by Exhibit I-3. The arrows in the exhibit show how the broad goals of the Act stated in the first sentence are given elaborate in the specific language in the sections of Title II.

D. The Increasing Need for Public-service principles in the Electronic Communications Sector of the 2nd Industrial Revolution

Is all this concern about nondiscrimination, integration, universal service, etc., in communications necessary? 400 years of experience suggested to Progressive Era policymakers that it was. The shift from *ex post* to *ex ante* and the layering of regulation of integration was driven by two factors, both very much akin to the underlying forces that drove the broader progressive movement, as summarized in Exhibit I-4 and discussed below.

EXHIBIT I-3: TITLE I GOALS AND TITLES II AND III TOOLS OF THE COMMUNICATIONS ACT

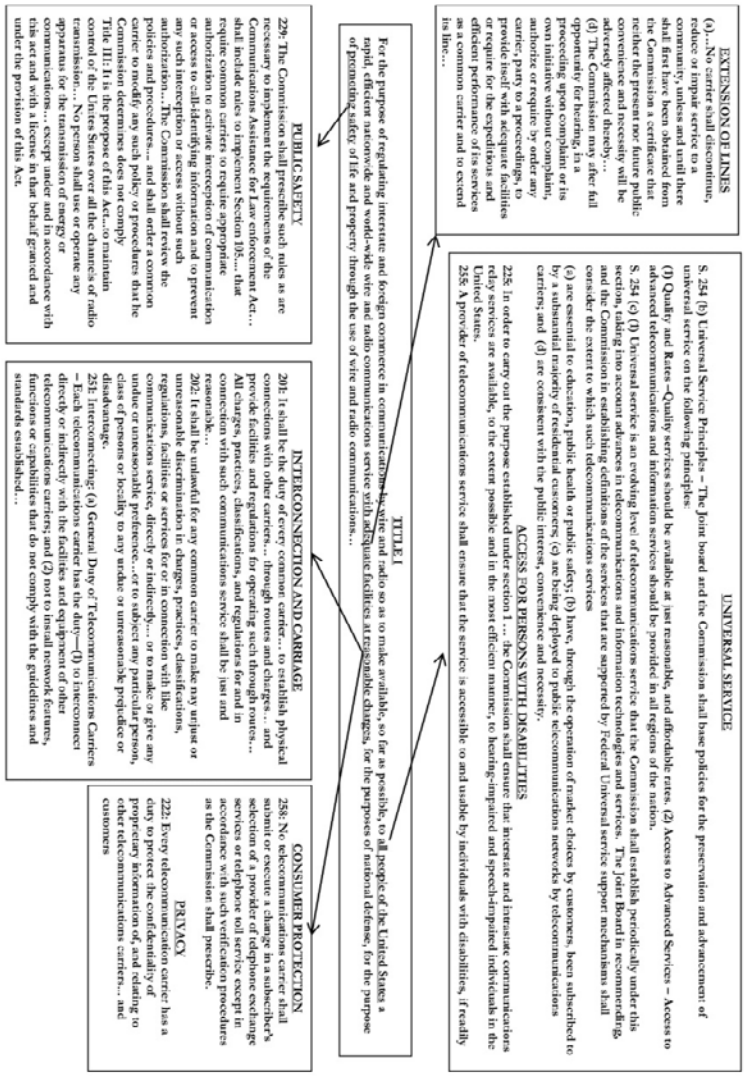
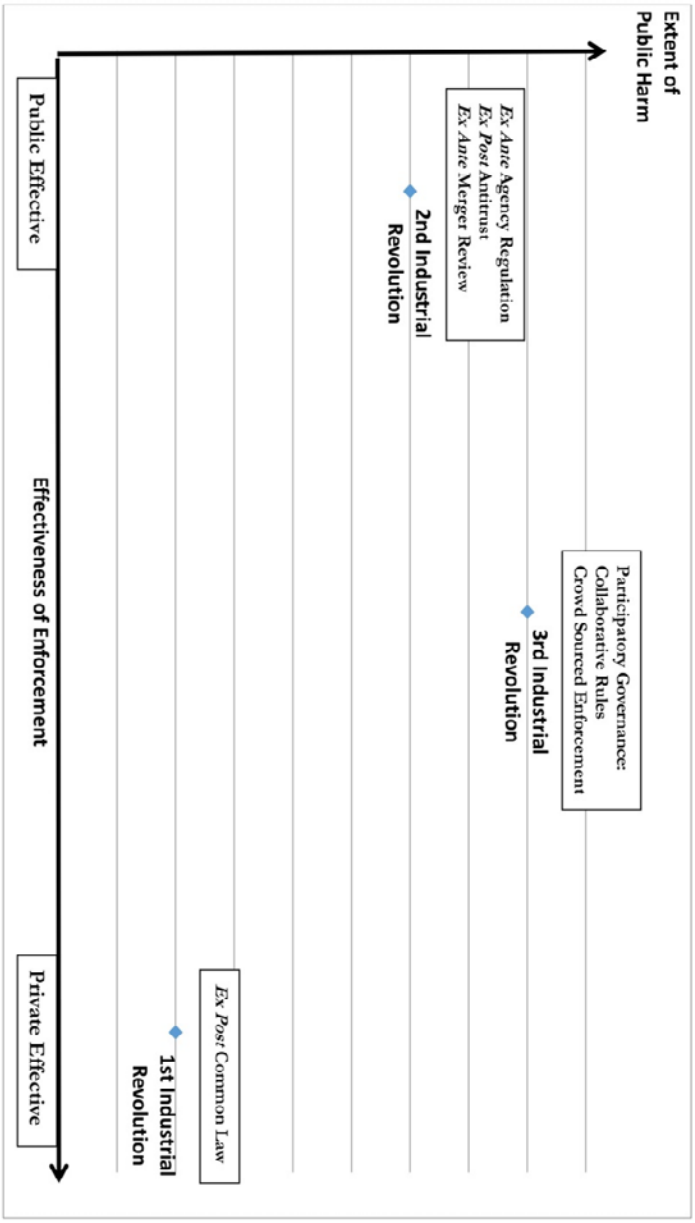


EXHIBIT I-4: ECONOMIC CONDITIONS DICTATE THE NATURE OF EFFECTIVE ENFORCEMENT



First, the importance of interconnection had grown as the division of labor became more complex, and the scope of the economy expanded. Alfred Chandler, a preeminent American economic historian, described the vital role of transportation and communications in the expansion of the economy during the Second Industrial Revolution as follows:

> But of far more importance to the expansion of the factory system was the reliability and speed of the new transportation and communication. Without a steady, all-weather flow of goods into and out of their establishments, manufacturers would have had difficulty in maintaining a permanent working force and in keeping their expensive machinery and equipment operating profitably. Moreover, the marketing revolution based on the railroad and the telegraph, by permitting manufacturers to sell directly to wholesalers, reduced requirements for working capital and the risk of having unsold goods for long periods of time in the hands of commission merchants. Reduced risks and lower credit costs encouraged further investment in plant, machinery and other fixed capital.[52]

Stone ties Chandler's observation back to Adam Smith through the important role that transportation and communications play in supporting the more complex division of labor:

> In short, the division of labor, as Adam Smith observed, is limited by the extent of the market. And the extent of the market is limited, in turn, by the speed, reliability, and cost of communications. Rapid and extensive communications, thus, radically transform production as well as distribution[.]
>
> The telegraph, in short, was not simply another new invention. Virtually every economic activity was significantly affected . . . . Although its commercial capabilities were not recognized in the nations of Europe (with the exception of Great Britain), the telegraph in the United States was, together with the railroad, critical in the development of national markets.[53]

Second, key changes in society created a need for a change in the mechanisms for enforcing the public-service principles. The ability of individuals to exercise their rights to nondiscriminatory access had been obliterated by the massive increase in size and power of the dominant owners of the means of communications and commerce.[54] The

52. ALFRED D. CHANDLER, JR., THE VISIBLE HAND: THE MANAGERIAL REVOLUTION IN AMERICAN BUSINESS 245 (1977), *cited in* STONE, *supra* note 3, at 25.

53. STONE, *supra* note 3, at 25-26.

54. *An Act to Regulate Commerce: Hearing on S. 2851 before the Senate*, 50th Cong. (1888) (statement of Sen. Shelby Cullom, Chairman, Comm. on Interstate Commerce).

suggestion that private individuals could effectively assert their rights under common-law when confronted with massive corporate power and resources, not to mention the legal expertise of the newly created corporate general counsels invented by the railroads was not very credible. As stated bluntly by the Cullum Committee Report, "[t]he Common-law fails to afford a remedy for such grievances."[55]

While the focus of attention has traditionally been on the economic factors and forces, the social bases of public-service principles should also be recognized. Important social values have been involved including provision of necessities, appropriate standards of living, the ability to participate in modern life, and equality of opportunity.[56] Universal service and consumer protection can be seen as principles that bridge the social and economic dimensions.[57] Just as the economic dimension of public service obligations expanded, the broader social values have expanded as well, underscoring the progressive nature of expanding public-service principles.

Thus, the economic costs and social injustice of the uneven enforcement of the private right to nondiscrimination that would result from massive corporations pursuing their private interests under common-law had become too great for society to tolerate. Policy turned to a broader set of multi-layered public-service principles imposed by regulation to enforce a broader right of access and achieve a higher level of integration. Simply put, the means of communications had become so important to the progress and practice of capitalism and democracy that, at the moment of ascendance of the Second Industrial Revolution, they were deemed sufficiently vital to merit both *ex ante* and *ex post* oversight that takes into consideration its "merely commercial aspect[s]" *and* its broadly sociopolitical impacts.[58]

E. The Quarter-life Crisis of the 3rd Industrial Revolution

The contemporary debate over the public-service principles and obligations of the PSTN is taking place at roughly the same point in the

55. *Id.*

56. STONE, *supra* note 3, at 24, 36.

57. *See generally* Mark N. Cooper, *Inequality In The Digital Society: Why The Digital Divide Deserves All The Attention It Gets*, 20 CARDOZO ARTS & ENT. L. J. 73 (2002); Mark Cooper, *The Digital Divide Confronts the Telecommunications Act of 1996: Economic Reality versus Public Policy*, *in* THE DIGITAL DIVIDE: FACING A CRISIS OR CREATING A MYTH? (Benjamin M. Compaine ed., 2001); Mark Cooper, *Universal Service: A Constantly Expanding Goal*, *in* NEW MILLENNIUM RESEARCH COUNCIL, CONSUMER PERSPECTIVES ON UNIVERSAL SERVICE: DO AMERICANS LOSE UNDER A CONNECTION-BASED APPROACH? 6 (2003); Mark Cooper, *Broadband in America: A Policy of Neglect is not Benign*, *in* OVERCOMING DIGITAL DIVIDES: CONSTRUCTING AN EQUITABLE AND COMPETITIVE INFORMATION SOCIETY (Enrico Ferro et al. eds., 2009).

58. Associated Press v. United States, 326 U.S. 1, 28 (1945).

lifecycle of the 3rd Industrial Revolution, as shown in Exhibit I-2 above. Digital communications have become the dominant means of communications. We are living through the quarter-life crisis of the digital revolution and we ask how it will shoulder its new responsibilities across a dozen or more important social issues. Today, we confront exactly the same questions that society grappled with in the maturation of the Second Industrial Revolution. Should public-service principles apply to the means of communications in the twenty-first century? Does it merit this close scrutiny?

History, law, economics and policy make the answer to these questions an emphatic "YES."[59] If anything, the commitment should be even stronger and the scrutiny closer in the twenty-first century political economy.

The convergence of communications and commerce, the increasing importance of communications in economic, social, and political life, and the more dynamic, interconnected nature of the digital economy means the failure of integration can impose greater harm than ever.[60] All of the key, economy-enhancing characteristics that Chandler attributes to the railroad and the telegraph in the middle of the nineteenth century certainly apply to digital communications technologies at the beginning of the twenty-first century with greater force.[61] Specifically:

- For some products that can take a purely digital form, digital technologies reduce or eliminate the need for physical distribution networks, which can cut the cost of the delivered goods and services by more than one-half.
- For many physical goods and services, digital technologies transform the production process.
- For all products, digital technologies lower transaction costs and dramatically reduce the need for inventory by ensuring

59. The consumer-friendly and citizen-friendly nature of the Internet was evident early on in its development. *See* MARK COOPER, EXPANDING THE INFORMATION AGE IN THE 1990S: A PRAGMATIC CONSUMER VIEW (1990).

60. The importance of digital technology and the digital communications revolution is widely recognized. *See* Cooper, *supra* note 17. An approach that ties this to the issue of access to infrastructure can be found in BRETT M. FRISCHMANN, INFRASTRUCTURE: THE SOCIAL VALUE OF SHARED RESOURCES (2012).

61. *See* Mark Cooper, *Structured Viral Communications: The Political Economy and Social Organization of Digital Disintermediation*, 9 J. ON TELECOMM. & HIGH TECH. L. 15 (2011); Mark Cooper, *From Wi-Fi to Wikis and Open Source: The Political Economy of Collaborative Production in the Digital Information Age*, 5 J. ON TELECOMM. & HIGH TECH. L. 125 (2006); Mark Cooper, *The Economics of Collaborative Production in the Spectrum Commons*, *in* NEW FRONTIERS IN DYNAMIC SPECTRUM ACCESS NETWORKS 379-400 (2005); Mark Cooper, Collaborative Production in Group-Forming Networks (Oct. 21, 2005) (unpublished manuscript), *available at* http://www.citi.columbia.edu/conferences/stateoftelecom/cooper.pdf.

a closer (in some cases perfect) fit between what is produced and consumed.

- Even more importantly, digital technologies empower and facilitate innovation by the users of the network on a pervasive basis, supporting a dramatic and unique transformation of the division of labor.
- Of equal or greater importance, the increase in citizen participation in political discourse made possible by the new means of communications can enrich democracy.

Because of the increasing public benefits of the seamless flow of information and data, more than in the past, the harm of failing to adhere to the public-service principles is greater and the inability of *ex post* action to remedy it is magnified. In a decentralized economy one never knows from where innovation will come or how important it will be.[62]

In a profoundly interconnected society that has become a highly recursive system, with dynamic, real-time networks, discrimination can be devastating to rapidly evolving, highly interconnected activity.[63] In digital networks, discrimination can be subtle, but potent. With a small number of critical choke points that possess a great deal of vertical leverage and the ability to extract massive rents, thereby wasting important resources, the incentive and ability to discriminate in these networks is strong.[64]

The case for the *ex ante* public service obligation is at least as strong when it comes to non-economic issues. As digital networks become the dominant means of communications and expression, the exercise of political rights becomes dependent on access to and the flow of information over those networks. Where basic rights are involved, "replacement" dictates that the right is not diminished as the medium of political discourse changes, but also expands on the new networks. In light of the importance and power of digital communications networks, I argue it makes even less sense to rely on *ex post* regulation than it did a century and a quarter ago when it was abandoned by progressive era

62. Cooper, *Structured Viral Communications*, *supra* note 61; Cooper, *From Wi-Fi to Wikis and Open Source, supra* note 61.

63. Mark Cooper, *The Importance of Open Networks in Sustaining the Digital Revolution*, *in* NET NEUTRALITY OR NET NEUTERING: SHOULD BROADBAND INTERNET SERVICES BE REGULATED 109 (Thomas M. Lenard & Randolph J. May eds., 2006); Mark N. Cooper, *Anticompetitive Problems of Closed Communications Facilities in* OPEN ARCHITECTURE AS COMMUNICATIONS POLICY: PRESERVING INTERNET FREEDOM IN THE BROADBAND ERA 155 (Mark N. Cooper ed., 2004); MARK COOPER, CABLE MERGERS AND MONOPOLIES: MARKET POWER IN DIGITAL MEDIA AND COMMUNICATIONS NETWORKS (2003).

64. *See* Mark Cooper, *Antitrust As Consumer Protection in the New Economy: Lessons from the Microsoft Case*, 52 HASTINGS L.J. 813 (2001).

policy makers.

However, in making the case for the increased importance of the public-service principles on the basis of the dynamic, recursive nature of the digital age, I also lay the foundation for arguing that the approach to imposing and enforcing the public-service principles must evolve as well.[65] More than 500 years of history teach that regulated common carriage is not synonymous with public-service principles and obligations. On the contrary, for three-quarters of the history of capitalism in the Anglo-American world, nondiscrimination was enforced by common-law, so we should be open to alternative ways of ensuring nondiscrimination in the digital economy, even though we reject the *ex post* approach.

The lesson is not that we need to impose the expert agency model exactly as it was during the Second or Third Industrial Revolutions. Rather, the lesson is that the public-service principles need to be preserved, even expanded, to support the high level of performance of a networked society and implemented with a form of regulation that best supports the functioning of the new mode of production. The form of regulation needs to fit the nature of the networks and develop as they do. The digital communications sector requires a more flexible, dynamic *ex ante* approach to ensuring the implementation of the public-service principles. Indeed, as I argue in the next section, it was a decision to replace the common carrier approach with a more flexible, less intrusive policy that created an environment that was uniquely favorable to the birth and growth digital revolution in communications.

II. PSEUDO-ACCESS COMPETITION AND UBIQUITOUS, SEAMLESS INTEGRATION OF INFRASTRUCTURE NETWORKS

As we have seen, competition (or the lack thereof) does not determine whether public-service principles govern an activity and impose obligations on service providers.[66] The state of competition is a factor that should be examined, particularly in the current policy context, where one goal of public policy is to promote competition. In this context, the question of whether public policy can simply rely on competition to ensure the principles will inevitably arise. As discussed in the next section, the 1996 amendments to the Communications Act provide specific standards for answering this question. Here I examine how access competition affected interconnection in various circumstances in several industries in the U.S.

65. Cooper, *supra* note 17, at 56.
66. STONE, *supra* note 3, at 31.

A. The Evil Empire vs. the Benevolent Despot, or something in between

The events of the early competitive period in the U.S. telephone sector are fairly well agreed upon. Their interpretation and meaning are not. Two primary theories are offered to explain the integrated, near-national monopoly that developed. In one view, it was the result of AT&T's nefarious strategy to end competition, using the promise of interconnection to convince regulators not to impose severe restraints and to later allow acquisition of the independent providers (the "Independents").[67] From the other view, AT&T saw the benefits of an integrated national monopoly and embraced a policy of natural monopoly that was consistent with the underlying economics and the public interest.[68]

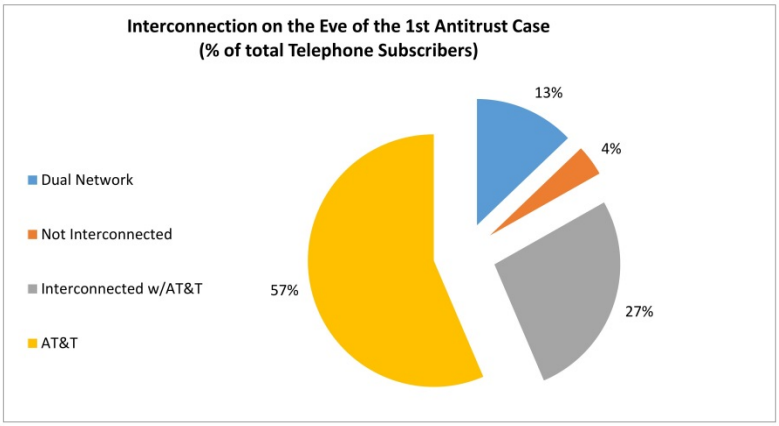
After the expiration of the Bell patents, a short intense period of construction of independent phone networks occurred, mostly in areas where AT&T did not to provide service.[69] Competition in long distance service was much weaker. As shown in Exhibit II-1, at the height of the competitive period, 'Independent' accounted for over 40% of all telephone subscribers. During this period, however, 13% of all telephone subscribers (mostly businesses) had service from dual networks.

67. *See e.g.,* SUSAN P. CRAWFORD, CAPTIVE AUDIENCE: THE TELECOM INDUSTRY AND MONOPOLY POWER IN THE NEW GILDED AGE (2014); MILTON MUELLER, UNIVERSAL SERVICE: COMPETITION, INTERCONNECTION, AND MONOPOLY IN THE MAKING OF THE AMERICAN TELEPHONE SYSTEM (1997); STONE, *supra* note 3; BREAKING UP BELL: ESSAYS ON INDUSTRIAL ORGANIZATION AND REGULATION (David S. Evans & Robert Bornholz eds., 1983).

68. *See e.g.,* CRAWFORD, *supra* note 67; STONE, *supra* note 3.

69. The beneficial effect of the expiration of the patent, which afforded open access to the underlying technology, is another example of the beneficial effect of the principle discussed in this paper. The fact that the Constitution embodies the great suspicion of monopoly both reflects the intellectual tradition of the framers and the uniquely American approach.

EXHIBIT II-1: TELEPHONE SUBSCRIPTION AND INTERCONNECTION PATTERNS IN THE COMPETITIVE ERA[70]



Initially AT&T refused to interconnect with independent networks, but as pressures mounted, they reversed course.[71] Thus, in 1900 only 4% of independent lines were interconnected; by 1905, 13% of independent phone subscribers were served by independent companies that interconnected with AT&T; by 1910, the number had risen to 53%; and, in 1920 it was 84%. The pressures came from the Independents, who needed access to a long distance network to provide service that could compete with AT&T; from local businesses, who disliked the need for dual service; and from local regulators who saw duplication as wasteful and the denial of interconnection as harmful to local interests.[72]

The dominant carrier, AT&T, agreed to interconnect as part of a strategy that intended to restrict competition.[73] The Independents had difficulty agreeing to interconnect with one another, particularly to build an independent long distance network to compete with AT&T, which would have greatly enhanced their ability to become viable, long-term competitors with AT&T.[74] Interconnection with AT&T came at a price. AT&T asserted control over quality and imposed the condition that termination of calls in areas where AT&T faced a competitor had to be on the AT&T-affiliated local exchange. In other words, AT&T used its dominant position in long distance as vertical leverage to advantage its

70. MUELLER, *supra* note 67; STONE, *supra* note 3. Percentages are calculated assuming dual networks involve subscribers to AT&T local and an independent.

71. *See infra* EXHIBIT II-2.

72. STONE, *supra* note 3, at 160.

73. *Id.* at 130-40, 179-80, 186-91, 199-204 (charting the economic difficulties of the independents and their inability to form an arrangement that would let them build a second long distance network).

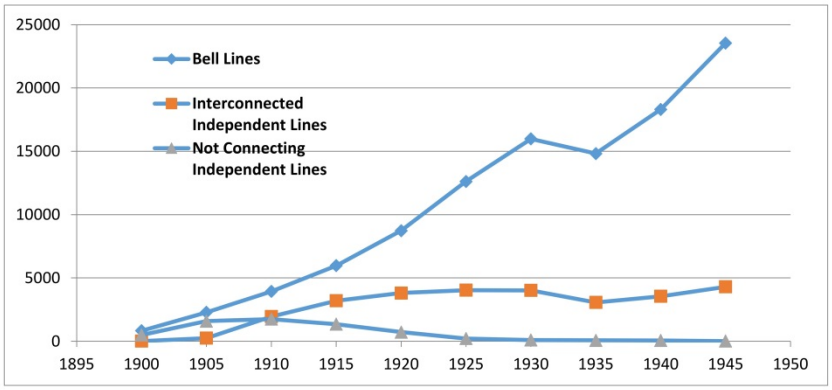
74. *Id.*

local services.[75]

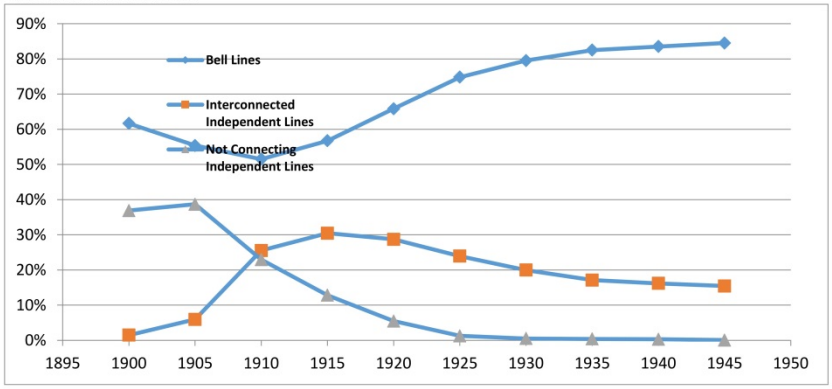
As the states grappled with the problem of lack of interconnection, federal policymakers took notice. It was during the competitive-era that state regulation was imposed on local telephone companies. One of the causes being the need for dual-service, and one of the consequences being the elimination of competition.[76] From the peak of access competition with over 40% of subscribers being to non-AT&T companies (and 55% of all service territories, since the Independents tended to serve smaller towns and rural areas) the Independents shrank to 18% by 1965.[77]

75. *Id.*
76. *Id.* at 158-64; *See infra* EXHIBIT II-3.
77. BUREAU OF THE CENSUS, *supra* note 32, at 783.

EXHIBIT II-2: INDEPENDENT LINES INTERCONNECTED WITH AT&T[78]

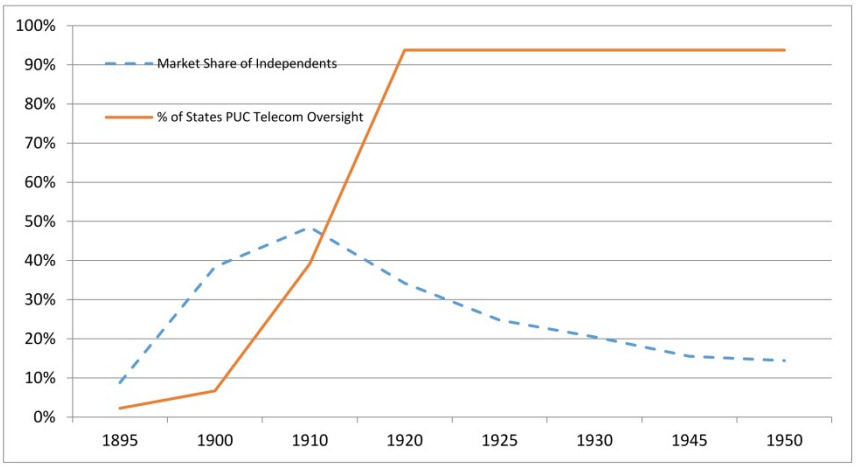


Percent of Subscribers



78. *Id.*

EXHIBIT II-3: COMPETITION AND REGULATION[79]



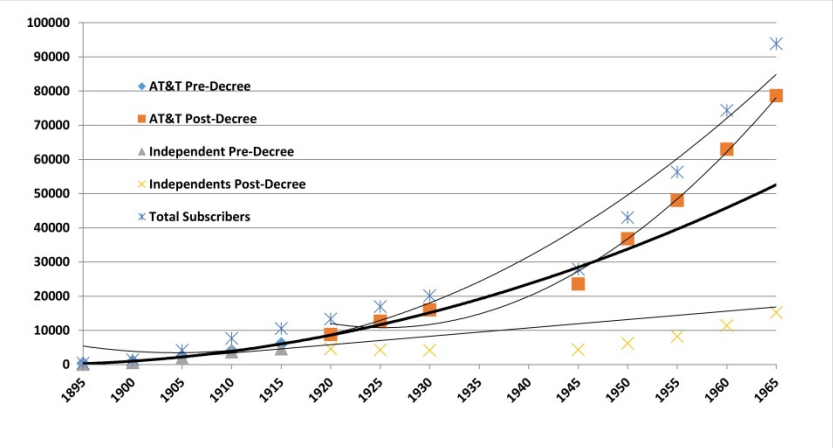
It is difficult to see much difference in the growth of subscribership between the competitive and the post-competitive periods, although the institutional changes make it difficult to sort out "causality." The co-linearity of important variables means the competing explanations persist and drive analysts toward qualitative historical accounts.[80] To be sure, the entry of Independents extended telephone service to areas where AT&T had chosen not to go but generally avoided head-to-head competition. Ultimately, growth under the monopoly models looks quite like growth during the competitive period. Competition did not affect subscription to promote universal service.

B. Pseudo-Access Competition does not Lead to Ubiquitous, Seamless Network Integration

The period of access competition did not produce interconnection. Advocates of competition argue that the problem was that there was not enough competition, so the Independents still saw their subscriber base as a source of local market power to be exploited. If there had been more competition, the theory goes, the Independents would have realized the futility of separate networks and shared the benefits of interconnecting.

79. STONE, *supra* note 3; BUREAU OF THE CENSUS, *supra* note 32, at 783.
80. *See infra* EXHIBIT II-4.

EXHIBIT II-4: SUBSCRIBER GROWTH COMPETITIVE PERIOD AND AFTER (000 SUBSCRIBERS)[81]



> The competing telephone companies, as the discussion above demonstrates, failed to interconnect because there was too little competition rather than too much competition. These companies tried to use local exchanges as strategic bottlenecks in developing telephone systems.[82]

In this theory, the competitive access approach to interconnection requires not only a sufficient number of viable competitors to eliminate the allure of exploiting the local monopoly; it also requires vertical separation between local and long distance and vigorous antitrust oversight to prevent collusion.

> Separating the exchanges from the companies (or associations) providing long distance might have fostered interconnections and prevented the Bell system from establishing a monopoly over the national telephone system. Lacking any system-building incentives, local exchanges would have had strong incentives to either interconnect with each other or interconnect with a common-long distance company. There is no reason to believe that local exchange would have foregone these opportunities for mutually advantageous trades. This policy would have maintained a quasi-competitive local exchange market and, perhaps, a quasi-competitive long-distance

81. BUREAU OF THE CENSUS, *supra* note 32, at 783.

82. Robert Bornholz, *The Early History of Competition in the Telephone Industry, in* BREAKING UP BELL: ESSAYS ON INDUSTRIAL ORGANIZATION AND REGULATION 33 (David S. Evans & Robert Bornholz eds., 1983).

> market. On the other hand, the incentive to collude between competitive local exchanges and between local exchanges and long-distance companies might have required vigilant oversight over such an industry.[83]

The question is not whether there is a range on the supply curve where marginal costs are rising, but how many competitors are sustainable when that scale has been reached. The question of economic viability of competitors becomes critical.[84] Less than a decade after the consent decree required AT&T to interconnect and provide equal access to its long distance network, the competing firms that were identified in the decree were on the brink of bankruptcy as the result of destructive competition in which rates were driven to non-compensatory levels. Those firms asked the court to lift the decree so they could merge.[85] The Independents were too small to survive, but too big to be convinced that they should give up their local market power to join an integrated national network. The policy sweet spot of access competition is extremely small and the goal of "quasi-competition" is not all that attractive.

The challenge of finding this policy sweet spot is particularly difficult where there are multiple potential sources of vertical leverage and monitoring complex behavior is particularly difficult. Not only must policy hope that minimum efficient scale will support enough competition to induce integration, but it must prevent vertical integration across a number of linked products and police collusion.

Faced with this improbable scenario in which access competition can be relied on (in part) to yield interconnection, an alternative approach is to argue that ubiquitous, seamless integration is no longer desirable. Mueller argued that demand-side economies of scale and advancing technologies change the policy terrain, as shown by his observation that integration is "no longer an unqualified good, as it may have been in the

83. *Id.*

84. MUELLER, *supra* note 67 (arguing that supply side economies of scale are less important than people thought, citing statements by industry executives and findings that marginal costs are rising. Mueller depicts the supply curve as one with only slightly rising marginal costs. However, he misses the fact that there is a wide range of production in which the average costs are falling. The important question for competition is not simply whether marginal costs are rising or falling, but whether the minimum efficient scale in the industry is small enough to support vigorous competition. If it is not, then the industry will not be vigorously competitive. He does recognize that current network economics may indicate the industry is in a range of declining cost, which makes competition difficult).

85. STONE, *supra* note 3, at 131-135 (arguing that comparative analysis of market performance in areas before, during, and after competition across time, as well as between areas with and without competition, leave the claims for the superiority of competition, at a minimum, in doubt).

era of Vail."[86] With technological change "in the present environment, it is easier to achieve various levels or gradations of compatibility and interconnection. Thus, it is unlikely that users will be confronted with the stark choice between interconnection and no interconnection they faced in the past."[87]

Underlying this alternative view of interconnection are hypotheses about technology and consumer demand.

> As fears about privacy and security grow, and technologies such as voice mail and caller ID gain popularity, one can only conclude that today's users are as interested in controlling and restricting access as they are in broadening it. To many people, the indiscriminate intrusion of a universal "information superhighway" into their home or business is about as welcome as the presence of an eight-lane interstate highway in their backyard.
>
> The typical business card today carries three or four different user addresses – one each for a telephone, a cellular phone, a fax and an electronic mail address, or a pager. There may be additional information about internal, enterprise networks. Compared to that, the advertisements of the dual service era, in which businesses had to list two different telephone numbers, seem simple. . . . Indeed, a large number of users now have two incompatible and unconnected "telephones" on their desk. One is the traditional voice telephone connected to the PSTN, the other is a computer equipped with Internet voice transmission software.
>
> It is possible that technological and institutional difference between the past and the present have tilted the social optimum away from integration and toward more tolerance of heterogeneity, fragmentation, and competition.[88]

The argument is based on several dubious assumptions. Heterogeneity and competition at the application layer does not require fragmentation at the physical layer. At the time these observations were

86. MUELLER, *supra* note 67, at 187.

87. *Id.* (one final point made by Mueller is important. He notes that the way we use the concept of universal service today is quite different that the one used by Vail in 1908, although the concept as used in 1934 is closer to contemporary usage. Mueller is right about Vail, who intended it as a commitment to interconnection, which is important. But the fact that the public service obligations of communications and transportation carriers have evolved over the course of half a millennium is not the insult that Mueller seems to think it is. Because his analysis is ahistorical, seeking to derive lessons for interconnection policy today by focusing on the short period of access competition, which lasted for only a couple of decades in a history that is approaching six hundred years, he vastly overstates its potential. The public service obligations evolve in a progressive manner over time, an evolution that has accelerated with the acceleration of technological progress. It is a fact of life, not a mistake of analysis).

88. *Id.* at 186-88.

offered, the Internet almost certainly rode on the PSTN. In that sense, they were not "incompatible and unconnected." In short order, Voice over Internet Protocol ("VOIP") rendered the two completely compatible and connected. It is the incumbents who have historically resisted interconnection and interoperability, that have blocked it on occasion, and would certainly like to change the terms and conditions of interconnection in the digital age.

The value of ubiquitous seamless integration lies in the optionality of group formation, which argues that the value of the communications network does not lie in who you did talk to, but to whom you could talk.[89] The problem is that the subgroups of consumers who would like to talk to each other are hard to know in advance, and the choices of subscribers with whom one wants to communicate may not be static. [90] With whom you want to talk may change over time. That option value has grown dramatically in the digital age and is reduced by fragmentation of networks. Designing networks that cater to individual consumer needs is difficult and would result in severe fragmentation. This ignores the transaction costs of knowing which service reaches which customers and suppliers.

The tsunami of data and the sharing of information on social media suggest that users value access a great deal more than they value restriction of access. Users would certainly like more control of their data, but they clearly want to have and use access.

C. Deregulated Network Industries do not Embrace Seamless Integration

Infrastructure network industries in other circumstances without regulated integration suggest that seamless integration is not an outcome to be expected in the marketplace.[91] The inclination to use local market

89. Reed's law is the assertion of David P. Reed that the utility of large networks, particularly social networks, can scale exponentially with the size of the network. The reason for this is that the number of possible sub-groups of network participants is $2^N - N - 1$, where N is the number of participants. This grows much more rapidly than either the number of participants, N, or the number of possible pair connections, $N(N-1)/2$ (which follows Metcalfe's law) so that even if the utility of groups available to be joined is very small on a peer-group basis, eventually the network effect of potential group membership can dominate the overall economics of the system. Reed's Law, WIKIPEDIA (Jan. 13, 2014, 7:25 PM), http://en.wikipedia.org/wiki/Reed%27s_law.

90. David Reed, *That Sneaky Exponential: Beyond Metcalfe's Law to the Power of Community Building* (Jan. 3, 2014, 10:00 PM), http://www.reed.com/dpr/locus/gfn/reedslaw.html; Cooper, *From Wi-Fi to Wikis and Open Source*, *supra* note 61, at 135.

91. *See* Mark Cooper, The Failure Of Market Fundamentalism: What Are The Issues In The ICT Sector? (Mar 20, 2009) (unpublished manuscript), *available at* http://www4.gsb.columbia.edu/rt/null?&exclusive=filemgr.download&file_id=70142&rtcontentdisposition=filename%3DCooper.pdf; Mark Cooper, *Recognizing the Limits of Markets,*

power to extract rents and undermine competition, rather than interconnect was as strong at the turn of the twenty-first century as it was at the turn of the twentieth, where deregulation in the airline and railroad industries made interline movements the first victims of deregulation; as network operators want to drive end-to-end traffic onto their networks and they develop elaborate strategies for doing so.[92] In each of the cases of deregulation, the post-deregulation industry looked nothing like the pre-deregulation competition theory predicted, yet policy makers are urged to just plow ahead, in spite of the fact that behavior contradicts the theoretical basis for deregulation.[93]

The telecommunications sector is not an exception. The reconstitution of integrated local and long distance companies through mergers by firms that also dominate wireless and have joint-ventures with their closest cable rivals bears no resemblance to the "sweet spot" that the pre-divestiture theory identified as the place where quasi-competition might produce "voluntary" integration between independent networks. Special access services, which allow competitors to interconnect with the wireline telecommunications network, have been a source of constant complaint about abuse since the industry was deregulated.[94]

The FCC has successfully asserted jurisdiction over roaming charges for wireless interconnection.[95] In the realm of interconnection, even though the FCC asserted authority to compel interconnection, the telecommunications carriers have ignored, pushed the limits of, and violated the FCC's rules in a short period of time, suggesting that, absent the public policy principles that require integration, it will not be

Rediscovering Public Interest in Utilities, *in* ELECTRIC AND NATURAL GAS BUSINESS: UNDERSTANDING IT! (Robert E. Willett ed., 2003).

92. Mark Cooper, Freeing Public Policy From The Deregulation Debate: The Airline Industry Comes Of Age (And Should Be Held Accountable For Its Anticompetitive Behavior) (Jan. 22, 1999) (unpublished manuscript), *available at* http://www.consumerfed.org/pdfs/abaair1.pdf (airlines have developed the hub and spoke structure, which was not predicted by deregulatory theory); Consumer Federation Of America, Comments of the Consumer Federation Of America On November 2008 Report Of L.R. Christensen Associates, Inc. (Comments to U.S. Surface Transportation Board, Ex Parte No. 680, Study Of Competition In The Freight Rail Industry Dec. 22, 2008), *available at* http://docs.stb.dot.gov/?sGet&Dl1YTH1WXw1zAAwFXBRSV0x6Sw1xfAQGXAIGCW4DF3wCe3cGXQsHCmYFFgkFdBJVAl9GcUsOS1FELBJGO1dES0ZcQQ0AfQADS1RfVEpdTl1VcAYEWQAFDQoBakBUK20yNjgvMy8wME00Ngw%3D (railroads have developed "paper barriers" to prevent short lines from interconnecting with multiple long-haul railroads).

93. Cooper, *supra* note 92.

94. FED. COMMC'NS COMM. FCC ISSUES COMPREHENSIVE DATA REQUEST IN SPECIAL ACCESS PROCEEDING (Sept. 19, 2011), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-309670A1.pdf.

95. The interconnection between the wireless and wireline networks has been subject to FCC authority under title III throughout.

observed.[96]

In fact, in each of these network infrastructure industries we observe a period of pseudo-access competition (quasi-competition is too strong a word).[97] Small, "mom and pop," service providers crop up in unserved areas to extend service. Head-to-head competition does not make sense to these entrants and is quite rare. Interconnection also is not attractive to them, as they guard their local monopoly as a source of potential rents.[98] In order to get going, the small entrants rely on inferior technology, offer services on non-compensatory rates, and fail to maintain their quality of service. In short order, there is a wave of bankruptcies and buyouts. Advocates of competition, ignoring economies of scale and the rigors of minimum efficient scale, wave their arms in the air and complain about the evils of concentration.

This pattern occurred in the railroads (1860s-1870s), telephone (1910s-1930s), cable industry (1970s-1990s), and cellular service (2000-2010).[99] Incumbent telecommunications carriers strangled competition where it represented a threat, as in the 'Baby Bell' approach to interconnection with the competitive local exchange carriers after the 1934 Act. To the extent there is end-to-end seamless integration of infrastructure communications networks, that is the result of mandated integration.

Ironically, a claim that an especially weak form of pseudo-access competition (especially weak because it was not head-to-head, intramodal competition but intermodal competition) would discipline market power in broadband access played a key role in leading the FCC to misclassify high-speed data transmission as an information service.[100] Pseudo-competition quickly gave way to a monopoly, or at best a cozy duopoly in access.[101] As shown in Section III, speculation about the possibility of future competition that might develop was a very weak and

96. *See generally* Mark Cooper, Broken Promises and Strangled Competition: The Record of Baby Bell Merger and Market Opening Behavior (June 2005) (unpublished manuscript), *available at* http://www.consumerfed.org/pdfs/telco_broken-promises_exec_sum.pdf.

97. CRAWFORD, *supra* note 67.

98. STONE, *supra* note 3.

99. *Id.* at 21 (noting each of the short periods of competitive access gives way to monopoly markets).

100. Rob Frieden, *From Bad to Worse: Assessing the Long-Term Consequences of Four Controversial FCC Decisions,* 77 BROOKLYN L. REV., 959, 963, 974, 999 (2012) (noting the repeated role that intermodal competition plays).

101. Consumer Fed'n of America & Consumer's Union, Lessons From 1996 Telecommunications Act: Deregulation Before Meaningful Competition Spells Consumer Disaster (Feb. 2001) (unpublished manuscript), *available at* http://consumersunion.org/pdf/lesson.pdf; Mark Cooper, The Failure of 'Intermodal Competition in Cable Markets, (Apr. 2002) (unpublished manuscript), *available at* http://www.consumerfed.org/pdfs/intercomp.20020423.pdf.

illegal basis on which to pin the future of the public-service principles of the Communications Act. Congress placed a much higher value on the principles and established a much more rigorous process to relax regulation, a process that the FCC mistakenly ignored.[102]

D. The Inadequacies of Command-and-Control Regulation to Guarantee Public-service principles in the Digital Communications Space

As noted above, the twentieth century approach to promoting the public-service principles of the communications sector relied on command-and-control regulation. Some would like to extend it, lock, stock and barrel to the twenty-first century digital network.[103] Yet, there are good reasons to believe that command-and-control regulation is not well-suited to the new mode of production. Repeating the historic pattern, new enforcement mechanisms are needed.

First, the dynamic, complex, and interconnected nature of the twenty-first century economy, particularly those sectors touched by digital technologies, makes it difficult for centralized, bureaucratic oversight to write and enforce regulation.[104] Ponderously slow-moving common carriage may have been well-suited for railroad tracks, copper wires, electricity grids, and water pipes—products which are relatively homogeneous and static—but it is ill-suited to the dynamic digital environment. Given that common carriage was the exception in the long history of public-service principles we should be open to alternative ways of ensuring nondiscrimination in the digital economy, even as we

102. 47 U.S.C. § 160 (2012) (Section 10 forbearance entails a finding about specific regulation).

103. *E.g.,* CRAWFORD, *supra* note 67.

104. *See* OFFICE OF COMMUNICATIONS (UK), IDENTIFYING APPROPRIATE REGULATORY SOLUTIONS: PRINCIPLES FOR ANALYZING SELF- AND CO-REGULATION 4 (2008), *available at* http://stakeholders.ofcom.org.uk/binaries/consultations/coregulation/statement/statement.pdf ("[I]ndustry-led approaches can play an important role in delivering regulatory objectives: these can help address an issue quickly and flexibly while benefiting from industry expertise, often at a lower cost to society than formal regulation. Timeliness and flexibility of solutions are particularly critical in fast moving, technologically complex communications markets."); Neil Gunningham, Reconfiguring Environmental Regulation: The Future Public Policy Agenda 9 (2005) (unpublished manuscript), *available at* http://www.lafollette.wisc.edu/research/environmentalpolicy/gunninghamreconfigure.pdf (quoting Daniel J. Fiorino, *Rethinking Environmental Regulation: Perspectives from Law and Governance*, 23 HARV. ENVTL. L. REV. 441, 464 (1999)) ("A common theme is that traditional regulation is not suited to meet many contemporary policy needs (although as we emphasize below, it still has a role to play), and indeed it is partly in response to the perceived shortcomings of the regulatory *status quo* . . . . 'underlying each strand in the literature is the belief that the increased complexity, dynamism, diversity, and interdependence of contemporary society makes old policy technologies and patterns of governance obsolete.'); Denis D. Hirsch, *The Law and Policy of Online Privacy: Regulation, Self-Regulation, or Co-Regulation?*, 34 SEATTLE U. L. REV. 439, 458 (2011).

reject the *ex post* approach.

The magnitude of the difference between the digital communications space and other infrastructure networks is stunning. Two analogies that are frequently made are the highway system and electricity. The former is a public sector undertaking. The latter is a regulated private utility. In the five decades from 1960 to 2010, the output of these two infrastructure industries increased by more than four-fold.[105] In contrast, the traffic flowing on the Internet has been almost doubling every year since 1996.[106] The increase in the diversity of traffic was also orders of magnitude greater than in the other network infrastructure industries as well.

Second, the legitimacy of the state to exercise authority is weakened in an increasingly complex environment, where the complexity is, in part, the result of the enrichment and growth of the communications capabilities. The command-and-control-model reflected the passive representational pattern of the nineteenth and twentieth century. The command-and-control regulation rests on the assumption of delegation of authority from a passive public to an expert agency through institutions of representative democracy. In light of the dramatic increase in communications and empowerment at the edge, the traditional approach to democratic participation has become stale. The twenty-first century citizenry is vastly more heterogeneous and active. The borderless, transnational nature of the Internet resource system compounds the problem of weakening state authority. Because information flows are so fluid and multinational, it is argued that the challenge to national authority is well beyond the typical international challenge.[107]

105. Energy Information Administration, Monthly energy Review, Table 7.2a (Feb. 2014), http://www.eia.gov/totalenergy/data/monthly/pdf/sec7_5.pdf (electricity consumption in 2010 was 5.3 times what it was in 1960); Bureau of Transportation Statistics, Table 1-40: U.S. Passenger-Miles (Millions) http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_statistics/html/table_01_40.html (vehicle miles traveled in 2010 were 3.3 times those traveled in 1960).

106. *Internet Traffic,* WIKIPEDIA (Mar. 16, 2014, 6:24 PM), http://en.wikipedia.org/wiki/Internet_traffic.

107. ELENA PAVAN, FRAMES AND CONNECTIONS IN THE GOVERNANCE OF GLOBAL COMMUNICATIONS: A NETWORK STUDY OF THE INTERNET GOVERNANCE FORUM xxix (2012) (concisely summarizing all of the issues discussed up to this point: "we are standing in an epoch of overall political uncertainty caused, in the first place, by the fact that states have to face multiple and complex issues that extend beyond the boundaries of their sovereignty and, more importantly, that require an incredibly large amount of competency to be managed adequately. This does not mean that states have lost their functions: institutions continue to be the sole agents in charge of producing policies. What changes is that they can no longer perform their functions 'behind closed doors' but, rather, find themselves forced to act within a very crowded environment, populated by a multiplicity of non-institutional actors who possess the required knowledge and the expertise for managing complex and dynamic global issues.

The above two factors involve very fundamental economic and political problems with command-and-control regulation. These have been compounded by more superficial but important factors. The traditional approach to formal notice and comment regulation was based on the belief that expert agencies could do a better job than political bodies such as legislatures in designing regulation in dealing with the day-to-day functioning of industries. Once the regulatory agency becomes politicized, it loses its advantage.[108] The model of an expert agency relied upon to implement broad goals has been undermined by the politicization of the regulatory process. Moreover, traditional regulation is not likely to work very well because the ability of the state to implement and enforce regulation has been undermined by systematic and persistent defunding of regulatory agencies.[109] Decades of anti-government and pro-market rhetoric have taken their toll. The agencies now lack the resources to do their jobs.[110] In the United States, the number of regulatory and antitrust employees per dollar of value they oversee in the economy at large and the communications sector is one-fifth the level it was in 1970.[111] Compared to profits and assets, agency budgets are less than half the level they were in 1970.[112]

None of these factors is likely to be reversed any time soon. Rather than expending a great deal of effort trying to rehabilitate an enforcement mechanism that is not likely to work very well, even if it is resurrected, public policy should embrace new approaches to advancing and enforcing the expanding set of public-service principles.

E. Expansion of Access in the 3rd Industrial Revolution: Creating

How to translate the necessity for multifactor collaboration into efficient governance arrangements remains an open question. This is particularly true in the case of information and communications matters, where technical and social aspects are both relevant and so interwoven that, when it comes to their regulation, governments have to coordinate a plurality of interests, knowledge, agendas, and priorities but often are not equipped with the necessary competencies to do so.") (internal citations omitted).

108. *See* Jo Becker & Barton Gellman, *Leaving No Tracks*, WASH. POST, June 27, 2007, at A01, *available at* http://voices.washingtonpost.com/cheney/chapters/leaving_no_tracks (suggesting that while producers complain about the involvement of public interest groups, it is certainly true that there has been a politicization of the process on both sides and industry has generally gotten the best of it, symbolized by Vice President Dick Cheney's campaign against environmental regulation in which he told his clients to "match the science").

109. *See* Mark Cooper, Crowd Sourcing Enforcement: Building a Platform for Participatory Regulation in the Digital Information Age (Feb. 12, 2010) (unpublished manuscript), *available at* http://siliconflatirons.com/documents/conferences/2011.02.13/MarkCooperPresentation.pdf.

110. *See* Mark Cooper, *The Future of Journalism: Addressing Pervasive Market Failure with Public Policy*, *in* WILL THE LAST REPORTER TURN OUT THE LIGHTS 320 (Robert W. McChesney & Victor Pickard eds., 2011).

111. Cooper, *supra* note 109.

112. *Id.*

Space Between the Market and the State

The search for a new model to advance the public-service principles without undermining the dynamic nature of the core communications resource system of the digital economy need go no further than the examples provided by the digital revolution itself. The Internet protocols and Wi-Fi are remarkable communications systems based on brutally simple obligations of interconnection and integration, open to all on a nondiscriminatory basis, supported by voluntary standards, and managed by multi-stakeholder processes that promote interoperability. A key spark is provided by a regulatory decision of guaranteed access, while a backstop of the threat of further governmental oversight ensures that access is available.

In both cases, the government had an important role in creating the environment in which an entirely new approach to communications could thrive.[113] This is a space that lies between the market and the state in the sense that the abuse of power by dominant communications companies and government regulators was held in check.

The Caterfone and the Computer Inquiries launched in the late 1960s ensured that nondiscriminatory access to the telecommunications network would extend to the flow of data and that innovation in customer premise equipment could flourish.[114] The dominant incumbent telecommunications carrier despised the idea of a decentralized communications protocol and would have quickly throttled it by denying access had it been allowed to, just as it had done a century earlier at the start of the telephone age.[115] Without decisive public policy action by the FCC, the telecommunications companies might have defeated decentralized communications altogether; they certainly would have slowed its development down and probably would have distorted its growth, if only by forcing the government to regulate the space more intensely. The voluntary action of the developers of the new communications protocol to fill the space opened by government action was a key ingredient for success. The social institutions they developed and used to manage the decentralized network for thirty years deserve

113. Cooper, *supra* note 17.

114. Robert Cannon, *Where Internet Service Providers and Telephone Companies Compete: A Guide to the Computer Inquiries, Enhanced Service Providers and Information Service Providers*, 9 COMMLAW CONSPECTUS 49 (2001).

115. JANET ABBATE, INVENTING THE INTERNET (INSIDE TECHNOLOGY) 7 (2000) (recounting the hostility of AT&T to the idea of a decentralized switching protocol in the formative period of the Internet); JOHNATHAN E. NUECHTERLEIN & PHILIP J. WEISER, DIGITAL CROSSROADS: TELECOMMUNICATIONS LAW & POLICY IN THE INTERNET AGE 23 (2013) (recounting the much more public opposition to interconnection of "foreign" equipment, long distance, and the Computer Inquiries, all of which played important parts in building the Internet).

close study and deference as candidates for the future governance structure of the communications network.

The Caterfone and the Computer Inquiries must be seen as the origin and foundation for a significant shift in the thrust of public policy with respect to the communications network. They introduce the possibility for innovation at the edge of the network as a primary driver of economic activity.[116] Once any device can connect and transmit information, individuals are free to invent new uses and applications. Functionalities that were monopolized by the network operator or, more importantly, never dreamed of by them, become possible. The critically important change is to ensure that traffic flows first and shift a heavy burden onto the network operator to show that it should not. When the broader digital revolution located an immense amount of intelligence (computational power) at the edge of the network with the personal computer, the possibilities became virtually limitless.

AT&T's desire for centralized control did not go quietly into history. It repeatedly complained that services and communications by innovators should be stopped.[117] By resisting the attempts of AT&T to burden the decentralization of innovation, the FCC established an environment in which innovation at the edge could flourish to become the driving force for economic and productivity growth.[118]

The mid-1980s spread spectrum rulemaking adopted by the FCC to allow everyone and anyone to have access to radio frequencies long considered garbage by the commercial users of the public airwaves, subject to simple rules of use, had a similar effect.[119] It ensured access to

116. TIM WU, THE MASTER SWITCH: THE RISE AND FALL OF INFORMATION EMPIRES 190-91 (2011) ("[t]he phone jack and the Caterfone decision made it possible to sell to the public devices like fax machines and competitively price (non-Bell) telephones. They also made possible the career of Dennis Hayes, a computer hobbyist ('geek' is the term of art) who, in 1977 built the first modulator/demodulator (modem) designed and priced for consumers . . . . He built, that is, the first consumer device that allowed personal computers to talk to each other, and with that you can spy the first causal relations between the federal deregulation of the 1990s and the birth of the Internet . . . with strange and unprecedented foresight, the FCC watered, fertilized, and cultivated online computer services as a special protected industry, and, over the years, ordained a set of rules called the *Computer Inquiries,* a complex regime designed both to prevent AT&T from destroying any budding firm and also to ensure that online computer services flourished unregulated. What matters so much for the fate of telecommunications and our narrative is that he infant In short, in these obscure and largely forgotten regimes, the new FCC played surrogate parent to the Internet firms.").

117. *Id.* The opposition drove the FCC to continually modify the rules written in the Computer Inquiries.

118. Stephen S. Cohen, et al., *Tools: The Drivers of E-commerce in* TRACKING A TRANSFORMATION: E-COMMERCE AND THE TERMS OF COMPETITION IN INDUSTRIES 3 (Stephen S. Cohen, et al. eds., 2001); François Bar, *The Construction of Marketplace Architecture*, *in* TRACKING A TRANSFORMATION: E-COMMERCE AND THE TERMS OF COMPETITION IN INDUSTRIES 27 (Stephen S. Cohen, et al. eds., 2001).

119. Mark Cooper, Governing the Spectrum Commons: A Framework for Rules Based on Principles of Common-Pool Resource Management (Mar. 2, 2006) (unpublished manuscript),

an irreplaceable, raw communications resource in the most deregulatory, free market approach imaginable, unlicensed, universal access. The private sector concluded, to its credit, that a common communications protocol would expand the market and the best approach was to create voluntary institutions to adopt and defend those standards.[120] Had they not done so, there is a good chance that the government would have stepped in to ensure interoperability, with rules that would have been significantly less friendly to innovation, entrepreneurship, and consumers.

In both cases, the rules were structured in such a way that the government did not have to get involved in the day-to-day regulation of behavior. In both cases, because of the deregulatory age in which these decisions were made, the presumption was shifted in favor of the freedom to act. The incumbent network operators had to show that devices would harm the network, or data traffic should not be allowed to flow, which they rarely, if ever were able to show.

For three decades encompassing the birth, childhood and adolescence of the digital communications revolution, Internet traffic flowed freely over the telecommunications network (free as in speech, not as in beer) under the Computer Inquiries to devices that were made possible by the Carter phone decision. Shifting to an approach that offered *ex ante* freedom and required the powerful incumbent to prove *ex post* harm to the network, rather than requiring the entrants to show *ex ante* they would do no harm (by offering a simple certification standard and process) is a key pillar on which future interconnection policy should stand.

The model worked precisely because it was located between the market and the state. The state used its power to create a space that was free from the worst instincts of both the market and the state, and the private actors who wanted to enter that space realized that they needed to regulate themselves in a manner consistent with the principle of nondiscrimination, which they equated with interoperability.

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available at http://cyberlaw.stanford.edu/attachments/GOVERNING%20THE%20SPECTRUM%20COMMONS.pdf; Mark Cooper, Efficiency Gains and Consumer Benefits of Unlicensed Access to the Public Airwaves: the Dramatic Success of Combining Market Principles and Shared Access (Jan. 2012) (unpublished manuscript), *available at* http://www.markcooperresearch.com/SharedSpectrumAnalysis.pdf; Comments Of The Consumer Fed'n Of Am., to *Notice of Proposed Rulemaking* in Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auction, 27 FCC Rcd. 12,357 (Jan. 25, 2013), *available at* http://apps.fcc.gov/ecfs/document/view?id=7022112311.

120. Cooper, Efficiency Gains and Consumer Benefits of Unlicensed Access to the Public Airwaves, *supra* note 119**;** Kai Jakobs, et al., *Creating a Wireless LAN Standard: IEEE 802.11*, *in* THE INNOVATION JOURNEY OF WI-FI: THE ROAD TO GLOBAL SUCCESS 53 (Wolter Lemstra, et al. eds. 2011).

Unlike the Internet and the Wi-Fi communities, which engaged in vigorous and effective voluntary self-organizing efforts to develop protocols and processes to keep their respective spaces open,[121] the telecommunications infrastructure network operators had the opportunity after the Cable Modem Order with the declaration of the four Internet freedoms, and again after the Wireline Broadband Order, and the Network Neutrality Order to follow the model of the IP-community and the Wi-Fi-community.[122] They could have filled the space opened by the Cable Modem and Wireline Broadband Orders with a vigorous voluntary process to demonstrate a commitment to the four freedoms. They failed utterly to do so, immediately attacking and infringing the principles.[123] History repeats itself; incumbent network operators have never willingly conceded constraints on their market power in half a millennium. Forced to operate networks in an open access manner, they make the most of it, but they do not create such networks. Open spaces like the Internet and Wi-Fi protocols are the meat and potatoes of new entrants and entrepreneurs but anathema to entrenched network incumbents.

The flexible, multi-stakeholder approach to implementing public-service principles that are well-defined in statutes is a challenging process but one that has proven successful and holds much greater potential for success than the alternatives. This approach has been embraced broadly by the Internet community and important policymakers. Exhibit II-5—drawn from an OECD policy Communiqué that U.S. authorities helped to develop and have embraced—reflects the importance of the public-service principles, the vital role that the state plays in implementing the principles, and also the desire to have voluntary, multi-stakeholder processes accomplish as much of the goals as possible. The key observation here is that striving to use flexible, civil society processes as much as possible does not require one to disavow the importance of the role of the state in defining and defending the public-service principles.

121. *See* Robert E. Kahn & Vinton G. Cerf, *What is the Internet (and what makes it work)?, in* OPEN ARCHITECTURE AS COMMUNICATIONS POLICY: PRESERVING INTERNET FREEDOM IN THE BROADBAND ERA 17 (Mark N. Cooper ed., 2004).

122. *See* Cooper, Efficiency Gains and Consumer Benefits of Unlicensed Access to the Public Airwaves, *supra* note 119; Jakobs*, supra* note 120.

123. The best indication of this behavior is the constant litigation of FCC efforts to implement the orders. Comcast Corp. v. Fed. Commc'ns Comm'n, 600 F.3d 642 (D.C. Cir. 2010); Verizon v. Fed. Commc'ns Comm'n, 740 F.3d 623 (D.C. Cir. 2014).

EXHIBIT II-5: PUBLIC-SERVICE PRINCIPLES IN THE GLOBAL CONTEXT: OECD COMMUNIQUÉ ON PRINCIPLES FOR INTERNET POLICY-MAKING[124]

We recognised the essential contribution of stakeholders, including business, civil society, the Internet technical community and academic institutions, to the ongoing development of the Internet and the enrichment of society using the Internet….

We emphasised that, in certain cases, public support and investment may be needed to ensure the greatest practical availability of these networks in our countries, in particular in rural and remote areas, and that such public intervention should support market competition and promote private investment initiatives…

The roles, openness, and competencies of the global multi-stakeholder institutions that govern standards for different layers of Internet components should be recognised and their contribution should be sought on the different technical elements of public policy objectives. Maintaining technology neutrality and appropriate quality for all Internet services is also important to ensure an open and dynamic Internet environment. Provision of open Internet access services is critical for the Internet economy…

Suppliers should have the ability to supply services over the Internet on a cross-border and technologically neutral basis in a manner that promotes interoperability of services and technologies, where appropriate. Users should have the ability to access and generate lawful content and run applications of their choice. To ensure cost effectiveness and other efficiencies, other barriers to the location, access and use of cross-border data facilities and functions should be minimised, providing that appropriate data protection and security measures are implemented in a manner consistent with the relevant OECD Guidelines…

Governments may be able to achieve certain policy goals through flexible, adaptive means by encouraging, facilitating and supporting the development of codes of conduct that are supported by effective accountability mechanisms… Such co-operative efforts should be balanced and consistent with the applicable legal framework and where those co-operative efforts are not forthcoming, other policy options consistent with these principles should be considered in consultation with relevant stakeholders…

Strong privacy protection is critical to ensuring that the Internet fulfills its social and economic potential. Current privacy challenges are likely to become more acute as the economy and society depends more heavily on broadened and innovative uses of personal information that can be more easily gathered, stored, and analysed… Privacy rules should be based on globally recognised principles, such as the OECD privacy guidelines, and governments should work to achieve global interoperability by extending mutual recognition of laws that achieve the same objectives. Cross-border enforcement co-operation will further protect privacy and promote innovation. Privacy rules should also consider the fundamental rights of others in society including rights to freedom of speech, freedom of the press, and an open and transparent government.

Low barriers to entry enabled by the open platform nature of the Internet environment have been crucial to online creativity and innovation. Policies and practices should continue to encourage and promote an Internet environment which is conducive to launching creative and innovative technologies, businesses, and other endeavours that respect recognised legal rights without having to obtain permission or affirmative co-operation from established service providers.

Encouraging investment and innovation in the Internet marketplace requires clearly defined legal rights and a robust and fair process to protect those rights, including users' rights, consistent with the need of governments to enforce applicable law. It is important in this regard that governments, industry and civil society work together to foster respect for the law and protect fundamental rights. Sufficient government enforcement resources and industry co-operation should also be available to ensure that Internet-based activities comply with law. Current legislative and regulatory provisions could be reviewed to ensure that they can be effectively enforced and are consistent with fundamental rights.

III. THE LEGAL FOUNDATION FOR PUBLIC-SERVICE PRINCIPLES TO GOVERN THE DIGITAL COMMUNICATIONS NETWORK

This section shows that the FCC has the tools to maintain and advance the public-service principles of the communications network as it transitions from twentieth century time-division multiplexing switching facilities to twenty-first century Internet protocol ("IP") switching facilities. Its ability to maintain and advance these principles has been made more difficult by an initial decision that appears to have placed its authority to implement the Communications Act for advanced

124. THE ORGANISATION FOR ECON. CO-OPERATION & DEV., COMMUNIQUÉ ON PRINCIPLES FOR INTERNET POLICY-MAKING (2011), *available at* http://www.oecd.org/internet/innovation/48289796.pdf.

telecommunications services in doubt, but that is a reversible error.[125]

The FCC ended up in the wrong place because it took the wrong approach to a narrow consideration of only one of the public service obligations of telecommunications carriers. Consideration of the full range of issues and the full body of evidence demonstrates that there is strong legal, historical, policy, technological, and economic evidence to support the classification of high-speed data transmission as a telecommunications service. Thus, when considering the full range of policy issues raised by the petitions to sunset the PSTN, classifying high-speed data transmission would not be a matter of "reclassifying" high-speed data transmission as a telecommunications service; it is more a correction of its partial misclassification as an information service.

A. Advanced Telecommunications Services are Telecommunications Services that are Governed by the Public-service principles of the Act

As noted above, the goals of the 1934 Act, referred to as the public-service principles or public interest obligations of telecommunications carriers include integration (nondiscriminatory interconnection and carriage), universal service, public safety, access for people with disabilities, consumer protection, and protection of consumer privacy.[126] The goals are stated in the first sentence of the Communications Act, and the statute links those goals directly to the tools for achieving them, which are laid out in Titles II and III. In these subsequent Titles, Congress not only defined the public interest goals with precision, it also identified the specific tools and procedures that the Commission should use to accomplish them. The Telecommunications Act of 1996 reaffirmed the commitment to these goals and strengthened them in several ways.

AT&T's petition to sunset the PSTN reveals the fundamental flaw in the approach taken by the FCC to the definition of services since the passage of the Telecommunications Act of 1996. In updating the 1934 Act, Congress embraced the framing of the definition of services and the approach to regulation that had been developed by the FCC and the courts over the previous quarter of a century. Congress explicitly intended for the public-service principles to apply to the evolving telecommunications environment by defining telecommunications services, "regardless of the facilities used" to deliver service to the public.[127]

125. Mark Cooper, Handicapping the Next Network Neutrality Court Case, Address before National Association of Regulatory Utility Commissioners (July 19, 2010).

126. *See supra* EXHIBITS I-1, I-2, I-3.

127. Brief of Petitioner at 17, Brand X Internet Servs. v. Fed. Commc'ns Comm'n, 345

In affirming and expanding the commitment to universal service, Congress stated that "the Joint Board and the Commission shall base policies for the preservation and advancement of universals service on the following principles."[128] Among these was access to advanced telecommunications and information services.[129] The definitions clause of the Universal Service section declares that "[u]niversal service is an evolving level of telecommunications services that the Commission shall establish periodically under this section, taking into account advances in telecommunications and information technologies and services."[130] The next section, entitled "Access by persons with disabilities," was tied to this definition of telecommunications services.

The close fit between the language of the statue and the underlying technology led the court in the initial test of the definition of telecommunications service applied to cable modem service to conclude that, as a matter of law and policy, high-speed data transmission is clearly a telecommunications service, stating:

> Among its broad reforms, the Telecommunications Act of 1996 enacted a competitive principle embodied by the dual duties of nondiscrimination and interconnection. See 47 U.S.C. § 201 (a) . . . § 251 (1) . . . . Together, these provisions mandate a network architecture that prioritizes consumer choice, demonstrated by vigorous competition among telecommunications carriers. As applied to the Internet, Portland calls it "open access," while AT&T dysphemizes it as "forced access." Under the Communications Act, this principle of telecommunication common carriage governs cable broadband as it does other means of Internet transmission such as telephone service and DSL, "regardless of the facilities used." 47 U.S.C. § 153(46). The Internet's protocols themselves manifest a related principle called "end-to-end": control lies at the ends of the network where the users are, leaving a simple network that is neutral with respect to the data it transmits, like any common carrier. On this the role of the Internet, the codes of the legislator and the programmer agree.[131]

F.3d 1120 (9th Cir. 2003) (Nos. 02-70518, 02-70684, 02-70685, 02-70686, 02-70879, 02-71425 and 02-72251), 2002 WL 32191908, at *14 (quoted in Earl W. Comstock & John W. Butler, *Access Denied: The FCC's Failure to Implement Open Access to Cable as Required by the Communications Act* in OPEN ARCHITECTURE AS COMMUNICATIONS POLICY: PRESERVING INTERNET FREEDOM IN THE BROADBAND ERA 283, 304 (Mark N. Cooper ed., 2004)).

128. 47 U.S.C. § 254(b) (2012).

129. *Id.* at (b)(2).

130. *Id.* at (c)(1).

131. Am. Telephone &Telegraph Corp. v. Portland, 216 F.3d 871, 879 (9th Cir. 2000).

B. Providing for Forbearance from Regulation

The Telecommunications Act allowed the Commission to forebear from applying specific rules in specific circumstances, if it found that those rules were no longer necessary in the public interest to accomplish the goals of the Act.[132] It never contemplated that the Commission would give up its authority to adopt policies to achieve the goals. Yet that is exactly what has happened because the Commission mishandled the distinction between information services and the telecommunications facilities that communications carriers use to deliver those services to the public for a fee.[133]

In outlining the conditions under which the FCC could forbear from regulation, Congress was precise and identified the public-service principles as touchstones. The statute requires the Commission to ensure that key public-service principles will be protected. It invokes the key nondiscrimination and consumer protection language from section 201, as well as a broader concern about consumer protection, as the following language from the statue makes clear:

> (a) REGULATORY FLEXIBILITY- Notwithstanding section 332(c)(1)(A) of this Act, the Commission shall forbear from applying any regulation or any provision of this Act to a telecommunications carrier or telecommunications service, or class of telecommunications carriers or telecommunications services, in any or some of its or their geographic markets, if the Commission determines that—
>
> (1) enforcement of such regulation or provision is not necessary to ensure that the charges, practices, classifications, or regulations by, for, or in connection with that telecommunications carrier or telecommunications service are just and reasonable and are not unjustly or unreasonably discriminatory;
>
> (2) enforcement of such regulation or provision is not necessary for the protection of consumers; and
>
> (3) forbearance from applying such provision or regulation is consistent with the public interest.
>
> (b) COMPETITIVE EFFECT TO BE WEIGHED- In making the determination under subsection (a)(3), the Commission shall consider whether forbearance from enforcing the provision or regulation will promote competitive market conditions, including the extent to which such forbearance will enhance competition among providers of telecommunications services. If the Commission determines that such

132. 47 U.S.C. § 205 (2012).
133. *Id.*

> forbearance will promote competition among providers of telecommunications services, that determination may be the basis for a Commission finding that forbearance is in the public interest.
>
> . . .
>
> (d) LIMITATION- Except as provided in section 251(f), the Commission may not forbear from applying the requirements of section 251(c) or 271 under subsection (a) of this section.[134]

This framing very carefully and explicitly separates the public-service principles from the competitive aspirations of the Act. Subsection (b) allows the promotion of competition to meet subsection (a)(3), but subsections (a)(1) and (a)(2) must also be met. Moreover, there are some provisions that are not subject to forbearance.

EXHIBIT III-1: THE HISTORY OF A CLOSE CALL, THE REGULATORY AND JUDICIAL TREATMENT OF MASS-MARKET, HIGH-SPEED DATA TRANSMISSION SERVICE HAS BEEN UP IN THE AIR FOR OVER A DECADE

Year	Event	Implications for Current Classification Review
1998	Stevens Report	Ambiguous on Classification
1998	Public Interest Groups Petition for Title II Classification	Need for Nondiscrimination demonstrated
2000	Portland v. AT&T Cable: 9th Circuit Court of Appeals finds cable modem service involves telecommunications is subject to Title II	Title II Classification asserted
2000	FTC imposes commercial access condition on AOL-Time Warner	Concern about bottleneck provider expressed
2002	FCC issues Cable Modem Declaratory Order classifying Cable modem service as an information (not telecommunications) service.	Classified Information Service; Title I Authority Asserted, Need to address Communications Act principles affirmed
2003	Brand X v. FCC – 9th Circuit Court of Appeals affirms its Portland v. AT&T and overturns Cable Modem order	Information Service rejected; telecommunications affirmed
2004	Chairman Powell declares Four Internet Freedoms	Importance of Non-discrimination, Consumer protection affirmed
2005	FCC uses Title II authority to investigate undue discrimination by Madison River	Importance of Non-discrimination affirmed
2005	Supreme Court reverses 9th Circuit (6-3) on procedural grounds and upholds FCC information service classification	Information service upheld, Justices debate Title I authority
2005	FCC extends the Information service definition to mass market, high-speed data transmission services offered by telephone companies.	Title I authority claimed; Need to address Communications Act principles affirmed
2005	FCC turns Four Internet Freedoms into a policy statement	Importance of Non-discrimination, Consumer protection affirmed
2006	AT&T agrees to network neutrality Bell South merger condition	Ability to distinguish service demonstrated
2007	FCC finds Comcast illegally discriminated against peer-to-peer applications.	Need for non-discrimination affirmed Technical ability to offer separate services demonstrated
2010	Open Internet Proceeding initiated	Need for Non-discrimination stated, Title I authority asserted
2010	National Broadband Plan	Importance of Communications Act principles affirmed Failure to achieve Communications Act goals documented
2010	D.C. Appeals Court overturns FCC action against Comcast	Title I authority questioned
2010	Broadband Internet Access Notice of Inquiry	Recognizes important of all Communications Act principles Documents failure to achieve goals of the Act.

C. The Tortuous Route to Misclassification of High-speed data Transmission

The strong continuity of the 1996 Act and the regulatory framework that had developed over the quarter century before the amendments to the 1934 Act were adopted provides an important context for the tortuous

134. *Id*. at § 160.

route that the FCC took to the misclassification of high-speed data transmission as an information service. As shown in Exhibit III-1, the classification of mass market, high-speed data transmission service has been up in the air for over a decade.

To begin with, the definition of high-speed data transmission service as an information service rested on a theory of "contamination," i.e., that the combination of telecommunications and information services in a "bundle" turns the whole bundle into an information service. This was a reversal of long-standing Commission policy and the regulatory structure that provided the model for the 1996 Act.[135] Previously, the presence of telecommunications in the bundle created a telecommunications service.

The issue was first litigated before the Ninth Circuit Court of Appeals in 1999, in *Portland v. AT&T*, when Portland attempted to impose conditions of nondiscrimination on cable modem service.[136] The court concluded that the underlying service was a telecommunications service, which should be subject to the nondiscrimination provisions of the Telecommunications Act.[137] Later that year, the Federal Trade Commission imposed open access requirements on Time Warner as a condition of approving the AOL-Time Warner merger.[138] In 2002, the FCC issued its Cable Modem declaratory ruling, which declared it an information service, in contradiction to the Ninth Circuit decision.[139] Brand X, a small, non-facilities based Internet Service Provider (ISP), appealed the ruling to the Ninth Circuit, which affirmed its earlier conclusion, that the high-speed data transmission is a telecommunications component of the service.[140]

While the Supreme Court review of *Brand X v. AT&T* was pending, the FCC engaged in two acts that seemed intended to quiet fears that classifying high-speed data transmission would undermine the principle of nondiscrimination in telecommunications. First, then FCC Chairman Michael Powell, a vigorous defender of the information service classification, declared that there were four Internet freedoms that should be preserved.[141] They cover several of the public-service principles,

135. Brief of Petitioner, *supra* note 127.

136. AT&T Corp. v. Portland, 216 F.3d 971 (9th Cir. 2000).

137. 47 U.S.C. § 151 et seq. (2013).

138. Press Release, Fed. Trade Comm'n, FTC Approves AOL/Time Warner Merger with Conditions: Competitive Concerns Addressed Through Open Access and Interactive Television Provisions, DSL Marketing Requirements,
(Dec. 14, 2000), *available at* http://www.ftc.gov/news-events/press-releases/2000/12/ftc-approves-aoltime-warner-merger-conditions.

139. Concerning High-Speed Access to the Internet Over Cable And Other Facilities, *Declaratory Ruling & Notice of Proposed Rulemaking*, 17 FCC Rcd. 4798 (Mar. 14, 2002).

140. Nat'l Cable & Telecomms. Ass'n v. Brand X Internet Servs., 545 U.S. 967 (2005).

141. Michael K. Powell, *Preserving Internet Freedom: Guiding Principles for the*

including integration (ability to connect devices, access content and use applications) and consumer protection (obtaining service plan information).[142] These were later turned into a policy statement of the Commission and were proposed as part of a new Open Internet rule.[143] Second, the FCC brought an enforcement action against a small telephone company for blocking VOIP, an Internet application that competed with its voice service.[144] In the consent decree, Title II authority was invoked twice—section 201(a) in the introduction and section 208 in the body of the consent decree. In other words, three weeks before the oral argument in the *Brand X* case and less than four months before the ruling, the FCC was using its Title II authority to prevent undue discrimination in access to the telecommunications network. Two years later, the FCC found that a cable operator had violated the nondiscrimination policy of the Commission.[145]

A 6-3 Supreme Court split reversed the Ninth Circuit and upheld the FCC's definition of high-speed data transmission as an information service, based on purely procedural grounds, concluding the agency should be afforded *Chevron* deference in an ambiguous situation.[146]

The reversal of the Ninth Circuit ruling was even a closer call than the math indicates. In his concurrence Justice Breyer emphasized the closeness of the decision saying "I join the Court's opinion because I believe that the FCC's decision falls within the scope of its statutorily delegated authority—though perhaps just barely."[147]

The dialogue between the Justices foreshadowed the controversy that continues to this day. While defending agency discretion, Justice Breyer went on to point out that agency discretion might not apply in cases where "Congress may have intended not to leave the matter of a particular interpretation up to the agency, irrespective of the procedure the agency uses to arrive at that interpretation, say, where an unusually basic legal question is at issue."[148] In a second concurrence Justice Stevens pointed out that overturning an Appeals Court for second-guessing the agency "would not necessarily be applicable to a decision

Industry, 3 J. ON TELECOMM. & HIGH TECH. L. 5 (2004).

142. *Id.*

143. Appropriate Framework for Broadband Access to the Internet over Wireline Facilities, *Policy Statement*, 20 FCC Rcd. 14,986 (2005), *available at* http://fjallfoss.fcc.gov/edocs_public/attachmatch/FCC-05-151A1.pdf.

144. Madison River Commc'ns, *Order*, 20 FCC Rcd. 4,295 (2005).

145. Formal Complaint of Free Press and Public Knowledge Against Comcast Corporation for Secretly Degrading Peer-to-Peer Applications, *Memorandum Opinion and Order*, 12 FCC Rcd. 13,028 (2008).

146. Nat'l Cable & Telecomms. Ass'n v. Brand X Internet Servs., 545 U.S. 967, 1003 (2005).

147. *Id.* (Breyer, J., concurring).

148. *Id.* at 1004.

by this Court that would presumably remove any pre-existing ambiguity."[149] Substance trumps process. If the Court's interpretation of a law clears up the ambiguity in a way that supported the Appeals court, it would not be bound to overturn the Appeals Court on procedural grounds. The nature of the underlying law and the nature and the extent of the ambiguity are critical considerations.

Scalia's dissent argued the substance and reached a conclusion that supported the Ninth Circuit. "After all is said and done, after all the regulatory cant has been translated, and the smoke of agency expertise blown away, it remains perfectly clear that someone who sells cable-modem service is 'offering' telecommunications. For that simple reason . . . I would affirm the Court of Appeals."[150] Most telling, however, was the exchange between Scalia and Thomas, first at oral argument and then in Scalia's dissent. He took special issue with the suggestion by the FCC and the majority that Title I authority could be used to replace the Title II authority that had been abandoned with the decision to classify the service as a Title I service.

