The Law and Economics of Municipal Broadband

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TABLE OF CONTENTS

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I. INTRODUCTION

Broadband Internet service is integrated into nearly every aspect of contemporary American society, perhaps even to a fault. Kids sleep (or not) with their Internet-connected mobile devices under their pillows, mental health professions treat afflictions like Internet Addiction Disorder and Compulsive Internet Use, and half of the nation's ministers are having issues with online pornography.[1] Like all things, there are downsides, but broadband Internet connectivity is now seen as essential for modern life, not only because of the significant private benefits to its users, but also because of the alleged sizable social payoff—a "broadband bonus" above and beyond the purely private benefits of the service.[2] Consider the FCC's 2010 *National Broadband Plan*'s take: "Broadband is a platform to create today's high-performance America—an America of universal opportunity and unceasing innovation, an America that can continue to lead the global economy, an America with world-leading broadband-enabled health care, education, energy, job training, civic engagement, government performance and public safety."[3] While the rhetoric is often melodramatic, broadband is unquestionably important to consumers for its private benefits and to policymakers for its purported social payoffs, leading some political leaders

1. Hillary Cash et al., *Internet Addiction: A Brief Summary of Research and Practice*, 8(4) CURR PSYCHIATRY REV. 292 (2012); Doni Bloomfield, *Kids Who Sleep Near Smartphones Get Less Shuteye: Study,* BLOOMBERG (Jan. 5, 2015), http://www.bloomberg.com/news/articles/2015-01-05/kids-who-sleep-near-smartphones-get-less-shuteye-study [https://perma.cc/9QXD-EZCW]; Bo Lane, *How Many Pastors Are Addicted to Porn? The Stats are Surprising*, EXPASTORS.COM (Mar. 25, 2015), http://www.expastors.com/how-many-pastors-are-addicted-to-porn-the-stats-are-surprising [https://perma.cc/U4QW-SJD2]; *Computer/Internet Addiction Symptoms, Causes and Effects*, PSYCHGUIDES.COM, http://www.psychguides.com/guides/computerinternet-addiction-symptoms-causes-and-effects (last visited July 5, 2020) [https://perma.cc/CJ8M-3JJH].

2. *See generally* T. Randolph Beard et al., *The Broadband Adoption Index: Improving Measurements and Comparisons of Broadband Deployment and Adoption*, 62 FED. COMM. L.J. 343 (2010); Shane Greenstein & Ryan C. McDevitt, The Broadband Bonus: Accounting for Broadband Internet's Impact on U.S. GDP, (Nat'l Bureau of Econ. Research, Working Article No. 14758, 2009); *Connecting America: The National Broadband Plan*, FED. COMMC'N COMM'N (Mar. 16, 2010), http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-296935A1.pdf [https://perma.cc/A5EK-GBZJ] [hereinafter *National Broadband Plan*].

3. *National Broadband Plan, supra* note 2, at 3.

to label the service a "necessity" and even a "human right."[4] Ubiquitous availability of broadband, if not universal adoption, is now a policy goal.[5]

Private investment has gone a long way to providing ubiquitous deployment and about 86% of U.S. homes now subscribe to the service.[6] There remains work to be done, however. Nearly 5% of households still can't subscribe to a basic fixed broadband service of 10 Mbps download speeds and 1 Mbps upload speeds (and 6.5% at 25/1 Mbps) and the capabilities of

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4. *See, e.g.*, Frank La Rue (Special Rapporteur on the Promotion and Protection of the Right to Freedom of Opinion and Expression) *Report of the Special Rapporteur*, U.N. General Assembly, Human Rights Council, U.N. DOC. A/HRC/17/27 (May 16, 2011); *Broadband Opportunity Council Report and Recommendations*, U.S. DEP'T OF AGRIC. & DEP'T OF COMMERCE (Aug. 20, 2015), https://obamawhitehouse.archives.gov/sites/default/files/broadband_opportunity_council_report_final.pdf [perma.cc/H78V-ZFMZ] ("Access to high-speed broadband is no longer a luxury; it is a necessity for American families, businesses, and consumers."); *Finland Makes Broadband a "Legal Right"*, BBC NEWS (July 1, 2010), http://www.bbc.com/news/10461048 [https://perma.cc/3SJ2-SUXU]; *Internet Access is "A Fundamental Right",* BBC NEWS (Mar. 8, 2010), http://news.bbc.co.uk/2/mobile/technology/8548190.stm [https://perma.cc/ZM2V-UTMN].

5. In the U.S., since the passage of the Telecommunications Act of 1996, the ubiquitous availability of broadband connections has been a bi-partisan goal of federal policy. *See, e.g.*, Section 706, 47 U.S.C. § 1302; *see also FACT SHEET: Broadband That Works: Promoting Competition & Local Choice In Next-Generation Connectivity,* THE WHITE HOUSE - OFF. OF THE PRESS SEC'Y (Jan. 13, 2015), https://www.whitehouse.gov/the-press-office/2015/01/13/fact-sheet-broadband-works-promoting-competition-local-choice-next-gener [https://perma.cc/UB6H-NUDJ]; Nick Mudge, *President Bush Says Universal Broadband by 2007*, GOVTECH.COM (Apr. 2, 2004), http://www.govtech.com/policy-management/President-Bush-Says-Universal-Broadband-by.html [https://perma.cc/DK7Y-6KWU].

6. Subscription level dated November 2019 obtained from *Digital Data Explorer*, N'T'L TELECOMM. AND INFO. ADMIN. (June 10, 2020), https://www.ntia.doc.gov/data/digital-nation-data-explorer#sel=wiredHighSpeedAtHome&disp=map [https://perma.cc/83SY-TNC7]; Inquiry Concerning the Deployment of Advanced Telecom. Capability to All Am. in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecom. Act of 1996, as Amended by the Broadband Data Improvement Act*, Notice of Inquiry*, 22 FCC Rcd 7816 (10), para. 15, Table 12 (2007) [hereinafter *2015 Broadband Progress Report*] ("Private industry continues to invest billions of dollars to expand America's broadband networks. This suggests that the industry recognizes both the value of and the need for continued investment to develop a robust broadband network that will meet consumers' demands."); City of Wilson, North Carolina, Petition for Preemption of North Carolina Gen. Statute Sections 160A-340 et seq., The Electric Power Bd. of Chattanooga, Tennessee, Petition for Preemption of a Portion of Tennessee Code Annotated Section 7-52-601*, Memorandum Opinion and Order*, 30 FCC Rcd 2408, para. 3 (2015) [hereinafter *2015 Preemption Order*] ("The private sector has invested billions of dollars upgrading their broadband networks throughout the United States, and current deployment data indicate that 92% of Americans in urban areas, and 47% in rural areas, have access to fixed broadband with speeds of at least 25/3 Mbps"); Michael J.R. Martin, *Rural and Lower-Income Counties Lag Nation in Internet Subscription*, U.S. CENSUS BUREAU (Dec. 6, 2018), https://www.census.gov/library/stories/2018/12/rural-and-lower-income-counties-lag-nation-internet-subscription.html [https://perma.cc/CQH9-AX2A]; *National Broadband Plan, supra* note 2, at 3 ("Due in large part to private investment and market-driven innovation, broadband in America has improved considerably in the last decade. More Americans are online at faster speeds than ever before.").

broadband connections vary widely across the country.[7] Adoption, while high, is still deemed too low, especially in certain segments of the population, causing what is often dubbed the Digital Divide.[8] Working against the lofty goals of policymakers with respect to broadband are a number of factors, including variations in consumer demand based on income, education, age, perceived value, and so forth, and the high deployment and operating costs of broadband networks.[9]

In pursuit of broadband's social payoffs, some municipal governments have taken on the enormous financial risk of building and operating their own communications networks in order to provide telephone, video, and high-speed Internet connectivity to their constituents (and to some persons beyond the municipal boundaries). These government-owned networks ("GONs") are most often being built in areas where communications services are not available or where the connection speeds and market coverage of existing private providers are deemed by local officials as inadequate.[10] Municipal governments generally have no interest in constructing and operating a communications network and most cities will never even consider it—yet out of desperation for modern communications services (i.e., high-speed broadband) and the benefits they are believed to provide, a few hundred cities

7. Deployment of Advanced Telecom. Capability to All Ams. in a Reasonable and Timely Fashion, *Notice of Inquiry*, 34 FCC Rcd 3857 (2019); John Wenz, *The FCC Has Defined Broadband as 25 Mbps*, POPULAR MECHANICS (Jan. 29, 2015), http://www.popularmechanics.com/culture/web/a13716/fcc-changes-broadband-definition-25-mbps/[https://perma.cc/V57Z-6VPS]; *see* Marguerite Reardon, *Sorry, Your Broadband Internet Technically Isn't Broadband Anymore*, CNET (Jan. 29, 2015,4:28 PM), http://www.cnet.com/news/sorry-your-broadband-internet-technically-isnt-broadband-anymore [https://perma.cc/5T9X-5KNB].

8. Monica Anderson & Madhumitha Kumar, *Digital Divide Persists as Lower-Income Americans Make Gains in Tech Adoption*, PEW RE. CEN. (May 7, 2019), https://www.pewresearch.org/fact-tank/2019/05/07/digital-divide-persists-even-as-lower-income-americans-make-gains-in-tech-adoption; Monica Anderson et al., *10% of American Don't Use the Internet. Who Are They?*, PEW RE. CEN. (Apr. 22, 2019), https://www.pewresearch.org/fact-tank/2019/04/22/some-americans-dont-use-the-internet-who-are-they/[https://perma.cc/SA3W-LHZ7]; ECON. AND STATISTICS ADMIN., U.S. CENSUS BUREAU, EXPLORING THE DIGITAL NATION - COMPUTER AND INTERNET USE AT HOME, (2011), http://www.ntia.doc.gov/files/ntia/publications/exploring_the_digital_nation_computer_and_internet_use_at_home_11092011.pdf [https://perma.cc/6CXP-JNW5]; Andrew Perrin, *Digital Gap Between Rural and Nonrural America Persists*, PEW RES. CEN. (May 31, 2019), https://www.pewresearch.org/fact-tank/2019/05/31/digital-gap-between-rural-and-nonrural-america-persists/[https://perma.cc/DSF6-79YL].

9. *Id*.

10. These areas are often referred to as "underserved" communities. *See, e.g.,* Hillary Schaub & Darrell M. West, *Broadband Alternatives in Unserved and Underserved Areas*, BROOKINGS INSTITUTION: TECHTANK (May 23, 2014), http://www.brookings.edu/blogs/techtank/posts/2014/05/23-broadband-alternatives-underserved-areas-schaub [https://perma.cc/V3BG-9QUK]; *2015 Broadband Progress Report*, *supra* note 6, ¶¶ 29-30, 45-46.

are doing so.[11] In markets where private firms already provide some level of service, these government-owned and operated systems become "competitors" to the existing private firms, typically amassing significant market share and serving most, if not all, government buildings.

Not surprisingly, these types of municipal broadband systems are highly controversial. Opponents contend that having to compete with the government is inherently unfair.[12] Opponents also claim that the presence of a government-owned firm threatens private investment, a position supported by the *National Broadband Plan* and economic theory (as detailed herein).[13] A number of high-profile failures, forcing taxpayers and captive municipal electric utility ratepayers to shoulder millions in financial losses, provide

11. *Municipal Networks Will Not Wire U.S. for Broadband*, SPEEDMATTERS.ORG (Jan. 19, 2015, 8:52 PM), http://www.speedmatters.org/blog/archive/municipal-networks-will-not-wire-u.s.-for-broadband [https://perma.cc/EE94-HBD4]. Harold DePriest, Head of Chattanooga's municipal broadband system, made a similar point at a hearing before the Tennessee State Legislature: "This stuff is not cheap, it is not easy, and I guess I'm not really telling you that every community is going to run out and build broadband, that doesn't make sense to me." Institute for Local Self-Reliance, Head of Chattanooga EPB Discusses Broadband at State Legislation, YouTube (Apr. 20, 2011), https://www.youtube.com/watch?v=oRtzmNMGILo&index=19&list=FLeDkoYbc2YqmOTN6BcfU0JQ [https://perma.cc/DMA3-UP7X]; *see also* Community Network Map, Community Networks, http://muninetworks.org/communitymap (last visited July 7, 2020) [https://perma.cc/ZAT6-R6UY]; Exec. Office of the President, Community-Based Broadband Solutions the Benefits of Competition and Choice for Community Development and Highspeed Internet Access (2015), http://muninetworks.org/sites/www.muninetworks.org/files/White-House-community-based-broadband-report-by-executive-office-of-the-president_1.pdf [https://perma.cc/D52Q-PC55]; Masha Zager, *Census of Community Fiber Networks Rises to 165*, BROADBAND COMMUNITIES (Aug./Sept. 2015), http://www.bbpmag.com/Features/0815Census-of-Community-Fiber-Networks-Rises-to165.php [https://perma.cc/59N5-2A84].

12. This "unfair" concept has many elements, including debt costs, tax advantages, and so forth. For example, in some instances, municipal broadband systems do make payments to the city (but not usually to the state or federal governments) that are analogous to taxes. City systems may also face requirements that private providers do not.

13. *National Broadband Plan, supra* note 2.

potent warning regarding the risks and likely consequences of such ventures.[14] Such arguments have proven compelling: twenty-three states have passed laws overseeing how their political subdivisions enter the communications business.[15] In a few states, cities are prohibited by law from doing so. Like municipal broadband itself, these laws are highly controversial and there is a movement afoot to have them either repealed or preempted by the federal government.[16] In 2015, the FCC preempted such laws in the states of Tennessee and North Carolina at the request of cities in those states.[17] While the Agency's efforts to preempt ultimately did not withstand judicial scrutiny,[18] its actions confess to the intense political nature and emotional investment in this issue. While the mounting evidence of near inevitable financial failure of municipal systems has weakened interest, the push for

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14. *See, e.g.*, Sonia Arrison et al., *Wi-Fi Waste: The Disaster of Municipal Communications Networks,* PACIFIC RES. INST. (Feb. 2007), https://www.heartland.org/publications-resources/publications/wifi-waste-the-disaster-of-municipal-communications-network [https://perma.cc/HB4G-RS2A]; John Barrett & David G. Tuerck, *Municipal Broadband in Concord*, BHI POL'Y STUDY (March 2004), http://www.beaconhill.org/BHIStudies/ConcordCable.pdf [https://perma.cc/2UMC-PLB5]; Charles M. Davidson & Michael J. Santorelli, *Understanding the Debate over Government-Owned Broadband Networks*, ADVANCED COMMS. L. & POL'Y INST. (June 2014), http://www.nyls.edu/advanced-communications-law-and-policy-institute/wp-content/uploads/sites/169/2013/08/ACLP-%E2%80%93-Chattanooga-Case-Study-%E2%80%93-June-2014.pdf [https://perma.cc/6JGK-S5J4]; Joseph P. Fuhr, *The Hidden Problems with Government-Owned Networks*, COALITION FOR THE NEW ECON. (2012), http://www.coalitionforthenewеconomy.org/wp-content/uploads/2012/01/1-6-12-Coalition-for-a-New-Economy-White-Article.pdf [https://perma.cc/FNT3-RYG7]; *GON with the Wind: The Failed Promise of Government Owned Networks Across the Country,* TAXPAYERS PROTECTION ALLIANCE (May 13, 2020), https://www.protectingtaxpayers.org/report/gon-with-the-wind [https://perma.cc/YG4Q-9ZP7]; Ronald J. Rizzuto, *Financial Performance of Tennessee's Municipal Cable and Internet Overbuilds in 2009*, U. OF DENVER (Feb. 25, 2010), http://media.timesfreepress.com/docs/2010/05/Rizzuto_report_on_Tennessee_telecoms.pdf [https://perma.cc/UNH8-8U3D]; David G. Tuerck, et. al., *Cashing in On Cable: Warning Flags for Local Government*, BEACON HILL INST. (2001), http://www.beaconhill.org/BHIStudies/BHIcablestudy103001.pdf [https://perma.cc/H88B-9ZRB]; James Valvo, *Municipal Broadband's Record of Failure*, AMS. FOR PROSPERITY (Mar. 2009), https://www.heartland.org/publications-resources/publications/municipal-broadbands-record-of-failure-1 [https://perma.cc/UEJ3-ARV7].

15. *See, e.g.*, *Comments of the Coalition for Local Internet Choice (Appendix)*, WC Docket No. 14-116 (Aug. 29, 2014), http://apps.fcc.gov/ecfs/document/view;NEWECFSSESSION=Z2h2Wh7Ytt5SXkcGyfL8hny1gcl33YwpLqdhWmmW0Glqs22bmcCq!-729788805!-681833196?id=7521826171 [https://perma.cc/5VTL-PXJE]; Sherry Lichtenberg, *Municipal Broadband*, NRRI REPORT NO. 14-11, NAT'L REG. RES. INS. (Nov. 2014), https://pensacolabroadband.files.wordpress.com/2015/08/11-2014-municipal-broadband-a-review-of-rules-requirements-and-options.pdf [https://perma.cc/9JT5-FZX6].

16. *See, e.g.*, John Eggerton, *FCC, States Square Off in Court Over Municipal Broadband*, BROADCASTING+CABLE (Mar. 17, 2016), https://www.nexttv.com/news/fcc-states-square-court-over-municipal-broadband-154745 [https://perma.cc/6PAA-A94S].

17. *2015 Preemption Order, supra* note 6.

18. *See infra* Section IX.

municipal broadband remains strong in some cities and political circles.[19] Whether they want to or not, federal and state legislatures will be addressing the question of municipal broadband networks, and laws related to them, for years to come.

While the controversy surrounding municipal broadband has generated a rich, varied, and informative literature on the phenomenon, what is missing is a careful economic analysis of the underlying nature of municipal broadband and its advocacy,[20] and why we see government entry in an industry where private investment is abundant.[21] In this Article, we try to fill that gap. As we see it, the economic essence of the municipal broadband debate can be boiled down to a simple question: *why is the municipality the only one willing to build the network?* Evidently, the answer is "*because no one else will*."[22] This question and its restatement as an answer help frame up the economic analysis of the issue, or at least key parts of it.

The reader should be aware, however, that our effort is admittedly and necessarily modest. It is unlikely that a single exercise will tell us all we need to know about the advisability of municipal entry in cities as diverse as Seattle, Washington (population 670,000), Chattanooga, Tennessee (population 173,000), Barbourville, Kentucky (population 3,200), Lenox, Iowa (population 1,359), and American Samoa (population 55,000).[23]

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19. *See, e.g.*, Conor McCormick-Cavanagh, *Citywide Broadband Initiative Could Be on Denver Ballot in 2020,* WESTWORD (Oct. 12, 2019), https://www.westword.com/news/denver-could-vote-on-municipal-broadband-in-2020-11508093 [https://perma.cc/9TR6-97X2]; Malia Spenser, *Portland-Area Municipal Broadband Study Group Kicks Off,* PORTLAND BUS. J. (Oct. 21, 2019), https://www.bizjournals.com/portland/news/2019/10/21/portland-area-municipal-broadband-study-group.html [https://perma.cc/9GNE-2BUM]; *see also* Jonathan Sallet, *Broadband for America's Future,* BENTON INST. FOR BROADBAND & SOC'Y (Oct. 2019), https://www.benton.org/sites/default/files/BBA_full_F5_10.30.pdf [https://perma.cc/Z5JZ-KHWM]; Elizabeth Warren, *Here's How We Get Broadband Internet To Rural America,* WASH. POST (Aug. 27, 2019, 12:06 PM), https://www.washingtonpost.com/opinions/elizabeth-warren-heres-how-we-get-broadband-internet-to-rural-america/2019/08/27/adc63c4e-c5c8-11e9-9986-1fb3e4397be4_story.html [https://perma.cc/M2XW-64HD].

20. A list of numerous studies is maintained at: *Reports Highlighted by Muninetworks.org,* COMMUNITY NETWORKS, http://muninetworks.org/reports (last visited July 7, 2020) [https://perma.cc/5F6F-PLU8].

21. *See supra* note 6; *see also* Michael Mandel, *U.S. Investment Heroes of 2015*, PUBLICATIONS. (Sept. 28, 2015), http://www.progressivepolicy.org/issues/economy/u-s-investment-heroes-of-2015-why-innovation-drives-investment [https://perma.cc/YQ2C-2F2Q].

22. This "no one else will" sentiment is widely held. *See*, *e.g.*, Allen S. Hammond & Chad Raphael, *Municipal Broadband* (Sept. 2006), https://digii.files.wordpress.com/2008/02/a-background-briefing-Article.doc [https://perma.cc/KB8U-68B3]; Harry, *US Lagging Behind in Broadband*, GRID INTERNET & TV (May 23, 2011), http://gridcommunications.net/lagging-broadband [https://perma.cc/2WYT-9X6T]; Laura Leslie, *Liveblog: H129 Municipal Broadband Hearing,* WRAL (Mar. 23, 2011), http://www.wral.com/news/state/nccapitol/blogpost/9313335 [https://perma.cc/N4BJ-C6NH].

23. Saad Bashir, *Gigabit availability*, SEATTLE.GOV (June 2015), http://www.seattle.gov/broadband/broadband-study [https://perma.cc/CT7T-CFX5]; Zager, *supra* note 11. Population data from the U.S. Census Bureau.

Admittedly, our analysis may lead to more questions than answers, but we do believe the contemplation of these new questions will improve policy making in this space. As is posted on the reading room door at Tromsø University in Sweden: "We have not succeeded in answering all our problems. The answers we have found only serve to raise a whole set of new questions. In some ways we feel we are as confused as ever, but we believe we are confused on a higher level and about more important things."[24]

II. SUMMARY OF FINDINGS

Our analysis relies heavily on (somewhat basic) economic theory, so our findings are general in nature.[25] Nevertheless, much of the evidence and anecdotes on municipal broadband fits nicely into this general framework. The economics also have a long-run view, revealing the underlying yet powerful forces that produce outcomes. Much of the evidence has, unlike the theory, a short-run view, whether for or against municipal broadband.[26] While there is always the possibility of the exceptional anecdote showing a short-run departure from prediction, policy should not be based solely (if at all) on anecdote and naïve, short-run considerations. Systematic departures of the evidence from the theory presented here, if they occur, point to areas for further research. Our review of the available evidence is broadly consistent with theoretical predictions.

Our purpose is not to disparage or promote municipal broadband as a policy option, but rather to provide an economic framework that aids in understanding what municipal broadband is and how one might reasonably support or oppose it. Municipal broadband is a complex issue, and this Article is but one entry into a portfolio of analysis on the topic (much of which remains to be done).

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24. BERNT ØKSENDAL, STOCHASTIC DIFFERENTIAL EQUATIONS 4 (5th ed.) (quoting EARL C. KELLY, THE WORKSHOP WAY OF LEARNING 2 (1951)).

25. We have studied municipal provision of communications services, on and off, for over twenty-five years, both as an academic exercise and as consultants. In fact, some of our research on the topic is frequently cited in the debate, and usually by the municipal broadband advocates. *See, e.g.,* George S. Ford, *Does a Municipal Electric's Supply of Communications Crowd Out Private Communications Investment?*, 29 ENERGY ECON. 467, 467-78 (2007), http://sites.udel.edu/broadbandplanning/files/2012/01/MunicipalCommunicationsSupply_2006.pdf [https://perma.cc/4EEZ-C3V3]; George S. Ford &Thomas Koutsky, *Broadband and Economic Development: A Municipal Case Study from Florida*, 17 REV. OF URB. & REGIONAL DEV. STUD. 216, 216–29 (2005), http://Articles.ssrn.com/sol3/Articles.cfm?abstract_id=925973); *cf.* George S. Ford & Thomas W. Hazlett, *The Fallacy of Regulatory Symmetry*, 3 BUS. & POL. 21, 21-46 (2001) (the Hazlett and Ford Article is not about municipal broadband but is nonetheless frequently cited in the debate.).

26. Building a communications networks requires sizable upfront investments, thus ensuring the builder will incur losses in the early years of operation. Such losses are not an indictment of the network. Profits must be evaluated over many years using discounting analysis.

Our findings may be summarized as follows: First, the exceedingly high standards set for ubiquitous deployment and universal adoption of broadband are not based on the private benefits of the service, but on the *social benefits* of it.[27] Broadband policy is motivated by a positive externality.[28] As a consequence of positive third-party effects (to the extent they exist), the private incentives of consumers to pay for and the private incentives of firms to deploy the "right amount" of broadband are systematically *too low* from a social perspective.[29] Disappointment in the deployment and adoption of broadband is guaranteed absent an effective policy to close the gap between private and social benefits. Competition is not a solution to the externality problem, so the competition justification for municipal broadband is misguided. Traditionally, externalities are dealt with by using subsidies to alter private incentives so that they coincide with the social perspective, thereby increasing consumer welfare.

Second, the economics predict (and the evidence confirms) that municipal broadband is in almost all scenarios *subsidized entry*, covering capital costs and losses with tax dollars and other internal transfers. Advocates of municipal broadband do not generally contest this fact. In Chattanooga, Tennessee, for example, the city's system received a federal grant equal to about $2,000 per subscriber, and millions more in subsidies from the city's electric ratepayers. In Bristol, Virginia, direct subsidies received from various sources equaled about $7,000 per subscriber. And in a recent audit of the municipal system in Lafayette, Louisiana, the auditor discovered sizable and improper cross-subsidies between the city's services (electricity, sewer, water) and its broadband network.[30] The auditor concluded that the director of the city's services "was aware of the improper activity and may have

27. Governments may be used for the purpose of manipulating markets to obtain advantages for one party or another, but we ignore these purely political motivations.