> In other words, what the Commission hath given, the Commission may well take away–unless it doesn't. This is a wonderful illustration of how an experienced agency can (with some assistance from credulous courts) turn statutory constraints into bureaucratic discretions. The main source of the Commission's regulatory authority over common carriers is Title II, but the Commission has rendered that inapplicable in this instance by concluding that the definition of "telecommunications service" is ambiguous and does not (in its current view) apply to cable-modem service. It contemplates, however, altering that (unnecessary) outcome, not by changing the law (i.e., its construction of the Title II definitions), but by reserving the right to change the facts. Under its undefined and sparingly used "ancillary" powers, the Commission might conclude that it can order cable companies to "unbundle" the telecommunications component of cable-modem service. And presto, Title II will then apply to them, because they will finally be "offering" telecommunications service! Of course, the Commission will still have the statutory power to forbear from regulating them under section 160 (which it has already tentatively concluded it would do). Such Möbius-strip reasoning mocks the principle that the statute constrains the agency in any meaningful way.[151]

The decision to classify mass market, high-speed service as an information service was premature, based on a very short period of

149. *Id.* at 1003 (Stevens, J., concurring).
150. *Id.* at 1014 (Scalia, J., dissenting).
151. *Id.* at 1013-14.

experience with service. Both of the orders that classified mass market, high-speed data transmission service presumed that the FCC had adequate authority, ancillary to it general authority under Title I of the Act to implement the policies necessary to carry out the purposes of the Act and both orders affirmed that policy was necessary, although they devoted almost no attention to those policies.[152]

At every key point in the regulatory and judicial process, the FCC asserted that it needed and had the authority to implement policies to promote the Communications Act's goals under both Title I and Title II.[153] The assumption repeatedly made by the Commission, that it would be able to exercise substantial "ancillary" authority under Title I to accomplish the goals provided for in Titles II and III has also now been called into question.

The National Broadband Plan affirmed the urgent need for policy,[154] which the D.C. Circuit Court decision calls into question by threatening the agency's authority.[155] At the same time, the technological and economic assumptions on which the information service classification rested no longer apply, if ever they did.

Because those proceedings involved only one of the many important public obligations in Title II, the Commission never thoroughly vetted the full range of implications of the definitional exercise for universal service, public safety, and consumer protection—not to mention innovation at the edge. It recognized that there could be important implications of its actions and launched proceedings to consider them, but it implemented the definitions without ever completing those

152. Appropriate Framework for Broadband Access to the Internet Over Wireline Facilities, *Report & Order & Notice of Proposed Rulemaking,* 20 FCC Rcd. 14,853, 14,885-94 (2005); Inquiry Concerning High-Speed Access to the Internet Over Cable and Other Facilities, *Declaratory Ruling & Notice of Proposed Rulemaking,* 17 FCC Rcd. 4,798, 4,841-43 (2002).

153. Statement of Chairman Michael Powell (Mar. 14, 2002) ("The Commission is not left powerless to protect the public interest by classifying cable modem service as an information service. Congress invested the Commission with ample authority under Title I. That provision has been invoked consistently by the Commission to guard against public interest harms and anti-competitive results. It was this Commission that promulgated *Computer I, Computer II and, Computer III,* (all under Title I) in an effort to protect against public interest harms, all with the blessing of judicial review and court sanction of its ancillary authority. Additionally, Title VI is a direct progeny of the Commission's assertion of jurisdiction over cable services under its Title I authority and has regulated cable extensively for a number of years under that authority. This exercise, too, was approved by the Supreme Court as within the congressional scheme. There is no basis to conclude that Title I is inadequate to strike the right regulatory balance. The Commission's willingness to ask searching questions about competitive access, universal service and other important policy issues demonstrates its commitment to explore, evaluate and make responsible judgments about the regulatory framework.").

154. FED. COMMC'NS COMM'N, CONNECTING AMERICA: THE NATIONAL BROADBAND PLAN (2010), *available at* http://download.broadband.gov/plan/national-broadband-plan.pdf.

155. Verizon v. Fed. Commc'ns Comm'n, 740 F.3d 623 (D.C. Cir. 2014).

inquiries. With the AT&T petition to sunset the PSTN and Verizon's unilateral decision to abandon it, the Commission is forced to confront all of the implications of its actions that it never addressed in classifying high-speed data transmission as an information service.

When the full range of public-service principles and the explicit language of the Telecommunications Act are considered, classification of high-speed data transmission is consistent with the long-standing practice and with the intent of Congress. It clears up ambiguity introduced by the FCC, not the underlying statutory language. On the basis of history, law, and policy, high-speed data transmission should be classified as a telecommunications service. Technology and economics also contradict the FCC's misclassification of high-speed data transmission as an information service.

D. The Technology and Economic Evidence Indicate that the Assumptions on Which the FCC Based its Classification are Questionable at Best

The Supreme Court found that the statute was ambiguous and the technologic situation very complex. It concluded the Ninth Circuit Appeals Court, which had twice decided that high-speed data transmission is a telecommunications service that should be subject to Title II, should not second guess the expert agency.

However, developments since that time suggest that the decision was premature and not well grounded. The Title I information service classification was reached by the agency based on a hearing record that was completed in 2000, just four years after the passage of the Telecommunications Act of 1996 and well before mass market, high-speed data transmission service had penetrated widely in the marketplace. As the service penetrated and the market developed, the fundamental technological and economic assumptions on which the decision was based proved to be wrong, as summarized in Exhibit III-2. By the time the first dispute under the information service classification reached the D. C. Circuit, the underlying assumptions that the FCC has used had already proven to be incorrect.

The argument that high-speed data transmission is so intimately intertwined with applications and content that it could not be treated separately never rested on solid ground and recent developments on both the supply and the demand sides make it clear that bundling of data transmission and services has no compelling technological underpinning. It is a strategy to avoid regulation and a marketing strategy to maximize market power and extract consumer surplus.

EXHIBIT III-2: TECHNOLOGICAL AND ECONOMIC UNCERTAINTY HAVE BEEN REDUCED, IF NOT ELIMINATED

Supply-side

Historically, the FCC had made just such a distinction for over three decades under the Computer Inquiries. The telephone companies had no difficulty making high-speed data transmission available on a stand alone basis, primarily to the enterprise market (T-1 service) and continue to do so.

In the years after the cable modem order hundreds of small telephone companies offered plain vanilla high speed data transmission services to their mass market customers for a fee separate for applications and content and continue to do so.

AT&T agreed to network neutrality provisions that rested on a technological definition that it could easily implement. Indeed, as part of its agreement, it distinguished specific services for which it wanted the ability to prioritize traffic, thereby affirming the distinction between the underlying transmission of data and the service.

In the BitTorrent case Comcast demonstrated the ability to distinguish transmission from applications by singling out a specific application for discriminatory treatment and, when pressed, quickly came up with a nondiscriminatory alternative.

Independent third party provision of functionalities that the FCC argued were "inextricably intertwined," with transmission, like IP address assignment, DNS, caching, etc. are readily available on a stand-alone basis.

Demand-Side

From the point of view of usage, consumers fully understand the difference between data transmission and services, even with respect to the services that the Commission claimed had to be bundled with data transmission.

Cable operators routinely market separate services. Above all, speed is what they sell, but they also differentiate levels of service by additional applications included in the bundle. Clearly, there is not technological imperative in bundling high-speed data transmission and services of functionalities.

The majority of e-mail accounts are with independent service provides who do not bundle transmission and e-mail

When it comes to content sites, the disparity is even greater. No web site of an ISP affiliated with a network operator ranks in the Web sites of the top high speed data transmission service providers are nowhere to be found in the top twenty web sites; none ranks in the top 20 news web sites.

Even if we look at the top video web sites, we find that Comcast, the largest broadband ISP ranks 12th and AOL (owned by Time Warner) ranks 13th. Comcast and AOL account for about 2 percent of video views on the web, but they account for close to one-third of all broadband subscribers. Consumers clearly take the data transmission service and use separate applications and content services from independent ISPs.

Supply-side: From the point of view of technology, the distinction between transmission and applications was easy to make. The FCC had made just such a distinction for over three decades under the Computer Inquiries. The telephone companies had no difficulty making high-speed data transmission available on a stand-alone basis, primarily to the enterprise market. In the years after the Cable Modem Order hundreds of small telephone companies offered plain vanilla high-speed data transmission services to their mass-market customers for a fee separate from applications and content. It is hard to argue that the much larger network operators, many of whom had plenty of practice, could not figure out how to make high-speed transmission service available to the mass market.

The hoped for competition from broadband over power lines that was loudly touted by the Commission had failed miserably. Cable modem service had moved to the fore, with the national broadband plan expecting near total market dominance by the cable technology.

As a condition of its acquisition of Bell South, AT&T agreed to network neutrality provisions that rested on a technological definition that it could easily implement. Indeed, as part of its agreement, it distinguished specific services for which it wanted the ability to prioritize traffic, thereby affirming the distinction between the underlying

transmission of data and the service.

In the BitTorrent case, Comcast demonstrated the ability to distinguish transmission from applications, by singling out a specific application for discriminatory treatment and, when pressed, quickly came up with a nondiscriminatory alternative.

Independent third party provision of functionalities that the FCC argued were "inextricably intertwined," with transmission, like IP address assignment, DNS, caching, etc. is readily available on a stand-alone basis.

Demand-Side: From the point of view of economics and usage, consumers fully understand the difference between data transmission and services, even with respect to the services that the Commission claimed had to be bundled with data transmission.

Thus, the majority of e-mail accounts are with independent service providers who do not bundle transmission and e-mail. Web sites of the top high-speed data transmission service providers are nowhere to be found in the top-twenty web sites in general or for specific types of content like news.

Even if we look at the top video web sites at the time of the decision, we find that Comcast, the largest broadband ISP ranks 12th and AOL (owned by Time Warner) ranks 13th. Comcast and AOL account for about 2 percent of video views on the web, but they account for close to one-third of all broadband subscribers. Consumers clearly take the data transmission service and use separate applications and content services from independent ISPs. The claim of an integrated bundle was never a technological issue. It is not even a marketing reality. Cable operators routinely market separate services. Above all, speed is what they sell, but they also differentiate levels of service by additional applications included in the bundle. Clearly, there is no technological imperative in bundling high-speed data transmission and services of functionalities.

Exhibit III-3 summarizes the case for correcting the misclassification of high-speed data transmission as an information service. Technology, economics, law and policy all support the conclusion that the FCC should correct the mistake and classify high-speed data as a title II telecommunications service.

EXHIBIT III-3: CONSIDERATION OF ALL THE PUBLIC-SERVICE PRINCIPLES STRONGLY FAVORS A TELECOMMUNICATIONS/TITLE II CLASSIFICATION

Based on a short period of experience with mass market, high speed data transmission legal ambiguity and technological uncertainty opened the door to the exercise of agency discretion to classify the service as an information service, but subsequent developments remove the ambiguity and uncertainty and a full consideration of the policy implications indicates that a classification as a telecommunications service is superior.

Factors causing change in non-discrimination/information service classification

The Cable Modem Declaratory Order was a rush to judgment. To the extent there was legal ambiguity or technological uncertainty, these have been cleared up since the order was issued.

Technology:	**Claim of technological integration was always dubious and separation of transmission and content has become more evident: Hundred of carriers offer wholesale high speed data transmission service, functionalities are widely available from 3rd party services user patterns and company marketing indicate consumers and producers know the difference between transmission and service**
Economics:	**Discriminatory practices repeatedly occur threatening competition in applications and content** **Competition has failed to develop as predicted (e.g. broadband over powerline, satellite).**
Law:	**Title II classification was supported by history at least as much as Title I.** **Title I authority had been used and it was assumed to be available to prevent undue discrimination and the other policy goals of the Act, but the Title I safety net has now been called into question.**
Policy:	**The National Broadband Plan supersedes the Universal Service (Stevens) Report**

There were never any grounds for Chevron discretion to classify high-speed data transmission service as anything but a Title II (or title III) service with regard to these principles.

Technology:	**There is no technological complexity that would allow the FCC discretion to alter or abandon these goals and authorities.**
Economics:	**These goals have not been achieved and the increasing importance of high-speed data transmission makes them all the more important and urgent (per the National Broadband Plan).**
Law:	**These issues were never addressed in the rulemakings or court proceedings that dealt with nondiscrimination. There is no legal ambiguity that would allow the FCC discretion to alter or abandon the clear language of the statute**

Policy: The National Broadband Report establishes a firm evidentiary basis for immediate implementation of policies to accomplish these goals, but the uncertainty about FCC authority hampers its ability to do so. Weakening the tools available to achieve these goals would be contrary to clear Congressional intent.

E. Misclassifying High-speed Data Transmission Makes it Difficult, if not Impossible, to address The Public Service Goals of the Act

Initial comments filed by Public Knowledge in response to AT&T's PSTN petition add an important perspective by walking through the diverse ways in which VOIP has been handled by the Commission with respect to each of the principles.[156] VOIP is a useful test case since its very name captures the key endpoints of the transitions from the preeminent service in the telephone age (voice) into the digital age (Internet Protocol).

The following table highlights two key aspects of the transition.

1) The extension of the principles has been inconsistent.

156. *See infra* EXHIBIT III-3.

2) The legal authority on which the application of the principles to the IP space is tied to Title II justifications, but ancillary jurisdiction or the capability of a VOIP call to touch the PSTN, could well be eliminated if the FCC sunsets the PSTN.

EXHIBIT III-4: THE INCONSISTENT TREATMENT OF VOICE OVER INTERNET PROTOCOL

PUBLIC GOALS	VOIP TREATMENT	LEGAL AUTHORITY
Adequate Facilities		
Numbering	Grandfathered, but new numbers must be be purchased from incumbents	Ancillary authority
Reliability	back up power	
Universal Service		
USF	Covered for purposes of revenue collection, Excluded for purposes of revenue disbursement	Ancillary authority, Capability of reaching the PSTN
Disability	Applies, Contribution to TRS required	Ancillary authority
Public Safety	E-911	
Interconnection		
Duty	NA	
Numbering	Applied	Ancillary Authority
Consumer Protection	Slamming, cramming rules do not apply although they could if enough complaints arise	Unclear

Because the FCC erroneously classified high-speed data transmission as an information service, it struggled to execute its primary responsibilities to pursue the public service goals of the Telecommunications Act. The petition of AT&T and the action of Verizon in seeking to sunset the PSTN brings the flaw in the FCC classification of high-speed data into clear focus.

F. Split Authority

Consolidating the authority for all the public-service principles under Title II is the simplest and most direct path to ensuring they apply to twenty-first century telecommunications services. It is not the only way that the end result could be achieved. The D.C. Circuit court might uphold the assertion of ancillary authority to govern network neutrality, which is the basis on which the Computer Inquiries always rested. The FCC could then assert authority to implement the other public-service principles under Title II. It is interesting to recall that the D.C. Circuit Court noted that the FCC's argument "places particular emphasis on the [Computer Inquiries]."[157] The D.C. Appeals Court ruling drew the roadmap.

157. Comcast Corp. v. Fed. Commc'ns Comm'n, 600 F.3d 642, 655 (D.C. Cir. 2010).

> The crux of our decision in CCIA was that in its Computer II Order the Commission had linked its exercise of ancillary authority to its Title II responsibility over common carrier rates – just the kind of connection to statutory authority missing here. . . In other words, we viewed the Commission's Computer II Order—like the Supreme Court viewed the regulations at issue in Southwestern Cable—as regulation of service otherwise beyond the Commission's authority in order to prevent frustration of a regulatory scheme expressly authorized by the statute.[158]

The split basis for authority might seem odd, but that was the situation for over thirty years under the Computer Inquiries, which always rested on ancillary authority. Because the data flow covered by the Computer Inquiries did not intersect with the other public-service principles, the conflict did not present itself forcefully. Responding to the D.C. Appeals Court ruling, the FCC has many provisions throughout the Act on which to rest either independent or ancillary authority, including Sections 151, 152, 230, 201, 202, 251, 254, 256, 257, 301, 303, 304, 307, 309, 316, 616, 628, and 706.[159] The long list of candidates reflects the convergence of communications onto broadband. The expression triple play, so commonly applied to broadband services refers to voice, video and data. Voice and video (broadband and cable) are the services to which Titles II, III and VI apply. The FCC's ability to implement the Communications Act policies in the 21st century rests on its ability to exercise the many authorities Congress afforded it to guide the communications network toward the public service goals of the Act.

158. *Id.* at 656.

159. 47 U.S.C. §§ 151, 152, 230, 201, 202, 251, 254, 256, 257, 301, 303, 304, 307, 309, 316, 616, 628, 706 (2012).

HARM CLAIM THRESHOLDS: FACILITATING MORE INTENSIVE SPECTRUM USE THROUGH MORE EXPLICIT INTERFERENCE PROTECTION RIGHTS

J. PIERRE DE VRIES*

I. INTRODUCTION

Wireless technology has become a cornerstone of economic growth and social well-being. It is a heavily regulated industry, and government institutions such as the FCC make the ground rules that determine what can be done, when, how and by whom. It is therefore crucial that spectrum regulation be effective.

This paper provides an introduction to harm claim thresholds, a regulatory tool that adds clarity to the rights and responsibilities of radio

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system operators seeking protection against harmful interference from other systems.

This section provides an introduction to key concepts in spectrum regulation, including economic externalities such as inter-system interference, the role of regulators in the management of such externalities, the value of clear default operating rights, and key concept of harmful interference. Section II explains the importance of receivers in spectrum regulation. Section III discusses the definition, benefits, implementation, and enforcement of harm claim thresholds.

A. Interference

Since two radio systems operating at the same time, place, and frequency—i.e., that use the same spectrum—tend to degrade each other's performance, setting operating rules that ensure efficient coordination of radio operations has traditionally been the province of government regulators.[1] In the U.S., the National Telecommunications and Information Administration ("NTIA") authorizes federal government operations,[2] and the Federal Communications Commission ("FCC" or "Commission") authorizes everyone else, including commercial as well as state and local government operations.[3] In some cases, such as aviation, governance is shared between the FCC and NTIA.

When one system degrades another's performance, harmful interference is said to occur.[4] "Interference" is defined as "unwanted energy."[5] However, "harmful interference" only occurs when an unwanted signal "seriously degrades, obstructs, or repeatedly interrupts" a service.[6] The amount of service degradation a receiver experiences is thus a combination of the strength of the unwanted signals delivered by the adjacent service and the receiver's ability to pick out its desired signal from the surrounding unwanted signals. Responsibility for harmful interference is therefore shared between transmitters and receivers. There are distinct connotations of the term "interference" in legal and

1. The term "spectrum" has multiple meanings; depending on the context in which the term is used, it can mean: the radio frequency range a service's signals are found in; the combination of frequencies, geographic area, time, and signal strength that a service may use; or the operating permissions, including licenses and license-exemption, issued to an operator or class of operators. Unless otherwise evident from the context, the term is used in this paper to denote a frequency range over which radio operation takes place.

2. The NTIA is an agency of the United States Department of Commerce that serves as the President's principal adviser on telecommunications policies. *See generally* 47 U.S.C §§ 901-904 (2013).

3. *See* 47 U.S.C. § 151 (1996).

4. *See* 47 C.F.R. § 2.1(c) (2013).

5. *Id.*

6. *Id.*

engineering parlance; engineering usage refers to an energy level,[7] while legal usage refers to the impact on system performance of that energy.[8]

Since the strength of radio signals generally decreases with distance, two wireless systems can operate simultaneously at the same frequencies if they are well separated. This leads to geographical operating assignments, where licenses are assigned to non-interfering areas. Combined with operating rules that limit either transmission power and/or the amount of signal that a licensee is allowed to deliver outside its operating area, this limits the effect one operation has on another in an adjacent area.

Two wireless systems can operate simultaneously in the same area by using different frequencies. Each transmitter broadcasts on its designated frequencies, and their respective receivers tune to those frequencies, filtering out signals on other frequencies. If the filtering does not reject signals and other frequencies sufficiently well, the receiver will admit a mixture of desired and undesired signals and may be unable to extract its own desired signal from the mix.

The further away unwanted signals are from the desired frequency, the easier it is for receivers to tune them out. Filtering out close-by signals, on the other hand, makes receivers more expensive. In the past, when more spectrum was available and filtering was expensive, the preferred solution was to spread services out widely in frequency, and so economize on receiver cost. Now that spectrum is more crowded, this solution seems increasingly questionable. It may be more cost-effective to increase the cost of receivers by requiring better filters while reaping greater benefit from being able to deploy more services.

B. Externalities and Regulators

Since radio systems interfere with each other, they contend for permission to operate. Since filters are imperfect, operation in one frequency band or area can degrade operations in an adjacent one. In economic terms this is a negative externality: a cost resulting from one party's activity incurred by another party against their will.

A service's *operating entitlements* consist of rights to exclude other operations by claiming that such operations cause harmful interference,[9] and rights that permit operation under certain constraints. Some of these constraints limit negative externalities, such as transmission power,

7. *See* GEN. SERVS. ADMIN., FEDERAL STANDARD 1037C (1996), http://www.its.bldrdoc.gov/fs-1037/fs-1037c.htm.

8. *Id.*

9. 47 C.F.R. § 2.102(f) (2013) ("The stations of a service shall use frequencies so separated from the limits of a band allocated to that service as not to cause harmful interference to allocated services in immediately adjoining frequency bands.").

resulting field strength, and geographic area, that are intended to avoid harmful interference to other services. In the section on harm claim thresholds I propose adding a complementary right to receive signals, with a constraint on the ability to claim harm is being caused by others. There are also constraints, typically associated with command and control allocations, that are intended to create positive externalities, such as requirements that a license may only be used to offer a specific service, that a specific technology should be used to offer that service (e.g., the requirement to use ATSC for digital television, or in the European case, to use GSM for cellular service), or that services should be offered under specific terms (e.g., the "open access" condition on the 700 MHz C block).[10]

The operating permissions that the FCC assigns to a party provide benefits to that party, and impose costs on neighbors. An operator who is allowed greater signal strength will have better service, but a neighbor will incur greater cost in building a system that will be able to operate in the presence of that signal. Operating permissions therefore entail a negative externality.

It is possible that this externality leads to maximum social welfare: the combined costs and benefits of the two parties given this externality may be the greatest possible. However, it is also possible that an adjustment could lead to an improvement. For example, perhaps the incremental gain from increasing the allowed transmitted signal strength—leading to faster data transfers, say—would be greater than the incremental loss to the other party from degradation to their service, or the cost of improving their receivers to tolerate increased interference. Conversely, the loss from reduced transmission power might be smaller than the benefit to the neighbor, so that the optimum transmission ceiling should be reduced.

If parties are able to negotiate such an adjustment between themselves, government intervention (e.g., an FCC rule-making) may not be required.[11] Given the well-known frailties of any regulatory process,[12] this route is preferred.

However, this option is not available when there are impediments to successfully concluding a negotiation, such as the inability of parties to act to adjust their rights, or collective action problems when it proves to be impossible to coordinate the interests of a large number of parties.

10. 47 C.F.R. § 27.16 (2013).

11. Ronald H. Coase, *The Federal Communications Commission*, 2 J.L. & ECON. 25 (1959).

12. *See, e.g.*, Thomas W. Hazlett, *The Wireless Craze, the Unlimited Bandwidth Myth, the Spectrum Auction Faux Pas, and the Punchline to Ronald Coase's "Big Joke": An Essay on Airwave Allocation Policy*, 14 HARV. J.L. & TECH. 335 (2001).

Regulatory action is then required to frame rights appropriately, and address collective action problems where they cannot be avoided. The regulator can also provide an adjudication venue that backstops negotiations and provides a forum for dispute resolution.

Traditional methods of spectrum management need to adapt to the demands of the rapidly evolving wireless spectrum landscape, including a faster rate of technical and commercial innovation, increasing demand leading to more pressure to crunch services together, and the greater value of radio operations leading to greater losses when there is inefficiency.

C. The Importance of Clear Default Entitlements

There is a robust consensus in the economic literature that "bargainers are more likely to cooperate when their rights are clear and less likely to agree when their rights are ambiguous."[13]

Negotiations are therefore more likely to succeed when parties can proceed from a pre-defined default rule.[14] A pre-defined default rule offers a focal point for negotiations, preempts parties from focusing on getting the default rule to be their favored one, and provides a reasonable outcome when parties cannot agree. In a bilateral monopoly situation, one party may hold out for a better deal. Complete clarity—the absence of any ambiguity—is not possible.[15] However, the government has the responsibility to design an initial package of rights, along with a process for fine-tuning it.

The starting point does not need to be exhaustively defined; adding detail adds cost, but it also adds benefit. The challenge for policy makers, as always, is to complicate matters as much as necessary, but no more.[16]

It can be argued that where parties can negotiate effectively, clarity

13. ROBERT COOTER & THOMAS ULEN, LAW & ECONOMICS 89 (6th ed. 2011).

14. While the absence of clarity may lead to inefficient delay in a bargain, under certain conditions it may speed up the completion of an efficient bargain. *See* Rachel Croson & Jason Scott Johnston, *Experimental Results on Bargaining Under Alternative Property Rights Regimes*, 16 J.L. ECON. & ORG. 50, 69 (2000). In the latter case, the risk that that one party may take advantage of the absence of clarity may induce the other party to come to an agreement that either he/she would not have agreed to or may have increased the speed with which an efficient agreement is made.

15. "Property borders are always subject to some degree of fuzziness . . . . Contracts, in which property is reconfigured and rights traded, are likewise incomplete, reflecting efficiencies internalized by the parties to the contract." Thomas W. Hazlett & Sarah Oh, *Exactitude in Defining Rights: Radio Spectrum and the "Harmful Interference" Conundrum*, 28 BERKELEY TECH. L.J. 227, 294 (2013). Hazlett and Oh argue that "exclusive spectrum rights should not be over-defined. . . . [T]he goal of rights definition is . . . to simplify the process wherein rights are transferred to parties who can best maximize social value—a rule that also applies when seeking the parties in the best position to design the packages." *Id.* at 299.

16. With apologies to Albert Einstein, who is reputed to have said that things should be as simple as possible, but no simpler.

about entitlements is not necessary.[17] Allocating flexible use rights in ways that facilitate negotiation by reducing the fragmentation of allocations may well reduce the need to increase the clarity of rights definitions.[18] However, it is not a matter of either/or. Transaction costs in spectrum remain high; spectrum is not a simple commodity.[19] Improving clarity must therefore remain as an important part of effective spectrum policy, at least until I reach the point when spectrum markets are tolerably efficient. If nothing else, more clarity will be important for bands where fragmentation and/or lack of rights hamper effective renegotiation of default assignments. Such bands are likely to remain a feature of the regulatory landscape for a long time to come.

FCC operating rules are merely the starting point in a ceaseless process of finding the most productive way to operate radio systems that affect each other. They are not the end of the story. They are the defaults that should, wherever possible, be adjusted by radio operators among themselves. Only where refinement by private law is impractical should the regulator step in. Thus, I believe that operators should for the most part find the optimal configuration of their interacting systems through private negotiation to refine and adapt the defaults set by the FCC, both within an allocation and in neighboring allocations that affect each other.

The regulatory context should be designed to make such private optimization as easy and prevalent as possible. The proposals outlined in this paper would contribute to such private agreements by providing a valuable increment in the clarity of the rights and responsibilities regarding harmful interference.

D. Protection From Harmful Interference

Claims of harmful interference between systems are at the heart of spectrum disputes. For example, 47 C.F.R. § 2.102(f) requires that

17. Hazlett & Oh, *supra* note 15, at 241.

18. *Id.* at 243.

19. John W. Mayo & Scott Wallsten, *Enabling Efficient Wireless Communications: The Role of Secondary Spectrum Markets,* GEORGETOWN CTR. FOR BUSINESS & PUB. POLICY 11 (June 2009), http://www.gcbpp.org/files/Academic_Papers/EnablingWirelessCommunicationsJuly2009.pdf ("[T]he multidimensional nature of secondary market transactions introduces more complexity into potential transactions than are commonly appreciated."); Scott Wallsten, *Is There Really a Spectrum Crisis? Quantifying the Factors Affecting Spectrum License Value*, TECH. POLICY INST. (Jan. 23, 2013), https://techpolicyinstitute.org/files/wallsten_is_there_really_a_spectrum_crisis.pdf ("A spectrum "crisis," presumably, would therefore be reflected in rapidly rising prices. However, as Peter Cramton once remarked, "spectrum isn't like pork bellies. Pork bellies are nice." That is, spectrum is not a homogenous good, and its value depends on a myriad of factors, ranging from the physical characteristics of the spectrum, to the rules governing its use, to the behavior of users of neighboring bands.") (citations omitted).

"stations of a service shall use frequencies so separated from the limits of a band allocated to that service as not to cause harmful interference to allocated services in immediately adjoining frequency bands."[20] This is an explicit recognition of the possibility of interaction, i.e., interference between services in adjoining bands.[21]

Conflict resolution and avoidance can therefore be facilitated by a more technically verifiable definition of harmful interference that does not rely on case-by-case elucidation by the FCC.[22] I refer to such approaches in general as *interference limits*. I will describe a particular implementation, harm claim thresholds, below.

Rules and statutes as they stand are not very helpful. The definitions provided in 47 § C.F.R. 2.1 are very general and require case-by-case interpretation.[23] FCC precedent has not provided much if any clarity on the general meaning of "harmful interference." Its actions in particular cases are explicitly limited.[24] Since spectrum negotiations frequently hinge on responsibilities to mitigate interference, guidelines about what counts as harmful interference that do not require recourse to FCC rulemaking would be helpful.

Even if more explicit statements about harmful interference were not necessary in negotiation, they would provide more reliable guidelines for both incumbents and new entrants about the rules for new allocations. The LightSquared case illustrates how differently parties can interpret their responsibilities regarding harmful interference in the current regime.[25] Similar disagreements about responsibilities to prevent

20. 47 C.F.R. § 2.102(f) (2013).

21. Some advocates (i.e. LightSquared, Inc.) like to think of this as only applying to signals that are emitted outside a transmitter's assigned frequencies, referred to as out-of-band emissions (OOBE); if OOBE is limited, they have no further obligations. However, signal strength inside assigned frequencies also causes interference, and there is nothing in the language of the rule that limits interference only to OOBE. In fact, the limits on in-band transmit power are a recognition that such signals have the potential to cause harmful interference.

22. R. Paul Margie, *Can You Hear Me Now? Getting Better Reception from the FCC's Spectrum Policy*, STAN. TECH. L. REV. (Dec. 29, 2003), http://stlr.stanford.edu/pdf/margie-fcc.pdf.; Ellen P. Goodman, *Spectrum Rights in the Telecosm to Come*, 41 SAN DIEGO L. REV. 269 (2004); Mitchell Lazarus, *Finding the Harm in "Harmful Interference,"* COMMLAWBLOG (Jan. 30, 2009), http://www.commlawblog.com/2009/01/articles/broadcast/finding-the-harm-in-harmful-interference; Michael Marcus, *Harmful Interference: The Definitional Challenge*, SPECTRUMTALK (Dec. 18, 2008), http://spectrumtalk.blogspot.com/2008/12/harmful-interference-definitional.html.

23. 47 C.F.R. § 2.1 (2013).

24. *See, e.g.*, Improving Pub. Safety Commc'ns in the 800 MHz Band, *Report & Order*, 19 FCC Rcd. 14,969, 14,976 (2004) ("We adopt a new, objective definition of "unacceptable interference," for purposes of this proceeding only.").

25. *See* Petition for Declaratory Ruling, LightSquared Inc., FCC 11-109, i (Jan. 30, 2012), *available at* http://apps.fcc.gov/ecfs/document/view?id=7021857391 ("The commercial GPS industry claims, without justification, that these GPS receivers somehow are entitled to "protection" from the LightSquared authorized operations that occur entirely within the MSS

or mitigate interference occurred in the M2Z case.[26] I therefore believe that interference limits will be a cost effective part of the default rules, and will be beneficial not just in cases where private law is not expected to be effective.

If interference limits are promulgated, the default operating rules will not only place constraints on what transmitters can do, but will also make explicit the currently implicit limits on the extent to which operators can constrain the transmissions of other operators by claiming that they cause harmful interference. In other words, interference limits will make the rights and responsibilities of receiver operators explicit. However, as I will explain, I do not propose that the FCC defines the performance of individual receivers; I are not proposing mandated receiver standards.

II. THE IMPORTANCE OF RECEIVERS

The long history of cross-allocation receiver issues shows that more attention to receivers' role in harmful interference would be beneficial.[27] Poor receiver performance has precluded or delayed the introduction of valuable new services, or has led to costly instances of avoidable harmful interference. Many examples come to mind, including the dispute over M2Z's proposed operation in the AWS-3 band adjacent to existing

band."); Opposition of Deere & Company to LightSquared Inc. Petition for Declaratory Ruling, LightSquared Inc., FCC 11-109, 2 (Feb. 27, 2012), *available at* http://apps.fcc.gov/ecfs/document/view?id=7021869323 ("The Commission should reject LightSquared's Petition as another attempt to run roughshod over the legitimate and significant concerns of the GPS community regarding severe widespread interference harm that will result if LightSquared is permitted to proceed."); Opposition of the U.S. GPS Industry Council To LightSquared, Inc. Petition for Declaratory Ruling, LightSquared, Inc., FCC 11-109 at iii (Feb. 27, 2012), *available at* http://apps.fcc.gov/ecfs/document/view?id=7021869290 ("LightSquared's Petition is simply an effort to alter its manifest obligations as a non-conforming spectrum user to protect other L-band services from harmful interference.").

26. *See, e.g.*, Serv. Rules for Advanced Wireless Servs. in the 2155-2175 MHz Band, *Notice of Proposed Rulemaking*, 22 FCC Rcd. 17,035, 17,042 (2007) ("We may, however, determine that the interference protection measures necessary to protect mobiles receiving in the designated AWS-1 and proposed AWS-2 base-transmit bands adjacent to the AWS-3 spectrum and mobiles receiving in co-channel and adjacent channel AWS-3 bands would limit the ability of transmitting AWS-3 mobiles to operate effectively. We may also determine that the need to protect base stations receiving in the AWS-3 band would significantly limit the performance of base-transmit operations in the AWS-3 band.").

27. *See* J. Pierre de Vries & Kaleb August Sieh, *The Three Ps: Increasing Concurrent Operation by Unambiguously Defining and Delegating Radio Rights*, 2011 IEEE SYMPOSIUM ON NEW FRONTIERS IN DYNAMIC SPECTRUM ACCESS NETWORKS 56 (2010), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1704194; Pierre de Vries, *Radio Regulation Summit: Defining Inter-channel Operating Rules: A Report on a Silicon Flatirons Summit on Information Policy, held 8/9 September 2009*, SILICON FLATIRONS CENTER 8-13 (Dec. 2, 2009), http://siliconflatirons.com/documents/misc/OOBSummit/Inter-channelSummitReportv1.0.1.pdf.

AWS-1 cellular service,[28] the unexpected interference from AWS-1 cell towers into broadcasters' electronic newsgathering receive stations,[29] as well as the recent GPS/LightSquared matter.[30]

This problem has been well understood for quite some time. For example, in its comments on the 2003 Receivers NOI,[31] the NTIA enumerated examples of "a number of instances of reported interference that could have been avoided if appropriate receiver standards had been applied."[32] Similarly, the Spectrum Working Group of the FCC Technological Advisory Council summarized in its December 2011 white paper "a number of examples of situations where receiver performance was a significant issue affecting access to the spectrum for new services."[33]

The ability of radio systems to tolerate interference is an important part of spectrum management, whether in the formulation of regulation or in negotiations between operators. This ability depends not only on the design of the receiver, but also the relative strength of desired and undesired signal transmissions. The received signal strength depends not only on the power of the signal at the transmitting antenna, but also the distance between the transmitter and the receiver, and intervening obstacles. A low power transmitter near to a receiver may deliver a much stronger signal than a high power transmitter that is far away.

Wireless systems in one band that cannot tolerate reasonable signal levels in an adjacent band unfairly impose costs on others, notably the operators in those adjacent bands, while reaping the benefits themselves,

28. *E.g.*, de Vries & Sieh, *supra* note 27, at 58-59; Receivers & Spectrum Working Grp.: FCC Tech. Advisory Council, Interference Limits Policy: The Use of Harm Claim Thresholds to Improve the Interference Tolerance of Wireless Systems (Feb. 6, 2013) (white paper), *available at* http://transition.fcc.gov/bureaus/oet/tac/tacdocs/WhitePaperTACInterferenceLimitsv1.0.pdf [hereinafter TAC RECEIVERS & SPECTRUM WORKING GROUP (2013)].

29. Serv. Rules for Advanced Wireless Servs. in the 1.7 GHz and 2.1 GHz Bands, *Report & Order*, 18 FCC Rcd. 25,162 (2003).

30. Letter from Lawrence E. Strickling, Assistant Sec'y for Commc'n & Info., to Julius Genachowski, Chairman of the FCC 7 (Feb. 14, 2012), http://www.ntia.doc.gov/files/ntia/publications/lightsquared_letter_to_chairman_genachowski_-_feb_14_2012.pdf ("NTIA urges the FCC, working with all stakeholders, to explore appropriate actions to mitigate against the impact GPS and other receivers may have to prevent the full utilization of spectrum to meet the nation's broadband needs.").

31. Interference Immunity Performance Specifications for Radio Receivers, 68 Fed. Reg. 23,677 (proposed May 5, 2003) (to be codified at 47 C.F.R. pt. 15).

32. NAT'L TELECOMM. & INFO. ADMIN., COMMENTS: STANDARDS FOR NON-GOVERNMENT RADIO RECEIVERS Section IV, http://www.ntia.doc.gov/federal-register-notice/2003/comments-standards-non-government-radio-receivers (last visited Jan. 7, 2014).

33. Technological Advisory Council Sharing Work Group, Spectrum Efficiency Metrics 24, (Sept. 25, 2011) (white paper), *available at* http://transition.fcc.gov/oet/tac/tacdocs/meeting92711/Spectrum_Efficiency_Metrics_White_Paper_by_TAC_Sharing_Working_Group_25Sep2011.doc.

for example by using cheaper receivers. This is not only unfair, but prevents the addition new wireless services that could foster innovation, improve public safety, and create jobs. Government has a legitimate role in seeking to limit such an unfair economic externality where one service stands to gain while their neighbor bears the cost.

So far, the FCC has handled such interference to an affected receiver due to signals from inside an adjacent band almost entirely by placing the burden on the neighbor, e.g., by reducing their transmit power, moving neighbors away from the band boundary, or requiring transmitters to provide additional filters for receivers.

However, it takes two to tango: both the affected system and the influencing system play a role.[34] The affected system that is being protected also needs to bear some responsibility. While this is often framed as a matter of "better receivers," it is actually a system issue: in addition to using more robust receivers, an operator might also improve interference tolerance by increasing the strength of the desired signal at the receiver, and/or by moving their service away from the frequency boundary (a.k.a. internal guard bands).

Where the resulting signal strengths at receivers and the ability of receivers to process such signals is known to all parties, as is the case if they are in the same industry, then they both can be factored into system designs and border negotiations.[35] However, this is often not the case at boundaries between spectrum allocations, particularly when receiver performance specifications are proprietary. In such cases, statements by the regulator about the interference environment in which a receiver must be operate—called *interference limits* in TAC Receivers & Spectrum Working Group (2013)—could facilitate negotiations.[36]

This baseline information is particularly important in cases where there are many kinds of receivers in the same band with different abilities to tolerate interference. A receiver-independent statement of the interference that needs to be tolerated provides clarity for operators in adjacent bands.

34. I use the terms "affected" and "influencing" to avoid the implied judgments of the more common terms "victim" and "transmitter." The latter terminology implies that the transmitter is always at fault, and the receiver always the victim. The consensus that receivers also have a role to play in avoiding harmful interference is relatively recent. For example, a 1987 Report and Order stated that "[s]ub-standard receivers do not cause system interference." Dev. & Implementation of a Pub. Safety Nat'l Plan and Amendment of Part 90 to Establish Serv. Rules and Technical Standards for Use of the 821-824/866-869 MHz Bands by the Pub. Safety Servs., *Report & Order*, 3 FCC Rcd. 905, 908 (1987).

35. However, just because adjacent operators have congruent interests does not guarantee that this situation will persist.

36. TAC RECEIVERS & SPECTRUM WORKING GROUP (2013), *supra* note 28.

A. The Tent Analogy

An analogy might help to clarify the radio system design factors that influence the trade-offs between transmitter and receiver performance. Imagine the property line between a two adjacent lots—in the radio case, it would be a boundary between two frequency bands, not two geographic areas. Everyone has to take some responsibility for tolerating sounds that come from their neighbors. If Bob lives in a tent, he is going to be very sensitive to noise from Alice next door.

One response, and a typical one in spectrum policy, is to make the neighbors—such as Alice—keep their voices down, i.e., limit the allowed transmission power in the adjacent band or perhaps even prohibit transmission altogether. However, it seems unreasonable for Bob to demand that Alice always whispers when she is in her own garden. Bob could also take some responsibility, for example by moving indoors. In radio terms, that is analogous to adding receiver filters to exclude signals in the adjacent band. Bob could ask the people he is talking with to speak more loudly or come into the same room so that they can be heard better, or Bob could move to a room on the other side of the house.

The radio analogy would be to increase the Bob's desired radio signal level by increasing transmitter power or deploying more transmitters, or to move an operating channel away from the band boundary, respectively.

This example is a riff on the case of the doctor and the confectioner cited by Coase.[37] In both cases, harm is reciprocal: avoiding disturbance to Bob by silencing his neighbors causes harm to them, and allowing them to make noise disturbs Bob. Receiving systems with inadequate interference tolerance can harm the interests of neighboring transmitters, the converse of the conventional assumption that it is always transmitters that harm receivers. As Coase suggested, the ideal solution is to give the parties well-defined rights so that they can find the optimal balance among themselves.[38]

III. HARM CLAIM THRESHOLDS

A. Definition

Interference-limits policies describe the environment in which a receiver must operate without necessarily specifying receiver performance. There are many ways to implement interference limits. This paper advocates *harm claim thresholds*, a statement in a service's rules that defines the signal levels it needs to tolerate before being able to

37. *See* Ronald. H. Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1, 9-10 (1960).
38. *See* COOTER, *supra* note 13.

bring a harmful interference claim.[39]

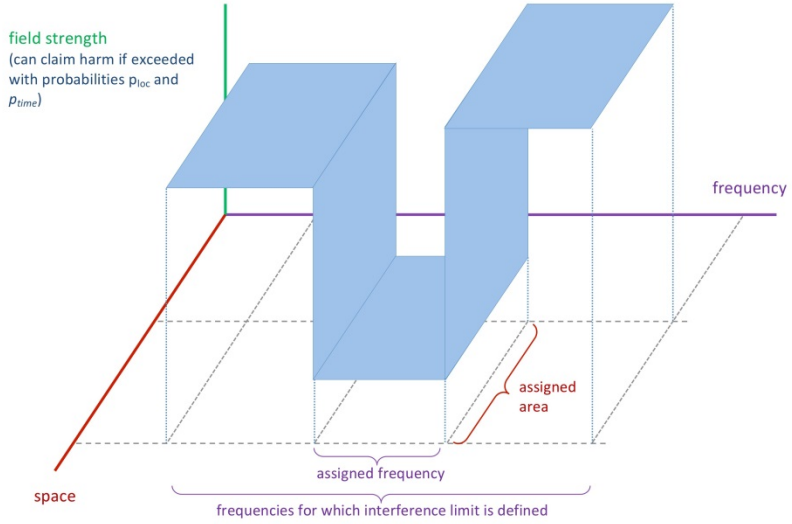

FIGURE 1. A GENERIC HARM CLAIM THRESHOLD. ONLY ONE SPATIAL DIMENSION IS SHOWN.

Harm claim thresholds are expressed as a field strength profile—both inside and outside an assigned service's designated frequencies—that must be exceeded at more than a specified, small percentage of locations and times in a measurement area before a user can claim that it is experiencing harmful interference.[40]

Interference-limits policies may or may not specify the performance of receivers; harm claim thresholds do not explicitly specify receiver performance. This is important, since receiver performance specifications are just one of many requirements needed to define a wireless system. Manufacturers and operators are left to determine whether and how to build receivers that can tolerate such interference, or even to determine that they will choose to ignore these limits. In other words, harm claim thresholds are not government receiver performance mandates, sometimes referred to as "receiver standards."

B. Benefits

Setting harm claim thresholds delegates decisions about system design, including receiver performance, to manufacturers and operators. This gives them more flexibility, and reduces the need for the FCC to

39. *See* TAC RECEIVERS & SPECTRUM WORKING GROUP (2013), *supra* note 28.
40. *See supra* Figure 1.

adjudicate interference disputes. Harm claim thresholds also give manufacturers and operators the information they need to figure out the best way to tolerate potentially interfering signals in adjacent bands, including by improving the performance of their receivers.[41] For example, they can invest in high performance receivers that tolerate high levels of adjacent band noise even when their own received signals are weak, or they can deploy more basic receivers, but invest in increasing the level of their own received signals by deploying more transmitters.

Harm claim thresholds can facilitate bargaining, allowing wireless system operators to find and adjust the optimum level of mutual interference. Depending on the economic/regulatory environment, a harm claim threshold should also improve clarity of entitlements.

Setting harm claim thresholds also allows the FCC to give notice to operators that an adjacent band that is currently radio quiet will not remain so, by setting a high harm claim threshold over that band. It also allows the Commission to incentivize improved system performance without imposing receiver performance mandates. It delegates decisions to the market place. If the FCC chooses, it can select threshold levels, or gradually increase levels over time, to incentivize better receivers without mandating them.

Citizens benefit because more clarity about interference rights and better receivers will lead to valuable new commercial services being deployed in limited spectrum while protecting public safety and enhancing national security by improving resistance to both "friendly" interference and hostile jamming.

Explicit thresholds facilitate long-term planning by both the FCC and industry, thus encouraging investment in new services by more clearly stating the rights and responsibilities of services to tolerate interference from each other.

C. Implementation

I note some salient points regarding the implementation of harm claim thresholds.[42]

The harm claim threshold values for an assignment can be chosen to reflect the status quo. For example, if the receivers in an allocation are very susceptible to interfering signals in frequencies outside their band, the harm claim threshold can be set very low; thus, little or no operation will be permissible in the adjacent band. In this way, incumbents will not

41. *See supra* Part II.A.

42. *See* TAC RECEIVERS & SPECTRUM WORKING GROUP (2013), *supra* note 28; J. Pierre de Vries, *Optimizing Receiver Performance Using Harm Claim Thresholds*, 37 TELECOMM. POL'Y 757 (2013), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2195330.

be required to replace existing receivers. However, if the FCC wishes to change the neighboring allocation in the future to allow a stronger signal there, it can stipulate that harm claim thresholds will increase at some future date. The time period can be chosen to give incumbent operators sufficient time to upgrade their receivers over time.

Conversely, if the status quo is that there is already strong signal operation in the adjacent band, the harm claim threshold for the new assignment can be set sufficiently high over the adjacent band that the incumbent strong signal operation will not be deemed to be causing harm.

The approach is not one-size-fits-all. As the preceding examples illustrate, an assignment's harm claim threshold can be customized to reflect the current and expected performance of systems in this assignment, and those next to it. Thus, different bands will have different harm claim thresholds.

A harm claim threshold is not a receiver performance mandate since it does not specify how a receiver should perform in the presence of interference. It merely defines the interfering signal levels that must be exceeded before a service can bring a harmful interference claim.

There may be cases where the initially assigned harm claim threshold is not economically efficient. For example, there might be net social gain if the threshold were increased, allowing increased transmit power and thus better service in the adjacent band. The FCC should allow parties to adjust the limit by negotiation among affected neighbors. If the Commission deems that there is no prospect of such negotiations being concluded successfully, it could put incumbents on notice that the harm claim threshold level will be increased step-wise over time.

Harm claim thresholds may not be sufficient in cases where receivers are not controlled by a license holder, for life-safety systems like aviation, or for unlicensed devices. For example, thresholds attached to a transmitter license may be ineffective as a means of encouraging optimum receiver performance when receivers are not controlled by a licensee, as in the so-called decoupled receiver.[43] Examples include television, GPS, FM radio, satellite weather receivers, and unlicensed cases.

Additional measures may be required to ensure that such receivers operate adequately in the presence of interference. One possible solution is to require that manufacturers self-certify that a receiver is fit for

43. *See* Madelaine Maior, *Efficient Interface Management: Regulation, Receivers, and Right Enforcement: A Report on a Silicon Flatirons Summit, held 18 October 2011*, SILICON FLATIRONS CENTER (Jan. 10, 2012), http://www.siliconflatirons.com/documents/publications/report/EfficientInterferenceManagement.pdf.

purpose in its envisaged use, e.g., that it will operate successfully given the prescribed harm claim thresholds. A self-certification could function as an express warranty, or the certification could be enforced by false advertising regulation. This could be done by individual companies, or collectively through an industry-certified seal of approval. The FCC could also require the manufacturer to submit a testing protocol that allows validation of the claim to be fit for purpose, as in the self-declaration approach of the R&TTE directive.[44]

I do not believe that government receiver performance mandates are necessary or desirable. Receiver performance specifications are just one of many requirements needed to define a wireless system. Others include transmitter performance, and the power, height and spacing of transmit antennas. These specifications result from trade-offs between many design requirements, including the nature of the service to be delivered, cost constraints, quality of service requirements, and the radio interference environment. Imposing receiver performance mandates requires the FCC to take a position on these trade-offs for every product and every allocation where they are required. A mandate necessarily embeds these design trade-offs in regulation. But, while industry-defined receiver standards can evolve quite rapidly as technology changes, regulation changes more slowly. Last but not least, there are questions about whether the FCC currently has sufficient statutory authority to impose receiver mandates. Mandating "better" receivers may be unavoidable in a few cases —such as where receivers are not controlled by a license holder, for life-safety systems, or for unlicensed devices—but should be a last resort. Receiver standards may be best used as a safe harbor where industry standards ensure that systems should operate satisfactorily as long as the harm claim threshold is not exceeded. The FCC could use performance degradation of a standards-compliant system as prima facie evidence that a harm claim threshold has been exceeded.

D. Enforcement

The use of harm claim thresholds would make it clearer when a radio system operator is entitled to seek protection from the FCC against harmful interference by another operator. Since the 47 C.F.R. 2.1 definition of harmful interference is qualitative, the basis for seeking enforcement is unclear.

The procedure for seeking enforcement under a harm claim

44. *See* Directive 1999/5/EC, of the European Parliament and of the Council of 9 March 1999 on Radio Equipment and Telecommunications Terminal Equipment and the Mutual Recognition of Their Conformity, 1999 O.J. (L 91) 10, 17-18.

threshold regime[45] requires a plaintiff to make a quantitative showing that received interfering signal levels exceed their harm claim threshold.[46] If the plaintiff is suffering service degradation but the threshold is not being exceeded, it is responsible for finding a remedy, e.g., by improving its receivers or paying the interfering[47] neighbor, the influencing system, to reduce its transmitter levels.

If the harm claim threshold is exceeded the plaintiff may bring a harm claim to the FCC, and the Enforcement Bureau will determine whether the influencing system is operating outside its allowed transmitter parameters. If so, the FCC will conduct an enforcement proceeding. If the transmitter limits are not exceeded, there is a rule conflict: the affected system's harm claim threshold is exceeded, but not due to a fault of the influencing system. The FCC will then need to resolve this contradiction.

Showing actual harm (e.g., service degradation) is not necessary to show liability, but would affect the remedy. Even if liability is established, a greater or lesser showing of fault influences the consequences. For example, an affected system that has not yet started operating in a particular region will not suffer actual harm if a neighbor's signals exceed the harm claim threshold, but may be able to enjoin that operation in any case. There is also room for the defending influencing system to rebut the claim of harmful interference, for example if the circumstances that lead to the threshold being exceeded were very unusual.

The status quo enforcement procedure, i.e., without harm claim thresholds, is shown in Figure 2 by the blue shading. The use of harm claim thresholds makes it clear that an affected system bears some responsibility to mitigate the effects of interference, as shown by the unshaded boxes on the left-hand side.

45. *See infra* Figure 2.

46. *See* TAC RECEIVERS & SPECTRUM WORKING GROUP (2013), *supra* note 28 (noting this treatment differs from it in assigning more responsibilities to the FCC, and fewer to the affected system (called the target system there) and multi-stakeholder bodies).

47. GEN. SERVS. ADMIN., *supra* note 7 (noting interference refers here to energy that impedes reception of desired signals and does not presuppose that the interference is harmful).

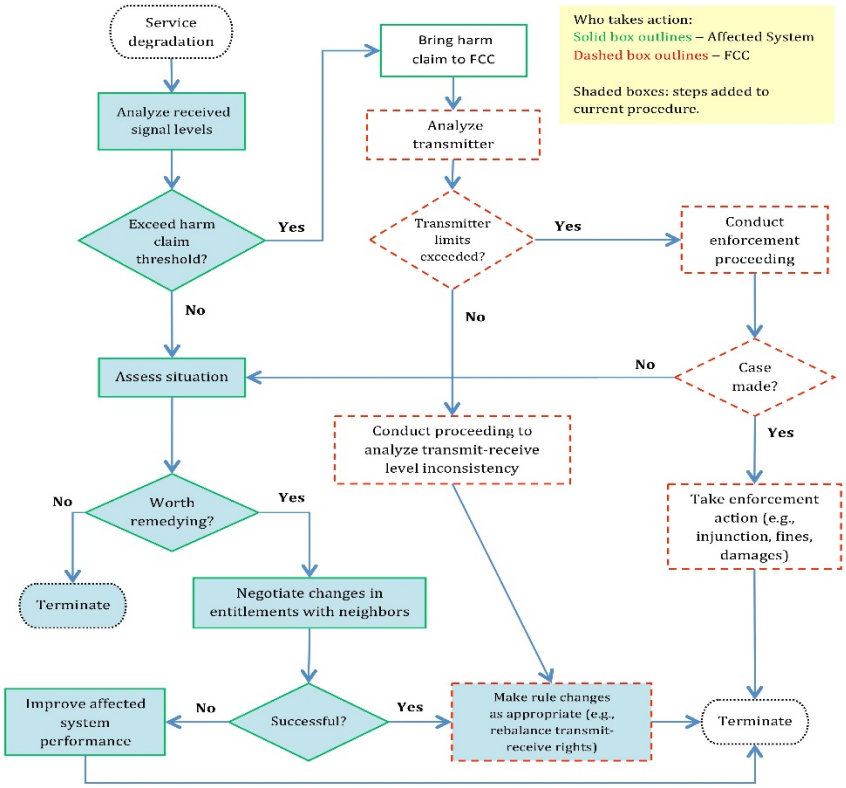

FIGURE 2. ENFORCEMENT PROCESS. A DECISION TREE FOR MAKING ENFORCEMENT DECISIONS AS DESCRIBED IN THE TEXT. STEPS ADDED TO THE CURRENT PROCEDURE ARE INDICATED BY SHADED BOXES.

IV. CONCLUSION

Setting harm claim thresholds is a minimally intrusive way to incentivize better receiver system performance by clearly stating the rights and responsibilities of systems to protect themselves against interference. If expectations about the interference tolerance of receiving systems had been set more clearly in the past, lost opportunities and economic harms could have been reduced or avoided.

MEASURING BROADBAND INTERNET PRICES

GABOR MOLNAR, SCOTT J. SAVAGE, AND DOUGLAS C. SICKER*

1. INTRODUCTION

How much? – asks the boss of the expert.
30! – the expert answers.
What do you mean when you say 30? – asks the boss.
What do you mean when you ask how much? – replies the expert.[1]

We may experience similar situations to the joke above when trying to collect economic data for broadband Internet access. Some data is available,[2] but when we make an attempt to understand how broadband markets and their players behave, we soon realize that there is no data in

* We thank Shane Greenstein, William Lehr, and seminar participants at CAIDA's 3rd Workshop on Internet Economics 2012, the Interdisciplinary Telecommunications Program, the Silicon Flatirons Center Digital Broadband Migration Annual Conference 2013, and the University of Colorado for comments. We gratefully acknowledge the use of data from Telogical Systems.

1. This is a classic joke in central Europe.

2. For example, the number of subscribers of the largest Internet Service Providers is available. *See* LEICTMAN RESEARCH GROUP, 2.6 MILLION ADDED BROADBAND FROM TOP CABLE AND TELEPHONE COMPANIES IN 2013 (2014), *available at* http://www.leichtmanresearch.com/press/031714release.html.

the public domain that could be used to track national or regional broadband service price development.

Consider the all-item Consumer Price Index ("CPI"), one of the most closely watched national economic statistics in the United States.[3] This general price index tracks the average change in prices over time, and it is commonly used to adjust the real values of salaries and pensions and to regulate prices. The Internet services CPI is part of the all-item CPI, but it cannot be used to monitor broadband price movements. The U.S. Bureau of Labor Statistics ("BLS") has been publishing an Internet price index since 1997, but this index does not consider the appreciable improvements in broadband end user experience and overestimates the results of inflation.[4] If we have an improperly calculated broadband CPI and we include this broadband CPI in the overall CPI, the overall CPI will also be incorrect.[5]

A more accurate broadband price index and a better understanding about aggregate prices are beneficial for many reasons. First, better pricing information means better inferences about market power and better policy decisions. Second, better pricing information is useful for estimating supply-demand models for broadband markets and calculating demand elasticity for high-speed Internet services. Third, price indices are useful for tracking conduct over time. Finally, a well-constructed Internet price index would mean a better general price index for the whole economy.

Despite these benefits and resultant academic criticism regarding the status quo, there is still no data available in the public domain to show how the quality-adjusted prices of Internet service in the United States change over time. This is a serious drawback. We must find a way to construct a relevant Internet price index that can be used by industry stakeholders as a benchmark for monitoring nationwide broadband price movements. If we accept that "broadband [Internet] is a foundation for economic growth, job creation, global competitiveness and a better way of life," and that "every American should have affordable access to robust broadband service,"[6] we should also seek to collect more reliable national and regional pricing data related to Internet access.

One of the recommendations of the National Broadband Plan is to

3. *See* CONSUMER PRICE INDEX, http://www.bls.gov/cpi/ (last visited Mar. 26, 2014).

4. Shane Greenstein, *Is the Price Right? The CPI for Internet Access: A Report for the Bureau of Economic Analysis* (Dec. 20, 2002), *available at* http://www.kellogg.northwestern.edu/faculty/greenstein/images/htm/Research/WP/Is_the_price_right.pdf.

5. The weight of the Internet services CPI in the overall CPI is not large today, but with convergence and cord cutting, the former's importance will likely grow.

6. FED. COMMC'NS COMM'N, CONNECTING AMERICA: THE NATIONAL BROADBAND PLAN XI, XIV (2010), *available at* http://download.broadband.gov/plan/national-broadband-plan.pdf.

improve the availability of information about broadband services.[7] The Federal Communications Commission's ("FCC") Measuring Broadband America program built an ongoing, rigorous, nationwide study of residential broadband technical service parameters in the United States.[8] As a result, researchers now have open access to the data of the program and can also access open platforms to deploy additional engineering measurements tools. We argue that there is also a need to create an ongoing, rigorous, nationwide study of *residential broadband price movements* in the United States.

In Section 2 of this paper, we provide an overview of the history of the CPI and review the shortcomings of the Internet access CPI. Section 3 adds relevant literature and reviews the most important challenges pertaining to the construction of a broadband price index. In Section 4, we show a simple example to illustrate why it is not possible to construct a price index with the public data currently available. Section 5 includes our recommendation on how data transparency could be improved by using a trusted repository and setting up an ongoing broadband pricing trends study. Section 6 concludes and outlines future efforts.

2. OVERVIEW

The CPI shows how the prices of certain products and services change over time. The Index is probably the most commonly used tool to monitor change in consumer prices around the world. In addition to its primary monitoring function, it has two other important applications. First, it is used as a deflator when time series data need to be adjusted to ensure that data is reported in monetary units that are comparable over time. Second, it is used as a benchmark measure in various types of contracts that include terms or conditions indexed to inflation.

A price index operates as a measure that examines the weighted average of prices of a predefined "basket" of consumer goods in time period t_o and compares this calculated average price with the weighted average of prices of the basket in time period t_1. As a simple example to illustrate the calculation of a broadband service price index, consider a single market with two Internet Service Providers ("ISPs"). One is a

7. *Id.* at 18-26.

8. The FCC's Measuring Broadband America program employs a comprehensive suite of software-based tools that periodically measure technical parameters, including upstream and downstream data rates, packet loss, latency, and jitter, while excluding the effects of consumers' equipment and their Internet activity. *See* OFFICE OF ENG'G & TECH. & CONSUMER & GOVERNMENTAL AFFAIRS BUREAU, FED. COMMC'NS COMM'N, MEASURING BROADBAND AMERICA: A REPORT ON CONSUMER WIRELINE BROADBAND PERFORMANCE IN THE U.S., 1-7 (2011), *available at* http://transition.fcc.gov/cgb/measuringbroadbandreport/Measuring_U.S._-_Main_Report_Full.pdf.

cable ISP and the other is a DSL ISP, each offering only one tier of service with an advertised downstream rate of 4Mbps. If the ISP of the 4Mbps DSL service, priced at $20 in year 0, increases the monthly price of the service to $22 in year 1, while holding other characteristics of the service (e.g. data rate) constant, the DSL Internet price index would record a 10 percent year-to-year increase. If the ISP of the 4Mbps cable service, also priced at $20 in year 0, increases the monthly price of the service to $24 in year 1, while holding other characteristics of the service constant, the cable Internet price index would show a 20 percent increase. In this example, assuming a hypothetical market share of 75 percent to cable and 25 percent to DSL, the overall broadband price index would show an annual increase of 17.5 percent.

2.1 Brief historical summary

The CPI is over 100 years old. The BLS first published an index of consumer prices for food in 1903.[9] By 1914, the index basket was expanded to include cloth and clothing.[10] It soon became apparent that the early version of the CPI was not representative of consumer prices in general. As a remedy, the BLS introduced a consumer expenditure survey to develop a broader index basket. Regular publication of a national CPI based on expenditure survey data began in 1921.[11] Since that time, the CPI has been revised six times to implement changes regarding weights, expanded coverage, and methodologies.[12] The improvements introduced over the years have reflected not only BLS's own experience but also the results of academic research.[13]

Although the accuracy of the CPI has long been questioned due to various types of potential biases,[14] the BLS and other statistical agencies around the world employ the same fundamental methodological principle

9. JOSEPH P. GOLDBERG & WILLIAM T. MOYE, FIRST HUNDRED YEARS OF THE BUREAU OF LABOR STATISTICS 36 (1985), *available at* http://www.bls.gov/opub/blsfirsthundredyears/100_years_of_bls.pdf.

10. Marshall Reinsdorf & Jack E. Triplett, *A Review of Reviews: Ninety Years of Professional Thinking About the Consumer Price Index*, *in* PRICE INDEX CONCEPTS AND MEASUREMENT 17 (Erwin W. Diewert et al. eds., 2009), *available at* http://www.nber.org/chapters/c5068.

11. BUREAU LABOR STATISTICS, *The Consumer Price Index,* in BLS HANDBOOK OF METHODS 7 (2007), *available at* http://www.bls.gov/opub/hom/pdf/homch17.pdf.

12. *Id.* at 8-12.

13. *Id.* at 10-12. Changes include, but are not limited to, methodology changes, changes in consumer spending weights, geographic and housing sample updates, and item classification revisions.

14. The Boskin Commission report emphasized four sources of possible CPI bias: substitution bias, outlet bias, quality bias, and new product bias. *See e.g.* ADVISORY COMM'N TO STUDY THE CONSUMER PRICE INDEX ("BOSKIN COMMISSION"), TOWARD A MORE ACCURATE MEASURE OF THE COST OF LIVING; FINAL REPORT TO THE SENATE FINANCE COMMITTEE (1996), *available at* http://www.ssa.gov/history/reports/boskinrpt.html.

today. First, the statistical agency chooses a sample of products and services as well as their sellers. Then the agency assigns a weight to each of these items based on how much a typical consumer spends on each of those items. Next, it gathers the price in the initial period for each of the product and service categories selected. After that, in a second period, the agency collects the price for exactly the same product or service from the same seller that was selected in the initial period. Finally, the agency calculates the CPI for the given time period from the data collected.[15]

The formula for the all-item CPI assumes that products and services have constant quality, and that their characteristics are not changing. There are goods and services, however, which show rapid rates of quality change, including Internet service. Customers may pay the same amount of money during the first and the second time periods, but they may experience a significantly better service in the second period due to data rate improvements offered by the ISP. Not adjusting for quality means that, for example, should an ISP increase its 1Mbps service (priced at $20) to 1.5Mbps, while holding other characteristics of the service constant, the official CPI would not record a price change.

2.2 The BLS Internet CPI methodology and its shortcomings

Simply put, the BLS constructs its price indices in two stages. In the first stage, basic indices are determined for each CPI item-area combination.[16] The weights for the first stage come from the sample data for the category in the area. The weights for the second stage are derived from reported expenditures from consumer expenditure surveys. The BLS then creates the all-items CPI from 8,018 basic indices derived from 38 geographic areas and 211 item categories.[17] Aggregate, higher-level indices are created by averaging across subsets of the 8,018 CPI item-area combinations. For example, the all-items CPI for Denver is the average of all 211 basic indexes in the Denver CPI area.[18] Similarly, the aggregate CPI for Internet services is the average of the basic indices for Internet services in each of the 38 index areas.[19]

The Internet services CPI has two components: one for new broadband customers and another for existing Internet users. These two components are added together to generate the Internet CPI, using price information from the relevant service providers. The appropriate weights

15. Jack Triplett, *Handbook on Hedonic Indexes and Quality Adjustments in Price Indexes: Special Application to Information Technology Products*, (Org. for Econ. Co-Operation & Dev. Directorate for Sci. Tech. & Indus., Working Paper No. 2004/9, 2004), *available at* http://www.oecd.org/science/scienceandtechnologypolicy/33789552.pdf.

16. For example, the Internet services index for the Denver CPI area is a basic index.

17. BUREAU LABOR STATISTICS, *supra* note 11, at 20-21.

18. *Id.*

19. GOLDBERG & MOYE, *supra* note 9, at 12-20.

are determined by the consumer expenditure surveys.[20]

The BLS first calculated and added the Internet access CPI to the all-item CPI in 1997.[21] Despite its relatively long existence, the Internet services CPI still does not reflect the steady changes in broadband end-user experience. In addition, the Internet services CPI does not provide relevant information for rural areas. We address each of these inadequacies in turn.

First, the BLS does not consider service quality when it constructs the Internet service price index. The BLS does not differentiate between distinctive service data rates, and considers a lower-tier Internet access service the same as a higher-tier Internet access service. Using the example from the beginning of this section, if the Internet service provider of the 4Mbps DSL service doubles the data rate of its broadband service in year 1, while keeping its price the same, the DSL CPI would show no change. Similarly, if the Internet service provider of the 4Mbps cable service increases the data rate to 20Mbps in year 1, while keeping its prices the same, the cable Internet price index still would not show any change. Although every customer would be receiving better service, the broadband price index for this sample market would show no change.

Year	All item CPI	Internet CPI	Ave. d/s data rate
2007	100	100	2.05 Mbps
2008	104	101	2.07 Mbps
2009	103	104	3.95 Mbps
2010	105	105	3.82 Mbps
2011	108	104	3.85 Mbps
2012	111	104	4.51 Mbps

TABLE 1. ALL ITEM CPI, INTERNET SERVICES CPI, AND AVERAGE DOWNSTREAM DATA RATES (2007-2012)[22]

At the time of writing, Internet access still is not among the CPI categories that utilize hedonic quality adjustment.[23] As a result, the official Internet CPI remains quite flat, notwithstanding the significant

20. Greenstein, *supra* note 4, at 7-8.

21. GOLDBERG & MOYE, *supra* note 9, at 7-11.

22. This information can be pulled from the BLS's online database under index item SEEE03 for years 2007-2012 and using 2007 as a baseline of 100. *Consumer Price Index-All Urban Consumers: Multi-Screen Data Search*, BUREAU OF LABOR STATISTICS, http://data.bls.gov/cgi-bin/dsrv?cu (last visited Oct. 23, 2013).

23. Hedonic quality adjustment methods remove price differentials due to quality change by adjusting the price with the estimated value of the change. For the full list of CPI items that utilize quality adjustments *see Hedonic Quality Adjustment in the CPI*, BUREAU OF LABOR STATISTICS, http://www.bls.gov/cpi/cpihqaitem.htm (last modified Feb. 23, 2012).

improvement in broadband access speeds. Table 1 shows the all-item CPI and the Internet services CPI of the BLS for the years 2007-2012. The last column presents the growth of the average downstream data rate within the same time period.[24] Table 1 illustrates that Internet prices, on average, have increased by four percent between 2007 and 2012, while the all-item CPI has increased by eleven percent. During the same period, Internet subscriptions increased by 250 percent and the average downstream data rate of broadband subscriptions increased by 120 percent.[25] Contrary to this, the BLS does apply hedonic quality adjustment in certain other item categories that tend to experience a high degree of quality change. For instance, the Bureau adjusts for quality changes in television or video equipment.[26]

Another issue is that the Internet service price indices of the BLS do not reflect the inflation impact across the entire US population. This is not an error in the CPI construct, but it is an attribute by definition. The CPI is defined as a measure of the average change over time in the prices paid by urban consumers for a market basket of consumer products and services.[27] That is, the BLS price indices reflect only the inflation experiences of urban consumers.[28] This is also an issue for economists and policymakers, as ISP service offerings can differ substantially between urban and rural areas. Without realistic data on quality, price, and number of subscriptions from all regions of the U.S., it is difficult to reliably assess the effectiveness of policy programs intended to increase broadband service penetration in underserved areas. Regardless of these shortcomings, we believe that a broadband price index can be constructed that is more relevant and able to address these issues. The next section reviews the most significant challenges pertaining to its creation.

24. Average data rates are based on the connections-by-speed-tier data reported by the FCC. *See* High-Speed Services for Internet Access, INDUS. ANALYSIS & TECH. DIV., WIRELINE COMPETITION BUREAU, FED. COMMC'NS COMM'N. (2007-2012), *available at* http://transition.fcc.gov/wcb/iatd/comp.html.

25. Data from FCC form 477 filings for the years of 2007-2012. Only Internet connections where data rates exceeded 200kbps in both direction were considered. *See Local Telephone Competition and Broadband Deployment*, FED. COMMNC'NS COMM'N, http://transition.fcc.gov/wcb/iatd/comp.html.

26. BUREAU LABOR STATISTICS, *supra* note 11, at 12-20.

27. BUREAU LABOR STATISTICS, *Consumer Price Index Frequently Asked Questions (FAQs*), http://www.bls.gov/cpi/cpifaq.htm (last modified Aug. 15, 2013).

28. The BLS publishes two CPIs: one for all urban consumers (CPI-U) and another one for urban wage earners and clerical workers (CPI-W). They differ in the relative weights that are attached to the basic item-area components. *See* BUREAU LABOR STATISTICS, *supra* note 11, at 20-21.

3. CONSTRUCTING A BROADBAND CPI

Simply put, we need two things to create a broadband price index. First, we need reliable, validated data about service penetration and prices. That is, we need to know—for every relevant time period—the number of broadband customers in each geographical market, their service levels, and the price they pay for their broadband service. Second, we need to build a method that adequately accounts for quality changes between relevant time periods. This section reviews these two areas of consideration.

3.1 Data on service availability, penetration, and prices

There are various entities that collect and offer empirical data about Internet service, but none of the databases allow us to construct a broadband price index and truly monitor broadband price movements. The FCC aggregates information about broadband and voice connections from ISPs twice a year.[29] Based on the current rules of the FCC's Form 477 data program, all broadband service providers must report the numbers of residential subscribers at the census-tract level, broken down by technology and speed tier. The Form 477 program, however, does not collect price information, and makes only the summary statistics of subscribership data available to the public.[30]

The National Broadband Map ("NBM") also offers data on broadband Internet service availability, on the technology used to provide the service, and on the service levels offered by ISPs.[31] Created from a collaboration between the National Telecommunications and Information Administration ("NTIA"), the FCC, and all states and territories of the U.S., the NBM is an online tool to provide semi-annual information on the availability, technology, speed, and location of broadband Internet access at the census block group ("CBG") level. The NBM is a useful tool to track service availability, but it does not provide information on subscriptions or pricing.

The Securities and Exchange Commission ("SEC") requires companies to disclose certain financial and business information on an ongoing basis. The federal securities laws require publicly traded companies to submit annual reports on Form 10-K, quarterly reports on Form 10-Q, and updates on Form 8-K.[32] It is possible to gather

29. *See Instructions for Local Telephone Competition and Broadband Reporting*, FED. COMMNC'NS COMM'N, http://transition.fcc.gov/Forms/Form477/477inst.pdf (last visited Apr. 15, 2014).

30. *Id.*

31. NATIONAL BROADBAND MAP, http://www.broadbandmap.gov (last visited Mar. 26, 2014).

32. *See generally Form 10-Q: General Instructions*, SEC. & EXCH. COMM'N,

information from these documents, but the reports only provide aggregate information that might be used to validate data but not to construct a broadband CPI. For example, ISPs disclose in their SEC reports how many broadband customers they have, but they disclose only aggregate figures and do not provide any breakdown as to geographical markets or service tier.[33]

Consulting firms and other commercial information providers, for example Telogical Systems, also regularly collect data and provide their customers with business information on Internet service availability and pricing. ISPs also have their own internal confidential databases. None of these databases are in the public domain, but some data from these sources could be used to validate information regarding service penetration or prices.

Data Sources	Accessibility	**Data Content**
FCC Form 477 Data Program	Semi-public	Subscriber numbers (census tract level, per speed tier), no pricing info
NTIA/FCC National Broadband Map	Public	Service coverage, max. advertised rates at the CBG level, no pricing info
Company SEC filings	Public	Subscriber numbers & revenues (quarterly, no regional breakdown)
Commercial Information Providers & Business Consulting Firms	Private, for fee	Varies
Proprietary Databases (e.g., CableLabs, Company internal data)	Confidential	Varies

TABLE 2. DATA SOURCES, ACCESSIBILITY, AND CONTENT

3.2 Accounting for qualitative changes and other contract features

How to adequately account for quality change has been one of the controversies in estimating price indices for Internet services. Indeed, one of the greatest problems faced in compiling a price index is the

https://www.sec.gov/about/forms/form10-q.pdf (last visited Apr. 15, 2014); *Form 10-K: General Instructions*, SEC. & EXCH. COMM'N, https://www.sec.gov/about/forms/form10-k.pdf (last visited Apr. 15, 2014); *Form 8-K: Current Report*, SEC. & EXCH. COMM'N, https://www.sec.gov/about/forms/form8-k.pdf (last visited Apr. 15, 2014).

33. Note that most of the DSL ISPs do not disclose revenue details from their residential broadband activities in their SEC reports; they report only revenue from their residential market segment. Contrary to this, cable ISPs do provide some details in their SEC filings regarding revenue from residential broadband activities.

accurate measurement and treatment of quality change due to changing product specifications and consumption patterns.[34]

Greenstein argued that hedonic quality adjustments would be desired to construct an Internet access CPI; he also argued that quality-adjusted indices are better than transactional indices because quality-adjusted indices use systematic methods to consider quality change.[35] Several empirical studies since have concluded that quality adjustments are necessary to create a better price index. Stranger and Greenstein, and Yu and Prud'homme determined that quality-adjusted price indices for Internet access show larger price declines than those of unadjusted indices.[36] Even later, Greenstein and McDevitt found that an Internet access CPI that adequately considered quality changes would have declined by between 1.6 percent and 2.2 percent per year.[37]

Williams recommends that the BLS adopt price adjustments using the predicted-price method based on the Box-Cox model.[38] Williams also constructed a quality-adjusted broadband CPI, based on empirical data, and investigated the difference between this experimental index and the official price index.[39] He concludes that, in order to account for quality movements over time, hedonic adjustments need to be made to the official Internet access CPI.[40] Williams also argues that the Box-Cox regression provides a better estimation of hedonic models than other,

34. There are two fundamentally different types of methodologies to handle the issues related to rapid quality changes: conventional (matched model) techniques and hedonic methods. The detailed review of these techniques lies outside the scope of this paper. *See* Triplett, *supra* note 15.

35. Greenstein, *supra* note 4, at 7-8. Greenstein identified six areas in which Internet access issues should be addressed: service data rate, service availability, contract features, reliability, network effects, and other non-price features.

36. Greg Stranger & Shane Greenstein, *Pricing in the shadow of firm turnover: ISPs during the 1990s*, 26 INT'L J. IND. ORG. 625 (2008); Kam Yu & Marc Prud'homme, *Econometric issues in hedonic price indices: the case of internet service providers,* 42 APPLIED ECON. 1973 (2010), *available at* http://flash.lakeheadu.ca/~kyu/Papers/Yu-Prudhomme2010.pdf.

37. Shane Greenstein & Ryan C. McDevitt, *The Broadband Bonus: Estimating Broadband Internet's Economic Value* (Apr. 2010), http://www.kellogg.northwestern.edu/faculty/greenstein/images/htm/Research/WP/Broadband%20Bonus%20-%20GreensteinMcDevitt-4.pdf.

38. Brendan Williams, *A hedonic model for Internet access Service in the Consumer Price Index*, MONTHLY LABOR REV., July 2008, at 33, *available at* http://www.bls.gov/opub/mlr/2008/07/art3full.pdf. The Box-Cox regression procedure transforms the dependent variable using a specific data transformation function. This technique is useful when normal distribution cannot be assumed.

39. *Id.* at 40-46. The experimental work of Williams showed the value of hedonic adjustment, but found no major differences between the quality-adjusted experimental and official indices. It is important to note, however, that Williams' work focused on the time period of 2005-2006, where broadband only contributed about 36 percent of the overall quotes used to calculate the price index; the rest of the quotes were still for dial-up.

40. *Id.* at 47.

more restrictive functional forms.[41]

While we argue that quality adjustment is necessary, development of a recommended hedonic regression model is outside the scope of this paper. Nevertheless, it is very appealing to investigate the use of the Box-Cox model using validated data from 2010 and onwards, and we consider doing that at a later phase of our research.

4. A SIMPLE EXAMPLE

The first three sections of this paper argue that there is no reliable regional data in the public domain on broadband pricing and service penetration. This section now connects the theoretical concepts presented in the previous sections with a simple example to illustrate the difficulties when calculating a broadband price index with imperfect data.[42]

4.1 CPI for continuing users

Internet markets are very heterogeneous in terms of consumer preferences, technologies used, and service plans provided by the ISPs.[43] Most ISPs offer multiple service packages in their respective coverage areas. The geographical size of the "market" is arbitrary for the purpose of our investigation. We may focus on small geographic areas and consider each census block as a distinct market. Alternatively, we could also study large markets and interpret each state as a separate market. In the former case, it will be extremely difficult to collect reliable information at this very granular level. In the latter case, we give up granularity but will likely be able to collect relevant information.

Broadband CPI can be calculated by measuring price changes and multiplying price changes by the weighting attached to the service packages. To calculate a formula for the broadband price index between 2010-2011 and 2011-2012, we must first approximate the number of customers of the ISPs in each market. Second, we must assign a weight to each of the ISP service packages based on customer penetration figures in each market. From this information, combined with prices, it is possible to calculate the weighted average price of the broadband Internet service in 2010, 2011, and 2012.