28. *See* MACMILLAN DICTIONARY OF MODERN ECONOMICS 146 (David W. Pearce ed., The Macmillan Press Ltd., 3rd ed. 1986)) ("Externalities involve an interdependence of utility and/or production functions. . . . For example, a beekeeper may benefit neighboring farmers by incidentally supplying pollination services. . . . A distinction is drawn between marginal and inframarginal externalities. In the former small changes in the level of the externality-generating activity will affect the production or utility of the externally affected party. In the latter, while the activity itself generates an externality, small or marginal changes in the level of the activity do not have any effect on the production or utility of the externally-affected party. A Pareto-relevant externality occurs when the extent of the activity may be modified in such a way that the externally-affected party can be made better off without the acting party being made worse off, that is, where there exists the possibility of gains from trade.").

29. *See* Theodore A. Chapman & Judith G. Waite, *Summary: Chattanooga, Tennessee; Retail Electric*, STANDARD & POOR'S, (Oct. 10, 2012), https://ecfsapi.fcc.gov/file/7521737337.pdf [https://perma.cc/7VUB-DAF3] ("These positive externalities are unlikely to be considered by private providers when making FTTH deployment decisions.").

30. *Lafayette City-Parish Consolidated Government Lafayette Utilities System LUS-Fiber,* CARR, RIGGS & INGRAM (Aug.12, 2020), https://drive.google.com/file/d/1Qp1DHRutc4-11DZqD-6pH4oAWm4jPwwv/view?_ga=2.62748716.1898275301.1598036956-1924561232.1598036956 [https://perma.cc/6KEC-GFA4].

violated several state laws."[31] Yet, proponents of municipal broadband are often quick to criticize these state laws, including the North Carolina law that the FCC preempted in 2015, because these laws limit subsidization and thereby serve, it is claimed, as an entry barrier.[32] The asymmetric subsidization of municipal entrants (or any entrant) is a legitimate and serious concern. Entry by a subsidized government-owned firm with no regard for profit reduces the incentives of private firms to invest in modern communications infrastructure and may reduce consumer welfare.

Third, the economics indicate that subsidized municipal broadband is incapable of increasing competition (in the long run), if competition is measured as the number of firms offering service in each area. The number of providers in a market is determined by economic forces, not the whims of federal, state or city politicians. In the long-run, either the municipal entrant will fail or a private provider will exit or materially reduce its investments. Municipal systems regularly obtain significant market shares and often remove a major anchor tenant (the government) from private networks, thereby weakening the economic case for private investment in upgrades. If municipal systems are truly not interested in profit maximization, as is frequently claimed, then municipal entry may be a poison pill for all private sector investment.[33]

Fourth, and following from the prior findings, subsidized municipal entry is prone to be predatory (i.e., prices below incremental cost).

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31. *Id.* at 31.

32. Jeff Stricker, Note, *Casting a Wider 'Net: How and Why State Laws Restricting Municipal Broadband Networks Must Be Modified*, 81 GEO. WASH. L. REV. 589, 591-92, 615, http://www.gwlr.org/wp-content/uploads/2013/03/Stricker1.pdf [https://perma.cc/23TG-KGUD].

33. Matthew Halverson, *Disbanded: No Broadband Utility for Seattle*, SEATTLE MET (June 20, 2012), http://www.seattlemet.com/articles/2012/6/20/disbanded-no-broadband-utility-for-seattle-july-2012 [https://perma.cc/CR39-YA4T] ("A municipal network should be evaluated on the same basis of how we evaluate roads and other infrastructure," says Christopher Mitchell, founder of muninetworks.org, which tracks community broadband issues. "Which is to say that the point of the road is not to produce revenue for the general fund. It's to produce economic development and other benefits."); Christopher Mitchell, *Broadband Payback Not Just About Subscriber Revenues*, COMMUNITY NETWORKS (July 15, 2011), https://muninetworks.org/content/broadband-payback-not-just-about-subscriber-revenues [https://perma.cc/LK3W-VRCY] ("[I]n doing a cost/benefit analysis on telecom infrastructure investment, it's important to take into account not only the direct revenues that the infrastructure generates but also the dollars that flow into a community as a result of the investment."); Henry Rosoff, *Tacoma Could be First Major Washington City with Publicly-Owned Broadband Network*, KIRO7.COM (Nov. 30, 2015), https://www.kiro7.com/news/utility-board-tacoma-council-decide-click-cable-tv/19126115/?_website=cmg-tv-10090 [https://perma.cc/A45J-9X8F] (quoting Tacoma Public Utility Board Chairman Bryan Flint) ("Publicly-run means we don't have a profit motive."); David St. John, *Municipal Fiber to the Home Deployments*, FIBER TO THE HOME COUNCIL 3 (Apr. 2008), http://community-wealth.org/sites/clone.community-wealth.org/files/downloads/article-st-john.pdf [https://perma.cc/TT4V-PGBA] ("In the case of muni systems, which are not-for-profit enterprises, one measure of 'success' is defined as the level of their 'take rate'—that is, the percentage of potential subscribers who are offered the service that actually do subscribe").

Municipalities operating broadband networks are not, as the Supreme Court observed, acting only "to serve the public weal."[34] Instead, the municipal entrant seeks to capture market share from private sector providers. As such, if one discusses municipal broadband in the context of competition, the asymmetric subsidized entry of a municipal system is better characterized as anticompetitive in nature and may raise antitrust concerns.

Fifth, because municipal systems are disconnected from profit maximization and asymmetrically subsidized, the mere threat of municipal entry can reduce private sector investment. This deterrence effect is particularly pernicious at a time when private providers are undergoing widespread and costly upgrades to their networks. Paradoxically, the resulting lack of private supply may then be used to justify the municipal entry that caused the perceived lack of competition in the first place.

Sixth, economic theory reveals that the unqualified support of "more competitors" cannot be supported. As is well-documented in the economics literature, because of profit maximization and fixed costs, free entry into a market typically leads to excessive, not too little, entry. It may be a bitter pill to swallow when consumers face relatively few suppliers, but the risks of welfare-reducing entry are particularly acute in broadband markets where fixed costs are high, and services are not much differentiated. Lower prices (and thus higher quantities) must be paid for by the high cost of building a new network. Thus, the consumer welfare implications of forced entry via municipal broadband may very well be unfavorable. The dependence on asymmetric subsidies worsens the welfare consequences because subsidy dollars are expensive; research suggests that every dollar of spending by government costs much more than a dollar to gather and distribute.[35] Hundreds of millions in federal subsidies have been used to support municipal networks and it is well known that the federal budget deficits and federal spending are out of control.

Seventh, given the above, some (but not all) of the provisions of state laws overseeing municipal broadband have a sound economic basis. As noted a moment ago, many of these state laws attempt primarily to limit the subsidization of municipal systems, to encourage first the pursuit of alternatives to municipal entry, and to protect taxpayers from undue risk (or at least inform them of it by, say, requiring a referendum). In doing so, certain provisions may very well reduce the likelihood of municipal entry, but they do so for sound economic and policy reasons. Even laws that prohibit municipal broadband altogether, while admittedly an extreme approach, can be supported by legitimate economic arguments, at least in markets where private providers already provide service.

Eighth, if subsidies are to be used, then theory indicates that subsidies to existing firms are more efficient than municipal networks at achieving

34. City of Lafayette v. La. Power & Light Company, 435 U.S. 389, 403 (1978).

35. *See, e.g.*, E.K. Browning, *On the Marginal Welfare Cost of Taxation*, 77 AM. ECON. REV. 11, 11-23 (1987) (estimating a marginal cost of funds of $0.21); Don Fullerton, *Reconciling Recent Estimates of the Marginal Welfare Cost of Taxation*, 81 AM. ECON. REV. 302, 302-308 (1991).

positive externalities by boosting output. Subsidies are continuous and can be fine-tuned and targeted. Entry is a clumsy approach in that it is discrete, untargeted, relatively expensive, risky for taxpayers, and arguably predatory.

Ninth, broadband is economically important, but most of the economic gains attributed to municipal broadband systems are based on economic migration rather than economic development. Certainly, such "economic migration"—as opposed to economic growth—is "privately" advantageous to a city, but whatever gains the city obtains from recruiting business is a loss to the city from which that business came. Since there are costs to moving and large costs of building the network, it may be that the migration is net detrimental to society as a whole. While it is easy to see a city's leadership wanting to advantage its city over others, it is not clear why the federal and state governments should approve. Business stealing is also not a sustainable policy. A "first mover" advantage is, by definition, not available to late comers. Newer and proposed deployments of municipal systems are perhaps already late to the party; the incentive to migrate to a particular city for high-speed broadband, and the economic gain realized from such migration, gets smaller by the day.

Tenth, we review the recent empirical literature on the economic benefits of municipal broadband. The most thorough empirical analysis of the topic to date looks at changes to the labor market in Chattanooga, Tennessee, following the city's deployment of a broadband network. Relative to comparable cities, an analysis of U.S. Census data finds no improvement in the labor market in that city. A few other studies point to the uneconomic nature of municipal entry. Finally, a few informal surveys reveal government-owned systems do not offer lower prices for services.

Eleventh, and finally, a multitude of legal issues continue to swirl around the municipal broadband debate. To wit, precedent indicates that it is unlikely that opponents of state municipal broadband laws will be able to achieve preemptive relief from either the FCC under the Communications Act or even new law from Congress. As a Constitutional matter, the Supreme Court appears to hold that the federal government cannot intervene into the relationship between states and their political subdivisions. Moreover, given the predatory nature of municipal broadband, GONs which have been found to have improperly cross-subsidized their operations could be in violation of the antitrust laws. Most importantly, because operators of GONs act as both regulator and competitor, recent caselaw indicates that municipal broadband raises significant Constitutional due process concerns.

The analysis presented below prescribes a heavy dose of caution regarding municipal entry into the communications business, perhaps explaining why much of the debate is political rather than economic in nature. Economics does not, however, offer an unequivocal indictment of municipal broadband. The benefits of broadband Internet service are perceived to be large and include externalities, and most of the welfare gains from broadband are obtained with even a single provider. Municipal broadband may have a role to play in broadband deployment in markets where private entry is not profitable, even if municipal entry is subsidized heavily. Such subsidies

should be subjected to cost-benefit tests, however, as the benefits of broadband are finite and the costs very high in some areas. In markets already served, there are *potentially* more efficient and less controversial alternatives to capture the benefits of broadband service than adding a government-owned competitor, which, according to economic theory, is an action better characterized as anticompetitive than it is competitive. Municipal broadband should be the last-ditch effort, and we suspect that many cities took it to be so but eventually built a network anyway.[36] Desperate times may call for desperate measures, and when the toolkit is limited, the chosen fix may appear to be a kluge. Undoubtedly, desperation is a lousy climate for good decision-making.[37] In that light, municipal broadband may be a symptom of the lack of coherent, economically informed federal and state policies for broadband deployment and adoption in economically-marginal communities.

III. THE ECONOMICS OF THE BROADBAND BONUS

If one were to condense the FCC's 2010 *National Broadband Plan* down to a single sentence, it might sound like this: *broadband is really important and we need people to use more of it*.[38] Broadband's importance stems from both its private value and its social value, but it is the social value that drives the need for social policy. While activities are not always easily categorized as one or the other, the *Plan's* depiction of broadband as a "platform to create today's high-performance America" suggests that the Internet is useful for more than just shopping and watching high-definition movies and cat videos (which provide benefits primarily of a *private* nature). Downloading a movie in five seconds rather than five minutes is a private issue, not a social good worthy of taxes and subsidies.[39] Alternately,

36. *Oregon Municipal Broadband*, LEAGUE OF OR. CITIES 30 (July 2011), http://www.orcities.org/Portals/17/Headlines/BroadbandReport%20July%202011%20FINAL forWEB.pdf [https://perma.cc/Y5LZ-BT7H] ("In 1999, the cities of Monmouth and Independence asked their local cable company when high-speed Internet would be introduced to the cities. The cities were told services would be available no sooner than 2020. With the new millennium approaching, both cities realized that to be economically viable, high-speed Internet services were desperately needed. Accordingly, the two cities conducted a feasibility study regarding an intergovernmental broadband network. This study also included a public survey, which showed that the citizens of Monmouth and Independence were receptive to the idea of a municipal broadband utility. Furthermore, a major client was eager to receive better telecommunications services, Western Oregon University. These and other factors illustrated to the two city councils that a municipal broadband utility was a viable and necessary project.").

37. *See, e.g.*, T. Randolph. Beard, *Bankruptcy and Care Choice*, 12 RAND J. OF ECONS. 626, 626-634 (1990).