It is feasible to gather information on the number of residential

41. *Id.*

42. To keep the example simple, we compare annual price changes between mid-year of 2010, 2011 and 2012.

43. INDUS. ANALYSIS & TECH. DIV., WIRELINE COMPETITION BUREAU, FED. COMMC'NS COMM'N., INTERNET ACCESS SERVICES: STATUS AS OF JUNE 30, 2011 1-12 (2012), *available at* http://transition.fcc.gov/Daily_Releases/Daily_Business/2012/db0614/DOC-314630A1.pdf.

broadband customers of the largest ISPs. Public companies report this information in their regular SEC filings. Consulting companies, such as the Leichtman Research Group, also regularly publish broadband subscriber counts of the largest ISPs.[44] However, this is nationwide data and no regional breakdown is available.

Concerning the availability of pricing information, commercial information providers, such as Telogical Systems, regularly collect and organize broadband pricing data and make it accessible to their clients. Although these pricing databases are not in the public domain, they include the relevant information for price index construction.[45] Telogical Systems regularly collects detailed price information of Internet service, and its data can be organized by ISP, geography, and service package. For example, Q2 2010 data from Telogical System shows that Comcast offered several residential service packages in most of its major markets.[46] These service packages range from basic, economy service (1.5Mbps) through mid-tier service (16Mbps) to top-tier service (50Mbps). Pricing information is available, per service tier, on the setup charge, the monthly rate, and promotional charges. We can also learn the specifics about service bundles that include voice and video as well as Internet. This pricing information is necessary, but not sufficient, to calculate the average price per market. Calculation of the average price per each geographical region can only be done if we have some knowledge as to the number of customers subscribing to different service plans, and this is where the exercise must end; it is not possible to calculate average prices because appropriate weights depend on information that is not disclosed by the ISPs.

The U.S. government understands the importance of broadband pricing data collection[47] and has made several attempts to collect market-specific data on blended average speed or average revenue per end-user

44. *See e.g.,* LEICHTMAN RESEARCH GROUP, BROADBAND INTERNET ACCESS & SERVICES IN THE HOME (2013), *available at* http://www.leichtmanresearch.com/research/bband_home_brochure.pdf. Note, that collecting data on the 20 largest ISPs is sufficient because these providers server over 93 percent of the customers.

45. We gratefully acknowledge the use of data from Telogical Systems for our pricing study.

46. Telogical data is not in the public domain and must be purchased. *Residential Telecom Pricing & Alerts*, TELOGICALSYSTEMS, http://www.telogicalsystems.com/products-services/telogical-data-alerts/residential-telecom-pricing-data-alerts/ (last visited Apr. 13, 2014) (providing purchase information).

47. *See e.g.,* Broadband Data Improvement Act, Pub. L. No. 110-305, 122 Stat. 4096 (2008) (codified as amended 47 U.S.C. §§ 1301, 1303, 1304 (2012)) ("The Comptroller General shall conduct a study to consider and evaluate additional broadband metrics or standards that may be used by industry and the Federal Government to provide users with more accurate information about the cost and capability of their broadband connection, and to better compare the deployment and penetration of broadband in the United States with other countries.").

("ARPU").[48] However, the relevant aggregate broadband service pricing data is not available,[49] nor it is being collected today.[50] The question then remains: if the government does not or cannot collect the data, what else can be done?

There are two potential solutions to this problem. The first is to use statistical methods and collect information directly from the field. The second is to set up a structure in which ISPs would be willing to share relevant aggregated data on subscriptions and prices. In the following section, we suggest doing both.

5. BROADBAND AMERICAN PRICING TRENDS STUDY

The first three sections argued that end-users, researchers, policy makers, and the telecom industry as a whole are lacking reliable data on broadband service penetration in the US.[51] The previous section showed by example that none of the existing data sources allow us to make up for the deficiencies of the official Internet access CPI. We now argue that the industry must form an ongoing, rigorous, nationwide study of broadband pricing trends in the United States. As a remedy, we propose to set up an ongoing research effort using industry-wide collaborative efforts. The objective of the efforts would be the creation and maintenance of a Residential Broadband Price Index.[52]

48. The FCC also regularly publishes its Broadband Progress Reports. These reports analyze broadband deployment in the United States using a speed benchmark. These reports have used Form 477 data in the past, but they now rely solely on NBM data. In addition, the Broadband Data Improvement Act requires the FCC to report "information comparing the extent of broadband service capability (including data transmission speeds and price for broadband service capability) in a total of 75 communities in at least 25 countries abroad for each of the data rate benchmarks for broadband service utilized by the Commission to reflect different speed tiers." *Id.*

49. The original description of the "State Broadband Data and Development Grant Program" aspired to collect data on the ARPU and subscriber-weighted average speed for each broadband service provider, by county, across the entire United States. A later-issued supplemental guidance made the collection of pricing data "not required". State Broadband Data and Development Grant Program, 70 Fed. Reg. 40,569-70 (Aug. 12, 2009); *see also* NAT'L TELECOMM. AND INFO. ADMIN., RIN 0660-ZA29, STATE BROADBAND DATA AND DEVELOPMENT GRANT PROGRAM (2009), *available at* http://www2.ntia.doc.gov/files/NTIA_MappingFAQ_NOFAClarity.pdf.

50. It may be suggested that the FCC's Form 477 data program can solve the issue regarding the lack of relevant pricing information. The FCC, as part of its larger Data Innovation Initiative, issued a Notice of Proposed Rulemaking on Modernizing the FCC Form 477. Modernizing the FCC Form 477 Data Program, *Notice of Proposed Rulemaking,* 26 F.C.C.R. 1508, 1572 (2011). After two years, however, there is no information regarding when or if the program will be extended to collect relevant pricing data.

51. Individual ISPs, of course, do know their prices and penetration figures and likely have information on their competitors. The industry as a whole, however, does not have aggregate understanding about CPI and other aggregate pricing data.

52. Our broadband pricing trends initiative would leverage the concept of the Measuring Broadband America program. We believe that the methodology used by the program to collect

In the spirit of the Measuring Broadband America program, the suggested pricing trend study would gather data from an all-volunteer broadband end user sample panel. The sample panel would be selected with the goal of covering major ISPs in all the states across six broadband technologies: DSL, cable, fiber-to-the-home ("FTTH"), fixed-terrestrial-wireless, mobile, and satellite.[53] The sample panel would be representative of the U.S. population to ensure that the results would support statistically valid inferences.[54]

Validation of panelists' service tier would be done by collecting actual end-user bills. To ensure the protection of survey respondents' privacy, the sample panel should include volunteers who knowingly and explicitly opt into the research. The study would collect data from end-users and operators on a semi-annual basis. Data collection of the study would be in sync with the data collection periods of the National Broadband Map. The regularly updated technical performance and service availability data from the Measuring Broadband America program and the National Broadband Map would allow us to build a robust quality adjustment model for major regions, cities, and selected rural and remote locations.

A critical component of such a study is the existence of a trusted repository capable of collecting and analyzing pricing data and making aggregate results available. We believe that the Interdisciplinary Telecommunications Program at the University of Colorado have the necessary expertise relevant to the subject, and could act and be viewed as a trusted repository for pricing trend data.

Contrary to the performance measurement program, the participation of the ISPs is not required. Despite this, the study desires to include leading ISPs. ISPs may voluntarily provide price and service penetration data to a trusted repository to ensure that the Broadband America Pricing Trend study brings accurate results. Participating ISPs would be asked to provide information to the trusted depository about their Internet data package(s), the corresponding average monthly price, and their number of customers per service tier(s). ISPs would be asked to provide relevant data semi-annually and at the state level.

The study then would use statistical techniques to validate the survey data results using data provided by the participating ISPs, and use

performance data could also serve as an example for collecting aggregate pricing data.

53. The Measuring Broadband America program currently measures the performance of only five broadband technologies: DSL, cable, FTTH, fixed-terrestrial-wireless, and satellite, but introducing a performance measurement for mobile services has also been considered. Additionally, due to the low number of satellite and fixed terrestrial wireless technology samples, the results from those technologies were not included in the 2011 and 2012 report.

54. Considering the costs of data collection at the time of writing, a sample size of 15,000 participants is called for.

the validated data to construct residential broadband price indices. Of course, all data submitted to the Broadband America Pricing Trends study would be held strictly confidential, and the program would maintain the confidentiality of information at the service provider level. Only aggregations of the data will be made public, to ensure that an individual ISP's data is not identified. Participating ISPs, as an extra incentive, may also be granted access to more detailed regional data—but only to aggregate data; no ISP specific data would be provided to any third party.

The goal of the Broadband America Pricing Trends study is to provide the most accurate economic information available related to pricing trends in the United States. To make this possible, the team would be using a variety of best practices to validate data before constructing the broadband price index. This includes a combination of techniques, including comparing information supplied by end users to data from the broadband service providers, public data, and third-party datasets.

6. SUMMARY AND CONCLUDING REMARKS

Former FCC Chairman Julius Genachowski has remarked that "policymaking is only as good as the facts and data on which decisions are based."[55] Indeed, fact-based communication policy-making is important for two reasons. First, quality data drives quality decisions. Second, factual and public data improves transparency, and transparency can protect against decision-making processes being captured by partial interests.

There are efforts from the US government to collect better economic data related to broadband Internet, but the fact is that, as of 2014, the United States does not have a broadband price index that reliably monitors nationwide broadband price changes. The BLS has been publishing an official Internet price index for over fifteen years, but despite criticism, the official price index still does not consider broadband data rate improvements.

This paper provided an overview of the history of CPI and reviewed the shortcomings of the BLS Internet access CPI. Most of the issues the paper raised are not new discoveries and can be solved by having adequate data available. While some efforts are underway to improve the situation, it is also not clear if, when, or how the U.S. government will start collecting and publishing aggregate pricing information for broadband Internet services.

To augment existing efforts, we presented the concept of a

55. Modernizing the FCC Form 477 Data Program, *supra* note 50, at 1572.

Broadband America Pricing Trends study, a research initiative of the Interdisciplinary Telecommunication Program at the University of Colorado. The objective of the initiative is to regularly publish broadband price indices that can be used by end users, academia, policy makers, and the industry to accurately measure and monitor price trends of broadband Internet service. While the task is not simple, we believe that by leveraging the methodology of the Measuring Broadband America program, and by using a trusted repository, a contemporary and robust broadband price index can be created by joint efforts.

INCREASING WIRELESS VALUE: TECHNOLOGY, SPECTRUM, AND INCENTIVES

GREGORY L. ROSSTON*

Communications services have changed substantially over the past 50 years. In 1963, about three quarters of U.S. households had a landline telephone with very expensive long-distance charges.[1] Just over 90% of households had televisions,[2] typically receiving the signals of three

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1. *See* U.S. CENSUS BUREAU, *Selected Communications Media: 1920 to 2001*, No. HS-42, 79–80 (2003), *available at* http://www.census.gov/statab/hist/HS-42.pdf.

2. *Id.*

national television networks and possibly a few local television channels, broadcasting in black and white.[3] Approximately 2,000 computers were in use in the entire United States.[4] The U.S. Postal Service handled about one letter per person per day.[5]

In the 1970s, 1980s, and 1990s, the spread of cable television, the introduction of cellular telephony, and the rise of the Internet changed how people communicate. Even over the past ten years, changes have continued, with the advent of texting, smartphones, video conversations, and the like. Demand for wireless service has been growing rapidly. But while quantity of wireless service—measured in terms of bytes or minutes—has increased dramatically, price has increased little, if at all. Because price has not increased while the demand curve has shifted dramatically for wireless communications (tastes, capabilities, etc.), the supply curve must have shifted dramatically as well.[6]

Most predictions are that demand will continue to shift outwards as tastes move to wireless and wireless devices continue to become more attractive. So, shifts in the supply curve must continue or prices will increase.

This article will examine how supply of wireless capacity has increased and how it can continue to increase in the future. At a high level, there are three ways to increase wireless capacity: increasing the amount of spectrum used—or increasing the value of the use of spectrum; increasing the use of capital involving a particular technology (e.g., more cell sites) with the spectrum; and increasing the technological capability of the capital employed (e.g., more technologically advanced cell sites, or somehow reducing contention for spectrum use) for wireless transmissions.

The first mechanism for increasing wireless capacity is to make additional spectrum available. However, very little spectrum is not currently allocated to any specific use, so that increasing the amount of spectrum available for one use necessarily entails an opportunity cost—some other use that would be precluded or limited.

Given that there is little prospect for finding currently unused spectrum, the government should institute policies that promote the

3. In addition, on December 7, 1963, CBS showed the first instant replay in the Army Navy football game. *See Computer History 1960 – 1980*, COMPUTER HOPE, http://www.computerhope.com/history/196080.htm (last visited Oct. 23, 2013).

4. *Id*.

5. *Pieces of Mail Handled, Number of Post Offices, Income, and Expenses Since 1789,* U.S. POSTAL SERVICE (2014), http://about.usps.com/who-we-are/postal-history/pieces-of-mail-since-1789.pdf.

6. *CTIA Semi-Annual Wireless Industry Survey*, CELLULAR TELECOMM. & INFO. ASS'N (2012), http://files.ctia.org/pdf/CTIA_Survey_MY_2012_Graphics-_final.pdf. Wireless output used to be measured in terms of voice minutes of use but now output needs to be measured differently—in terms of data usage, which includes voice and text.

economically efficient use of spectrum currently in use, which in turn could make spectrum available for alternative uses. The best way for the government to promote spectrum efficiency is to ensure that users have flexibility and that they realize the opportunity cost of their use of spectrum. The government can do this by removing restrictions on use; transferring transmission rights from the government to the private sector; and ensuring that open access spectrum is appropriate, both in quantity and in terms of the frequencies it occupies.

Such government policies also facilitate the second and third mechanisms for increasing wireless capacity. If users internalize the opportunity cost of spectrum use, they will make appropriate investments in capital and the introduction of new technology.

I. INCREASING CAPACITY ON SPECTRUM THAT IS FLEXIBLY ALLOCATED

Hatfield and Ax use an engineering model to show the tradeoff between using spectrum and splitting cells (using additional capital) in a cellular system.[7] While the technologies have changed, users still make a calculation between acquiring spectrum and investing in additional infrastructure to increase capacity.

Licensees have incentives to use flexibly allocated spectrum efficiently and have increased the technical efficiency of the transmissions on their licensed spectrum. There are two ways to increase the technical efficiency for a given amount of spectrum: increasing the amount of capital, and enhancing the technology used with the spectrum.

Currently, the Federal Communications Commission ("FCC") has allocated about 547 MHz for commercial licensed flexible use spectrum below 3.7 GHz, of which it indicates that 442 MHz is suitable and available for mobile broadband service (including 156.5 MHz below 1 GHz).[8] There should be "500 megahertz of spectrum newly available for broadband within 10 years, of which 300 megahertz should be made available for mobile use within five years."[9]

Licensed wireless service providers have invested over $347 billion

7. *See generally* DALE HATFIELD & GENE G. AX, THE OPPORTUNITY COSTS OF SPECTRUM ALLOCATED TO HIGH DEFINITION TELEVISION (1988).

8. Cellular (50 MHz), PCS (120 MHz), SMR (26.5 MHz), and 700 MHz (80 MHz) spectrum, as well as AWS-1 (90 MHz) and BRS (55.5 MHz) Wireless Communications Service (“WCS”) (20 MHz). Application of AT&T Inc. and Qualcomm Inc. for Consent to Assign Licenses and Authorizations, Order, 26 FCC Rcd. 17,589 (Dec. 22, 2011); Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions, 26 C.F.R. §§ 1, 27, 73 (2013). The FCC hopes to transition up to 120 MHz of spectrum in the 600 MHz band from television to flexible use in the next few years.

9. FED. COMMC’NS COMM’N, CONNECTING AMERICA: THE NATIONAL BROADBAND PLAN xii (2010).

to build the infrastructure necessary to provide cellular service where the frequencies assigned to them can be used many times within a metropolitan area.[10] Building more cell sites and reducing the range of transmission increases the frequency reuse and hence increases system capacity. However, each cell split becomes more complex with fewer locations for transmitters and increased cost for backhaul and cell handoffs. In addition, it may be difficult to reduce power and achieve coverage—especially within buildings—at the same time.

Advances in technology have also led to substantial increases in capacity. Originally, cellular systems were based on the FCC-mandated Analog Mobile Phone System ("AMPS") standard developed by Motorola and Bell Labs. In the 1980s, capacity worries led wireless providers to move toward more advanced digital technologies.[11] In 1994, the FCC declined to adopt any particular standard for U.S. wireless (in contrast to Europe's adoption of GSM technology) and carriers adopted at least three major flavors of 2G technology (GSM, TDMA, and CDMA technologies).[12] 2G technology led to a capacity increase over AMPS. The move to 3G and now to LTE technology has generated further increases in capacity over 3G and AMPS.

The order of magnitude increases in wireless usage has been driven by increased spectrum, increased capital investment in cell sites and backhaul, and increases in technological capability as carriers install newer, more spectrally efficient technology.

At the same time, there has been substantial increase in the capacity from and usage on unlicensed spectrum for the same reasons. Most of this additional capacity has been on so-called Wi-Fi networks. Spectrum has been allocated to unlicensed use in the 900 MHz, 2.4 GHz, and 5.2 GHz bands. In addition, new generations of technology have been introduced. From 802.11a and 802.11b in 1999 to 802.11g in 2003 to 802.11n in 2009, and future generations are under development.[13] The changes in technology have increased the carrying throughput of any Wi-Fi channel. Finally, and perhaps most importantly, the number of Wi-Fi networks has grown dramatically. One source reports more than 85 million Wi-Fi networks, although I suspect that the actual number is

10. CELLULAR TELECOMM. & INFO. ASS'N, SEMI-ANNUAL WIRELESS INDUSTRY SURVEY (2012), *available at* http://files.ctia.org/pdf/CTIA_Survey_MY_2012_Graphics-_final.pdf (reporting that there were over 285,000 commercial cell sites).

11. Gregory L. Rosston, An Economic Analysis of the Effects of FCC Regulation on Land Mobile Radio (Aug. 1994) (unpublished Ph.D. dissertation, Stanford University) (on file with Robert Crown Law Library, Stanford University).

12. FED. COMMC'NS COMM'N, SECOND ANNUAL REPORT AND ANALYSIS OF COMPETITIVE MARKET CONDITIONS WITH RESPECT TO COMMERCIAL MOBILE SERVICES 7 (1997), *available at* http://wireless.fcc.gov/auctions/data/papersAndStudies/fc9775.pdf.

13. *See generally* Kevin J. Negus & Al Petrick, *History of Wireless Local Area Networks (WLANs) in the Unlicensed Bands,* 11 INFO. 36 (2009).

much higher as the figure only accounts for reported networks.[14] Because of the short-range nature of Wi-Fi transmissions, households adding a Wi-Fi network cover their homes and only at most a small number of nearby homes, meaning that the channels can be reused every few homes without substantial contention for the spectrum capacity.

II. MOVING SPECTRUM TO BE MORE FLEXIBLY ALLOCATED

Kwerel and Williams examine the benefits from reallocating television spectrum to general wireless service and find there would have been large benefits from such reallocation.[15] They consider not only the Hatfield/Ax cost tradeoff,[16] but also the net social surplus from the new services. One of the most important lessons from Kwerel and Williams, and many other spectrum studies is that flexible use is a key to maximizing benefits from spectrum because flexibility allows spectrum users to provide more highly valued services.

Government regulates spectrum on several dimensions: flexible use vs. mandated use; licensed vs. open entry; primary and secondary usage rights; and technology choice. The government rules lead to very different outcomes in intensity of spectrum use—what engineers might call technical efficiency—and even more importantly, very different outcomes in the value of spectrum use.

Normally, market forces would push such imbalances away and cause the value of spectrum used for different services to move toward equality at the margin. As a matter of economics, without market power concerns, there should not be substantial inefficiencies in the use of non-governmental spectrum where users face the full opportunity cost of spectrum use. Licensees with very flexible rights of usage and the ability to recover value from repurposing the use of the spectrum realize most if not all of the opportunity cost of their spectrum use, and act accordingly, with investment in capital and technological transitions, and would not "hoard" spectrum inefficiently.

There are at least three exceptions to the efficient use for non-governmental spectrum. First, when licenses restrict use, such as with television broadcasting and satellite, and the licensees do not have flexibility in repurposing spectrum use. To achieve more efficient spectrum use, granting flexible usage rights should make a large improvement. At the same time, instituting fees on these users would be

14. *WiFi Networks over Time*, WIGLE.NET, http://www.wigle.net/gps/gps/main/stats/ (last visited Oct. 20, 2013).

15. *See generally* Evan R. Kwerel & John R. Williams, *Changing Channels: Voluntary Reallocation of UHF Television Spectrum* (Fed. Commc'ns Comm'n Office of Plans & Policy, Working Paper No. 27, 1992) *available at* http://transition.fcc.gov/Bureaus/OPP/working_papers/oppwp27.pdf.

16. Hatfield & Ax, *supra* note 7.

at best an indirect mechanism to correct for this government failure to design property rights flexibly.

Second, there are bands such as the 450-470 MHz private radio band where entry is open so that users do not have licenses that make them realize the full opportunity cost of their spectrum use. In these bands, spectrum coordinators work to accommodate all entrants to the band. As a result, if a single user adopts a more efficient technology for its use, the benefits redound to new users who might be able to fit into the band as well as existing users who have a better chance of clear communications. With open entry, it is difficult to get a user to adopt efficient technology without some other mechanism such as spectrum fees.

Third, sometimes there could be market power concerns. Rosston and Topper showed that market power was not a problem in the market for wireless services generally. [17] But, it is important for the competition authorities to ensure that actions do not result in a reduction in competition that harms consumer welfare. The FCC[18] and DeGraba and Rosston[19] show that the proposed AT&T and T-Mobile merger was likely to lead to higher prices, leading to the government action to block the merger and the ultimate abandonment of the deal by the parties.

For spectrum used by the government, there are two related margins on which to promote efficiency: allocating spectrum within government users and allocating spectrum between the government and the market.

A. Government spectrum may be able to be used more efficiently

This section looks at how lack of flexibility, legacy technology, and lack of coordination impact the two main areas of spectrum users that most observers claim are inefficient: the federal government and commercial licensees without full flexibility and an ability to realize the opportunity cost of their use of spectrum.

The Government Accountability Office ("GAO") reports that the federal government is the exclusive or predominant user of 39 to 57 percent of the spectrum between 225 MHz and 3.7 GHz.[20] In addition,

17. *See generally* Gregory L. Rosston & Michael Topper, *An Antitrust Analysis of the Case for Wireless Net Neutrality,* 22 INFO., ECON. & POL'Y 103 (2010).

18. Applications of AT&T Inc. & Deutsche Telekom AG For Consent to Assign or Transfer Control of Licenses and Authorizations, *Order*, 26 FCC Rcd. 16,184, 16,185 (Nov. 29, 2011).

19. Patrick Degraba & Gregory Rosston, *The Proposed Merger of AT&T and T-Mobile: Rethinking Possible*, *in* THE ANTITRUST REVOLUTION: ECONOMICS, COMPETITION, AND POLICY 34 (John E. Kwoka & Lawrence J. White eds., 2013).

20. *See generally* U.S. GOV'T ACCOUNTABILITY OFFICE, SPECTRUM MANAGEMENT: INCENTIVES, OPPORTUNITIES, AND TESTING NEEDED TO ENHANCE SPECTRUM SHARING (2012), *available at* http://www.gao.gov/assets/660/650019.pdf.

state and local agencies have access to additional spectrum for public safety and other government responsibilities.

1. Incentives for efficient use by Government?

Government spectrum users do not generally face incentives to use spectrum efficiently. The government budget process makes it difficult for spectrum managers to have the correct incentives. It is critically important to provide sufficient resources to our agencies so that they can provide safety and security for the American public. For the vast majority of the tools used to provide safety and security, the government uses the market system. The government competes with private enterprise for soldiers, police, fire and all other employees. The government buys tanks, airplanes, bullets, computers, and food from commercial enterprises. The government also buys the radio equipment used with spectrum. But the government does not buy spectrum. Historically, it has been given the right to use certain blocks of spectrum, either exclusively or in conjunction with others.

If a government agency or spectrum manager has access to spectrum but does not have to pay for it or realize gains from vacating, it will have an incentive to keep access to this valuable resource for use now because it can reduce other operating costs, and also as an option for the future when it might be able to use the resource in a new service or use access in exchange with some other entity as the option value could be very valuable.

A government agency has no incentive to adopt equipment that would use half as much spectrum for the same mission unless it benefitted from releasing the remaining spectrum. When the cellular carriers invested in technology to move from AMPS to 2G to 3G and now from 3G to 4G, they see the benefits of this additional capacity because they can use the spectrum to provide more service. In contrast, a government agency with a narrow mission would see the cost of the new equipment, but not realize any benefit. In fact, the agency might lose even more because it loses the option value of converting to new equipment in the future that might continue to use the full block of spectrum, but provide additional necessary services. If the other portion of the spectrum were used by someone else, that option would be foreclosed.

Government agencies might be able to accept additional money from making spectrum available in auctions. However, because of the political budget process, I have argued that spectrum managers and even agency heads would be reluctant to believe that they would see any of the budget benefit in the long-run, much less the full value of the

resource they gave up.[21] Instead, if an agency released spectrum worth $10 billion, they might expect that over time, their budget would be reduced by an equivalent amount, with some possible increases to provide for replacement equipment, but by no means allowing the agency to reap the full benefit of the spectrum.[22]

Whatever mechanisms are used to improve spectrum efficiency, they should take into account the importance of transitions from one use to another, including transaction costs and timing issues. Wireless networks require upfront design and investment. Hence a flash cut to a new mechanism could cause dislocation costs. As a result, any change should be announced well in advance and should be phased in gradually. Setting a process in place is also important to minimize subsequent opposition that would prevent ultimate use of the mechanisms at the time they are to be implemented.[23]

2. Improving the use of government spectrum

a) Fees

Charging annual fees for the use of the spectrum resource by government agencies has the potential to encourage agencies to realize the opportunity cost of the spectrum they use in a manner similar to the use of other market resources. Of course, it would be important to have a realistic measure of the opportunity cost or value of the spectrum right that is being used. The GAO manages rental prices for office buildings owned by the government and charges rent to different agencies in a similar manner. And buildings, even within a specific city, just like different frequency bands, have very different market values and the GAO presumably charges different rental fees for internal government transfers.

Administered Incentive Pricing ("AIP") implementation in the United Kingdom provides some guidance for thinking about spectrum fees for government users.[24] First, the goal should remain efficient use of spectrum, not to attempt simply to have users "give back" spectrum. The effectiveness of an AIP process cannot be measured by the amount of spectrum given back because changes in spectrum could be very small if the initial allocation is close to efficient or if changes take time to

21. *See generally* Gregory L. Rosston, *The Future of Wireless,* STANFORD INST. FOR ECON. POLICY RESEARCH (May 2001), *available at* http://www.stanford.edu/group/siepr/cgi-bin/siepr/?q=system/files/shared/pubs/papers/briefs/policybrief_may01.pdf.

22. *Id.*

23. *See generally* U.S. GOV'T ACCOUNTABILITY OFFICE, *supra* note 20.

24. *SRSP: The Revised Framework for Spectrum Pricing – Our Policy and Practice of Setting AIP Spectrum Fees*, OFCOM (Dec. 17, 2010), http://stakeholders.ofcom.org.uk/binaries/consultations/srsp/statement/srsp-statement.pdf.

effectuate because of legacy system investment.

A second lesson from the United Kingdom is that once fees are set, it may be difficult to change them in the future. United Kingdom AIP fees were set at approximately 50% of the level that was thought to be appropriate. Instead of having a mechanism in place to increase the level to be more appropriate, the fees appear to be fixed at the lower level. As a result, only very inefficient government users would feel the incentive to stop paying the fees.[25]

There is some concern that spectrum fees would be too high and that government agencies would not be able to afford the spectrum they need to fulfill their missions.[26] Setting fees above the market price would reduce government spectrum use too much, but if market-based fees were so high that the agencies could not afford the spectrum, that indicates that the mission costs are higher than the agencies believe and it is important to understand the true costs. It may take time for agencies to review their options and develop alternatives so it is important to publicize the fees well in advance of their implementation, provide certainty about the fee levels for a reasonable amount of time into the future—possibly a rolling five year window of future fees—and gradually introduce the fees, say 20% per year over five years. With these provisions, agencies can adjust their budgets to request additional funds for spectrum or implement alternatives to accomplish their missions. In this way, agencies will adjust their operations to reflect the value of the spectrum resources they use in accomplishing their missions.

At the same time, it is also possible for fees to have no effect if agencies simply request and receive additional funds earmarked for their spectrum needs. While budget increases are possible (and possibly likely in the very short term), over time, budget officers should see the true cost of using spectrum and better be able to understand the tradeoffs between spectrum use, capital investment and other techniques to accomplish missions. The downside risk of a fee system is small relative to the potential benefits of the system. Even if the fees had no effect, the transaction costs of determining and administering a set of fees are likely

25. There may be some differences in systems using spectrum for the first time (new acquisitions of spectrum) and existing users of spectrum. It is important for new systems to immediately realize the full opportunity cost of their spectrum use because of the substantial sunk investment in new networks and equipment that may be long-lived. However, treating new systems and changes to existing systems differently will lead to incentives for agencies to maintain older inefficient systems if spectrum charges for older systems are substantially lower. As a result, it is important to have a clear time path for equalization of charges for new and existing systems.

26. NAT'L TELECOMM. & INFO. ADMIN., INCENTIVES SUBCOMMITTEE REPORT 8 (2011), *available at* http://www.ntia.doc.gov/files/ntia/publications/incentivessubcomm_report_final_01112011.pdf.

to be small relative to the value of spectrum at issue.

b) "Sharing"

Recently, there has been a large amount of discussion of sharing spectrum. Sharing can be mandated by rule or encouraged by fees like those discussed above. It is important to carefully determine a definition of sharing as the term "sharing" has come to mean different things to different people. Some people use the term to mean different end users transmitting on the same spectrum. Others use the term to imply that different systems can occupy the same spectrum. These two different visions can have very different implications for sharing rules and resulting efficiency.

Sharing is not an end in itself. Instead, the notion of sharing should be thought of in a context of increasing the value of the use of spectrum; sharing could increase the efficiency of spectrum use. If more people with the same value can use the same spectrum, then sharing is good. But "sharing" and "exclusive use" are not necessarily incompatible. Over 100 million users "share" the spectrum that is licensed to AT&T even though that spectrum is "exclusively" licensed to AT&T and not shared with any other licensee.[27]

If Verizon realizes the opportunity cost of its spectrum use and had neither market power nor concerns about getting spectrum rights back in the future, it might allow other systems to use its spectrum if those users were willing to pay enough money to satisfy Verizon. But Verizon may have a sufficiently high opportunity cost (which by an economist's definition would include any potential market power or plans for the introduction of new services) or there may be sufficient uncertainty about the resolution of interference or high transaction costs that Verizon would not negotiate with other providers to use its spectrum.

Government users face similar issues – they could share their spectrum with other users, but also face costs in such sharing, even if current missions would not be affected.

The PCAST report[28] attempted to set forth a sharing framework for government spectrum, and the FCC added a possible implementation of this framework in its recent Notice of Proposed Rulemaking for the 3.5

27. FED. COMMC'NS COMM'N, SIXTEENTH ANNUAL REPORT AND ANALYSIS OF COMPETITIVE MARKET CONDITIONS WITH RESPECT TO COMMERCIAL MOBILE SERVICES 55 (2013), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-13-34A1.pdf.

28. PRESIDENT'S COUNCIL OF ADVISORS ON SCI. & TECH., REALIZING THE FULL POTENTIAL OF GOVERNMENT-HELD SPECTRUM TO SPUR ECONOMIC GROWTH (2012), *available at* http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast_spectrum_report_final_july_20_2012.pdf.

GHz band.[29]

The PCAST framework set forth a hierarchy of users: primary, secondary and tertiary. Primary users would retain their transmission and protection rights. Secondary users could get priority access to the bands under certain conditions. For example, they might have guarantees of quality of service in certain areas or certain times, but need to protect the primary users. Tertiary users could operate under certain parameters, but must not degrade service to the primary and secondary users. In addition, tertiary users would have no claims against the primary and secondary users for degradation of tertiary users' service.[30]

Many other variants could build from the PCAST framework. A government user might be willing to work with only a limited number of other users so that in the event of interference disputes, the government user would not have to deal with a large and diffuse set of users regarding determination of the source of interference and negotiation about the resolution of the issues. In other circumstances, a federal user might be willing to have a large number of low power users co-existing with it, but no relatively higher power single user so that there might only be a primary user with tertiary users and no secondary users.

Economics provides two rationales for advocating sharing on federal spectrum. First, as discussed above, federal users do not realize the opportunity cost of the spectrum they use. To the extent that sharing can increase the efficiency of the use of the spectrum to be closer to the socially optimal use, sharing would be beneficial. Of course, simply imposing sharing could lead to too little, too much, or the right amount of use of the bands. Without market prices for sharing, we would not know how much spectrum the government should use and how it should make sharing available.

Second, an important role of government is providing the public good of knowledge. To the extent that sharing techniques require experimentation, research and risk, the government may be in the best position to facilitate experiments in sharing that could then be adopted by private sector licensees who would benefit from the knowledge spillovers. For example, if the government can demonstrate that a technique for sharing, previously unknown, could allow two different technologies to share the spectrum, then commercial licensees might adopt similar techniques for sharing—either with other entities or virtual sharing within their own organizations to increase capacity. The private entities might not have sufficiently high incentives to invest in and

29. Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band, *Notice of Proposed Rulemaking & Order*, 27 FCC Rcd. 15,594 (2012).

30. PRESIDENT'S COUNCIL OF ADVISORS ON SCI. & TECH., *supra* note 28, at 75.

develop the technologies on their own as they might not expect to be able to internalize enough of the knowledge spillovers. However, because the commercial licensees with flexible use spectrum should realize the opportunity cost of their spectrum, they should not be forced to open their spectrum for sharing.

CSMAC has been working to increase the efficiency of the use of spectrum held by the government.[31] It has produced reports on spectrum fees among other things. Currently, it is working to facilitate the shared use of the 1755 through 1850 MHz bands. By drawing attention to the potential value of these frequencies in commercial use, the CSMAC has pushed the government to try to facilitate sharing with commercial entities. However, it is not clear how much success it will have nor whether its goals are too high or sufficiently high for transferring rights to the private sector.

B. Broadcast spectrum

The FCC allocated over 400 MHz in the VHF and UHF bands for over-the-air broadcast television in the 1940s.[32] It allocated, and has continued to allocate, this spectrum specifically for free over-the-air broadcast television on a site-specific basis. While broadcasters can provide ancillary services for a fee, the FCC rules do not allow the broadcasters to terminate broadcasting and provide other services instead. In addition, the FCC is effectively the licensee for all of the areas not covered by site-specific licenses. Because of these constraints, the broadcasters do not realize the full opportunity cost of their use of the spectrum.

In 1983, the FCC reallocated channels 70 through 83 (14 channels) to land mobile radio, including cellular and private radio.[33] In addition, in certain areas, the FCC allowed public safety users to make use of spectrum occupied by channels 14 through 20.[34] The FCC began its transition to digital television by giving broadcasters a second "digital" channel on a temporary basis, and then in 2009, terminating analog broadcasting, freeing up a large number of channels.[35] Prior to the

31. CSMAC advises the Assistant Secretary for Communications and Information at National Telecommunications and Information Administration ("NTIA") on a broad range of spectrum policy issues.

32. Thomas W. Hazlett, *Optimal Abolition of FCC Spectrum Allocation*, 22 J. ECON. PERSP. 103, 107 (2008).

33. MARK MESSER, TV WHITE SPACE: IS THE PICTURE BECOMING CLEARER? 2 (2012), *available at* http://www.connectak.org/sites/default/files/connected-nation/Ohio/files/tv_whitespace_an_engineering_whitepaper_connect_oh.pdf.

34. Availability of Land Mobile Channels in the 470-512 MHz Band in the Ten Largest Urbanized Areas of the United States, *Fourth Report and Order*, 43 F.C.C.2d 949 (Nov. 20, 1973).

35. REED HUNDT, YOU SAY YOU WANT A REVOLUTION: A STORY OF INFORMATION

termination of the analog broadcasts, the FCC auctioned the rights for channels 51 through 69 to be used flexibly.

As a result of these actions, a substantial amount of broadcast spectrum has been transitioned from a specific use—which may have been socially optimal at some point in time—to flexible use that can more easily evolve over time as technology and demand change.

To date, these reallocations have not required any broadcaster with a full license to cease broadcasting – the FCC has been able to find vacant channels for broadcasters that had been transmitting on the reallocated channels. Such "free" transitions are much less likely to occur since the digital transition packed the channels more tightly and reallocated much of the vacant spectrum.

C. Other underutilized spectrum

In addition to the government spectrum and the television broadcast spectrum, the FCC should make more capacity available to the market by reducing restrictions on spectrum use. In most cases, it made mistakes by limiting flexibility at initial licensing and not completely allocating the rights with the spectrum. The FCC can rectify this problem by increasing flexibility and comprehensively allocating transmission rights. For example, the FCC has begun to allow terrestrial use of spectrum that it had initially restricted to satellite use only.[36] This move highlights two issues that result from inefficient spectrum restrictions and a lack of clear enforcement of rights.

In 1997, the FCC auctioned 30 MHz of spectrum for Wireless Communication Services ("WCS").[37] The WCS spectrum is next to the spectrum that the FCC allocated specifically for Digital Audio Radio Service ("DARS").[38] XM Radio and Sirius Radio were the two purchasers of the DARS license at the FCC auction.[39] Because of its desire to promote DARS, the FCC put extremely stringent interference requirements on WCS that essentially rendered the spectrum useless for mobile, and even for most fixed applications.[40] Had the FCC instead auctioned the two bands together with a possible package bid, then the

AGE POLITICS 63 (2000).

36. *See e.g.,* Service Rules for Advanced Wireless Services in the 2000-2020 MHz and 2180-2200 MHz Bands, *Report and Order*, 27 FCC Rcd. 16,102 (2012).

37. Auction of Wireless Communications Service (WCS) Auction Notice and Filing Requirements for 128 WCS Licenses Scheduled for April 15, 1997, *Public Notice*, 13 FCC Rcd. 3981 (1997).

38**.** *Id.*; FCC Announces Auction Winners for Digital Audio Radio Service, *Public Notice*, 12 FCC Rcd. 18,727 (1997).

39. *Id.*

40. Amendment of the Commission's Rules to Establish Part 27, the Wireless Communications Service (WCS), *Report & Order*, 12 FCC Rcd. 10,785, 10,801 (1997).

DARS providers could have expressed the value of their service compared to the value that terrestrial wireless providers would have placed on being able to transmit at higher power.

As it stands, the WCS spectrum has essentially remained fallow for 15 years and is only now possibly becoming usable because of recent FCC rule changes. With a more flexible allocation for both WCS and DARS spectrum together, the FCC could have auctioned the initial spectrum rights and let the marketplace determine the highest value use of the spectrum. Given the merger of the two DARS licensees, it is highly likely that the FCC allocated too much spectrum for DARS and could have engendered more consumer value by enabling higher power use on the WCS portion of the band. The FCC's faulty initial conditions (including requirements to launch and operate satellites) made transitions much more difficult than they should have been.

The recent case of LightSquared is another example of where the lack of clarity of initial rights and subsequent enforcement of rights led to spectrum being unused.[41] LightSquared claims that it would be operating within its rights, but that adjacent GPS receivers have been poorly designed (to save on costs) while the adjacent spectrum was idle and planned to be used in satellite-only service. The low cost GPS design apparently means that even if LightSquared operated in compliance with the terrestrial operating restrictions of its license, it would still cause interference to the GPS devices.

Some argue that this is a problem with property rights and flexibility.[42] Instead, it shows that lack of clarity about emission rights, lack of enforcement, and inefficient restrictions on flexibility can cause incentives to use the political process to lock in place rights that were not there before. A better solution would be to allocate rights more broadly and clearly. Instead of allocating rights for satellite service, the FCC should allow satellite and terrestrial licenses with initial emission rights and protection from interference that can then be negotiated with other licensees. The FCC appears to be moving more toward flexible use—the recent decision to allow DISH network to use the spectrum licenses for terrestrial service removes some inefficient restriction on use.[43]

41. Letter from Julius Genachowski, Chairman, Fed. Commc'ns Comm'n to Senator Charles Grassley (May 31, 2011), *available at* http://www.insidegnss.com/pdf/2011-05-31_FCC_to_Grassley-1.pdf; *see also* Harold Feld, *My Insanely Long Field Guide to Lightsquared v. The GPS Guys*, WETMACHINE (June 14, 2011), http://tales-of-the-sausage-factory.wetmachine.com/my-insanely-long-field-guide-to-lightsquared-v-the-gps-guys/.

42. Feld, *supra* note 41.

43. Some may argue that there is "unjust enrichment" because Dish (and it predecessor licensees) acquired the licenses under the rules that restricted their use. *See generally* Service Rules for Advanced Wireless Services, *supra* note 36.

D. Flexible use

The goal, from an economic perspective, should be flexible use spectrum.[44] Essentially, this means licensees should have technological flexibility, and service flexibility.[45]

Technological flexibility means that licensees can decide to change the nature of their transmissions. Subject to the interference parameters of their licenses (as modified through negotiations), parties should be able to implement the technology of their choosing. For example, AT&T has changed the transmission on its frequencies from AMPS to TDMA to GSM to EDGE to HSPA to LTE in less than 20 years without getting FCC approval in advance for its business decisions, with the exception that the FCC mandated the continuation of AMPS past the efficient transition period.[46] AT&T made these changes to increase capacity and the quality of its network and consumers benefit from the increased capacity and quality. Had it been required to obtain pre-approval from the FCC, the transitions likely would have taken longer, like the transition away from AMPS, and may not have been as competitively significant.

However, there should be limits on what a licensee should be allowed to do technologically. For example, it could not change its transmission so that it encroached on other licensees, either geographically with co-channel licensees, or in frequency to harm adjacent or other licensees. There is a large caveat to this restriction. If the licensee is able to negotiate with its "neighbors" so that it can change its transmission, it should be allowed to do so.

In terms of service provision, the FCC has put restrictions on certain licenses.[47] Broadcasters must provide free over-the-air television service. Certain other licenses have similar service restrictions. Generally, with a competitive spectrum market, the FCC should abolish all service restrictions so that spectrum can be used to provide the highest value services.

E. Cost of relocation/sharing

Because the FCC has put different systems in different regulatory categories, one of the costs of reallocating spectrum is the cost of

44. There may be some beneficial restrictions on use for initial transmission and interference parameters. For example, it may make sense to group low power transmitters in similar bands and not have them adjacent to high power transmitters. However, if there are sufficiently well-laid out license rights, the license holders should be in a position to negotiate changes to those rights.

45. *See generally* Gregory L. Rosston & Jeffrey S. Steinberg, *Using Market-Based Spectrum Policy to Promote the Public Interest*, 50 FED. COMM. L.J. 87 (1997).

46. FED. COMMC'NS COMM'N, *supra* note 27, at 122-23.

47. Hazlett, *supra* note 32, at 107.

"relocating" existing systems. Had there been complete flexibility, the licensees would internalize these costs. However, there are costs for relocating or shutting down private licensees and also for transitioning government systems.

Historically, the FCC simply told licensees to vacate spectrum. For example, television stations in channels 70-83 were allowed to get different channels or to go off the air when the FCC reallocated that spectrum for land mobile radio use.[48] Starting with the PCS auctions in 1994, the FCC moved to a more efficient relocation mechanism whereby the new spectrum users would not only pay for the spectrum rights but would also have to take into account the cost of relocating the incumbent users.[49]

In the case of PCS, the spectrum incumbents were point-to-point microwave users. The PCS winners were able to negotiate with the incumbents and pay for them to vacate the PCS band. Some incumbents obtained point-to-point licenses in other bands, some switched to other communication means—from commercial providers or using wired solutions—and others reduced their use of the communications path.[50]

The expected cost of the relocation should have been considered in the bids for the spectrum licenses. In other auctions, there may be provisions where the auction proceeds are used to pay the relocation costs rather than having negotiations between auction winners and incumbents. In either case the net revenue to the government for the relocation should be similar (depending on how the negotiation rules change) whether the costs are paid by the winners directly or through the auction revenues. Bidders should look at the net cost of the additional spectrum.

If the value to a new user is higher than the cost necessary to keep an incumbent equally well off, then it would be efficient to reallocate the spectrum to the new user to use. If the new users are not willing to pay enough, then the transfer is not efficient. However, it may be the case that at different points in time, depending on the expected future streams of revenue and cost for the incumbent, that transfers may be more or less desirable. For example, an incumbent that sees that it would have put in a new system in two years might be more willing to vacate to avoid the capital expense than an incumbent with a system that has an expected life of 20 years.

Currently, the FCC is investigating reallocating more spectrum from specific-use broadcast to flexible use. The FCC has a Notice of Proposed

48. An Inquiry Relative to the Future Use of the Frequency Band 806-960 MHZ**,** *First Report & Order, & Second Notice of Inquiry*, 19 Rad. Reg. 2d (P & F) 1663 (1970).

49. Peter Cramton et al., *Efficient Relocation of Spectrum Incumbents*, 41 J.L. & ECON. 647, 667-68 (1998).

50. *Id.* at 668-69.

Rule Making for so-called "incentive auctions" designed to allow broadcasters to state their willingness to accept payment for going off the air or switching to a different television band.[51]

In conjunction with the determination of the willingness of broadcasters to vacate spectrum (the supply side of the market combined with currently vacant channels), the auctions will also determine the willingness to pay wireless providers for the vacated spectrum (the demand side of the market). If there is sufficient willingness to pay, then some broadcasters will cease broadcasting and vacate the spectrum and it will be reallocated for flexible use.[52]

These "incentive" auctions are complex and may take years to implement. However, they provide the possibility of up to 120 MHz of prime spectrum for flexible wireless use. While this auction does not grant flexibility for the broadcasters, it is a mechanism to allow them to realize some or all of the opportunity cost of their television broadcasts.

The social cost of such a transition may not be high as the vast majority of television viewers do not use the over-the-air broadcasts and hence the termination of such broadcasts would only affect a relatively small number of households. Even then, there will likely be a number of remaining over-the-air broadcasters, which presumably would be those with the highest value to over-the-air households, so that would minimize any losses from the transition.

III. ROLE OF LICENSED AND UNLICENSED SPECTRUM.

The discussion to this point has used examples from licensed spectrum to illustrate the value of flexibility. Flexibility is also important for unlicensed spectrum use. Indeed, it is flexibility that has led to many of the innovations in service and capacity now available on unlicensed networks. The use of licensed spectrum has created great value for users and much of the value emanates from the flexibility of equipment designers to change the services they provide without difficulty.

However, unlicensed spectrum works with certain requirements that help prevent inefficient overuse or contention with the unlicensed bands, but can also limit flexibility for unlicensed users. Such flexibility limitations can be overall beneficial as they ensure that other users are

51. Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions, 77 Fed. Reg. 69,934 (Nov. 21, 2012); Applications of AT&T Mobility Spectrum LLC, Triad 700, LLC, Centurytel Broadband Wireless, LLC, 700 MHz, LLC, Cavalier Wireless, LLC, Ponderosa Telephone Co., David L. Miller, Comsouth Tellular, Inc., Farmers Telephone Company, Inc., and McBride Spectrum Partners, LLC for Consent to Assign Licenses, *Memorandum Opinion & Order*, 27 FCC Rcd. 15,831 (2012).

52. One additional feature of the auctions are that not only does there have to be sufficient money to pay the broadcasters to vacate the spectrum, but there also needs to be enough to fund a public safety wireless network, on the order of $8 billion.

able to operate without being subject to undue service degradation from an overly high-power system. However, changing the rules once in place with a large diverse group of users can be difficult in certain circumstances.

A. How much unlicensed spectrum should there be?

The theory behind unlicensed operation is that each user does not cause any, or only causes minimal contention for the use of the spectrum. With only minimal contention for the use of spectrum, the etiquettes and protocols can be fairly unobtrusive and have minimal effect on users. For example, my use of Wi-Fi affects my next-door neighbors on either side, but not the houses on the other sides of them. Because of power limits, the signal travels reasonably well in our house, but not two houses away. In that way, they can use the Wi-Fi as much as they want and not cause any direct contention for my use.

Low-power unlicensed use causes little contention within the band. However, there is contention when a band is exclusively designated for unlicensed use. Such a designation means that the band cannot be used for licensed use. That means that unlicensed use, even if each individual use does not cause contention, overall causes contention with licensed use and creates an opportunity cost.

There is a potentially very high value for unlicensed use, and that such use might not decrease auction proceeds for licensed spectrum because unlicensed use can serve as a complement to licensed spectrum, increasing the value of the licensed spectrum that is auctioned.[53]

However it is hard to determine the quantity of spectrum that should be dedicated to unlicensed use. While Milgrom et al. argue that bidders might undervalue the unlicensed spectrum, they do not provide any guidance or assurance that regulators would be better at determining the correct amount of unlicensed spectrum.[54]

There are some ways in which one might at least make some rough judgments about how much unlicensed spectrum to allocate. Instead of simply allocating a band of spectrum for unlicensed use, the FCC could allow bidders to express a preference for licensed use by bidding on it. In this auction, the FCC could set a reserve price, essentially declaring the social value of unlicensed use equal to the reserve price and seeing if the value of the spectrum in licensed use is higher. It is difficult to pick a level for the reserve price, but by simply declaring that spectrum will be unlicensed, the FCC is essentially setting a reserve price at an infinite level when it allocates unlicensed spectrum. With a set-aside rather than

53. *See generally* Paul R. Milgrom et al., *The Case for Unlicensed Spectrum* (Stanford Institute for Economic Policy Research, Discussion Paper No. 10-036, 2011).

54. *See generally id.*

an explicit reserve price, the FCC hides the forgone revenue and opportunity cost of using the unlicensed spectrum.

The FCC might also use the auction format in other ways to see if bidders would have different valuations for the licensed spectrum if there were a nearby unlicensed band than were that band allocated to additional licensed use. The ability to have bidders submit multiple bids for different "packages" of "licensed only" and "licensed + unlicensed" would allow the FCC to understand at least the differential valuations of bidders. At the same time, equipment manufacturers and other companies that support the provision of unlicensed spectrum could participate in an auction with bids to support unlicensed use.

It is important for regulators to realize when making allocation decisions that both licensed and unlicensed spectrum have high potential value and to understand how the two work together and not simply to assess one with a high value and assume that we need more of it. Instead, it is important to understand the marginal valuations of additional spectrum.

B. What characteristics are better with unlicensed?

In order to think about the amount and type of spectrum to use for unlicensed spectrum, it is useful to think about the economic characteristics that make unlicensed spectrum valuable.

The protocols and available spectrum mean that transmission distances for unlicensed uses are measured in feet. While some systems have used unlicensed spectrum to cover areas large relative to a home Wi-Fi system (e.g. Tropos, Google, Comcast), those metro mesh networks tend to be small in comparison to the coverage of commercial cellular systems. In addition, the metro Wi-Fi systems operate with the unlicensed protocols and each transmission is for a small area even though multiple transmissions are put together as in a typical licensed cellular system to cover an area. The use of the unlicensed spectrum by mesh networks can therefore cause contention to other small Wi-Fi networks in the same area.

At the same time that there are "macro" metro Wi-Fi systems, licensed systems are moving to smaller and smaller cells with the addition of femto cells and Distributed Antenna Systems ("DAS"). Smaller cells allow licensed systems to increase capacity substantially and also to look more like the very limited range of unlicensed. In addition, licensed systems are incorporating Wi-Fi systems to offload data to reduce the traffic on their networks.

If the FCC increases the amount of spectrum for unlicensed use, contention should only increase from what would happen without the extra spectrum if the extra spectrum causes higher quality service that in

turn increases demand substantially. However, if the FCC allows higher power, then one of the main benefits of unlicensed spectrum use, the lack of contention, could disappear. Former FCC Chairman Genachowski lamented the slow speeds of Wi-Fi in crowded airports because of the relatively large number of devices trying to share the same fixed amount of unlicensed spectrum: "As innovation opportunities and demand for unlicensed uses continue to grow, and Wi-Fi networks get more and more congested – have you tried using Wi-Fi in a busy airport recently?"[55]

The concentrations of unlicensed use in a single small area show one of the key economic drawbacks of unlicensed spectrum, "unlicensed spectrum is shared between many users and devices, and therefore may suffer from congestion and interference."[56] Expanding the range of unlicensed spectrum offers the opportunity for greater unlicensed coverage. However, expanding the range of transmissions is equivalent to crowding more transmissions into the airport and hence increases congestion and interference.

While there are protocols and etiquettes for usage, such mechanisms do not necessarily lead to efficient usage. No one can express a high willingness to pay for use of the spectrum so that low value and high value uses have the same priority. Essentially, as transmission distances increase, the amount of contention caused within unlicensed use increases and the economic argument for unlicensed use decreases. Economically, unlicensed use is appropriate when there is little or no within-band contention and no economically reasonable use charge, but as contention grows, the economically appropriate use charge rises above zero and licensed spectrum becomes more appropriate.

It is important to ensure that this is not an argument to reduce the power of unlicensed transmissions on low frequency bands so that there is no contention. Bands should be used optimally and not set up in a manner to fit a certain profile to get favorable regulatory treatment. In addition, it is important to ensure that there is competition for licensed spectrum systems. However, using unlicensed spectrum in low frequency bands where contention within unlicensed use is likely to be greatest is likely to be an inefficient use of the spectrum resource.

55. FCC Chairman Julius Genachowski, Remarks at the University of Pennsylvania Wharton School of Business (Oct. 4, 2012), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-316661A1.pdf. It is unclear if there is substantial contention in the current unlicensed bands. If not, it may not be useful to increase allocations of spectrum for unlicensed use.

56. Milgrom, *supra* note 53, at 21.

C. Licensing regimes

There are a variety of different regimes within licensed and unlicensed use of spectrum. At one extreme would be exclusive licensed whereby the licensee has all rights for transmission in a specific band. Exclusive licenses could be for a geographic area such as an MTA,[57] or could be for a fixed point-to-point path. A second type of licensing regime involves non-exclusive licensing. In one case a primary licensee has the right to operate without interference from other users, but other users are allowed to operate. The "secondary" users in this case would also be licensed, but would be restricted from harming the primary licensees operation and would have to deal with potential harm from the primary licensees emissions. In a variant of this, it is possible to have "secondary" users not need licenses, but be able to operate in the same fashion – not causing harm and accepting harm. The next level would be non-exclusive licenses. In the private radio bands, users require licenses, but anyone qualified is able to get a license. The private radio coordinators add the new user and there could be some degradation in the quality of service for the pre-existing users. Finally, there are open entry bands without licenses that have typically been referred to as unlicensed bands. Typically such bands have regulation on the operating characteristics of the transmitters to manage the contention for the spectrum.

The table below shows some of the tradeoffs from the different licensing possibilities.

57. Metropolitan Trading Area as defined by Rand McNally.

	Benefits	**Costs**
Exclusive Primary Only	Licensees bear the opportunity cost of unused or underutilized spectrum. Licensees have the ability to coordinate use in the band and to internalize contention in the band. Incentive to invest in the band for the long term and upgrade to new technology.	Transactions costs may make it uneconomic for others to negotiate deals for unused or underutilized spectrum. Market power may provide incentives to prevent others from using the spectrum to provide service.
Open Entry Licensed	Low cost of entry.	Unlimited entry can cause contention. Users may acquire more resources than needed so when have to share, get what they need. Hard to facilitate efficient spectrum use and migration to new technology.
Primary and Secondary Licensed	Primary licensee has similar incentives to exclusive use. Secondary licensee can make use of unused or underused spectrum. If there is harm from operation, easy to assess source of harm.	Potentially hard for primary licensee to assert rights if it wants to use or change its use of spectrum and that subjects it or the secondary licensee to harm. Hard to evict secondary users.
Primary Licensed and Secondary Unlicensed	Primary licensee has similar incentives to exclusive use. Secondary user can make use of unused or underused spectrum.	Potentially hard for primary licensee to assert rights if it wants to use or change its use of spectrum and that subjects the secondary users to harm. Hard to

		evict secondary users. If there is harm from operation, potentially hard to assess source of harm and enforce usage rights.
Open Entry Unlicensed	Easy entry for users. May allow for rapid introduction of new technology. Limited concerns about exercise of market power.	Required to set operating metrics in advance and may make transition to more efficient technology lengthy. Precludes use by exclusive licensee. Can create contention.

IV. CONCLUSION

Spectrum policy is very important for the continued growth and pricing of wireless services. The quality and cost of licensed and unlicensed services depend on the availability of spectrum and on the rules for the use of spectrum set by the FCC and by NTIA. History shows that setting initial flexible rules allows users to realize the opportunity cost of their spectrum usage, leading to investments in technology and much more efficient transitions of use. When users do not realize fully the opportunity cost of their spectrum use—either due to license restrictions or due to being a government entity with limited ability to benefit from more efficient use—spectrum tends to be used sub-optimally.

Incentives for economically efficient spectrum use have proven effective and the use of fees and market prices for sharing could lead to an increased effective supply of spectrum to meet the growing demand for spectrum.

There is a role for both licensed and unlicensed spectrum. Unlicensed spectrum can be both a complement to and substitute for licensed spectrum in use. In both roles, it serves a valuable social purpose. But, allocating spectrum for unlicensed use imposes an opportunity cost – the spectrum cannot be used for licensed use. As a result, it makes sense to allocate spectrum for unlicensed use where the propagation characteristics are amenable to the key feature of unlicensed use – limited contention. In addition, the FCC should attempt to understand the magnitude of the opportunity cost of allocating spectrum for unlicensed use.

Overall, there is a large opportunity for the government to increase

wireless capacity through technology, spectrum and incentives.

AN APPROPRIATE INTERCONNECTION BACKSTOP

JAMES B. SPETA*

The term "Internet" means the combination of computer facilities and electromagnetic transmission media, and related equipment and software, comprising the interconnected worldwide network of computer networks that employ the Transmission Control Protocol/Internet Protocol or any successor protocol to transmit the information.

— 47 U.S.C. § 231(e)(3)

INTRODUCTION

Nearly any definition of the Internet, whether technical, legal, or colloquial, includes the notion of interconnection. As is well known, the development of TCP/IP had as its principal object a technique for sending traffic between disparate networks, effectively interconnecting the networks.[1] The U.S. Code, Federal Communications Commission ("FCC") Reports, and case law are littered with definitions that equate the Internet and interconnection.[2] And, as a matter of usage, many

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1. *See e.g.*, Robert E. Kahn, Keynote Address at the University of Colorado Silicon Flatirons Center Symposium on Digital Broadband Migration: Confronting New Regulatory Frontiers (Feb. 20, 2006) ("The Internet really was a logical architecture that allowed you to connect virtually any kind of networking machine together.").

2. 47 U.S.C. § 230(f)(1) (2013) ("The term 'Internet' means the international network of both Federal and non-Federal interoperable packet switched data networks"); Reno v. Am. Civil Liberties Union, 521 U.S. 844, 849-50 (1997) ("The Internet is an international network of interconnected computers.").

Internet services connote not only interconnection but universality: we have the "world wide web," the Universal Resource Locator ("URL"),[3] and the notion, borrowed from the telephone space, of "universal service," a stated if yet unrealized goal of Internet policy.[4]

The fundamental regulatory question is whether there ought to be a legal rule to enforce this widespread understanding of interconnection. Some commentators have argued for such a legal requirement—indeed, more than ten years ago, I made a case for such a rule of interconnection.[5] However, the past decade has seen few interconnection denials. Not zero, of course, and at least one of those interconnection denials caused many consumers to lose Internet service.[6] And some of the most informed and influential technical authorities suggest that market conditions may be changing such that threats to interconnection may increase.[7]

This paper does not re-state the case for an interconnection rule, although I think that case has largely been made. Considering the fundamental importance of the Internet—and of interconnectivity to the Internet—I believe that the law ought to provide some background rule to address serious denials of Internet interconnection, in appropriate, important cases. Private institutions have a role to play as well, such as the consensus-developing role of the Broadband Internet Technical Advisory Group ("BITAG").[8] But many private institutions depend on some legal backstop to address cases that cannot be resolved, or to enforce previously-agreed to decisions that are privately made.

This paper addresses the possible content of such a background rule.

3. Now renamed "uniform resource locator." *See* Connie L. Fulmer, *Comparing Portals and Web Pages*, *in* ENCYCLOPEDIA OF PORTAL TECHNOLOGIES AND APPLICATIONS 162, 165 (Arthur Tatnall ed., 2007).

4. *See Availability*, FED. COMMC'N COMM'N, CONNECTING AMERICA: THE NATIONAL BROADBAND PLAN, http://www.broadband.gov/plan/8-availability ("The FCC's long-range goal should be . . . [to preserve] the connectivity that Americans have today and [advance] universal broadband in the 21st century.").

5. James B. Speta, *A Common Carrier Approach To Internet Interconnection*, 54 FED. COMM. L.J. 225 (2002); *see also* Thomas B. Nachbar, *The Public Network*, 17 COMMLAW CONSPECTUS 67 (2008); Kevin D. Werbach, *Only Connect*, 22 BERKELEY TECH. L.J. 1233 (2007).

6. *See* Adam Candeub & Daniel McCartney, *Law and the Open Internet*, 64 FED. COMM. L.J. 493, 536-37 (2012); Shane Greenstein, *Glimmers and Signs of Innovative Health in the Commercial Internet*, 8 J. ON TELECOMM. & HIGH TECH. L. J. 25, 66-67 (2010); Philip J. Weiser, *The Future of Internet Regulation*, 43 U.C. DAVIS L. REV. 529, 536-37 (2009).

7. DAVID CLARK ET AL., INTERCONNECTION IN THE INTERNET: THE POLICY CHALLENGE, TELECOMM. POLICY RESEARCH CONFERENCE 22 (2011), *available at* http://groups.csail.mit.edu/ana/Publications/Interconnection_in_the_Internet_the_policy_challenge_tprc-2011.pdf ("Interconnection policy is going to become the battleground for the new telecom regulatory debates.").

8. *See* Joe Waz & Phil Weiser, *Internet Governance: The Role of Multistakeholder Organizations*, 10 J. ON TELECOMM. & HIGH TECH. L. 331, 339 (2012).

Designing the rule is easier said than done, of course, for once one moves beyond the general notion that the Internet should be interconnected and that the law should intervene to correct "serious denials" in "important cases," any consensus begins to break down. What Internet networks or traffic must be interconnected? What is an interconnection dispute as opposed to a pricing or discrimination dispute—and is there a difference? What are "serious denials" and "important cases"? Moreover, the difficulty of design increases when recognizing—as already noted—that outright denials of interconnection have been relatively rare in recent years.

The substance of Internet regulation, as with other forms of regulation, has an intimate relationship with the forms and institutions of dispute resolution. Much in the literature on interconnection disputes has focused on the institutional questions such as the use of co-regulation, the use of *ex post* complaints instead of *ex ante* rules, the use of cease-and-desist orders instead of fines and damages.[9] The institutions are, in fact, quite important, and institutional design can relieve some of the difficulties of regulations' substance: over- and under-inclusiveness of rules may be addressed by opting for adjudications; uncertainty may be reduced by creating clear, *ex ante* safe harbors; and fear of government error may be addressed by relying on expert, outside bodies. But, at the end of the day, even if substance and procedure overlap, substance matters—both because it determines in what cases government intervention may occur and because it can determine permissible and impermissible commercial practices.[10] Even a tentative first step, such as a call for more transparency in current interconnection practices, must make the substantive decision of what practices matter, what must be disclosed, and to whom.[11]

As I will argue, current law has no clear background rule that governs Internet interconnection disputes. So, it is into the substantive breach that this essay (carefully) treads, to see if a workable outcome can be reached. I first choose two, somewhat current Internet traffic disputes to be used to discuss the scope of the legal backstop, for discussing such standards in the abstract seems less fruitful. Second, I canvas what might be existing backdrop rules and discuss some of their merits and demerits.

9. *E.g.*, Weiser, *supra* note 6.

10. I only say "can determine" because the substantive rule may, initially, be stated at a high level of generality, which specific adjudications determining the actual practices that either conform with or offend the substantive rule.

11. *But see* CLARK ET AL., *supra* note 7, at 21 ("Our policy recommendations focus on enhancing transparency because we are not convinced by the evidence we have seen to date that more activist policies (e.g., direct regulation of Internet interconnection) is warranted; and equally importantly, even if we were to see a need for such regulation, we are concerned any such regulation might cause more harm than good.").

Finally, I suggest that Internet interconnection might be addressed principally through rules that forbid the abrupt termination of transit connections, for those terminations are the most likely to disrupt legitimate consumer expectations. Other interconnection disputes can be dealt with on a slower track, with opportunities for more fulsome development of any claims of anticompetitive effect.

I. TWO INTERNET TRAFFIC DISPUTES – THOUGHTS ON SCOPE

I choose two types of Internet traffic disputes as examples around which to frame the discussion of a legal rule. Many commentators have noted the growing complexity of Internet interconnection, but these same commentators often focus on a similar, simplifying taxonomy.[12] The two examples differ principally in their potential effect on an access provider's customers. In the first—the termination of a peering or transit relationship—an access provider's customers may lose access to all or a portion of the Internet. In the second—the termination of a peering relationship (or even an interconnection) with a content distribution network ("CDN")—an access provider's customers may experience a change in quality of service, but typically the action will not result in the loss of customers' access to content or applications.

One denial of interconnection has already drawn some attention in legal literature—a temporary termination of interconnection between Sprint and Cogent that led to many Internet customers losing some part of their Internet service. Cogent and Sprint were in heated negotiations concerning whether the two companies would interconnect based upon a settlement-free peering relationship.[13] Most such peering relationships are based upon relatively equal traffic flows between the carriers, although there are other important factors, some of which can be managed through negotiations over points of interconnection and routing protocols. Sprint and Cogent had different views of the traffic needed to sustain the peering relationship, with Sprint seeming to seek payment and Cogent insisting on a settlement-free arrangement.[14] When the parties could not agree, Sprint terminated its relationship with and its interconnection to Cogent, although both sides appear to bear some

12. *E.g.*, CLARK ET AL., *supra* note 7.

13. Weiser, *supra* note 6, at 531-32; *see also* Adam Candeub & Daniel McCartney, *Law and the Open Internet*, 64 FED. COMM. L.J. 493, 536-37 (2012); Shane Greenstein, *Glimmers and Signs of Innovative Health in the Commercial Internet*, 8 J. ON TELECOMM. & HIGH TECH. L. 25, 66-67 (2010) (warning "bargaining breakdowns are, by themselves, insufficient to conclude definitively there is a problem" in the market. But, interconnection breakdowns do affect Internet users. The regulatory suggestion below is, in truth, quite modest, in no small part because the level of demonstrated market concern is itself modest).

14. Weiser, *supra* note 6, at 531.

responsibility for the ultimate loss of interconnection.[15] Customers of Internet Service Providers ("ISPs") who relied upon Cogent for transit lost connectivity with many customers of Sprint, and many Sprint customers lost access to websites that purchased Internet access from Cogent.[16] Some estimate that "millions of Internet users" were affected and, for the weeklong duration of the interruption, lost part of the universal interconnectivity usually associated with the Internet—they "lost the ability to send e-mails to or access the websites" of users of the other carrier.[17]

Fortunately, such denials of interconnection have been relatively rare, or, to be precise, we are not aware of many other interconnection disputes that have resulted in the loss of connectivity by retail Internet customers. Net neutrality debates have identified some more selective controversies, such as Madison River Telephone Company's blocking of VOIP access to its DSL customers[18] and Comcast's partial blocking of peer-to-peer traffic using spoofed reset packets.[19] These are real controversies, but they do not arise from the denial of a physical connection between two carriers—by which I mean companies that each provide physical transport infrastructure. Below, I discuss potentially different regulatory treatment for these disputes, which I would put more in the realm of discrimination than interconnection.

Nevertheless, an interconnection denial such as Sprint/Cogent may reoccur, and it may affect many Internet users' access to sites and services. The effect may also be unpredictable, for the Sprint/Cogent dispute had only an indirect effect on at least some retail Internet users' access. Cogent's principal business was providing transit services to access providers such as ISPs.[20] Cogent's termination of access to Sprint meant that those ISPs' customers lost access to Sprint-connected sites and customers, but their recourse was against their own ISP, which did not have any direct relationship with Sprint.[21] To be sure, the affected ISPs could switch their transit relationship to another provider, and so Cogent did have an incentive to internalize the costs that it was imposing on these customers, but such a switch presumably could not be accomplished instantaneously.[22] Nevertheless, here, and with some

15. *Id.* at 532; Greenstein, *supra* note 13, at 65-66.

16. Weiser, *supra* note 6, at 532.

17. *Id.*

18. *See, e.g.*, Candeub & McCartney, *supra* note 13, at 537.

19. *See* Comcast Corp. v. Fed. Commn'cn Comm'n, 600 F.3d 642 (D.C. Cir. 2010) (discussing allegations against Comcast, but holding that the FCC had not justified its jurisdiction over the matter).

20. *See* Greenstein, *supra* note 13, at 65.

21. *See* Weiser, *supra* note 6, at 532.

22. No commentator has suggested that Cogent had a monopoly over transit offerings in any of the affected areas, at least so far as I have been able to discern.

denials of interconnection, the significant effects will fall indirectly on the customers of the customers of the carriers engaged in the interconnection dispute.[23]

The second example, which has been in the news more recently, arises between an access provider and a CDN, typically when the CDN seeks to negotiate a peering relationship—or other discounted traffic delivery relationship—with the access provider. Netflix has been at the center of some of these controversies, in part because some estimates have suggested that upwards of 25% of access-carrier traffic during peak evening periods is Netflix traffic.[24] The biggest growth area of access-provider traffic is streaming video from all sources, including Google, Amazon, Vudu, Hulu, and other providers in addition to Netflix.[25]

In the case of Netflix, the controversy began when Netflix transferred its content to Level 3.[26] Level 3 is a leading Internet backbone that also has a significant CDN business.[27] Level 3 had in place peering agreements with many leading access providers, including Comcast, the largest cable Internet access provider—and likely therefore the largest residential Internet access provider.[28] Comcast took the position that the addition of Netflix traffic over the Level 3/Comcast interconnection meant that the traffic flows would become substantially unequal, in the direction of Level 3 to Comcast, and that Level 3 should therefore compensate Comcast for the termination of that traffic.[29] That the traffic was caused by Comcast's customers requesting Netflix content and Comcast charged those customers was not part of the dispute, for Comcast does not charge its customers either specifically for video-streaming content or more generally based on bandwidth, except at the very-highest usage levels.[30]

Comcast appears to have at least partially prevailed in the first phase of this dispute, with the parties announcing that they are sharing the costs of traffic termination in some unknown amount.[31] Some have questioned this result, because in general, an access provider may benefit

23. Weiser, *supra* note 6, at 531-32 (using this complexity of contracting to justify interconnection regulation, even apart from more classic market failures such as monopoly power).

24. CLARK ET AL., *supra* note 7, at 4.

25. *Id.* at 4-5.

26. *See generally* Rob Frieden, *Rationales For and Against Regulatory Involvement in Resolving Internet Interconnection Disputes*, 14 YALE J.L. & TECH. 266, 275 (2012).

27. Marguerite Reardon, *Understanding the Level 3 Comcast Spat (FAQ)*, CNET (Nov. 30, 2010 3:28 PM), http://news.cnet.com/8301-30686_3-20024197-266.html.

28. Frieden, *supra* note 26, at 271.

29. *Id.* at 283-85.

30. *See* CLARK ET AL., *supra* note 7, at 5; Frieden, *supra* note 26, at 272.

31. Drew FitzGerald, *Level 3, Comcast Resolve Dispute over Internet Traffic Costs*, WALL ST. J., July 16, 2013, *available at* http://online.wsj.com/article/BT-CO-20130716-708697.html.

from peering with a CDN by gaining enhanced quality of service for its subscribers and also reducing its transit costs.[32] Comcast may have been able to rely on its size for bargaining leverage. Moreover, Comcast may have had the incentive to resist peering with Level 3 in order to increase Netflix's costs. Both the Department of Justice ("DOJ") and the FCC in considering the NBC/Comcast merger embraced the notion that Netflix and other online video providers competed with Comcast as to both linear video and video on demand.[33] Nevertheless, as noted, the parties reached a commercial resolution.

In sum, disputes over interconnection can be divided based on whether the issue involves the interruption of access to services or individuals, even though interconnection disputes can take many different forms that depend on both technical and economic issues. And, in fact, both types of disputes have happened, even if outright denials of connectivity are relatively rare.

II. CURRENT (POSSIBLE) LEGAL BACKGROUND RULES

The spectrum of possible legal background rules to address Internet interconnection runs from the very general remedy of antitrust to sector specific, mandatory interconnection requirements. Here, I describe those extremes, and several potential stopping points in between the poles, as well as how they might apply to disputes in this area. None of these current rules, in my view, satisfactorily addresses Internet interconnection.

Antitrust has been used to resolve some of the most significant interconnection disputes in traditional telephony, but as a background rule for modern Internet interconnection it probably does not provide an adequate substantive scope to resolve many cases of interest. In particular, after *Trinko*, antitrust may not resolve those direct interconnection cases that would most comfortably fit within an essential facilities construct.[34]

Monopolization and essential facilities theories have been important in resolving major interconnection controversies in the developing telephone network. The 1913 Kingsbury Commitment, which required AT&T to interconnect with noncompeting, independent local telephone companies, resolved a monopolization case.[35] The 1956 AT&T Consent

32. *See* CLARK ET AL., *supra* note 7, at 5.

33. *See* James B. Speta, *Supervising Managed Services*, 60 DUKE L.J. 1715, 1721 (2011) (discussing the FCC and DOJ orders in the merger).

34. Verizon Commc'ns Inc. v. Law Offices of Curtis V. Trinko, 540 U.S. 398 (2004).

35. *See* Joseph D. Kearney, *From the Fall of the Bell System to the Telecommunications Act: Regulation of Telecommunications Under Judge Greene*, 50 HASTINGS L.J. 1395, 1404 (1999).

Decree,[36] which limited AT&T to common carrier communications services, had the effect of ensuring computer services' interconnection with the network.[37] And the 1974 case, resulting in the break-up decree, was based in large part on AT&T's allegedly improper denial of interconnection to MCI for that company's local origination and termination of switched long-distance traffic.[38] That 1982 Consent Decree created a monitored antitrust regime of local/long-distance interconnection, called the "equal access" obligations,[39] which were later embedded in a second antitrust decree vis *GTE*[40] and then placed in FCC regulations.[41]

Modern antitrust law, however, may not stretch to encompass the interconnection theories put forward in these historic telephone cases. The *Trinko* case emphasized that the Sherman Act "does not restrict the long recognized right of [a] trader or manufacturer engaged in an entirely private business, freely to exercise his own independent discretion as to parties with whom he will deal."[42] The case says that it neither recognizes nor repudiates the essential facilities doctrine,[43] but the tenor of the case is strongly against mandatory sharing remedies. Indeed, both I and others have previously written that *Trinko* would strongly suggest that an interconnection claim might have difficulty under current antitrust law.[44]

The specific question of how post-*Trinko* antitrust may resolve interconnection disputes depends to a significant extent on the breadth of the *Trinko* opinion. A termination of continuing interconnection, such as occurred between Sprint and Cogent, could fall within an *Aspen Skiing* theory.[45] That case emphasized that the termination of the four-mountain pass was "a decision by a monopolist to make an important change in the

36. *See* United States v. W. Electric Co., Civil Action No. 17-49 (D.N.J. 1956).

37. *See* Steve Bickerstaff, *Shackles on the Giant: How the Federal Government Created Microsoft, Personal Computers, and the Internet*, 78 TEX. L. REV. 1, 16-20 (1999).

38. United States v. Am. Tel. & Tel. Co., 552 F. Supp. 131, 139 (D.D.C. 1982).

39. *Id*. app. B at 233.

40. United States v. GTE Corp., 603 F. Supp. 730, 743 (D.D.C. 1984).

41. MTS and WATS Market Structure Phase III, *Report and Order*, 100 F.C.C. 2d 860 (1985).

42. Verizon Commc'ns Inc. v. Law Offices of Curtis V. Trinko, 540 U.S. at 408 (2004) (quoting United States v. Colgate & Co., 250 U.S. 300, 307 (1919) (internal quotation marks omitted)).

43. *Id*. at 411.

44. *See* James B. Speta, *Antitrust and Local Competition under the Telecommunications Act*, 71 ANTITRUST L.J. 99 (2003); Daniel F. Spulber & Christopher S. Yoo, *Mandating Access to Telecom and the Internet: The Hidden Side of* Trinko*,* 107 COLUM. L. REV. 1822, 1872-74 (2007); Howard A. Shelanski, *The Case for Rebalancing Antitrust and Regulation*, 109 MICH. L. REV. 683 (2011). *But see* Adam Candeub, Trinko *and Re-grounding the Refusal to Deal Doctrine*, 66 U. PITT. L. REV. 821 (2005) (arguing that *Trinko* should not be read so broadly, while conceding that the opinion contains much that suggests such a reading).

45. Aspen Skiing Co. v. Aspen Highlands Skiing Corp., 472 U.S. 585, 604 (1985).

character of the market," and the Court treated the termination of the cooperative relationship as evidence of anticompetitive effect.[46] Several scholars have characterized this as a key to the case—with some also noting that such an interpretation would create powerful incentives to refuse to cooperate in the first instance, and that loss of business model experimentation is likely harmful to consumers.[47] And the Court broadly held that the denial of access to the four-mountain pass fell within antitrust.[48] Similarly, MCI prevailed by showing that "it was technically and economically feasible for AT&T to have provided the requested interconnections, and that AT&T's refusal to do so constituted an act of monopolization."[49] For its part, *Trinko* might be distinguished by pointing to the role that the FCC's supervision of the Telecommunications Act of 1996's[50] unbundling obligations played in the Court's decision. Although the Court noted that the Act itself prevented a holding of implied preemption,[51] the Court nevertheless said that "[a]ntitrust analysis must always be attuned to the particular structure and circumstances of the industry at issue. Part of that attention to economic context is an awareness of the significance of regulation."[52] The Court found that the FCC's regulatory supervision, both generally and of the specific unbundling dispute in the case, meant there were only "slight benefits of antitrust intervention."[53] In an Internet interconnection dispute (where FCC jurisdiction is either lacking or unexerted, on which more just below), an antitrust court would not have a regulatory scheme in place.

This is the most optimistic characterization of antitrust's ability to address the termination of a peering arrangement (or a transit arrangement), but even on these terms an antitrust action would face challenging substantive hurdles. Primary is the issue of monopoly power, for both *Aspen Skiing* and *MCI* were sustained under a monopolization theory. And proof of monopoly power might be difficult in peering and transit markets, where much evidence exists of multiple players.[54] Moreover, any antitrust theory that could apply to the denial of interconnection would fall within the rule of reason and therefore depend

46. *Id*.

47. *E.g.*, Eleanor M. Fox, *Is There Life in* Aspen *After* Trinko*? The Silent Revolution in Section 2 of the Sherman Act*, 73 ANTITRUST L.J. 153 (2005).

48. *Aspen Skiing*, 472 U.S. at 155.

49. MCI Commc'ns Corp. v. Am. Tel. & Tel. Co., 708 F.2d 1081, 1133 (7th Cir. 1983).

50. Telecommunications Act of 1996, Pub. L. No. 104–104, 110 Stat 56 (codified as amended in scattered sections of 15 and 47 U.S.C. (1996)).