38. Blair Levin & Denise Linn, *The Next Generation Network Connectivity Handbook*, GIG.U (July 2015), http://www.gig-u.org/cms/assets/uploads/2015/07/Val-NexGen_design_7.9_v2.pdf [https://perma.cc/54JL-LCFN]; *National Broadband Plan*, *supra* note 2.

39. It could be argued that such a difference may serve as a recruitment device for a city, but this does not contribute to any social net gain. Whatever benefits arise from one city recruiting a business is offset by the loss to the community from which the business originated. In fact, the recruitment motivation for cities is likely to be welfare reducing in that it encourages the premature deployment of new networks.

widespread high-speed broadband use may permit governments, school systems, and healthcare providers to operate more efficiently and at lower costs by conducting business online, and some part of these efficiencies may be viewed as rendering social benefits not fully captured by private parties. In this Article, we will use the term "positive externality" to account for those uses that produce a benefit above and beyond what consumers are willing to pay for themselves and what firms can turn into revenues.

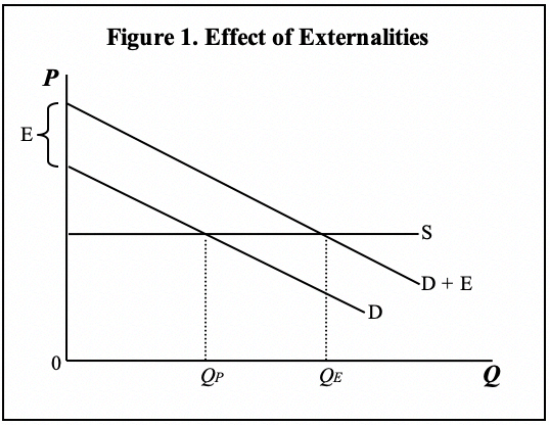
An important aspect of a positive externality is that such benefits accrue neither to broadband providers nor their consumers, but to a third party. Consumers are not inclined to pay for benefits that accrue to others. Likewise, firms are profit-maximizers, so any benefit that does not affect revenues and profits does not impact its decisions. In the presence of a positive externality, the private incentives of consumers to pay for and the private incentives of firms to deploy the "right amount" of broadband are *too low* from a social perspective. This lack of attention to the full social values of broadband to others results because consumers, or the veil we call a "firm" that masks a group of consumers, are normally willing to pay only for benefits they receive. Altruism is noble, but not universal. The wedge between private and social benefits is the source of the dissatisfaction with both the deployment and adoption of broadband service, and this displeasure in turn drives a heightened attention to broadband policy. All the wishful thinking, complaining, and name calling people can muster won't close this gap; only a change in the economics of deployment and adoption will make the difference. Municipal broadband does not alter the economics of broadband.

A. The Externality Issue

Figure 1 illustrates the nature of the externality problem using the basic supply-demand graph, where quantity is measured along the horizontal axis and price along the vertical axis.[40] The private demand for the good is the downward sloping curve labeled D. Given constant cost and perfect competition, the equilibrium quantity based on private incentives alone is Q_P, where demand and long-run supply (S) intersect. Assuming the good produces a positive externality of value E, the social demand curve is the downward sloping curve labeled D + E, which is shifted up and to the right by the amount E to account for the positive externality. For society, which includes the third parties receiving the external benefit, the desired quantity is Q_E. When accounting for the externality, private incentives produce a quantity that is too low (by the amount Q_E less Q_P). By subsidizing consumers by an amount equal to E, the effective demand of the consumers seen by the

40 For a discussion of the economics of externalities, *see generally* ROBERT B. EKELUND & ROBERT D. TOLLISON, ECONOMICS: PRIVATE MARKETS AND PUBLIC CHOICE (1999); Thomas Helbling, *What Are Externalities?*, 47 FIN. & DEV. 48, 48-49 (Dec. 2010), http://www.imf.org/external/pubs/ft/fandd/2010/12/basics.htm [https://perma.cc/PC6L-HMXK].

sellers is now D + E, so the externality problem is resolved and Q_E becomes the equilibrium quantity.[41]



If the private incentives of consumers and producers produce too little quantity by a failure to internalize the externality, then a subsidy is a policy solution (taxes are used to solve the negative externality problem). Broadband service is believed to provide positive externalities and these externalities lead to calls for ubiquitous deployment and universal adoption.[42] Yet, because these goals are based on social rather than private gains, neither goal will be met without some type of intervention. In this simple scenario, that intervention is a subsidy.[43]

B. Competition is Not the Solution to Externalities

The fact that quantity is too low in the presence of a positive externality is the source of much confusion in the broadband policy sphere, especially regarding municipal broadband. Specifically, basic economics indicates that competition reduces prices and, in turn, increases quantity by the law of demand. This leads to the belief that if quantity is "too low," then an increase in competition is a suitable solution. It is not. Indeed, in Figure 1, perfect competition is assumed, and yet quantity remains too low. Competition is not a solution to the externality problem; no amount of competition will close the

41 A subsidy to the firms of the same amount would lower the perceived marginal cost, thus increasing quantity by the same amount.

42. *See* Robert D. Atkinson, *The Case for a National Broadband Policy*, INFO. TECH. AND INNOVATION FOUND. 6 (June 2007), https://www.itif.org/files/CaseForNationalBroadbandPolicy.pdf [https://perma.cc/LX2C-FM5N].

43. A subsidy intervention may involve the public supply of the good or service, as with public education.

gap between the private and socially desired quantity. Calls simply to "promote competition" ignore the true nature of externality and its solution.[44]

A review of the vast literature on municipal broadband reveals the same confusion between the effect of *positive externalities* and of *competition*.[45] Positive externalities are realized when people "consume" broadband, and the more of it they consume, the larger the social well-being (i.e., consumer welfare, economic welfare, or social welfare). Municipal broadband networks do not solve the externality problem by competing with the private sector. *To solve the externality problem, we need more quantity, not more firms*. Adding more sellers to the market does not address the underlying problem, because that problem is a wedge between private and social values. Certainly, in the presence of excessive market power, additional competition may bring down prices. Even so, these marginal reductions in price can never solve the real problem—that is, the externality problem. How these price reductions are obtained is also important, and we address that question in more detail in the following sections.

As deployment data shows, private incentives are enough for the deployment of high-speed networks, and usually multiple networks, in most cities and places across the country. Where broadband is not available, the FCC has stepped in to subsidize broadband deployment (by a single firm) through its Connect America Fund ("CAF") and now its Rural Digital Opportunity Fund ("DOP"). These subsidy schemes focus almost exclusively on areas that are not served at all (or served with very low speed connections).[46] These programs may leave gaps. Enlightened management of rights-of-way and using the government as an anchor tenant for private providers may be effective tools in some areas, but may not always be adequate to induce the widespread availability of very high-speed broadband networks at privately uneconomic prices. Municipal broadband is prone to manifest as an option in areas where private incentives are insufficient for deployment and gaps in the subsidy system manifest.

C. Economic Development and Municipal Broadband

Perhaps the most common argument used in favor of municipal systems is economic development. Several studies allegedly provide evidence that advanced communications networks "cause" economic growth, and these

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44. Statement of Tom Wheeler, Chairman, Fed. Commc'ns Comm'n, Where There is "Competition, Competition, Competition," the Need for Cable Rate Regulation is Diminished (on file at https://apps.fcc.gov/edocs_public/attachmatch/FCC-15-62A2.pdf).

45. *See, e.g.*, Sallet, *supra* note 19.

46. Details on the FCC's Connect America Fund may be found at: *Connect America Fund (CAF)*, FED. COMMS. COMMISSION, https://www.fcc.gov/encyclopedia/connecting-america (last visited July 7, 2020) [https://perma.cc/7C2X-2L2V]. The Rural Digital Opportunity Fund is detailed at: Rural Digital Opportunity Fund; Connect America Fund, *Notice of Proposed Rulemaking*, 34 FCC Rcd 6778, 8 (2019), https://www.fcc.gov/document/fcc-proposes-204-billion-rural-digital-opportunity-fund-0.

studies are often cited in support of municipal broadband.[47] Case studies are also used to support the argument. However, the economic development motivation is defective. Broadband is, no doubt, important to economic infrastructure—and by extension, jobs—but it is no magic elixir.[48] In the context of municipal broadband, economic development is a local, not a global, phenomenon.

D. Economic Migration Versus Growth

Most of the gains attributed to municipal broadband systems are based on *economic migration* rather than *economic development*. Consider, for example, former FCC Chairman Tom Wheeler's description of the economic gains attributed to the municipal network in Chattanooga-Tennessee: "Smaller businesses such as Claris Networks, Co.Lab, EDOps, and Lamp Post Group *relocated* to the city, and Chattanooga is also emerging as an incubator for tech start-ups."[49] Note the operative word here is "relocated." For the most part, the economic development from municipal broadband systems appears to be based on stealing businesses from other cities.[50] Certainly, such "economic migration"—as opposed to economic growth—is advantageous to a city, but whatever gains the city obtains from recruiting business is a loss to the city from which that business came. Since there are costs to moving and large costs of building the network (usually prematurely from an economic viewpoint), it may be that the migration is net detrimental to society as a whole. Most troubling is that the federal subsidies used to support financially municipal networks are funded through federal taxation; therefore, the people in cities losing businesses are perversely funding the broadband networks doing the stealing. The basis for such federal favoritism is unclear.

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47. There are many studies—of varying quality—on the relationship between broadband and economic growth. *See, e.g.*, Robert W. Crandall et al., *The Effects of Broadband Deployment on Output and Employment*, BROOKINGS INSTITUTION, ISSUES IN ECON. POL'Y (June 1, 2007), http://www.brookings.edu/research/Articles/2007/06/labor-crandall [https://perma.cc/F3YJ-V3VB]; *Impact of Broadband on the Economy*, INT'L TELECOMM. UNION (April 2012), https://www.itu.int/ITU-D/treg/broadband/ITU-BB-Reports_Impact-of-Broadband-on-the-Economy.pdf [https://perma.cc/WP5Z-B4B5]; Michael Minges, *Exploring the Relationship Between Broadband and Economic Growth*, WORLDBANK (Jan. 2015), http://pubdocs.worldbank.org/pubdocs/publicdoc/2016/1/391452529895999/WDR16-BP-Exploring-the-Relationship-between-Broadband-and-Economic-Growth-Minges.pdf [https://perma.cc/ZH68-SKMS]; *Socioeconomic Effects of Broadband Speed*, ERICSSON (Sept. 2013), http://www.ericsson.com/res/thecompany/docs/corporate-responsibility/2013/ericsson-broadband-final-071013.pdf [https://perma.cc/F4YR-W4GW].

48. George S. Ford & R. Alan Seals, *The Rewards of Municipal Broadband,* PHX. CTR. (May 2019), http://www.phoenix-center.org/pcpp/PCPP54Final.pdf [https://perma.cc/H7YK-UZS3].

49. Tom Wheeler, *Removing Barriers to Competitive Community Broadband,* FED. COMM. COMMISSION BLOG (June 10, 2014, 4:17 PM), http://www.fcc.gov/blog/removing-barriers-competitive-community-broadband [https://perma.cc/YYL7-KL5W] (emphasis added).

50. *See, e.g.*, Heather B. Hayes, *Businesses Benefit from Municipal Broadband*, BIZTECH, https://biztechmagazine.com/article/2016/03/businesses-benefit-municipal-broadband ("Many communities have realized that if they do not invest in themselves, they will be left behind in the digital economy.").

Also, economic migration—i.e., business *stealing*—is not a sustainable policy. Chattanooga and other cities were perhaps wise to get a first-mover advantage in stealing businesses from other cities, but as the deployment of very high-speed broadband networks becomes more pervasive, early-mover advantages dissipate. A "first mover" advantage is, by definition, not available to late comers. Newer and proposed deployments of municipal systems are perhaps already late to the party; the incentive to migrate to a particular city for high-speed broadband, and the economic gain realized from such migration, gets smaller by the day.