51. Verizon Commc'ns v. Law Offices of Curtis v. Trinko, LLP, 540 U.S. 398, 406 (2004).

52. *Id*. at 411.

53. *Id*. at 414.

54. *See, e.g.*, CLARK ET AL., *supra* note 7.

on proof of foreclosure. Given that a carrier that denied interconnection would likely argue that the commercial terms that it sought were reasonable compensation for the receipt and delivery of traffic, a full-blown rule of reason analysis would be indeterminate at the time interconnection was terminated or refused. In all events, proof is time-consuming. As others have noted, a general problem of antitrust institutions is the time it takes to resolve a controversy.[55]

As to any access network's refusal to grant a CDN the form of access that it desires, the second type of interconnection dispute I have described, the antitrust claim would also have to proceed under a classic foreclosure approach, which would require both proof of market power and proof of anticompetitive effect. One could imagine the anticompetitive effect prong as either a claim asserted by the CDN itself or a claim asserted by the content provider that sought to take advantage of the CDN's interconnection with an access provider. The CDN could assert that the access network worked an anticompetitive effect in the market for distribution—especially if the access network provided caching or similar services directly to content providers. The content provider could assert that any access network that was vertically integrated with content (as in the Netflix disputes) was denying the CDN interconnection to advantage its own content. In some regards, such a claim would recall the anticompetitive concerns that prompted the DOJ and the FCC to insist on certain nondiscrimination obligations in the NBC/Comcast merger.[56] But, such a claim would also run into the difficulty that, as David Clark and Bill Lehr have written, transit markets both seem reasonably competitive and cap any access providers' ability to deny CDN interconnection.[57] An access network cannot do without a transit arrangement, for its users demand access to the whole Internet, and the transit market seems relatively robust.

One might respond to the relatively strict requirements of an antitrust claim by pointing to the Federal Trade Commission Act's ("FTC Act") prohibition of "unfair methods of competition."[58] This standard extends, at least to some degree, beyond the antitrust laws, to encompass practices that are anticompetitive "in their incipiency."[59] But the degree to which the FTC Act can and should be read to reach practices not expressly forbidden by the Sherman and Clayton Acts remains highly contentious, and the Federal Trade Commission ("FTC") has remained cautious in expanding its enforcement.[60] More particularly, the authority

55. Weiser, *supra* note 6, at 551.
56. *See* Speta, *supra* note 33, at 1756.
57. *See* CLARK ET AL., *supra* note 7.
58. 15 U.S.C. § 45(a)(1) (2006).
59. Fed. Trade Comm'n v. Brown Shoe Co., 384 U.S. 316, 322 (1966).
60. *See generally* Herbert Hovenkamp, *The Federal Trade Commission and the Sherman*

for using section 5 as a restriction on the non-collusive behavior of oligopolists, and so even if the backbone and transit markets are somewhat less than fully competitive and opportunities for strategic behavior remain, section 5 of the FTC Act is an unlikely substantive ally.[61]

The Communications Act[62] itself contains a sector-specific interconnection requirement. Actually, it contains three: the 1934 Act required that common carriers interconnect, in language borrowed from the Interstate Commerce Act ("ICA"),[63] and such interconnection requirements exist in other children of the ICA, such as the electricity regulation.[64] The 1996 Act included its own interconnection requirements, one for all "telecommunication carriers"[65] and one specifically for incumbent local exchange carriers;[66] these additions were necessary to ensure that interconnection obligations applied to local carriers as the 1996 Act sought to enable entry into the local markets.[67]

The section 201 requirement of interconnection was stated explicitly in terms of a "public interest" requirement, that is, the FCC could order interconnection if it found that interconnection was in the public interest.[68] The public interest was a broad, but not unlimited notion, requiring the FCC to consider competition issues but also the health of the carrier that was ordered to provide interconnection.[69] Although it is often said that *Carterfone*[70] and *Hush-a-Phone*[71] established broad

Act, 62 FLA. L. REV. 871 (2010) (discussing the debate).

61. *See* Spencer Weber Waller, *Prosecution by Regulation: The Changing Nature of Antitrust Enforcement*, 77 ORE. L. REV. 1383, 1390 & n.31 (1998).

62. Communications Act of 1934, Pub. L. No. 73-416, 48 Stat. 1064 (codified as amended in scattered sections of 47 U.S.C.).

63. 47 U.S.C. § 201(a) (2013) ("It shall be the duty of every common carrier engaged in interstate or foreign communication by wire or radio to furnish such communication service upon reasonable request therefor; and, in accordance with the orders of the [FCC], in cases where the [FCC], after opportunity for hearing, finds such action necessary or desirable in the public interest, to establish physical connections with other carriers, to establish through routes and charges applicable thereto and the divisions of such charges, and to establish and provide facilities and regulations for operating such through routes.").

64. 16 U.S.C. § 824(d) (1978).

65. 47 U.S.C. § 251(a)(1) (1999) ("Each telecommunications carrier has the duty . . . to interconnect directly or indirectly with the facilities and equipment of other telecommunications carriers.").

66. *See id*. § 251(c)(2).

67. The 1934 Act left much in local telephony outside the reach of the FCC. *See* 47 U.S.C. § 152(b) (1993). Section 251 applied to local telephone companies and services, as well as interstate, and the FCC then had power to make rules governing local interconnection as well. *See* AT&T Corp. v. Iowa Utils. Bd., 525 U.S. 366, 380-82 (1999).

68. 47 U.S.C. § 201(a).

69. *See, e.g.*, S. Pac. Commc'ns Co. v. Am. Tel. & Tel. Co., 556 F. Supp. 825, 972-78 (D.D.C. 1982) (summarizing open-ended nature of traditional interconnection decisions).

70. Use of the Carterfone Device in Message Toll Telephone Service, 13 F.C.C. 2d 420 (1968).

71. Hush-A-Phone v. United States, 238 F.2d 266 (D.C. Cir. 1956).

interconnection requirements, those cases stand only for the proposition that a carrier that refused interconnection had to demonstrate that the interconnection "would result in damage to [the] telephone system or would otherwise be contrary to the public interest."[72] As to the 1996 Act additions, those were interpreted "as referring 'solely to the physical linking of two networks, and *not* to the exchange of traffic between networks.'"[73] The rationale was that section 251 required physical interconnection—the "facilities and equipment" for interconnection—while section 252 governed the terms of traffic exchange.[74]

The problem with the Communications Act's interconnection requirements is not that they are necessarily insufficiently powerful to cover Internet disputes, although we are still in a situation in which the FCC's power to use the 1996 Act over Internet traffic is in substantial dispute.[75] The problem with the 1934 Act's "public interest" version is in the vagueness and unpredictability of the standard. As the long-distance entry saga showed, it took years under FCC proceedings (prodded by the courts) for interconnection to make progress, and only an antitrust suit really did the trick.[76] The 1996 Act's versions are more certain, but perhaps too mandatory.

The FCC has recently suggested an interconnection duty that rings of the Act's indeterminate "public interest" standard. In particular, in the *Connect America Fund* order, the FCC said that all carriers were under a duty to negotiate in "good faith" for Internet Protocol ("IP") interconnection with the PSTN—and perhaps for IP-to-IP interconnection in certain circumstances.[77] Even apart from the vagueness of this standard, the FCC's ability to maintain such a regulatory stance towards Internet interconnection remains uncertain.

A background interconnection rule could draw on both antitrust and sector-specific regulation to occupy some middle ground. It seems worthwhile to pause on two such models: the 2002 European Regulatory

72. Lincoln Tel. & Tel. Co. v. Fed. Commc'n Comm'n, 659 F.2d 1092, 1105 (D.C. Cir. 1981) (internal quotation marks omitted) (footnote omitted).

73. AT&T Corp. v. Fed. Commnc'n Comm'n, 317 F.3d 227, 234 (D.C. Cir. 2003) (emphasis in original) (quoting *Total Telecomm. Servs., Inc.*, 16 FCC Rcd. 5726 at ¶ 23).

74. *AT&T Corp.*, 317 F.3d at 234; *see also* Competitive Telecomm. Ass'n v. Fed. Commnc'n Comm'n, 117 F.3d 1068, 1071-72 (8th Cir. 1997) (same under 251(c)(2)); Verizon Tel. Cos. v. Fed. Commnc'n Comm'n, 292 F.3d 903, 905 (D.C. Cir. 2002) (same under 251(c)(6) (facilities for collocation)).

75. *See* Comcast Corp. v. Fed. Commnc'n Comm'n, 600 F.3d 642 (D.C. Cir. 2010). The case challenging the FCC's attempt to re-assert its 1996 Act powers over the Internet was heard in the D.C. Circuit in September 2013. Edward Wyatt, *Verizon-FCC Court Fight Takes on Regulating Net*, N.Y. TIMES, Sept. 8, 2013, at B1.

76. Glen O. Robinson, *The Titanic Remembered: AT&T and the Changing World of Telecommunications*, 5 YALE J. ON REG. 517, 521 (1988).

77. *See Connect America Fund*, 26 FCC Rcd. 17,663, 17,678 (2011).

Framework[78] and the proposed 2005 Digital Age Communications Act ("DACA").[79] Each of these was a sector-specific approach to telecommunications—including Internet communications—that borrowed heavily from competition economics but also created some *ex ante* interconnection obligations.

Under the 2002 European Regulatory Framework, all "electronic communications networks,"[80] which essentially means all communications networks providing two-way services, must interconnect and provide access.[81] Further regulatory obligations depended on a showing of "significant market power" in a specific market segment, and those additional obligations could range from nondiscrimination requirements to universal service obligations to price controls.[82] The framework described an iterative process, in which European Union ("EU") competition authorities defined relevant communications markets, the national regulatory authorities conducted market analysis and made findings of significant market power, and the EU authorities confirmed those particular findings.[83] This original framework has been updated by additional EU institutions, including a regulators coordinating body and several statements on appropriate remedies,[84] but the original framework marked an innovation in the use of competition law to determine the extent of regulation—after the initial interconnection requirement.

The DACA proposal took a somewhat different approach. It emphasized *ex post* remedies under an antitrust standard, requiring proof of injury to consumers from any challenged practice in communications markets.[85] DACA explicitly borrowed language from the FTC Act, requiring for most regulation an express finding of consumer injury

78. Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a Common Regulatory Framework for Electronic Communications Networks and Services, 2002 O.J. (L108) 33 [hereinafter Directive 2002/21/EC], *available at* http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2002:108:0033:0050:EN:PDF.

79. Digital Age Communications Act, S. 2113, 109th Cong. § 2(a)(10)(A)(ii) (2005).

80. Directive 2002/21/EC, *supra* note 78, at L108/38.

81. *See generally* James B. Speta, *Rewriting U.S. Telecommunications Law with an Eye on Europe*, *in* GOVERNANCE OF COMMUNICATIONS NETWORKS: CONNECTING SOCIETIES AND MARKETS WITH IT 1, 13-14 (Brigitte Preissl & Jürgen Muller eds., 2006); J. Scott Marcus, *The Potential Relevance to the United States of the European Union's Newly Adopted Regulatory Framework for Telecommunications*, *in* RETHINKING RIGHTS AND REGULATIONS (Lori Cranor & Steven Wildman eds., 2003).

82. *See id.*

83. Directive 2002/21/EC, *supra* note 78, at arts. 5 & 6.

84. *See generally* William H. Melody, *Moving Beyond Liberalisation: Stumbling Towards a New European ICT Policy Framework*, 15 INFO. 25 (2013) (discussing more recent regulatory developments in European telecommunications framework).

85. Digital Age Communications Act, *supra* note 79, at § 2(10) (defining specific type of unfair practice involving denial of interconnection).

flowing from market power.[86] But DACA also included an interconnection requirement that did not quite require an antitrust showing: rather, it limited the agency to interconnection orders in circumstances in which it could find "with respect to interconnection, practices that pose a substantial and non-transitory risk to consumer welfare by materially and substantially impeding the interconnection of public communications facilities and services in circumstances in which the [FCC] determines that marketplace competition is not sufficient adequately to protect consumer welfare."[87]

III. TENTATIVE STEPS FORWARD

Internet service—as provided and, more importantly, as experienced—involves interconnection. An interconnected Internet generates economic and social benefits, and for many regulation-minded folks, that creates a sufficient basis for interconnection regulation. The case I made in 2002 was somewhat more elaborate, relying on economic arguments—the possible exclusionary strategies created by network effects, fed by oligopoly concerns—and noneconomic arguments of the benefits of interconnectivity.[88] What we have seen in the more than ten years since, however, is a very well-functioning market, with relatively few true interconnection disputes. The strategic concerns remain, and a few examples show that they are more than theory. Moreover, the macro-economic and social importance of the Internet has continued to grow unabated. A substantial portion of the economy lives online; other businesses cannot operate their physical businesses without Internet access. It is increasingly difficult to investigate and apply for jobs except online. Modern education, beginning in grade school, now frequently depends on Internet access.

A sector-specific interconnection requirement for Internet carriers seems justified, but the substantively appropriate requirement should specify three vectors: the scope of the requirement, the parties to whom it applies, and the remedies available for its enforcement.

a. What An Interconnection Requirement Might Provide

We can begin by saying that an interconnection requirement requires Internet carriers to interconnect and to accept and deliver traffic originating from other carriers, but perhaps the easiest starting point is to distinguish an interconnection requirement from its alternatives. For example, one can say that an interconnection requirement is more

86. *Id.* at § 2(10)(A)(i).
87. *Id.*
88. *See* Speta, *supra* note 5.

regulatory—or more mandatory—than antitrust, but less so than an unbundling requirement or a broad nondiscrimination rule. That is not to say that interconnection is hermetically sealed from those other tests, for both competition issues and discrimination will probably be a part of many interconnection disputes. But interconnection can be distinguished from each of these other regimes—as already indirectly shown by the foregoing survey.

Antitrust occupies the least regulatory end of the spectrum, due to its substantive requirements, its applying to all industries generally, and its institutional features requiring private litigation. An interconnection requirement differs from an antitrust rule because it does not require proof of anticompetitive foreclosure as a predicate to its development or enforcement. Carriers must interconnect, or provide for interconnection. In the 1996 Act, the requirement is phrased in terms of interconnection "directly or indirectly" meaning that a carrier need not build physical interconnection points to all requesting carriers.[89] I would propose to maintain this requirement, at least from a remedial perspective, and remit challenges to denials of direct interconnection—when indirect connections were maintained—to the realm of nondiscrimination challenges.

At the most regulatory end of the spectrum is unbundling rules, where carriers are required to wholesale their services or their capacity to others who would then offer their own retail services entirely or partially over the infrastructure of the regulated carrier.[90] In fact, I wrote the 2002 article as a response to the "cable open access" movement, which proposed that wholesaling or unbundling rules be applied in the Internet access space,[91] and the point was to show that an interconnection requirement could maintain much of the "open" nature of the Internet without the much more heavy-handed aspects of unbundling regulation. Unbundling regulation—which includes wholesaling regulation—requires regulatory price-setting. There is simply no alternative. And, where the third-party business model is based on pure wholesaling or uses unbundled elements as a substantial fraction of its inputs, then the amount of retail competition—and the benefits thereof, such as through lower prices—will be significantly due to the vigor of price regulation

89. Telecommunications Act of 1996, *supra* note 50, at § 251(a)(1).

90. *See* AT&T Corp. U.S. v. Iowa Utils. Bd., 525 U.S. 366, 380-82 (1999). I recognize that the 1996 Act draws a distinction between wholesaling and unbundling, although that distinction was lost when the Supreme Court approved the FCC's short-lived rules permitting the assemblage of unbundled network elements into a complete retail offering. *See id.* For these purposes, the difference can be elided.

91. *See, e.g.*, Mark A. Lemley & Lawrence Lessig, *Open Access to Cable Modems*, 22 WHITTIER L. REV. 3 (2000); Mark A. Lemley & Lawrence Lessig, *End of End-to-End: Preserving the Architecture of the Internet in the Broadband Era*, 48 U.C.L.A. L. REV. 925 (2001).

and not due to the entry of additional parties.[92]

In the middle, and most similar to an interconnection requirement, is a nondiscrimination rule such as those advanced by network neutrality advocates. Kevin Werbach has argued that an interconnection rule is different from a nondiscrimination rule,[93] but it is difficult to see how to completely remove the overlap. Just as with an unbundling rule, interconnection does not happen in a vacuum as the parties must negotiate the terms of the interconnection and some of those terms involve the cost of completing the interconnection (at a minimum, the cost of constructing facilities to a meet point). Moreover, even if one takes the view of the 1996 Act, that interconnection is only a "physical" requirement, that will not meet the needs of interconnection in the Internet era, for most of the action is on the exchange of data and the pricing and quality of service agreements that the parties exchanging traffic reach.[94] Sprint and Cogent did not have an issue with the physical connection of their networks; the issue was price, settlement-free peering versus paid transit. Level 3 and Comcast are not having a dispute over the actual delivery of Netflix traffic—again, the question is compensation. Even the examples which Werbach uses to try to demonstrate the difference between interconnection and nondiscrimination seem to cross the line into claims of unequal treatment.[95]

I do not think that one can avoid the issues of nondiscrimination that surround an interconnection requirement, but I do think that one can apply a different standard based on the nature of the claim—that is, whether the claim is of a denial of any interconnection or whether it is a claim of discriminatory interconnection. I return to this question just below in discussing remedies, but briefly I would treat a denial of interconnection—direct or indirect—as akin to a *per se* violation, justifying regulatory intervention, while a claim that interconnection was provided on a discriminatory basis would require proof that the terms of the denial were anticompetitive.

92. Entry can result in competitive benefits as to those parts of the service not provided by the incumbents. The 1996 Act's pure wholesaling rules contemplated competitive provision of customer service and billing, and new entrants might provide those services more cheaply. Additionally, entrants who provide services or infrastructure in addition to those leased from incumbents can provide innovative services. The point is not to deny the possibility of some benefits from wholesaling or unbundling, but to note the central role of price regulation and the frequent confusion of multiple retailers with competitive markets.

93. *See* Werbach, *supra* note 5, at 1241-42.

94. 47 U.S.C. § 201(a).

95. *See* Werbach, *supra* note 5, at 1294-95.

b. Who Must Provide Interconnection?

Interconnection requirements should apply to all Internet carriers, which should be defined as companies offering Internet transport service to the public. This definition mirrors the 1996 Act's interconnection requirement, without falling into the trap of whether Internet providers are providing "telecommunications services." "Internet carriers" would encompass companies offering retail services to consumers, such as access providers, as well as companies offering carriage to businesses, websites, and other carriers.[96] As under the Communications Act's definition of "common carriage," which defines the scope of the Act's duties, purely private enterprises—businesses running private networks for example—would be excluded. But it is also clear that offering service to the public need not be the whole public.[97] Thus, a CDN that offered transport to certain types of content providers would be an Internet carrier, even if it did not offer such services to consumers or even to businesses generally.[98]

This definition does not include companies solely offering applications, services, or content, or even to these higher-layer offerings by companies that also offer transport. In this regard, my proposal in 2002 to apply an interconnection requirement to the names-and-presence database of instant messaging seems at this distance to have been wrong.[99] The question of whether the Internet will have a universal addressing space for individuals remains an interesting and difficult question, but interoperable instant messaging simply has not been the competitive issue once imagined. I can only take comfort in saying that not only I got it wrong.

c. What Are The Remedies In Interconnection Disputes

As suggested above, I think that the interconnection requirement ought to have a bifurcated remedial scheme: one that imports different substantive requirements, and one that helps separate interconnection disputes from nondiscrimination disputes.

96. An "Internet transport service" is not meant to limit the requirement to networks that provide IP-based transport services, for (it is part of the point of the IP) that the networks might themselves use myriad transport technologies internally. However, the point is that a network is offering transport in service of what we colloquially understand to be Internet service or Internet traffic.

97. *See* Sw. Bell Tel. Co. v. Fed. Commnc'n Comm'n, 19 F.3d 1475, 1480 (D.C. Cir. 1994).

98. An interconnection requirement would not obligate a CDN (or any Internet carrier) to redefine its customer base. The interconnection requirement is not the duty to serve the entire public, which was traditionally the first duty of common carriers. *See* 47 U.S.C. § 201(a) (describing a duty to "furnish communications services upon request").

99. *See* Speta, *supra* note 5, at 235-38.

First, an outright denial of direct or indirect interconnection ought to be redressable on its own terms—that is, the denial of direct or indirect interconnection would violate the law without any additional proof—such as proof of foreclosure. The FCC would have the authority to order interconnection if traffic were not being delivered, this interconnection requirement being about traffic interconnection and not just physical meetups. And so a party seeking an interconnection order from the FCC would have to prove that a carrier was not delivering relevant traffic—that there was neither direct nor indirect interconnection.[100] This awkward phrasing—"not delivering relevant traffic"—is meant to capture the underlying notion of universal Internet connectivity. A CDN would not be able to protest an interconnection denial on the ground that "its" traffic—that is the traffic of the CDN—was not being delivered, if the CDN's traffic or its customers' traffic was accessible indirectly through transit agreements. The rule as stated is designed to reach cases such as the Sprint/Cogent dispute, where access to content and customers was lost, and in such cases the rule would empower the FCC to order a standstill—a nontermination agreement. There might, as in the case of preliminary injunctions in civil litigation, be a requirement that the party seeking an interconnection order post an appropriate security to cover any charges that should be applied to the connection of traffic. In fact, in at least some circumstances, the FCC applied this sort of interim solution in the telephone era, by ordering a local telephone company to interconnect with MCI for MCI's offering of Execunet service, subject to an interim compensation structure.[101]

In service of this requirement, the FCC should adopt rules that require carriers to provide adequate notice to counterparties of the termination of existing interconnection arrangements—notice adequate to either find alternative commercial arrangements or to seek an interconnection order from the agency. Most current peering and transit agreements appear to be relatively short term, requiring by their terms only thirty days' notice. That is some indication that the market believes that alternatives can be sought relatively quickly, and any FCC rules would hopefully not need to be significantly longer.

Second, denials of interconnection that do not involve the outright nondelivery of traffic would be dealt with under a nondiscrimination rubric, and this nondiscrimination obligation would require a showing that the discrimination was anticompetitive, in the sense that it injured consumers through foreclosure of competition. This is different from

100. To be absolutely clear, this rule would not be violated by a refusal to provide direct interconnection if the carrier were willing to indirectly exchange traffic, for example through a transit arrangement from a third party.

101. *See generally* Lincoln Tel. & Tel. Co. v. Fed. Commnc'n Comm'n, 659 F.2d 1092 (D.C. Cir. 1981) (upholding the FCC's actions).

pure network neutrality, because network neutrality treats discrimination as the relevant legal standard, not foreclosure. This second interconnection tier would cover disputes such as the Level 3/Comcast dispute and similar disputes between CDNs and access providers.[102] In such circumstances, the essence of the dispute is about the terms of the interconnection agreement—or the terms of traffic delivery—and not about whether two parties will be able to reach each other on the Internet.

To be sure, the line suggested above is not necessarily clean. A CDN could conceivably attempt to place itself in the first category by securing exclusive carriage agreements from content and applications providers and then denying indirect interconnections to access providers. Some economics suggests that the CDN might, by assembling a portfolio of content providers, create the opportunity for greater power in the market.[103] Similarly, one could object to the hypothetical order in the Sprint/Cogent dispute on the grounds that all concerned could have sought different traffic arrangements that did not require a direct connection between Sprint and Cogent at all. But if the real ambit of the above is to slow down terminations of traffic in situations in which commercial negotiations reach a boiling point, that is more than we have in place now, and probably resolves most of what needs government resolution.

CONCLUSION

Does the foregoing walk too far away from the common carrier requirements that proved so valuable before the Internet era? For two reasons, I suggest that it does not. First, interconnection preserves the essential universality of the Internet, which is its most valuable characteristic, and prevents the most damaging strategic behavior—the termination of connections that counterparties have relied upon and that customers need to experience true Internet service. Even if interconnection does not necessarily include a full-blown nondiscrimination requirement, it does work.

Second, communications law simply has never included a full-blown nondiscrimination requirement. Even the text of the 1934 Act outlaws only "unreasonable" discrimination, which, if it did not necessarily mirror competition law concepts, imported a more fulsome public interest requirement.[104] From the ICA through the Communications Act, regulators often mandated discrimination, to assist with universal service, to give smaller carriers an advantage against

102. *See* CLARK ET AL. *supra* note 7.

103. *See* Yanos Bakos & Erik Brynjolfsson, *Bundling Information Goods: Pricing, Profits, and Efficiency*, 45 MGMT. SCI. 1613 (1999).

104. *See* 47 U.S.C. § 202(a).

larger companies, or simply to cover the costs of the network through value-pricing.[105] As competition developed, the nondiscrimination requirement was increasingly a dead letter, through moves such as, first, contract tariffs and, later, detariffing. We are not at the point that undoing that evolution seems necessary. Indeed, we are seeking a way to preserve against strategic behavior the most important part of the Internet ecosystem while limiting the scope of unnecessary government intervention. This backup interconnection rule is an attempt to walk this fine line.

105. *See e.g.*, James B. Speta, *Supervising Discrimination: Reflections of the Interstate Commerce Act in the Broadband Debate*, 95 MARQ. L. REV. 1195 (2012).

WOULD UTILITY MODELS IMPROVE AMERICAN INNOVATION?

EVIDENCE FROM BRAZIL, GERMANY, AND THE UNITED STATES

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INTRODUCTION: THE UTILITY MODEL CONCEPT AND THE EFFECTS OF PATENT LAW ON INNOVATION

> *The Congress shall have Power . . . to promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries . . .* [1]

At the time of the founding of the American Republic, the importance of intellectual property protection was already recognized to the extent that the construction and maintenance of a legal regime for copyrights and patents is one of the constitutionally enumerated powers of the United States Congress. The 1st Congress passed the first American patent law barely more than a year after the establishment of the federal government,[2] and since then more than eight million United States patents have been issued.[3] The patent regime has been a crucial component of American federal law throughout the nation's history.

The reasons for this are, primarily, economic. "Patent law is the classic example of an intellectual property regime modeled on [a] utilitarian framework."[4] The theory underlying the existence of patents is that a legal, time-limited monopoly on the practice of an invention enables the inventor to recoup the value of the time, effort, and resources put into realizing the invention, and to reap the benefits of commercialization, before the invention enters the public domain, where its value accrues to the population generally.[5] Therefore, goes the pro-patent argument: inventors will be incented to invest labor and capital in their ideas, thereby accelerating the technological and economic progress of the nation as a whole.[6] In the United States, where economic liberalism has always been the norm, leveraging the economic incentives of individual inventors and entrepreneurs in this way has been, and remains, a fixture of the legal and political landscape.

Over the past several decades, however, a growing number of commentators have questioned whether the existence of patents is, in

1. U.S. CONST. art. I, § 8.
2. Patent Act of 1790, Ch. 7, 1 Stat. 109-112.
3. *Millions of Patents*, U.S. PAT. & TRADEMARK OFF. (Dec. 27, 2011, 12:58 PM) http://www.uspto.gov/news/Millions_of_Patents.jsp.
4. ROBERT P. MERGES, PETER S. MENELL & MARK A. LEMLEY, INTELLECTUAL PROPERTY IN THE NEW TECHNOLOGICAL AGE 29 (6th ed. 2012).
5. CRAIG ALLEN NARD, THE LAW OF PATENTS 31-33 (2d ed. 2011).
6. *Id.*

fact, beneficial. As early as 1958, the Austrian-American economist Fritz Machlup opined that "[i]f [the United States] did not have a patent system, it would be irresponsible, on the basis of our present knowledge of its economic consequences, to recommend instituting one. But since we have had a patent system for a long time, it would be irresponsible, on the basis of our present knowledge, to recommend abolishing it."[7] "[A]s many as 80 percent of software engineers say the patent system actually hinders innovation" in that sector,[8] and the Federal Reserve Bank of St. Louis argued in a 2012 working paper that "weak patent systems may mildly increase innovation with limited side-effects, [but] strong patent systems retard innovation with many negative side-effects."[9] That paper's recommendation was blunt: "[T]he best solution is to abolish patents entirely."[10]

A complete and thorough analysis of whether the existence of patents is beneficial would go well beyond the scope and competence of a single essay. A more tractable, and perhaps more fruitful, course of action is to assume the existence of a patent system and seek ways to optimize the system's effects on innovation, drawing on lessons from other nations. One of the clearest areas in which the American patent law regime is sub-optimal is in the length of time required to obtain a patent—as of December 2012, the U.S. Patent and Trademark Office had a backlog of more than 600,000 pending patent applications and an average time from application to first office action of 18.4 months.[11] Reducing this backlog should be a major goal of any patent reform, as "delay is . . . the greatest problem with the [American] patent system."[12]

One potential patent reform that could improve the effectiveness of the American patent regime is the introduction of the utility model. A utility model is "an exclusive right granted for an invention, which allows the right holder to prevent others from commercially using the protected invention . . . for a limited period of time . . . [and] is similar to

7. S. SUBCOMM. ON PATENTS, TRADEMARKS, AND COPYRIGHTS OF THE S. COMM. ON THE JUDICIARY, 85TH CONG, AN ECONOMIC REVIEW OF THE PATENT SYSTEM 80 (1958) (written by Fritz Machlup), *reprinted in* Nard, *supra* note 5, at 33.

8. *When Patents Attack*, NAT'L PUB. RADIO (July 22, 2011), http://www.npr.org/templates/transcript/transcript.php?storyId=138576167.

9. Michele Boldrin & David K. Levine, *The Case Against Patents* (Fed. Reserve Bank of St. Louis Working Paper 2012-035A, Sept. 2012), *available at* http://research.stlouisfed.org/wp/2012/2012-035.pdf.

10. *See id.*

11. *See Data Visualization Center Patents Dashboard*, U.S. PATENT & TRADEMARK OFFICE (USPTO), http://www.uspto.gov/dashboards/patents/main.dashxml (last visited Jan. Sept. 28, 2013).

12. *See Inside Views: Interview with Chief Judge Paul R. Michel on US Patent Reform*, INTELLECTUAL PROPERTY WATCH (July 14, 2011), http://www.ip-watch.org/2011/07/14/interview-with-chief-judge-paul-r-michel-on-us-patent-reform/.

a patent."[13] Never a part of the American patent law, utility models can be obtained in at least 55 countries.[14] Although such intellectual property rights schemes vary by country, utility models generally differ from patents in that they have less stringent acquisition requirements and shorter terms of protection, and confer a less extensive set of rights.[15] Perhaps most intriguingly, utility models are much cheaper and quicker to acquire than patents, with an average pendency of just six months.[16] Utility models can therefore be thought of, in many ways, as weak patents (which the Federal Reserve Bank of St. Louis observed can increase innovation) that are immune from the delays that plague the arduous United States Patent and Trademark Office (the "USPTO") prosecution process, making them a worthy target of interest for those concerned with reforming the American patent regime.

This paper will examine two utility model systems (the Brazilian and German systems, which differ from each other significantly) and compare innovative outcomes in those systems with outcomes in the United States. Part I of the paper lays out the analytical framework and methodology for assessing and comparing innovative outcomes. Part II carries out the analysis with respect to Brazil, Germany, and the United States. Finally, Part III presents a substantive, targeted policy recommendation for improving the innovation effects of the American patent regime.

I. THE ANALYTICAL FRAMEWORK: THE GLOBAL INNOVATION INDEX AS AN INDICATOR OF INNOVATIVE QUALITY

> *There's no question that measuring anything is tricky, and measuring "innovation" is even trickier.*[17]

One of the most methodologically rigorous attempts to measure innovation in countries around the world is the Global Innovation Index (the "GII"), published annually by the international business school, INSEAD, and the World Intellectual Property Organization ("WIPO"),[18] which has been used, audited, and refined by the European Commission's

13. *Protecting Innovations by Utility Models*, WORLD INTELL. PROP. ORG. (WIPO), http://www.wipo.int/sme/en/ip_business/utility_models/utility_models.htm (last visited Jan. 8, 2013).

14. *Where Can Utility Models Be Acquired?*, WIPO, http://www.wipo.int/sme/en/ip_business/utility_models/where.htm (last visited Jan. 8, 2013).

15. *Protecting Innovations by Utility Models*, *supra* note 13.

16. *Id.*

17. Robert B. Tucker, DRIVING GROWTH THROUGH INNOVATION 55 (2009).

18. *See generally* THE GLOBAL INNOVATION INDEX 2012 (Soumitra Dutta ed. 2012) [hereinafter "GII"] *available at* http://www.globalinnovationindex.org/userfiles/file/GII-2012-Report.pdf.

Joint Research Centre.[19] The GII is an invaluable research tool, not only because it is exhaustive (the 141 countries analyzed "represent 94.9% of the world's population and 99.4% of the world's GDP"[20]) and includes indicators that "go beyond . . . traditional measures of innovation,"[21] but because INSEAD and WIPO publish all of the raw data used to compile the GII freely on the Internet,[22] making it easy to examine the relationships between individual innovative inputs and outputs with greater specificity.

Another advantage of the GII is that it measures inputs to innovation as well as outputs, and it divides an out-of-100 output score by an out-of-100 input score to obtain a ratio indicating each country's innovative "efficiency."[23] Because the quantity and quality of innovative inputs correlates with the level of economic development in a country,[24] merely assessing innovative outcomes fails to capture how effectively and efficiently a country uses its innovative resources. As the goal of this paper is to assess the impact of utility models on innovation while controlling for as many other factors as possible, it is this Innovation Efficiency Index (the "IEI") which this paper uses as the dependent variable.

Full descriptions of the variables that make up the GII, as well as their relative weights, are presented in Appendices A (for input variables) and B (for output variables), but the workings of the GII and the IEI warrant some brief description here. There are five pillars of innovative inputs (institutions, human capital and research, infrastructure, market sophistication, and business sophistication) and two pillars of innovative outputs (knowledge and technology, and creative). Each of the pillars is further divided into three sub-pillars, each of which is comprised of three to six individual indicators. Examples of input indicators include press freedom (part of the "institutions" pillar) and net inflows of foreign direct investment (part of the "business sophistication" pillar); examples of output indicators include the number of patent applications at the national patent office and exports of computer and communications services (both part of the "knowledge and technology" pillar). The Innovation Input and Output Sub-Indices are weighted averages of their respective constituent indicators; the ratio of

19. *Global Innovation Index 2012 measures capabilities of 141 Countries*, EUROPEAN COMM'N JOINT RSCH. CENTRE (July 5, 2012), http://ec.europa.eu/dgs/jrc/index.cfm?id=1410&obj_id=15060&dt_code=NWS&lang=en.

20. GII, *supra* note 18, at 6.

21. *Id.* at 4.

22. *Global Innovation Index 2013,* INSEAD (2013), http://globalinnovationindex.org/content.aspx?page=data-analysis.

23. GII, *supra* note 18, at 22.

24. *Id.* at 76-77.

the latter Sub-Index to the former is the IEI.

Finally, the distinction between "technological" innovation and "creative" or "non-technological" innovation is useful for the analysis. The former consists of patent applications, scientific journal articles, computer software, etc. (the "knowledge and technology" pillar of the Innovation Output Sub-Index); the latter consists of trademark registrations, new business creation, recreation and culture, etc. (the "creative" pillar of the Innovation Output Sub-Index). Although this paper is directed toward the effects of patent law on innovation generally, such effects will be more direct, and more clearly identified, with regard to technological innovation.

II. ANALYSIS: THREE CASE STUDIES IN UTILITY MODEL REGIMES

> *[T]he very first official thing I did, in my administration—and it was on the very first day of it, too—was to start a patent office; for I knew that a country without a patent office and good patent laws was just a crab, and couldn't travel any way but sideways or backwards.*[25]

Not all utility model systems are created equal; from country to country, utility models vary in terms of length (from as short as six years in France[26] to as long as fifteen years in Brazil[27]), eligible subject matter (all patentable inventions are eligible in France,[28] while Asian countries generally allow utility models to be granted only for "[d]evices concerning a shape, structure or combination of these in an article"[29]), administrative procedures, and other areas. It is for this reason that, instead of "Are utility models good for innovation?", a more productive question to ask is "What *kind* of utility models are good for innovation?"

For purposes of comparison to the American patent regime, then, the utility model systems to be examined should differ in their details to allow for a more targeted policy recommendation. It is for that reason that this paper focuses most specifically on the Brazilian and German utility model regimes, which differ from one another in a number of

25. MARK TWAIN, A CONNECTICUT YANKEE IN KING ARTHUR'S COURT 64 (1889).

26. "Les titres de propriété industrielle protégeant les inventions sont: . . . [l]es certificats d'utilité, délivrés pour une durée de six ans à compter du jour du dépôt de la demande." ["The industrial property titles protecting inventions [include]: . . . utility certificates, issued for a period of six years from the date of filing."] CODE DE LA PROPRIÉTÉ INTELLECTUELLE art. 611-2 (May 3, 2012), *available at* http://www.wipo.int/wipolex/en/text.jsp?file_id=273944.

27. "[A] utility model patent [shall remain in force] for a period of 15 (fifteen) years from the date of filing." Law No. 9,279 of May 14, 1996 [hereinafter "Brazilian Law No. 9,279] art. 40, *available at* http://www.wipo.int/wipolex/en/text.jsp?file_id=125397.

28. CODE DE LA PROPRIÉTÉ INTELLECTUELLE, *supra* note 26, at art. 611-10.

29. *Comparison of Utility Model Systems by Nation*, JAPAN PATENT OFF., http://www.jpo.go.jp/shiryou_e/toushin_e/shingikai_e/pdf/en_utility/material3.pdf (last visited Jan. 11, 2013).

respects. Brazil's utility model system is unusual in that it requires substantive examination of utility model applications;[30] although the threshold of patentability for utility models is lower than for full-term patents, examination takes place in the context of the same basic requirements of novelty, inventive step, and industrial application.[31] Germany's system requires no such substantive examination.[32] In Brazil, any patentable subject matter may be eligible for protection as a utility model;[33] Germany's system excludes methods and processes from utility model eligibility.[34] Utility model protection lasts fifteen years in Brazil, as compared to ten years in Germany.[35]

Perhaps most important, however, are the ways in which the utility model systems complement, differ from, and interact with their full-term patent system counterparts, and it is here where the Brazilian and German systems evince fundamental differences not just in their technical details or administrative procedures, but in the philosophies and justifications that underlie and inform them. The German system is what might be termed a "coexisting" system—that is, patents and utility models are not alternatives to one another, but mutually reinforcing concepts, both of which can be directed to similar sets of ideas.[36] Utility

30. Brazilian Law No. 9,279, *supra* note 27, at art. 33.

31. "Uma invenção é patenteável quando atende simultaneamente aos três requisitos básicos: novidade, atividade inventiva e aplicação industrial . . . Um modelo de utilidade é patenteável quando o objeto de uso prático (ou parte deste) atende aos requisitos de novidade na nova forma ou disposição, aplicação industrial e envolve um ato inventivo, que resulte em melhoria funcional no seu uso ou na sua fabricação." ["An invention is patentable if it meets the three basic requirements: novelty, inventive step and industrial application . . . A utility model is patentable when the object of practical use (or part thereof) meets the requirements of novelty in the new form or arrangement, industrial application and involves an inventive step, which results in functional improvement in its use or in its manufacture."] *Guia de Depósitos de Patentes* [*Guide to Patent Applications*], INSTITUTO NACIONAL DA PROPRIEDADE INDUSTRIAL [BRAZILIAN NATIONAL INDUSTRIAL PROPERTY INSTITUTE] 11, http://www.inpi.gov.br/images/stories/downloads/patentes/pdf/Guia_de_Deposito_de_Patentes.pdf (last visited Jan. 11, 2013) [hereinafter "Brazilian Patent Guide"].

32. "Eine Prüfung des Gegenstands der Anmeldung auf Neuheit, erfinderischen Schritt und gewerbliche Anwendbarkeit findet nicht statt." ["Examination of the subject matter of the [utility model] application does not take place with regard to novelty, inventive step, and industrial application."] Gebrauchsmustergesetz [GebrMG] [Utility Model Law], as amended July 31, 2009, at § 8(1), http://www.wipo.int/wipolex/en/text.jsp?file_id=229677 (last visited Sept. 27, 2013) (Ger.).

33. Brazilian Patent Guide, *supra* note 31, at 16, 20.

34. "Als Gebrauchsmuster warden nicht geschützt: . . . Verfahren." ["Not protectable as utility models are: . . . methods."] GebrMG, *supra* note 32, at § 2.

35. "Die Schutzdauer eines eingetragenen Gebrauchsmusters beginnt mit dem Anmeldetag und endet zehn Jahre nach Ablauf des Monats, in den der Anmeldetag fällt." ["The term of protection of a registered utility model begins with the filing date and ends ten years after the end of the month in which the date of filing falls."] GebrMG, *supra* note 32, at § 23(1).

36. *See id.* at §§ 1, 2 (identifying the types of subject matter suitable and unsuitable for utility model protection); *cf.* German Patent Law, §§ 1, 3, *available at* http://www.wipo.int/wipolex/en/text.jsp?file_id=238776 (defining the scope of patent

models can claim priority on the basis of earlier-filed patent applications (as long as the claim is made within two months of the completion of the patent prosecution process)[37] and vice versa (as long as the claim is made within a year of the utility model's filing date)[38]—indeed, a utility model and, subsequently, a patent can be obtained for the same subject matter.[39] Brazil's utility model regime, by contrast, could be considered a "competitive" system, wherein patents and utility models are mutually exclusive options to accomplish similar, but not identical, ends; applications for utility models are handled by the same procedures as applications for patents,[40] and with the exceptions of the term of protection[41] and the thresholds of patentability necessary to obtain rights,[42] there is little to separate the two concepts. Unlike in Germany, utility models and patents may not be obtained for the same subject matter in Brazil, no matter the order in which they are sought or any claims to priority.

And so the question arises again, but with a slightly different meaning: "What *kind* of utility model is good for innovation?" Which of the two competing theories of what a utility model is, or should be, leads to better innovative outcomes? Is the ease of obtaining a German utility model (no substantive examination, no preclusion of later patentability) worth the weaker set of rights obtained thereby (no processes or methods, a term half as long as that of a patent[43])? Is it preferable to undergo a longer, more consequential prosecution (some degree of substantive examination, a forced choice between utility models and patents) to secure stronger rights (fifteen years of protection, all patentable subject matter eligible), as under the Brazilian regime? Are both systems beneficial? Or does American patent law, with its total absence of the utility model concept, have it right to begin with?

A. The "Strong" Utility Model Regime: Brazil

Among upper-middle-income countries, Brazil ranks eighth on the IEI with a score of 0.82 (0.08 better than the United States).[44] Detailed data on Brazilian innovation can be found in Appendix C.

protection in similar terms).

37. GebrMG, *supra* note 32, at § 5(1).

38. German Patent Law, *supra* note 36, at § 40(1).

39. *Id.* at § 40(5).

40. *See generally* Brazilian Law No. 9,279, *supra* note 27, at art. 30-37.

41. "An invention patent shall remain in force for a period of 20 (twenty) years, and a utility model patent for a period of 15 (fifteen) years from the date of filing." *Id.* at art. 40.

42. Brazilian Patent Guide, *supra* note 31, at 11.

43. "The duration of a patent shall be 20 years, beginning on the day following the filing of the application for the invention." German Patent Law, *supra* note 36, at § 16(1).

44. GII, *supra* note 18, at 23, 26.

As a nation with a developing economy, Brazil is a fertile proving ground for utility models as a concept because of the positive effect utility models have been shown to have on innovation in such countries. A 2011 investigation by researchers at the Korea Institute of Intellectual Property, Seoul National University, American University, and the Republic of Korea Naval Academy in the journal *Research Policy* found that in general, utility models are "conducive to innovation and growth, controlling for other factors" in developing countries.[45] In the Brazilian case particularly, the World Bank has recognized that "utility models helped domestic producers gain a significant share of the farm machinery market by encouraging adaptation of foreign technologies to local conditions."[46] Brazil is a poster child for the notion that utility models can serve as "a stepping stone for developing more patentable inventions later on."[47]

The design of Brazil's utility model system, especially its similarities to the regime for full patents, is particularly interesting in light of Brazil's current economic position. Although Brazil is still characterized as a developing country,[48] its rapid economic growth over the past decade[49] has put it on the threshold of becoming characterized as a developed country.[50] Thus, Brazilian intellectual property law must navigate the tricky boundary between two worlds: the developing world, where utility models "allow[] . . . economies to build up their indigenous innovative capacities,"[51] and the developed world, where "[full] patent protection contributes to innovation and economic growth."[52] It is perhaps not surprising then to find a "strong" utility model system in a country like Brazil, as such a system can be seen as an attempt to synthesize the advantages of utility models that enable the buildup of innovative infrastructure—lower thresholds for protection and a simpler prosecution process—with the advantages of patents that drive major

45. Yee Kyoung Kim, Keun Lee, Walter G. Park & Kineung Choo, *Appropriate Intellectual Property Protection and Economic Growth in Countries at Different Levels of Development*, 41 RES. POL'Y 358, 358 (2012).

46. WORLD BANK, GLOBAL ECONOMIC PROSPECTS AND THE DEVELOPING COUNTRIES 134 (2002), *available at* http://siteresources.worldbank.org/INTGEP/Resources/335315-1257200370513/gep2002complete.pdf.

47. Kim et al., *supra* note 45, at 358.

48. INTERNATIONAL MONETARY FUND, WORLD ECONOMIC OUTLOOK: GROWTH RESUMING, DANGERS REMAIN 182 (Apr. 2012), *available at* http://www.imf.org/external/pubs/ft/weo/2012/01/pdf/text.pdf.

49. Over the course of eight years, Brazil's per capita GDP (in current U.S. dollars) more than quadrupled, from $3,042 in 2003 to $12,576 in 2011. *GDP Per Capita,* WORLD BANK, http://data.worldbank.org/indicator/NY.GDP.PCAP.CD/countries (last visited Sept. 28, 2013).

50. The GII, for instance, classifies Brazil as an "upper-middle-income" country, one rung below the "high-income" classification. GII, *supra* note 18, at 26.

51. Kim et al., *supra* note 45, at 359.

52. *Id.*

breakthroughs in the developed world—stronger protections and longer terms of exclusive use.

A question then arises, however: for how much longer will Brazil need a utility model system? With Brazil headed toward characterization as a developed country within the next few decades and its utility model system already bearing strong resemblances to the patent regime, utility models may be reaching the ends of their useful lives in Brazil. Indeed, the Brazilian patent office, the Instituto Nacional da Propriedade Industrial (the National Institute of Industrial Property, the "INPI"), is already bedeviled by one of the hallmarks of patent systems in the developed world . . . delay. While the USPTO's average pendency in December 2012 was a substantial 39 months,[53] the INPI's mark in February of the same year was an astounding eight to nine years.[54]

This should give advocates of the introduction of the utility model in the United States some pause, as it may demonstrate that the utility model is not the right tool for solving the major problem the United States patent system faces; if the goal of a new reform is to reduce patent pendency, adopting a strategy that is utilized by a patent regime with an average pendency over twice as long as that of the United States does not, on its face, seem a particularly prudent course of action. One can argue that the length of pendency in Brazil is due to factors that have little or no relevance to the American system, such as a deficiency in resources as compared to the USPTO. The USPTO had 6,652 examiners on staff at the end of 2011[55] and received 503,582 patent applications in that year;[56] in 2010 the INPI employed 273 patent examiners[57] and received 22,686 patent applications and 1,988 utility model applications.[58] The INPI thus received 90.4 applications requiring examination per examiner, compared to 75.7 for the USPTO. Although this may explain some difference in efficiency between the two countries, it does not appear to be so significant as to account for such a wide gap in pendencies, especially considering the relative rates at which both offices have lately been expanding their corps of examiners[59] and

53. USPTO Data Visualization Center Patents Dashboard, *supra* note 11.

54. Letter from National Foreign Trade Council to U.S. Trade Representative Ronald Kirk (Feb. 10, 2012), *available at* http://www.nftc.org/default/Publications/Trade_Policy/Special301_Comments%202-10-12.pdf.

55. USPTO Data Visualization Center Patents Dashboard, *supra* note 11.

56. WIPO, WORLD INTELLECTUAL PROPERTY INDICATORS 49 (2012), http://www.wipo.int/export/sites/www/freepublications/en/intproperty/941/wipo_pub_941_2012.pdf.

57. INPI, BALANCE AND PERSPECTIVES: INPI IN TRANSFORMATION, 20, *available at* http://www.inpi.gov.br/images/stories/downloads/pdf/INPI_Relatorio_Comunicacao_ingles.pdf.

58. WIPO, *supra* note 56, at 49, 91.

59. INPI's 2010 staff of 273 examiners was a 22.4% increase over the previous year's

the fact that utility model applications do not undergo examinations as rigorous as those to which patent applications are subjected. Moreover, the INPI itself has identified that one of its major problems, irrespective of operational capacity, was that it was "little articulated with . . . industry and with the national innovation system;" INPI was "not perceived by many as relevant for its potential uses . . . [and was] culturally distant from the means of innovation."[60] This perceived irrelevance and "cultural distance" has been identified as a growing problem in the American system as well.[61] Brazil's experience, therefore, demonstrates that the existence of a strong utility model system is not a magic bullet for reducing pendency for full patent applications.

B. The "Weak" Utility Model Regime: Germany

Among high-income countries, Germany ranks fifth on the IEI with a score of 0.91 (0.17 better than the United States).[62] Detailed data on German innovation can be found in Appendix D.

The primary success of the German utility model (*Gebrauchsmuster*) has been as a placeholder—a measure used to quickly establish rights when the rights-holder eventually intends to obtain a full patent.[63] This is usually accomplished by "branching off" a utility model application from a preexisting patent application, which allows the rights-holder to maintain the priority date of the patent application and obtain rights while the patent application is still pending[64] (due to the lack of substantive examination of the utility model application). Unlike in several other countries with utility model systems,[65] a patent application is not deemed abandoned in the German system if a utility model application claiming the same subject matter and the same priority date is subsequently filed.[66] The most common reason for employing such a tactic is that holding a utility model can be advantageous in litigation if the patent applicant suspects infringement,[67] and intellectual property lawyers doing business in Germany often tout

223. INPI, *supra* note 57, at 20. In September 2012, the USPTO had a staff of 7,837 examiners, a 17.2% increase from the 6,685 of a year earlier. USPTO Data Visualization Center Patents Dashboard, *supra* note 11.

60. INPI, *supra* note 57, at 14.

61. *See When Patents Attack*, *supra* note 8.

62. GII, *supra* note 18, at 23.

63. *See* Hans-Peter Brack, *Utility Models and their Comparison with Patents and Implications for the US Intellectual Property Law System*, 2009 B.C. INTELL. PROP. & TECH. 102701, 7 (2010).

64. *Id.*

65. For instance, the patent offices of Japan, South Korea, and China all prohibit duplicate registrations. *See Comparison of Utility Model Systems by Nation*, *supra* note 29.

66. German Patent Law, *supra* note 36, at § 40(5).

67. Brack, *supra* note 63, at 6.

this to their clients as one of the major benefits of seeking a utility model.[68]

Despite their potential advantages in litigation, however, utility models' popularity in Germany is declining markedly; the number of German utility model applications declined 5.8%, and the number of German utility models granted declined 8.1% in 2011, as compared to the previous year.[69] "[L]arger firms such as those in the German chemical industry have taken the position that utility models are 'unsafe,' and oppose them . . . . [Such firms] do not wish to consume their resources defending themselves against an unexamined right [because] monitoring and litigation [of competitors' utility models] is quite costly for the firms."[70] By the same token, as Germany is a fully-developed nation with a well-established scientific infrastructure, many of the entities with the resources to realize new technological achievements may be willing to accept the expenditure of the additional time and money required to obtain the stronger rights that accompany a full patent, rather than risk their developments with the cheap but weak protections of the utility model; the utility model law (*Gebrauchsmustergesetz*) allows a wide range of parties to bring a claim for cancellation of a utility model,[71] and the burden lies with the holder of the utility model to prove validity.[72]

This reluctance to seek utility models for inventions and improvements is not confined to the German system; in 2011, applications for utility models decreased as compared to the previous year by substantial margins in South Korea, Japan, and Austria; decreased slightly in Spain; and were essentially flat in Italy and Hong Kong,[73] while patent applications increased markedly in each of these jurisdictions.[74] National patent offices in the developed world seem to be

68. *See, e.g.,* Steven C. Carlson, Frank Peterreins, Alexander Harguth, Adam R. Steinert, & Jan-Malte Schley, *German Utility Models: A Useful and Affordable Tool for Global IP Solutions*, http://www.fr.com/files/Uploads/Documents/Utility%20Models%20Article.pdf (last visited Jan. 14, 2013) (an advertisement to clients by the prestigious intellectual property firm Fish & Richardson promoting German utility models as a part of international IP litigation strategy); BARDEHLE PAGENBERG, UTILITY MODEL PROTECTION IN GERMANY 14 (2013), *available at* http://www.bardehle.com/fileadmin/contentdocuments/broschures/Utility_Model_Protection_EN.pdf (a similar publication by the firm Bardehle Pagenberg).

69. WORLD INTELLECTUAL PROPERTY INDICATORS, *supra* note 56, at 94. It should be noted that the trend in Germany is contrary to the worldwide trend of a 35.0% increase in applications and a 16.3% increase in grants, *id.* at 90, 94, but that trend is due almost entirely to a 42.9% increase in applications and an 18.5% increase in grants in China, which processes roughly 37 times as many utility model applications as any other single patent office. *Id.*

70. Brack, *supra* note 63, at p. 11.

71. GebrMG, *supra* note 32, at § 15(1).

72. *Id.* at § 17(1).

73. WORLD INTELLECTUAL PROPERTY INDICATORS, *supra* note 56, at 91.

74. *Id.* at 49.

getting the message; Germany is now one of the few remaining developed countries that offer utility model protection,[75] as those ranks have dwindled within just the last few years.[76] As firms increasingly move away from utility models and governments across the developed world drop their utility model systems (or consider doing so), Germany's system looks increasingly anachronistic, as does its weak utility model regime.

C. The No-Utility-Model Regime: The United States

Among high-income countries, the United States ranks 26th on the IEI with a score of 0.74.[77] Detailed data on American innovation can be found in Appendix E.

As noted in the Introduction to this paper, the American patent system is beset by a range of infirmities that pose a serious threat to innovation in the United States. Foremost among these is the sheer length of time necessary to prosecute a patent application through the USPTO, but several others loom. One such issue, which has received substantial press but is still largely misunderstood by the general public, is a sharp increase in patent trolling.[78] These two problems, in combination with others, have led innovators in several fields, most notably software, to begin eschewing the notion of patents completely.[79] On first impressions, utility models could arguably address these two major thorns in the side of the American innovator—utility models are quicker and easier to obtain than patents, and they are, under the "weak" utility model system that prevails in the developed world, less valuable to patent trolls because they are much more susceptible to cancellation than patents.[80]

The idea that the United States might benefit from the implementation of a utility model system, though not without its merits and its proponents,[81] suffers from several flaws. As an initial matter, despite much hand-wringing in the press (not all of it unfounded),

75. Kim et al., *supra* note 45, at 360.

76. The Netherlands, for instance, abolished its six-year utility model on 5 June 2008. NL Patent Office, *Patent Act 1995*, http://en.octrooicentrum.nl/patent-trademark-or-design/patents/patent-act-1995.html (last visited Jan. 14, 2013). Belgium did the same on 8 January 2009. *Belgian Patents*, FPS ECONOMY OF BELGIUM, http://economie.fgov.be/en/entreprises/Intellectual_property/Patents/Belgian_patents (last visited Jan. 14, 2013).

77. GII, *supra* note 18, at 23.

78. Patent assertion entities brought 61% of all patent lawsuits in the United States in the first eleven months of 2012, compared with 45% in 2011 and 23% in 2007. Sarah McBride, *Patent Troll Cases Now Make up Majority of All Patent Litigation, Study Says*, REUTERS (Dec. 10, 2012, 4:19 PM), http://www.reuters.com/article/2012/12/10/us-patents-usa-lawsuits-idUSBRE8B913I20121210.

79. *When Patents Attack*, *supra* note 8.

80. *See, e.g.*, GebrMG, *supra* note 32, at §§ 15(1), 17(1).

81. *See, e.g.*, Brack, *supra* note 63, at p. 11.

American *technological* innovation is not, in fact, in a state of all-out crisis. Although the United States ranks squarely in the middle of the pack in the IEI,[82] this is largely driven by weakness in what might be termed "creative" or "non-technological" innovation; America ranks 75th (out of 87 countries with data) in national office trademark registrations[83] and 41st (out of 62 countries with data) in Madrid Agreement trademark registrations.[84] If the IEI were recalculated using only the "knowledge and technology" pillar of the innovation output score, the United States would rank 31st overall[85]—not an excellent showing, but a substantially better one.

Furthermore, the performance of the American patent system has recently showed signs of improvement, at least in terms of patent pendency, without the implementation of utility models. The USPTO's time to first office action, though still much too high at 20 months, has fallen by eight months since August 2011, and the backlog of 608,000 applications is the smallest in well over two years.[86] The USPTO's own Quality Composite Score, which combines seven individual metrics to obtain a picture of how the USPTO is performing as a whole, stood at 72.4 in the fourth quarter of 2012, more than forty points higher (on a 0-to-100 scale) than just a year earlier.[87] These improvements may be expected to continue as the Office opens new branch offices in Dallas, Denver, Detroit, and Silicon Valley over the next two years.[88] As the USPTO begins to set its house in order after many years of subpar performance, the necessity of further reform may be questioned.

Additionally, to the extent that reform of the American patent system is needed, Congress has already attempted to address that need with the Leahy-Smith America Invents Act (the "AIA"), which was signed into law in September 2011 and will be fully in force by September 2015 (with most provisions becoming effective in March 2013).[89] The most significant change to American patent law contained in the AIA, and the one likely to have the biggest impact on the workings of the USPTO, was the switch from a first-to-invent system—the last

82. Of 141 countries examined, the United States' IEI score placed 70th, and in the bottom half (26th out of 44) of high-income countries. GII, *supra* note 18, at 23.

83. *Id.* at 396.

84. *Id.* at 397.

85. Author's own calculations. Based on data from *Global Innovation Index 2013*, *supra* note 22.

86. USPTO Data Visualization Center Patents Dashboard, *supra* note 11.

87. *Id.*

88. Allison Sherry, *Denver to Get U.S. Patent Office, A $440 Million Economic Boost*, THE DENVER POST (July 1, 2012), *available at* http://www.denverpost.com/politics/ci_20981965/denver-get-u-s-patent-office.

89. *See generally* UNITED STATES PATENT & TRADEMARK OFFICE, AMERICA INVENTS ACT: EFFECTIVE DATES (Oct. 5, 2011), *available at* http://www.uspto.gov/aia_implementation/aia-effective-dates.pdf.

such system in the world[90]—to a first-to-file system.[91] Proponents of the AIA argue that this change will improve the USPTO's efficiency by eliminating the need for examiners to closely scrutinize extrinsic evidence of an invention's date of "reduction to practice" and the need for interference, a costly and time-consuming procedure used to settle conflicting claims for priority between inventors under the first-to-invent system.[92] Under the AIA, an inventor may still claim that an earlier-filing inventor "derived" the invention from him or her and seek to have the earlier-filed application invalidated.[93]

Critics of the AIA contend that the newly created procedure of the derivation proceeding, by which the USPTO will examine claims of derived invention, will, in practice, be at least as administratively burdensome as the old interferences, vitiating any putative gains in patent system efficiency.[94] It is, of course, too early to tell which of these conflicting points of view is more accurate, but one cause for concern about the AIA's supposed efficiency gains, at least in the short-run, is that, for the next several years, the USPTO will have to conduct both interferences and derivation proceedings because applications filed on or after March 16, 2013 will be subject to derivation proceedings, while the backlog of hundreds of thousands of pending applications filed before that date will still be subject to interferences as they work their way toward issue.[95]

Even if utility models have a positive effect on innovation generally, they may not be appropriate for the American case. Economic research on the subject of utility models suggests that "[w]here th[e] capacity [to conduct innovative research] exists . . . a system that provides incentives to conduct minor, incremental inventions [*i.e.* a utility model system] is more conducive to growth."[96] In contrast, utility model protection weakly affects innovation and growth in developed countries.[97] This is consistent with the trend among developed countries away from utility models, even as the annual quantity of patent applications increases despite continued backlogs in most of the world's

90. Suzanne Konrad, *The United States First-to-Invent System: Economic Justifications for Maintaining the Status Quo*, 82 CHI.-KENT L. REV. 1629, 1629 (2007) (citing MARTIN J. ADELMAN ET AL., CASES AND MATERIALS ON PATENT LAW 160 (2d ed. 2003).

91. AMERICA INVENTS ACT: EFFECTIVE DATES, *supra* note 89, at 6.

92. George Rondeau, "*America Invents Act" Patent Law Overhaul: The Benefits and the Drawbacks*, LEXOLOGY.COM (Nov. 17, 2011), http://www.lexology.com/library/detail.aspx?g=5f772592-7ac2-41bc-becb-d3ff5c8ed192.

93. Changes to Implement Derivation Proceedings, 77 Fed. Reg. 56,068, 56,069 (Sept. 11, 2012) (to be codified at 37 C.F.R. pt. 42).

94. Charles L. Gholz, *Would Derivation Proceedings Be the Same as Derivation Interferences?*, 2 MEDICAL INNOVATION AND BUSINESS 39 (Summer 2010).

95. AMERICA INVENTS ACT: EFFECTIVE DATES, *supra* note 89, at 6.

96. Kim et al., *supra* note 45, at 358.

97. *Id.* at 359.

major patent offices. Even if decision-makers in the United States were to conclude that establishing some type of utility model protection would be beneficial for American innovation, implementing the utility model system would require changes to many aspects of American law;[98] whether American business—and, perhaps more significantly, the American Congress—would have the political and economic stomach to get such changes right is an open question.

III. CONCLUSION: RECOMMENDATIONS FOR THE FUTURE OF AMERICAN PATENT LAW

Be not the first by whom the new are try'd,
Nor yet the last to lay the old aside.[99]

The Brazilian and German experiences with their respective utility model systems give conflicting evidence as to the usefulness and propriety of the utility model concept, both in those countries and in regard to any prospective future reforms for the United States.

Brazil has, in the recent past, greatly benefited from its strong utility model system; in the late '90s and the early years of the 21st century, that system helped small, local businesses and was a significant catalyst in the economic miracle that has put Brazil on the cusp of transition to a high-income standard of living. Now that Brazil is prepared to make that leap from developing country to developed country, however, the continued viability and necessity of its utility model system is on shaky ground, both philosophically and practically.[100] Brazil also now faces a threat to innovation with which developed nations are well-acquainted and to which the utility model alternative has provided little relief: seemingly interminable patent pendency. If utility models have not immunized South America's largest and most important intellectual property system from such a malady, it is doubtful that they would do so in the United States, where they would likely play an even less prominent role.

Germany, in many ways, is now the standard-bearer for the utility model concept generally—the German Patent and Trademark Office (*Deutsches Patent- und Markenamt*) now receives more utility model

98. Brack, *supra* note 63, at 11.

99. ALEXANDER POPE, AN ESSAY ON CRITICISM, pt. 2, lines 336-37 (1709).

100. At present, Brazilian patent and utility model application data for 2011 are not available; in 2010, the number of utility model applications to INPI fell by 36.3% as compared to the previous year, while the number of patent applications rose 88.1%. WORLD INTELLECTUAL PROPERTY INDICATORS, *supra* note 56, at 49, 91. This could indicate that innovators, when faced with the choice between patents and utility models, are consciously shifting away from utility models in favor of patents, as the conventional model of IP rights suggests is appropriate for a country in Brazil's economic position.

applications than any of its peer offices in the developed world and, outside of China, Germany is perhaps the most prominent country that still offers utility model protection—but there, too, the concept's successes are counterbalanced by drawbacks. There is little doubt that Germany's weak utility model system provides firms with great flexibility and gives both plaintiffs and defendants in litigation (and potential litigation) greater clarity when making decisions about intellectual property strategy; it is perhaps for this reason that Germany has not fallen victim to America's rampant patent trolling epidemic. As a rich country, however, it has the capacity to go beyond the incremental improvements so typical of utility models and pursue game-changing technologies that are more properly protected by patents; it is unclear whether the utility model is still needed in Germany, and, if trends in other developed countries are any indication, the existence of the *Gebrauchsmuster* is on the wrong side of history.

What, then, can be said about the propriety of bringing utility models to the United States, where they have never before been implemented? There is no doubt that the American patent system has room to improve, but with the first performance data from 2012 giving encouraging signs and a significant expansion in USPTO capacity on the horizon, such improvement looks firmly within America's grasp without the need for utility models. As the German case and the recent history of utility models in the developed world evinces, for rich countries the utility model is quickly becoming an add-on, an afterthought whose time as an important piece of the intellectual property rights puzzle has passed.

Congress, to its credit, recognized that reform was needed, but its attempt at such reform was belated[101] and imperfect and has been subjected to sharp criticism.[102] The AIA's shortcomings in addressing some of the fundamental problems with the American patent system,

101. Apart from the creation of the United States Court of Appeals for the Federal Circuit in 1982, the AIA was the first significant modification to American patent law since 1952, despite many instances of clamoring for change (Fritz Machlup's 1958 testimony to Congress being an example). David Goldman, *Patent Reform Is Finally on Its Way*, CNN MONEY (June 24, 2011, 11:05 AM), http://money.cnn.com/2011/06/24/technology/patent_reform_bill/index.htm. Indeed, Congress and the Patent Act have often lagged behind the times throughout the nation's history; between the passage of the initial Patent Act in 1790 and the 1952 Patent Act, Congress meaningfully revised the American patent system only three times, in 1793, 1836, and 1870. Nard, *supra* note 5, at 19-22.

102. *See, e.g.*, Timothy B. Lee, *Mostly Pointless Patent Reform Bill Goes to Obama for Signature*, ARS TECHNICA (Sept. 8, 2011, 3:48 PM), http://arstechnica.com/tech-policy/2011/09/mostly-pointless-patent-reform-bill-goes-to-obama-for-signature/; Rob Wheeler & James Allworth, *U.S. Patent Overhaul Won't Help Innovators*, HARVARD BUSINESS REVIEW BLOG NETWORK (Sept. 15, 2011, 9:38 AM), http://blogs.hbr.org/cs/2011/09/the_america_invents_act_rearra.html.

such as the proliferation of business and software patents[103] (the latter of which have been a primary culprit in the growth of patent trolls[104]), have been a source of substantial misgivings about the continued viability of the American patent system.[105] While the additional resources that have been made available to the USPTO will, at least in the eyes of optimists and some reformers, cut down patent pendency,[106] problems remain, and Congress' political will to tackle such a challenging issue so soon after its latest attempt at reform is doubtful.[107]

So what *can* be done? Addressing the problem of software patents would certainly be a good start. The receptiveness of the USPTO and the Federal Circuit to software patents might have made sense in the earlier years of computing, but many in the industry now claim that such patents are counterproductive because they hinder research and development,[108] allow for the patenting of trivial or obvious improvements,[109] and are philosophically incompatible with the growing open source software movement.[110] While software patents do bring some benefits as well,[111] given the role they play in America's patent trolling epidemic, cabining or eliminating them is worth considering. Amending American patent law to exclude software from patentability would probably be the most ironclad (although potentially problematic) means of accomplishing that, but in the absence of congressional action, the Federal Circuit should seriously reevaluate its line of software patent cases to give the USPTO

103. Lee, *supra* note 102.

104. "You can't separate the problem with the patent troll from the problem with software patents. . . . There are hundreds of thousands of software patents floating around that are really broad, that are really vague . . . and a lot of them are bought up by patent trolls." Zach Weissmueller, *How Patent Trolls Kill Innovation*, REASON.COM (Feb. 20, 2013), http://reason.com/reasontv/2013/02/20/too-many-patents-how-patent-trolls-kill (internal quotation marks omitted).

105. *See, e.g.*, Boldrin & Levine, *supra* note 9.

106. Author's interview with John Posthumus (Oct. 11, 2012).

107. The AIA was the result of six years of political process, and was only passed after multiple previous attempts at reform failed because "private sector stakeholders remained in deadlocked disagreement on key provisions." Joseph M. Potenza, *The America Invents Act: One Year Later*, ABA-IPL LANDSLIDE (last visited Sep. 27, 2013), *available at* http://www.americanbar.org/publications/landslide/2012_13/january_february/the_america_invents_act_one_year_later.html.

108. ADAM B. JAFFE & JOSHUA LERNER, INNOVATION AND ITS DISCONTENTS 18 (3d ed. 2007).

109. JAMES BESSEN & MICHAEL J. MEURER, PATENT FAILURE: HOW JUDGES, LAWYERS, AND BUREAUCRATS PUT LAWYERS AT RISK 216 (2008).

110. *See, e.g.*, Richard Stallman, *Let's Limit the Effect of Software Patents, Since We Can't Eliminate Them*, WIRED (Nov. 1, 2012, 6:30 AM), http://www.wired.com/opinion/2012/11/richard-stallman-software-patents/.

111. For instance, a software patent can help a small company grow its valuation and expand its business. World Intellectual Property Organization, *Ways in Which Patents Can Help Your E-Commerce Business*, http://www.wipo.int/sme/en/e_commerce/pat_help.htm (last visited Sep. 27, 2013).

clearer guidance. The Federal Circuit's decision in *In re Bilski*,[112] in which it abandoned the "useful, concrete and tangible result" test for patentability of *State St. Bank and Trust Co. v. Signature Financial Group, Inc.*,[113] was a significant first step in this direction. Simply providing a weaker form of patent-like protection on software is another idea, but it is worth noting that neither Brazil[114] nor Germany[115] allow for utility model protection on computer programs.

Perhaps, at some point in America's past, before the United States became the economic hegemon it is today, it would have been advisable to institute a utility model regime, but the time to implement that regime is not now. To paraphrase Fritz Machlup, the Austrian-American economist who testified before Congress about the economic impacts of the patent system over fifty years ago: as to a utility model system, it would be irresponsible, on the basis of our present knowledge of its economic consequences, to recommend instituting one.[116]

112. 545 F.3d 943 (Fed. Cir. 2008), *aff'd sub nom. Bilski v. Kappos*, 130 S.Ct. 3218 (2010).

113. 149 F.3d 1368, 1373 (Fed. Cir. 1998).

114. UK Intellectual Property Office, INTELLECTUAL PROPERTY RIGHTS PRIMER FOR BRAZIL 30 (2008), *available at* http://www.ipo.gov.uk/ipr-guide-brazil.pdf (noting that software is protected by a special, longer-term form of copyright in Brazil).

115. "The following items, for example, do not qualify for utility model protection: . . . programs for computers." Deutsches Patent- und Markenamt [German Patent and Trademark Office], *Utility Model Protection*, http://www.dpma.de/english/utility_models/utility_model_protection/index.html (last updated Feb. 9, 2013).

116. Brack, *supra* note 63, at 11 (positing that the introduction of utility models to the landscape of United States intellectual property law, in the absence of significant "legal system reforms and . . . development of new business methods," would not bring "significant benefits").

APPENDIX A:
GLOBAL INNOVATION INDEX INPUT VARIABLES, WITH RELATIVE WEIGHTS IN GII[117]

Variable	Description or source	Relative weight in GII
Political stability and absence of violence/terrorism	World Bank index	0.022
Government effectiveness	World Bank index	0.022
Press freedom	Reporters Without Borders index	0.022
Regulatory quality	World Bank index	0.022
Rule of law	World Bank index	0.022
Cost of redundancy dismissal	Sum of notice period and severance pay for redundancy dismissal (in salary weeks, averages for workers with one, five, and ten years of tenure, with a minimum threshold of eight weeks)	0.022
Ease of starting a business	World Bank percent rank index	0.022
Ease of resolving insolvency	World Bank percent rank index	0.022
Ease of paying taxes	World Bank percent rank index	0.022
Expenditure on education	As a percentage of GNI	0.013
Public expenditure on education per pupil	All levels, as a percentage of GDP per capita	0.013
School life expectancy	Total number of years of schooling	0.013

117. The information in Appendices A and B is derived from the Sources and Definitions and Technical Notes of the 2012 Global Innovation Index. *See generally* GII, *supra* note 18, at 409-32.

	that a child can expect to receive in the future	
Assessment in reading, mathematics, and science	Programme for International Student Assessment average scores	0.013
Pupil-teacher ratio, secondary		0.013
Tertiary enrollment	As a percentage of the age group that corresponds to the tertiary level of education	0.017
Graduates in science and engineering	As a percentage of total tertiary graduates	0.017
Tertiary inbound mobility	The number of students from abroad studying in the country, as a percentage of the total tertiary enrollment in the country	0.017
Gross tertiary outbound enrollment	Mobile students coming from a country/region as a percentage of the population of tertiary student age in their home country	0.017
Researchers	Per million population	0.022
Gross expenditure on R&D (GERD)	As a percentage of GDP	0.022
Quality of scientific research institutions	World Economic Forum Executive Opinion Survey index	0.022
Information and communication	International Telecommunication	0.017

technologies (ICT) access	Union (ITU) index	
ICT use	ITU index	0.017
Government's online service	United Nations Public Administration Network (UNPAN) index	0.017
Online e-participation	UNPAN index	0.017
Electricity output	kWh per capita	0.017
Electricity consumption	kWh per capita	0.017
Trade- and transport-related infrastructure	World Bank/Turku School of Economics Logistics Performance Index	0.017
Gross capital formation	As a percentage of GDP	0.017
GDP per unit of energy use	At parity, per kilogram of oil equivalent	0.022
Environmental performance	Yale University/Columbia University index	0.022
ISO 14001 environmental certificates	Per billion dollars GDP at parity	0.022
Ease of getting credit	World Bank percent rank index	0.022
Domestic credit to private sector	As a percentage of GDP	0.022
Microfinance institutions' gross loan portfolio	As a percentage of GDP	0.022
Ease of protecting investors	World Bank percent rank index	0.017
Market capitalization	As a percentage of GDP	0.017
Total value of stocks traded	As a percentage of GDP	0017
Venture capital deals	Per trillion dollars GDP at parity	0.017

Applied tariff rate, weighted mean		0.013
Market access for non-agricultural exports	Five major export markets' weighted actual applied tariff rate	0.013
Imports of goods and services	As a percentage of GDP	0.013
Exports of goods and services	As a percentage of GDP	0.013
Intensity of local competition	World Economic Forum Executive Opinion Survey index	0.013
Employment in knowledge-intensive industries	As a percentage of workforce	0.011
Firms offering formal training	As a percentage of firms	0.011
GERD performed by business enterprise	As a percentage of total GERD	0.011
GERD financed by business enterprise	As a percentage of total GERD	0.011
GMAT mean score	Weighted by total number of test takers	0.011
GMAT test takers	Per million population 20-34 years old	0.011
University/industry research collaboration	World Economic Forum Executive Opinion Survey index	0.013
State of cluster development	World Economic Forum Executive Opinion Survey index	0.013
GERD financed by abroad	As a percentage of total GERD	0.013
Joint venture/strategic alliance deals	Per trillion dollars GDP at parity	0.013
Share of patents		0.013

with foreign inventor		
Royalty and license fees payments	Per thousand dollars GDP	0.017
High-tech imports	As a percentage of total net imports	0.017
Computer and communications service imports	As a percentage of commercial service imports	0.017
Foreign direct investment net inflows	As a percentage of GDP	0.017

APPENDIX B:
GLOBAL INNOVATION INDEX OUTPUT VARIABLES, WITH RELATIVE WEIGHTS IN GII

Variable	Description or source	Relative weight in GII
National office patent applications	Per billion dollars GDP at parity	0.042
Patent Cooperation Treaty applications	Per billion dollars GDP at parity	0.042
National office utility model applications	Per billion dollars GDP at parity	0.042
Scientific and technical journal articles	Per billion dollars GDP at parity	0.042
Growth rate of GDP per person engaged	Annual, in constant dollars at parity	0.042
New business density	New business registrations per thousand population 15-64 years old	0.042
Total computer software spending	As a percentage of GDP	0.042
ISO 9001 quality certificates	Per billion dollars GDP at parity	0.042
Royalty and license fees receipts	Per thousand dollars GDP	0.042
High-tech exports	As a percentage of total net exports	0.042
Computer and communications service exports	As a percentage of commercial service exports	0.042
Foreign direct investment net outflows	As a percentage of GDP	0.042
National office trademark registrations	Per billion dollars GDP at parity	0.042
Madrid Agreement trademark registrations	Per billion dollars GDP at parity	0.042

ICT and business model creation	World Economic Forum Executive Opinion Survey index	0.042
ICT and organizational models creation	World Economic Forum Executive Opinion Survey index	0.042
Recreation and culture consumption	As a percentage of total individual consumption	0.033
National feature films produced	Per million population 15-69 years old	0.033
Daily newspapers circulation	Per thousand population 15-69 years old	0.033
Creative goods exports	As a percentage of total exports	0.033
Creative services exports	As a percentage of total services exports	0.033
Generic top-level domains	Per thousand population 15-69 years old	0.042
Country-code top-level domains	Per thousand population 15-69 years old	0.042
Wikipedia monthly edits	Per population 15-69 years old	0.042
Video uploads on YouTube	Per population 15-69 years old	0.042

APPENDIX C:
GLOBAL INNOVATION INDEX DATA FOR BRAZIL[118]

Brazil

Key indicators

Population (millions)	194.9
GDP per capita, PPP$	11,845.8
GDP (US$ billions)	2,517.9

		Score (0–100) or value (hard data)	Rank	
Global Innovation Index 2012 (out of 141)		**36.6**	**58**	
Innovation Output Sub-Index		33.0	52	
Innovation Input Sub-Index		40.2	69	
Innovation Efficiency Index		0.8	39	
Global Innovation Index 2011 (out of 125)			47	
GII 2012 rank among GII 2011 economies (125)			56	
1	**Institutions**	**50.4**	**84**	
1.1	*Political environment*	*59.6*	*62*	
1.1.1	Political stability*	66.5	63	
1.1.2	Government effectiveness*	42.8	65	
1.1.3	Press freedom*	69.4	78	
1.2	*Regulatory environment*	*71.0*	*48*	
1.2.1	Regulatory quality*	56.5	67	
1.2.2	Rule of law*	47.8	58	
1.2.3	Cost of redundancy dismissal, salary weeks	13.2	58	
1.3	*Business environment*	*20.6*	*127*	○
1.3.1	Ease of starting a business*	28.0	101	
1.3.2	Ease of resolving insolvency*	15.1	119	○
1.3.3	Ease of paying taxes*	18.7	113	○
2	**Human capital & research**	**31.5**	**83**	
2.1	*Education*	*49.6*	*73*	
2.1.1	Current expenditure on education, % GNI	4.8	43	
2.1.2	Public expenditure/pupil, % GDP/cap.	19.1	67	
2.1.3	School life expectancy, years	14.0	49	
2.1.4	PISA scales in reading, maths, & science	401.0	56	○
2.1.5	Pupil-teacher ratio, secondary	17.1	83	
2.2	*Tertiary education*	*16.4*	*115*	○
2.2.1	Tertiary enrolment, % gross	36.1	65	
2.2.2	Graduates in science & engineering, %	12.2	91	○
2.2.3	Tertiary inbound mobility, %	0.0	90	○
2.2.4	Gross tertiary outbound enrolment, %	0.2	129	○
2.3	*Research & development (R&D)*	*28.4*	*47*	
2.3.1	Researchers, headcounts/mn pop.	1,100.1	52	
2.3.2	Gross expenditure on R&D, % GDP	1.1	34	
2.3.3	Quality of scientific research institutions†	52.3	40	
3	**Infrastructure**	**39.1**	**49**	
3.1	*Information & communication technologies (ICT)*	*46.1*	*47*	
3.1.1	ICT access*	46.2	62	
3.1.2	ICT use*	21.1	61	
3.1.3	Government's online service*	67.3	32	
3.1.4	E-participation*	50.0	31	●
3.2	*General infrastructure*	*34.4*	*81*	
3.2.1	Electricity output, kWh/cap.	2,436.1	68	
3.2.2	Electricity consumption, kWh/cap.	2,200.6	66	
3.2.3	Quality of trade & transport infrastructure*	52.5	36	
3.2.4	Gross capital formation, % GDP	19.2	100	
3.3	*Ecological sustainability*	*36.6*	*54*	
3.3.1	GDP/unit of energy use, 2000 PPP$/kg oil eq.	6.9	39	
3.3.2	Environmental performance*	60.9	29	●
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.3	55	
4	**Market sophistication**	**35.6**	**82**	
4.1	*Credit*	*15.3*	*108*	
4.1.1	Ease of getting credit*	27.0	88	
4.1.2	Domestic credit to private sector, % GDP	57.0	55	
4.1.3	Microfinance gross loans, % GDP	0.1	72	○
4.2	*Investment*	*35.4*	*42*	
4.2.1	Ease of protecting investors*	46.7	60	
4.2.2	Market capitalization, % GDP	74.0	32	
4.2.3	Total value of stocks traded, % GDP	43.2	24	●
4.2.4	Venture capital deals/tr PPP$ GDP	10.0	47	
4.3	*Trade & competition*	*56.1*	*108*	
4.3.1	Applied tariff rate, weighted mean, %	7.6	106	
4.3.2	Non-agricultural mkt access weighted tariff, %	0.5	55	
4.3.3	Imports of goods & services, % GDP	12.1	141	○
4.3.4	Exports of goods & services, % GDP	11.2	139	○
4.3.5	Intensity of local competition†	69.3	46	
5	**Business sophistication**	**44.4**	**42**	
5.1	*Knowledge workers*	*52.6*	*48*	
5.1.1	Knowledge-intensive employment, %	19.3	72	
5.1.2	Firms offering formal training, % firms	52.9	22	●
5.1.3	R&D performed by business, %	40.2	44	
5.1.4	R&D financed by business, %	43.9	35	
5.1.5	GMAT mean score	563.8	24	●
5.1.6	GMAT test takers/mn pop. 20–34	33.5	98	
5.2	*Innovation linkages*	*38.0*	*57*	
5.2.1	University/industry research collaboration†	53.4	36	
5.2.2	State of cluster development†	52.1	30	●
5.2.3	R&D financed by abroad, %	n/a	n/a	
5.2.4	JV–strategic alliance deals/tr PPP$ GDP	16.7	70	
5.2.5	PCT patent filings with foreign inventor, %	10.1	93	○
5.3	*Knowledge absorption*	*42.6*	*38*	
5.3.1	Royalty & license fees payments/th GDP	1.4	60	
5.3.2	High-tech imports less re-imports, %	14.3	23	●
5.3.3	Computer & comm. service imports, %	49.4	17	●
5.3.4	FDI net inflows, % GDP	2.3	72	
6	**Knowledge & technology outputs**	**30.5**	**55**	
6.1	*Knowledge creation*	*22.7*	*67*	
6.1.1	Domestic resident patent ap/bn PPP$ GDP	1.2	64	
6.1.2	PCT resident patent ap/bn PPP$ GDP	0.2	55	
6.1.3	Domestic res utility model ap/bn PPP$ GDP	0.9	35	
6.1.4	Scientific & technical articles/bn PPP$ GDP	6.1	50	
6.2	*Knowledge impact*	*34.9*	*63*	
6.2.1	Growth rate of PPP$ GDP/worker, %	4.1	31	
6.2.2	New businesses/th pop. 15–64	2.4	41	
6.2.3	Computer software spending, % GDP	0.1	53	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	9.0	50	
6.3	*Knowledge diffusion*	*34.1*	*44*	
6.3.1	Royalty & license fees receipts/th GDP	0.2	60	
6.3.2	High-tech exports less re-exports, %	3.6	49	
6.3.3	Computer & comm. service exports, %	57.0	16	●
6.3.4	FDI net outflows, % GDP	0.6	51	
7	**Creative outputs**	**35.4**	**54**	
7.1	*Creative intangibles*	*41.2*	*67*	
7.1.1	Domestic res trademark reg/bn PPP$ GDP	21.9	61	
7.1.2	Madrid resident trademark reg/bn PPP$ GDP	n/a	n/a	
7.1.3	ICT & business model creation†	62.7	33	
7.1.4	ICT & organizational model creation†	50.4	62	
7.2	*Creative goods & services*	*29.7*	*47*	
7.2.1	Recreation & culture consumption, %	5.1	52	
7.2.2	National feature films/mn pop. 15–69	0.6	76	
7.2.3	Paid-for dailies, circulation/th pop. 15–69	60.9	79	
7.2.4	Creative goods exports, %	0.5	88	
7.2.5	Creative services exports, %	20.5	4	●
7.3	*Online creativity*	*29.7*	*49*	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	6.6	53	
7.3.2	Country-code TLDs/th pop. 15–69	42.7	43	
7.3.3	Wikipedia monthly edits/mn pop. 15–69	1,048.8	60	
7.3.4	Video uploads on YouTube/pop. 15–69	64.3	41	

118. *Id.* at 195.

APPENDIX D:
GLOBAL INNOVATION INDEX DATA FOR GERMANY[119]

Germany

Key indicators

Population (millions)	81.4
GDP per capita, PPP$	37,935.5
GDP (US$ billions)	3,628.6

		Score (0–100) or value (hard data)	Rank	
Global Innovation Index 2012 (out of 141)		**56.2**	**15**	
Innovation Output Sub-Index		53.7	7	●
Innovation Input Sub-Index		58.8	23	
Innovation Efficiency Index		0.9	11	
Global Innovation Index 2011 (out of 125)			12	
GII 2012 rank among GII 2011 economies (125)			15	
1	**Institutions**	**76.7**	**26**	
1.1	*Political environment*	*87.3*	*13*	
1.1.1	Political stability*	84.9	27	
1.1.2	Government effectiveness*	81.8	17	
1.1.3	Press freedom*	95.3	15	
1.2	*Regulatory environment*	*82.2*	*33*	
1.2.1	Regulatory quality*	91.7	14	
1.2.2	Rule of law*	90.9	16	
1.2.3	Cost of redundancy dismissal, salary weeks	21.6	94	○
1.3	*Business environment*	*60.4*	*42*	
1.3.1	Ease of starting a business*	48.9	71	○
1.3.2	Ease of resolving insolvency*	78.4	31	
1.3.3	Ease of paying taxes*	53.9	65	
2	**Human capital & research**	**55.4**	**16**	
2.1	*Education*	*63.6*	*23*	
2.1.1	Current expenditure on education, % GNI	4.3	61	
2.1.2	Public expenditure/pupil, % GDP/cap.	n/a	n/a	
2.1.3	School life expectancy, years	n/a	n/a	
2.1.4	PISA scales in reading, maths, & science	510.2	13	
2.1.5	Pupil-teacher ratio, secondary	13.2	57	
2.2	*Tertiary education*	*41.8*	*45*	
2.2.1	Tertiary enrolment, % gross	n/a	n/a	
2.2.2	Graduates in science & engineering, %	24.6	28	
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.2.4	Gross tertiary outbound enrolment, %	1.8	50	
2.3	*Research & development (R&D)*	*60.7*	*11*	
2.3.1	Researchers, headcounts/mn pop.	5,305.4	12	
2.3.2	Gross expenditure on R&D, % GDP	2.8	8	●
2.3.3	Quality of scientific research institutions†	76.6	10	
3	**Infrastructure**	**55.1**	**16**	
3.1	*Information & communication technologies (ICT)*	*73.1*	*14*	
3.1.1	ICT access*	84.1	6	●
3.1.2	ICT use*	56.9	20	
3.1.3	Government's online service*	75.2	24	
3.1.4	E-participation*	76.3	8	●
3.2	*General infrastructure*	*51.5*	*22*	
3.2.1	Electricity output, kWh/cap.	7,525.1	27	
3.2.2	Electricity consumption, kWh/cap.	7,107.8	23	
3.2.3	Quality of trade & transport infrastructure*	83.5	1	●
3.2.4	Gross capital formation, % GDP	17.3	116	○
3.3	*Ecological sustainability*	*40.8*	*39*	
3.3.1	GDP/unit of energy use, 2000 PPP$/kg oil eq.	7.0	37	
3.3.2	Environmental performance*	66.9	11	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	2.0	44	
4	**Market sophistication**	**54.9**	**24**	
4.1	*Credit*	*56.9*	*21*	
4.1.1	Ease of getting credit*	77.4	21	
4.1.2	Domestic credit to private sector, % GDP	107.8	27	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	*Investment*	*39.1*	*32*	
4.2.1	Ease of protecting investors*	35.9	76	○
4.2.2	Market capitalization, % GDP	43.2	49	
4.2.3	Total value of stocks traded, % GDP	42.5	26	
4.2.4	Venture capital deals/tr PPP$ GDP	90.6	15	
4.3	*Trade & competition*	*68.9*	*34*	
4.3.1	Applied tariff rate, weighted mean, %	1.6	11	
4.3.2	Non-agricultural mkt access weighted tariff, %	2.0	92	○
4.3.3	Imports of goods & services, % GDP	41.4	69	○
4.3.4	Exports of goods & services, % GDP	46.8	49	
4.3.5	Intensity of local competition†	79.9	8	●
5	**Business sophistication**	**51.7**	**24**	
5.1	*Knowledge workers*	*69.8*	*25*	
5.1.1	Knowledge-intensive employment, %	41.9	14	
5.1.2	Firms offering formal training, % firms	35.4	51	
5.1.3	R&D performed by business, %	68.2	13	
5.1.4	R&D financed by business, %	67.3	9	
5.1.5	GMAT mean score	565.5	23	
5.1.6	GMAT test takers/mn pop. 20–34	260.4	24	
5.2	*Innovation linkages*	*39.2*	*55*	
5.2.1	University/industry research collaboration†	69.3	12	
5.2.2	State of cluster development†	62.0	13	
5.2.3	R&D financed by abroad, %	4.0	67	○
5.2.4	JV–strategic alliance deals/tr PPP$ GDP	21.3	64	
5.2.5	PCT patent filings with foreign inventor, %	24.5	74	○
5.3	*Knowledge absorption*	*46.1*	*26*	
5.3.1	Royalty & license fees payments/th GDP	4.0	25	
5.3.2	High-tech imports less re-imports, %	15.1	19	
5.3.3	Computer & comm. service imports, %	43.6	29	
5.3.4	FDI net inflows, % GDP	1.4	96	○
6	**Knowledge & technology outputs**	**54.9**	**12**	
6.1	*Knowledge creation*	*71.1*	*7*	●
6.1.1	Domestic resident patent ap/bn PPP$ GDP	25.3	5	●
6.1.2	PCT resident patent ap/bn PPP$ GDP	6.0	8	●
6.1.3	Domestic res utility model ap/bn PPP$ GDP	4.7	11	
6.1.4	Scientific & technical articles/bn PPP$ GDP	16.0	19	
6.2	*Knowledge impact*	*42.0*	*40*	
6.2.1	Growth rate of PPP$ GDP/worker, %	3.1	49	
6.2.2	New businesses/th pop. 15–64	1.2	57	○
6.2.3	Computer software spending, % GDP	0.7	15	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	17.2	29	
6.3	*Knowledge diffusion*	*51.5*	*18*	
6.3.1	Royalty & license fees receipts/th GDP	4.4	14	
6.3.2	High-tech exports less re-exports, %	13.7	24	
6.3.3	Computer & comm. service exports, %	54.2	20	
6.3.4	FDI net outflows, % GDP	3.3	17	
7	**Creative outputs**	**52.6**	**10**	●
7.1	*Creative intangibles*	*46.2*	*40*	
7.1.1	Domestic res trademark reg/bn PPP$ GDP	69.4	22	
7.1.2	Madrid resident trademark reg/bn PPP$ GDP	1.5	14	
7.1.3	ICT & business model creation†	65.3	24	
7.1.4	ICT & organizational model creation†	54.1	44	
7.2	*Creative goods & services*	*45.8*	*11*	
7.2.1	Recreation & culture consumption, %	9.5	15	
7.2.2	National feature films/mn pop. 15–69	2.7	40	
7.2.3	Paid-for dailies, circulation/th pop. 15–69	333.6	10	●
7.2.4	Creative goods exports, %	2.2	38	
7.2.5	Creative services exports, %	13.8	9	
7.3	*Online creativity*	*72.2*	*9*	●
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	98.9	7	●
7.3.2	Country-code TLDs/th pop. 15–69	77.5	5	●
7.3.3	Wikipedia monthly edits/mn pop. 15–69	8,223.0	14	
7.3.4	Video uploads on YouTube/pop. 15–69	70.5	24	

119. *Id.* at 224.

APPENDIX E:
GLOBAL INNOVATION INDEX DATA FOR THE UNITED STATES[120]

United States of America

Key indicators

Population (millions)	312.9
GDP per capita, PPP$	48,147.2
GDP (US$ billions)	15,064.8

		Score (0–100) or value (hard data)	Rank	
Global Innovation Index 2012 (out of 141)		**57.7**	**10**	
Innovation Output Sub-Index		49.1	16	
Innovation Input Sub-Index		66.3	9	
Innovation Efficiency Index		0.7	70	
Global Innovation Index 2011 (out of 125)			7	
GII 2012 rank among GII 2011 economies (125)			10	
1	**Institutions**	**85.1**	**17**	
1.1	*Political environment*	*78.5*	*29*	
1.1.1	Political stability*	72.8	52	
1.1.2	Government effectiveness*	78.8	19	
1.1.3	Press freedom*	83.8	41	
1.2	*Regulatory environment*	*94.4*	*13*	
1.2.1	Regulatory quality*	87.7	20	
1.2.2	Rule of law*	89.8	17	
1.2.3	Cost of redundancy dismissal, salary weeks	8.0	1	●
1.3	*Business environment*	*82.5*	*13*	
1.3.1	Ease of starting a business*	92.8	11	
1.3.2	Ease of resolving insolvency*	91.3	13	
1.3.3	Ease of paying taxes*	63.3	52	
2	**Human capital & research**	**53.4**	**22**	
2.1	*Education*	*61.3*	*31*	
2.1.1	Current expenditure on education, % GNI	4.8	46	
2.1.2	Public expenditure/pupil, % GDP/cap	22.0	46	
2.1.3	School life expectancy, years	16.8	10	
2.1.4	PISA scales in reading, maths, & science	496.4	23	
2.1.5	Pupil-teacher ratio, secondary	13.8	61	
2.2	*Tertiary education*	*38.8*	*54*	
2.2.1	Tertiary enrolment, % gross	94.8	2	●
2.2.2	Graduates in science & engineering, %	15.5	74	○
2.2.3	Tertiary inbound mobility, %	3.4	42	
2.2.4	Gross tertiary outbound enrolment, %	0.2	119	○
2.3	*Research & development (R&D)*	*60.1*	*12*	
2.3.1	Researchers, headcounts/mn pop.	4,663.3	18	
2.3.2	Gross expenditure on R&D, % GDP	2.8	9	
2.3.3	Quality of scientific research institutions†	80.4	7	
3	**Infrastructure**	**56.1**	**14**	
3.1	*Information & communication technologies (ICT)*	*80.9*	*5*	●
3.1.1	ICT access*	72.4	22	
3.1.2	ICT use*	58.9	17	
3.1.3	Government's online service*	100.0	1	●
3.1.4	E-participation*	92.1	5	●
3.2	*General infrastructure*	*58.5*	*12*	
3.2.1	Electricity output, kWh/cap	13,990.7	9	
3.2.2	Electricity consumption, kWh/cap	13,268.1	11	
3.2.3	Quality of trade & transport infrastructure*	78.8	7	
3.2.4	Gross capital formation, % GDP	15.1	129	○
3.3	*Ecological sustainability*	*29.0*	*73*	
3.3.1	GDP/unit of energy use, 2000 PPP$/kg oil eq	5.2	71	
3.3.2	Environmental performance*	56.6	48	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.3	93	○
4	**Market sophistication**	**76.8**	**2**	●
4.1	*Credit*	*83.8*	*2*	●
4.1.1	Ease of getting credit*	97.1	4	
4.1.2	Domestic credit to private sector, % GDP	202.2	6	●
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	*Investment*	*83.0*	*2*	●
4.2.1	Ease of protecting investors*	94.2	5	
4.2.2	Market capitalization, % GDP	117.5	13	
4.2.3	Total value of stocks traded, % GDP	208.8	1	●
4.2.4	Venture capital deals/tr PPP$ GDP	243.3	5	●
4.3	*Trade & competition*	*63.7*	*69*	
4.3.1	Applied tariff rate, weighted mean, %	1.8	41	
4.3.2	Non-agricultural mkt access weighted tariff, %	1.1	76	
4.3.3	Imports of goods & services, % GDP	16.2	139	○
4.3.4	Exports of goods & services, % GDP	12.6	135	○
4.3.5	Intensity of local competition†	76.8	17	
5	**Business sophistication**	**59.9**	**9**	
5.1	*Knowledge workers*	*79.3*	*6*	●
5.1.1	Knowledge-intensive employment, %	36.3	28	
5.1.2	Firms offering formal training, % firms	n/a	n/a	
5.1.3	R&D performed by business, %	72.6	8	
5.1.4	R&D financed by business, %	67.3	10	
5.1.5	GMAT mean score	529.4	53	
5.1.6	GMAT test takers/mn pop. 20–34	1,832.0	1	●
5.2	*Innovation linkages*	*58.5*	*8*	
5.2.1	University/industry research collaboration†	78.5	3	●
5.2.2	State of cluster development†	63.2	9	
5.2.3	R&D financed by abroad, %	n/a	n/a	
5.2.4	JV–strategic alliance deals/tr PPP$ GDP	46.1	29	
5.2.5	PCT patent filings with foreign inventor, %	42.3	56	
5.3	*Knowledge absorption*	*41.7*	*46*	
5.3.1	Royalty & license fees payments/th GDP	2.3	40	
5.3.2	High-tech imports less re-imports, %	17.3	15	
5.3.3	Computer & comm. service imports, %	34.7	57	
5.3.4	FDI net inflows, % GDP	1.6	89	○
6	**Knowledge & technology outputs**	**56.1**	**11**	
6.1	*Knowledge creation*	*66.8*	*9*	
6.1.1	Domestic resident patent ap/bn PPP$ GDP	16.7	8	
6.1.2	PCT resident patent ap/bn PPP$ GDP	3.2	14	
6.1.3	Domestic res utility model ap/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	15.0	27	
6.2	*Knowledge impact*	*45.0*	*31*	
6.2.1	Growth rate of PPP$ GDP/worker, %	3.5	42	
6.2.2	New businesses/th pop. 15–64	n/a	n/a	
6.2.3	Computer software spending, % GDP	0.9	7	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.8	96	○
6.3	*Knowledge diffusion*	*56.3*	*13*	
6.3.1	Royalty & license fees receipts/th GDP	7.3	9	
6.3.2	High-tech exports less re-exports, %	14.8	20	
6.3.3	Computer & comm. service exports, %	45.4	30	
6.3.4	FDI net outflows, % GDP	2.4	22	
7	**Creative outputs**	**42.2**	**33**	
7.1	*Creative intangibles*	*37.0*	*84*	
7.1.1	Domestic res trademark reg/bn PPP$ GDP	11.2	75	○
7.1.2	Madrid resident trademark reg/bn PPP$ GDP	0.3	41	○
7.1.3	ICT & business model creation†	77.0	2	●
7.1.4	ICT & organizational model creation†	60.1	25	
7.2	*Creative goods & services*	*37.2*	*27*	
7.2.1	Recreation & culture consumption, %	9.3	18	
7.2.2	National feature films/mn pop. 15–69	3.5	34	
7.2.3	Paid-for dailies, circulation/th pop. 15–69	212.4	22	
7.2.4	Creative goods exports, %	2.5	34	
7.2.5	Creative services exports, %	5.4	36	
7.3	*Online creativity*	*57.6*	*20*	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	91.2	8	
7.3.2	Country-code TLDs/th pop. 15–69	30.4	54	
7.3.3	Wikipedia monthly edits/mn pop. 15–69	5,004.9	30	
7.3.4	Video uploads on YouTube/pop. 15–69	83.2	2	●

120. *Id.* at 311.

HIGH-SPEED RAIL IN CALIFORNIA MAY BE INEVITABLE: WHERE DOES THAT LEAVE OPPONENTS?

ANDY EVANS*

INTRODUCTION

In the 1960s, the United States began seriously considering constructing a high-speed rail ("HSR")[1] system.[2] Developing such a system has been a slow process for various reasons: aggressive political opposition; an overwhelming American obsession with the automobile and, in turn, the lack of citizen embrace of public transportation; and other priorities receiving government attention and spending. Despite

* J.D. Candidate University of Colorado Law School, May 2014. A special thanks to my parents, friends and my editor, Kelsey Velemirovich, for keeping me motivated during the questionable process of writing a law journal student note.

1. Congress has defined HSR as having trains capable of reaching speeds of more than 125 mph. 49 U.S.C. § 26105 (2011).

2. *See, e.g.,* President Lyndon Baines Johnson, Annual Message to the Congress on the State of the Union (Jan. 4, 1965).

this, it appears certain that ground will finally be broken towards creating the first high-speed track in 2014.[3] This will take place in California, where the state plans to build up to 500 miles of HSR track connecting Los Angeles and San Francisco, with trains reaching top speeds of 220 mph.[4] With many other regions in the nation hoping to enact their own HSR lines, the project in California is being watched closely across the nation.[5] If successful, other regions will use California's HSR project as a standard in creating their own plans, and any mistakes made will similarly serve as guidance on what tactics to avoid. In this sense California is a "test case" for the nation's overall HSR vision.

Although construction on the initial construction segment ("ICS") of the project is set to begin sometime in 2014, the project still faces staunch opposition from various interests ranging from politicians at both the state and federal levels to local governments and ordinary citizens. Once the project began to gain steam around 2008, these groups intensified their opposition by employing a variety of tactics all aimed at ultimately undoing the project.

Irrespective of opposition, the project may have passed the point of no return. In addition to beginning construction on the ICS soon, a number of recent events have provided additional future security for the project. Perhaps most important were the various outcomes from the 2012 elections—at both the federal and state levels—which shored up much of the necessary political support for the project. This combined with the project's past successes increases the likelihood that the project will ultimately be constructed.

Certainly some opponents believe that their efforts can still stop the project. However, at this point, it may be in their respective best interests to drop their opposition, and redefine themselves as stakeholders. With this new paradigm, they can easily transition to more active roles associated with the HSR project to achieve results that better align with their various goals.

To place this situation in the most appropriate context, this note will first review the history of HSR in the United States and describe the current situation in detail, followed by a similar examination of the development of HSR in California to show why the state's project is so

3. At the time this note was submitted for publication, construction had not yet begun; preliminary work has begun in some areas. *See* Tim Sheehan, *Fresno soil drilling prepares for high-speed rail construction*, FRESNO BEE (Dec. 17, 2013), http://www.fresnobee.com/2013/12/17/3672421/soil-drilling-begins-in-fresno.html.

4. CAL. HIGH-SPEED RAIL AUTH., CALIFORNIA HIGH-SPEED RAIL PROGRAM REVISED 2012 BUSINESS PLAN: BUILDING CALIFORNIA'S FUTURE ES-13 (2012), *available at* http://www.hsr.ca.gov/docs/about/business_plans/BPlan_2012_rpt.pdf.

5. *See, e.g.,* Allen Best, Op-Ed, *High-Speed Rail Closer to Reality*, DENVER POST, Oct. 7, 2012 at 1D.

vital to the HSR vision for the entire country. Next, this note will detail the efforts of the most notable opponents of California's HSR project. In considering how their results align with their goals, the note will conclude by suggesting various tactical changes for these opponents in light of the imminence of the HSR project.[6]

I. THE HISTORY OF HSR IN THE UNITED STATES

American politicians began to explore the feasibility of bringing HSR to the United States after seeing various Asian and European countries build successful models as early as 1955.[7] Due to its long-term planning and intensive infrastructure requirements, public investment is integral to the development and coordination of any HSR project—especially in its infancy. Accordingly, the federal government has always played an active role of incubating the development of HSR in the United States. However, instead of a "hands-on" federal project—as was used in constructing the national highway system and transcontinental railroad—the Federal Government opted for a decentralized, regional approach, leaving the planning of corridors to the states while retaining a degree of oversight.

Whereas public discussion regarding HSR in the United States has taken place for half a century, it was not until the 1990s that the vision finally began to take shape. In 1991, Congress enacted the Intermodal Surface Transportation Efficiency Act of 1991 to allow the Department of Transportation to conduct preliminary research and examine the feasibility of HSR.[8] The law also called for the designations of potential HSR corridors—including the current one being constructed in California. Soon thereafter, the Swift Rail Development Act of 1994 provided additional focus to the nation's HSR vision by outlining the specific roles for federal and state governments, and, perhaps more importantly, appropriating the initial funding to support early stage planning of HSR.[9] The Transportation Equity Act for the 21st Century followed to provide additional funding for corridor planning.[10] While these acts created the base from which a HSR system could spring, it was

6. The HSR project in California has a multitude of legal and political issues to explore, such as the economic and financial aspects of the project as well as the safety and technology employed. While these are all controversial and fascinating topics, they are outside the scope of this note and, therefore, will not be addressed in detail.

7. For a comprehensive overview of the systems in Europe and Asia *see* DANIEL ALBALATE & GERMA BEL, THE ECONOMICS AND POLITICS OF HIGH-SPEED RAIL (2012).

8. Intermodal Surface Transportation Efficiency Act of 1991, Pub. L. No. 102-240, 105 Stat. 1914.

9. Swift Rail Development Act of 1994, Pub. L. No. 103-440, 108 Stat. 4615.

10. Transportation Equity Act for the 21st Century, Pub. L. No. 105-178, 112 Stat. 107 (1998).

the American Reinvestment and Recovery Act of 2009 ("ARRA"), signed into law by President Barack Obama soon after taking office, that would provide the necessary next step to take HSR from planning to implementation.[11] ARRA created guidelines for various regional HSR corridors to compete against one other—based on the feasibility and readiness of their proposed plans—for billions of dollars.[12] At the time of ARRA's enactment, many corridors had already established basic HSR plans, but some were more polished and further along than others. Simply put, without ARRA, the current HSR vision would be nowhere near as complete as it is now.

For the purposes of ARRA funding, the Tampa-Orlando-Miami corridor was arguably the most competitive and construction-ready. The region's population size, combined with the modest distance between the cities, and Florida's head start on planning would have allowed the HSR corridor to be constructed quicker and with lower overall costs than most other corridors across the nation.[13] As late as 2010, with billions in ARRA funding within reach to supplement existing efforts, it seemed like a foregone conclusion that the nation's first modern HSR line would be in Florida. None of this was altogether too surprising either, since the state's HSR roots run nearly as deep as the Federal Government's, dating back to the 1970s.[14] In early 2011, however, these expectations were thwarted when Governor Rick Scott—in a move that some consider a broader rejection of the policies of President Obama—rejected ARRA funds already awarded to Florida for HSR.[15] As a result, Florida's HSR project was abruptly halted while other corridors continued developing. While Governor Scott's actions certainly constituted a major setback to the nation's HSR efforts, they also created opportunities for other corridors to steal not only the spotlight, but the funds Florida did not want.

With its own history of HSR just as extensive as Florida's, California's corridor planning to connect San Francisco to Los Angeles also emerged as one of the more competitive regional plans for a significant amount of ARRA funds.[16] When Governor Scott rejected

11. American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, 123 Stat. 115.

12. *Id.*

13. Florida's first line of track between Tampa and Orlando was expected to be operational in 2014. *See* Ted Jackovics, *State Makes Official Bid For High-Speed Rail Cash*, TAMPA TRIBUNE, Oct. 3, 2009, at 4.

14. *See High Speed Rail*, TAMPA BAY PARTNERSHIP, http://www.tampabay.org/high-speed-rail (last visited Mar. 2, 2014).

15. Janet Zink, *Gov. Rick Scott Rejects Funding for High-Speed Rail*, TAMPA BAY TIMES, Feb. 11, 2011, *available at* http://www.tampabay.com/news/localgovernment/gov-rick-scott-rejects-funding-for-high-speed-rail/1151937.

16. In the 1980s, Florida modeled some of its HSR planning efforts off California's. *See*

Florida's share of the ARRA funds, the Federal Government allowed other states to compete for the already-appropriated funds.[17] Seizing this opportunity, California was able to add $300 million to its already largest share of over $3 billion, thus signaling it as a clear-cut front runner to be the first in the union to develop HSR.[18]

II. WHY CALIFORNIA IS IMPORTANT

"High Speed Rail . . . is bold, but so is everything else about California."[19] With the largest state economy in the nation by a large margin, and expectations of population growth of around 30% in the next 20 years, HSR appears a highly strategic and perhaps necessary addition to the transportation infrastructure in California.[20] Considering the state's rich history during the development of the transcontinental railroad in the late 1800s, becoming the first state in the nation to develop HSR would be fitting. [21]

California is also no stranger to being a leader for new political ideas. The state was a forerunner to many groundbreaking political movements, such as Progressivism at the dawn of the 20th century, the tax revolt in the late 1970s, which spawned the "Reagan Revolution,"[22] and more recently the struggle to legalize gay marriage on a national scale through the courts.[23] The state is also well-known for being a trendsetter of high-technology, with Silicon Valley producing many of the nation's breakthroughs in the field.

California's history of investing in infrastructure is nearly as ambitious as its willingness to push for political and technological advances. In response to massive increases in population during the 20th century, the state built highway and public university systems that quickly became the envy of the rest of the world.[24] Further paralleling HSR, California's highway system was also initially funded with bond

Tim Smart, *Visions of Bullet Train Lure Investors to State*, MIAMI HERALD, Aug. 16, 1982, at A1.

17. Robert J. Hawkins, *State's high-speed rail wins $300m declined by Fla.*, U-T SAN DIEGO, May 9, 2011, *available at* http://www.utsandiego.com/news/2011/May/09/california-high-speed-rail-wins-300-million-florid/.

18. *Id.*

19. Governor Edmund G. Brown, State of the State Address, (Jan. 24, 2013).

20. HANS JOHNSON, PUB. POL'Y INST. OF CAL., CALIFORNIA POPULATION: PLANNING FOR A BETTER FUTURE 1 (Jan. 2013).

21. *First Transcontinental Railroad*, WIKIPEDIA (Oct. 7, 2013, 10:05 PM), http://en.wikipedia.org/wiki/First_Transcontinental_Railroad.

22. For a comprehensive overview of California's political history, *see* PETER SCHRAG, PARADISE LOST: CALIFORNIA'S EXPERIENCE, AMERICA'S FUTURE (2004).

23. *California Proposition 8*, WIKIPEDIA (Oct. 2, 2013, 7:52 AM), http://en.wikipedia.org/wiki/California_Proposition_8.

24. KEVIN STARR, GOLDEN DREAMS: CALIFORNIA IN AN AGE OF ABUNDANCE, 1950-1963 266 (2009).

measures.[25]

While history indicates that California is the perfect place to construct HSR, its citizens' traditional tastes appear to be a less-ideal fit for embracing it. For instance, Californians have always had a strong affinity to the automobile.[26] Because of this, the state has traditionally invested heavily in roads while relegating funding for public transportation to the margins.[27] These attitudes, however, appear to be changing as already prevalent concerns over pollution continue to mount[28] and gasoline costs soar.[29] As a result, it appears that Californians may be more open to transportation alternatives.

The first mention of an idea for a HSR system that would span the length of the state came during current Governor Jerry Brown's first tenure as governor in the 1970s.[30] It was not until 1996 that this idea would actually begin coming into focus, when the legislature created the High-Speed Rail Authority (the "Authority") to oversee and administer the creation of HSR in California.[31] The Authority continued to study and plan for HSR throughout the 1990s, but the critical point for HSR occurred when voters enacted The Safe, Reliable High-Speed Passenger Train Bond Act for the 21st Century ("Proposition 1A") in 2008.[32] Proposition 1A pledged nearly $10 billion in state bond funding to develop a HSR system connecting the Northern and Southern regions of the state.[33] This major commitment of funding alone positioned California quite well to receive a significant portion of ARRA funds. In the summer of 2012, the state legislature approved construction to begin on the ICS, thus enabling the authority to break ground on connecting the Central Valley cities of Merced and Fresno.[34]

25. *History of California's State Highway System,* WIKIPEDIA (May 11, 2013, 5:06 AM), http://en.wikipedia.org/wiki/History_of_California's_state_highway_system.

26. *See generally*, KEVIN NELSON, WHEELS OF CHANGE: FROM ZERO TO 600 M.P.H.: THE AMAZING STORY OF CALIFORNIA AND THE AUTOMOBILE (2009).

27. *See, e.g.*, CLIFFORD W. WOODWARD, U.S. DEPT. OF TRANSP., TRENDS IN FEDERAL DOMESTIC TRANSPORTATION PROGRAMS, REVENUES AND EXPENDITURES: BY STATE, FISCAL YEARS 1957-1975 5-C (1979).

28. MARK BALDASSARE ET AL., PUB. POL'Y INST. OF CAL., PPIC STATEWIDE SURVEY: CALIFORNIANS & THE ENVIRONMENT 5 (July 2012).

29. CAL. ENERGY COMM'N, CALIFORNIA AVERAGE WEEKLY GASOLINE PRICES, http://energyalmanac.ca.gov/gasoline/retail_gasoline_prices2.html (last visited Mar. 2, 2014).

30. *State Planning High-Speed Train Line, Governor Says*, L.A. TIMES, Nov. 18, 1980, at A3.

31. California High-Speed Rail Act, ch. 796, 1996 Cal. Stat. 796.

32. The Safe, Reliable High-Speed Passenger Train Bond Act for the 21st Century, ch. 267, 2008 Cal. Stat. 267.

33. *Id.*

34. Act of July 18, 2012, ch. 152, 2012 Cal. Stat. 152.

III. OPPOSITION TO HSR IN CALIFORNIA

No matter what the end-goal, large public infrastructure projects always attract opponents. For instance, even the cherished national highway system and iconic Golden Gate Bridge each faced opposition from various special interests when they were in their respective planning stages.[35] So it was not surprising when opposition to HSR in California sprang up around 2008 when Proposition 1A was being considered.[36] Once the public approved the measure, opponents at the state and federal level adjusted their tactics hoping to kill the project before it even began.

A. State Legislative Opposition

In hindsight it might seem odd, but Proposition 1A actually began as a bipartisan effort, with 18 Republican legislators and then-Republican Governor Arnold Schwarzenegger all supporting it.[37] In the years since, however, support and opposition to HSR in California has mostly followed party lines, with most Democrats supporting the project, and almost all Republicans opposing it—not unlike most modern issues tackled by the state legislature.[38] Despite hoping to seize upon declining public support for government spending, especially in a state with budget shortfalls throughout much of the past decade,[39] state legislative opponents' efforts have largely been devoid of actual results.

A prime example of this is Assembly member Diane Harkey, who

35. *See* THOMAS L. KARNES, ASPHALT AND POLITICS: A HISTORY OF THE AMERICAN HIGHWAY SYSTEM 82-83 (2009); KEVIN STARR, GOLDEN GATE: THE LIFE AND TIMES OF AMERICA'S GREATEST BRIDGE 71, 75, 77 (2010).

36. Up until it was passed by the legislature, the bill which put Proposition 1A on the ballot included only one registered opponent; however, once it was on the ballot, many more groups voiced their opposition. *See* STAFF OF S. RULES COMM., BILL ANALYSIS ASSEMB.B. 3034, Reg. Sess. (Cal. 2008), *available at* http://leginfo.ca.gov/pub/07-08/bill/asm/ab_3001-3050/ab_3034_cfa_20080808_164606_sen_floor.html; *California Proposition 1A, High-Speed Rail Act (2008),* BALLOTPEDIA (Apr. 8, 2013, 9:39 AM), http://ballotpedia.org/wiki/index.php/California_Proposition_1A,_High-Speed_Rail_Act_%282008%29#Opposition.

37. *AB 3034 – Assembly Floor Vote Information*, CAL. LEGISLATIVE COUNSEL (Aug. 13, 2008), http://leginfo.ca.gov/pub/07-08/bill/asm/ab_3001-3050/ab_3034_vote_20080813_0451PM_asm_floor.html; *AB 3034– Senate Floor Vote Information*, CAL. LEGISLATIVE COUNSEL (Aug. 7, 2008), http://leginfo.ca.gov/pub/07-08/bill/asm/ab_3001-3050/ab_3034_vote_20080807_1055AM_sen_floor.html.

38. Most recently seen in S.B. 1029 which did not receive a vote from a single Republican legislator. *SB 1029 – Senate Floor Vote Information,* CAL. LEGISLATIVE COUNSEL (July 6, 2012), http://leginfo.ca.gov/pub/11-12/bill/sen/sb_1001-1050/sb_1029_vote_20120706_0356PM_sen_floor.html; *SB 1029 – Assembly Floor Vote Information,* CAL. LEGISLATIVE COUNSEL (July 5, 2012), http://leginfo.ca.gov/pub/11-12/bill/sen/sb_1001-1050/sb_1029_vote_20120705_0445PM_asm_floor.html.

39. PAUL WARREN & MARGARET WESTON, PUB. POL'Y INST. OF CAL., CALIFORNIA BUDGET: PLANNING FOR A BETTER FUTURE 1 (Jan. 2013).

represents a district comprising much of Orange County, where constituents have supported Republican presidents in every election since World War II and been traditionally hostile to government spending.[40] In introducing bills seeking to completely defund the project in each of the last three years, Harkey has made opposing HSR one of her key policy aims.[41] However, because Republicans constitute such a small minority in the state legislature, none of these bills even survived the first hurdle of making it out of a policy committee.[42] Perhaps as a ploy to draw attention to her efforts, Harkey has accompanied them with colorful, charged statements in the media about the HSR project, such as referring to the ARRA funds as "cocaine for the train,"[43] and characterizing the decision to start construction in the state's Central Valley farmland as "cultural genocide."[44] Despite a lack of results, Harkey may be incented to maintain an image as a strong opponent of HSR after receiving nearly $90,000 from the oil, gas, and automotive industries—all of which would logically be threatened by California providing consumers with an alternative to existing transportation options.[45]

Until recently, the most notable opponent in California's other legislative house was former state Senator Doug LaMalfa.[46] LaMalfa—whose district is in the far northern portion of the state and far away from the planned route for HSR—was the main face of legislative opposition when a quote was needed by media outlets attempting to show balance. While LaMalfa also introduced legislation similar to Harkey's, which also failed,[47] he received more publicity from an attempt to certify a ballot initiative defunding the project completely.[48] Like Harkey, LaMalfa used creative language to draw attention to his ballot initiative by seeking to have its title certified as the "Stop the $100 Billion Bullet

40. *Orange County, California: Politics*, WIKIPEDIA (Oct. 15, 2013, 10:02 AM), http://en.wikipedia.org/wiki/Orange_county,_ca#Politics.

41. Assemb.B. 1455, Reg. Sess. (Cal. 2012); Assemb.B. 76, Reg. Sess. (Cal. 2011); Assemb.B. 2121, Reg. Sess. (Cal. 2010).

42. *Id.*

43. Assemb. Diane Harkey, *The Cocaine for the Train*, FLASHREPORT (Apr. 23, 2012), http://www.flashreport.org/blog/featured-columns-library0b.php?faID=2012042310240250.

44. David Siders, *GOP Kicks Off Budget Roadshow of its own*, CAPITOL ALERT (Apr. 7, 2011, 1:37 PM), http://blogs.sacbee.com/capitolalertlatest/2011/04/gop-kicks-off-budget-roadshow.html.

45. *See generally* CAL. SEC'Y OF STATE, CAMPAIGN FINANCE: DIANE HARKEY, http://cal-access.sos.ca.gov/Campaign/Candidates/Detail.aspx?id=1281241 (last visited Mar. 2, 2014) (figure accounts for 2008, 2010, and 2012 election cycles where donors could at least be reasonably discerned be from the above three industries).

46. *Doug LaMalfa: 2012 Election*, WIKIPEDIA (Oct. 2, 2013, 3:02 PM), http://en.wikipedia.org/wiki/Doug_LaMalfa#2012_election.

47. S.B. 985, Reg. Sess. (Cal. 2012); S.B. 22, Reg. Sess. (Cal. 2011).

48. Torey Van Oot, *GOP Senator Wants to Put High-Speed Rail Back on the Ballot*, CAPITOL ALERT (Nov. 1, 2011, 4:57 PM), http://blogs.sacbee.com/capitolalertlatest/2011/11/gop-sen-lamalfa.html.

Train to Nowhere Act."[49] Despite this, the initiative failed to garner the required amount of signatures to qualify for the ballot.[50] Opponents of HSR may consider attempting a similar initiative in the future, but the earliest that such a measure can be placed on the ballot is 2014—long after construction has begun. At this point, no legislator in the state Senate appears poised to fill LaMalfa's role. This may indicate that the opposition voices in the legislature are dwindling even further.

State legislative opposition has not only come from Republicans. In July 2012, four Democratic state senators—Alan Lowenthal, Fran Pavley, Joe Simitian, and Mark DeSaulnier—voted against a bill to fund the ICS, despite all previously supporting the project.[51] In hindsight, these votes did not harm the project. However, at the time they seemed quite threatening as the bill mustered a bare majority and only upon the final deadline for bills to be passed for the session.[52] If the bill had failed, $3.2 billion in federal funding would have been withdrawn and the project's fate could have easily mirrored the situation in Florida.[53] These votes do not signal a longer trend in the state legislature, since all four Senators seemed influenced by the state's current budget shortfall at the time of the vote.[54] Now the state is projecting a budget surplus for the first time in a decade, thereby mitigating such concerns.[55] Also, both Lowenthal and Simitian have since left the state legislature after being elected to other offices in November 2012.[56]

49. Letter from Doug LaMalfa, Calif. St. Senator, & George Radanovich, former Congressman, to Ashley Johansson, Office of the Cal. Att'y Gen., (Mar. 20, 2012), *available at* https://oag.ca.gov/system/files/initiatives/pdfs/12-0010%20%28i1058_12-0010_%28bullet_train%29%29.pdf?.

50. Letter from Katherine Montgomery, Office of the Cal. Sec'y of State, to Cal. Cnty. Clerks/Registrars of Voters and Proponents, (Oct. 26, 2012), *available at* http://www.sos.ca.gov/elections/ccrov/pdf/2012/october/12308km.pdf.

51. *See AB 3034 – Assembly Floor Vote Information, supra* note 37; *AB 3034 – Senate Floor Vote Information, supra* note 37.

52. David Siders, *California Senate Approves Funding for High-Speed Rail*, CAPITOL ALERT (July 6, 2012, 3:59 PM), http://blogs.sacbee.com/capitolalertlatest/2012/07/california-senate-approves-funding-for-high-speed-rail.html.

53. *Id.*

54. *See, e.g.,* Sen. Joe Simitian, *Simitian's Floor Speech on High-Speed Rail*, STATE SENATOR JOE SIMITIAN (July 9, 2012), http://www.senatorsimitian.com/entry/senator_simitians_floor_speech_on_high-speed_rail/.

55. *Jerry Brown Projects Budget Surplus,* KQED NEWS (Jan. 10, 2013, 10:00 AM), http://blogs.kqed.org/newsfix/2013/01/10/governor-to-propose-budget-more-money-for-schools-expected/.

56. Press Release, Rep. Alan Lowenthal, Rep. Lowenthal Sworn Into Office (Jan. 3, 2013), *available at* http://lowenthal.house.gov/news/documentsingle.aspx?DocumentID=334143; L.A. Chung, *Joe Simitian Returns to Supervisor's Seat*, LOS GATOS PATCH (June 6, 2012), http://losgatos.patch.com/articles/joe-simitian-returns-to-supervisors-seat-f7323971.

B. Federal Opposition

Due to their large price tags and need for uniformity, long-term infrastructure projects in the United States have traditionally required a large amount of support from the federal government. With its expected 20-30 year timeframe, billions of dollars in expected costs, and the potential to link into the greater national transportation system, California's HSR project is no different.[57] Even though ARRA constituted seventeen times more funding for HSR than all the previous ten fiscal years,[58] future federal funding will likely be necessary to some degree. Accordingly, President Obama has requested $1 billion for HSR in each of the last three budget years from Congress, only to be denied by the Republican-controlled majority, highlighting their main difference from their state-level counterparts.[59]

While the 2012 election should be generally perceived as a victory for HSR, it also vaulted state Senator, and long-time HSR foe, Doug LaMalfa into Congress. Soon after being sworn in, LaMalfa reaffirmed his stance to "do everything in my power to stop funding and the implementation of high speed rail in California."[60] LaMalfa joins a group of California Congressmen who have expended much effort to oppose HSR. Of the group, Jeff Denham, who represents a district located in the middle of the ICS, has been the most visible. As a member of the House Transportation and Infrastructure Committee he has aggressively questioned witnesses involved with the project during Congressional hearings. For example, in December 2012, during a heated exchange with Secretary of Transportation Ray LaHood, Denham vowed to oppose the HSR project until it becomes fully funded.[61] Denham also introduced bills prohibiting the distribution of any federal transportation funds to the California HSR project for the 2013 fiscal year[62] and sought to block

57. CALIFORNIA HIGH-SPEED RAIL PROGRAM REVISED 2012 BUSINESS PLAN, *supra* note 4, at ES-13.

58. *President to Sign Stimulus Bill Today*, TRANSP. WKLY., (Legis. Services Group, Wash. D.C.), Feb. 17, 2009, at 5, *available at* http://www.pennfedbmwe.org/Docs/news/20090217_Transportation_Weekly_Usitorloseit.pdf.

59. DAVID R. PETERMAN, JOHN FRITTELLI & WILLIAM J. MALLETT, CONG. RESEARCH SERV., THE DEVELOPMENT OF HIGH SPEED RAIL IN THE UNITED STATES: ISSUES AND RECENT EVENTS 3 (2012).

60. John Myers, *LaHood: California will get Federal High Speed Rail Cash*, NEWS10/KXTV (Jan. 7, 2013), http://www.news10.net/news/california/article/224276/430/LaHood-remains-buoyant-on-state-high-speed-rail.

61. *An Update on the High-Speed Intercity Passenger Rail Program: Mistakes Made and Lessons Learned*: *Hearing Before the Subcomm. on R.R.s, Pipelines, & Hazardous Materials of the H. Comm. on Transp. & Infrastructure,* 112th Cong. (2012) (statement of Ray LaHood, Sec'y of Transp. of the U.S.).

62. Transportation, Housing and Urban Development, and Related Agencies Appropriations Act, 2013, H.R. 5972, 112th Cong., 2d Sess. § 432 (2012) (awaiting passage in

California from receiving Florida's forfeited ARRA funds in 2011.[63]

Another strong voice in opposition to HSR in California has been Majority Whip Kevin McCarthy, who represents Bakersfield—another city in the middle of the ICS. McCarthy is perhaps best known as a founding member of the "Republican Young Guns," along with other well-known, up-and-coming GOP Congressmen Eric Cantor and Paul Ryan.[64] His political profile is much larger than Denham's, and as a result he likely received more attention when he dubbed the project in California a "billion dollar boondoggle"[65] and attempted to divert money for HSR in California to other purposes.[66]

Similar opposition is not present in the Senate for two reasons. First, both of California's two longtime Senators—Barbara Boxer and Dianne Feinstein—are Democrats who have been strong supporters of the project.[67] Second, Democrats have controlled the Senate since 2006. Without majority control or a single Senator from California, Senate Republicans have devoted their efforts elsewhere.

C. Citizen Opposition

Unlike legislators, citizen opponents of HSR in California have used procedural litigation as their method to stop the project. The most common vehicle for litigation has been using the state's seminal environmental quality law, the California Environmental Quality Act ("CEQA"), to sue the Authority.[68] CEQA requires a project's lead agency—in this case, the Authority—to fulfill various procedural requirements, including ensuring all environmental effects are identified and any alternatives are considered in an environmental impact report ("EIR"). Though the process can be onerous, the agency is not bound to

the Senate as of Aug. 7, 2013).

63. Jamie Dupree, *More Budget Amendments*, JAMIE DUPREE'S WASHINGTON INSIDER (Feb. 16, 2011, 9:30 AM), http://www.ajc.com/weblogs/jamie-dupree/2011/feb/16/more-budget-amendments/.

64. Nat'l Republican Cong. Comm., *About*, YOUNG GUNS, http://gopyoungguns.com/about/ (last visited Mar. 2, 2014).

65. Kevin McCarthy, *High-Speed Rail: A Billion Dollar Boondoggle,* KEVIN MCCARTHY, http://kevinmccarthy.house.gov/media-center/enewsletters/high-speed-rail-a-billion-dollar-boondoggle (last visited Mar. 2, 2014).

66. H.R. 3143, 112th Cong., 1st Sess. (2011). McCarthy, Denham, and fellow California Congressman Devin Nunes also teamed together to co-sponsor a bill that would specifically divert ARRA HSR funds to state highway construction. *See* H.R. 761, 112th Cong., 2d Sess. (2011).

67. Press Release, Senator Barbara Boxer, Boxer, Feinstein Statement on DOT High-Speed Rail Announcement (May 9, 2011), *available at* http://boxer.senate.gov/en/press/releases/050911.cfm.

68. California Environmental Quality Act, CAL. PUB. RES. CODE §§ 21000-21189.3 (West 2012).

take any action based on the results of the EIR.[69] While CEQA is a valuable safeguard to ensure that environmental considerations are taken into account when agencies make discretionary decisions, it can also be used as a tool for political opponents—even those agnostic to environmental concerns—to halt state infrastructure projects.

The most notable of the CEQA lawsuits (the "Atherton suits") against the Authority have come out of the Bay Area.[70] One of the lead plaintiffs in the action—the Town of Atherton—was named after a relative of famed San Francisco author Gertrude Atherton,[71] who, coincidentally, was one of the notable opponents of the iconic Golden Gate Bridge during its construction in the 1930s.[72] While each of the Atherton suits were CEQA claims asserting that the Authority did not sufficiently meet its EIR prerequisites, the goal of the litigation was clearly to divert the path of the HSR line so that it does not pass through the cities of the plaintiffs in the suits.[73] In the only instance of success against the Authority, the Atherton suits' plaintiffs received a partial favorable ruling in 2009, when a judge ruled that the Authority had not completed the necessary EIR process and ordered the agency to rectify the deficiency.[74]

Although the Authority revised the EIR in accordance with the ruling, the plaintiffs continued to litigate. They filed another lawsuit, contesting the revised EIR, but this time the suit was thrown out in March 2013 by the same judge.[75] Shortly thereafter, continuing to fight the project and confirming their true motivations, the town voted to donate $10,000 to a non-CEQA lawsuit against the Authority based in the Central Valley.[76] This quite clearly confirms the Atherton plaintiffs'

69. *Id.* § 21002.1(c).

70. Town of Atherton v. Cal. High-Speed Rail Auth., No. 34-2008-80000022, 2009 WL 6754051 (Cal. Super. Ct. Nov. 3, 2009); Town of Atherton v. Cal. High-Speed Rail Auth., Nos. 34-2010-80000679-CU-WM-GDS, 34-2008-80000022-CU-WM-GDS, 2011 WL 10677730 (Cal. Super. Ct. Nov. 10, 2011), *appeal docketed*, No. C070877 (Cal. Ct. App. Apr. 13, 2012).

71. The city of Atherton was named after Faxon D. Atherton, Gertrude's father-in-law. *See Gertrude Atherton*, WIKIPEDIA (Oct. 11, 2013, 6:35 AM), http://en.wikipedia.org/wiki/Gertrude_Atherton.

72. STARR, *supra* note 35.

73. A complete victory in any of the law suits would have likely forced the Authority to alter the proposed route, currently set to span the entire length west of the Bay, to one that would instead extend further through the central valley and split east of the Bay, with one line going to San Francisco and the other to San Jose—thereby bypassing a large swath of the Bay area, which includes Atherton and the city of Menlo Park, another plaintiff in the suits. *See, e.g.,* Complaint at 2-3, Town of Atherton v. Cal. High-Speed Rail Auth., No. 34-2008-80000022 (Cal. Super. Ct. Aug. 8, 2008).

74. Atherton, 2009 WL 6754051 (final judgment).

75. Mike Rosenberg, *Bullet Train Scores Win on Peninsula, Judge Dismisses Cities' Lawsuit to Block Use of Caltrain Corridor*, SAN JOSE MERCURY NEWS, Mar. 1, 2013, at 1B.

76. Renee Batti, *Another Lawsuit: Atherton Donates $10K to High-Speed Rail*

only goal in the original lawsuit was to kill the project outright. Given the imminence of construction, the money could have been better spent elsewhere.

Another coalition of local governments and property interests—located in the Central Valley of the state, where the ICS is scheduled to be built—have also brought a CEQA suit against the Authority.[77] However, the judge overseeing the case denied their request for an injunction and in doing so recognized that granting their request would have possibly risked completely derailing the entire project.[78] Perhaps sensing an unfavorable ruling, one county voted to drop out of the lawsuit in May 2013.[79] Soon thereafter the rest of the plaintiffs settled with the Authority and dropped the suit.[80]

Regardless of their motives, a future CEQA lawsuit could be used as a tool to threaten the project's viability by hoping to delay it long enough to cause the state to miss critical deadlines imposed by the Federal Government. While at this time no CEQA lawsuits are pending, it is worth noting that rulings in CEQA suits have been notoriously hard to predict.[81] Since its enactment over 40 years ago, the resulting lawsuits have produced a diverse body of case law specific to a particular project.[82] Increasing uncertainty is inevitable attitudinal shifts over the passage of time and the fact that judges generally afforded high amount of discretion to evaluate whether a lead agency has performed a legally thorough-enough analysis under the law's guidelines.[83] Despite this, agencies are generally afforded a high amount of deference and EIR's are

Litigation, THE ALMANAC (Mar. 6, 2013), http://www.almanacnews.com/story.php?story_id=13823.

77. Three separate suits were consolidated into one: Cnty. of Madera v. Cal. High-Speed Rail Auth., Nos. 3420128001165, 34-2012-80001166-CU-WM-GDS, 34-2012-8000116S-CU-WM-GDS, 2013 WL 2297158 (Cal. Super. Ct. Jan. 22, 2013). In October 2012, Bakersfield, another city along the ICS, had its city council vote unanimously to sue the Authority under CEQA as well. At the time of publication, no lawsuit has been filed. *See* Antonie Boessenkool, *City Considers Lawsuit to get High-Speed Rail Answers*, BAKERSFIELD CALIFORNIAN, Oct. 15, 2012, *available at* http://www.bakersfieldcalifornian.com/local/x1526555495/City-considers-lawsuit-to-get-high-speed-rail-answers.

78. Cnty. of Madera v. Cal. High-Speed Rail Auth., No. 34-2012-80001165, 2012 WL 5846400 (Cal. Super. Ct. Nov. 16, 2012) (order denying preliminary injunction).

79. Tim Sheehan, *Madera County Drops Suit Against High-Speed Rail*, FRESNO BEE (Apr. 2, 2013), http://www.fresnobee.com/2013/04/02/3240315/madera-county-supervisors-drop.html.

80. Press Release, Cal. High-Speed Rail Auth., High-Speed Rail Authority and Madera/Merced County Agricultural Interests Reach Settlement Agreement on Remaining CEQA Litigation (Apr. 18, 2013), *available at* http://www.hsr.ca.gov/docs/newsroom/archives/Settlement%20Agreement%20Reached%20in%20Remaining%20CEQA%20Litigation%20041813.pdf.

81. *See* Christian Marsh, *The California Supreme Court's Recent Flood of CEQA Decisions*, 33 L.A. LAW. 13 (2011).

82. *Id.*

83. *Id.*

presumed adequate.[84] Also, as exhibited by the ruling in the Central Valley CEQA suit, judges are cognizant of the risk involved for ruling against the lead agency for what might amount to a mere technical oversight—especially if plaintiffs have ulterior motives. As a final resort, the Authority can seek CEQA waivers through the legislature if a lawsuit does actually pose a serious threat to the project. Such action is usually more appropriate for smaller projects,[85] and such maneuvers may face public criticism and come at a high political price.[86]

Amidst all this, there have been recent calls for massive CEQA reform largely due to concerns that the process is not agile enough and is commonly abused by project opponents hoping to merely kill public projects.[87] In addition to this, the fact that the Authority has likely improved its EIR process since 2009—using the first rulings as a guidepost—and subsequent CEQA lawsuits seem less likely to succeed against the Authority.[88]

The only legal challenge outside the CEQA framework argued that the Authority is illegally expending the funds from Proposition 1A.[89] The plaintiffs have been quite open about the fact that their motivation is to kill the project.[90] In August 2013, Judge Michael Kenny ruled that the Authority did not have a comprehensive enough funding plan or obtain the necessary environmental clearance for the project in its current state.[91] While the Authority had completed each for the ICS, Kenny ruled that Proposition 1A required them for the entire Initial Operating Segment (IOS), of which the ICS is only a portion.[92] The overall effect of the ruling is unclear since it ordered the Authority to rescind its funding plan from the November 2011 Business Plan, which had already been superseded by the 2012 Revised Plan.[93] More importantly, Kenny

84. CAL. PUB. RES. CODE § 21167.3 (West 2012).

85. Most visibly, these waivers are sought for the building of new stadiums, *see, e.g.*, Assemb.B. 81, 3rd Ext. Sess. (Cal. 2009).

86. *See, e.g.*, Garret Therolf & Patrick McGreevy, *L.A. County Supervisors Oppose Waivers for Professional Football Stadium*, L.A. TIMES (Sept. 8, 2009, 7:01 PM), http://latimesblogs.latimes.com/lanow/2009/09/county-supervisor-oppose-waivers-for-professional-football-stadium.html.

87. *Steinberg Sets CEQA Reform as Agenda Priority*, SENATE PRESIDENT PRO TEM DARRELL STEINBERG, http://sd06.senate.ca.gov/news/2012-09-13-steinberg-sets-ceqa-reform-agenda-priority.

88. Kevin Grochow, Comment, *California High-Speed Rail on Track? Bridging the Gap Between Competing Land Use Issues with the California High-Speed Rail Project*, 15 CHAP. L. REV. 585, 611 (2012).

89. Tos v. Cal. High-Speed Rail Auth., No. 34-2001-00113919, 2013 WL 6578791, (Cal. Super. Ct. Aug. 16, 2013).

90. Michael Cabanatuan, *Central Valley Skeptics*, S.F. CHRON., July 5, 2012, at A1.

91. *Tos*, 2013 WL 6578791, at *5.

92. *Id.*

93. Tos v. Cal. High-Speed Rail Auth., No. 34-2001-00113919, 2013 WL 6184096, at *2 (Cal. Super. Ct. Nov. 25, 2013).

refused to rescind all of the project's appropriations and construction contracts, which would have effectively halted the project.[94] It seems that Kenny's message may have been to sanction the Authority for cutting corners, with an underlying acknowledgement that killing the project at this point would be an extreme measure at odds with the will of the voters. From a practical standpoint, the ruling may demonstrate how hard it is to utilize the courts to kill the project at this stage.

Even though the Authority has thus far been quite successful in court, losing in court does not necessarily mean losing completely, as a long, drawn out court battle could affect the project as adversely as losing in court.[95] As such, the Authority will need to proceed cautiously and take any legal challenges seriously, despite their perceived motivations and merits. So far, the Authority has done such and protected the viability of the project in the process. The recent developments of the dismissal or settling of the CEQA suits has removed major potential hurdles for the project and suggest a larger trend.

IV. IS HSR IN CALIFORNIA INEVITABLE?

Outgoing Secretary of Transportation Ray LaHood recently exclaimed, "[t]here's no stopping high-speed rail in California."[96] His words might be more prophetic than some want to believe. The implications of the 2012 elections and future political projections suggest that HSR may be at a point where opponents can no longer kill the project. With the ICS now fully funded and local lawsuits mostly dispensed with, barring an unforeseen development, construction on it will begin this calendar year and finish around 2017.[97] Combining all of this seems to indicate that HSR in California is approaching inevitability, despite constant media depiction of a see-saw battle.[98]

A. The 2012 Election

Arguably the most critical recent event for HSR in California was the 2012 election, as President Obama's victory essentially assured continued support for the project. Although Mitt Romney did not focus much on HSR during his campaign, his fiscal plan was more directed toward austerity and spending cuts than capital investments and

94. *Tos*, 2013 WL 6578791, at *8; *Tos,* 2013 WL 6184096, at *3.

95. *See, e.g.*, Kathy Fox Powell, *Southwest Airlines v. High-Speed Rail: More Powerful Than a Locomotive?*, 60 J. AIR L & COM. 1091 (1995) (examining how a law suit in Texas where the plaintiff's loss ultimately caused the HSR agency there to fold).

96. Myers, *supra* note 60.

97. CALIFORNIA HIGH-SPEED RAIL PROGRAM REVISED 2012 BUSINESS PLAN, *supra* note 4, at 2-13.

98. *See, e.g.*, Myers*, supra* note 60.

infrastructure funding, so it can be deduced that a project like HSR would have been a candidate to be cut.[99] On the other hand, President Obama supported HSR heavily during his first term,[100] making it easy to conclude that for HSR, the difference between a Romney presidency and an Obama presidency would have been stark.

Even though the 2012 elections saw the Republicans retain a majority in the House, it was lessened from 47 to 32.[101] While any Republican majority will likely continue to oppose Obama's budget requests for HSR, a smaller majority is certainly better for his overall vision. HSR opposition in the Senate will continue to remain irrelevant for the next two years as the Democrats' majority there was not only maintained, but grew as well.[102]

At the state-level, the 2012 elections also further blunted already weak HSR opposition. In the legislature, voters provided Democrats with a 2/3 majority in both houses.[103] This is critical because the state constitution requires a 2/3 majority to raise taxes.[104] It is unlikely that in the next two years HSR will need additional state funding, however such a large majority will make it easier to raise revenue to fund other competing priorities—such as education, highways, and social services—which may be more important to certain legislators than HSR. Such a majority also provides a larger cushion if any Democratic legislators decide to stray from party lines on HSR, as was the case in the lead-up to SB 1029's passage.

Perhaps more important for HSR has been the passage of Proposition 30—a ballot measure that raised taxes on the highest income earners.[105] Because Governor Jerry Brown sponsored and campaigned heavily for the measure, its success can be viewed as an indirect referendum on Brown in general. If it failed, anything associated with

99. *See* Alexander Burns, *Romney Endorses Ryan Budget*, POLITICO (Mar. 20, 2012, 5:00 PM), http://www.politico.com/blogs/burns-haberman/2012/03/romney-endorses-ryan-budget-118079.html.

100. Senator Barack Obama, Remarks to the U.S. Conference of Mayors (June 21, 2008).

101. *House Results – Election 2012*, N.Y. TIMES, http://elections.nytimes.com/2012/results/house/big-board (last visited Mar. 2, 2014).

102. *Senate Results – Election 2012*, N.Y. TIMES, http://elections.nytimes.com/2012/results/senate/big-board (last visited Mar. 2, 2014).

103. Brian Joseph, *Norby Loss Gives Foes New Power; Apparent Defeat in 65th Assembly Race Hands State's Democrats a Supermajority*, ORANGE COUNTY REG., Nov. 15, 2012. While the 2012 election resulted in Democrats obtaining a 2/3 majority in both houses, at the time this note was submitted for publication two seats in the Assembly remain vacant, thus bringing the Democratic majority down to just below 2/3. If a Democratic candidate wins either of the two special elections, then the supermajority remains intact. *See* Patrick McGreevy, *Assembly's Democrats Could Briefly Lose Supermajority*, L.A. TIMES, Mar. 10, 2013, *available at* http://articles.latimes.com/2013/mar/10/local/la-me-legislature-20130311.

104. CAL. CONST. art. XIII A, § 3.

105. *California Proposition 30 (2012),* WIKIPEDIA (Aug. 4, 2013, 6:16 PM), http://en.wikipedia.org/wiki/California_Proposition_30_%282012%29.

Brown—including HSR—would have surely received collateral backlash. In fact, some suggested that Brown would need to abandon his support for HSR in order for the measure to pass,[106] citing poll numbers supporting this conclusion.[107] Nonetheless, Brown stood by his prior commitment to HSR.[108] This fact, even more than his verbal support of HSR, reaffirms his true willingness to keep HSR as a priority for the rest of his tenure.

The fiscal effect of the passage of Proposition 30 should also have residual effects on the HSR project. It was widely assumed that if Proposition 30 failed, the budgetary shortfall would have needed to be filled through spending cuts in areas deemed less important than traditional government spending—such as education. Given its large price tag and lack of immediate benefit, the HSR project would have surely been high on the list of potential programs to cut. This assumption was a pillar in Senator Simitian's reasoning when he opposed Senate Bill 1029.[109] Instead, proving many political commentators wrong, Proposition 30 passed with a double-digit margin.[110] The wide margin of victory shows that, amidst many years of budget cuts and loud calls for austerity by some, the state's voters will support raising revenues to pay for certain projects.

B. Future Years

The future for HSR in California looks promising. At the state level, the project should continue to be supported by both the Governor and the legislature. Moreover, if construction on the early stages of the ICS is successful, that could also galvanize additional support. While Republicans still control the House, President Obama's continued support for HSR provides a good counter to their opposition. With that in mind, the 2014 mid-term Congressional elections could have a grave impact on the pace of the project's construction, so it will be critical to monitor them closely. Lastly, after it appeared that public sentiment in California may have turned against HSR in 2011, indications show that either this conclusion was premature or that voters are once again supporting HSR.

106. Dan Schnur, Op-Ed, *How Gov. Brown Can Save Prop. 30*, L.A. TIMES, Nov. 2, 2012, http://articles.latimes.com/2012/nov/02/opinion/la-oe-schnur-proposition-30-train-20121102.

107. MARK DICAMILLO & MERVIN FIELD, FIELD POLL, VOTERS FAVOR BROWN TAX INITIATIVE 54% TO 38%; EVENLY SPLIT ON MUNGER AND STEYER TAX PLANS. SUPPORT FOR THE GOVERNOR'S INITIATIVE WOULD BE ADVERSELY AFFECTED IF THE LEGISLATURE FUNDS HIGH-SPEED RAIL PROJECT, (July 5, 2012), *available at* http://field.com/fieldpollonline/subscribers/Rls2415.pdf.

108. David Siders, *The Buzz: 'Don't worry about the Field Poll' on high-speed rail, Jerry Brown says*, SACRAMENTO BEE, July 20, 2012, at 3A.

109. *See* Simitian, *supra* note 54.

110. *California Proposition 30 (2012), supra* note 105.

This point will only become more apparent if the economy continues to improve, making taxpayers more apt to support public investments in infrastructure.

1. State Level Support

While support from both the Governor and the legislature for HSR in California appears secure for the next two years, beyond that timeframe some uncertainty does exist. While Jerry Brown is expected to be easily re-elected as Governor in 2014, Brown's age may give rise to some doubts. And while construction on the ICS is poised to begin in 2013, in order to better fend off critics, the Authority nonetheless still has much to do to ensure that the project is viewed as a success.

Governor Brown's commitment to HSR was confirmed in the period prior to the 2012 election when in the face of intense pressure, he did not abandon the project.[111] As such, it would be highly beneficial for the project if Brown were to win an additional term of office in 2014, not only because of his enthusiasm for it, but because five of the nine members of the Authority's board of directors serve at the pleasure of the Governor.[112] Governor Brown serving an additional term provides more security and continuity for the Authority, which can only add to the project's overall efficiency. Also, his role in campaigning for Proposition 30 served as a reminder of how good a politician he is, and in turn how he is able to persuade the public to support an issue in which he believes. Considering the fact that he hopes to include HSR as part of his ever growing political legacy,[113] having such a credible and impassioned supporter of the cause only further bolsters the long-term hopes for the project.

While Brown has yet to announce his candidacy for 2014, he did hint that he is strongly considering running for re-election.[114] Worth noting is the fact that Brown will be 76 years old by the time the election is held.[115] He is already the oldest serving governor in California history.[116] Despite his remarkable energy and unusually good health

111. Siders, *Don't worry about the Field Poll*, *supra* note 108.

112. CAL. PUB. UTIL. CODE § 185020(b)(1) (West 2012).

113. Dan Morain, *Brown buys a risky ticket on high-speed rail*, SACRAMENTO BEE, Jan. 19, 2012.

114. As of the time when this note was submitted for publication, Brown had yet to announce his candidacy for 2014. *See Face the Nation* (CBS television broadcast Apr. 29, 2012), *available at* http://www.cbsnews.com/8301-3460_162-57423869/face-the-nation-transcript-for-april-29-gov-barbour-mayor-villaraigosa-and-gov-brown/?pageNum=5.

115. *Jerry Brown*, WIKIPEDIA (Oct. 19, 2013, 3:20 AM), http://en.wikipedia.org/wiki/Jerry_brown.

116. *Governor of California: Age and Longevity*, WIKIPEDIA (Oct. 11, 2013, 4:53 AM), http://en.wikipedia.org/wiki/Governor_of_California#Age_and_longevity.

overall, he has had two cancer scares.[117] Because of this, there may be a chance that Brown will decide against running due to health or age concerns. However, if Brown does decide to run, due to consistently high approval ratings,[118] many are predicting that he will not face much of a challenge.[119] Further buttressing this point is a lack of credible challengers. As of now, the only major candidate who has announced is Abel Maldonado, who before serving as Lieutenant Governor—arguably the least relevant office in state politics—served an uneventful set of terms in the legislature where his most notable moment was crossing Republican Party lines for a budget vote.[120] Due to electoral losses in 2006 for State Controller, 2010 for re-election as Lieutenant Governor and 2012 for Congress, most observers do not view him as a serious threat.[121]

Support in the state legislature also appears quite secure for the foreseeable future. Over the past 40 years, Democrats have maintained a majority in both houses of the state legislature for all but a brief period in the mid-1990s.[122] Despite recently accumulating a supermajority, Democrats would be wise to act prudently with such a mandate since allowing the state to backslide from its current budget surplus might cause voter backlash.[123] Regardless, Democrats should be able to at least maintain a majority in both houses, since registered Republicans in the state are on the decline.[124] Considering the party line support for HSR, this is just another item suggesting a secure future of the HSR project at the state level of government.

A latent aspect of the viability of the HSR project in California

117. *Jerry Brown Done With Radiation Treatments*, POLITICO (Jan. 8, 2013, 8:05 PM), http://www.politico.com/story/2013/01/jerry-brown-done-with-radiation-treatments-85937.html.

118. MARK DICAMILLO & MERVIN FIELD, FIELD POLL, JERRY BROWN CONTINUES TO RECEIVE HIGH JOB PERFORMANCE MARKS. MORE FAVOR THAN OPPOSE HIS RE-ELECTION SHOULD HE RUN NEXT YEAR (July 24, 2013), *available at* http://www.field.com/fieldpollonline/subscribers/Rls2446.pdf.

119. *See* Alex Isenstadt, *Jerry Brown's California Revival*, POLITICO (Dec. 22, 2012, 4:03 PM), http://www.politico.com/story/2012/12/jerry-browns-california-revival-85440_Page2.html.

120. Dan Smith & Jim Sanders, *Governor Turns to a Senate Ally*, SACRAMENTO BEE, Nov. 24, 2009 at 1A.

121. *Abel Maldonado*, WIKIPEDIA (Sept. 27, 2013, 7:25 AM), http://en.wikipedia.org/wiki/Abel_Maldonado.

122. Republicans had a one vote majority for about one-and-a-half years in the mid-90s. *See California Republican Party: State Assembly*, WIKIPEDIA (SEPT. 29, 2013, 4:10 PM), http://en.wikipedia.org/wiki/California_Republican_Party#State_Assembly.

123. Editorial, *Will Democrats Squander Their Supermajority*, SACRAMENTO BEE, Nov. 11, 2012.

124. Drew Joseph, *California Republican Ranks Shrinking*, S.F. CHRON., Nov. 2, 2012, *available at* http://www.sfgate.com/politics/article/California-Republican-ranks-shrinking-4005002.php.

stems from the Authority's role in implementing the project. In early 2012, the Authority was under fire regarding its efficiency, technical decisions, and overall business model.[125] Various stakeholders also claimed that the Authority used heavy-handed tactics and was unresponsive to many of their concerns.[126] Additionally, the highly respected, non-partisan Legislative Analyst Office ("LAO") raised concerns about the Authority's ability to function due in large part to the fact that many key positions in the Authority were vacant for extensive periods of time.[127]

The Authority utilized this feedback appropriately and took concerted efforts to address many of these concerns throughout the rest of 2012. The most visible example of this approach is the Revised Business Plan, where numerous critiques, concerns, and suggestions were not only considered, but also implemented.[128] Acknowledging the public relations downside of being perceived as bullying stakeholders, the Authority also committed to a more responsive outreach program.[129] A specific example of this is the Authority's decision to extend the public comment period for one of its EIRs due to stakeholder requests, despite no legal obligation to do so.[130] Because rebuilt relationships may carry a suspicious stigma, the Authority needs to continue focusing on making stakeholder relations a key aspect of the project. Lastly, the issue regarding high-level vacancies is slowly being addressed as well.[131] In all, the Authority appears to be making smart decisions towards rebranding its image much more positively as it enters the critical period of building the ICS.

125. *See generally,* CAL. LEGIS. ANALYST'S OFFICE, HIGH-SPEED RAIL IS AT A CRITICAL JUNCTURE (2011), *available at* http://www.lao.ca.gov/reports/2011/trns/high_speed_rail/high_speed_rail_051011.pdf; CALIF. HIGH-SPEED RAIL PEER REVIEW GROUP, COMMENTS OF THE PEER REVIEW GROUP ON THE DRAFT 2012 BUSINESS PLAN (2012), *available at* http://www.cahsrprg.com/files/comments_on_draft.pdf.

126. Cabanatuan, *supra* note 90.

127. CAL. LEGIS. ANALYST'S OFFICE, THE 2012-13 BUDGET: FUNDING REQUESTS FOR HIGH-SPEED RAIL (2012), *available at* http://www.lao.ca.gov/analysis/2012/transportation/high-speed-rail-041712.aspx.

128. CALIFORNIA HIGH-SPEED RAIL PROGRAM REVISED 2012 BUSINESS PLAN, *supra* note 4.

129. *See, e.g.*, John Cox, *McCarthy, Rail Chairman Spar Over Project*, BAKERSFIELD CALIFORNIAN (Mar. 16, 2012), http://www.bakersfieldcalifornian.com/special-sections/rail/x1688919022/McCarthy-rail-chairman-spar-over-project.

130. Press Release, Cal. High-Speed Rail Auth., High-Speed Authority Extends Public Comment Period for Revised Environmental Report for Fresno to Bakersfield Project Section (Aug. 22, 2012), *available at* http://www.hsr.ca.gov/docs/programs/fresno-baker-eir/RDrft_EIR_FB_ED082212.pdf.

131. Vanessa Castañeda, *High Speed Rail Authority Appoints New Managers*, BELMONT PATCH, Aug. 29, 2012, *available at* http://sancarlos.patch.com/groups/business-news/p/high-speed-rail-authority-appoints-new-managers-514ead82.

Perhaps the most important aspect of this rebranding will be the Authority's execution of the ICS. Surely stakeholders, skeptics, and opponents will all be watching this situation closely, and the Authority knows this.[132] Once construction has commenced, if the authority can point to specific successes—particularly, keeping the project on budget and on time—demonizing the project becomes a much harder task. Regardless of how the project fares some voices will continue to oppose it; however, success on the ICS will relegate these voices even further to the margins. Additionally, it will galvanize potential private investment, which would offset reliance on uncertain federal funding and the critics who oppose the project on the basis of its cost.

The ICS certainly provides a watershed moment for the HSR project. Consequently, how it turns out will likely set the tone for the future of the entire project. While the passage of SB 1029 provided the Authority with a bit of breathing room, the agency must continue to focus on outreach and achieving its stated benchmarks in order for the project to enjoy a successful future.

2. Federal Support

Unlike support at the state level, many more questions remain at the federal level for HSR in California. While President Obama secured a second term quite easily, his agenda will inevitably contain many competing priorities. As such, it will be interesting to see how he balances these priorities and where HSR fits into his overall vision, amidst a contentious relationship with a Republican-controlled Congress. Whereas Congress has rejected his requests for HSR funding the past two years, and will likely do so for the next two years, if Democrats can retake a majority in Congress this trend is likely to reverse. Even if such funding does not materialize, there are reasons to believe that the project will still progress.

Even though HSR in California will enjoy more certainty under a Barack Obama presidency than a Mitt Romney one, an intransigent Congress could force him to shift or displace certain priorities for political expediency, despite the fact that he did reaffirm his support for HSR.[133] On the other hand, with healthcare reform and re-election no longer a concern, he may be willing to take more bold political risks to ensure some of his policy aims—such as HSR funding—are implemented despite this opposition. Whether this means the President will be willing to strong-arm certain policies or craft more political deals

132. Ronald Campbell, *High-Speed Rail Boss: We Don't Dare Mess Up*, OC WATCHDOG (Dec. 4, 2012, 10:25 AM), http://www.ocregister.com/articles/strong-478976-speed-high.html.

133. *See* President Barack Obama, Annual Message to the Congress on the State of the Union (Feb. 12, 2013); Myers, *supra* note 60.

with an unrelenting Congress remains to be seen, but such tactics seem more likely during his second term.

One area at the federal level over which Obama has complete control that has far reaching implications on the future of HSR is his power to appoint the Secretary of Transportation. During Obama's first term, HSR flourished under Secretary Ray LaHood. Not only has his enthusiasm been beneficial for the project in California, but also the fact that he was a seven-term Republican Congressman gives HSR a shade of bipartisanism reminiscent of pre-Proposition 1A.[134] However, as is the tradition with most cabinet secretaries, LaHood stepped down soon after Obama's second term began.[135] Obama recently replaced LaHood with Charlotte's Democratic Mayor Anthony Foxx.[136]

While Foxx will not be able to replicate the bipartisanship or Congressional experience that made LaHood such an effective Transportation Secretary, a few conclusions can be drawn about his priorities regarding the HSR project despite his short political career. During Foxx's three and a half years as Mayor, Charlotte started construction on a new streetcar program and invested in a light rail system.[137] This prompted some in the media to refer to him as "the rapid-transit-loving Mayor."[138] So it certainly appears that Foxx heavily values modernizing public transportation. It has also been suggested that having a recent mayor transition to the post will be highly beneficial to a program like HSR in California that has such a direct impact on local governments, especially during an economic recovery.[139] While the jury may be out on Foxx for the next few years, it seems that he is primed to continue LaHood's role as the lead advocate for California's HSR project at the federal level.