The discussion of an externality—that is, some activity that causes a difference between private and social valuations—is also relevant to the economic development issue. Cities building municipal networks justify doing so because those networks permit them to steal businesses from other cities. The cities view such economic gains as "social" in nature—and they may be social within the city limits—but in fact they are mostly private. Society includes both the city doing the stealing and its victims. Taking a city to be a collective of private (and political) interests, economic theory points to an inefficiency caused by the private motivations of a city's leadership. This *economic war among the cities* supports a role for state and federal governance over municipal broadband, since the private and individual decisions of cities may not coincide with broader social goals.[51]

IV. MUNICIPAL BROADBAND, COMPETITION, AND WELFARE

A professor of economics stands before her class of fifty students with $101 in her hand. She offers an even cut of that $101 to every student willing to pay $20 to enter into the sharing scheme. At first, most of the fifty raise their hands to participate for an easy profit, but since a share is worth only about $2 if split among all fifty students, hands soon begin to fall. How many hands are up in the end? If six, then each participant gets only $16.80, which is less than the $20 entry fee. So, the final number must be less than six. If four, then each participant gets $25.25, earning a $5.25 profit on the $20 investment. While a good deal, the sum of these profits equals $21 ($= 5.25 \times 4$), so there is room for one more participant to make a profit at the $20 entry fee. In the end, there are five participants, with each student earning a return of $0.20 on their $20 investment. There is no motivation for a sixth student to enter, and no motivation for one of the five final participants to exit. Five participants form an *equilibrium*.[52]

51. *See, e.g.*, Melvin L. Burstein & Arthur J. Rolnick, *Congress Should End the Economic War Among the States*, FED. RES. BANK OF MINNEAPOLIS (Jan. 1, 1995), https://minneapolisfed.org/publications/annual-reports/congress-should-end-the-economic-war-among-the-states [https://perma.cc/2UL5-H6SM].

52. For purposes of exposition, the discussion of this example is simplified somewhat. In particular, we ignore the possibility of equilibria in mixed strategies. One consequence of such solutions is that the observed number of entrants will be random, although the point being stressed in the text remains correct.

The simplicity of this game belies its significant economic insight. If a firm believes it can enter and serve a market profitably, then it will enter. If an existing firm is losing money and sees no way to turn that around, then it will exit. When entry and exit stop (or balance), the market is said to have reached equilibrium. Just like prices and quantities have equilibrium levels, there exists an *equilibrium number of firms* that arises naturally out of the economic conditions of the marketplace. Whether this equilibrium industry structure is satisfactory to parties or policymakers is beside the point; the supply-side and demand-side conditions determine the number of firms that can profitably serve the market. That number may be big or small. If market conditions only permit two firms to operate profitably, then three firms cannot do so, and no amount of wishful thinking will change that fact.

As discussed above, the case for aggressive competition policy in broadband markets is based on data showing that most households have few options (if any options at all). While two or three providers is unarguably few, this fewness is not an accident. It is driven primarily by the supply- and demand-side conditions for the services offered over wireline communications networks. As the FCC recognized in its *National Broadband Plan*:

> Building broadband networks—especially wireline—requires large fixed and sunk investments. Consequently, the industry will probably always have a relatively small number of facilities-based competitors, at least for wireline service.[53]

Because wireline communications networks are exceedingly expensive to build, maintain, and operate, "fewness" is expected. The more there are of them, the less market share is available to any single firm, making it difficult to earn a return sufficient to justify the investment. Financial studies of municipal broadband proposals often find that a GON will require a market share of at least 40% or so to be financially self-sufficient.[54] If so, then how many networks can serve this market? If a network needs no less than a 40% penetration rate (with the typical 80% of total homes subscribing), then the answer is two. While the "relatively small number of facilities-based competitors" is often lamented by advocates and policy makers, it is, in many respects, Mother Nature that has produced that outcome. Certainly, there may be policies that make entry more difficult (e.g., local franchise laws, net neutrality) and there may be policies that ease entry (e.g., tax incentives, easy rights-of-way rules, and so forth). Even so, the nature of providing wireline services prohibits large numbers of firms and there is little public policy can

53. *National Broadband Plan, supra* note 2, at 36.

54. Jennifer Karami, *What Can Tacoma Teach Seattle About Muni Broadband?*, SEATTLE WEEKLY NEWS 9 (June 1, 2015), https://issuu.com/pnwmarketplace/docs/i20150630181432650 [https://perma.cc/H2R2-WJPJ] ("[T]o be sustainable, this new network would need to capture over '40 percent of the broadband market at a subscriber cost of $75 per month to be financially viable over the long term,' . . . .").

do to alter those underlying economic forces with the possible exception of massive and sustained subsidization (which presents its own set of issues).

As for those of us who have studied communications policy for the past twenty-five years, we think a little perspective is in order. Let's not forget that not that long ago there was essentially no competition for communications and video services and households were faced with buying from regulated monopolists, if they were regulated at all. In the mid to late-1990s, even the thought of having two wireline providers of voice and video service was a cause for celebration.[55] It was understood, both practically and theoretically, that even a little competition goes a long way. In fact, the U.S. Congress codified that idea. In the Cable Competition and Consumer Protection Act of 1992, for example, Congress imposed rate regulation on cable television systems.[56] Rate controls were eliminated, however, if a cable system faced *half a competitor* (i.e., a rival that passed half the homes in a franchise area).[57] Congress determined that half a competitor is better than a regulated monopolist, and the evidence has affirmed this view.[58] Interestingly, the rate reductions imposed on cable systems after the 1992 Cable Act were based on a statistical study of rate reductions found in markets with *two* competitors. Rate regulation, at its best, could only mimic the duopoly outcome. Two competitors in wireline broadband was taken to be very good stuff, and two wireline providers may be the best the unsubsidized market can do in many cities and rural areas. If the full costs of the subsidies are considered in a cost-benefit analysis, then there is no guarantee such subsidies will increase consumer welfare.

Also, it is important to keep in mind that the "number of competitors" is not the equivalent of "competition." Consider a market where there are two firms. These two firms may compete very aggressively or not at all (i.e., collusion). Either is a possibility. The number of competitors alone does not say much about the intensity of price competition.[59] In fact, if firms compete intensely, only a few firms can survive, implying that few competitors in a market may be an indicator of intense price competition rather than a lack of it. In the Professor's game, imagine what would happen if for every hand

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55. George S. Ford, *Reflecting on Twenty Years Under the Telecommunications Act of 1996*, 68 FED. COMM. L.J. 17 (2016); Lawrence J. Spiwak, *Reflecting on Twenty Years Under the Telecommunications Act of 1996*, 68 FED. COMM. L.J. 62 (2016).

56. *See* Rafael G. Prohias, Longer than the Old Testament, *More Confusing than the Tax Code: An Analysis of the 1992 Cable Act*, 2 COMMLAW CONSPECTUS 81, 93 (1994); Edmund L. Andrews, *Bush Rejects Bill that Would Limit Rates on Cable TV,* N.Y. TIMES, Oct. 4, 1992, § 1, at 1, https://www.nytimes.com/1992/10/04/us/bush-rejects-bill-that-would-limit-rates-on-cable-tv.html.

57. 47 U.S.C. § 542(l).

58. THOMAS HAZLETT & MATTHEW L. SPITZER, PUBLIC POLICY TOWARD CABLE TELEVISION: THE ECONOMICS OF RATE CONTROLS (1997).

59. *See* George S. Ford et al., *Competition After Unbundling: Entry, Industry Structure and Convergence*, 59 FED. COMM. L. J. 331, 333 (2007), http://www.phoenix-center.org/Articles/FCLJCompetitionAfterUnbundling.pdf [https://perma.cc/9244-YQDL] for a detailed discussion.

raised, the prize shrunk by $5. There would fewer students—only four in fact—willing to raise their hand in the end. A look at the financials of firms that offer wireline services and the lack of widespread competitive entry certainly does not suggest they are earning huge returns. Accounting profits for these firms are below average for firms in the S&P 500.[60]

The fact is that the outcomes we observe in markets, whether we like them or not, are what the inherent supply- and demand-side conditions of the market permit. Changing such outcomes will require costly regulatory interventions, and history suggests such interventions are often politically motivated, ham-handed, and ineffective at increasing the number of providers for wireline communications services.[61] Policymakers are swimming upstream; wireline communications is a hard business. Economic theory indicates that without subsidization, the observed number of firms from a free entry scenario equals or exceeds the number of firms chosen by a capable regulator intent on maximizing consumer welfare subject to a zero-profit constraint. Of course, in the presence of such a benevolent, omniscient, and all-powerful social planner, perhaps there's no need for competition in the first place since the competitive outcome could be produced by the planner's mandate. Yet, experience suggests that the performance in even workably competitive markets dominates either regulated monopoly or industry nationalization. Almost all advanced economies have abandoned nationalized communications networks and have done so for good reason.

A. The Equilibrium Number of Firms

We can formalize the analysis with a basic economic model to get a more precise understanding of the issue. Our goal here is to keep it as simple as possible (e.g., a linear model) but rich enough that the key elements of the issue can be addressed. Numerical examples and figures are provided to illustrate the logic of the analysis, which is quite intuitive. This bit of rigor disciplines the argument, and if intellectual discipline is needed anywhere today, it is in communications policy generally and the municipal broadband issue specifically. Nevertheless, the classroom example above illustrates the prescriptions of this more technical analysis.

Consistent with the standard view that more competitors leads to lower prices and firm profits, we employ the Cournot Model of Competition, which results in a smooth movement from monopoly to perfectly competitive prices (and profits) as the number of rivals increases (see Figure 2 below).[62] Also, in

60. George S. Ford & Lawrence J. Spiwak, *Substantial Profits in the Broadband Ecosystem: A Look at the Evidence*, PHX. CTR. PERSPECTIVE (Apr. 22, 2010), http://www.phoenix-center.org/perspectives/Perspective10-04Final.pdf.

61. George S. Ford & Lawrence J. Spiwak, *Lessons Learned from the U.S. Unbundling Experience*, 68 FED. COMM. L.J. 95, 101, 123-25 (2016), http://www.fclj.org/wp-content/uploads/2016/01/68.1.3-Spiwak-and-Ford.pdf [https://perma.cc/DPS8-JRYH].

62. In the Cournot model, rival firms choose the quantity they wish to offer for sale. Each firm maximizes profit on the assumption that the quantity produced by its rivals is not affected by its own output decisions. *See, e.g.*, DENNIS W. CARLTON AND JEFFERY M. PERLOFF, MODERN INDUSTRIAL ORGANIZATION (2000).

policy debates, the number of firms is often taken to measure the degree of competition, and the Cournot Model is consistent with that view. So, to begin, consider a Cournot Oligopoly model with N symmetric (or identical) firms and a linear market demand curve given as:

$$P = A - Q, \tag{1}$$

where P is market price, Q is market quantity, and A is the intercept of the market demand curve (which is also a measure of market size). For convenience, we assume that each firm has zero marginal costs and fixed costs equal to f. The firms are symmetric so they all charge the market price and sell quantities Q/N, where N is the number of firms. The Nash Equilibrium is characterized by the following price (P_e):

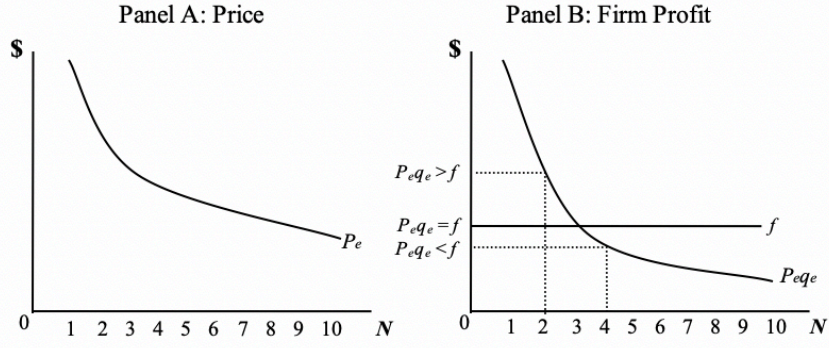
$$P_e = A/(N + 1) ; \tag{2}$$

and total quantity (Q_e):

$$Q_e = N \cdot A/(N + 1) . \tag{3}$$

Equation (2) reveals the familiar result that equilibrium price falls as the number of firms (N) increases. Likewise, Equation (3) shows that total quantity rises in the number of firms (in response to the price decline). Each firm has a quantity of $q_e = Q_e/N$, so each firm's profits are just $P_e q_e$. Figure 2 illustrates the relationship between the number of firms, N, and price (Panel A) and firm profits (Panel B).

Figure 2. Prices, Profits and the Number of Firms



As shown in Panel A of Figure 2, as the number of firms (N) increases, the market price falls. Panel B shows that firm's profits also fall as N increases. Profits fall at a faster rate than prices because not only are total industry profits falling as N rises but also because those lower profits are being split among more firms (a shrinking pie is being cut into more and more

pieces). The number of firms is obviously quite important to competition policy, so what determines N? The answer is: *profits do*.

If a firm can enter and earn a profit large enough to pay f, then it will. At some point, however, falling prices from additional entry will lead to prices and quantities so low that f cannot be covered. When that happens, entry stops. Or, if too many firms enter, then all firms lose money, some must exit. When the entry and exit stop (or balance), then the equilibrium number of firms, N^*, is obtained. In Panel B of Figure 2, with fixed cost f, if N were 4, all firms lose money ($P_e q_e < f$). If N is 2, then profits are positive ($P_e q_e > f$) and sufficiently so that a third firm can enter and still make a profit. Thus, the equilibrium number of firms is $N^* = 3$; no firm wants to exit, and no firm wants to enter.