134. *See, e.g.,* Ray LaHood, Sec'y of Transp., Remarks at the High-Speed Rail Summit (Feb. 12, 2013); *Ray LaHood*, WIKIPEDIA (July 2, 2013, 7:42 PM), http://en.wikipedia.org/wiki/Ray_Lahood.

135. Press Release, United States Dept. of Transp., U.S. Transportation Secretary LaHood Announces That He Will Not Serve for a Second Term (Jan. 29, 2013), *available at* http://www.dot.gov/briefing-room/us-transportation-secretary-lahood-announces-he-will-not-serve-second-term.

136. *See Senate Approves Transportation Secretary Nominee*, N.Y. TIMES, June 28, 2013, at A19.

137. Alex Goldmark, *Meet Anthony Foxx, Young Transit-Loving Mayor, Employed by Bus Company, Tapped as U.S. Transpo Secretary*, TRANSPORTATION NATION (Apr. 29, 2013, 3:32 PM), http://www.wnyc.org/blogs/transportation-nation/2013/apr/29/slim-credentials-hometown-take-charlotte-mayor-anthony-foxx-us-transportation-secretary/.

138. Mark Silva, *Anthony Foxx's High-Speed Promotion*, POLITICAL CAPITAL (Apr. 29, 2013, 9:21 AM), http://go.bloomberg.com/political-capital/2013-04-29/anthony-foxxs-high-speed-promotion/.

139. Ryan Holeywell, *Anthony Foxx Confirmed: What Having a Mayor in Control of U.S. Transportation Could Mean*, GOVERNING (June 27, 2013), http://www.governing.com/blogs/fedwatch/gov-senate-confirms-charlotte-mayor-as-transportation-secretary.html.

Foxx's biggest struggle will be in dealing with a majority Congress that has thus far refused to provide any federal funds to HSR since ARRA passed. Since the Authority is seeking no federal funding until 2015, Congressional opposition might currently be a moot issue. However, the 2014 mid-term elections for Congress might possibly be the most critical points for HSR, along with the Authority's ability to execute on the ICS. While predicting how a body as large and as disparate as Congress will look in the future might be an impossible task, it is safe to say that the situation is worth keeping a close eye on for how it could affect the future of HSR. If Democrats can retake the House, while sustaining their current majority in the Senate, funding will almost certainly resume for HSR. If the Republicans maintain control, alternate funding paths might need to be sought.

If federal funding does not materialize for HSR following the 2014 elections, the project in California can still survive. Securing alternative financing from the private sector has always been a strong possibility.[140] This possibility should increase if the Authority's efforts in constructing the ICS are successful. Further signaling the desire of the private sector to get involved with HSR is a recent movement in Texas to revive its folded HSR project with private financing.[141] Also, interest groups are beginning to suggest contingency plans on how to fill such funding gaps in the face of Congressional abandonment.[142] In any case, even given political uncertainties, HSR in California has a high likelihood of receiving the funding necessary to keep the project on schedule beyond the construction of the ICS.

3. Public Support

As rhetoric ratchets up and opposing politicians dominate headlines surrounding an issue, it is easy to lose sight of the influence of public sentiment in the overall debate. As noted earlier, integral to this support is the Authority's rebranding efforts and how successful the construction of the ICS is. Reports suggesting a majority of voters had changed their mind on HSR in California, even after supporting it three years prior, were almost certainly a major influence on the Authority's decision to rebrand.[143] It was no coincidence that this apparent shift in public

140. *An Update on the High Speed and Intercity Passenger Rail Program*, *supra* note 61.

141. Gordon Dickson, *Group Aims to Raise $10 Billion for High-Speed Rail in Texas*, FORT-WORTH STAR TELEGRAM (May 10, 2012), http://www.star-telegram.com/2012/05/09/3949397/group-aims-to-raise-10-billion.html.

142. Egon Terplan & Heng Gao, *Getting High-Speed Rail on Track*, S.F. PLAN. & URB. RES. ASS'N, July 10, 2012, *available at* http://www.spur.org/publications/library/article/getting-high-speed-rail-track.

143. MARK DICAMILLO & MERVIN FIELD, FIELD POLL, Voters Very Aware of High Speed Rail Project. Large Majority Wants Legislature to Call a Re-Vote on the Bond Package.

sentiment occurred around the same time the project's estimated capital costs skyrocketed to around $100 billion, up from the original estimate of $33 billion in 2006.[144] This implication was confirmed by polling soon thereafter.[145] Making matters worse was that this increase took place amidst a still suffering national economy, making it a ripe subject to dominate headlines.[146]

To counter public concerns surrounding the cost of the project, the Authority has revised cost projections to $68.4 billion.[147] The new estimate should only serve to allay fears that the project's costs are spiraling out of control. Indeed, two-thirds of Californians still view the HSR project as important to the state, though approximately half are still sensitive to the cost of the project.[148] However, some additional inferences can be drawn from a few notable items that suggest that public opinion was probably not as bad as the polling indicated. For instance, polling also suggested that voters would have reacted negatively to Proposition 30 if Governor Brown continued to support HSR. In the end, the measure still passed overwhelmingly. This suggests that public backlash against HSR may not have been as strong as initially expected. Another important factor likely to weigh heavily on public sentiment for the project is the improvement of the economy.[149] If it continues to recover as most are predicting,[150] the public is more likely to support infrastructure spending in general.

An additional gauge of public sentiment can be editorials in local newspapers. Even though the digital age has prompted a decline in the industry, a newspaper's editorial board continues to wield clout in the

Majority Would Vote No if an Election Were Held Today 3 (Dec. 6, 2011), *available at* http://www.field.com/fieldpollonline/subscribers/Rls2400.pdf.

144. CALIF. HIGH-SPEED RAIL AUTH., CALIFORNIA HIGH-SPEED TRAIN BUSINESS PLAN 19 (2008), *available at* http://www.hsr.ca.gov/docs/about/business_plans/BPlan_2008_FullRpt.pdf; CALIF. HIGH-SPEED RAIL AUTH., CALIFORNIA HIGH-SPEED RAIL PROGRAM DRAFT 2012 BUSINESS PLAN ES-9 (2011).

145. DICAMILLO & FIELD, *supra* note 143.

146. *See, e.g.,* Juliet Williams, *California High-Speed Rail to Cost $98B, Plan Says*, WASHINGTON TIMES (Nov. 1, 2011), http://www.washingtontimes.com/news/2011/nov/1/california-high-speed-rail-cost-98-billion/?page=all.

147. CALIFORNIA HIGH-SPEED RAIL PROGRAM REVISED 2012 BUSINESS PLAN, *supra* note 4, at ES-13.

148. MARK BALDASSARE ET AL., PUB. POL'Y INST. OF CAL., PPIC STATEWIDE SURVEY: CALIFORNIANS & THEIR GOVERNMENT 13 (Mar. 2013).

149. *See* BUREAU OF ECON. ANALYSIS, GROSS DOMESTIC PRODUCT, 4TH QUARTER AND ANNUAL 2012 (ADVANCE ESTIMATE) (2013).

150. Leah Schnurr, *Fiscal Woes to Keep U.S. Growth Modest in 2013 Reuters Poll*, REUTERS (Jan. 24, 2013, 5:21 PM), http://www.reuters.com/article/2013/01/24/us-economy-poll-usa-idUSBRE90N1BB20130124; U.S. DEPT. OF TREASURY, RECENT U.S. ECONOMIC GROWTH IN CHARTS (May 2012).

community and can often provide insight into local attitudes. So, the fact that newspapers in two notable cities on the planned HSR route have changed from opposing the project to supporting it is notable. The Sacramento *Bee* and Bakersfield *Californian* opposed Proposition 1A in 2008,[151] but have recently switched to embracing the project.[152] In fact, both even hinted that their reasoning for this is that the project is nearing inevitability. Whether shifts in editorial board attitude actually track public sentiment is debatable, however, they do add to the other evidence suggesting a stronger public embrace of HSR.

V. SUGGESTIONS FOR OPPPONENTS

Since the future of the HSR project in California appears quite secure, the remaining opponents may want to consider altering their tactics. Instead of launching fruitless lawsuits, landowners and farmers in areas along the route should consider becoming more active participants in the process and engage the Authority in good-faith negotiations. State-level politicians opposing the project should realize that given their lack of political power, their opposition is unlikely to result in stopping the project. Instead, they too should consider a working relationship with the Authority and their legislative colleagues who support the project. And while opponents in Congress have a majority, a better long-term strategy might be to allow money to flow to the project but with strings attached to shape the project to be consistent with their own visions. Essentially, the various segments of opposition should all consider becoming stakeholders to better suit their interests.

A. Affected Property Owners

Given the Authority's checkered history in dealing with stakeholders, some citizens might be cynical to work with such a partner. This is certainly a valid concern; however, current leadership at the Authority seems to better understand the importance of having affected property owners as participating stakeholders.[153] Because having affected landowners supporting the HSR project would provide a boost in

151. Editorial, *Our Endorsements,* SACRAMENTO BEE, Oct. 20, 2008, at A14; Editorial, *We Recommend*, BAKERSFIELD CALIFORNIAN (Oct. 23, 2008).

152. Editorial, *McCarthy's Bid to Kill High-Speed Rail is Baffling*, SACRAMENTO BEE, Dec. 14, 2012, at 18A; Editorial, *Rail is Coming, With Us or Without Us*, BAKERSFIELD CALIFORNIAN, Nov. 24, 2012, *available at* http://www.bakersfieldcalifornian.com/opinion/our-view/x59956304/Rail-is-coming-with-us-or-without-us.

153. *Oversight of California High-Speed Rail Hearing Before Subcomm. on R.R.s, Pipelines, & Hazardous Materials of the H. Comm. on Transp. & Infrastructure,* 113th Cong. 11 (2013) (statement of Dan Richard, Chairman, California High-Speed Rail Authority Board of Directors).

credibility and public relations, the Authority has incentive to conduct fair negotiations with them rather than commencing eminent domain proceedings, which are usually bitter contests. So while these landowners have a right to be cautious in dealing with the Authority, they should not outright reject the notion of negotiating with it—especially if they can receive adequate returns.

John Tos, a Central Valley farmer and a lead plaintiff in one of the lawsuits against the Authority[154] recently remarked that if the ICS is constructed, there will be a repeat of the Mussel Slough tragedy—a conflict between settlers and Southern Pacific Railroad supporters that left seven dead in Tos's home city of Hanford in 1880.[155] With such impassioned conviction, it is clear that some people, such as Tos, are unlikely to abandon their opposition to HSR; however, others in the area understand the potential benefits of negotiating directly with the Authority. One example is fellow Hanford farmer Brad Johns, whose property is directly traversed by the planned route. He realized in 2011 that fighting the project was unlikely to produce positive results, and embraced it as a new opportunity.[156] With an engaging attitude, not only was he able to get the Authority to pay to have his house physically moved, but, once relocated, Johns plans to sell solar energy to the eventual operator of the HSR line.[157] As is the case with most large infrastructure projects, an unfortunate side effect of the HSR project is that some landowners will lose their land or have it affected adversely. The Authority has the ability to mitigate damage to affected citizens,[158] and those who understand how likely the project is to be built are in a better position to negotiate with the Authority than those who plan to fight it at any cost.

The Authority's power to negotiate with affected entities does not only apply to private citizens. Success stories of positive negotiations also include the actual cities on the planned route. For instance, the city of Fresno successfully negotiated an additional $4.6 million to aid it in

154. Tos v. Cal. High-Speed Rail Auth., No. 34-2001-00113919-CU-MC-GDS, (Cal. Super. Ct. filed Nov. 14, 2011).

155. Seth Nidever, *Residents Unite Against HSR*, HANFORD SENTINEL (Oct. 14, 2011), http://www.hanfordsentinel.com/news/local/residents-unite-against-hsr/article_c34f530e-f694-11e0-bbb3-001cc4c03286.html; *Mussel Slough Tragedy*, WIKIPEDIA (May 30, 2013, 6:53 PM), http://en.wikipedia.org/wiki/Mussel_Slough_Tragedy.

156. Tim Sheehan*, Path of High-Speed Rail Worries Valley Farmers,* FRESNO BEE (Jan. 8, 2011), http://www.fresnobee.com/2011/01/08/2225457/rail-project-worries-valley-farmers.html.

157. *PBS Newshour: Will Brown's Vision for High-Speed Rail in California Stay on Track?* (PBS television broadcast Mar. 1, 2012), *available at* http://www.pbs.org/newshour/bb/business/jan-june12/highspeedrail_03-01.html.

158. *See, e.g.,* CAL. HIGH-SPEED AUTH., RELOCATION ASSISTANCE PROGRAM BROCHURE (BUSINESS, FARM, AND NON-PROFIT ORGANIZATIONS) (2011).

retaining local businesses in the downtown area.[159] Making this negotiation critical is the fact that Fresno currently struggles with unemployment nearly double the national rate[160] and has been trying to revitalize its downtown area since the 1990s.[161] Bearing in mind the lack of success the plaintiff cities in the Atherton cases have had, they may want to consider switching tactics to a course of action similar to Fresno's.

In general, parties that believe suing the Authority is the best course of action should reconsider their tactics in light of the costs of litigation versus alternatives—including any externalities of such actions. While litigation might garner more headlines, it carries the risk of losing in court and then having nothing to show for it. This risk seems quite high since the Authority has a strong track record in court and judges fully understand the gravity of suits seeking to shut down the project on purely procedural grounds at this juncture.[162] Continued litigation also risks alienating these parties if they attempt to deal with the Authority in the future. All told, these plaintiffs might be better off spending their money on lawyers who negotiate rather than litigate.

B. State Legislative Opponents

Ever since Proposition 1A passed, state-level legislative opponents have had virtually no effect on HSR. These politicians might enjoy the political points they score with some of their constituents, but due to the distinct minority of HSR opponents, these are not likely to produce anything more. Even though support from these politicians is not necessary to the overall success of the project, the Authority would certainly welcome it since a bipartisan consensus would lead to better public relations for the project. Part of the reason Proposition 1A was successful was the bipartisan support it had.[163] Since construction will begin soon, the state legislative opponents should consider abandoning

159. George Hostetter, *Fresno Accepts $4.6 Million to Help Business Affected by High-Speed Rail*, FRESNO BEE (Sep. 27, 2012), http://www.fresnobee.com/2012/09/27/3008995/fresno-accepts-46-million-to-help.html.

160. *Economy at a Glance: Fresno, CA*, BUREAU OF LABOR STATISTICS, http://www.bls.gov/eag/eag.ca_fresno_msa.htm (last visited Mar. 2, 2014); *Economy at a Glance: United States*, BUREAU OF LABOR STATISTICS, http://www.bls.gov/eag/eag.us.htm (last visited Mar. 2, 2014).

161. While Fresno has had many revitalization efforts, it is an ongoing process. *See, e.g.,* Sanford Nax, *Agency's Demise Worrisome; Downtown Business Leaders Hope Someone Takes Up the Work of the Fresno Revitalization Corp.,* FRESNO BEE, June 15, 1996, at E1; Editorial, *Downtown Fresno is On Right Track to Revitalization, Mayor Will Release Crucial Planning Document Friday,* FRESNO BEE, Oct. 12, 2011.

162. *See, e.g.,* Cnty. of Madera v. Cal. High-Speed Rail Auth., *supra* note 77.

163. Safe, Reliable High-Speed Passenger Train Bond Act for the 21st Century, *supra* note 32.

their current tactics in favor of becoming more active participants in the project's development.

In fact, these opponents could learn a lesson from their former colleague Senator Joe Simitian. Even though SB 1029 passed over Simitian's opposition, his concerns had a direct impact on the Authority's Revised Business Plan.[164] The fact that he was previously a strong supporter of the project and based many of his concerns on the LAO and Peer Review Group Study's findings provided additional clout to his reasoning.[165] In contrast, politicians like Diane Harkey who seize every opportunity to oppose HSR, have their professed criticisms easily dismissed. On the other hand, if these politicians extended a degree of support to the project, it would go a far way to show that they are acting in good-faith. This, in turn, would seemingly allow for more input on the project, and more desirable results.

C. Federal Opponents

Three of HSR's loudest opponents in Congress—Kevin McCarthy, Jeff Denham, and Devin Nunes—are in a paradoxical position regarding the project in California. Certainly their opposition is in line with the current Republican Party orthodoxy, but each of them represent a district located directly on the ICS. Accordingly, their constituents stand to gain much from a successful HSR project—in particular, an immediate infusion of new jobs and creating better access to the region to fuel its enormous growth potential. When this fact is coupled with the promising future for HSR in California, pivoting their position on HSR seems to be a smart decision.

Ashley Swearengin is a great example of how these opponents can leverage their situations to provide maximum benefits for constituents. While not a member of Congress, Swearengin is the Mayor of Fresno, a city situated to gain enormous benefits being the largest city on the ICS. As a result, the city's economic planning revolves around where in the city the HSR route is. [166] Beyond the obvious creation of initial jobs from the project's construction, Fresno's long-term plans include revitalizing its downtown business environment to cater to passengers and aligning the area's higher education institutions to serve as feeders for jobs working with and around HSR.[167] Swearengin, a Republican, separated herself from partisan politics to best serve her constituents in the face of

164. CALIFORNIA HIGH-SPEED RAIL PROGRAM REVISED 2012 BUSINESS PLAN, *supra* note 4.

165. *Id.*

166. ECON. DEV. CORP., FRESNO WORKS (2010), *available at* http://www.fresnoedc.com/about/publications/FresnoWorks/flash.html.

167. *Id.*

the likelihood of construction of the HSR project.

While partisan politics surely factors into the Congressmen's opposition to HSR, some of their specific criticisms do not need to be abandoned if they shift to supporting the project. As evidenced by the strong Republican opposition to ARRA, clearly there is a link between these Congressmen's opposition to HSR and the use of public funds to construct the project.[168] But since their districts have so much to gain from the project, instead of staunchly opposing it, perhaps these three should be focusing their efforts on ensuring private investment constitutes a majority of the remaining funding requirements.[169] Members of Congress wield great power and connections within the business community as a whole, so leading the charge to secure private funding for the project would not be difficult, nor would it seem to offend the Republican base too much. Another concern cited by the three as a pretext for opposition is that the project will lead to wasteful spending of taxpayer money. If this is the case, attaching additional oversight provisions to federal funding would seem to be the logical solution.[170]

Denham, McCarthy, and Nunes have specific options that not only would address their stated concerns but also allow them to save political face if they were to shift their position on the project. Doing so would ensure their constituents receive maximum benefits from the project. With this in mind, it is amazing that they have not shown signs of altering course.

CONCLUSION

In politics, nothing may ever be truly inevitable, but the HSR project in California might be passing a point where its long-term viability is no longer in doubt. Though some uncertainty exists as to funding, as time passes and more ground is broken on the project, constructing the entire HSR line in California becomes more probable and the money should follow. As this happens, the various sets of opponents should re-evaluate their tactics to see if the results they are currently achieving actually align with their stated goals. While it may be politically painful for some, better long-term results might be attainable

168. Final Roll Call Vote: H.R. 1, United States House of Representatives (Jan. 28, 2009), *available at* http://clerk.house.gov/evs/2009/roll046.xml; Final Roll Call Vote: H.R. 1, United States Senate (Feb. 10, 2009), *available at* http://www.senate.gov/legislative/LIS/roll_call_lists/roll_call_vote_cfm.cfm?congress=111&session=1&vote=00061.

169. *McCarthy's Bid to Kill High-Speed Rail is Baffling, supra* note 152.

170. Patt Morrison, *Is California's High-Speed Train on Track or Off the Rails?*, L.A. TIMES (July 10, 2012), *available at* http://articles.latimes.com/2012/jul/10/news/la-ol-california-high-speed-train-20120710.

by redefining their role as stakeholders. For citizens affected directly by the project, this means working with the Authority to produce the best possible outcome given their circumstances. For state-level politicians, this means utilizing what little political power they have to generate some possible returns for the symbolic support they could provide the project. And for federal-level opponents, this means better aligning their tactics to best suit the goals and needs of their constituents.

In sum, the arguments at this point should not be about whether to have HSR or not, they should be geared towards addressing the specifics of how the project will eventually reach its end goal. Once the opponents realize this and become stakeholders, the entire dialogue regarding the project will be more efficient, focused, and most importantly, honest.

LIMITING SRO IMMUNITY TO MITIGATE RISKY BEHAVIOR

JACLYN FREEMAN*

INTRODUCTION

Financial markets have become increasingly reliant on complex, high-speed technological systems to facilitate trading. Stock exchanges are no exception. Exchanges worldwide have used technological innovations to develop highly advanced trading systems, which are used to facilitate market transactions. Although the use of technology has benefitted markets and the investing public, markets have also experienced technological glitches that have caused major losses to investors and financial firms. Yet the exchanges that operate and profit from these complex, technological trading systems are immune from liability for any misconduct that may have contributed to the malfunctions or the losses that ensued. This creates potential for moral hazard: exchanges are motivated by profits and are more likely to engage in risky behavior to maximize profits knowing that they are shielded by

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absolute immunity.

Underlying this moral hazard problem is the self-regulatory system of U.S. stock exchanges. Under the Securities Exchange Act of 1934, stock exchanges are considered Self-Regulatory Organizations ("SROs"), which, courts have found, affords them absolute immunity from civil damages.[1] And although all major U.S. exchanges have demutualized to become for-profit, shareholder-owned corporations, they have maintained SRO status and continue to enjoy the immunity that comes with it. Thus, SROs are motivated by profits, and may engage in risky behavior to achieve profit-maximization for shareholders, knowing that they can hide behind absolute immunity. This is further exacerbated by the increase in market competition,[2] which has put pressure on the exchanges to attract deal flow.

The potential for increasingly risky behavior by exchanges is particularly problematic in light of recent cases of technological failures that have caused major losses to investors and financial institutions. Examples of such occurrences include the 2012 Facebook IPO software malfunction and the Flash Crash of 2010. These events have made clear the importance of recognizing the potential for technical errors and taking appropriate precautions to prevent, or at least reduce, the negative effect on the market. The exchanges, however, have a reduced incentive to take caution given the immunity they enjoy as SROs. This creates the potential for risky behavior in introducing and maintaining technological trading systems, as well as in responding to malfunctions.

To mitigate risky behavior with respect to introducing new technologies and responding to system malfunctions, I propose that all conduct relating to operating trading systems, market facilitation, trade execution and order processing should not be afforded immunity. Instead, immunity should be very limited and applied only to functions the SEC itself would perform–specifically rulemaking and enforcement.

In Part I of this note, I provide an overview of the history of SROs and why stock exchanges have been given this special status. In Part II, I discuss the absolute immunity protection provided to SROs, the reasons behind it, and how the courts have applied the doctrine in actions against exchanges. In Part III, I describe the process of demutualization and argue that SROs have become more like private entities over time. I also discuss the policy implications of a system where exchanges are for-profit but still maintain SRO status and the immunity that comes with it.

In Part IV, I present a brief case study on the Facebook IPO and the

1. Securities Exchange Act of 1934, Pub. L. No. 94-29, sec. 3(6), § 3(a)(26), 89 Stat. 97, 100 (1975) (codified as amended at 15 U.S.C. § 78c(a)(26) (West 2013)).

2. Concept Release Concerning Self-Regulation, Exchange Act Release, 69 Fed. Reg. 71,256, 71,257 (Dec. 8, 2004) [hereinafter SRO Concept Release].

technical glitch the NASDAQ experienced during the IPO, which caused major losses to investors. I then analyze the NASDAQ's potential liability under the current structure. I determine that the NASDAQ may be able to invoke absolute immunity under the theory that it was acting in its "quasi-governmental" capacity, even though it may have been acting for its personal interest and not as a regulator. I argue that the ability to invoke such immunity has a negative impact on markets because it encourages risky behavior–the moral hazard problem.

Finally, in Part IV, I provide a prescription to mitigate the moral hazard problem. I propose that courts limit the activities that are considered regulatory to only the functions that the SEC itself would provide–i.e. rulemaking and enforcement. This narrow approach would exclude from "regulatory" any activity involving: (i) introducing, and running technology-driven trading platforms; (ii) executing trades; and (iii) processing orders. Thus, exchanges would not be shielded from liability with respect to these "operating" functions, and would, therefore, have incentive to take necessary precautions and limit risky behavior.

I. OVERVIEW OF SELF-REGULATORY ORGANIZATIONS

A. History of Stock Exchanges and the SRO System

Self-regulation in the securities industry is a long-standing tradition in the United States, dating back to the 1700s.[3] The "Buttonwood Agreement" of 1792 formed the first organized stock exchange in New York.[4] As the New York Stock Exchange ("NYSE") and other stock exchanges developed over time, a system of exchange rules developed as common trading practices became formalized in documents such as constitutions and bylaws.[5]

Before the stock market crash of 1929, there was very little support for federal regulation and oversight of the stock market.[6] Most investors did not consider systemic risk associated with abuse of margin financing and the low quality of information they received about the securities in which they were investing.[7] This general attitude changed when the stock market crashed and the public lost confidence in the market.[8]

After losing fortunes in the 1929 crash and the Great Depression

3. *Id.*
4. *See id.*
5. *Id*.
6. *The Investor's Advocate: How the SEC Protects Investors, Maintains Market Integrity, and Facilitates Capital Formation*, SEC. & EXCH. COMM'N, http://www.sec.gov/about/whatwedo.shtml#create (last modified June 10, 2013) [hereinafter *The Investor's Advocate*].
7. *Id*.
8. *Id*.

that followed, investors and banks began to support a regulatory regime.[9] The general consensus at the time was that public confidence in capital markets had to be restored in order for the economy to recover.[10] Congress began to consider what caused the crash and how to restore market confidence and prevent future crashes.[11]

In contemplating legislative responses, Congress directed the U.S. Senate Banking and Currency Committee to conduct hearings in an effort to examine the stock exchange practices that were prevalent in the years leading up to the crash.[12] The hearings achieved their stated purpose of "lay[ing] foundation for remedial legislation."[13] The hearings uncovered market manipulation and other deceptive practices[14] on the part of traders and investment bankers as well as investigatory failure on the part of the NYSE.[15] These discoveries further diminished the public's faith in financial institutions so as to "galvanize[] broad public support for direct federal regulation of the stock markets."[16] The Senate Committee's report on the hearings "indicted the system as a whole by demonstrating that the system had failed to impose essential fiduciary standards on persons whose responsibility it was to handle other people's money."[17]

With broad support and political momentum for financial market reform, Congress enacted two statutes—the Securities Act of 1933 (the "Securities Act") and the Securities Exchange Act of 1934 (the "Exchange Act" or the "Act").[18] The Securities Act and the Exchange Act, which created the Securities Exchange Commission (the "SEC" or the "Commission"), were designed to restore confidence in the capital markets by providing investors and the markets with reliable information surrounding securities and "clear rules of honest dealing."[19] The SEC, empowered with broad authority over all aspects of the securities industry, was charged with enforcing securities laws, promoting stability

9. *Id*.

10. *Id*.

11. *Id.*

12. Joseph A. Castelluccio III, *Sarbanes-Oxley and Small Business: Section 404 and the Case for a Small Business Exemption*, 71 BROOK. L. REV. 429, 434-35 (2005) (discussing the history of the Securities Act of 1933 and the Securities Exchange Act of 1934).

13. *Id*. at 435 (internal quotation marks omitted) (quoting S. REP. NO. 73-1455, at 4 (1934)).

14. *Id*. at 461.

15. Yesenia Cervantes, *Fin Rah! . . . A Welcome Change: Why the Merger Was Necessary to Preserve U.S. Market Integrity*, 13 FORDHAM J. CORP. & FIN. L. 829, 839 (2008).

16. Castelluccio, *supra* note 12, at 436 (internal quotation marks omitted) (quoting Joel Seligman, THE TRANSFORMATION OF WALL STREET: A HISTORY OF THE SECURITIES AND EXCHANGE COMMISSION AND MODERN CORPORATE FINANCE 2 (3d ed. 2003)).

17. *Id*.

18. *Id*.

19. *The Investor's Advocate*, *supra* note 6.

in markets, and protecting investors.[20]

Under the Act, the SEC oversees SROs, defined broadly to include "any national securities exchange, registered securities association, or registered clearing agency."[21] The SROs continued to conduct day-to-day regulation and administration of U.S. stock markets under the Act[22] but were required to register with and be supervised by the SEC.[23] These regulations forced SROs to implement rules that would protect investors and prevent conduct "inconsistent with just and equitable principles of trade."[24]

The Exchange Act was seen as a compromise between the public powers of Washington and the private powers of Wall Street.[25] In passing the Act, Congress "devised an unprecedented structure of public governance over the stock exchanges, by both endorsing the continued viability of the NYSE, which already possessed a well-established tradition of self-regulation in the U.S. marketplace, while, at the same time, transforming this once exclusively private club into a government-supervised, self-regulatory body."[26] Underlying this regulatory regime was the view that "self-regulation [was] the best 'first-line' defense against unethical or illegal securities practices."[27]

Efforts to restore market confidence also entailed repairing the damaged reputations of over-the-counter ("OTC") securities dealers.[28] OTC dealers formed the Investment Bankers Code Committee in 1933, which was succeeded three years later by the Investment Bankers Conference. The organization consisted of prominent investment banks that came together "to act as a national, voluntary industry organization."[29] The SEC and the leaders of the investment banking industry felt that in order to carry out the task of self-regulation, an industry organization would need official legal status.[30] The Maloney Act of 1938 accomplished this task by amending the Exchange Act to include section 15A, which established the concept of national securities

20. *Id*.

21. Securities Exchange Act of 1934, 15 U.S.C.A. § 78c(a)(26) (West 2012).

22. Weissman v. Nat'l Ass'n of Sec. Dealers, Inc., 500 F.3d 1293, 1296 (11th Cir. 2007).

23. William I. Friedman, *The Fourteenth Amendment's Public/Private Distinction Among Securities Regulators in the U.S. Marketplace–Revisited*, 23 ANN. REV. BANKING & FIN. L. 727, 739 (2004).

24. *Id.* (internal quotation marks omitted) (quoting Norman S. Poser, BROKER-DEALER LAW & REGULATION § 13.04 (2d ed. 2001)).

25. *Id*. at 738.

26. *Id*. (footnote omitted).

27. *Id*. at 738-39 (internal quotation marks omitted) (quoting First Jersey Sec., Inc. v. Bergen, 605 F.2d 690, 698 (3d Cir. 1979)).

28. SRO Concept Release, *supra* note 3, at 71,257.

29. *Id*.

30. *Id*.

association SROs.[31] One such association, which formed as a result of the Maloney Act[32], is the National Association of Securities Dealers ("NASD"). The NASD is a voluntary organization of broker-dealers engaged in trading OTC stocks.[33]

The SEC has granted much autonomy and deference to the SROs. Justice William Douglas, who once served as the chairman of the SEC observed that "from the beginning of federal securities regulation the SEC allowed the exchanges to enjoy considerable autonomy . . . play[ing] an essentially passive role, [and] allowing the securities industry to govern itself in its own wisdom."[34] Justice Douglas explained that the SROs were on the front lines of regulation, and that the SEC was authorized to step in only when the SROs failed to adequately provide protection to investors.[35] Thus, the Exchange Act "represented the inception of the government's intervention in the securities markets and its establishment of a symbiotic relationship with the SROs in their joint regulation of the U.S. securities markets."[36]

B. Periodic Reexamination of the SRO System

Over time, the broad authority and autonomy granted to SROs has been reexamined, but has mostly been left intact. The effectiveness of self-regulation was "called into question by stock market abuses, especially in the OTC market."[37] In 1963, the SEC presented to Congress the Report of Special Study of the Securities Markets of the Securities and Exchange Commission[38] ("Special Study"), which evaluated the condition of the securities industry and the performance of SROs.[39] Among other things, the Special Study found that SROs have a "natural tendency to protect member firms," and that the amount of control that exchange floor members exercised over exchange regulatory operations and governance ought to be reduced.[40] The conclusion, however, was not that the SRO model of the securities industry was inherently flawed, but

31. *Id*.

32. *Id*.

33. Roberta S. Karmel, *Should Securities Industry Self-Regulatory Organizations Be Considered Government Agencies?*, 14 STAN. J.L. BUS. & FIN. 151, 153 (2008).

34. Friedman, *supra* note 23, at 740 (internal quotation marks omitted) (quoting Poser, *supra* note 24, at § 13.01 n.33).

35. *See id*. at 740-41.

36. *Id*. at 741.

37. Karmel, *supra* note 33, at 162.

38. *Report of Special Study of Securities Markets of the Securities and Exchange Commission,* H.R. DOC. NO. 88–95, pt. 1, at 151 (1st Sess. 1963).

39. Marianne K. Smythe, *Government Supervised Self-Regulation in the Securities Industry and the Antitrust Laws: Suggestions for an Accommodation*, 62 N.C. L. REV. 475, 485 (1984).

40. SRO Concept Release, *supra* note 3, at 71,258.

rather that self-regulation should not only be maintained, but strengthened.[41]

Self-regulation was questioned again in the early 1970s in reaction to a major market failure often referred to as the "paper crunch."[42] Until the 1970s, most securities firms had a team of clerks that handled securities transfers using a manual certificate system.[43] This was a tedious process involving a substantial amount of paperwork.[44]

As trading volumes increased during the bull market of the 1960s, it became "virtually impossible to transfer stock certificates quickly enough to keep up with ongoing trading."[45] The NYSE's daily trading volume quadrupled between 1960 and 1968, yet the industry made no serious effort to increase the efficiency of settlement activity.[46] Firms became so backed up that by 1969 unperformed obligations could range from 70% to 200% of a firm's total assets.[47] Strong cash flows allowed firms to cover short positions caused by missing securities through open market purchases.[48] But as the market took a downturn in 1970, firms' working capital took a hit, and they were forced to default.[49] The manual certificate system had paralyzed the markets while the industry idly stood by.[50]

This so-called "paper crunch" resulted in the demise of over a hundred brokerage firms, which either entered bankruptcy or were acquired by stronger competitors.[51] Moreover, the SROs leading the market had done virtually nothing to stop the crisis.[52] The response was the enactment of the 1975 Securities Reform Act (the "Reform Act").[53]

The Reform Act, among other things, gave the SEC the power to initiate and approve SRO rulemaking, expanded the Commission's role in enforcement and discipline, and allowed it to "play an active role in structuring the market."[54] The Act also eliminated the differences

41. *Id.*

42. David C. Donald, *Heart of Darkness: The Problem at the Core of the U.S. Proxy System and Its Solution*, 6 VA. L. & BUS. REV. 41, 50 (2011).

43. *Id.*

44. *Id.* ("A study performed by North American Rockwell Information Systems at that time found that brokers might use an average of 33 different forms for a single security transfer." (quoting SEC, Study of Unsafe and Unsound Practices of Brokers and Dealers, H.R. DOC. NO. 92–231, pt. 24 (1971))).

45. Emily I. Osiecki, Alabama By-Products Corp. v. Cede & Co.: *Shareholder Protection Through Strict Statutory Construction*, 22 DEL. J. CORP. L. 221, 224.

46. Donald, *supra* note 42, at 50.

47. *Id.* at 50-51.

48. *Id.* at 51.

49. *Id.*

50. Osiecki, *supra* note 45, at 224.

51. Donald, *supra* note 42, at 50.

52. *Id.* at 50-51.

53. Friedman, *supra* note 23, at 742.

54. *Id.* (internal quotation marks omitted) (quoting Roberta S.

between the SEC's oversight of the NASD and the exchanges.[55] Thus, the Reform Act did not attempt an overhaul of the SRO system of market regulation but rather maintained the self-regulatory regime while broadening SEC supervisory authority. Congress believed that although SROs had not always performed their role up to expectations, the self-regulatory system had "worked well and 'should be preserved and strengthened.'"[56]

Perhaps, as the legislative history suggests, it was not so much that the system worked well but more that Congress did not believe the federal government was capable of regulating the markets itself.[57] Congress stated as the reason for maintaining the SRO system, "the sheer ineffectiveness of attempting to assure [regulation] directly through the government on a wide scale."[58] Thus, Congress found, "it was 'distinctly preferable' to rely on 'cooperative regulation, in which the task will be largely performed by representative organizations of investment bankers, dealers, and brokers, with the Government exercising appropriate supervision in the public interest, and exercising supplementary powers of direct regulation.'"[59]

II. ABSOLUTE IMMUNITY FOR SROS

Absolute immunity is the strongest form of immunity an individual may seek, providing unconditional protection from civil liability, even where malice, corruption, and fraud are present.[60] Although "[i]t is well established that government officials are entitled to some form of immunity from suits for damages,"[61] *absolute* immunity is reserved for certain public functions that "require a greater degree of protection than qualified immunity can provide."[62] Accordingly, courts have considered the nature of the governmental functions being performed and extended absolute immunity to judges, administrative law judges, and prosecutors.[63]

Karmel, *Securities Regulation: Should the New York Stock Exchange Be Reorganized?*, 230 N.Y. L.J. 3 (2003)).

55. *Id.*

56. SRO Concept Release, *supra* note 3, at 71,258 (quoting S. REP. 94-75, at 23 (1975), *reprinted in* 1975 U.S.C.C.A.N. 179, 201).

57. *Id.* (internal quotation marks omitted) (quoting S. REP. 94-75, at 22 (1975), *reprinted in* 1975 U.S.C.C.A.N. 179, 201).

58. *Id.*

59. *Id.* at 71,257-58 (citing S. REP. NO. 94-75 (1975), *reprinted in* 1975 U.S.C.C.A.N. 179, 181).

60. Rohit A. Nafday, *From Sense to Nonsense and Back Again: SRO Immunity, Doctrinal Bait-and-Switch, and a Call for Coherence*, 77 U. CHI. L. REV. 847, 855 (2010).

61. Barbara v. New York Stock Exch., Inc., 99 F.3d 49, 58 (2d Cir. 1996) (internal quotation marks omitted).

62. *Id.*

63. *Id.*

Absolute immunity has also been extended to SROs and their officers for private damages suits arising out of a SRO's discharge of its regulatory, adjudicatory, and prosecutorial authority.[64] Although stock exchanges are private, immunity doctrines may be extended to private actors when performing important governmental functions.[65] Because SROs perform a variety of governmental functions, but do not enjoy the sovereign immunity afforded to governmental agencies, they are protected by absolute immunity when performing their statutorily delegated authority.[66] This extends both to exercise and *nonexercise* of an SRO's governmental powers–its adjudicatory, regulatory, and prosecutorial functions.[67] Additionally, courts have continued to entertain the absolute immunity defense in actions against stock exchanges, even after demutualization.[68]

A. Broad Grant of Absolute Immunity for Stock Exchanges

Stock exchanges, in performing their SEC-delegated SRO duties, have commonly enjoyed immunity from suit.[69] Courts have "not hesitated to extend the doctrine of absolute immunity to private entities engaged in *quasi-public.*" activities, given the regulatory nature of performing such functions.[70] Although SRO absolute immunity was initially limited to "quasi-judicial" functions, courts have expanded the doctrine over time to apply to all quasi-governmental activities, thus providing SROs with absolute immunity for not only prosecutorial and adjudicatory functions but for all regulatory functions as well.[71]

As explained by the U.S. District Court for the District of Colombia ("D.C. District Court") in a 2007 case against the NASD, absolute immunity for SROs was initially recognized only for an exchange's

64. Weissman v. Nat'l Ass'n of Sec. Dealers, Inc., 500 F.3d 1293, 1297 (11th Cir. 2007); Standard Inv. Chartered, Inc. v. Nat'l Ass'n of Sec. Dealers, Inc., 637 F.3d 112, 115 (2d Cir. 2011).

65. *Barbara*, 99 F.3d at 58.

66. *Weissman*, 500 F.3d at 1296.

67. *In re* NYSE Specialists Sec. Litig., 503 F.3d 89, 98 (2d. Cir. 2007); *Weissman*, 500 F.3d at 1296.

68. *See NYSE Specialists*, 503 F.3d at 98; *see also Standard Inv.*, 637 F.3d at 112; *Weissman*, 500 F.3d at 1293. "Demutualization" refers to the process by which stock exchanges transformed from non-profit member-owned organizations to for-profit shareholder-owned corporations. Demutualization of the stock exchanges is discussed in detail in section III below.

69. D'Alessio v. New York Stock Exch., Inc., 258 F.3d 93, 104 (2d Cir. 2001); see also *Barbara*, 99 F.3d 49; Sparta Surgical Corp. v. Nat'l Ass'n of Sec. Dealers, Inc., 159 F.3d 1209, 1215 (9th Cir. 1998); Zandford v. Nat'l Ass'n of Sec. Dealers, Inc., 80 F.3d 559, 559 (D.C. Cir. 1996); Austin Mun. Sec., Inc. v. Nat'l Ass'n of Sec. Dealers, Inc., 757 F.2d 676, 692 (5th Cir. 1985).

70. *D'Alessio*, 258 F.3d at 105.

71. Nafday, *supra* note 60, at 862.

exercise of its disciplinary function.[72] In discussing the evolution of SRO immunity, the D.C. District Court referred to a 1985 Fifth Circuit case, *Austin Mun. Sec., Inc. v. Nat'l Ass'n of Sec. Dealers, Inc.*, which involved claims against the NASD and its disciplinary arm.[73] There, as the first court to consider the "extent of immunity for disciplinary officers of a Congressionally-mandated self-regulatory organization," the Fifth Circuit performed its analysis "guided . . . by Supreme Court decisions concerning the immunity of judges, prosecutors, and executive disciplinary officials."[74] The *Austin* court concluded that the NASD and its disciplinary arm were absolutely immune "for actions within the scope of their disciplinary duties, which were essentially adjudicatory and prosecutorial in nature."[75]

Other courts followed suit, "borrow[ing] official-immunity principles to confer absolute immunity on SROs for suits arising out of their disciplinary activities."[76] In *Zandford v. Nat'l Ass'n of Sec. Dealers, Inc.*, the D.C. District Court granted absolute immunity to the NASD from liability for prosecutorial and adjudicative acts.[77] Similarly, in *Barbara v. New York Stock Exch., Inc.*, the Second Circuit, persuaded by the reasoning in *Austin*, held that the NYSE was "absolutely immune from damages claims arising out of the performance of its federally-mandated conduct of disciplinary proceedings."[78]

In finding that "absolute immunity is particularly appropriate in the unique context of the self-regulation of the national securities exchanges," the *Barbara* court placed great weight on the fact that, under the Exchange Act, stock exchanges perform many functions as SROs that would otherwise be performed by the SEC.[79] In affording this protection to SROs, the court was influenced by the nature of the SROs' "special status and connection" to the SEC.[80] The court explained that because the SEC would receive sovereign immunity protection for performance of the very same duties it delegates to the SROs, the SROs ought to receive the same protections.[81] Furthermore, allowing suits against SROs that arise out of performance of governmental duties would "'stand[ ] as an obstacle to the accomplishment and execution of the full purposes and objectives of Congress,' namely, to encourage forceful self-

72. *In re* Series 7 Broker Qualification Exam Scoring Litig., 510 F. Supp. 2d 35, 39 (D.D.C. 2007).

73. *Id.*

74. *Id.* at 39 (citing Austin Mun. Sec., Inc., 757 F.2d at 686).

75. *Id.* at 40 (citing Austin Mun. Sec., Inc., 757 F.2d at 689-91).

76. *Id.*

77. Zandford v. Nat'l Ass'n of Sec. Dealers, Inc., 30 F. Supp. 2d 1, 16-18 (D.D.C. 1998).

78. Barbara v. N.Y. Stock Exch., Inc., 99 F.3d 49, 58 (2d Cir. 1996).

79. *Id* at 59.

80. *Id.*

81. *Id.*

regulation of the securities industry."[82]

Although *Barbara* involved claims surrounding the NYSE's *disciplinary* function, it laid the groundwork for the expansion of absolute immunity to cover all "quasi-governmental" activities.[83] In the years following the 1996 *Barbara* decision, the Ninth and Second Circuits, relying on *Barbara*, extended absolute immunity beyond the scope of an SRO's adjudicatory and prosecutorial functions to include all regulatory activities.[84]

In the 1998 action, *Sparta Surgical Corp. v. Nat'l Ass'n of Sec. Dealers, Inc.*, the Ninth Circuit granted regulatory immunity to the NASD and the NASDAQ ("National Association of Securities Dealers Automated Quotations") for claims involving the SRO's temporary de-listing and suspension of trading in the plaintiff's stock.[85] Recognizing that the activities in question were not adjudicatory or prosecutorial acts, the *Sparta* court believed that the extension of absolute immunity to an SRO's "quasi-governmental functions was consistent with the Congressional grant of "enormous discretionary authority concerning stock listing and de-listing."[86] Citing *Barbara* for the proposition that "self-regulatory organizations have been granted immunity from suit when acting in a *quasi-governmental* capacity," the Ninth Circuit held that SROs are entitled to absolute immunity whenever "they are acting under the aegis of the Exchange Act's delegated authority."[87]

The Second Circuit also relied on its *Barbara* opinion when it extended absolute immunity beyond prosecutorial and adjudicatory functions in *D'Alessio v. New York Stock Exch., Inc.*[88] There, the court rejected the plaintiff's attempt to limit absolute immunity to disciplinary functions, reading *Barbara* to stand for the broad proposition that an SRO "may be entitled to immunity from suit for conduct falling within the scope of the SRO's *regulatory and general oversight functions*."[89] The court held, therefore, that when acting in its capacity as an SRO, an exchange is entitled to immunity "when it engages in conduct *consistent* with the quasi-governmental powers delegated to it."[90]

D'Alessio not only extended absolute immunity, but also laid the groundwork for the Second Circuit's outright refusal to carve out a fraud

82. *Id.* (quoting Hines v. Davidowitz, 61 S. Ct. 399 (1941) (citations omitted)).

83. *In re* Series 7 Broker Qualification Exam Scoring Litig., 510 F. Supp. 2d 35, 41 (D.D.C. 2007).

84. *Id.*

85. Sparta Surgical Corp. v. Nat'l Ass'n of Sec. Dealers, Inc., 159 F.3d 1209, 1210 (9th Cir. 1998).

86. *Id.* at 1214.

87. *Id.* (emphasis added).

88. D'Alessio v. New York Stock Exch., Inc., 258 F.3d 93 (2d Cir. 2001).

89. *Id.* at 105 (emphasis added).

90. *Id.* at 106 (emphasis added).

exemption from SRO immunity. In the 2005 *DL Capital* case against the NASDAQ, the plaintiffs alleged fraud in the form of a material omission on grounds that the exchange failed to timely announce that it would cancel all trades that took place during a certain period in which erroneous orders had been placed.[91] This allegedly resulted in losses to the plaintiff.[92]

In finding that absolute immunity was appropriate even in cases of fraud, the *DL Capital* court relied on *D'Alessio* for precedent, stating that, there, it had implicitly held that SROs were absolutely immune from fraud claims because it "upheld the dismissal of all the plaintiffs' claims even though one of the claims was for 'fraudulent deceit and concealment.'"[93] The court further reasoned that a fraud exemption would leave exchanges too open to litigation, giving plaintiffs a method of circumventing absolute immunity simply by alleging fraud.[94] The court then cited to *D'Alessio* again, explaining that "rejecting a fraud exception is a 'matter not simply of logic but of intense practicality since [otherwise] the [SRO's] exercise of its quasi-governmental functions would be unduly hampered by disruptive and recriminatory lawsuits.'"[95]

The Second Circuit revisited the exemption in a 2007 case against the NYSE for its alleged complicity with regard to specialist firms'[96] market manipulation and self-dealing.[97] In *NYSE Specialists*, the court held that absolute immunity applies as long as the alleged misconduct was governmental in nature.[98] Citing *DL Capital*, the court explained that "allegations of bad faith, malice, and even fraud-all of which may be relevant to a qualified immunity analysis-cannot, except in the most unusual of circumstances, overcome absolute immunity."[99] Thus, "immunity depends only on whether specific acts and forbearances were incident to the exercise of regulatory power, and not on the propriety of those actions or inactions."[100]

91. DL Capital Grp., LLC v. NASDAQ Stock Mkt., Inc., 409 F.3d 93, 96 (2d Cir. 2005).

92. *Id.* at 96.

93. *Id.* at 98 (quoting *D'Alessio*, 258 F.3d at 97).

94. *Id.* at 99. Notably, the opinion did not discuss the strict pleading requirements for securities fraud claims that might otherwise mitigate the litigation problem. *See, e.g.*, Tellabs, Inc. v. Makor Issues & Rights, Ltd., 551 U.S. 308, 309-10 (2007).

95. *DL Capital Grp.*, 409 F.3d at 99 (quoting D'Alessio v. New York Stock Exch., Inc., 258 F.3d 93, 105 (2d Cir. 2001)).

96. "A specialist is a 'dual trader' who either brokers orders for its clients (investors) or fills orders for these clients from its own inventory. Specialists are known by different names in different markets. They are often referred to as market makers." Nan S. Ellis et al., *The NYSE Response to Specialist Misconduct: An Example of the Failure of Self-Regulation*, 7 BERKELEY BUS. L.J. 102, 105 (2010).

97. *In re* NYSE Specialists Sec. Litig., 503 F.3d 89, 101 (2d. Cir. 2007).

98. *Id.*

99. *Id.* at 101.

100. *Id.* at 98.

The *NYSE Specialists* court also clarified that SROs enjoy absolute immunity for both action and inaction, rejecting the argument that in failing to act, the NYSE abandoned its regulatory duties and was therefore not entitled to immunity.[101] Thus, absolute immunity extends even to an exchange's failure to act.

The Ninth and Second Circuits' broad reading of *Barbara* allowed the courts to expand the immunity afforded to exchanges to encompass activities well beyond the scope of disciplinary functions. "What had historically been a narrowly drawn protection intended to protect those officials engaged in quasi-judicial proceedings had become, in two decades, a near blanket protection for almost any sort of activity in which a SRO might engage."[102] The resulting standard is that an SRO is objectively entitled to absolute immunity for any action or inaction consistent with its delegated governmental power.

B. Immunity Analysis – Governmental v. Private Actions

Under the case law, the inquiry for an SRO's absolute immunity is whether the conduct in question is governmental or private in nature and function. Applying an objective test, courts focus on "the nature of the function performed, not the identity of the actor who performed it."[103] Thus, an SRO is not protected by absolute immunity with respect to non-governmental actions in which the entity is acting in its own interest, as a *private* entity.[104]

Additionally, given the substantial protection provided by absolute immunity, courts have cautioned that the doctrine "is of a rare and exceptional character,"[105] and, therefore, courts must consider the grant of immunity on a case-by-case basis, and the party claiming immunity– the SRO–"bears the burden of demonstrating its entitlement."[106] To invoke the shield of absolute immunity, therefore, an SRO must show that its conduct (or misconduct) was governmental in nature and function.[107]

Calling this a "burden," however, is a stretch in light of the Second Circuit's propensity to attach immunity to essentially any activity that

101. *Id.* at 97.

102. Nafday, *supra* note 60, at 868.

103. NYSE Specialists, 503 F.3d at 96 (citing Forrester v. White, 484 U.S. 219, 229 (1988)).

104. Weissman v. Nat'l Ass'n of Sec. Dealers, Inc., 500 F.3d 1293, 1297 (11th Cir. 2007).

105. Standard Inv. Chartered, Inc. v. Nat'l Ass'n of Sec. Dealers, Inc., 637 F.3d 112, 115 (2d Cir. 2011) (citing Barrett v. United States, 798 F.2d 565, 571 (2d Cir. 1986)).

106. *NYSE Specialists*, 503 F.3d at 96 (citing D'Alessio v. N.Y. Stock Exch., Inc., 258 F.3d 93, 104 (2d Cir. 2001)).

107. *See Standard*, 637 F.3d at 115-116.

relates in some way to an SRO's regulatory authority.[108] The court and others following it have allowed exchanges, as SROs, to shield themselves from liability for any action that is "incident to"[109] or "consistent with"[110] an exchange's quasi-governmental power.

Under this broad standard, the Second Circuit has granted absolute immunity to exchanges with respect to all of the following activities:

> (1) disciplinary proceedings against exchange members; (2) the enforcement of security rules and regulations and general regulatory oversight over exchange members; (3) the interpretation of the securities laws and regulations as applied to the exchange or its member; (4) the referral of exchange members to the SEC and other government agencies for civil enforcement or criminal prosecution under the securities laws; and (5) the public announcement of regulatory decisions.[111]

The Second Circuit lengthened the list in its 2011 *Standard* opinion, adding "an SRO's amendment of its bylaws where . . . the amendments are inextricable from the SRO's role as a regulator."[112] There, the claim arose out of an alleged misstatement in a proxy solicitation for votes to amend the NASD's bylaws in order to complete consolidation with the NYSE's regulatory arm to form the Financial Industry Regulatory Authority ("FINRA").[113] Recognizing that the consolidation was a regulatory act, the court found that because the amendment was necessary to achieve the regulatory act of consolidation, the proxy solicitation fell within the scope of the exchange's quasi-governmental powers, and therefore absolute immunity attached.[114] Failing to provide a clear test for or definition of quasi-governmental conduct, the court simply noted that the common thread in the activities listed is that "absolute immunity attaches where the activity 'relates to the proper functioning of the regulatory system.'"[115]

The Eleventh Circuit provided some guidance as to the private versus governmental inquiry in *Weissman v. NASD*. Nevertheless, the

108. The Second Circuit is particularly important to this discussion because it has decided the vast majority of SRO immunity cases, as the NYSE and NASDAQ are both located in the Second Circuit. *See, e.g.*, *Standard*, 637 F.3d at 112; *NYSE Specialists*, 503 F.3d at 89; DL Capital Grp., LLC v. NASDAQ Stock Mkt., Inc., 409 F.3d 93 (2d Cir. 2005); *D'Alessio*, 258 F.3d at 93.

109. *Standard*, 637 F.3d at 116.

110. *D'Alessio*, 258 F.3d at 106.

111. Standard Inv. Chartered, Inc. v. Nat'l Ass'n of Sec. Dealers, Inc., 637 F.3d 112, 116 (2d Cir. 2011) (citations omitted).

112. *Id.*

113. *Id.*

114. *Id.* at 116-17.

115. *In re* NYSE Specialists Sec. Litig., 503 F.3d 89, 96 (2d. Cir. 2007) (quoting *D'Alessio*, 258 F.3d at 106).

difficulty in determining what is "quasi-governmental" is apparent in this en banc decision where an eight-judge majority found that an exchange's conduct was not "quasi-governmental," leaving four judges who thought otherwise to dissent.[116] In *Weissman,* the Eleventh Circuit excluded marketing activities from the guise of "regulatory" functions that enjoy immunity.[117] In performing its analysis, the court looked to "the objective nature and function of the activity"[118] and refused to grant immunity to the NASD for actions that the court deemed to be private.[119]

In *Weissman*, the plaintiff alleged that the NASDAQ's publication of certain advertisement fraudulently induced him to purchase WorldCom stock.[120] The court "made clear that when an SRO is 'performing duties that pertain to the exercise of those private franchises, powers, and privileges which belong to them for their own corporate benefit,' the SRO, like a for-profit corporation, will not be entitled to immunity."[121] The court then provided an immunity analysis, distinguishing regulatory actions such as "implementing and effectuating compliance with securities laws; promulgating and enforcing rules governing the conduct of its members; and listing and de-listing stock offerings," from non-governmental actions that serve private business interests such as "efforts to increase trading volume and company profit" and "daily administration and management of other business affairs."[122]

The Eleventh Circuit concluded that the NASDAQ could not invoke absolute immunity to dismiss the complaint because the allegations did not relate to the exchange's "statutorily delegated responsibility to 'prevent fraudulent and manipulative . . . practices,' 'promote just and equitable principles of trade,' 'remove impediments to and prefect the free market, or protect investors and the public interest.'"[123] And, importantly, the *Weissman* court noted that absolute immunity applies only to "activities involving an SRO's performance of regulatory, adjudicatory, or prosecutorial duties *in the stead of the SEC*."[124]

116. Weissman v. Nat'l Ass'n of Sec. Dealers, Inc., 500 F.3d 1293 (11th Cir. 2007).

117. *Id.*

118. *Id.* at 1297.

119. *Id.* at 1299.

120. *Id.* at 1294-95. *See generally* Simon Romero & Riva D. Atlas, *WorldCom's Collapse: The Overview; WorldCom Files for Bankruptcy; Largest U.S. Case*, N.Y. TIMES (July 22, 2002), www.nytimes.com/2002/07/22/us/worldcom-s-collapse-the-overview-worldcom-files-for-bankruptcy-largest-us-case.html (WorldCom, "plagued by the rapid erosion of its profits and an accounting scandal that created billions in illusory earnings," filed for bankruptcy in 2002).

121. Craig J. Springer, Weissman v. NASD*: Piercing the Veil of Absolute Immunity of an SRO Under the Securities Exchange Act of 1934*, 33 DEL. J. CORP. L. 451, 460 (2008) (citing Weissman v. Nat'l Ass'n of Sec. Dealers, Inc., 500 F.3d 1296 (11th Cir. 2007)).

122. *Weissman*, 500 F.3d at 1296.

123. *Id.* at 1299 (quoting 15 U.S.C. § 78*o*-3(b)(6) (2006)).

124. *Id.* at 1298.

In another 2007 case, *Opulent Fund v. NASDAQ Stock Mkt., Inc.*,[125] the Northern District of California also shed some light on the distinction between governmental and private conduct. There, the court agreed with the plaintiffs that pricing an index was not a "regulatory function," and therefore did not deserve absolute immunity.[126] Considering the *Weissman* court's "in the stead of the SEC" language, the court noted that the SEC "would not create an index and volunteer to disseminate pricing data if Nasdaq did not exist," and that "in choosing to create the index and disseminate the price information, Nasdaq 'represents no one but itself.'"[127] The court then explained that the NASDAQ's conduct did not serve to protect investors, which might fall within its delegated duty of "monitoring its market carefully *to protect the investing public*," but rather functioned to "create a market and increase trading."[128] Finding that the NASDAQ's conduct did not share the "same 'regulatory' character as suspending trading, banning traders, or carrying out disciplinary actions," the court held that the actions in question were *private*, and therefore not "cloaked with absolute immunity."[129]

The analyses performed by the courts in *Weissman* and *Opulent Fund* indicate a narrower standard than the Second Circuit. This stricter standard places weight on an SRO's "stepping into the shoes of the SEC," and includes consideration of whether the SEC, as a regulator, would itself have performed the actions in question. This inquiry is helpful in determining whether an action is "regulatory" in nature, and serves to limit the grant of absolute immunity to only actions the SEC itself would take.

III. ABSOLUTE IMMUNITY IN A DEMUTUALIZED SRO SYSTEM

Over time, and especially since the turn of the 21st century, stock exchanges have started to look more like private, for-profit entities, and most of them have demutualized.[130] Although the SEC continues to revisit SRO status for stock exchanges through processes such as concept releases, in which the Commission seeks comments from the public, as of the date of this note, the exchanges continue to receive the benefits of

125. Opulent Fund v. NASDAQ Stock Mkt., Inc., No. C-07-03683 RMW, 2007 WL 3010573 (N.D. Cal. Oct. 12, 2007).

126. *Id.* at 5.

127. *Id.* (quoting *Weissman*, 500 F.3d at 1299).

128. *Id.* (emphasis added).

129. *Id.*

130. Dan Mathisson, *Above the Law, What Exchanges and Kings Have in Common*, TRADERS MAGAZINE, August 2012, *available at* http://www.tradersmagazine.com/issues/25_341/rules-exchanges-ats-mathisson-110176-1.html; Nina Mehta, *Nasdaq Exchange Immunity May Limit Losses From Facebook Claim*, BLOOMBERG, (June 12, 2012, 10:00 PM), http://www.bloomberg.com/news/2012-06-13/nasdaq-exchange-immunity-may-limit-losses-from-facebook-claims.html.

SRO status.[131]

A. Demutualization

Beginning in the early 1990s, with the demutualization of the Stockholm Stock Exchange, most major stock exchanges worldwide have changed their membership structure into a share ownership structure.[132] Major American stock exchanges began demutualizing, with regulatory approval, at the turn of the 21st Century.[133] The Chicago Mercantile Exchange was first to demutualize in 2000, followed by its IPO in 2003, in which it listed its shares on the NYSE.[134] Others followed, including the NASDAQ and the NYSE.

In mid-1999, announcements by the NASDAQ[135] and the NYSE of their intentions to demutualize sparked a debate amongst regulators, academics, and members of the financial community regarding whether the markets would continue to be able to perform their SRO duties.[136] Major concerns included (1) regulation by a for-profit, shareholder-owned SRO of "entities like broker-dealers who in turn have ownership stakes in competitive rivals such as ECNs" (Electronic Communication Networks), and (2) whether "the altered economics of being a for-profit, shareholder owned exchange [would] affect an exchange's ability to effectively regulate itself."[137] Regardless of these concerns, however, both entities demutualized by 2006, with SEC approval.[138]

Initially, the NYSE decided to postpone demutualization. However, in early 2006, upon approval from the SEC, the NYSE acquired Archipelago Holdings Inc., an all-electronic exchange, and became a publicly traded company.[139] This "end[ed] the exchange's 213-year history as a member-owned association."[140] The NASDAQ, on the other

131. *See, e.g.*, SRO Concept Release, *supra* note 3.

132. PAMELA S. HUGHES & EHSAN ZARGAR, EXCHANGE DEMUTUALIZATION, May 1, 2006, at 5-7, *available at* http://www.scribd.com/doc/60628391/Paper-Exchange-Demutualization-May2006.

133. *Id.* at 7.

134. *Id.*

135. GARY SHORTER, CONG. RESEARCH SERV., RS21193, NASDAQ'S PURSUIT OF EXCHANGE STATUS AND AN INITIAL PUBLIC OFFERING 1 (2005) (The NASDAQ stock market is an all-electronic trading facility that, unlike traditional stock exchanges like the NYSE, has no trading floor and facilitates trading of over-the-counter stocks through electronically connected market makers. The NASDAQ was originally a wholly-owned for-profit subsidiary of the nonprofit SRO, the NASD).

136. *Id.* at 2.

137. *Id.*

138. Hughes & Zargar, *supra* note 132, at 9.

139. Reena Aggarwal & Sandeep Dahiya, *Demutualization and Public Offerings of Financial Exchanges*, Nov. 6, 2005, at 2, *available at* http://faculty.msb.edu/aggarwal/exchanges.pdf; Hughes & Zargar, *supra* note 132, at 9; SHORTER, *supra* note 135, at 2.

140. Hughes & Zargar, *supra* note 132, at 9.

hand, stayed its course from the beginning and in 2000, upon membership approval, the non-profit NASD spun off the for-profit NASDAQ and converted it into a shareholder-owned market.[141] Subsequently, a three-step process toward demutualization ensued: (1) issuance of privately placed stock; (2) conversion into exchange status[142]; and (3) issuance of public stock.[143] Given, among other things, the concern arising from the fact that once approved as an exchange, the NASDAQ would be its own SRO, the SEC took roughly five years to consider the NASDAQ's application to become a registered securities exchange, which it approved in January 2006.[144]

Through demutualization, "a quasi-governmental institution is transformed into a profit-oriented publicly traded company."[145] The resulting, restructured exchange is controlled by shareholders, which "effectively separates ownership from trading privileges as stockbrokers become the exchange's *customers* and are no longer required to be owners."[146] In addition to the separation of trading and membership rights, in most cases, demutualization also allows outside ownership of the exchange.[147] Introducing the possibility of outside ownership is indicative of an exchange's post-demutualization profit motive, as the exchange now has shareholders seeking profitability.[148] "Thus a demutualized exchange may be understood to have a corporate set up with profit motive."[149]

The SEC has expressed concern that as a result of increased competition among stock markets, "the markets that SROs operate will continue to come under increased pressure to attract order flow.[150] This business pressure can create a *strong conflict* between the SRO regulatory and market operations functions."[151] Moreover, due to continued growth in inter-market competition, there are increasingly more options for where to direct order flow, which may cause SRO staff to be "less inclined to enforce vigorously SRO rules that would cause large liquidity providers to redirect order flow."[152] A clear conflict exists

141. SHORTER, *supra* note 135, at 3.

142. At that point, because the NASDAQ was operated by the NASD, it was exempt from "exchange" status under the Exchange Act. *Id.* at 3.

143. *Id.*

144. Hughes & Zargar, *supra* note 132, at 9; SHORTER, *supra* note 135, at 4.

145. Hughes & Zargar, *supra* note 132, at 6.

146. *Id.* at 7 (emphasis added).

147. Subhashish Saha, Stock Exchange Demutualization and Self Regulation, Indian Institute of Capital Markets 9th Capital Markets Conference Paper, 5 (Sept. 5, 2005), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=877806.

148. *Id.*

149. *Id.*

150. SRO Concept Release, *supra* note 3, at 71,261.

151. *Id.* at 71,261-62 (emphasis added).

152. *Id.* at 71,262.

between an SRO's responsibility to maximize profits for shareholders while at the same time discharging their regulatory duties.

Furthermore, over time, many of these regulatory duties are no longer performed by the exchanges themselves, who now rely on FINRA to regulate.[153] As of July 2012, "every exchange except BATS outsources all or most of its regulatory responsibilities to [FINRA]."[154] These demutualized, shareholder-controlled, profit-seeking entities, having delegated away their regulatory responsibilities, are more akin to for-profit corporations than their predecessor non-profit, member-owned SROs.[155]

The transformation of exchanges into private, for-profit entities calls into question whether they should maintain their status as SROs.[156] In the aftermath of the 2012 Facebook IPO software malfunction, Christopher Nagy, former head of order-routing for TD Ameritrade and now a consultant to brokers and exchanges, commented, "this raises once again the question of whether our nation's exchanges should be allowed to operate as for-profit, publicly traded companies rather than public utilities, as they historically had been run."[157] To date, however, the exchanges have not been stripped of their SRO status, thus maintaining[158] "absolute immunity from private damages suits in connection with the discharge of their regulatory responsibilities."[159]

B. Policy Implications

Demutualization of the exchanges presents the issue of "whether a commercial entity carrying on the business of running an exchange and seeking to protect and promote its business can continue to support the integrity and efficiency of the trading markets by setting and enforcing appropriate regulations in the public interest."[160] The SEC has warned that "SRO demutualization raises the concern that the profit motive of a shareholder-owned SRO could detract from proper self-regulation."[161]

153. Mathisson, *supra* note 130; Stephen J. Nelson, *Commentary: FINRA's NYSE Reg Takeover – The End of an Era?*, TRADERS MAGAZINE (June 9, 2010), http://www.tradersmagazine.com/news/nyse-regulation-finra-richard-grasso-sec-105812-1.html.

154. Mathisson, *supra* note 130.

155. *See id.*; *see also* Nelson, *supra* note 153.

156. *See* Mehta, *supra* note 130; *see also* Mathisson, *supra* note 130.

157. Jacob Bunge, *Citi, in Letter to SEC, Blasts Nasdaq on Facebook*, WALL ST. J. (Aug. 22, 2012, 6:59 PM), http://online.wsj.com/article/SB10000872396390444270404577605714235711588.html.

158. Mathisson, *supra* note 130; *see also* Nelson, *supra* note 153.

159. Standard Inv. Chartered, Inc. v. Nat'l Ass'n of Sec. Dealers, Inc., 637 F.3d 112, 115 (2d Cir. 2011).

160. Roberta S. Karmel, *Turning Seats Into Shares: Causes and Implications of Demutualization of Stock and Futures Exchanges*, 53 HASTINGS L.J. 367, 420 (2002).

161. SRO Concept Release, *supra* note 3, at 71,263.

This conflict is intensified by a continued increase in inter-market competition, which puts pressure on SROs to attract deal flow.[162] As noted above, this business pressure creates a "strong conflict" between the regulatory and market operation functions of an SRO.[163]

The conflicted role of demutualized exchanges has brought about much debate regarding an overhaul of the SRO system. That issue, however, is not the focus of this paper.[164] Instead, in this section, I take as given that the self-regulation will remain, and argue that the immunity granted to SROs should be limited in order to balance the need for self-regulation with the conflicted incentives of profit-seeking, shareholder-owned SROs.

Demutualization has altered the motivations of stock exchanges. Because SROs are now for-profit, shareholder-owned organizations, they must act in the best interest of shareholders and seek to maximize profits and increase earnings.[165] At the same time, the exchanges are still charged with self-regulation and continue to enjoy the absolute immunity that they were granted in the pre-demutualization era.

Allowing demutualized exchanges to remain SROs creates a moral hazard problem. As SROs, the exchanges have been afforded broad absolute immunity for all quasi-governmental activities.[166] At the same time, the demutualized SROs, facing an increasing inter-market competition, are under pressure to attract deal flow and maximize profits for shareholders.[167] This combination creates a moral hazard in that the exchanges, with their absolute immunity in mind, will engage in excessively risky behavior in order to maximize profits, knowing that they will not face any liability as long as the conduct falls within the SRO's quasi-governmental powers.

The Second Circuit has held that an exchange, when acting in its capacity as an SRO, is "entitled to immunity from suit when it engages in conduct consistent with the quasi-governmental powers delegated to it pursuant to the Exchange Act and the regulations and rules promulgated thereunder."[168] An examination of the Exchange Act, therefore, is

162. *Id.*

163. *Id.* at 71,261-62.

164. For discussion of the SRO system, *see* SRO Concept Release, *supra* note 3; Onnig H. Dombalagian, *Self and Self-Regulation: Resolving the SRO Identity Crisis*, 1 BROOK. J. CORP. FIN. & COM. L. 317 (2007); Ellis, *supra* note 96; Saule T. Omarova, *Rethinking the Future of Self-Regulation in the Financial Industry*, 35 BROOK J. INT'L L. 665 (2010).

165. SRO Concept Release, *supra* note 3, at 71,263; *Computerized Trading Venues: What Should the Rules of the Road Be?: Before the S. Comm. on Banking, Housing, and Urban Affairs, Subcomm. on Securities, Insurance, and Investment*, 112th Cong. 11 (2012) (written testimony of Daniel Mathisson, Head of U.S. Equity Trading, Credit Suisse).

166. DL Capital Grp., LLC v. NASDAQ Stock Mkt., Inc., 409 F.3d 93, 99 (2d Cir. 2005).

167. SRO Concept Release, *supra* note 3, at 71,261-62.

168. D'Alessio v. N.Y. Stock Exch., Inc., 258 F.3d 93, 106 (2d Cir. 2001).

informative. Under the Exchange Act, SROs are charged with the following "statutorily-delegated" duties: (1) to prevent fraudulent and manipulative acts and practices; (2) to promote just and equitable principles of trade; (3) to foster cooperation and coordination with persons engaged in regulating, clearing, settling, processing information with respect to, and facilitating transactions in securities; (4) to remove impediments to and perfect the mechanism of a free and open market and a national market system, and (5) in general, to protect investors and the public interest.[169]

This broad list of powers coupled with the Second Circuit's "incident to" and "consistent with" language almost ensures that an exchange's actions will be protected by absolute immunity, especially given the objective nature of the analysis. As long as an exchange can show that the "function and nature" of the conduct underlying a claim is consistent with discharging any of the very general duties listed above, it will be able to invoke the absolute immunity shield, escaping liability in the preliminary stages of an action.

This system is flawed because it allows exchanges to engage in risky behavior without the threat of civil damages, thereby reducing the incentive to take important precautions. This is especially dangerous with respect to the exchanges' use of complex, high-speed technology to operate their trading systems. These innovations have vastly increased the amount of trading that goes on in a given second, which means not only more participants, but more transactions. As such, even one small error or glitch can have a major effect on the market, and can cause huge losses in a matter of minutes, as exhibited in the numerous malfunction disasters of the past few years.

May 6, 2010, the day of the infamous "Flash Crash," saw a breakdown in the market triggered by computer-trading system errors that caused stocks to plunge 10%.[170] Two years later, after months of planning and anticipation, a technical glitch at BATS Global Markets forced the exchange operator to withdraw its own IPO.[171] In early 2013, BATS was again plagued by technology, when a single programming error caused execution at the wrong price for some 435,000 trades, resulting in $420,000 in losses to traders.[172]

169. Securities Exchange Act of 1934, *supra* note 1, at § 78f(b)(5).

170. Scott Patterson, *Breakdown: A Glimpse Inside the 'Flash Crash'*, WALL ST. J. (June 10, 2012, 5:56 PM), http://online.wsj.com/article/SB10001424052702303296604577454330066039896.html.

171. Michael J. De La Merced, *BATS Chief on Friday's Troubles: 'My Stomach Sank'*, N.Y. TIMES DEALBOOK (Mar. 26, 2012, 12:11 AM), http://dealbook.nytimes.com/2012/03/26/bats-chief-on-fridays-meltdown-my-stomach-sank.

172. Nathaniel Popper, *Errors Mount at High-Speed Exchanges in New Year*, N.Y. TIMES (Jan. 10, 2013), http://www.nytimes.com/2013/01/11/business/in-new-year-errors-mount-at-high-speed-exchanges.html.

In May 2012, the NASDAQ suffered a glitch in the trading software it introduced to conduct Facebook's IPO, allegedly causing hundreds of millions of dollars in losses to traders.[173] A few months later, in August 2012, market-maker[174] Knight Capital had to be bailed out by financial firms, when a computer malfunction bombarded the equity exchanges with erroneous orders, resulting in losses of $457.6 million.[175] The Knight disaster was apparently attributable to "one line of code,"[176] a phrase that sums up the major effects trading software malfunctions can have on the market.

These examples illustrate the fact that technology glitches in trading software occur and can have a serious impact on the market, causing delay, confusion, and ultimately losses. While non-exchanges like Knight Capital must bear the burden of their losses,[177] exchanges like BATS, the NYSE, and the NASDAQ are protected by absolute immunity from civil damages, leaving them with less incentive to refrain from risky behavior with respect to computerized trading systems. Thus, exchanges may be less inclined to take all necessary precautions when introducing new trading technologies and may fail to respond properly to malfunctions. Why not take a risk when there is no potential for liability?

III. FACEBOOK IPO CASE STUDY

In this section, I examine the Facebook IPO software malfunction and the potential for liability. I first explain what actually happened on the day of the IPO. Next, I examine whether the NASDAQ might be liable under the current case law. I find that although the NASDAQ was acting in its own, *private* self-interest, it may be able to invoke absolute immunity by showing that its behavior was consistent with its statutorily delegated duties under the Exchange Act. I propose that because technological malfunctions can wreak havoc on markets, exchanges should be encouraged to act with utmost caution and care in

173. Mehta, *supra* note 130.

174. A market-maker is a "broker-dealer firm that accepts the risk of holding a certain number of shares of a particular security in order to facilitate trading in that security. Each market maker competes for customer order flow by displaying buy and sell quotations for a guaranteed number of shares. Once an order is received, the market maker immediately sells from its own inventory or seeks an offsetting order. This process takes place in mere seconds." *Market Maker Definition*, INVESTOPEDIA, http://www.investopedia.com/terms/m/marketmaker.asp#axzz2MWv5n32C (last visited Sept. 6, 2013).

175. Whitney Kisling, *Knight Capital Reports Net Loss After Software Error*, BLOOMBERG (Oct. 17, 2012, 9:58 AM), http://www.bloomberg.com/news/2012-10-17/knight-capital-reports-net-loss-as-software-error-takes-toll-1-.html.

176. Scott Patterson et al., *SEC Nixed Knight's Plea for a Do-Over*, WALL ST. J. (Aug. 6, 2012, 11:26 AM), http://online.wsj.com/article/SB10000872396390444246904577571113923528168.html.

177. Knight had to be bailed out by other firms. *Id*.

implementing and maintaining these systems and in responding to glitches. Therefore, the exchanges should face potential civil liability for negligence in operating, maintaining, and responding to malfunctions in the electronic trading systems they use to facilitate market transactions. The grant of absolute immunity for SROs fails to do this.

A. What happened with the Facebook IPO?[178]

After battling with NYSE for the listing, the NASDAQ won what was anticipated to be the biggest technology IPO in history–that of social media giant Facebook, Inc.[179] The company went public on May 18, 2012.[180] That morning, trading was supposed to begin at 11 A.M., but technical malfunctions, said to be caused by a "design flaw in Nasdaq's IPO auction mechanism," forced the NASDAQ to delay the IPO.[181]

The NASDAQ's system was set up to accept last-second modifications to orders.[182] As the orders kept coming in, the system reset the price over and over again.[183] Some of these orders were blocked while the NASDAQ tried to fix the system, and therefore were not executed, while others were placed at prices other than the opening bid price.[184] The effort to fix the system also prevented confirmations from being sent immediately to brokers, leaving many unsure of their position, i.e. how many shares they held.[185] As one market-maker put it, traders "were flying blind."[186]

Eventually, the NASDAQ manually overrode the system and switched to a backup server, and shares began trading at 11:30 A.M.—thirty minutes after the planned opening.[187] Over two hours later, confusion arose once more, as traders saw a sell order of roughly eleven million shares, which caused the stock price to drop from $42 to $40 in a

178. The description in this section is a simplified version of the complicated issues that took place during the Facebook IPO. For a more detailed description of the events, *see* Self-Regulatory Organizations; The NASDAQ Stock Market LLC; Order Instituting Proceedings To Determine Whether To Approve or Disapprove Proposed Rule Change To Amend Rule 4626—Limitation of Liability, Exchange Act Release No. 68,115, 77 Fed. Reg. 66,197 (Nov. 2, 2012).

179. Comment Letter from Citigroup Global Markets Inc. to the SEC 5 (Aug. 22, 2012), *available at* http://www.sec.gov/comments/sr-nasdaq-2012-090/nasdaq2012090-5.pdf [hereinafter "Citi Comment Letter"].

180. Mehta, *supra* note 130.

181. *Id.*; Ben Protess et al., *As Facebook Seeks Answers, S.E.C. Investigates Exchanges*, N.Y. TIMES DEALBOOK (June 21, 2012), http://dealbook.nytimes.com/2012/06/21/as-facebook-seeks-answers-s-e-c-investigates-exchanges.

182. Protess et al., *supra* note 181.

183. *Id.*

184. *Id.*; Mehta, *supra* note 130.

185. Protess et al., *supra* note 181.

186. *Id.*

187. *Id.*

matter of minutes.[188] This was the result of shares being dumped back into the market as the NASDAQ started to process trades that were backed up in the system.[189]

The NASDAQ OMX Group CEO Robert Greifeld has attributed the debacle to "a malfunction in the trading-system's design for processing order cancellations."[190] Although admitting "[t]his was not [the NASDAQ's] finest hour"[191] two days after the fiasco, Greifeld called the IPO "quite successful" overall, claiming that the technical issues did not affect the price of Facebook shares, which closed at $38.23 on opening day, roughly where it started.[192]

Regardless of whether the technical malfunctions affected the *price* of Facebook's stock—a debate that will continue for some time—the malfunctions caused order processing failures that resulted in investors and market-makers losing hundreds of millions of dollars.[193] While the NASDAQ has proposed settlements with the market-maker firms that trade on the exchange, retail investors have not been included in these proposals.[194] Additionally, the affected parties claim that the proposed payout is entirely insufficient to compensate losses.[195] Meanwhile, a class action suit has been filed on behalf of those whose retail orders, trades, and cancellations were mishandled, and who did not receive execution at accurate and fair prices or suffered other losses as a result of the NASDAQ's alleged negligence.[196]

B. Absolute Immunity Analysis

Industry experts say that the NASDAQ should have delayed the IPO until the software was properly tested, or, at least when faced with the malfunction, should have "halted, solved the problem and recommenced trading."[197] Regardless of this hindsight, industry experts believe that the exchange will be protected from civil damages by its SRO absolute

188. *Id*.