The figure indicates that to determine the long-run equilibrium number of firms, we must first set firm profits equal to zero:

$$P_e q_e - f = 0, \tag{4}$$

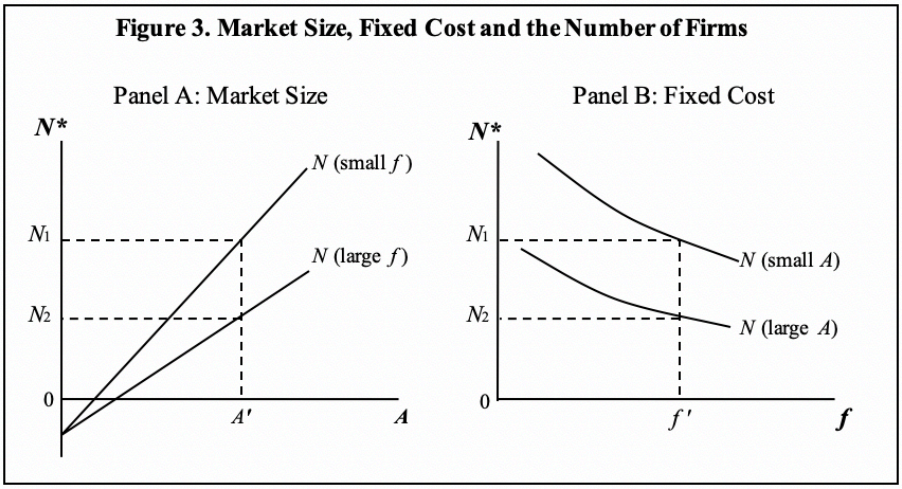
and then we solve this condition for the long-run number of firms which is (the integer part of):

$$N^* = A/\sqrt{f} - 1. \tag{5}$$

This equation is simple but it contains a basic insight for competition policy.[63] That is, the larger the market size (A) is relative to the (square root of the) fixed cost of providing the service (f), the larger the number of firms in equilibrium. Going back to the example of the Professor's game, if the prize was raised from $101 to $201, then 10 students would be willing to pony up the $20 fee (recall only five did so at a prize of $101). When the prize (that is, the market) gets bigger, more students are willing to participate in the game.

The relationships implied by Equation (5) are illustrated in Figure 3. In Panel A, market size (A) is measured along the horizontal and the number of firms along the vertical axis. Two curves are shown with one reflecting high fixed costs (f) and the other low fixed costs. As market size gets larger, so does the number of firms. But, the number of firms grows faster as market size rises when fixed costs are relatively lower. At A', there are N_1 firms when fixed costs are low and N_2 firms when fixed costs are high. In Panel B, fixed costs are measured along the horizontal axis. With market size constant, as fixed costs rise, the number of firms declines (non-linearly, given Equation (5)). The number of firms will be larger for any given f when market size (A) is larger. At f', there are N_1 firms when fixed costs are low and N_2 firms when fixed costs are high.

63. The theory of equilibrium industry structure is well-developed, and much research has stemmed from the pioneering work of Professor John Sutton. John Sutton, SUNK COST AND MARKET STRUCTURE (1991). For an explanation of this work, *see* Ford, *supra* note 57; *see also* Implementation of Section 19 of the Cable Television Consumer Protection and Competition Act of 1992*, First Report*, 9 FCC Rcd 7442, App'x H (1994).



The implications are clear. A large market with low capital costs will have many sellers (*A* is large, *f* is small) and a small market with large fixed capital costs will have few sellers (*A* is small, *f* is large). Even in a large market, few providers may exist if fixed costs are also large (*A* is large, *f* is large too). Large fixed costs create scale and density economies, and these economies favor large firms and thereby limit their numbers. In many cities across the U.S., and in many cities where municipal systems are being built or considered, the markets are small by low population and the fixed costs relatively high given the low density of that population. Both factors work against the presence of many firms (or even the presence of one firm).

Equation (5) indicates that the number of firms in a market is finite and may be determined by factors mostly outside the control of public policy (or exogenous), such as consumer preferences and the costs of building and maintaining a network. The theory further reveals that public policy cannot choose *N** directly.[64] If policymakers are unhappy with the number of providers, then public policy usually must either increase the size of the market or reduce the fixed costs of providing the service. Equation (5) also provides a detailed explanation for the *National Broadband Plan's* statement that "[B]uilding broadband networks—especially wireline—requires large

64. It is perhaps more accurate to say that policymakers cannot make *N* exceed *N**. Regulations can always be used to reduce *N* below *N** (i.e., a franchised monopoly), though there will be pressures to eliminate such restrictions if more competition is possible. In the early days of the mobile wireless industry, the FCC allocated licenses in order to maintain a large number of firms. Competition was excessive, and eventually mergers and acquisitions reduced the number of rivals. *See*, *e.g.,* T. Randoplh Beard, et al., *Wireless Competition Under Spectrum Exhaust*, 65 FED. COMM. L. J. 79 (2012). In the radio industry, the FCC also limited the number of stations a single owner could own, but inefficiencies eventually led to the relaxation of those ownership rules. *See*, *e.g.*, Robert B. Ekelund Jr. et al., *Market Power in Radio Markets: An Empirical Analysis of Local and National Concentration*, 43 J. L. & ECON. 157, 158, n. 3 (2000).

fixed and sunk investments. Consequently, the industry will probably always have a relatively small number of facilities-based competitors, at least for wireline service."[65] In effect, the *Plan's* statement says that if *f* is large, *N* is likely to be small.

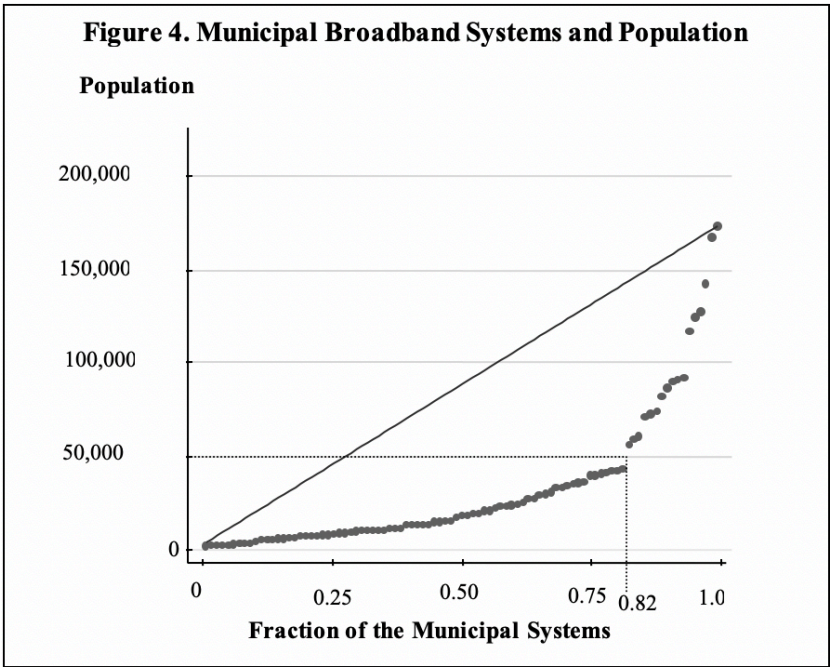
As the theory indicates, there will be fewer firms and less investment in areas where market size is small relative to entry costs. Thus, it is the smaller, rural town where broadband availability is expected to be the most limited, and, in turn, where municipal broadband networks are more commonly found. In Figure 4, the quartile distribution of the populations of cities listed in a recent census of fiber municipal broadband networks is shown.[66] From this figure, we see that 82% of systems in the survey are in cities with less than 50,000 in population (or about 20,000 homes).[67] About 60% of these communities had populations less than 25,000 (10,000 homes), about half had populations less than 18,000 (7,200 homes), and one-third have populations less than 10,000 (5,000 homes). Municipal networks are being built mostly in smaller communities, many of them with a significant rural footprint, where investment in network and/or network upgrades may not be justifiable on purely private incentives alone.[68] While there are some deployments in larger cities (Chattanooga, for example), they are relatively few and these special cases may be explainable by special economic (or political) considerations. Figure 4 comports with theoretical expectations.

65. *National Broadband Plan, supra* note 2, at 36.

66. *See* Zager, *supra* note 11.

67. The average U.S. household has 2.58 persons. *See*, *e.g.*, U.S. CENSUS BUREAU, HOUSEHOLDS AND FAMILIES: 2010 (Apr. 2012), https://www.census.gov/prod/cen2010/briefs/c2010br-14.pdf [https://perma.cc/F6T3-KVW7].

68. Emily Badger, *Why Are There No Big Cities with Municipal Broadband Networks*, BLOOMBERG CITYLAB (Mar. 4, 2013), http://www.citylab.com/cityfixer/2013/03/why-are-there-no-big-cities-municipal-broadband-networks/4857 [https://perma.cc/BC5Z-JCWF].



There is great practical significance to this theory as well. When someone says, "we need to promote competition," the retort is to ask, "what are you doing to increase market size or reduce entry costs?" If competition is taken to be the number of firms as it often is, then economics tells us that changing market size or entry costs (or both) is the only real mechanism by which to increase the number of competitors. Municipal broadband does neither while ignoring the underlying economic factors. It is, consequently, no surprise that many of the municipal systems have experienced profound financial difficulties. While it is possible to construct more sophisticated models that introduce more factors, it is also true in these models that market size and fixed costs are the key determinants to the number of firms. In fact, these additional factors often just scale market size or costs. Most policy actions can be collapsed into either market size or fixed costs, and therefore the influence of policy on the number of firms can be readily assessed.[69] More intense price competition and taxes, for example, shrink market size and thus produce equilibriums with fewer firms. Subsidies may reduce fixed cost (or increase market size), thereby increasing the number of competitors in equilibrium, but subsidies are not free and threaten the profitability of firms not receiving them, perhaps causing exit and no change in *N*.

69. T. Randolph Beard et al., *Network Neutrality and Industry Structure*, 29 HASTINGS COMM. & ENTERTAINMENT L.J. 149 (2007), http://www.phoenix-center.org/Articles/CommEntNetworkNeutrality.pdf [https://perma.cc/ZSG6-ZHUT]; Ford, *supra* note 59, at Section IV.

B. Welfare and the Number of Competitors

Much of the conversation regarding communications policy generally, and municipal broadband policy specifically, is about promoting competition. Yet, *competition is a means, not an end*. Competition is not valued because it lowers prices. In fact, prices can be too low. Competition is valued because it increases consumer welfare by bringing prices in line with costs and ensuring that services consumers want and are willing to pay for get produced at the lowest possible cost.[70] What is advantageous about competition is that it forces firms to weigh both consumer interests as well as the costs of production, thereby increasing consumer (or total) welfare by an invisible hand.

If competition works via an *invisible* hand, we must at least question the wisdom of introducing the *visible* hand of policy. Should policymakers promote competition in wireline markets at any costs? Of course not. To see why, let us analyze the effect of the number of firms on consumer welfare (labeled W), where consumer welfare is the sum of benefits to consumers and firms less the cost of producing those benefits. Consumer welfare (the sum of all surplus of all humans) is the standard by which policy is typically judged, at least by economists.[71]

Let us look at consumer welfare more formally to see the point. As a function of the number of firms, the welfare function is:

$$W(N) = 0.5(A^2 - P_e^2) - Nf. \quad (6)$$

The first term of Equation (6) is the benefits to consumers and producers. The second term is the costs of making the good or service available, which is just the number of firms in the market multiplied by their fixed costs (recall, marginal costs are assumed to be zero for convenience).

What happens to welfare if we increase the number of firms? We can figure that out by taking the derivative of the consumer welfare function with respect to the number of firms (N), rendering:

$$W'(N) = P_e^2/(N + 1) - f. \quad (7)$$

From Equation (7), we can clearly see the two contrary effects of additional entry. The first term of Equation (7) shows that adding an additional firm to the market adds to consumer welfare by reducing the equilibrium price. Note that this positive effect will be smaller the larger the number of firms is (see Figure 2), since adding a third firm has a much larger effect than, say, adding

70. In this Article, consumer welfare is defined to be the sum of all the benefits provided society (both consumers and producers) by the consumption of a good less the cost of producing that good. In some instances, consumer welfare is narrowly associated with consumer surplus, but here a more inclusive definition is used that encompasses producer surplus as well. *See*, *e.g.*, Gregory J. Werden, *Essays on Consumer Welfare and Competition Policy* (Mar. 2, 2009), http://ssrn.com/abstract=1352032 [https://perma.cc/9K8Y-M8M7].

71. By "economists" we mean those practicing Neoclassical Economics.

a tenth. The second term of Equation (7) implies, however, that adding another firm reduces consumer welfare by replicating fixed cost *f*, which is a constant. Equation (7) reveals the tradeoff from additional entry—lower prices versus higher fixed costs. In effect, the price paid for the lower price is the fixed cost *f*, so for welfare to rise, the benefits of the price cut must exceed the additional fixed cost. This point is important—*price cuts from additional competitors must be purchased, and in broadband markets, they are purchased at the high cost of building an additional network*. Society desires (from a welfare perspective) not to pay too dearly for a price cut, so looking to competition to drive price reductions may not be the wisest policy.

Consider a hypothetical where 80 million broadband consumers could organize, without cost, to build their own fiber network to serve every customer. This company must be financially sustainable without subsidies, which is, of course, a stretch, since if it were possible to enter profitably, a private firm already would have done so. For argument's sake, let us set aside this logical nuisance for the moment. Suppose the business model suggests that this new firm would, through competition, reduce the price by 10%. Even so, the network is calculated to remain financially viable. The average price before entry is $80 so the discount is $8 per month, reducing the price to $72 per month, and producing an annual savings of $96 per subscriber. Total payoffs from the discount are measured as the net present value of the savings over 15 years discounted at a rate of 5%, which is approximately equal to ten-times the annual effect of the discount. So, the payoff per customer of the network is $960, with total network benefits of about $77 billion across the 80 million subscribers. These benefits must be compared to the cost of producing them. Very conservative estimates of the cost of a nationwide Google-style fiber network are $140 billion (closer to $300 billion over the fifteen-year window if you assume a 10% maintenance and upgrade factor), but the benefits to consumers are only $77 billion.[72] Consumers, at least rational ones, would not wish to construct such a network (as the costs exceed the benefits by a long shot).

Alternately, assume that a social planner is considering building such a network.[73] Unlike the consumers, the social planner also considers the effect of the price discount on sellers; after all, sellers are just consumers engaged in a supply-side role. Thus, the $77 billion of benefits from the discount calculated above are merely a transfer from sellers to consumers, which to the

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72. Jay Yarow, *How Much It Would Cost Google To Become A National Cable Company Like Comcast*, BUS. INSIDER (Dec. 7, 2012), http://www.businessinsider.com/how-much-it-would-cost-google-to-build-a-cable-network-2012-12 [https://perma.cc/7TBG-XWU4]. The estimates are based on actual spends, but those figures come from more densely populated areas and do not account for the exceedingly high cost of rural buildouts. The FCC estimates a nationwide buildout would cost $350 billion. *See Broadband Plan Presentation*, *September Commission Meeting*, FCC (Sept. 29, 2009), https://apps.fcc.gov/edocs_public/attachmatch/DOC-293742A1.pdf [https://perma.cc/N3QZ-2TB4].

73. By "social planner," we mean an entity that maximizes social welfare, which is equal to the benefits to both buyers and sellers.

social planner are a wash. Only the gains to new consumers are of any value to the social planner. Assuming that a 10% discount would lead to a 10% increase in adoption, the total welfare effects of the new network are only $3.8 million.[74] At a cost of no less than $140 billion, it is clear that the social planner would not construct the network, absent an unreasonable assumption about the size of the externality.

C. *Adding Competitors to a Market Already in Equilibrium*

In many policy-relevant contexts, there is frustration with the number of competitors that Mother Nature has produced in broadband markets (that is, N^*). In those cases, it is not the general welfare tradeoffs that are of interest, but rather the welfare consequences arising from the addition of a competitor to a market already in a private-entry equilibrium (see Eq. 5). Thus, we need to evaluate the welfare function at the equilibrium levels of N^* and P_e^*. By substitution, this yields the long-run market price:

$$P_e^* = \sqrt{f}. \tag{8}$$

Evaluating the derivative of the welfare function of Equation (6) at the long-run number of firms (and price), we have:

$$W'(N^*) = f \cdot N^*/(N^* + 1) < 0. \tag{9}$$

Equation (9) indicates that the derivative of the welfare function with respect to the number of firms is negative *at the long-run equilibrium level of private sector firms*. That is, the entry of an equally efficient firm to a market in equilibrium would cause a decrease in consumer welfare. Promoting "more firms" for the sake of competition is not in all circumstances a good thing. Certainly, policies that remove government activities that shrink market size or raise fixed costs are valid targets for reform, but forcing N to be larger for the sake of a larger N, even accounting for any associated price reduction, may be bad policy.

Figure 5 illustrates the relationship between consumer welfare and the number of firms under three scenarios—nearly zero fixed costs (W_0), low fixed costs (W_L) and high fixed costs (W_H). To generate the curves in the figure, we assume A is 36 and f is 0.1 (essentially zero fixed cost), 50 (low fixed cost) or 144 (high fixed cost) and then compute Equation (6) accordingly.[75] With essentially no fixed costs, N is just over 100 firms, so that welfare rises as the number of firms increases across the range shown in Figure 5.[76] In the low fixed cost case, N^* is 4 by Equation (5); in the high

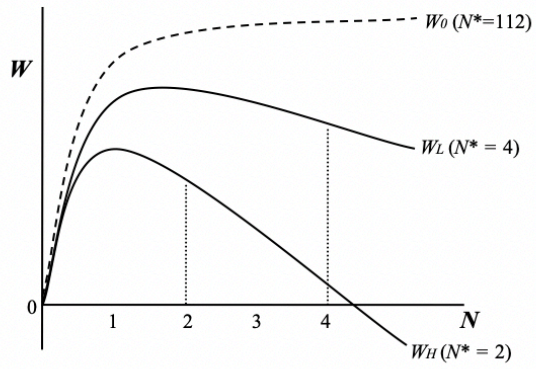
74. It is assumed the new customers are responding only to the price cut and not availability.

75. The term N^* is undefined at $f = 0$, so we have selected an arbitrarily small value for f.

76. The change in welfare from additional firms will be negative at the equilibrium number of firms (about 112).

fixed cost case, N^* is 2. With fixed costs, however, the addition of firms to the market does not always increase welfare. In both cases where fixed costs are larger, the figure reveals that consumer welfare is declining at the equilibrium number of firms and continues to decline for even larger N. More entry is not always better—entry is costly. In fact, with free entry and fixed costs, most models of competition indicate that entry is excessive on welfare grounds.[77] Certainly, entry in excess of the private entry equilibrium seems likely to reduce consumer welfare. Communications policy is more nuanced than a simple "promote competition" agenda suggests.

Figure 5. Social welfare and *N*



More sophisticated models of competition may render different relationships between consumer welfare and the number of providers, but even so it is typical for economic models to show that free entry results in too many firms in equilibrium. The reason is that a firm only considers its own profits when it contemplates entry, and when it does enter it steals business from existing firms. The movement of profits between firms does not increase welfare but does increase profits to the entrant; it is only the increase in welfare that counts against the fixed cost of entry. From a welfare perspective, the incentive to enter is *too strong*.

This analysis might lead one to conclude that governments should limit entry, but that is not the case. In practice, *free entry* should be encouraged for many reasons, including primarily that there is no reason to suspect that policymakers have the capacity to produce a better outcome.[78] Also, the free

77. *See, e.g.*, Avinash K. Dixit & Joseph E. Stiglitz, *Monopolistic Competition and Optimal Product Diversity*, 67 AM. ECON. REV. 297 (1977); N. Gregory Mankiw & Michael D. Whinston, *Free Entry and Social Inefficiency*, 17 RAND J. OF ECON. 48 (1986); Steven Salop, *Monopolistic Competition with Outside Goods*, 10 BELL J. OF ECON. 141 (1979).

78. Prior to the Telecommunications Act of 1996, regulations prohibited entry in many telecommunications markets based on the belief that such markets were natural monopolies. The U.S. abandoned that approach, though the rules of the FCC's new CAF only subsidized one firm, which is a policy based (rightfully so) on the natural monopoly logic.

entry number of firms is equal to the number of firms chosen by a social planner that maximizes consumer surplus (by choosing *N* rather than *P*) subject to a zero-profit constraint (i.e., no subsidies).[79] Also, in most cases, firms offer differentiated products and services, and differentiation adds value for consumers that will at least partially cover the fixed cost of entry. Even so, entry may be excessive in models with product differentiation.[80]

Rather than an indictment against free entry, the welfare result encourages caution in implementing policies designed to *force* entry into markets already in equilibrium (say, a subsidized municipal network). As shown in Figure 5, caution is particularly warranted in markets where *N** is small, as in wireline broadband service, since the reductions in welfare from excessive entry are relatively large (because fixed costs are large). If public policy is to encourage entry, then it should focus on growing market size and reducing entry costs, looking first at government policies that impede competitive entry. Making markets more suitable for competition is a sensible goal, but forcing competition beyond what markets produce is not likely to be welfare-improving. As we will discuss later, the presence of an externality alters the welfare calculations, but not by much with respect to *N*.

D. The Value of the First Firm

Figure 5 also shows the importance of the first entrant. In almost all cases, adding the first firm to the market produces much of the welfare available from the product. In communities without broadband service, getting that first provider into the market is exceedingly crucial, especially in light of the view that broadband is privately and socially valuable. Getting that first firm in the market is valuable, but costly. Subsidizing a network in an unserved market should be subject to a cost-benefit analysis. The *National Broadband Plan*, for example, estimated that it costs above $50,000 on average to serve each of the six million most costly homes in the country(and even then the most efficient technology).[81] There is no business case, whether private or social, for such expenditures.[82] The returns to broadband, whether private or social, are not infinitely large.

In contrast, additional firms, while perhaps transferring some welfare from producers to consumers, is not all that helpful in increasing consumer welfare when fixed costs are large. We do not wish to belittle the value of

79. Dixit, *supra* note 77, at 301 (". . . we have a rather surprising case where the monopolistic competition equilibrium is identical with the optimum constrained by the lack of lump sum subsidies.").

80. There exists a substantial literature on this topic, much of it pointing back to the seminal Article: Steven C. Salop, *Monopolistic Competition with Outside Goods*, 10 BELL J. OF ECON. 141 (1979).

81. *See, e.g.*, George S. Ford & Lawrence J. Spiwak, *Justifying the Ends: Section 706 and the Regulation of Broadband*, 16 J. OF INTERNET L. 1, 8 (Jan. 2013), http://www.phoenix-center.org/Articles/JournalofInternetLawSection706.pdf [https://perma.cc/Z3LV-S9YT].

82. *Id*.

competition, as it often brings with it benefits that are not easily incorporated into economic models. Economic theory, for example, is ambiguous about the effects of competition on quality and costs.[83] Yet, experience suggests that in many cases quality is higher with competition (but not always). While monopoly takes a lot of criticism, the fact is that in markets with high fixed costs, a monopoly may deliver the bulk of the available benefits of the service, even if it behaves like a monopolist (see Figure 5).

E. Externalities and the Equilibrium Number of Competitors

Broadband Internet service is not an unqualified good, but its benefits are alleged to be many, like enabling health care, improving education, facilitating job search, reducing depression, and creating "today's high-performance America."[84] Given the large benefits of both a private and (alleged) social nature, attention is focused on expanding the adoption of broadband service. Adoption is not possible without availability, so expanding availability is one goal of public policy. But as the *National Broadband Plan* makes clear, availability is a means to an end, and that end is adoption and use.[85] Using the Internet is what is important; without *use* the benefits are not obtained.

Later in this Article, we will analyze the relevance of the positive externalities in more detail, with attention on municipal broadband. For now, let us just see how we can incorporate a positive externality into the model presented above. The easiest way to think about positive externalities is as an additional payoff to consumption. Let z be the value of the positive externalities ($z > 0$) per unit consumed (Q_e). The total value of the positive externalities is, then, just zQ_e. More formally, we can incorporate broadband's externality into the analysis by adding a term to the consumer welfare function of Equation (6):

$$W(N) = 0.5(A^2 - P_e^2) - Nf + zQ_e \,, \tag{10}$$

Equation (10) says that the more people that use broadband, the greater the payoff to society from the positive externalities. With the externality, society is better off with more Q than the private equilibrium would produce.

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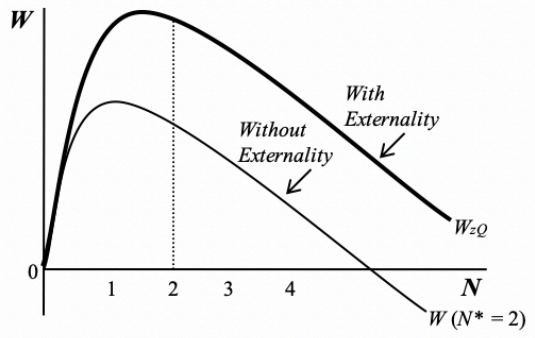
83. *See, e.g.,* JEAN TIROLE, THE THEORY OF INDUSTRIAL STRUCTURE 100-02 (1988); Yogmin Chen & Marius Schwartz, *Product Innovation Incentives: Monopoly vs. Competition*, 22 J. OF ECON. & MGMT. STRATEGY 513, 513-528 (2013); Rachel E. Kranton, *Competition and the Incentive to Produce High Quality*, 70 ECONOMICA 385 (2003).