189. *Id*.

190. Jenny Strasburg et al., *Nasdaq's Facebook Problem; Exchange Says Glitches Affected Millions of Shares; IPO System to be Redesigned*, WALL ST. J. (May 21, 2012, 8:02 AM), http://online.wsj.com/article/SB10001424052702303610504577416530447015656.html.

191. *Id*.

192. Protess, *supra* note 181.

193. Mehta, *supra* note 130 (reporting estimates from $200M to over $350M).

194. Michael J. De La Merced & Nathaniel Popper, *Nasdaq Sets Aside $40 Million to Settle Facebook Claims*, N.Y. TIMES DEALBOOK (June 6, 2012, 2:08 PM), http://dealbook.nytimes.com/2012/06/06/nasdaq-sets-aside-40-million-to-settle-facebook-trading-claims.

195. *Id*.; Citi Comment Letter, *supra* note 179.

196. *See* Amended Class Action Complaint, Goldberg v. NASDAQ OMX Group, Inc., No. 12-CV-4054 (S.D.N.Y. June 12, 2012), 2012 WL 2365297.

197. Mehta, *supra* note 130.

immunity.[198] Attorney George Simon explains that while one could argue that demutualization makes the premise behind limiting liability no longer relevant, SRO immunity rules "are still in effect and courts . . . have honored them."[199] He further proclaims, "[i]f I were a betting person, I'd bet in favor of Nasdaq."[200] Moreover, the class action suit was filed in the Second Circuit, which has approached this issue broadly in favor of SROs retaining absolute immunity.[201]

If the case proceeds, given the Second Circuit's position that "immunity depends only on whether specific acts and forbearances were incident to the exercise of regulatory power, and not on the propriety of those actions or inactions,"[202] whether the NASDAQ acted negligently is not relevant to whether it will be shielded by absolute immunity. The question, rather, is whether the NASDAQ's alleged misconduct with respect to the Facebook IPO falls within the scope of the NASDAQ's quasi-governmental duties as an SRO.[203]

There appear to be two aspects to the NASDAQ's potential liability: first, the NASDAQ's introduction of new software to conduct an IPO, and second, the NASDAQ's response to the software malfunction. In attempting to invoke a shield of absolute immunity, an exchange such as the NASDAQ would argue that its conduct was consistent with its quasi-governmental duties pursuant to the Exchange Act. Given the Exchange Act's broad language, this may not prove a difficult task.

New IPO software, and trading software in general, could have numerous potential purposes. The software may increase speed, which allows more trades, making markets more efficient and accessible. Thus, the exchange could claim that because it improves efficiency and accessibility, the software was consistent with its duty to "remove impediments to and perfect the mechanism of a free and open market and a national market system" or its duty to "foster cooperation and coordination with persons engaged in regulating, clearing, settling, processing information with respect to, and facilitating transactions in securities."[204]

Similarly, an exchange's conduct in responding to a software malfunction could be shown to fall within the scope of its duties, as delegated by the Exchange Act. Given the potential harm a malfunction could cause to investors and the market, an exchange could easily claim that responding to a glitch is consistent with its duty to "remove

198. *Id*.
199. *Id*.
200. *Id*.
201. *See* Nafday, *supra* note 60, at 864.
202. *In re* NYSE Specialists Sec. Litig., 503 F.3d 89, 98 (2d Cir. 2007).
203. *See id*. at 96.
204. Securities and Exchange Act of 1934, 15 U.S.C.A. §78f(b)(5) (West 2012).

impediments to and perfect the mechanism of a free and open market and a national market system, and, in general, to protect investors and the public interest." [205] Additionally, absolute immunity would attach to a decision *not* to suspend trading when a glitch occurs, as a failure to act receives the same protection as an action.[206]

This result is problematic considering the incentives of a demutualized exchange. Because an objective test is applied in an absolute immunity analysis, an exchange's motives are not considered. Thus, if introducing new trading software is quasi-governmental under the reasoning provided above, then it would not matter that an exchange was entirely motivated by profits in introducing the software. Furthermore, because the inquiry stops at whether the conduct was governmental, there is no evaluation of the propriety of the conduct. Thus, an exchange could introduce software prone to problems without facing potential liability for taking such a risk.

Similarly, if responding to a malfunction is quasi-governmental, the motives behind and propriety of the exchange's conduct in doing so are not subject to scrutiny. It would matter only that the function of responding to a malfunction is governmental, and therefore entitled to absolute immunity. A court would not even consider that the exchange decided how to respond to the malfunction with an eye on maximizing profits rather than removing impediments to the free and open market or protecting investors. Without subjecting such decisions to judicial review and potential liability, an exchange may engage in risky behavior, such as allowing trading to continue on a malfunctioning system. As illustrated by the Facebook IPO, this would lead to major losses for traders, who may not be able to overcome a motion to dismiss on grounds of absolute immunity.

It is worth noting that there are some forces in place that mitigate risky behavior. First, the markets are increasingly competitive. Although not facing liability, exchanges could face losing deal flow. At the same time, however, increased competition also puts pressure on the exchanges to attract deal flow, which may encourage risky behavior. Second, exchanges derive profits from the execution of trades. If an exchange has to cancel trades because of a malfunction, they will also lose the profits derived from those trades. These losses, however, might be negligible when compared with potential damages in a civil case where numerous investors could lose millions of dollars. Thus, liability is still a necessary deterrent in mitigating risky behavior.

V. PRESCRIPTION FOR LIMITING IMMUNITY TO MITIGATE RISKY

205. *Id*.
206. *NYSE Specialists*, 503 F.3d at 97.

BEHAVIOR

In recent Congressional testimony, Credit Suisse's head of U.S. equity trading, Dan Mathisson, warned that "[i]t is a dangerous situation when a for-profit enterprise can cause half a billion dollars of losses for others, and not have the risk of being held legally liable."[207] This danger is moral hazard–exchanges have no incentive to guard against risky behavior if there is no potential downside to balance the upside. Without the potential for civil damages, an exchange may not think twice about introducing faulty software or failing to exercise caution in responding to a malfunction in hopes of increasing profits for shareholders in a highly competitive market.

The Second Circuit's broad quasi-governmental standard does not properly mitigate the moral hazard problem created by granting absolute immunity to demutualized exchanges, especially given the exchanges' reliance on highly complex technology and the potential losses to investors caused by the malfunction of these systems. To reduce the moral hazard problem, courts should adopt the test implied in *Weissman* and implemented in *Opulent Fund*, and limit absolute immunity to apply to only those actions that the SEC would itself engage in as a regulator. This test remains true to the premise that an SRO is entitled to immunity for activities involving its regulatory, adjudicatory, or prosecutorial functions, but limits the scope of what is "regulatory," moving away from the overly broad and undefined quasi-governmental standard.

Prosecutorial and adjudicatory functions are at the heart of the absolute immunity grant, and are not particularly affected by the changed incentives of demutualized exchanges.[208] Disciplinary activities do not yield profits, and, more importantly, FINRA, which is not a for-profit exchange, has taken on these disciplinary tasks on behalf of many of the exchanges. Accordingly, absolute immunity for prosecutorial and adjudicatory functions remains appropriate in a demutualized system.

The Second Circuit's extension of the absolute immunity doctrine to encompass regulatory actions, without limiting what is regulatory in nature and function, led to an overly broad grant of immunity to all activities deemed consistent with an SRO's quasi-governmental powers. As discussed above, this grant is too broad, especially in light of the Exchange Act's general language in its delegation of regulatory authority to SROs. This broad language allows exchanges too much latitude in invoking the absolute liability shield.

Instead, "regulatory" should be limited to only those actions the

207. *Computerized Trading Venues*, *supra* note 165, at 7.

208. The SEC did note that there is a potential increased incentive for inaction if disciplining a certain broker-dealer would somehow reduce deal flow, but did not find this to be a significant problem. SRO Concept Release, *supra* note 3, at 71,261-62.

SEC would take, since immunity is granted on the premise that when SROs step into the shoes of the SEC, they deserve the same protections afforded to the agency.[209] Thus, a court should consider whether the SEC would engage in the activity. Accordingly, because the SEC is charged with enforcement and rulemaking, any activities falling outside that scope should not be protected by absolute immunity. Therefore, because the SEC would not engage in facilitating markets, absolute immunity should not extend to exchanges for claims arising out of activities such as creating, operating, and maintaining trading software, processing orders, and executing trades. Such a test would mitigate the moral hazard by opening exchanges for liability with respect to activities, providing exchanges with an incentive to act with appropriate caution and care.

CONCLUSION

As innovation continues to improve technology and increase its presence in financial markets, technological issues will continue to occur. If the stock exchanges that facilitate market transactions are not held responsible for the operation and maintenance of the trading systems, as well as the handling of glitches that come along with those activities, investors will continue to bear losses while the exchanges continue to engage in risky behavior.

To date, stock exchanges have enjoyed absolute immunity from liability for their regulatory activities as SROs. Now that nearly all exchanges have transformed from being non-profit, member-owned organizations to for-profit, shareholder-owned, demutualized entities that outsource most of their governmental duties, an overhaul of the SRO system and the immunity that comes with it may be in order. In the meantime, however, courts and regulators must limit the grant of absolute immunity to truly prosecutorial, adjudicatory, and regulatory actions. Thus, courts should evaluate whether the SEC would engage in the conduct in question. If the answer is no, then the stock exchange was not acting in its governmental capacity, and must therefore face liability in its capacity as a corporation acting in its own self-interest. This would serve to better incentivize stock exchanges to take proper precautionary measures with respect to technological systems used to facilitate transactions, which in turn would protect investors from undue losses.

209. D'Alessio v. New York Stock Exch., Inc., 258 F.3d 93, 105 (2d Cir. 2001).

EAGLE-NET'S NEVER-ENDING ODYSSEY: ADDRESSING COLORADO'S UNIQUE BROADBAND INFRASTRUCTURE CHALLENGES

KELLEN O'BRIEN*

Although 80% of Colorado's population lives in the densely populated Front Range, the remaining 20% of Colorado residents live in sparsely populated regions. The Federal Communications Commission and the federal government's National Broadband Plan have prioritized universal availability of high speed Internet, but Colorado has struggled to close the "digital divide," which decreases the benefits of the Internet for public education and other services in rural regions. Using a $100 million federal grant and $35 million in additional funding from CenturyLink, Coloradans created the EAGLE-Net Alliance to address this issue. EAGLE-Net is a local government co-operative designed to create a middle-mile fiber network connecting Colorado's 178 public school districts and other community anchor institutions like hospitals. However, EAGLE-Net has already spent about 90% of its budget, yet it has only completed its broadband infrastructure build-out in six of Colorado's nineteen unserved counties. EAGLE-Net has also faced hostility from small telecom providers because of the organization's construction plan and because the executive team has focused on economic sustainability instead of ensuring optimal improvements to rural infrastructures. The National Telecommunications and Information Administration temporarily suspended EAGLE-Net's grant to determine if it is adequately completing its environmental assessments and to determine if the network will harm small telecom companies in rural Colorado. Many potential solutions exist; such as streamlining agency operations, repealing a state statute that prevents municipal broadband service, and accepting the need to operate at a loss in the most remote regions of Colorado.

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I. INTRODUCTION

In 1994, only a quarter of U.S. households had computers, and fewer than half of those had Internet access.[1] Six years later, after a rarely paralleled technology boom, 41.5% of U.S. households had Internet access.[2] Although the dotcom boom of the 1990s is remembered somewhat cynically as a bubble—due to high-profile stock meltdowns and overeager speculation—the United States population has never looked back. Less than a generation has passed since rudimentary interfaces like AOL and the widespread adoption of email, but people

1. NAT'L TELECOMM. & INFO. ADMIN., FALLING THROUGH THE NET: A SURVEY OF THE "HAVE NOTS" IN RURAL AND URBAN AMERICA (tbls. 14 & 15) (1995), http://www.ntia.doc.gov/ntiahome/tables.htm (tbls. 14 & 15).

2. *See* NAT'L TELECOMM. & INFO. ADMIN., FALLING THROUGH THE NET: TOWARD DIGITAL INCLUSION 1 (2000), http://www.ntia.doc.gov/files/ntia/publications/fttn00.pdf.

now communicate, shop, and learn online.

Today, many Coloradans may take Internet access for granted, but 18% of Coloradans still do not have a computer or an Internet connection in their home.[3] While the private sector has made serious inroads into online profitability, the public sector's access to and use of high-speed broadband lags behind.[4] Key civic institutions—hospitals, police stations, schools, and libraries—are not wired as well as the private sector or even their counterparts in other advanced countries.[5] In part because of Colorado's geography and population dispersion, the Centennial State has struggled for fifteen years to ensure its rural citizens and civic institutions have Internet access equal to urban citizens and the private sector. A 2008 study showed that Colorado was forty-second in statewide broadband connectivity and that market forces were not strong enough to build adequate broadband infrastructure in the state's remote rural areas.[6] In 2010, EAGLE-Net Alliance ("EAGLE-Net") received a $100.6 million grant from the Department of Commerce's $4.7 billion Broadband Technologies Opportunities Program ("BTOP") to develop Colorado's middle-mile broadband infrastructure.[7]

Middle-mile infrastructure is akin to a network of highways carrying data on long hauls between destinations and connecting to the nation's Internet backbone. Last-mile broadband, akin to off-ramps and city streets, provides end-user service. End-user servicers, such as incumbent providers Comcast and CenturyLink, depend on middle-mile networks to efficiently hold and carry large amounts of data. The vanguard of middle-mile broadband is fiber-optic cable, which carries a nearly infinite amount of data at much faster speeds than its cable wire predecessor. EAGLE-Net received its BTOP grant to build a network of middle-mile fiber-optic cable throughout Colorado, particularly to rural areas.[8]

This note will begin with a discussion of the federal government's

3. *Computer and Internet Use, Presence and Type of Computer for Individuals 3 Years and Older, by State: 2010* at tbl. 3B [hereinafter *Computer and Internet Use 2010*]; U.S. CENSUS BUREAU, http://www.census.gov/hhes/computer/publications/2010.html (last revised July 2012).

4. *See generally Executive Summary,* FED. COMMC'N COMM'N ("FCC"), NAT'L BROADBAND PLAN: CONNECTING AMERICA [hereinafter NATIONAL BROADBAND PLAN], http://www.broadband.gov/plan/executive-summary.

5. *See id*.

6. *See id*.

7. *See* Notice of Funds Availability ("NOFA") & Solicitation of Applications, 75 Fed. Reg. 3792 (proposed Jan. 22, 2010), http://www.ntia.doc.gov//files/ntia/publications/fr_btopnofa_100115_0.pdf [hereinafter Notice of Funds Availability].

8. *See generally* C.T.C. TECH. & ENERGY, *EAGLE-NET IN CONTEXT: AN ANALYSIS OF THE PROCESSES AND BENEFITS OF MIDDLE-MILE BROADBAND PROJECTS* 1 (2012), http://www.ctcnet.us/EAGLE-Net.pdf.

vision for broadband infrastructure and the BTOP grant process. It will describe EAGLE-Net's formation, the implementation of its plan, and the controversy surrounding the National Telecommunications and Information Administration's ("NTIA") decision in January 2013 to suspend EAGLE-Net's grant. This note will also formulate criteria for analyzing EAGLE-Net's efforts and some of the problems it has faced. Finally, this note will suggest potential solutions such as streamlining agency operations, repealing a state statute that prevents municipal broadband service, or accepting the need to operate at a loss in the most remote regions of Colorado.

II. BROADBAND IN CONTEXT

Japan, Hong Kong, and South Korea have developed high-speed broadband networks that provide download speeds unlike anything the average American consumers experience in their living rooms. In Hong Kong and South Korea, Internet users benefit from average peak speeds close to 50 Mbps, whereas Internet users in urban areas of the United States only enjoy average peak speeds of about 28 Mbps and far lower in rural areas.[9] Like dial-up connections in the mid-1990s, the federal government's recognition of the importance of broadband infrastructure has been slow, but it has recently connected with the idea that broadband infrastructure is as vital in the twenty-first century as roads and bridges were in the twentieth.

A. The National Broadband Plan

The Telecommunications Act of 1996 deregulated the telecommunications market in an effort to create competitive innovation, spur rapid deployment of information technology, and make these technologies universally available.[10] Yet, in 2010 the Federal Communications Commission ("FCC") found that broadband capability was still not universally available—about eighty million adults did not have broadband access at home, and about twenty million adults lacked any access at all.[11] According to Section 706 of the Telecommunications Act of 1996, this finding meant the FCC needed to "take immediate action to accelerate deployment of advanced telecommunications

9. *See* Charlie Osborne, *Hong Kong Secures Top Spot for Global Broadband Speed*, ZDNET (Aug. 13, 2012, 8:19 AM), http://www.zdnet.com/hong-kong-secures-top-spot-for-global-broadband-speed-7000002511.

10. *See* H. R. REP. NO. 104-458, at 1 (1996) (Conf. Rep.).

11. *See generally* Inquiry Concerning the Deployment of Advanced Telecomm. Capability to all Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecomms. Act of 1996, as Amended by the Broadband Data Improvement Act, *Sixth Broadband Deployment Report*, 25 FCC Rcd. 9556, 9557 (2010) [hereinafter *Sixth Broadband Deployment Report*].

capability by removing barriers to infrastructure investment and by promoting competition in the telecommunications market."[12] In response, the FCC generated a report, which concluded that because consumer use changed dramatically as the Internet became more sophisticated in the 2000s, 4 Mbps of download speed and 1 Mbps of upload speed should be required across the nation's entire network.[13]

To facilitate its mission and explain the benefits of its goals, the FCC created the National Broadband Plan ("The Plan"). The Plan lays out the FCC's roadmap for using high-speed broadband Internet to improve the economy, public education, health care, and homeland security.[14] The Plan suggests digital literacy standards with the goal of teaching every young person in the country to use a computer effectively.[15] Talented high school students will have the opportunity to take online advanced placement courses not offered by their schools;[16] government agencies will be able to store documents on the cloud rather than in a warehouse; and employees will be able to spend more time on actual work and less time on paper work.[17] The Plan will also improve social services. Only half of the people eligible to receive food stamps actually use them, but programs like ACCESS NYC use online calculators to help residents determine their eligibility.[18] Yet, without Internet access this program cannot help those who need it. But, if high-speed Internet were available for free in a public library, residents could access this information and learn about their eligibility, even if they don't own a computer.[19]

The Plan captures the promise of the Internet. It is ambitious. But, for the ambition to come to fruition, the proper foundation must be laid.

In 2010, a study of broadband availability found about a third of counties in the United States were not even minimally served by broadband, and that those counties are generally more rural and have lower income levels than counties with broadband access.[20] In Colorado, nineteen counties were unserved, and 88% of the unserved households were in rural areas, one of the higher rural concentrations among the fifty

12. *See id*. at 9558.

13. *See id*. at 9559.

14. *See Plan,* FCC, NAT'L BROADBAND PLAN, http://www.broadband.gov/plan/ (last visited Feb. 28, 2013).

15. *Id*.

16. *See Education,* FCC, NAT'L BROADBAND PLAN, http://www.broadband.gov/plan/11-education/ (last visited Feb. 23, 2013).

17. *Government Performance,* FCC, NAT'L BROADBAND PLAN, http://www.broadband.gov/plan/14-government-performance (last visited Feb. 22, 2013).

18. *See id*.

19. *See id.*

20. *See Sixth Broadband Deployment Report, supra* note 11, at 9569-70.

states.[21]

B. Colorado's Fitful Effort

Over four million people live in Colorado's Front Range, dominated by the Denver, Fort Collins, and Colorado Springs metropolitan areas.[22] The rest of the state's population, about 900,000 people, is spread between rural Eastern Colorado, the isolated central mountain region, and the equally isolated Western slope.[23] Internet providers like Comcast and CenturyLink provide consistent, relatively cheap home Internet access to the high-density Front Range population.[24] However, slower Internet service is more expensive in the state's rural regions because infrastructure is costlier to build—especially in mountainous areas. The lower population density in rural areas makes service less profitable.[25] Pricing differences in Denver and Silverton illustrate a problem that is also prevalent in state services such as safety, health care, and education.

1. Colorado's Early Effort: The Rocky Mountain Network

In 1996, the Colorado legislature recognized a growing "digital divide"[26] in the state, and passed Senate Bill 102 to authorize a statewide network to equalize Internet access.[27] Colorado's Department of Personnel and Administration partnered with CenturyLink (then Qwest) to create the Colorado Multi-Use Network ("MNT"), the first attempt to fully equip Colorado for the Internet Age.[28] Implemented in 1999, when

21. *See id*. at 9582.

22. *Census 2000 and 2010 Counts by Region & County*, COLO. DEP'T OF LOCAL AFFAIRS, http://dola.colorado.gov/dlg/demog/2010data/total%20pop%20change%20region.pdf.

23. *See id*.

24. *Xfinity Internet High Speed Internet Service*, COMCAST, http://www.comcast.com/internet-service.html (last visited Sept. 29, 2013) (demonstrating Comcast's $29.99/month offer for 25 Mbps in Denver).

25. *Compare id. with Comcast in Silverton Xfinity Internet,* CABLETV, http://www.cabletv.com/co-silverton-comcast-cable.html (last visited Sept. 29, 2013) (demonstrating $34.99/month offer for 20 Mbps in Silverton).

26. *See generally The Digital Divide*, *ICT and the 50x15 Initiative*, INTERNET WORLD STATS, http://www.internetworldstats.com/links10.htm (last visited Mar. 31, 2013) (describing how the digital divide describes the disparity in useful, enriching broadband Internet access between urban and rural communities and rich and poor communities); *and "Digital Divide" Defined (Hint it's not about access)*, DIGITAL DIVIDE INSTITUTE, http://www.digitaldivide.org/digital-divide/digitaldividedefined/digitaldivide.html (last viewed Mar. 31, 2013).

27. *See About the Colorado State Network*, GOVERNOR'S OFFICE OF INFO. TECH. ("OIT"), http://www.colorado.gov/cs/Satellite/OIT-ServicesApps/CBON/1251610497752 (last visited Feb. 24, 2013).

28. *See Frequently Asked Questions,* DEP'T OF PERSONNEL AND ADMIN., THE MULTI-USE NETWORK PROJECT, http://www.state.co.us/mnt/faq/index.html (last viewed Feb. 24, 2013).

many people still connected to AOL via dial-up access, and completed in 2005, as Facebook, Google, and Amazon began to define Internet use, MNT's mission was to level the playing field for rural communities and mountain towns by providing them with bandwidth equal to that of the Front Range cities and to prepare schools, libraries, and government agencies for a new era.[29] MNT simplified the state's broadband network and saved money by aggregating demand and sharing costs across the state.[30] The network connected nearly 100 public-sector organizations through more than 3,000 endpoints.[31] In 2011, the Office of Information Technology entered into a new agreement with CenturyLink to modernize MNT, now known as the Colorado State Network.[32] Because the project's success was undercut by the fast pace of technological change,[33] it only ensured that the state has not fallen further behind.

2. Colorado Takes a Step Back

Just as MNT was completed, the state legislature passed C.R.S. § 29-27-103 ("SB 152"). This statute prevents municipalities from offering telecommunications services without a voter referendum that overrides the statute. Comcast and CenturyLink (née Qwest) lobbied for the bill, because it ensures they remain the dominant source of Internet for residents.[34] As the federal government relieves incumbent providers from building infrastructure in unprofitable regions, SB 152 ensures incumbent providers have leverage to keep consumers in a vice grip.

3. High Hopes and Ambitious Words

When one walks into a coffee shop, it seems like everyone in the world owns a Mac. That is not the case. In 2010, only 78% of Colorado residents lived in a household with a computer to access the Internet,[35] and a disproportionate number of those Coloradans are residents of the Front Range.[36]

29. *See id*.

30. *See id*.

31. *See About the Colorado State Network*, *supra* note 27.

32. *See id*.

33. Moore's Law states that processing power will double every two years. This means broadband infrastructure must be built out to prepare for rapid growth in data demand. *See* Gordon E. Moore, *Progress in Digital Integrated Electronics,* 21 INT'L ELECTRON DEVICES MEETING 11, 13 (1975), http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=1478174.

34. Esme Vos, *Dave Hughes: Colorado Lawmakers Bow to Qwest on Municipal Broadband*, MUNIWIRELESS.COM (Apr. 19, 2005), http://www.muniwireless.com/2005/04/19/dave-hughes-colorado-lawmakers-bow-to-qwest-on-municipal-broadband.

35. *Computer and Internet Use 2010*, *supra* note 3, at tbl. 3A.

36. NTIA estimates that 66% of urban households, compared to 54% of rural households, had broadband Internet access in their home. LAWRENCE E. STRICKLING & ANNA

In a joint resolution, Colorado's legislature determined that high-speed broadband access is vital and necessary for educating students, business development, and myriad other reasons.[37] In rural and remote areas across the state, deficient broadband infrastructure has hindered communities from competing in the broader economy. Developing sufficient broadband infrastructure is also increasingly necessary so that schools can provide an education to prepare students to compete in the twenty-first century workforce. The State House of Representatives recognized a gap between most urban and suburban schools, which already possessed sufficient access to broadband, and rural schools, which had "fewer opportunities to take advantage of broadband technologies."[38] The legislature also resolved that the best way to end these shortfalls in equity was to make every effort to "prioritize the provision of broadband service to unserved customers through the efficient distribution of resources."[39]

Like many resolutions, House Joint Resolution 10-1016 uses broad and vague language, but many of the goals coincide with the National Broadband Plan. The state recognizes the importance of prioritizing support for its rural and remote areas, which is a matter of equitability and aspiration. A robust statewide broadband network will open up the world for students in rural areas. One of the Internet's promises is shrinking the world by giving someone in a rural school district the same opportunities as someone in a suburban school district. Without a dependable, high-capacity broadband infrastructure that reaches rural and remote areas, the Internet's potential for improving the educational opportunities of rural school districts will not be met.

III. EAGLE-NET ALLIANCE

The first step towards statewide completion of the ambitious goals of House Joint Resolution 1026 came on the local level. The Centennial Board of Cooperative Educational Services ("CBOCES"), which provides cost-effective broadband services to thirteen member-school districts in northern Colorado,[40] served as a template and jumping off point for the EAGLE-Net.[41] Although the intellectual brainpower of EAGLE-Net was in a local organization, the capital came from the

GOMEZ, NAT'L TELECOMM. & INFO. ADMIN., DIGITAL NATION: 21ST CENTURY AMERICA'S PROGRESS TOWARD UNIVERSAL BROADBAND INTERNET ACCESS 10 (Feb. 2010).

37. H.R.J. Res. 10-1026, 67th Gen. Assemb., 2d Reg. Sess., at 2 (Colo. 2010).

38. *Id.*

39. *Id*. at 4.

40. *About Us,* CENTENNIAL BOCES, http://www.cboces.org/files/_hLDL3_/7d1e2ef30be3209d3745a49013852ec4/About_Centennial_BOCES_-_Who_We_Are.pdf (follow "CBOCES: Who We Are").

41. *History*, EAGLE-NET, http://www.co-eaglenet.net/about-us/history/.

federal government.

A. "The Stimulus" Provides Capital

The American Recovery and Reinvestment Act ("Recovery Act") targets several areas of economic development, including a $7.2 billion investment in technology and infrastructure on state and local levels.[42] The Recovery Act provided $4.7 billion to NTIA, which is within the Department of Commerce, to administer BTOP.[43] Agencies were instructed to "commenc[e] expenditures and activities as quickly as possible consistent with prudent management."[44] NTIA's Notice of Funds Availability ("NOFA") prioritized cooperation with end-user service providers and improvement of broadband infrastructure for institutions of learning, health, and safety, which would create "a ripple effect of economic development."[45]

EAGLE-Net received its NTIA grant during the second round of funding. Whereas, the Rural Utility Services ("RUS") and NTIA issued joint grants during the first round, they offered grants separately during the second round to "better promote each agency's distinct objectives" with the intent to avoid "geographic overlap."[46] RUS gave loans to rural businesses for essential utility services, including broadband.[47] NTIA focused on Comprehensive Community Infrastructure projects, which would develop and improve middle-mile broadband infrastructure for anchor institutions such as hospitals and schools.[48]

B. EAGLE-Net's Formation

CBOCES applied when BTOP was announced and won a $100.6 million grant in September 2010, in addition to receiving $35 million in private donations.[49] Instead of operating the statewide program itself, CBOCES formed EAGLE-Net, a non-profit, intergovernmental entity, which is structured as a cooperative.[50] EAGLE-Net, like other boards of cooperative educational services, provides cost savings across a network of member institutions and allows access to education networks that

42. Notice of Funds Availability, *supra* note 7, at 3792.
43. *Id*.
44. *Id*.
45. *Id*. at 3795.
46. *Id*. at 3794-95.
47. *About RD*, OFFICE OF RURAL DEVELOPMENT, U.S. DEP'T OF AGRICULTURE, http://www.rurdev.usda.gov/AboutRD.html (last visited Sept. 25, 2013).
48. Notice of Funds Availability, *supra* note 7, at 3818.
49. *Frequently Asked Questions*, EAGLE-NET, http://www.co-eaglenet.net/btop/faq/ (last visited Sept. 25, 2012).
50. *Id*.

cannot be accessed by "commodity" Internet users.[51]

EAGLE-Net's existence is predicated on an intergovernmental agreement between CBOCES, the Northeast Colorado Board of Cooperative Education Services, and over forty other local government entities.[52] These members share costs for web services like high-speed broadband access and data warehousing.[53] EAGLE-Net is registered with the Colorado Department of Local Affairs ("DOLA"), sends quarterly and annual financial reports to NTIA, and meets monthly with its Board of Directors, which represents EAGLE-Net's member institutions.[54] As part of its DOLA registration, EAGLE-Net must conduct independent audits and report to DOLA.[55]

C. EAGLE-Net's Implementation

EAGLE-Net's network was intended to improve Colorado's broadband infrastructure in two ways: EAGLE-Net planned to build 1,070 miles of new, indefeasible middle-mile cable and improve and put to use 1,718 miles of currently unused "dark fiber."[56] By creating a quality middle-mile backbone, EAGLE-Net allows last-mile access providers to provide better broadband to community anchors than to residential or business customers.[57]

Once completed, EAGLE-Net's middle-mile backbone will offer speeds from 20 Mbps to 1 Gbps.[58] Because governmental entities cannot compete with private providers like Comcast and CenturyLink, school districts will rely on incumbents for their actual Internet access.[59]

Because EAGLE-Net's grant requires sustainability, EAGLE-Net needs to take in revenue to maintain the network and provide service.[60] Member organizations, school districts, and other community anchors pay for their use of the network.[61] EAGLE-Net will save school districts money over the long term because middle-mile infrastructure costs will not be charged back to them by last-mile servicers.[62] In this way,

51. *Id*.

52. *EAGLE-Net Organizational Structure and Operations, Community Outreach Update,* EAGLENET (Mar. 2013) *available at* http://archive.constantcontact.com/fs189/1104865671015/archive/1112649250194.html.

53. *Id*.

54. *Id*.

55. *Id*.

56. *Construction Statistics*, EAGLENET, http://www.co-eaglenet.net/btop/progress/construction-statistics/ (as of Mar. 31, 2013).

57. EAGLE-NET, *supra* note 49.

58. *Id*.

59. *See* discussion of SB 152, *supra* Part II.B.2.

60. Telephone interview with Gretchen Dierks, Communications Director, EAGLE-Net (Nov. 8, 2012).

61. *Id*.

62. *Id*.

EAGLE-Net should be especially economically viable for remote school districts, which would otherwise have to pay a premium for high quality middle-mile networks through the free market.[63] However, like previous efforts, EAGLE-Net has talked the talk, but it has not walked the walk.

By the middle of 2013, EAGLE-Net was well behind its scheduled August 2013 completion date and well over budget.[64] As of June 30, 2013, 668 of 1,070 planned new network miles were in use, only 236 of 1,718 miles of dark fiber were activated, and fewer than half of 223 community anchor institutions were connected; yet, EAGLE-Net had spent $121,840,535 of its $135,300,777 budget.[65]

To compound these budgetary issues, EAGLE-Net's future building in the central mountains will be in Colorado's most difficult and expensive building region.[66] Additionally, an NTIA report raised doubts about the source and amount of EAGLE-Net's private matching funds.[67] EAGLE-Net's problems are illustrative of some of the problems Colorado's broadband projects have faced. The permitting process is complicated, construction is time-consuming and expensive, and mountain weather can slow things down.

D. Snags and Controversy

In a letter to Lawrence E. Strickling, NTIA's Assistant Secretary for Communications and Information, dated September 17, 2012, four Republican Congressman from Colorado expressed worries about EAGLE-Net's effect on small telecom carriers already operating in rural Colorado.[68] Specifically, the Congressmen claimed that EAGLE-Net had overbuilt networks in areas that were not unserved or underserved and in doing so, threatened the viability of the small telecom companies. The letter claimed that EAGLE-Net was doubling up on middle-mile fiber networks recently laid by small, private telecom providers.[69]

In rural areas, residential business is too dispersed to sustain a

63. *Id*.

64. John Bakken, *Second Quarter, 2012 BTOP Progress Report*, EAGLE-NET (2012), http://www.co-eaglenet.net/btop/progress/btop-progress-reports.

65. *Second Quarter, 2013*, EAGLENET (2012), http://www2.ntia.doc.gov/files/grantees/nt11bix5570001_eaglenetalliance_redacted_ppr2013_q2_0.pdf.

66. Edward Wyatt, *Waste is Seen in Program to Give Internet Access to Rural U.S.*, N.Y. TIMES, Feb. 11, 2013, http://www.nytimes.com/2013/02/12/technology/waste-is-seen-in-program-to-give-internet-access-to-rural-us.html?pagewanted=all&_r=0.

67. Andy Vuong, *Inside the Controversial Colorado EAGLE-Net Broadband Project*, THE DENVER POST (Mar. 3, 2013), http://www.denverpost.com/business/ci_22701822/eagle-net-broadband-project-steamboat-springs-struggles-launch.

68. Letter from Cory Gardner et al. to Lawrence Strickling (Sept. 17, 2012), *available at* http://gardner.house.gov/sites/gardner.house.gov/files/EAGLE%20Net%20Colorado%20Letter.pdf.

69. *Id*.

telecom, so large public institutions, like schools, are "the lifeblood of the private telecommunications providers."[70] Because EAGLE-Net began building in these regions, detractors claim, "U.S. taxpayers are being forced to subsidize a federal initiative whose most substantial accomplishment ultimately could be to put Colorado's rural telecommunications industry out of business."[71] The letter asks the Department of Commerce to halt EAGLE-Net's plans, address the small business concerns, and investigate EAGLE-Net's strategy and use of funds.[72]

On December 21, 2012, Strickling sent a response addressed to Representative Gardner.[73] The letter says that EAGLE-Net's core mission is to "expand broadband capabilities" in Colorado and "enhance broadband for community anchor institutions."[74] The letter stated that NTIA received "more than 80 letters of support from numerous community anchor institutions, stakeholders, and legislators in Colorado," and that support, particularly from education sector, continues.[75] NTIA's goal is to find "win-win solutions" for the competing entities to improve the state's broadband infrastructure and build the present and future economy.[76]

In a separate action, the NTIA suspended EAGLE-Net's grant until it verified that EAGLE-Net completed environmental assessments for routes modified since the previous certification had been approved. EAGLE-Net's environmental assessment did not account for two endangered wild plant species, the clay-loving wild buckwheat and the pagosa skyrocket.[77] EAGLE-Net posted a note on its website that it had been instructed by NTIA to temporarily suspend its construction on December 6, 2012 in order to provide project information and ensure compliance with grant requirements.[78] EAGLE-Net promised in that note that completed services would not be affected and that the suspension would not have a major impact on its long-term plan, because there was little construction planned for the winter.[79]

In a letter dated April 29, 2013, the Department of Commerce lifted

70. *Id*.
71. *Id*.
72. *Id*.
73. Letter from Lawrence Strickling, Assistant Secretary, NTIA, to Cory Gardner, U.S. Congressman (Dec. 21, 2012).
74. *Id*.
75. *Id*.
76. *Id*.
77. *EAGLE-Net Alliance NTIA Suspension: Explanation and Status Update*, EAGLE-NET (Feb. 2013), http://archive.constantcontact.com/fs189/1104865671015/archive/1112312361548.html.
78. *Id*.
79. *Id*.

EAGLE-Net's suspension, while keeping EAGLE-Net on agency review status until the project's conclusion to ensure reasonable and appropriate spending and build-out.[80] As part of the agreement, EAGLE-Net agreed to find a business partner and focus its remaining money in mountainous areas west of the Front Range.[81] In October 2013, EAGLE-Net announced a partnership with Affiniti of Colorado ("Affiniti"), a Texas company with a history of legal problems involving bid rigging and antitrust violations.[82] Affiniti will manage EAGLE-Net's operations and own any infrastructure built with its own capital.[83]

IV. ASSESSING EAGLE-NET

For the reasons outlined above, it is necessary to allocate public resources towards building broadband infrastructure. Although EAGLE-Net's work continues, and Trillion's impact is unclear, it is not too early to assess EAGLE-Net's accomplishments. Based on FCC rulings, NTIA's grant criteria, and Colorado's history, EAGLE-Net's efficacy can be measured by three components. The executive team should have a mix of expertise and business capability, the project should focus on creating universal availability by focusing on unserved and underserved rural areas, and EAGLE-Net should work with service providers, towns, anchor institutions, and other stakeholders.

A. EAGLE-Net's Executive Team

The EAGLE-Net executive team is defined by diverse experience with public education and the telecommunications industry, but its execution of EAGLE-Net's objectives has been less than impressive. Former Chief Executive Officer Randy Zila has a specialty in negotiations, and he worked for years in public education, winning Colorado Superintendent of the Year in 2007 while working for the St. Vrain School District.[84] In December 2012, Zila stepped down from his

80. Letter from Arlene Simpson Porter, Director, NOAA Grants Management Division, to Michael Ryan, President, EAGLE-Net Alliance (Apr. 29, 2013), http://www.co-eaglenet.net/wp-content/uploads/2013/04/BTOP-EAGLE-Net-Alliance-Lift-of-Suspension-2013-04-29.pdf.

81. Greg Avery, *Eagle-Net Reduces Scope, Regains Access to Stimulus Money*, DENVER BUSINESS JOURNAL (Apr. 30, 2013), http://www.bizjournals.com/denver/news/2013/04/30/eagle-net-reduces-scope-regains.html?page=2.

82. *See* Kristen Leigh Painter, *EAGLE-Net's Partnership with Affiniti of Colorado Raises Questions*, THE DENVER POST (Oct. 29, 2013), http://www.denverpost.com/breakingnews/ci_24413625/.

83. Kristen Leigh Painter, *EAGLE-Net Selects Affiniti as Network Operator*, THE DENVER POST (Oct. 22, 2013), http://www.denverpost.com/breakingnews/ci_24364648/eagle-net-selects-affiniti-network-operator.

84. *Executive Team*, EAGLE-NET, http://www.co-eaglenet.net/about-us/executive-team

EAGLE-Net post because of family health issues, and Mike Ryan, a former Level 3 executive, replaced him on January 14, 2013.[85] Other members of the executive team include Perry Movick, who has over thirty years of experience in telecommunications and networking management; Chip White, who worked in telecommunications and technology consulting; and Dale Briggs, who has twenty-five years of experience in operations management and networking services.[86] The Board of Directors, likewise, has members with leadership experience in public education, accounting, business, information technology, and eGovernment.[87]

The executive team looks competent on paper, but high salaries and poor explanations about the project's progress have brought EAGLE-Net in line for criticism. First, the Department of Commerce sent warnings about the team's poor budget management.[88] Then, at a Legislative Audit Committee in February 2013, state legislators criticized EAGLE-Net's leaders for their failure to clearly explain where money was spent and what anchor institutions were being served.[89] EAGLE-Net claimed grant transfer delays slowed its starting date[90] and NTIA's suspension kept it from connecting many nearly-connected sites.[91] However, its submission of a budget reprogram to its Board suggests its vision was flawed,[92] and its ample routing changes have drawn scrutiny.[93] Meanwhile, the organization has a $4 million payroll for only thirty employees and Zila made well over $250,000 in annual salary and benefits, despite maintaining employment as Executive Director of CBOCES and adjunct professor at the University of Northern Colorado.[94] If EAGLE-Net's build-out went smoothly, the executive team's pay would not be brought into question; instead, the team's work has resulted in mounting delays, disputes, and detractors. Most crucially, the executive team lost sight of its mission.

(as of Nov. 15, 2012).

85. *EAGLE-Net Appoints President,* EAGLE-NET (Feb. 2013), *available at* http://archive.constantcontact.com/fs189/1104865671015/archive/1112312361548.html.

86. *Executive Team*, *supra* note 84.

87. *Board of Directors*, EAGLE-NET, http://www.co-eaglenet.net/about-us/board-of-directors (as of Nov. 15, 2012).

88. Wyatt, *supra* note 66.

89. *See* Joe Hanel, *Lawmakers: What exactly is Eagle-Net?*, THE DURANGO HERALD (Feb. 26, 2013), http://durangoherald.com/article/20130226/NEWS01/130229675/Lawmakers:-What-exactly-is-Eagle-Net.

90. Bakken, *supra* note 64.

91. *Id.*

92. John Bakken, *Annual Report*, *2012 BTOP Progress Report*, EAGLE-NET (2012), http://www2.ntia.doc.gov/files/grantees/nt11bix5570001_apr2012_q4.pdf.

93. Wyatt, *supra* note 66.

94. Dan Njegomir, *CO: State Internet agency with no oversight spends millions*, COLORADOWATCHDOG.ORG (Sep. 21, 2012), http://watchdog.org/57047/eagle-net-follo.

B. Rural Focus

The clearest critique of EAGLE-Net's management is its priority setting, primarily its decision to start building in the Denver area and expanding outwards[95] at the expense of its *raison d'être*—building robust broadband infrastructure in Colorado's unserved rural areas to help achieve universal availability. After spending nearly its entire budget, EAGLE-Net's build-out to unserved rural counties is not remotely close to completion.[96]

According to the Sixth Broadband Report,[97] there are nineteen unserved counties in Colorado. Seven are in the southeast quadrant of the state, three are in the northeast, six are in the state's central mountain spine, and three are in the southwest corner of the state. EAGLE-Net's central purpose was providing high speed broadband to the school districts in these counties. EAGLE-Net cancelled plans to build to the six unserved counties in the southeast quadrant of the state, delayed building plans to five counties in the central mountains until 2014, and completed work in only six of the state's nineteen unserved counties by the end of its original project timeline. EAGLE-Net spent about 90% of its budget and failed to reach one third of the state's unserved counties.[98]

Meanwhile, EAGLE-Net completed work in the Front Range stretching into the northeast corner of the state and along the Western Slope. For the most part, these regions already had sufficient broadband infrastructure. For instance, Aurora Public Schools and Cherry Creek School District are connected[99] even though they already had lightning quick broadband speeds of 300 Mbps.[100] EAGLE-Net not only focused on areas with sufficient broadband infrastructure, but it avoided needy areas where mountains would drive up construction costs. Instead of prioritizing southeast Colorado or the central mountains, EAGLE-Net built a connection to Agate Elementary School in northeastern Colorado, the school's third fiber optic network connection.[101] With the most expensive mountain building remaining, it is clear that EAGLE-Net will not finish its work under budget. This means that the state's still-unserved rural school districts must hope that Affiniti finishes what EAGLE-Net

95. *See* Andy Vuong, *NTIA to lift EAGLE-Net suspension, broadband project needs more money*, THE DENVER POST (Apr. 29, 2013), http://denverpost.com/ci_23133964/ntia-lift-eagle-et-suspension-broadband-project-needs

96. *See infra*, Appx. A and B.

97. *Sixth Broadband Deployment Report, supra* note 11.

98. *Compare Colorado County Map,* GEOLOGY.COM, *available at* http://geology.com/county-map/colorado-county-map.gif, *with EAGLE-Net Network Map,* EAGLENET (Nov. 1, 2012), http://www.co-eaglenet.net/btop/map/ (tbl. 3b) (last viewed Jan. 30, 2013).

99. Vuong, *supra* note 67.

100. *See* Wyatt, *supra* note 66.

101. *Id.*

started.

Some of EAGLE-Net's work is defensible. Although EAGLE-Net has not connected its network in unserved southwestern counties, like Dolores, it is using an outside-in strategy—starting its network in counties on the western slope and then building connections into the central Rockies. Additionally, EAGLE-Net has completed building to all four unserved counties in the northeast (Washington, Phillips, Cheyenne, and Kit Carson).[102] Of course, EAGLE-Net's work in this region has generated controversy.[103]

Overall, EAGLE-Net's efforts barely made a dent in the two regions of the state most in need of a better broadband infrastructure. The failure to address the southeast during its first round of building is a major oversight. Six of the nineteen unserved counties are in the southeast, and EAGLE-Net came no closer than Cheyenne County—part of its building in the northeast. These counties are in the plains, so EAGLE-Net could have built cheaply and efficiently in the region to demonstrate its efficacy.

Additionally, EAGLE-Net should have addressed the unserved counties in the central spine of the Rocky Mountains earlier. Although EAGLE-Net has completed building in Saguache and Costilla Counties, EAGLE-Net should have addressed this region's needs before any building on the Front Range. Because construction costs are about ten times more expensive in the mountains, EAGLE-Net jeopardized its budget by spending substantial money in adequately served counties before completing work in the most expensive counties. In addition to unserved counties, EAGLE-Net is still planning to build in Fremont County, Chaffee County, Gunnison County, and Grand County, which extends from Rocky Mountain National Park to Winter Park. These low-population, mountainous counties also should have been completed before work on the I-25 corridor, because their demographics are the target of the federal government's universal availability goal. Instead, EAGLE-Net pursued a building plan far removed from its central goal of achieving universally available high-speed broadband access throughout Colorado.

C. Partnership Building

EAGLE-Net is required to partner with local telecoms to provide faster or cheaper broadband to end-users, but many local telecoms feel EAGLE-Net is competing with them instead. Because EAGLE-Net cannot provide last-mile service, the end-user "would have to pay for

102. *See Network Map*, *supra* note 98.
103. *See* Part III.E *and* Part IV.C., *supra*.

connecting EAGLE-Net's wholesale network itself" if it chose to avoid using a local telecom provider.[104] However, the Colorado Telecommunications Administration ("CTA"), which represents about two dozen small telecom carriers statewide, says that EAGLE-Net did not meet its burden for working with small telecoms, and in the fall of 2012, called for a discussion between EAGLE-Net, NTIA, and CTA to mutually decide on the best way to administer the grant money.[105] EAGLE-Net claims it has tried without success to reach out to small telecoms, and that its project will provide higher quality resources to rural school districts.[106]

Stakeholders on both sides of the controversy have spoken. In Durango, EAGLE-Net built successful relationships with Southwest Colorado Access Group, a local, grant-funded "last mile" co-op; Brainstorm Internet, a local telecom providing Internet to Durango school district; and business leaders, including Durango's mayor.[107] In Holyoke, in northeastern Colorado, PC Telecom claimed EAGLE-Net violated its grant requirements by providing direct last mile support to schools.[108] Superintendent Bret Miles said a three-year contract existed between EAGLE-Net, PC Telecom, and the school district, but the district would consider the impact on the local economy when it sought new services in three years.[109]

The Holyoke anecdote illustrates several difficulties faced by EAGLE-Net. First, EAGLE-Net needed to contract with dozens of different groups, and any disputes that could not be rectified quickly drove up transaction costs. Second, every middle-mile client EAGLE-Net acquires takes a client away from an existing company. Third, EAGLE-Net's project has been politicized and is being used as a symbol of the Stimulus's failures.[110] Although EAGLE-Net only shares a portion of the blame for these travails, its odd decision to over-build in the northeast quadrant of the state ruffled feathers and provoked disputes.

104. *See* Greg Avery, *Colorado's GOP congressmen want Eagle-Net situation examined*, DENVER BUSINESS JOURNAL (Sep. 19, 2012), http://www.bizjournals.com/denver/news/2012/09/18/colorados-gop-congressmen-want.html?page=all.

105. *See* Greg Avery, *Stimulus-funded project irks some rural telecoms in Colorado*, DENVER BUSINESS JOURNAL (Sep. 7, 2012), http://www.bizjournals.com/denver/print-edition/2012/09/07/stimulus-funded-project-irks-some.html.

106. *Id*.

107. *See* Luke Groskopf, *State of the Internet*, THE DURANGO HERALD (Nov. 24, 2012), http://durangoherald.com/article/20121124/NEWS01/121129757/State-of-the-Internet.

108. *See* Brenda Johnson Brandt, *EAGLE-Net Agreement Clarified*, HOLYOKE ENTERPRISE (Nov. 29, 2012), http://www.holyokeenterprise.com/index.php?option=com_content&view=article&id=6340:school-student-count-certified-for-funding&catid=37:school-news&Itemid=56.

109. *Id*.

110. *See* Wyatt, *supra* note 66; Njegomir, *supra* note 94.

V. SOLUTIONS

Universal availability of high-speed broadband Internet will improve the lives of rural residents by bridging the digital divide. Whether EAGLE-Net or a different entity completes this task, a few changes will make the process easier.

A. Operate at a Loss in Some Regions

A free market, sustainable model will not work in some regions of Colorado. In the central mountains, where small towns are dotted twenty miles apart and tourist-friendly resorts provide a huge chunk of local industry, year-round residents feel the harshest effects of the digital divide.[111] In small rural towns, residents may have access to speeds of three Mbps from multiple providers; in unincorporated outer-rings, they are either stuck with 1.5 Mbps of download speed or expensive and fast satellite Internet; beyond the outer ring, rural residents lack home Internet options altogether.[112]

Anchor institutions like schools and hospitals are similarly disadvantaged. In mountainous regions, school districts cannot meet their broadband needs, because incumbent service providers charge them ten times more for bandwidth than they do urban school districts.[113] In some difficult to access areas, such as Steamboat Springs, there is only one cable line connecting the town to the broadband network. On Halloween 2011, Steamboat's sole fiber connection from Summit County was disrupted for eight hours; during those eight hours businesses could not use credit card machines and hospitals could not access their patient's records.[114] In some places, EAGLE-Net's competition will drive prices down and provide a backup connection,[115] but EAGLE-Net's reticence to build in these regions shows that it, too, is choosing profit above progress.

If the federal government is serious about creating universal availability, it will need to accept operating at a loss in some regions. When big picture benefits outweigh taxpayer costs, it is worthwhile for the federal government to accept a loss. Rural schools, libraries, hospitals, and safety agencies need high-speed broadband to realize the Internet's promise of making rural living easier and equal to urban counterparts. The goal should not be profitability but net loss reduction trending towards zero. Where market solutions exist, profit should be

111. *See* Martin J. Woros, *Rural Internet Survey Response* 2009, GRAND COUNTY COLORADO, http://co.grand.co.us/Info_Systems/rural.html.

112. *Id.*

113. *See* Vuong, *supra* note 67.

114. *Id.*

115. *Id.*

championed, but expecting a profit from tough to reach places like Steamboat is like expecting five Aces from a single deck of cards.

B. Repeal SB 152

SB 152, described in II.B.2. *supra*, is a state statute preventing government entities from providing last-mile Internet access without voter approval. In 2009, Longmont citizens tried to make the city a broadband service provider, but the voter initiative failed because city representatives were restricted from advocating for the measure, and Comcast spent $250,000 on a misinformation campaign against the measure.[116] In 2011, Longmont citizens tried again, and this time the initiative passed.[117] Comcast and other large providers spent $300,000 to convince voters that it was risky for the city to provide Internet services, but this time their campaign was not enough.[118] Commentators compared Longmont's plan to turn Internet access into a city service to high-quality, low-cost city-run utilities.[119]

About half of broadband consumers purchase broadband access that delivers half the advertised speed.[120] Even if EAGLE-Net builds a robust middle-mile network, many users will not reap the benefits of their tax dollars, because last mile servicers will provide an inadequate product. Since federal and state governments spent billions of dollars to build advanced middle-mile networks, it makes no sense to prevent governments from also delivering last-mile service. Yet, SB 152 creates an unnecessary barricade that prevents this option. The statute removes a potential provider—municipalities—from the free market and allows incumbent providers to prey on consumers with limited choices. It also flies in the face of Colorado's home rule tradition. By repealing SB 152, Colorado would move its broadband market closer to the free market by giving municipalities an option for Internet independence if incumbent providers do not deliver high-quality, last-mile service.

C. Streamline Agency Operations

Agency rules prevent NTIA and RUS grant-funded entities from sharing infrastructure.[121] Market forces evolved quickly in the San Luis

116. *See* Jefferson Dodge, *Network to Nowhere*, BOULDER WEEKLY (July 7, 2011), http://www.boulderweekly.com/article-5957-network-to-nowhere.html.

117. *See* Andy Vuong, *Longmont Wins Right to Use Its Fiber Network*, THE DENVER POST BLOG (Nov. 4, 2011, 3:54 PM), http://blogs.denverpost.com/techknowbytes/2011/11/04/longmont-wins-right-to-use-its-fiber-network/1916/.

118. *Id*.

119. *See* Dodge, *supra* note 116.

120. *See Sixth Broadband Deployment Report*, *supra* note 11.

121. *See* Avery*, supra* note 105.

Valley, Lower Arkansas Valley, and northeastern Colorado to modernize broadband infrastructure when small telecoms took out RUS loans and banded together to improve infrastructure.[122] One example is an effort in 2010 by ten small telecoms located in northeastern Colorado, including the Zayo Group and PC Telecom, to build Colorado Communications Transport, a 750-mile fiber-optic loop that connects to Denver and allows for broadband offshoots around the region.[123] Instead of identifying and adapting to these market changes, EAGLE-Net plowed forward and spent NTIA funds where RUS funds were already in use. This violated the NOFA provision, which instructed organizations to avoid geographic overlap.

Although EAGLE-Net should have avoided these overbuilds, the federal government can avoid future overbuilds by improving its use of resources. At the very least, organizations funded by the two agencies should be able to share infrastructure to save costs and avoid doubling up. Better yet, RUS should be expanded to include urban projects, state-wide projects, and multi-state regional projects. RUS has eighty years of expertise in allocating funds and demanding accountability,[124] but NTIA has much more grant money to disperse. With expertise, autonomy, and more capital, RUS will spend more efficiently while setting uniform goals.

EAGLE-Net's problems could have been avoided if it received a clear mandate to address unserved areas first. Instead EAGLE-Net focused on profitability and economic sustainability. In Colorado, the neediest areas are also the least profitable and the most expensive places to build infrastructure. By disbursing grants and loans with airtight directives, RUS (or NTIA) would have an easier time ensuring organizations, like EAGLE-Net, focus on the agency's goals rather than the organization's viability.

VI. CONCLUSION

BTOP distributed 230 grants, and only fourteen of them have been suspended or terminated due to mismanagement and ineffective monitoring.[125] Although poor federal oversight may have been a contributing factor, the same Republican Congressman complaining about EAGLE-Net's overbuild would complain if EAGLE-Net could not operate sustainably. Even though its grant money should have been spent improving rural access to high-speed broadband Internet service, EAGLE-Net focused on becoming a sustainable Front Range business.

122. *Id*.
123. *Id*.
124. *See About RD, supra* note 47.
125. *See* Wyatt, *supra* note 66.

When EAGLE-Net ruffled feathers in northeastern Colorado, its focus shifted from building infrastructure to defending its work to legislators.[126] EAGLE-Net cancelled building plans in as many unserved counties as it completed by the end of 2013, and it only made slight progress into the central mountains, a particularly expensive region in which to build efficient broadband infrastructure.

If Affiniti does not complete EAGLE-Net's still ambitious building plan, another entity will have to solve Colorado's broadband infrastructure problems. In the next decade and a half, Colorado's population is projected to grow to over seven million residents with nearly one and a half million people living outside of the Front Range.[127] The population in the central mountains is poised to increase by 50% during that time,[128] so the threat of digital divide will remain. In order to reach its goal of universal broadband availability, the federal government will need to operate at a loss in Colorado's low-population, mountainous regions. By repealing SB 152, the state will allow municipalities to provide high-quality end-user service when incumbent providers are unable or unwilling to do so. Finally, the federal government should capitalize on the institutional competence of RUS by broadening its mandate to include non-rural areas. Doing so would streamline agency operations and help avoid future overbuilds.

Providing a strong infrastructure is only the first step in meeting the ambitious goals of the National Broadband Plan and the state legislature. Without a comprehensive plan to unlock the resources high-speed Internet provides, the creation of a statewide middle-mile network will be wasted. For instance, school districts will need to ensure teachers and administrators are trained to use the digital resources available with high-speed broadband Internet. Quality broadband will make interactive distance learning possible, so a student in Silverton will be able to take an Advanced Placement class from a teacher in Boulder. However, school districts and the Department of Education will need to develop programs to transform the possibility of distance learning into a reality. Once middle-mile infrastructure makes these ambitious goals possible, the state's anchor institutions will need to develop programs to make them reality.

126. *See* Hanel, *supra* note 89.

127. *See Table 1: Preliminary Population Forecasts by Region, 2000-2040*, U.S. CENSUS BUREAU, *available at* http://dola.colorado.gov/dlg/demog/2010data/UpdatedPreliminaryProjections.xls.

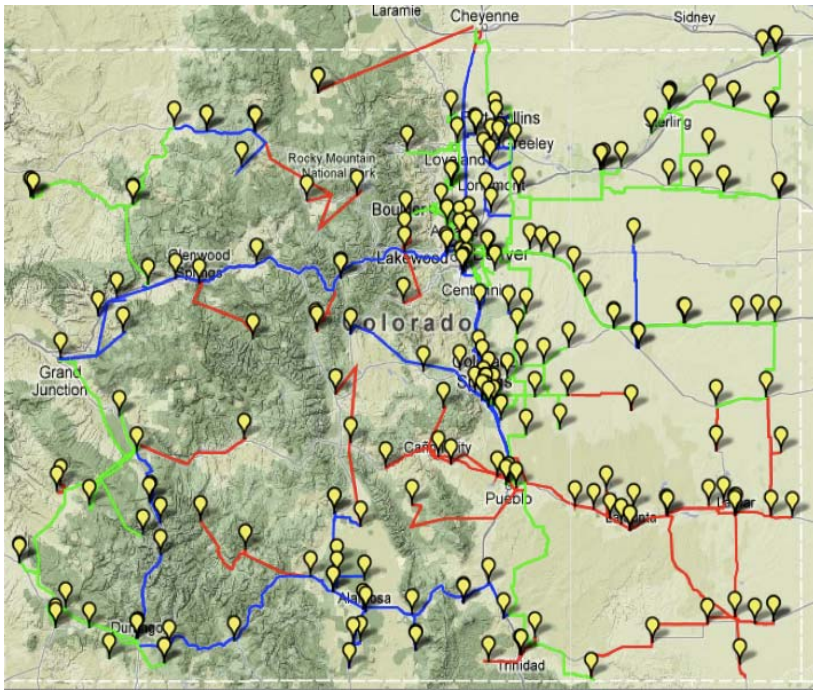
128. *Id.*

APPENDIX A: UNSERVED COUNTIES ACCORDING TO 2010 FCC REPORT AND EAGLE-NET'S BUILDING PROGRESS IN THOSE COUNTIES.

County Name	Region	Progress as of 1/30/13	Progress as of 11/15/13
Baca	SE	Future	Cancelled
Bent	SE	Future	Cancelled
Cheyenne	NE	Completed	Completed
Conejos	Central Mountains	Under development	Delayed
Costilla	Central Mountains	Under development	Completed
Crowley	SE	Future	Cancelled
Custer	Central Mountains	Future	Under development
Dolores	SW	Under development	Under development
Gilpin	Central Mountains	Unclear/future?	Delayed
Hinsdale	SW	Future	Delayed
Jackson	Central Mountains	Future	Delayed
Kiowa	SE	Future	Cancelled
Kit Carson	NE	Completed	Completed
Mineral	SW	Future	Delayed
Otero	SE	Future	Cancelled
Phillips	NE	Completed	Completed
Prowers	SE	Future	Cancelled
Saguache	Central Mountains	Under development	Completed
Washington	NE	Completed	Completed

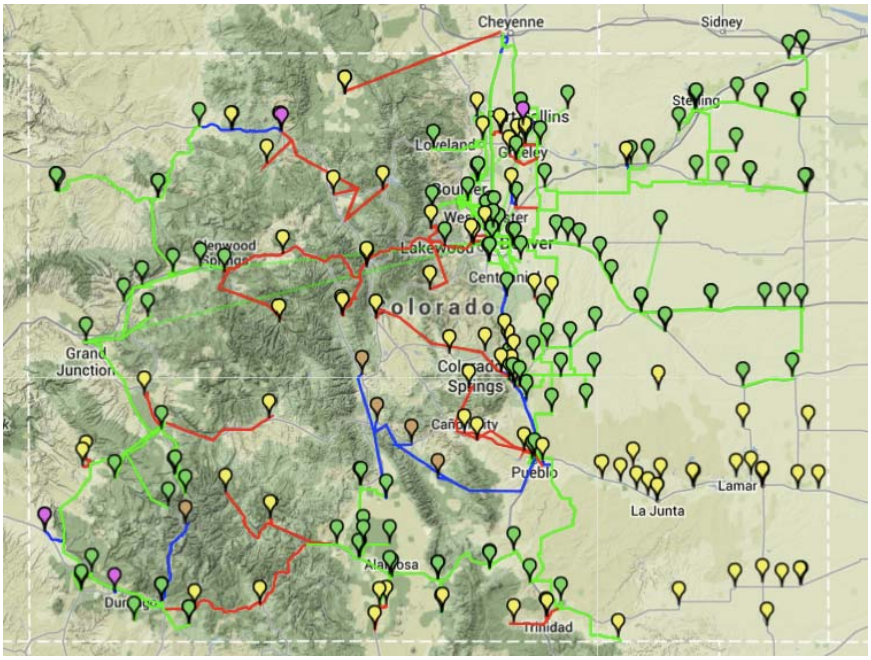
APPENDIX B: EAGLE-NET PROGRESS MAP AT THE BEGINNING AND END OF 2013

1. Network Progress as of January 30, 2013.



Map Key
Green = Complete
Blue = In progress
Red = Future development

2. Network progress as of November 15, 2013



Map Key

Lines:
Green = Complete
Blue = In progress
Red = future development

Marker tags:
Green = Service Available
Purple = 2013 Priority Build
Tan = 2014 Priority Build
Yellow = Other Community Anchor Institutions

CHINESE NATIONALISM AND THE MISHAPS THAT CLOSED THE SHOW ON GOOGLE MUSIC

JEAN PYUN*

INTRODUCTION

In 2009, Google partnered with major record labels and offered a music download search service in China. The service provided free licensed music downloads in an attempt to curb music piracy. Soon thereafter, Chinese online entertainment companies, such as Baidu and Youku, followed suit and started to clean up their intellectual property acts. Yet in September 2012, Google announced it was shutting down its music download search service in China. Why did Google's promising service fail? What could Google have done differently? Can market forces move Chinese entertainment websites towards legitimate uses of

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intellectual property?

This note proposes that Google's music product failure is attributable to China's cultural environment, which does not value individual property rights, and to Chinese society's preference for promoting national companies over foreign companies. China's strong nationalism creates an environment where businesses must adhere to Chinese societal values and laws in order to be successful. When businesses either ignore these cultural influences or attempt to apply a business model that does not account for the unique characteristics of the Chinese market, even the most successful businesses are vulnerable to failure in China.

Part I outlines the history of piracy in Chinese culture and explores piracy's impact on China's early education system. Part I also looks at the current role piracy plays in the Chinese marketplace. Part II details the rise of intellectual property rights in Chinese society as well as China's transition from a regime that promoted piracy to one that protects intellectual property rights. Part III details the rise of the Internet and government censorship. Part IV addresses Google's tumultuous relationship with China since it entered the Chinese market in 2006 and suggests that while China's history of accepting piracy played a role in Google's music service failure, the product's flop is mostly due to strong nationalist sentiments that were exacerbated when Google circumvented China's Internet censorship system. Part V concludes with a few of the key lessons learned from Google's mishaps, a discussion of how Google's music service did succeed in paving the way for other companies to address their intellectual property violations, and a guide for companies to better position themselves to prevent failure in China.

I. BACKGROUND OF PIRACY IN CHINA

A. Piracy Today and the Increase in Internet Users

The word "piracy" is often associated with China generally. After all, "no country contributes more to the piracy problem" than China.[1] For example, the recording industry estimates that while physical music piracy rates are around 90%, online music piracy rates are approaching 99%.[2] These extremely high rates of music piracy have drastic economic consequences. The United States International Trade Commission estimates that U.S. companies lost approximately $48.2 billion in sales,

1. Eric Priest, *The Future of Music and Film Piracy in China*, 21 BERKELEY TECH. L.J. 795, 796 (2006).

2. *2012 Special 301 Report on Copyright Protection and Enforcement*, 2012 INT. INTELL. PROP. ALLIANCE 32, *available at* http://www.iipa.com/rbc/2012/2012SPEC301CHINA.PDF [hereinafter IIPA Report].

royalties, or license fees due to intellectual property rights violations in China.[3] Improvements in enforcing China's intellectual property rights to levels that match those in the United States could lead to a $107 billion gain in U.S. exports and sales as well as the creation of over 922,500 new U.S. jobs.[4]

Internet-based piracy continues to increase with improvements in technology and access to mobile devices.[5] According to a report from the government-run China Internet Network Information Center, as of the end of 2011, there were 513 million Internet users in China.[6] This is a drastic increase from China's 298 million users at the end of 2008.[7] In contrast, the U.S. had 220 million Internet users as of November 2011.[8] Roughly 69.3% of China's Internet users can access the Internet through mobile devices.[9] In 2011, 75.2% of China's Internet users used the Internet for music, 63% used the Internet for gaming, and 63% used the Internet for videos.[10] China's Internet users are increasingly using the Internet to access entertainment content, and mobile devices allow more users to access this content anywhere.

However, despite the increase in China's Internet users, legitimate sales for music amounted to only $64.3 million in 2010. In comparison, legitimate sales for music totaled $68.9 million in Thailand, which is a country with less than 5% of China's population and nearly equivalent per-capita GDP.[11] If Chinese sales were to match Thailand's on a per-capita basis, music sales in China should be around $1.4 billion.[12]

These studies and reports illustrate the prevalence of music piracy in China and the huge economic toll piracy takes. Rampant music piracy in China results in a significant loss of revenue for record companies. The increased access to Internet has only exacerbated the problem,[13] as it allows easy access for those willing to engage in piracy. But why do so many Chinese engage in piracy, and why is it such a problem in China

3. U.S. INT'L TRADE COMM'N, CHINA: EFFECTS OF INTELLECTUAL PROPERTY INFRINGEMENT AND INDIGENOUS INNOVATION POLICIES ON THE U.S. ECONOMY, at 3-1, (May 2011), http://www.usitc.gov/publications/332/pub4226.pdf.

4. *Id.*

5. *See* IIPA Report, *supra* note 2.

6. Leslie Horn, *Number of Chinese Internet Users Climbs to 513 Million*, PC MAG (Jan. 17, 2012, 9:53 AM), http://www.pcmag.com/article2/0,2817,2398956,00.asp.

7. *See Chinese 'Net Users Soar*, PC MAG (Jan. 14, 2009, 9:29 AM), http://www.pcmag.com/article2/0,2817,2338924,00.asp.

8. Amir Efrati & Loretta Chao, *Google Softens Tone on China*, WALL ST. J. (Jan. 12, 2012), http://online.wsj.com/article/SB10001424052970203436904577155003097277514.html.

9. *See id.*

10. IIPA Report, *supra* note 2.

11. *Id.* at 33.

12. *Id.*

13. *See id.* at 32.

specifically?

B. History of Piracy as an Acceptable Practice in Chinese Culture

A closer look at China's Confucian-influenced history helps explain why piracy is so prevalent in Chinese society.[14] The imperial Chinese did not consider copying or imitating a "moral offense."[15] On the contrary, the Chinese considered copying or imitating a noble art, a way to pay respect to their ancestors.[16] In fact, having one's work copied was the greatest compliment an author could receive.[17] Thus, from an early age, Chinese children were taught to copy classics and histories, and, combined with their education focusing solely on relaying information from the past, they would grow up to become scholarly compilers rather than composers of their own creative works.[18] According to scholar Peter Yu, the practice of what would be considered plagiarism today was an "acceptable, legitimate, or even necessary" aspect of imperial China.[19] Yu even states that Confucius himself proudly declared in the Analects that he was only conveying what was taught to him.[20]

Furthermore, the Confucian ideals of family and society emphasized the familial unit and collective rights to the exclusion of individual rights.[21] For over two thousand years, Confucian teachings deeply influenced the Chinese and its principles laid the foundation for Chinese cultural and societal values.[22] According to the Confucian view of civilization, the family unit is considered the basic unit of community.[23] Instead of valuing an individual's innovations, creative works were considered to be a collective benefit for the family and the greater community.[24] The deeply rooted influence of Confucian values encouraged copying and promoted the idea of a collective right to creative works. Thus, the concept of individual rights did not exist in early Chinese society and is not a part of traditional Chinese culture.

14. *See, e.g.,* WILLIAM P. ALFORD, TO STEAL A BOOK IS AN ELEGANT OFFENSE: INTELLECTUAL PROPERTY LAW IN CHINESE CIVILIZATION (1997); Peter K. Yu, *Causes of Piracy and Counterfeiting in China*, GUANXI: THE CHINA LETTER (2007), http://www.peteryu.com/guanxi.pdf; Kenneth Rapoza, *In China, Why Piracy is Here to Stay*, FORBES (July 22, 2012, 9:47 PM), http://www.forbes.com/sites/kenrapoza/2012/07/22/in-china-why-piracy-is-here-to-stay/.

15. Yu, *supra* note 14, at 1.

16. *Id.*

17. Kristie Kachuriak, *Chinese Copyright Piracy: Analysis of the Problem and Suggestions for Protection of U.S. Copyrights*, 13 DICK. J. INT'L L. 599, 605 (1995).

18. Yu, *supra* note 14, at 1.

19. *Id.*

20. *Id.*

21. *Id.*

22. *Id.*

23. *Id.*

24. *Id.*; *see* Rapoza, *supra* note 14, at 1.

In addition to the strong emphasis on the collective right, Confucian teachings disapproved of creating works for profit.[25] Yu attributes this idea to the fact that merchants were considered the lowest amongst the social classes in traditional Chinese society to Confucianism's general disdain for commerce and profit-seeking motives.[26] Confucianism's distaste for merchants and commerce coupled with the emphasis on familial and community values demonstrate that individual and intellectual property, "where the spoils go to one entity or one person," historically, is not a Chinese cultural value."[27] Thus, it is illuminating to see how China eventually developed an intellectual property rights regime despite having these deeply embedded Confucian values and an established culture of piracy.

II. THE DEVELOPMENT OF CHINA'S COPYRIGHT LAWS

A. The Pre-Cultural Revolution and Cultural Revolution Era: 835-1966

China's earliest efforts to regulate the notion of intellectual property rights developed out of a motivation to sustain imperial power rather than a desire to foster the growth of creative works.[28] In 835 A.D., Emperor Wenzong of the Tang Dynasty issued an edict that regulated the reproduction of publications.[29] At the time, the edict was designed to protect against the unauthorized publication of any materials that would undermine the emperor's power or predict the dynasty's downfall.[30] By the end of the Tang dynasty, the edict was expanded and subsequently used as a way to sustain power rather than to promote creative works.[31] Successive dynasties expanded on these restrictions by simultaneously restricting the use of emblems associated with the imperial family and promulgating codes to control the use and publication of materials.[32] Despite these edicts and regulations, which seemingly attempted to protect the unauthorized reproduction of creative works, a formalized regime of intellectual property rights failed to come to fruition.[33] Perhaps this is because the narrow scope of the edicts prevented the expansion of intellectual property rights.

25. Yu, *supra note* 14.
26. *Id.*
27. Rapoza, *supra* note 14.
28. Peter K. Yu, *Piracy, Prejudice, and Perspectives: An Attempt to Use Shakespeare to Reconfigure the U.S.-China Intellectual Property Debate*, 19 B.U. INT'L L.J. 1, 4 (2001).
29. *Id.* at 3.
30. *Id.* at 4.
31. *Id.*
32. *See id.*; Alford, *supra* note 14, at 15.
33. *See* Alford, *supra* note 14, at 17-18.

The Qing dynasty eventually ratified China's first copyright statute in 1910, and it was amended in 1915 and 1928 by subsequent governments.[34] However, with the rise of the Chinese Communist Party and its leader, Mao Zedong, in 1949, the copyright law was repealed—under the Marxist-Leninist system of beliefs, all artistic, scientific, and literary works were considered expressions of state ideology and were not considered personal property.[35] Instead, "property" was owned by the state.[36] Despite the Communist government's policies, there was a system of informal regulations and administrative orders that controlled plagiarism until 1966, when these regulations were abolished during the Cultural Revolution.[37]

B. The Post-Cultural Revolution and Modern Era: 1976-Current

The death of Mao in 1976 led to new party leadership and the reopening of China in the 1980s, collectively known as the Open Door Policy reforms.[38] Under these new policies, the need for copyright law was recognized, but such laws were not enacted until 1990.[39] The copyright law that passed in 1990 was heavily influenced by pressures from the U.S. and Japan to harmonize China's copyright scheme to meet western standards.[40] The Standing Committee of the National People's Congress revised the Copyright Law of the People's Republic of China in 2010, and as it currently stands, the law provides protection for a broad range of works in arts, literature, and sciences, and it specifically enumerates the rights included in a copyright grant.[41]

This brief overview of the development of China's intellectual

34. June Cohan Lazar, Note, *Protecting Ideas and Ideals: Copyright Law in the People's Republic of China*, 27 LAW & POL'Y INT'L BUS. 1185, 1186 (1996).

35. Kachuriak, *supra* note 17, at 603.

36. *Id.*

37. Lazar, *supra* note 34, at 1186.

38. *Id.* at 1187.

39. Kachuriak, *supra* note 17, at 604.

40. *See* Lazar, *supra* note 34, at 1188; Heidi Hansen Kalscheur, Note, *About "Face": Using Moral Rights to Increase Copyright Enforcement in China*, 39 HASTINGS CONST. L.Q. 513, 518 (2012).

41. *See* Kalscheur, *supra* note 40, at 519; Copyright Law of the People's Republic of China (promulgated by the 13th Standing Comm. of the 11th Nat'l People's Cong., Feb. 26, 2010) (China), ch. 2 art. 10 (copyrights include the rights to: (1) publication; (2) authorship; (3) revision; (4) integrity; (5) reproduction; (6) distribution; (7) rental; (8) exhibition; (9) performance; (10) presentation; (11) broadcasting; (12) communication through information networks; (13) cinematography; (14) adaptation; (15) translation; (16) compilation; and (17) other rights a copyright owner is to enjoy; ch. 1 art. 3 includes works to be copyrighted as "works of literature, art, natural sciences, social sciences, engineering, and technology, which are created in any of the following forms": (1) written works; (2) oral works; (3) musical, dramatic, quyi, choreographic and acrobatic works; (4) works of the fine arts and architecture; (5) photographic works; (6) cinematographic works; (7) graphic works; (8) computer software; and (10) other works as provided for in laws and administrative regulations).

property rights regime shows that the concept of protecting authorship and individual rights is relatively new to China. It was not until the Open Door Policy reforms that China accelerated the process of developing its intellectual property rights in order to promote economic growth and open China's market to the rest of the world.[42] In fact, while it took other countries decades to develop their intellectual property rights regimes, China put together its regime in "a little more than a dozen years."[43] Thus, despite the rapid developments and improvements in intellectual property rights over the last two decades, the Chinese may have only an elementary understanding and appreciation of intellectual property.[44]

It is difficult to shed a deeply engrained idea that copying someone's work is a "noble art," especially when a young, rapidly developed intellectual property rights regime has only emphasized these rights for the past few decades. Therefore, it may be unrealistic to expect China to have the level of appreciation for the need to protect creative works with copyright protections similar to that of western regimes with advanced intellectual property protections.[45] As the Chinese struggle to develop a robust intellectual property rights regime, the increase of Internet users has also created a host of new problems for the Chinese government to deal with, including Internet censorship.

III. THE RISE OF THE INTERNET AND GOVERNMENT CENSORSHIP

For as long as there has been Internet in China, the Chinese government has monitored how its citizens use it and has controlled the content that is delivered through it.[46] This desire to monitor and control the Internet stems from the Cultural Revolution era when the government kept a tight control on the media.[47] During this era, the government not only restricted the number of media outlets, but it also controlled the content published, including the length and format.[48] Then, from the end of the Mao era to the mid-1990s, news media providers were funded either directly or indirectly through the government, which meant that the government had near total control of the information that was disseminated to its citizens.[49] When China's economy opened up in the

42. Kachuriak, *supra* note 17, at 605.

43. *Id.* (attributing The White Paper, which was released by the information office of China's State Council and explains China's position regarding intellectual property).

44. *Id.*

45. *Id.*

46. Randy James, *Chinese Internet Censorship*, TIME (Mar. 18, 2009), http://www.time.com/time/world/article/0,8599,1885961,00.html.

47. Jonathan Hassid, *Controlling the Chinese Media: an Uncertain Business*, 48 ASIAN SURVEY NO. 3 414, 416 (June 30, 2008).

48. *Id.*

49. *See id.* at 416-17.

late 1970s, the news business also gradually shifted to a market-driven system based on advertisement revenue.[50] However, Chinese news media organizations were financially incentivized to engage in self-censorship and were punished when they did not self-censor or comply with the government's mandates.[51] It is against this backdrop that China's Internet monitoring system has developed to become one of the most sophisticated and effective systems in the world.[52]

The Internet monitoring technology, also known as "the Great Firewall," blocks websites that display sensitive topics,[53] while government monitors frequently check blogs, chat rooms, forums, and emails to make sure that China's Internet users are not challenging the country's "harmonious society."[54] In addition, there is a voluntary pledge system where citizens can monitor and report sites that contain prohibited information and content.[55] This complex system of monitoring and regulation is backed by some of the most advanced technology available in the market.[56]

Despite the heavy monitoring, most Chinese seem to be comfortable with some government control of the Internet.[57] According to a 2007 survey conducted by the Chinese Academy of Social Services, over 80% of participants believed that the Internet should be managed or controlled, with the government having the biggest role, followed by Internet companies and parents.[58] Forty-five percent of respondents agreed that politics should be controlled while around 30% thought that online chatting should be managed or controlled.[59] Interestingly, only around 30% of those surveyed believed that the Internet gives people

50. *Id.*

51. Ashley Esarey & Xiao Qiang, *Digital Communication and Political Change in China*, 5 INT'L J. COMMC'N 298, 302 (2011).

52. Christopher Stevenson, Note, *Breaching the Great Firewall: China's Internet Censorship and the Quest for Freedom of Expression in a Connected World*, 30 B.C. INT'L & COMP. L. REV. 531, 537 (2007).

53. James, *supra* note 46. Such topics include the Tiananmen Square uprising, Taiwan, support for free Tibet, the Falungong Chinese religious movement, human rights issues, and pro-democracy commentary. Kristen Farrell, *The Big Mamas Are Watching: China's Censorship of the Internet and the Strain on Freedom of Expression*, 15 MICH. ST. J. INT'L L. 577, 587-88 (2007).

54. James, *supra* note 46.

55. Stevenson, *supra* note 52, at 540.

56. *Id.* at 541.

57. Yutian Ling, *Upholding Free Speech and Privacy Online: A Legal-Based and Market-Based Approach for Internet Companies in China,* 27 SANTA CLARA COMP. & HIGH TECH. L.J. 175, 185 (2010).

58. *Id.*; Guo Liang, *Surveying Internet Usage and its Impact in Seven Chinese Cities,* CHINESE ACAD. OF SOC. SERVS. 12-15 (2007), http://www.worldinternetproject.com/_files/_Published/_oldis/_China%20Internet%20Project%20Survey%20Report%202007.pdf [hereinafter Chinese Internet Survey].

59. Chinese Internet Survey, *supra* note 58, at 13-14.

"more political power."[60] These results indicate that Chinese attitudes toward the government's role in Internet censorship are generally positive and tend to receive public support. It was in this closely censored Internet environment that Google decided to enter the Chinese market.

IV. GOOGLE IN CHINA

A. Here Comes Google

Google launched Google.cn in 2006 with the belief that increasing access to information for the Chinese would offset the negative effects of having to censor some search results.[61] At the time, Google recognized the dilemma in complying with Chinese censorship and surveillance policies.[62] Despite these challenges, Google launched Google.cn fully aware that it would have to comply with government censorship and surveillance requirements, so long as it could state on search results pages that some results were unavailable due to censorship.[63]

From the start, China and Google had a difficult relationship. In December 2005, not long after Google received its operating license, the Chinese government declared the license invalid because it was uncertain if Google should be categorized as a news portal or as an Internet service.[64] Since foreigners were not allowed to operate news portals in China, the government decided to revoke the license until it could determine Google's status.[65] Google finally received its operating license again after more than a year of negotiations.[66]

In December 2009, Google and around twenty U.S. companies were targets of cyber attacks. Google publically suggested that the Chinese government was responsible for the attacks, which resulted in the email accounts of human rights activists being hacked.[67] Soon after, Google engaged in an intense battle with Beijing when it decided to stop censoring search results in China, even if that meant closing its China operations.[68] In March 2010, Google announced that it was redirecting all Google.cn visitors to its uncensored Hong Kong search site. A few months later, by way of a compromise, Google agreed to create a new

60. *Id.* at 86.

61. Jon M. Garon, *Searching Inside Google: Cases, Controversies, and the Future of the World's Most Provocative Company*, 30 LOY. L.A. ENT. L. REV. 429, 469 (2010).

62. *Id.*

63. Ryan Singel, *Google Fights China; Will Yahoo and Microsoft Follow?,* WIRED (Jan. 14, 2010, 10:07 AM), http://www.wired.com/business/2010/01/yahoo-microsoft-china/.

64. Steven Levy, *Inside Google's China Misfortune*, CNN MONEY (Apr. 15, 2011, 5:00 AM), http://tech.fortune.cnn.com/2011/04/15/googles-ordeal-in-china/.

65. *Id.*

66. *Id.*

67. Singel, *supra* note 63; Garon, *supra* note 61, at 470.

68. Singel, *supra* note 63.

Google.cn page with a link to the non-censored Hong Kong search site.[69]

Although Google pulled its web search site out of China, it says it never abandoned China completely as it still maintained an array of online services that did not require censorship.[70] Google's share of the Chinese search engine market fell to 7.2% in the third quarter of 2011 from 36% in the fourth quarter of 2009, which largely benefitted Baidu, China's largest search engine provider.[71] In 2012, Google renewed its push to expand its operations in China with hopes of growing its mobile devices operating system and online advertising and product-search services.[72] However, frequent disruptions in service due to the Chinese government's censorship system continue to trouble Google's services, such as Gmail and its Hong Kong search engine.[73]

B. China's Response to Google and the Strength of Chinese Nationalism

Google's decision to pull its China-based search site and redirect users in Mainland China to Hong Kong had a polarizing effect. Amongst elite Internet user circles, comprised of tech-savvy netizens,[74] many have expressed grief at what they believe to be a setback in promoting Internet freedom.[75] There was a sense of frustration for Google's sudden departure and the general lack of access to uncensored information.[76]

However, many Chinese citizens and state media outlets had the opposite reaction and launched attacks against Google.[77] The state-run Xinhua News agency decried Google's decision to skirt Chinese censorship laws and stated that Google broke its promise to filter harmful content.[78] A China Daily op-editorial alleged that Google's departure was

69. Jacqui Cheng, *Google Stops Hong Kong Auto-Direct as China Plays Hardball*, ARS TECHNICA (June 29, 2010, 9:53 AM), http://arstechnica.com/tech-policy/2010/06/google-tweaks-china-to-hong-kong-redirect-same-results/ (Google decided to make the change because it was applying to renew its Internet Content Provider license, and the Chinese officials found the redirect "unacceptable.").

70. Efrati & Chao, *supra* note 8.

71. *Id.*

72. *Id.* (according to Daniel Alegre, Google's top executive in Asia, Google hopes to "capitalize on its fast-growing Android operating system for mobile devices.").

73. *Id.*

74. Netizen is defined as an "active participant in the online community of the Internet". MERRIAM-WEBSTER, http://www.merriam-webster.com/dictionary/netizen (last visited Sept. 29, 2013).

75. *See* Lara Farrar, *Google.cn: R.I.P or Good Riddance?*, CNN (Mar. 26, 2010), http://edition.cnn.com/2010/TECH/03/26/china.google.reaction/index.html.

76. *Id.*

77. *See* Ben Blanchard & Melanie Lee, *WRAPUP 2-Chinese media launches new attack on Google*, REUTERS (Mar. 22, 2010, 9:07 AM), http://www.reuters.com/article/2010/03/22/china-google-idUSTOE62L03V20100322?type=marketsNews.

78. *Id.*

a foreign strategy tool for the Obama administration and that the search engine's exit from China was a "deliberate plot."[79] Furthermore, the article stated that Google's departure would leave "more room for China's homegrown search engines, such as Baidu, to improve and to benefit from its search technologies."[80]

Comments by and surveys of Chinese citizens seem to indicate a broader population base that does not support Google's actions. Robert Deng, an associate professor of new media at Fudan University, said, "I agree the Internet users should have freedom of speech, but Google raised this issue in a way that is unacceptable to the government and to the Chinese people."[81] In an online survey through the Global Times, 80% of the respondents said that they do not care about Google's departure. [82] One Chinese Internet user stated that "Google is too political and wants to try to force more human rights or democracy issues on China. . .[i]n this case, most Chinese won't like Google."[83]

These public sentiments reflect the backlash Google received in deciding to skirt Chinese censorship laws. Because the majority of Chinese Internet users agree that there should be some form of government censorship, Google's efforts to bypass China's censorship laws came off as a foreign corporation attempting to force China and its people to do things a certain way, namely, its way. Studies show that relatively minor incidents, such as China's capture of an American spy plane in 2001, provoke extreme public outrage and revive nationalist sentiments amongst the Chinese public.[84] Furthermore, the Chinese government is known to provoke nationalist responses to policy challenges from foreign entities.[85] Thus, Google's departure was welcomed by many Chinese who viewed Google's actions as anti-China. In addition, many saw Google's departure as an opportunity for China's own companies to grow and succeed.

Favoritism and preferential treatment for national brands and companies is not new to China. Historically, reputation was viewed as an individual's or enterprise's "most valuable asset."[86] A good reputation was considered more valuable and reliable than an official stamp or

79. Ding Yifan, *Google's exit a deliberate plot*, CHINA DAILY (Mar. 25, 2010, 7:48 AM), http://www.chinadaily.com.cn/opinion/2010-03/25/content_9638825.htm.

80. *Id.*

81. Farrar, *supra* note 75.

82. Blanchard & Lee, *supra* note 77.

83. Farrar, *supra* note 75.

84. *See, e.g.*, Eric A. Posner & John Yoo, *International Law and the Rise of China*, 7 CHI. J. INT'L L. 1, 2 (2006).

85. *Id.*

86. Jonathan Low & Vincent Leung, *Brand and Reputation in China Following the Financial Crisis*, INTELL. ASSET MGMT. 63 (Mar./Apr. 2011), http://www.iam-magazine.com/Issues/Article.ashx?g=eb292ffe-17e3-4ca2-891e-e1276a712520.pdf.

signature.[87] During Mao's communist takeover in 1949, all property was nationalized, and brands and reputation were controlled and run for the benefit of the communist government.[88] When China opened up its economy during the economic reform era, Chinese consumers started to concern themselves with brand identity and reputation.[89] Initially, Chinese consumers preferred foreign brands to local ones not only because they perceived the quality to be superior, but also because ownership of foreign brands became a symbol of status and wealth.[90]

However, Chinese attitudes towards brands are beginning to shift as its economy and the prominence of domestic brands increase. On the government side, Chinese officials enacted policies and regulations to help develop domestic companies.[91] For example, Beijing insisted that only those foreign companies willing to transfer or share their intellectual capital with the Chinese would receive preferential trading licenses.[92] Similarly, government-backed subsidies and tax-breaks were crucial in developing and supporting domestic companies.[93]

On the consumer side, Chinese citizens are supporting their national brands while simultaneously expressing their discontent with foreign brands. Lenovo, Haier, and Huawei are the success stories of China and have developed a sterling reputation amongst Chinese consumers while also finding favor with international markets.[94] Despite recent issues regarding the quality of milk and children's toys, accusations of poor quality in Chinese products by western countries are often met with sharp criticism. In contrast, Chinese charges of western bias are met with sympathetic public support and nationalism.[95]

This favoritism of Chinese companies and brands is viewed as an obstacle for many international and foreign companies that want to or are doing business in China. According to the 2011 results of an annual survey conducted by the American Chamber of Commerce in Shanghai in which U.S. companies are asked to evaluate the business environment of China, one of the main grievances U.S. companies complained about was Chinese favoritism or protectionism.[96] Despite increasing profits, companies find that the Chinese government favors domestic companies

87. *Id.*

88. *Id.*

89. *Id.*

90. *Id.* For example, according to LVMH Moët Hennessy, Chinese consumers are the largest purchasers of Louis Vuitton clothing and Hennessy cognac.

91. *See id.* at 66.

92. *Id.*

93. *Id.*

94. *See id.* at 64-66.

95. *See id.* at 62-64.

96. Chris Hogg, *Foreign firms complain of China favoritism*, BBC (Jan. 19, 2011, 8:10 AM), http://www.bbc.co.uk/news/business-12225662.

over foreign competitors, which leads to a challenging business environment.[97]

Furthermore, underestimating the role nationalism can have on business is becoming one of the crucial missteps for foreign companies that practice business in China. In a notorious case, a Chinese owner of a Mercedes publically smashed his car with a hammer to protest the quality problems and the unsatisfactory service he received from Mercedes.[98] Seventy-seven percent of Chinese that were surveyed believed that Mercedes discriminated against the Chinese and that Mercedes would have handled the complaint differently in another country.[99]

The favoritism of Chinese domestic companies coupled with a lack of transparency, inconsistency in regulations, and bureaucracy can make China a difficult place for foreign businesses to do work.[100] In addition, strong nationalist sentiments can easily sway public opinion. It was in this business environment that Google launched its free music download service in China.

C. Google's Innovative Music Product

Google's decision to offer Chinese consumers a free music download service in 2009 came at a time when the music industry was struggling in the fight against illegal music downloads. At the time, China's entire music industry brought in only $86 million in annual revenue compared to $10 billion from the U.S. market[101] According to the International Federation of the Phonographic Industry ("IFPI"), over 70% of Internet users in China download songs, and of the songs that are downloaded, 99% are downloaded illegally.[102] Therefore, Google's music search service seemed promising—it worked with various record labels from around the world to offer links to free licensed music downloads.[103] Consumers were also able to save song playlists and download them.[104]

97. *Id.*

98. Low & Leung, *supra* note 86, at 64.

99. *Id*. Also involving another Mercedes vehicle, when a Chinese Mercedes owner was involved in an accident, the airbags failed to deploy despite the severity of the car's damage. Unsatisfied with the answer Mercedes gave as to why the airbags did not deploy, the owner held a press conference soon after being released from the hospital to announce that he would only be purchasing domestic goods. Jonathon Ramsey, *Chinese man crashes Mercedes S350, vows to only drive Chinese-built cars*, AUTOBLOG (Jan. 1, 2008, 7:29 PM), http://www.autoblog.com/2008/01/01/chinese-man-crashes-mercedes-s350-vows-to-only-drive-chinese-bu/.

100. *See* Hogg, *supra* note 96.

101. Evan Hessel, *Google's Chinese Music Experiment*, FORBES (Apr. 1, 2009, 2:00 PM), http://www.forbes.com/2009/04/01/google-music-china-business-media-google.html.

102. *Id*.

103. *See id.*

104. *See* Melanie Lee, *Google shuts once-feted China music download service*, REUTERS

Since the service was free, it was thought to have appealed to Chinese consumers who were downloading music illegally and was a positive way to promote intellectual property rights in China.[105]

Google partnered with Google-funded Top100.cn, a Chinese online music provider, to offer the service.[106] By selling advertisements next to results delivered to users searching for certain artists, albums, or songs, the service was viewed as a way for music labels to receive some revenue, rather than none, in China.[107] Music labels were desperate to make some revenue from the Chinese music market and were willing to "turn over their catalogs in exchange for a share of such a measly new revenue stream," according to music and media analyst Sonal Gandhi.[108] The revenue derived from Google's music service was to be split between Google, Top100.cn, and the music labels.[109]

According to Top100.cn's CEO Gary Chen, Google and Top100.cn executives hoped to grow the service to around $15 million in revenue within the first few years following the service's launch.[110] Google sought to develop a music search service that rivaled the popular music search engine provided by Baidu, a Chinese search engine service, which at the time provided copyright-infringing music links and illegal downloads.[111] Baidu's dominance in the Chinese search engine market had already been established—as of 2009, it controlled 62% of the search engine market compared to 28% for Google.[112] Some were even under the impression that Google would be willing to operate the Chinese music service at a loss just to cut into Baidu's market share for search engine traffic.[113]

Google was in a prime position to succeed in China. It launched a music service that offered legal downloads at a time when there was increasing pressure for China and its consumers to curb the rampant music piracy. The IFPI was in the midst of suing Baidu for facilitating illegal music downloads.[114] In addition, Google's service was free for

(Sept. 21, 2012, 11:03 AM), http://in.reuters.com/article/2012/09/21/net-us-google-china-music-idINBRE88K07120120921.

105. *See* Hessel, *supra* note 101.

106. *Id.*

107. *Id.*

108. *Id.*

109. *Id.*

110. *Id.*

111. Lee, *supra* note 104.

112. Hessel, *supra* note 101; Most recently in 2012, according to Beijing-based research firm Analysys International, Baidu's market share for search traffic was over 78% while Google's market share was just under 17%. Paul R. La Monica, *Baidu: Is China's Google better than Google?*, CNN MONEY (Feb. 13, 2012, 12:56 PM), http://money.cnn.com/2012/02/13/technology/thebuzz/index.htm.

113. Hessel, *supra* note 101.

114. *Id.*

Chinese consumers because the revenue model was parsed together as a compromise for the record labels. If all the elements for success were in place for Google's music product, then why did Google decide to pull the plug on its music service in China just three years later? What was Google missing?

D. The Real Reasons Behind Google Music's Failure

In September of 2012, Google announced that it was ending its Chinese music service.[115] The announcement came through a blog post from one of Google China's senior executives, Boon-Lock Yeo, who stated that Google was shutting down its music service in order to focus on offering other Google products and services.[116] The music service was pulled after three years on the market and only two years after Google announced it was no longer willing to comply with Chinese censorship laws.

Baidu's dominance in China and Chinese consumers' strong nationalist sentiments help explain why Google's music service failed. While Google had a great music service to offer to the Chinese market, the general backlash against Google's decision not to censor its search engine results contributed to the demise of Google's music service.

Historically and culturally, China does not value intellectual property rights and this influence is apparent in today's society. Copyright violations are widespread in China, especially when it comes to music piracy. However, Chinese consumers seem to be gradually shifting away from a culture that does not respect intellectual property rights towards one that does value the importance of protecting intellectual property rights.[117] There are indications that the Chinese are willing to pay for some music services, such as services related to mobile devices—China Mobile, China's largest cellular phone operator, earned $3.1 billion in 2010 on digital music, which included purchases for background music that plays when someone calls a number.[118] But even if the mindset of Chinese consumers is a long way from making this type of revenue scheme a reality for record labels, free licensed music

115. Michael Kan, *Google yanks free music service in China*, PC WORLD (Sept. 21, 2012, 6:54 AM), http://www.pcworld.com/article/2010313/google-yanks-free-music-service-in-china.html.

116. *Id.*

117. *See* Loretta Chao, *With Baidu Free Music Deal, Can Record Labels Tempt Chinese Users to Pay Up?*, WALL ST. J. (July 19, 2011, 8:28 PM), http://blogs.wsj.com/chinarealtime/2011/07/19/with-baidu-free-music-deal-can-record-labels-tempt-chinese-users-to-pay-up/ (stating that as long as the music service or source is free, some Chinese consumers seem to show a preference for licensed music that can be downloaded legally).

118. *Id.*

services, such as the one Google offered, would seem to resonate with Chinese consumers who are increasingly concerned with intellectual property rights, but are unwilling to pay for a service they traditionally accessed for free.

Google's struggle in China also seems to have little correlation with its reputation regarding the quality of its services. In terms of the two search engine capabilities, while Baidu's incumbent status does provide some benefits, Google seems to offer comparable if not better search engine capabilities.[119] Baidu began its operations in 2000 while Google did not enter China until 2006.[120] However, technology analysts have stated that Google has adequately deciphered the difficulties and nuances of Mandarin.[121] Some Internet users are also critical of Baidu mixing organic search results with paid search results, which can lead to confusion for users.[122] According to some, this results in a high risk of scams for Internet users.[123] Thus, while Baidu attributes most of its success to knowing the Chinese user better than foreign rivals,[124] Google's service seems to match if not exceed its Chinese counterpart's quality when it comes to understanding the Chinese Internet user. Hence, Chinese users' preference for Baidu over Google must be attributed to factors that are not related to its reputation regarding the quality of its services.

Rather, it is more likely that the backlash Google encountered from its various missteps related to Internet censorship in China. This ultimately dissuaded Chinese consumers from using Google over Baidu, even when Google was offering a better product. First, Google failed to consider that a one-size-fits-all model would not work in China. Google did not expect that the majority of Chinese citizens supported the government's censorship of search results. Instead, Google attempted to import free speech and the democratization of ideas to China at a time when the Chinese did not seem ready to accept these values. This was a critical mishap for Google especially because it is a foreign entity. Technology journalist and blogger Ryan Singel believes that Google's dramatic response to the 2009 cyber attacks left "little room for the

119. *See* Stephanie M. Metha, *Google v. Baidu: Which company will win China?*, CNN MONEY (Dec. 8, 2009, 8:06 AM), http://tech.fortune.cnn.com/2009/12/28/google-v-baidu-which-company-will-win-china/.

120. *Id.*

121. *Id.*

122. *Id.*

123. Jon Russell, *Sizing up Two Internet Giants: Google vs. Baidu in China*, THE NEXT WEB (Feb. 23, 2012, 2:45 AM), http://thenextweb.com/asia/2012/02/23/sizing-up-two-internet-giants-google-vs-baidu-in-china-infographic/.

124. Loretta Chao & Aaron Back, *China's Baidu Weighs Life After Google*, WALL ST. J. (Jan. 21, 2010, 12:01 AM), http://online.wsj.com/article/SB10001424052748704423204575016791485282632.html.

Chinese government to negotiate and save face."[125] Rather, if Google had navigated within the parameters of China's laws and remained sensitive to Chinese culture, perhaps there would have been a different outcome, and Google may have been a strong player in the legitimization of music downloads in China.

Baidu is another factor that contributed to the failure of Google's music service. Google's retreat to Hong Kong had already halted the growth in traffic for the music service that it offered in partnership with Top100.cn. Therefore, although Baidu's music search services provided access to illegal links, Chinese citizens may not have been willing to overlook Google's status as a foreigner to support its music product. Strong Chinese preferences for supporting domestic companies over foreign ones can play an important role in determining which entities fail and which ones succeed. This is also why Microsoft and Yahoo still struggle with gaining market share even though they have largely agreed to China's censorship pact.[126] On December 19, 2012, Yahoo followed in Google's footsteps when it announced its decision to shut down its Chinese music service as part of an adjustment to its product strategy.[127] Even though Yahoo partnered with Chinese e-commerce powerhouse, Alibaba,[128] it still faced difficulties penetrating the Chinese market. And Google was no better off partnering with lesser-known Top100.cn.

V. LESSONS LEARNED FROM GOOGLE

While Google's music service was short-lived, it paved the way for Chinese Internet entertainment providers to evaluate and overhaul their intellectual property acts. In 2011, Baidu inked a deal with record labels to offer Chinese Internet users licensed copies of songs from three major record labels—Sony, Universal, and Warner—for free.[129] Because of the deal, Baidu song downloaders can now access over 500,000 songs that are owned by those three music labels.[130] This is an expansion of the licensed music offerings from regional labels and EMI that Baidu users already had access to.[131] This deal is a way "to forge a commercial partnership with Baidu that respects the value of copyright," according to

125. Singel, *supra* note 63.

126. *See id.* Yahoo came under criticism after it turned over the emails of activist Wang Xiaoning to government authorities who used the information to sentence Wang to a 10-year prison sentence. Microsoft has largely complied with Chinese censorship rules such as banning controversial terms in its blogging service.

127. Josh Ong, *Yahoo follows Google in shutting down music service in China*, THE NEXT WEB (Dec. 19, 2012, 3:04 AM), http://thenextweb.com/asia/2012/12/19/yahoo-follows-google-in-shutting-down-music-service-in-china/.

128. *Id.*

129. Chao, *supra* note 117.

130. *Id.*

131. *Id.*

Lachie Rutherford, a director of OneStop, which is the joint venture company created by Sony, Universal, and Warner to handle distribution agreements in China.[132]

Other Chinese companies like Youku, China's leading video sharing website, are also cleaning up their intellectual property acts. Youku is implementing several technologies, such as digital fingerprinting and a copyright screening system, to prevent digital copyright infringement.[133] While Youku started off with mostly unlicensed content, early last year, Youku inked a deal with Twentieth Century Fox to offer licensed films through its on-demand platform.[134] According to Youku, the number of users that pay for content has sharply increased in 2011, which is a positive step toward protecting intellectual property rights.[135]

While Google's music service was a failure by business standards, its failure sheds light on some important lessons regarding how a foreign company should navigate the Chinese market, especially when there is a domestic competitor. First, China is a country where intellectual property rights are not as developed as they are in western countries. Because China's copyright regime is relatively new, western counterparts should remain patient as the country experiences growing pains related to the protections it affords against copyright infringement. Eventually, as domestic companies expand and grow, the demand for better enforcement of intellectual property rights will likely continue as it did with Baidu and Youku.

Second, companies in China should be sensitive to Chinese nationalism and the cultural factors that motivate the population. Companies, especially foreign ones, should thoroughly consider how the Chinese market could perceive and react to its business decisions. For example, Google did not anticipate that acting against the government's censorship requirements would backfire and create public animosity rather than support. Complying with the government's laws and regulations is important and shows respect for China in the public's eyes.

Lastly, because China's government and the public are enthusiastic about supporting domestic companies, partnering with a domestic company and allowing it to be the face of a new project might increase the likelihood of success. Businesses should integrate and immerse as much as possible with the local markets to show less distinction between foreign and domestic entities. Identifying up-and-coming domestic

132. *Id.*

133. Ke Steven Wan, *Managing Peer-to-Peer Traffic in Mainland China and Hong Kong*, 11 J. Marshall Rev. Intell. Prop. L. 548, 560 (2012).

134. Rick Martin, *Chinese Video Site Youku Makes Movie Deal With Twentieth Century Fox*, YAHOO! FINANCE (Jan. 11, 2012, 8:45 AM), http://finance.yahoo.com/news/Chinese-Video-Site-Youku-paidcontent-2753412078.html.

135. *Id.*

competitors and investing in them may be a good way to decrease the risk of encountering a Google-esque failure.

CONCLUSION

Google's decision to cancel its free music service in China after only being on the market for three years probably did not come as a surprise to many. When Google defied the Chinese government's policy regarding its Internet censorship laws, there was public backlash against Google's actions. The public viewed the situation as a foreign entity acting against China and challenging its autonomy. In addition, Baidu, a Chinese company in the search engine industry, offered a competing product that was better received by the Chinese public because of Chinese preferences for supporting domestic companies. Google's misunderstanding of unique Chinese cultural factors, including the public's general approval of government censorship and strong Chinese nationalist sentiments, helps explain why Google faltered in China after offering the music service for just three years.

Despite Google's business failure, its project fostered many important improvements in China's intellectual property rights regime and many lessons can be drawn from Google's mishaps. The launch of Google's music service encouraged Chinese online media and entertainment companies to improve their intellectual property schemes and promote the legitimate download and use of licensed content. Lastly, Google's failure demonstrates that foreign companies who are looking to enter China must take into account the unique characteristics of the Chinese market. How a company decides to navigate the cultural differences can determine whether or not it will succeed in China.

HOW TO PREVENT FUTURE FLASH CRASHES AND RESTORE THE ORDINARY INVESTORS' CONFIDENCE IN THE FINANCIAL MARKET:

THE IMPLEMENTATION OF CIRCUIT BREAKERS AND SPEED LIMITS TO HELP ENFORCE THE MARKET ACCESS RULE

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INTRODUCTION

In the race for the newest, fastest, trading technology, Wall Street traders are quickly being replaced by lightning-quick computer algorithms, capable of executing a day's worth of stock trades with the single click of a computer mouse. As Wall Street firms invest millions of dollars in the research and development of high-frequency trading ("HFT") technology, U.S. regulators are struggling to keep pace.

The Securities and Exchange Commission ("SEC") simply does not have the financial resources to access the cutting edge trading technology responsible for the new surge of HFT technology in the financial market. The SEC's failure to keep up with these technological advances made its most dramatic display during the May 6, 2010, flash crash. On May 6, Waddell & Reed Financial Inc., a Kansas-based mutual fund manager, sold 1.6 million e-minis[1] over the course of twenty minutes, causing the market to suddenly drop 998.50 points.[2] The market was able to recover 347.8 points by the end of the day, giving the event its name: the flash crash.[3]

In the aftermath of the May 6 flash crash, the Canadian, German, and European Union financial markets immediately implemented preventative policies and regulations in order to avert flash crashes in

1. E-minis are stock market index futures contracts exclusively traded on the Chicago Mercantile Exchange's Globex electronic trading platform. According to Askville by Amazon, "[s]tock index futures are contracts to buy or sell the value of a specific stock index at a specific price on a specific date in the future. Mini contracts are smaller versions of regular contracts and require less money to trade." *What is E-Mini Trading?,* ASKVILLE BY AMAZON, http://askville.amazon.com/E-mini-trading/AnswerViewer.do?requestId=13406505 (last visited Nov. 3, 2013).

2. Tom Lauricella and Peter A. McKay, *Dow Takes a Harrowing 1,010.14-Point Trip*, WALL STREET JOURNAL (last updated May 7, 2010, 12:01 AM), http://online.wsj.com/article/SB10001424052748704370704575227754131412596.html; COMMODITY FUTURES TRADING COMM'N & SECURITIES AND EXCHANGE COMM'N, FINDINGS REGARDING THE MARKET EVENTS OF MAY 6, 2010 10 (Sept. 30, 2010), *available at* http://www.sec.gov/news/studies/2010/marketevents-report.pdf.

3. CFTC & SEC REPORT, *supra* note 2.

their international markets. Among these preventative measures are the implementation of circuit breakers and speed limits on trade execution velocity.[4] In the U.S., regulators did not act as quickly. After a trial period, the SEC implemented the market access rule. The rule aims to ensure that financial firms executing high frequency technology have safety measures in place in case their HFT technology algorithms go awry. While the market access rule is certainly a step in the right direction toward protecting investors from rogue computer algorithms, regulators should additionally follow the international market and implement circuit breakers and speed limits on trade execution. These additional regulatory measures will help overcome the danger of regulators allowing the HFT industry to regulate itself.

The addition of speed limits and circuit breakers to the existing regulatory framework will have the dual effect of leveling the playing field for ordinary investors while simultaneously helping prevent future flash crashes. Speed limits level the playing field for both ordinary and sophisticated investors by ensuring that high frequency traders are not given a radical time advantage over the rest of the financial markets. Speed limits accomplish this goal by placing a time limit on how fast trades can be executed. Circuit breakers, in contrast, are the most direct way to prevent flash crashes as soon as a stock begins to exhibit flash crash symptoms. Circuit breakers stop trading in a particular stock if the price of the stock moves up or down by a certain percentage over a certain, usually short, amount of time. The effect of circuit breakers is to immediately halt the trading of a stock exhibiting flash crash symptoms.

While there are certainly benefits to using HFT technology in the financial market, such as lower trading costs and competitive time advantages, there are signs that HFT is at least partially to blame for ordinary investors' loss of confidence in today's financial market. The U.S should follow the lead of Canada, Germany, and the European Union by implementing circuit breakers and speed limits on trade execution velocity. Speed limits will create a more transparent trading

4. *See* Birgit Ortkemper, BUNDESANSTALT FÜR FINANZDIENSTLEISTUNSAUFSICHT [BaFin] [Federal Financial Supervisory Authority], NEW RULES FOR HIGH FREQUENCY TRADING (Nov. 22, 2012), http://www.bafin.de/SharedDocs/Veroeffentlichungen/EN/Fachartikel/2012/fa_bj_2012_11_hochfrequenzhandel_en.html; Nathaniel Popper, *Beyond Wall Street, Curbs on High-Speed Trades Proceed*, N.Y. TIMES (Sept. 26, 2012), http://www.nytimes.com/2012/09/27/business/beyond-wall-st-curbs-on-high-speed-trading-advance.html?pagewanted=all; Barbara Schechter, *Canadian Regulator Set to Get Tough on High-Frequency Trading*, FINANCIAL POST (July 18,2012, 10:36 AM), http://business.financialpost.com/2012/07/18/canadian-regulator-set-to-get-tough-on-high-frequency-trading; Derek Klobucher, *Europe Takes Control of High-Speed Trading*, FORBES (Oct. 2, 2012, 9:15 AM), http://www.forbes.com/sites/sap/2012/10/02/europe-takes-control-of-high-speed-trading.

environment for financial market investors and circuit breakers will help prevent future flash crashes. Both will help restore the ordinary investor's confidence in the market.

In Part I, this Note offers background information about HFT, including how the technology is used and how the technology contributed to the May 6, 2010 flash crash. This part also describes regulatory reactions to the flash crash, including descriptions of the temporary policies that were immediately implemented in the flash crash's wake. Part II explores why HFT may be bad for ordinary investors, and why HFT technology may be at least partially to blame for ordinary investors' loss of confidence in the U.S. financial market. Additionally, this part analyzes the means by which U.S. regulators can work to overcome the volatile effect of HFT technology.

Part III analyzes the international model for regulating high frequency technology including the legislation and policies implemented by Germany, Canada, and the European Parliament. Part IV asserts that adopting speed limits and circuit breakers will help enforce the market access rule, prevent future flash crashes, and restore the ordinary investor's confidence in the market.

I. BACKGROUND

On May 6, 2010, the U.S. stock market experienced its first "flash crash." At approximately 2:32 p.m., Waddell & Reed Financial Inc., a Kansas-based mutual fund manager, sold 1.6 million e-minis[5] over the course of twenty minutes.[6] This sale saturated the market, causing the market to suddenly drop 998.50 points.[7] Despite the sudden drop, the algorithm continued to execute the trade "without regard to price or time."[8] The market was able to recover 347.8 points by the end of the day, giving the event its name: the flash crash.[9]

The increasing availability of fast-moving trade technology has played a direct role in the increasing prevalence of HFT. HFT is most easily described as a "lightning quick" stock market trade executed on a computer.[10] In its most basic use, HFT executes specialized algorithms via super-fast computers in order to detect market movements.[11] The

5. *See supra* note 1 for a discussion of e-minis.

6. Lauricella & McKay, *supra* note 2; CFTC & SEC REPORT, *supra* note 2, at 2.

7. Lauricella & McKay, *supra* note 2.

8. Graham Bowley, *Lone $4.1 Billion Sale Led to 'Flash Crash' in May*, N.Y. TIMES (Oct. 1, 2010), http://www.nytimes.com/2010/10/02/business/02flash.html.

9. CFTC & SEC REPORT, *supra* note 2, at 2.

10. *HFT*, N.Y. TIMES (updated Dec. 20, 2012) http://topics.nytimes.com/topics/reference/timestopics/subjects/h/high_frequency_algorithmic_trading/index.html.

11. *Rise of the Machines*, THE ECONOMIST (July 30, 2009),

computers then execute those algorithms again to exploit the market movements for the trader's or firm's advantage.[12] There are several ways for HFT to exploit the market movements. One strategy involves sending out "a stream of probing quotes" to trade large orders in blocks of 100 to 500 shares.[13] If the quotes go unanswered (with no willing buyers), the quotes are quickly cancelled.[14] The quotes continue to be cancelled until a buyer is found.[15] Once the trader finds a buyer, "the traders then buy or short the targeted stock ahead of the investor, offering it to them a fraction of a second later for a tiny profit."[16] This quick quoting and cancelling of the order helps the HFTers determine how much a buyer (investor) is willing to pay for the block of shares.[17]

Cisco, Tradeworx, and Thesys are at the forefront of leading HFT technology. Cisco recently released new technology that feeds market data into computers in just 50 nanoseconds.[18] Cisco's Series 3548 model line simultaneously supplies "high-speed switches" to trading firms while providing analytical information about changes in the market.[19] Operating in "normal mode," the 3548 takes in, processes, and forwards trading information in 250 nanoseconds.[20] The 3548 features a "warp span" with the capacity of replicating market data in just 50 nanoseconds and taking in, processing, and forwarding trade information in just 190 nanoseconds.[21]

Tradeworx has teamed up with Thesys technologies to create their own comprehensive HFT technology. The Tradeworx/Thesys technologies feature "hyper-efficient algorithms for block and basket-order execution, hosted on the fastest trading infrastructure anywhere."[22] The technology also creates a paper trail of "real-time and historical surveillance, compliance, and monitoring tools" and features "ultra-fast direct or aggregated feeds and order books, realistic exchange simulators for back testing of active and passive strategies, [and] historical data and visualization tools" to ensure safe trading activity and monitor risk.[23]

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http://www.economist.com/node/14133802.

12. *Id.*
13. *Id.*
14. *Id.*
15. *Id.*
16. *Id.*
17. *Id.*
18. Tom Steinert-Threlkeld, *Cisco Hits 'Warp' Speed, Replicates Feeds in 50 Nanoseconds*, TRADERS MAGAZINE (Sept. 19, 2012), http://www.tradersmagazine.com/news/cisco-50-nanosecond-data-replication-110311-1.html.
19. *Id.*
20. *Id.*
21. *Id.*
22. *See generally* TRADEWORX, http://mail.tradeworx.com (last visited Jan. 16, 2014).
23. *Id.*

After the flash crash, the SEC identified HFT technology, similar to that of Cisco, Tradeworx, and Thesys, as the igniting catalyst to the May 6, 2010 flash crash. An official SEC report found that the flash crash began when the sale of 75,000 E-Mini Standard & Poor's 500 future contracts was executed because of the manipulation of an algorithm over the short time span of just twenty minutes.[24] The report explains that normally, without HFT technology, a comparable sale of this size would take place over five hours.[25] However, the algorithm executed this particular trade "without regard to price or time," and "continued to sell even as prices dropped sharply."[26] As the trades were sold, high frequency traders began to aggressively resell those same trades, causing Waddell's algorithm to accelerate its selling.[27] The report describes what happened next as a "hot potato effect": contracts changed hands between the Waddell traders and the high frequency traders "27,000 times in 14 seconds, but with eventually only 200 actually being bought or sold."[28] The effects of this hot potato trading trickled down from the futures market to the stock market when arbitrageurs began buying the cheap futures contracts, and reselling the cash shares "on markets like the New York Stock Exchange."[29] Other automatic computerized traders on the stock market detected the radical rises in buying and selling, and shut down.[30] This shut down, in turn, led to steep drops in prices of individual stocks.[31] For example, on May 6, 2010, shares of Procter & Gamble were trading at a low price of just one cent, and a high price of $100,000.[32]

A. Symptoms of a Flash Crash

In the SEC's Findings Regarding the Market Events of May 6, 2010, the SEC identified five phases leading up to the flash crash.[33] In the first phase, from the time the market opened to the time Waddell began trading the large block trade, "prices were broadly declining across markets."[34] In the second phase, during the time period the SEC identifies as 2:32 p.m. to approximately 2:41 p.m., the broadly declining

24. Bowley, *supra* note 8.
25. *Id.*
26. *Id.*
27. *Id.*
28. *Id.*
29. *Id.*
30. *Id.*
31. *Id.*
32. *Id.*
33. CFTC & SEC REPORT, *supra* note 2, at 9.
34. *Id.*

markets continued to lose ground, "declining another 1-2%."[35] In the third phase, covering the time between 2:41 p.m. and 2:45:28 p.m., "volume spiked upwards and the broad markets plummeted a further 5-6%."[36] In phase four, from 2:45 p.m. to approximately 3:00 p.m., "broad market indices recovered while at the same time many individual securities and ETFs experienced extreme price fluctuations and traded in a disorderly fashion at prices as low as one penny or as high as $100,000."[37] In the fifth and final phase, beginning at about 3:00 p.m., "prices of most individual securities significantly recovered and trading resumed in a more orderly fashion."[38] These five phases can be more broadly described as: (1) an already volatile market (2) experiences dramatic price fluctuations across the market, then (3) individual securities begin to experience extraordinary price movements, and (4) trading suddenly resumes to a more "orderly fashion."[39]

B. Subsequent flash crashes and related technological glitches

Since the May 6 flash crash, technological glitches and misfires have continued to contribute to an unstable, volatile market. On August 1, 2012, a rogue algorithm caused Knight Capital to flood the market with millions of unintentional orders over a period of just 45 minutes.[40] Subsequently, the firm was forced to accept $400 million in rescue financing (in exchange for more than a 70% stake in the company) and is rumored to be in talks to settle with the SEC for approximately $12 million.[41]

The 2012 Facebook IPO fell victim to technological malfunction when trading was delayed on NASDAQ for 30 minutes after the exchange "had trouble matching buy and sell orders."[42] The pause caused a delay in the confirmation for millions of shares, arguably causing some investors to halt trading in the IPO, consequently hindering Facebook's first-day performance.[43]

On August 22, 2013, an electronic malfunction in a computer system froze trading in Nasdaq-listed stocks, like Apple and Facebook,

35. *Id.*
36. *Id.*
37. *Id.*
38. *Id.*
39. *Id.*
40. John D'Anotona, Jr., *KCG Close to $12M Settlement for 2012 Trading Glitch*, TRADERS MAGAZINE ONLINE NEWS (Sept. 27, 2013), http://www.tradersmagazine.com/news/kcg-knight-close-to-settlement-2012-trading-glitch-111571-1.html).
41. *Id.*
42. Christopher Matthews, *Wall Street's Worst Computer Glitches*, TIME (Sept. 20, 2013, 2:00 PM), http://business.time.com/2013/09/20/wall-streets-worst-computer-glitches.
43. *Id.*

for three hours.[44] That same month, a computer technical error at Goldman Sachs caused the company "to accidently send trade orders to the U.S. options exchanges."[45] Though the exchanges were able to cancel the trades, thereby causing no trading loss to the company, the cancellation outraged exchange members who stood to profit from the trades.[46]

The Knight Capital flash crash, Facebook IPO, and the computer glitches in the summer of 2013 were all the result of deviant computer technology. While these technological glitches cannot solely be attributed to HFT technology, the accumulation of events offer proof that operational risk will persistently plague Wall Street with the continued used of advanced trading technology. The sustained use of similar programs will continue to contribute to an unstable, volatile market.

C. REGULATORY REACTIONS TO THE FLASH CRASH AND CRITICISM OF HOW U.S. REGULATORS REACTED

In an effort to prevent flash crashes in the days and months immediately following the 2010 flash crash, the SEC immediately implemented temporary regulations aimed at curbing short-term volatility of the market. These temporary regulations included circuit breakers, "limit up-limit down" rules, and the market access rule. From these temporary regulations, the SEC permanently adopted the market access rule. Additionally, the SEC launched a website that offers information on every quarter's various HFT quotes, cancellations and executed trades.[47]

1. Circuit Breakers

In the immediate aftermath of the flash crash, the SEC temporarily adopted single stock circuit breakers. Single stock circuit breakers stop trading in a particular stock if the price of the stock moves up or down by 10% over the span of five minutes.[48] According to the SEC, the purpose

44. Kevin McCoy, *S&P: Exchanges' Glitches Put Ratings at Risk*, USA TODAY (Sept. 20, 2013, 2:24 PM), http://www.usatoday.com/story/money/markets/2013/09/20/exchange-glitches-and-downgrades/2842259.

45. *Exchanges' Technical Glitches Reveal Growing Operational Risk—And Could Trigger Downgrades*, STANDARD & POOR'S (Sept. 19, 2013, 1:06 PM), http://www.standardandpoors.com/ratings/articles/en/us/?articleType=HTML&assetID=1245357558044.

46. *Id.*

47. Sarah N. Lynch, *SEC Website Will Shed Light on High-Speed Trading*, REUTERS (Oct. 2, 2013, 6:22 PM), http://www.reuters.com/article/2013/10/02/us-sec-market-data-idUSBRE9910ZE20131002.

48. Bowley, *supra* note 8.

of circuit breakers is to "ensure that market participants have an opportunity to become aware of and respond to significant price movements."[49] The temporary regulation takes form through proposed changes to rule 11.14, and pilot testing began in April of 2013.[50] In broad form, rule 11.14 provides a methodology to determine when to "halt trading in all stocks due to extraordinary market volatility."[51] The rule also provides for trading halts characterized by certain market decline percentages.[52] Decline percentages are divided into three categories: levels 1, 2, and 3.[53] Under the temporary regulation, a level 1 halt indicates a 7% decline, level 2 indicates a 13% decline, and level 3 indicates a 20% decline.[54] The proposed changes also modify how the level trigger point is determined: under the temporary regulation, the level trigger point is calculated by the S&P 500 on a daily basis, rather than by the Dow Jones Industrial Average on a quarterly basis.[55] The changes to rule 11.14 began pilot testing in conjunction with the limit up, limit down rule.[56]

2. Limit Up, Limit Down

This regulation, formally known as Rule 608, provides "for market-wide limit up-limit down requirements that prevent trades in individual NMS Stocks from occurring outside of specified price bands."[57] According to the SEC, Rule 608 flags a trade as non-executable when "one side of the market for an individual security is outside the applicable price band."[58] The SEC explains,

> When the other side of the market reaches the applicable Price Band, the market for an individual security will enter a limit state. Trading for that security will exit the limit state if, within 15 seconds of entering the limit state, all limit state quotations were executed or cancelled. If the market does not exit a limit state within 15 seconds,

49. Self-Regulatory Organizations; EDGX Exchange, Inc.; Notice of Filing and Immediate Effectiveness of a Proposed Rule Change to Delay the Operative Date of Changes to the Rule for Halting Trading in All Stocks Due to Extraordinary Market Volatility, Exchange Act Release No. 34-68805, 78 Fed. Reg. 8648, 8649 (Feb. 6, 2013).

50. *Id.* at 8648-49.

51. *Id.* at 8648.

52. *Id.* at 8648-49.

53. *Id.*

54. *Id.* at 8649.

55. *Id.*

56. *Id.*

57. Self-Regulatory Organizations; C2 Options Exchange, Incorporated; Notice of Filing of Proposed Rule Change Relating to the Regulation NMS Plan to Address Extraordinary Market Volatility, Exchange Act Release No, 34-69083, 78 Fed. Reg. 1630, 1631 (Mar. 14, 2013).

58. *Id.*

> then the primary listing exchange will declare a five-minute trading pause, which will be applicable to all markets trading the security.[59]

The crucial difference between circuit breakers and the limit up, limit down rule, is that circuit breakers "would be used to stop trading across the whole exchange—while limit up, limit down are confined to futures contracts."[60] As explained by CNBC, circuit breakers are more expansive in that they are "a market safety feature [that] temporarily stop[s] trading when there is a computer-induced plummet in prices."[61] To date, the limit up, limit down rule has not been permanently adopted.

3. Market Access Rule

The market access rule is the only official rule adopted by the SEC in the wake of the flash crash. Officially codified as 17 C.F.R. § 242.613, the market access rule mandates that commodity and security exchanges create, implement, and maintain a consolidated audit trail while providing the exchange with flexibility "in how they choose to meet the requirements of the Rule. . ."[62]

The SEC requires that the consolidated audit trail "capture customer and order event information for orders in NMS [National Market Systems] securities, across all markets, from the time of order inception through routing, cancellation, modification, or execution."[63] The SEC explains, "[t]hese requirements are intended to ensure that the Commission and the public have sufficiently detailed information to carefully consider all aspects of the NMS plan ultimately submitted by the SROs, facilitating an analysis of how well the NMS plan would allow regulators to effectively and efficiently carry out their responsibilities."[64] Specifically, the market access rule says that firms executing trades via HFT must:

- Report data by 8 a.m. of the next trading day;[65]
- Transmit all orders to a central repository and "the repository must be able to efficiently and accurately link together all lifecycle events for the same order, and make

59. *Id.*

60. Mark Koba, *Limit Up, Limit Down: CNBC Explains*, CNBC (Mar. 7, 2012, 12:17 PM), http://www.cnbc.com/id/46644158.

61. *Id.*

62. Consolidated Audit Trail, Exchange Act Release No. 34-67457, 77 Fed. Reg. 45,722, 45,738 (18 Aug., 2012).

63. *Id.* at 45,722.

64. *Id.* at 45,725.

65. *Id.* at 45,724.

available to regulators this linked order data";[66]

- Permit small broker-dealers three years to "provide the required data to the consolidated audit trail";[67]

- Require that the selected "plan describe and discuss any reasonable alternative approaches to the creation of the consolidated audit trail that were considered by the SROs and why the approach set forth" was selected;[68]

- "Provide a plan to eliminate existing rules and systems (or components thereof) that are rendered duplicative by the consolidated audit trail, including identification of such rules and systems (or components thereof)";[69]

- Provide a "plan to address the process by which the plan sponsors solicited views of their members and other appropriate parties regarding the creation, implementation, and maintenance of the consolidated audit trail, provide a summary of the views of such members and other parties, and describe how the plan sponsors took such views into account in preparing" the plan;[70]

- "Require the central repository's Chief Compliance Officer to regularly review the operations of the consolidated audit trail, and, in light of market and technological developments, make appropriate recommendations for enhancements to the consolidated audit trail";[71] and

- Provide "detailed information regarding anticipated error rates as well as the plan's proposed error connection process,"[72] including "additional policies and procedures that are designed to ensure the rigorous protection of confidential information collected by the central repository."[73]

66. *Id.*
67. *Id.*
68. *Id.*
69. *Id.*
70. *Id.*
71. *Id.* at 45,724-25.
72. *Id.* at 45,725.
73. *Id.*

In addition to these requirements, the SEC asks that the firms address the following considerations in their plan:

> (1) The specific features and details of the NMS plan (e.g. how data will be transmitted to the central repository, when linked data will be available to regulators); (2) the SRO's analysis of NMS plan costs and impact on competition, efficiency, and capital formation; (3) the process followed by the SROs in developing the NMS plan (e.g. the requirement to solicit input from members of the SROs and other appropriate parties); and (4) information about the implementation plan and milestones for the creation of the consolidated audit trail.[74]

The rule encourages "risk targeted exams," designed to help the SEC better understand how HFT firms implement any technological changes, prevent problems or the algorithm from running affray, and how the firm recovers from technological glitches.[75]

4. SEC Website

The SEC launched the *Market Structure* website in October of 2013 in an effort to make information about HFT technology, data, and tracking more easily accessible to the public.[76] The website shows how quickly orders are filled, compares how often orders that entered the market were actually executed, and how many HFT orders were canceled.[77] The website invites investors to "review current staff market structure research, use interactive data visualization tools to explore a variety of advanced market metrics produced from the Commission's Market Information Data and Analytics System (MIDAS), download dozens of datasets to perform your own analyses," and further the dialogue on HFT through a public feedback feature.[78] According to SEC Chair Mary Jo White, "we expect this new tool to transform the debate on market structure by focusing as never before on data, not anecdote."[79] The SEC updates the website on a quarterly basis, but hopes to make more frequent updates in the future.[80]

74. *Id.*

75. Sarah N. Lynch, *SEC reviewing technology at brokerages following glitches*, REUTERS, (Sept. 26, 2012, 5:15 PM), http://www.reuters.com/article/2012/09/26/sec-technology-review-idUSL1E8KQFE020120926.

76. *Market Structure,* SEC.GOV, http://www.sec.gov/marketstructure/#.UnlUJpNetgJ (last modified Oct. 9, 2013).

77. Lynch, *supra* note 47.

78. *Overview*, *Market Structure,* SEC.GOV, *supra* note 76.

79. Lynch, *supra* note 75.

80. *Id.*

5. Criticism of the U.S. Regulators' Reaction

Critics of the SEC's hesitance to regulate in the aftermath of the 2010 flash crash stand in opposition to advocates against regulation. Critics in favor of regulation argue that a lack of SEC intervention will give rise to "dark pools" of secret trading, and unstable markets. Critics against regulation insist that the market is better off without government intervention. Advocates of self-regulation propose that any legislation of HFT should be left to technical experts in the field.[81]

Critics in favor of government regulation suggest that a lack of regulation contributes to an unstable market.[82] According to this school of thought, volume in the market is not equal with liquidity.[83] Even though HFT technology undeniably inserts volume into the market (by executing large numbers of trades at once), since those trades are not held overnight (they are quickly dropped), the unheld trades do not actually represent a liquid commodity.[84]

Those in favor of government regulation also argue that regulators are responsible for increasing transparency on HFTs.[85] "Dark pools" have surfaced as a safe haven for institutional investors to execute large volume trades in a location that is not available to the public's eye.[86] In the regular, public exchange, when traders detect a large order coming to the market, they run up the stock price.[87] However, in a "dark pool," operated on private platforms instead of the public exchange, "identities and total order sizes are kept hidden until the trade is executed."[88] A key feature of a "dark pool" is that the pool does not identify the

81. *See High Frequency Trading Debate*, THE ECONOMIST, http://www.economist.com/debate/days/view/818; Corey E. Costa, *Is HFT the Problem with the Financial Markets?*, 3 STEVENSON U. FORENSICS J., 18, 2012, http://gps.stevenson.edu/site/wp-content/uploads/2012/04/Forensic_Journal_2012.pdf#page=20; Letter from James D. Angel, PhD, CFA, to the SEC, *RE: Comments on market technology and issues and market stability*, Sept. 5, 2012, http://www.sec.gov/comments/4-652/4652-5.pdf; James Angel, Lawrence Harris, and Chester S. Spatt, Working Paper, *Equity Trading in the 21st Century*, USC MARSHALL SCHOOL OF BUSINESS, Feb. 23, 2010, http://www.scribd.com/doc/93399318/Angel-Harris-Spatt-Equity-Trading-in-the-21st-Century.

82. Seth Merrin, *The Opposition's Closing Remarks*, THE ECONOMIST (Mar. 14, 2012), http://www.economist.com/debate/days/view/818.

83. *Id.*

84. Sal Arnuk, Joseph Saluzzi and R. T. Leuchtkafer, *What's Changed Since the Flash Crash?*, ADVANCED TRADING (May 6, 2011), http://www.advancedtrading.com/algorithms/whats-changed-since-the-flash-crash/229402968.

85. Costa, *supra* note 81.

86. *Id.*

87. Allen Wastler, *Dark Pools: Letting in Some Light Now?*, CNBC (Jan. 28, 2013, 12:18 PM) http://www.cnbc.com/id/100409045.

88. *Id.*

participating broker or institution, or the information about the broker or institution's order.[89] Since the identities of both the buyer and the seller can be concealed in a dark pool, brokers can avoid the fees charged by the public exchanges.[90] Traders who want to make a large trade are enticed to execute in the "dark pool" so that competing traders can't watch the activity.[91] By staying in the "dark," competing traders cannot manipulate prices by driving them up or down, because competing traders can't see the activity.[92] This makes the use of dark pools very attractive for executers of HFT, who primarily execute large volume trade orders.[93]

Critics opposed to government intervention suggest that technical experts are in a better position than SEC attorneys to determine how to regulate the HFT industry.[94] In his comments to the SEC on market technology issues and market stability, James Angel PhD remarked, "the SEC should approach system technology the way the [Federal Aviation Administration] and [National Transportation Safety Board] approach transportation safety by relying primarily on experienced technical experts, not attorneys."[95] Angel advocates against approaching the HFT problems from a legalistic standpoint. He urges:

> It is tempting for the SEC (to) follow its usual custom and to pass a rule which says that market participants must have policies and procedures in place to have good technology and to document those procedures, and then send enforcement people in to inspect the paperwork. However, approaching the problem legalistically sets up an adversarial and thus unproductive atmosphere from the start.[96]

Angel insists that the SEC's effort to regulate through the market access rule is unproductive and more appropriately dealt with by industry experts with technical expertise in HFT.[97]

Other critics of HFT regulation disparage the dangers of the market

89. Nina Mehta, *Dark Pool Disclosures to Users are Subject of Review by Finra*, BLOOMBERG, (Jan. 18, 2013, 5:07 PM), http://www.bloomberg.com/news/2013-01-19/dark-pool-disclosures-to-users-are-subject-of-review-by-finra.html.

90. *Id.*

91. Wastler, *supra* note 87.

92. *Id.*

93. *Id.*

94. James Angel, PhD, CFA, to the SEC, *RE: Comments on market technology and issues and market stability*, Sept. 5, 2012, *available at* http://www.sec.gov/comments/4-652/4652-5.pdf; James Angel, Lawrence Harris & Chester S. Spatt, Working Paper, *Equity Trading in the 21st Century*, USC MARSHALL SCHOOL OF BUSINESS, Feb. 23, 2010, http://www.scribd.com/doc/93399318/Angel-Harris-Spatt-Equity-Trading-in-the-21st-Century.

95. Angel, *supra* note 94, at 2.

96. *Id.*

97. *Id.*

access rule's policy of self-regulation. After delivering his testimony to the Committee on Banking, Housing, and Urban Affairs Subcommittee on Securities, Insurance, and Investment, David Lauer told interviewers, "You don't rely on the subject of your study to build the device you are going to be studying them with."[98] The SEC's decision to permit HFT firms to regulate themselves is akin to "the fox guarding the hen house."[99] HFT firms cannot be trusted to regulate themselves because the temptation to take advantage of their position of power will be too great. HFT traders will continue to exploit the advantages of HFT to the detriment of the ordinary investor.

II. HFT'S AFFECT ON THE ORDINARY INVESTOR

A. How HFT can be Both Good and Bad for the Market and Ordinary Investors[100]

Ordinary investors should be attracted to all of the advantages of trading with HFT technology. HFT lowers the cost of trading, adds liquidity to the market by reducing the bid-ask spreads, and gives investors a valuable time advantage over investors who do not possess HFT technology.[101] All of these HFT characteristics should attract, and not deter, ordinary investors from investing their money in the market.

First, it costs less to execute a trade via high frequency technology. Because the trade is executed using computer technology, the investor pays less for the broker's labor. Lightning quick computer technology also makes it possible for firms to make small profits per trade on high volume orders.[102]

98. Nathaniel Popper and Ben Protess, *To Regulate Rapid Traders, S.E.C. Turns to One of Them*, N.Y. TIMES, Oct. 7, 2012, http://www.nytimes.com/2012/10/08/business/sec-regulators-turn-to-high-speed-trading-firm.html?pagewanted=all.

99. *Computerized Trading: What Should the Rules of the Road Be?* Hearing Before the Subcomm. on Sec., Ins. and Inv. of the S. Comm. on Banking and Urban Affairs, 112th Cong. 20 (2012) (statement of David Lauer, Market Structure and HFT Consultant, Better Markets, Inc.) *available at* http://banking.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore_id=56ef1df0-6c9a-4c53-99e8-2ad7a614afe2.

100. For the purpose of this paper, an ordinary investor is defined as someone who "buys stocks in companies whose profits they expect to rise." Peter Morici, *Are stocks a sucker's bet?*, UPI (Jan. 28, 2013 at 7:25 AM), http://www.upi.com/Top_News/Analysis/Outside-View/2013/01/28/Outside-View-Are-stocks-a-suckers-bet/UPI-31721359375904.

101. Frank J. Fabozzi, Sergio M. Focardi, and Caroline Jonas, *High-Frequency Trading: Methodologies and Market Impact*, 19 REV. OF FUTURE MARKETS, no. 1, 2011 at 7, 24-27, *available at* http://www.conatum.com/presscites/HFTMMI.pdf; James Angel, Lawrence Harris, & Chester S. Spatt, *Equity Trading in the 21st Century* (USC Marshall School of Business Working Paper FBE No. 9-10, 2010) *available at* http://www.knight.com/newsroom/pdfs/EquityTradinginthe21stCentury.pdf.

102. Jacob Bunge, *Does High-Speed Trading Hurt the Small Investor?*, WALL STREET

Second, HFT adds liquidity to the market by reducing the bid-ask spread. The bid-ask spread is the price difference between the highest price the buyer is willing to pay and the lowest price the seller is willing to give up.[103] When the bid-ask spread is reduced, the highest price the buyer is willing to pay is close to the lowest price the seller is willing to sell at. When this gap is small, investors are buying and selling at a price they are willing to pay, which makes investors more apt to invest.[104] With a smaller bid-ask spread, investors do not have to worry about bargaining for prices on the market, and they are more likely to invest their cash, which adds liquidity to the market.

Finally, HFT grants a valuable time advantage: the first to make the trade is the first to make money on the trade. HFT executes trades much more quickly than a human trader ever could.[105] Accordingly, ordinary investors and brokers employing HFT are rewarded by executing the best trades on the best prices at the highest speed.[106]

While HFT provides several advantages, HFT still comes with many disadvantages for the market and for ordinary investors. HFT allows those who have access to the technology the advantage of "flash orders" that are generally unavailable to the public.[107] Giving an advantage to the few at the cost of the many diminishes retail investors' confidence in the U.S. market and economy.

Additionally, HFT perpetuates the inherent unfairness of the financial markets.[108] The financial market has always offered advantages to those who could afford the advice of financial brokers and consultants. Now, this inherent unfairness is additionally exacerbated by the high cost of firms who can afford to use HFT over those firms who cannot. The unfairness is exacerbated even further because the SEC does not have the funding to invest the same amount of money financial brokers invest into HFT for monitoring and regulating this new technology.[109] This imbalance of funding provides an even larger advantage to the firms

JOURNAL (Oct. 10, 2011) http://online.wsj.com/article/SB10001424052970204226204576600980170960802.html.

103. *Bid-Ask Spread*, INVESTOPEDIA, http://www.investopedia.com/terms/b/bid-askspread.asp#axzz2HVRiYihg (last visited Nov. 29, 2013).

104. *Id.*

105. Linette Lopez, *A High Frequency Trader Explains his Three Basic Advantages*, BUSINESS INSIDER (Sept. 20, 2012, 5:00 PM), http://www.businessinsider.com/3-advantages-of-high-frequency-trading-2012-9.

106. *Id.*

107. Eric Philo, *High-Frequency Trading: A Grave Threat to the Markets and the Economy*, 24/7 WALL ST. (Dec. 4, 2012, 5:39 PM), http://247wallst.com/2012/12/04/high-frequency-trading-a-grave-threat-to-the-markets-and-the-economy.

108. *See* James J. Angel & Douglas M. McCabe, *Fairness in Financial Markets: The Case of High Frequency Trading* (Dec. 21, 2010), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1737887.

109. Bunge, *supra* note 102.

employing HFT.

Finally, HFT is especially vulnerable to operational risk. According to Standard & Poor's, the "spate of technical snafus at exchanges around the world in the past 18 months reveal exchanges' vulnerability to high operational risk."[110] The rating agency attributes the increase in technical glitches in part to advances in trading technology.[111] The rating agency explains that the rise of high-frequency traders and "the exchanges' heavy reliance on these order flows to generate revenues have led them to spend millions of dollars to reduce trade latency and build colocation services to attract high-frequency traders to their marketplace."[112] According to the report, "while technology is becoming more sophisticated and trade execution more efficient, this also increases the complexity of exchange operations."[113] The agency declares, "in our opinion, faster trade speed and greater interconnectivity are amplifying the impact of operational glitches when they occur."[114] Thus, according to the agency, regulators should be more than wary of the demonstrated risk of operational glitches of high frequency trading technology.

B. HFT May be to Blame for the Ordinary Investors' Loss of Faith in the U.S. Stock Market

Empirical studies suggest that investor confidence in the U.S. market has plummeted.[115] The decreased number of individuals and corporate investors in the market is an indication of the ordinary investor's lessening confidence in the market. According to the latest Chicago Booth/Kellogg School Financial Trust Index, only 15% of the public expresses trust in the stock market.[116] This figure is 8% lower than the public's expressed trust in banks.[117] Further proof of the loss of investors' confidence can be found in the massive loss of retail investors during a period where Americans are experiencing notably high stock market returns.[118] As David Lauer, in his testimony to the Committee on Banking, Housing, and Urban Affairs Subcommittee on Securities, Insurance, and Investment, said, "the flight of the retail investor during a period of incredible stock market returns is a sure sign that this exodus is a result of mistrust rather than economic conditions."[119]

110. *Exchanges' Technical Glitches, supra* note 45.
111. *Id.*
112. *Id.*
113. *Id.*
114. *Id.*
115. Lauer, *supra* note 99, at 4-5.
116. *Id.*
117. *Id.*
118. *Id.* at 4.
119. *Id.*

A decreased number of companies going public is another indicator that ordinary investors have lost confidence in today's market. Lauer's testimony explains that from 1990-2000, approximately 530 firms went public each year.[120] Since 2001, approximately 125 firms have gone public each year.[121] Lauer's report speculates that companies are experiencing an inability to grow, expand, or hire because of the increased costs of going public.[122] Lauer suggests that companies are encouraged to go public when they have access to a large amount of capital.[123] Accordingly, when ordinary investors are hesitant to invest their money in the stock market, companies have less access to cash and a decreased ability to go public.

Ordinary investors are further discouraged from participating in the market because of their inability to monitor the lightning quick rise and fall of stock prices. Andrew Brooks[124] describes the volatile effects of HFT on investor confidence as a kin to an unfair race where traders have the opportunity to bet on the winning horse while the public is forced to watch from the sidelines. Brooks explains:

> [HFT] generates a huge amount of market data in terms of price quotes—but most of the quotes are inaccessible and unactionable because the high-frequency firms cancel them so quickly. In a simplified form, their game is to initiate an action with the sole purpose of observing a reaction, and then quickly change strategy to profit from that reaction. The traders get to watch the finish of the horse race, then bet on the winning horse.[125]

Brooks' analogy demonstrates that the ordinary investor suffers even more because they are not given the opportunity to watch the race. The ordinary investor does not get the same opportunity to see the lightning quick rise and fall of prices, and may be forced to pay a higher price on a trade that would have cost a lower price just milliseconds before.

In addition to the ordinary investor's inability to monitor the lightning quick rise and fall of prices, ordinary investors are further discouraged from investing in the market because of their inability to compete with the resources available to HFT firms. Wealth management powerhouse Merrill Lynch explains that the ordinary investor does not

120. *Id.* at 5.
121. *Id.*
122. *Id.*
123. *Id.*
124. Brooks is a 33-year veteran on the T. Rowe Price trading desk, and head of T. Rowe Price's Equity Trading.
125. Anne Kates Smith, *High-Frequency Trading Kills Market Confidence*, KIPLINGER (Dec. 2012,), http://www.kiplinger.com/magazine/archives/high-frequency-trading-kills-market-confidence.html.

have the resources or the patience to compete with HFT technology.[126] Its Private Banking and Investment Group says that the normal Joe investing from his laptop cannot process, "let alone act on, data fast enough to anticipate a price change before the high-frequency traders close the spread, and even day traders who employ fundamental analysis can find themselves caught up in the backdraft of major HFT moves that have nothing to do with earnings estimates or interest rate swings."[127] It is undeniable that ordinary investors recognize that they're at a competitive disadvantage compared to firms that employ HFT technology, and this discourages ordinary investors from investing in the market.

C. How to Overcome the Volatile Effects of HFT

To overcome the volatile effects of HFT, U.S. Regulators should implement circuit breakers and place speed limits on trade execution velocity. These measures will help prevent future flash crashes and restore ordinary investors' confidence in the stock market. Circuit breakers will have the effect of immediately pausing trading activity in stocks exhibiting the symptoms of a flash crash, and executing speed limits on execution velocity will act as a confidence building device to overcome the volatile effects of HFT algorithms.

III. THE INTERNATIONAL MODEL FOR REGULATING HIGH FREQUENCY TRADES: CIRCUIT BREAKERS AND SPEED LIMITS ON TRADE EXECUTION VELOCITY

Germany, Canada, and the European Parliament have all implemented safety measures to help prevent future flash crashes. The safety measures implement circuit breakers or place speed limits on trade execution velocity. These measures have the effect of increasing ordinary investor's confidence while helping prevent future flash crashes from disrupting foreign markets.

A. Germany's Plan

Germany's regulators implemented legislation limiting the abilities of HFT firms from taking advantage of small changes in the price of stocks. The legislation was officially implemented through the Act for the Prevention of Risks and the Abuse of High Frequency Trading (the

126. *Man. Vs. Machine: Investing in the age of HFT*, MERRILL LYNCH: PRIVATE BANKING AND INVESTMENT GROUP (June 2012), http://www.pbig.ml.com/pwa/pages/man-vs-machine.aspx.

127. *Id.*

"HFT Act").[128] The HFT Act specifically implements speed limits on trade execution velocity by limiting firms' ability to rapidly place and cancel orders.[129] The speed limit prevents the transmission of erroneous trade orders, ensuring that the HFT does not create or contribute to a disorderly market.[130]

Similar to America's market access rule, the HFT Act requires HFT firms to have effective system and risk controls in place.[131] Specifically, the legislation requires firms engaging in HFT to demonstrate that their trading systems have appropriate trading capacity and limits, and that the system is not capable of executing "erroneous trades."[132] The HFT firms are also required to show that the firm's system does not encourage a disorderly market or violate official regulations.[133] Placing speed limits on trade velocity enforces the German regulators' policy of ensuring that HFT firms have effective safety measures in place that will help prevent future flash crashes.

B. Canada's Plan

Canadian regulators have taken the extra measure of imposing a mandatory fee for large orders executed via HFT technology in addition to the implementation of single stock circuit breakers. The Investment Industry Regulatory Organization of Canada (IIROC) implemented a single stock circuit breaker policy in the immediate wake of the 2010 flash crash.[134] Beginning in the spring of 2012, the IIROC also began increasing the fees charged to firms with HFT strategies. [135] Specifically, the fee structure applies to large order volumes, which forces large volume orders executed via HFT technology to be susceptible to a mandatory fee.[136] Results of the implementation have already proven to make trading more efficient because the fees have reduced the "the crush of data burdening the market's computer systems."[137]

128. Torsten Schwarze, *Germany Enacts High-Frequency Trading Act*, MORGAN LEWIS (Mar. 08, 2013), http://www.morganlewis.com/pubs/IM_LF_GermanEnactsHigh-FrequencyTradingAct_08mar13.

129. Nathaniel Popper, *Beyond Wall St., Curbs on High-Speed Trades Proceed*, N.Y. TIMES, (Sept. 26, 2012,), http://www.nytimes.com/2012/09/27/business/beyond-wall-st-curbs-on-high-speed-trading-advance.html.

130. Ortkemper*, supra* note 4.

131. *Id.*

132. *Id.*

133. *Id.*

134. *Canada Imposes High-Frequency Trading Obligations*, MARKETS MEDIA (July 11, 2012), http://marketsmedia.com/canada-imposes-high-frequency-trading-obligations.

135. Popper, *supra* note 4.

136. Schechter, *supra* note 4.

137. Popper, *supra* note 4.

C. European Parliament's Plan

Though the European Parliament has taken longer to take any action against HFT, the Economic and Monetary Affairs Committee recently passed, by unanimous vote, a half-second speed limit on firms using HFT to execute "lightning-fast" stock deals.[138] The proposed rules would also require firms implementing HFT to honor the quotes they submit for at least 500 thousandths of a second.[139] In addition to the speed limits on trade execution velocity, the new legislation also requires firms to "have 'circuit breakers' in place to suspend trading if necessary."[140] According to the European Parliament, all of these policies are aimed at implementing transparent rules and procedures with the goal of efficiently executing orders.[141]

The European Parliament's policies will help prevent flash crashes as well as help efficiently execute large volume orders (such as those placed with high frequency technology). The European Parliament's policy for ensuring "that trading venues are able to cope with sudden surges in orders or market stresses," will be reinforced by circuit breakers and speed limits.[142] Circuit breakers will stop the stock from trading as soon as it exhibits flash crash symptoms, and speed limits will ensure that trading systems don't get overloaded with too many simultaneous lightning quick trades at once.

IV. ADOPTING SPEED LIMITS AND CIRCUIT BREAKERS TO HELP ENFORCE THE MARKET ACCESS RULE

A. Policy Arguments Against Adopting Speed Limits and Circuit Breakers

Opponents of the implementation of speed limits and circuit breakers suggest that the implementation will not have the desirable effect of stabilizing America's volatile financial market. Critics suggest that speed limits and circuit breakers will exacerbate inefficiency in the markets. Some critics suggest that the cost of regulation will have the undesirable effect of increasing HFT costs to the ordinary investor.

138. Derek Klobucher, *Europe Takes Control of High Speed Trading*, FORBES (Oct. 10, 2012, 9:15 AM), http://www.forbes.com/sites/sap/2012/10/02/europe-takes-control-of-high-speed-trading/.

139. Popper, *supra* note 4.

140. Press Release, European Parliament-Plenary Session, Tougher rules to protect investors and curb high-frequency trading, (Oct. 26, 2012), *available at* http://www.europarl.europa.eu/news/en/pressroom/content/20121024IPR54367/html/Tougher-rules-to-protect-investors-and-curb-high-frequency-trading.

141. *Id.*

142. *Id.*

Others suggest that circuit breakers will suffer the same technological glitches that currently plague HFT technology. These proponents contend that an increase in trading cost combined with exacerbated technological glitches will contribute to, instead of alleviate, market volatility.

A prominent argument against adopting speed limits on the execution velocity of high frequency trades is that speed limits will jeopardize the lower trading costs that accompany HFT.[143] Kay Swinburne, one of six committee members involved in drafting the European Parliament rules, fears that "her fellow committee members may go too far and end up choking off trading, making buying and selling stocks more expensive for more traditional investors."[144] The reason why HFT should be so attractive to traditional mom and pop investors is that it costs significantly less. The industry fears that taking any regulatory action will interfere with an obvious benefit of the technology, lower trading costs on trading for the average investor.

Opponents of circuit breakers warn that circuit breaker software is equally susceptible to the glitches that plague HFT technology.[145] For example, in March of 2012, the Better Alternative Trading System (BATS) exchange operator "botched the listing of its own initial public offering, momentarily rattling shares of Apple, one of the most widely held stocks," in an event industry insiders describe as resembling a smaller version of the May 2010 flash crash.[146] Once the BATS system showed symptoms of failing, the circuit breakers paused trading in Apple shares. However, the BATS system misread the movement in stock as a symptom of failing. Consequently, a "software bug" prevented orders for BATS' own stock from being filled.[147] The BATS glitch caused the company's shares to be pushed down to just a fraction of a penny.[148] When the circuit breaker kicked in to suspend trading, Apple stock trading came to a halt.[149]

Speed limits may also have the adverse effect of restricting liquidity on the market. The United Kingdom commissioned the Foresight Project to assemble, study, and analyze the effect of high frequency technology on the financial market.[150] The recently published report

143. Popper, *supra* note 4.

144. *Id.*

145. Michael J. De La Merced and Ben Protess, *BATS Trading Error Bolsters Case for Curbs,* N.Y. TIMES DEALBOOK (Mar. 25, 2012, 8:58 PM), http://dealbook.nytimes.com/2012/03/25/little-fallout-expected-from-bats-trading-error/.

146. *Id.*

147. *Id.*

148. *Id.*

149. *Id.*

150. GOV. FORESIGHT: THE FUTURE OF COMPUTER TRADING IN FINANCIAL MARKETS (2012), FINAL PROJECT REPORT, THE GOVERNMENT OFFICE FOR SCIENCE,

mostly rejects proposals implemented in the European Union to curb high-frequency trading.[151] While the two-year study endorses the use of circuit breakers as a policy measure that could be effective, the study advises that imposing minimum resting times (aka speed limits) on orders as a policy measure is likely to prove problematic.[152]

The results of the two-year study, headed by Professor Sir John Beddington, revealed that imposing speed limits on execution trade velocities would actually "expose liquidity providers to increased 'pick-off risk' due to the inability to cancel stale orders."[153] The Foresight Project reports that imposing minimum resting times are counterintuitive to HFT strategies that rest on the ability to quickly cancel orders. Speed limits would have the adverse effect of restricting liquidity on the market, instead of improving liquidity on the market.[154]

B. The Implementation of Circuit Breakers and Speed Limits in the U.S. Market Will Help Reinforce the Market Access Rule and Prevent Future Flash Crashes

While the implementation of circuit breakers and speed limits does not come without costs, implementation will have the dual effect of supporting the policies behind the market access rule and preventing future flash crashes. While regulators should be aware of the costs of implementation, the benefits of implementation far outweigh the risks. Circuit breakers and speed limits are the most cost-efficient tools for the SEC to use to enforce the market access rule.

Among the largest obstacles faced by regulators with the advent of HFT is the SEC's lack of financial resources to keep up with HFT's technological innovations. The SEC cannot effectively police HFT technology when they cannot access it. A lack of access to the technology means the SEC cannot gain a comprehensive understanding of how the technology works, where the advantages are gained, or how to effectively regulate.

Another obstacle to the SEC's ability to implement new regulations is that it takes the SEC weeks to process the amount of information that more current HFT can process in just one day. [155] In an effort to reduce the advantages of high frequency technology traders the SEC recently

LONDON (U.K.), *available at* http://www.bis.gov.uk/assets/foresight/docs/computer-trading/12-1086-future-of-computer-trading-in-financial-markets-report.pdf.

151. Elliot Holleys, *UK Foresight Project rejects European Commission HFT proposals*, BANKING TECHNOLOGY (Oct. 24, 2012), http://www.bankingtech.com/50178/uk-foresight-project-rejects-european-commission-hft-proposals/.

152. The Government Office for Science, London, *supra* note 150, at 7.

153. *Id.* at 12.

154. *Id.* at 9.

155. Popper, *supra* note 98.

implemented the "Midas" program, which includes the Tradeworx program. Tradeworx is a highly technical computer program that will give the SEC "the ability to spot trading patterns in an individual stock, or to rewind and watch what happened in the trading of all stocks during previous crises."[156] Currently, it takes the SEC weeks to process an amount of data that would only take the Tradeworx system one day to process.[157]

The implementation of systems such as Tradeworx will have the effect of creating a "paper trail" which will help the SEC ensure that firms have safety measures in place to prevent any future flash crashes. If ordinary investors are assured that regulators have taken positive steps to prevent flash crashes, they will be more apt to invest in the market. However, a major concern is whether the industry is capable of providing unbiased information about the market to a regulatory agency.[158] While the implementation of such programs may add transparency to the financial market, regulators in the U.S. should take one step further and implement speed limits on the trade velocity of HFT, to help overcome the dangers of self-regulation.

The Foresight Project advocates the use of circuit breakers as an effective policy measurement to help control the adverse effects of HFT. The report states that benefits to circuit breakers include a cooling off period, uncertainty resolution, and investor protection.[159] The report says that circuit breakers allow for a "cooling period" that "prevents mechanical selling at any price, allows the market to understand what is happening and gives counterparties time to enter, thereby reducing the order imbalance."[160] The report adds that a long enough pause in trading will help traders identify the cause of large shifts of movement in the market.[161] Finally, circuit breakers protect investors because the trading halts offered by circuit breakers provide an avenue for ordinary retail investors to not lose out to professional traders who have the advantage of continuously monitoring the markets.[162] The Foresight Project reports that circuit breakers "remove or ameliorate concerns that small investors can be taken advantage of by manipulative trend-generating strategies."[163]

The launch of the new website by the SEC will not suffice to ameliorate the concerns of the ordinary investor. The public release of

156. *Id.*
157. *Id.*
158. *Id.*
159. The Government Office for Science, London, *supra* note 150, at 101.
160. *Id.* at 103.
161. *Id.*
162. *Id.* at 104.
163. *Id.*

HFT information on a quarterly basis is not frequent enough for the ordinary investor to make meaningful investment decisions based on the SEC data. While the public availability of HFT data creates a more transparent trading environment, it will not help prevent future flash crashes or give ordinary investors equal access to the advantages of HFT technology.

Speed limits are a necessary policy in the U.S. because, like in Canada, Germany, and the European Union speed limits will have the effect of leveling the playing field for the ordinary investor, adding transparency to the financial market and increasing the ordinary investor's confidence in the financial market. So long as HFT firms are permitted to have a competitive time advantage over ordinary investors, it is unlikely that ordinary investors will feel like they are investing in a fair financial market. If ordinary investors are made to feel like they're given the same competitive advantages as sophisticated professionals, they will be more likely to invest their money in the financial market.

The use of circuit breakers is just one policy U.S. regulators should adopt to help enforce the market access rule. While the results of the Foresight Project indicate that circuit breakers may be helpful for the early detection of flash crash like symptoms, regulators should additionally focus on increasing the transparency of the financial market through the implementation of speed limits. Because the ordinary investor does not have access to the same analytical tools as a professional HFT strategist, the ordinary investor's confidence in the market will be restored if she knows she is investing her money in a transparent market.

V. CONCLUSION

To help enforce the market access rule and prevent any future flash crashes, U.S. regulators should follow the international model and implement circuit breakers and speed limits on HFT. In the aftermath of the May 6, 2010 flash crash, international markets like Canada, Germany, and the European Union immediately implemented policies and regulations to prevent the occurrence of a flash crash in their markets. Speed limits and circuit breakers will not completely remove the competitive time advantage gained from using lightning quick trading technology, but they do create more transparency in the market and help to prevent the occurrence of future flash crashes.

While there are certainly benefits to using HFT technology in the financial market, such as lower trading costs and competitive time advantages, there are signs that HFT is at least partially to blame for ordinary investors' loss of confidence in today's financial market. The U.S should follow the lead of Canada, Germany, and the European Union and implement circuit breakers and limits on trade execution

velocity. Circuit breakers and speed limits will create a more transparent trading environment for financial market investors and also have the residual effect of helping enforce the safety measures behind the market access rule's policy.