84. *See generally*, Ford and Koutsky, *Broadband and Economic Development: A Municipal Case Study from Florida*, *supra* n. 25; Shelia R. Cotton et al., *Internet Use and Depression Among Older Adults*, 28 COMPUTERS IN HUM. BEHAV. 496, 496-499 (2012); Shelia R. Cotton et al*., Internet Use and Depression Among Retired Older Adults in the United States: A Longitudinal Analysis*, 69 J. OF GERONTOLOGY – SERIES B 763-771 (2014), http://psychsocgerontology.oxfordjournals.org/content/early/2014/03/25/geronb.gbu018.full.pdf+html [https://perma.cc/UU5L-87DA]; George S. Ford et al., *Internet Use and Job Search,* 36 TELECOMM. POL'Y 260, 260–73 (2012); *National Broadband Plan, supra* note 2.

85. *National Broadband Plan*, *supra* note 2, at 3 ("[U]biquitous connections are means, not ends. It is what those connections enable that matters.").

In Figure 6, the relationship between consumer welfare and the number of firms is illustrated for the purposes of seeing the value of the externality. The curve labeled W is based on Equation (6) where A is 36 and f is 144 (the high-fixed cost case from Figure 3). The curve labeled W_{zQ} is the welfare function from Equation (10) that adds in the value of the externality, where z is assumed to be 2 (about 10% of the welfare-maximizing price from Eq. 6). As shown in the figure, welfare is much higher when adding in the externality, but the welfare consequences of additional entry at the equilibrium ($N^* = 2$ is the standard case) are unchanged (welfare is declining at N^*).

Figure 6. Externality, Social welfare and *N*



In the presence of a positive externality, there is a strong case for increasing adoption, but no apparent case for expanding N above the N^* determined absent the externality. The question then is how to get more people to adopt broadband? There are numerous approaches to increase adoption, including increasing availability, education programs, subsidy programs, and competition. Municipal broadband is often claimed to be a source of competition that drives up Q and thus increases the benefits from the positive externalities, but increasing competition comes at the high of network construction. We will turn to the efficacy of municipal broadband and competition as a means by which to obtain the externalities of broadband next.

V. SUBSIDIES, PREDATION, AND PRIVATE INVESTMENT

It is now time to turn more directly to the issue of municipal broadband. Our analysis focuses mainly on using municipal broadband to increase competition and, in turn, realize more positive externalities. Where there is no service, municipal broadband is less controversial, so there is less reason to study it in those cases. The analysis above can evaluate municipal broadband in unserved markets, but our discussion will focus mainly on the competitive aspects of the policy.

Whether one is for or against municipal broadband, at first glance one must admit that it is a somewhat radical, or at least unconventional, way to promote competition. In fact, we suspect most city officials see it that way.[86] We doubt there are many city officials wanting to add to their responsibilities the enormous business risk of building a broadband network to compete in the wireline market with well-established professionals like AT&T, Verizon, and Comcast. Municipal broadband appears to be mostly born out of desperation.

To begin, we will ask whether municipal broadband can increase competition. It is easy to demonstrate that it cannot. In fact, if you take the advocates at their word, municipal broadband may lead to the monopolization of wireline broadband either by the city or a private provider. Next, we will demonstrate that municipal broadband must be, in almost all cases, subsidized entry. The evidence supports this finding and few contest it.[87] Then, by implication, we will show that municipal broadband is prone to be predatory in nature. In fact, we will show that even the threat of municipal entry may discourage private sector investment, a theoretical argument that supports the *National Broadband Plan*'s warning about municipal entry.

A. Municipal Broadband and the Number of Firms

Recall the key question asked above: *why is the municipality the only one willing to build the network*? And, recall the frequently provided answer: "*because no one else will*." If no one else will, then it must be the case that the equilibrium number of firms has been obtained (see discussion around Eq. 5), even if that number is zero. There is no incentive for any other private firm to enter (or upgrade). Since no private firm will enter because expected profits are negative, the municipality itself becomes the entrant (ignoring, as is frequently claimed, profits). As such, municipal broadband is, quite explicitly, an attempt to increase N by increasing N directly (at nearly any cost) rather than expanding market size or reducing costs. Whether or not the additional entrant is a government-owned firm or not, after entry the market now has

86. Tom Sloan, *Why States Should Support Broadband,* 2015 BROADBAND COMMUNITIES 76, https://www.bbcmag.com/pub/doc/BBC_May15_WhyStates.pdf [https://perma.cc/PU43-YE7Z].

87. Doug Dawson, *Creative Financing for Fiber Networks*, BROADBAND COMMUNITIES (Sept. 2014); Joanne Hovis, *The Business Case for Government Fiber Networks*, BROADBAND COMMUNITIES (Mar./Apr. 2013), http://www.bbpmag.com/2013mags/mar-apr/BBC_Mar13_BusCase.pdf [https://perma.cc/5PLD-MEK8]; Craig Settles, *Show Me the Money*, BROADBAND COMMUNITIES (Sept. 2015), http://www.bbcmag.com/2015mags/Aug_Sep/BBC_Aug15_ShowMeTheMoney.pdf [https://perma.cc/69ZS-JFTD]; Costas Troulos, *Driving Deployment Of Fiber to the Home* , BROADBAND COMMUNITIES (Sept. 2012), http://www.bbpmag.com/Features/0912feature-diffraction.php [https://perma.cc/6RCQ-6Q8M] ("Public endeavors can be supported by public funds [] or by public or semipublic businesses such as electric and water utilities."); *The Next Generation Network Connectivity Handbook, supra* note 38, at 47-51; *Oregon Municipal Broadband*, *supra* note 36, at 17-18.

$N^* + 1$ firms in it. This situation is financially unsustainable and, when the dust settles, a firm must exit for the market to return to the equilibrium. As noted in the *National Broadband Plan,* "[m]unicipal broadband has risks. Municipally financed service may discourage investment by private companies."[88]

How exactly the market will adjust to municipal entry will vary. The economic model presented here is an abstraction pointing to a long-run phenomenon—an underlying current, so to speak, pushing the market participants in a particular direction. Changes will likely come slowly. Broadband networks involve sunk costs in long-term assets and often somewhat stable customer relationships, so we should not expect private firms to abandon their assets soon after municipal entry. Rather, the effects of municipal entry on private investment will manifest over time and will most acutely impact the decisions to invest in upgrades. "Decay" may be a more practical description of the response than is "exit." There have, however, been a few cases where the private sector abandoned a market after municipal entry (as discussed *infra*).

Also, given the observed failures of many municipal systems, incumbents may, in the short term, choose to weather the storm and wait for the municipal entrant to fail, for the political winds to change, or for the taxpayers to tire of subsidizing a communications network (a common occurrence). It is also a competition; incumbents may invest in upgrades in hopes of being a survivor or to establish a strategic posture.[89] We may very well see prices fall in the short run to protect market share, but this is less a legitimate competitive response than it is the same response we would see to predation by a private firm (and we do not view predation as a good thing). Only time will tell how the market gropes to equilibrium, but economic theory and common sense tell us that the addition of another entrant to a market already in equilibrium puts stress on the finances of the providers, reducing the returns on investments and, in turn, reducing the incentive to continue making investments. Quite simply, if there is only room for two, then three is a crowd.

While we normally expect the full equilibrium effect of municipal entry to take time, there are cases where exit by the private sector has occurred in a more dramatic fashion. The municipal broadband system in Glasgow, Kentucky (Glasgow Electric Power Board) acquired Comcast's cable system in 2001.[90] Paragould Light Water & Cable (in Paragould, Arkansas) acquired

88. *National Broadband Plan, supra* note 2, at 153.

89. *See, e.g.*, Drew Fudenberg & Jean Tirole, *The Fat-Cat Effect, the Puppy-Dog Poly, and the Lean and Hungry Look*, 74 AM. ECON. REV. 361, 361-366 (1984).

90. Press Release, Glasglow, Ky., Purchase of Comcast by Glasgow EPB Now Complete (Apr. 2, 2001), http://www.glasgow-ky.com/releases/#Comcast%20Purchase%20Completed%20040201 [https://perma.cc/RQT4-Y22H].

its rival Cablevision in 1998.[91] Private incumbents were also acquired in other cities, including, but not limited to, Muscatine, Iowa and Poplar Bluff, Missouri.[92] We do not disparage the purchase of the incumbents by the municipality; it is a far more reasonable strategy than to force their exit through predatory actions (as discussed later).

The risk to private sector firms is increased if, as advocates and municipal providers often claim, the municipal system is unconcerned about profits and is mostly interested in obtaining the positive externalities of broadband service. As observed by one system's management (and echoed by many others), "[w]e price our services aggressively because we have a lot of flexibility as a municipal broadband provider. We are here to take care of our citizens."[93] If a municipal broadband system prices aggressively, which the advocacy suggests is the case, then the effect of municipal entry will be to reduce N^* by more than the entry of just another profit-maximizing private firm.[94] Broadband networks are characterized by both scale and density economies, so a large market share confers advantages. If a municipal entrant gains significant market share and prices at its (perceived) average cost, which is below true economic costs due to the often sizable and asymmetric subsidies, then no unsubsidized private firm can match that price and survive in the long run. Since municipal entry often occurs where there are few wireline broadband providers (and thus large density economies), an aggressive municipal entrant could displace all private provision of broadband service.[95] Doing so would lead to a government-owned monopoly (or a private one, if the municipal system fails). Considering the advocacy for

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91. George Waldon, *Cable TV War is Over*, ARK. BUS. (Dec. 15, 1997), http://www.arkansasbusiness.com/article/72284/cable-tv-war-over [https://perma.cc/4S8Q-LF55].

92. Sarah Passick, *Mediacom Sells Muscatine Business*, QUAD-CITY TIMES, (Nov. 27, 2002), https://qctimes.com/business/mediacom-sells-muscatine-business/article_1ad08661-5f6d-5ec7-8ba9-e3942b942458.html [https://perma.cc/E54P-93G9]; *Rural Broadband Investments Acquires Poplar Bluff Cable Assets*, BUSINESSWIRE (Apr. 1, 2014), http://www.businesswire.com/news/home/20140401005585/en/Rural-Broadband-Investments-Acquires-Poplar-Bluff-Cable#.VfbQfhHBzRY [https://perma.cc/HJ87-MYD6]; *see also Wi-Fi Waste, supra* note 14, at 19.

93. *Navigating the Winding Municipal Broadband Road: A Case Study of Bellevue, Iowa,* INNOVATIVE SYSTEMS 5, http://www.telecompetitor.com/clients/innovativesystems/casestudy/Bellevue_Case_Study.pdf (last visited July 10, 2020) [https://perma.cc/PWC4-KGZF].

94. *See* Ford et al., *supra* note 55, at 349 (explaining that the number of firms in equilibrium is smaller when price competition is more intense).

95. With fixed entry costs, if the incumbent firm prices such as to earn a zero profit, then there is no incentive for another firm to enter. *See National Broadband Plan, supra* note 2, at 136 (When "service providers in these areas cannot earn enough revenue to cover the costs of deploying and operating broadband networks, including expected returns on capital, there is no business case to offer broadband services . . . ."); *see also The Broadband Availability Gap*, FED. COMMC'NS COMM. 1 (Apr. 2010), http://download.broadband.gov/plan/the-broadband-availability-gap-obi-technical-Article-no-1.pdf ("Private capital will only be available to fund investments in broadband networks where it is possible to earn returns in excess of the cost of capital. In short, only profitable networks will attract the investment required.").

municipal broadband networks, which frequently asserts that municipal systems are unconcerned with profit and act more aggressively on pricing than do private firms, monopolization is a serious concern. In fact, some advocates of municipal broadband suggest monopolization is the goal.[96] If there are to be few providers, the argument is that the market might as well be served by a benevolent, government monopolist.

History is not kind to the benevolent monopolist idea, but there is evidence that municipal broadband systems do behave differently than do private providers. For example, a 2007 Article showed that Competitive Local Exchange Carriers ("CLECs") were more likely to say they had operations in cities (in Florida) where a municipal electric utility had deployed some communications facilities.[97] These CLECs did not build local networks, but acquired portions of the local phone networks in a regulatory scheme called "unbundling," sometimes mingling these local network elements with their own facilities.[98] Our experience suggests that this increase in CLEC activity likely had to do with the more cordial relationships between CLECs and municipalities than with private providers regarding the locating of interconnection equipment. At the time, the private phone companies were forced to deal with CLECs on regulated terms, poisoning the relationships.[99] Due to unfavorable court rulings and FCC decisions, as well as technological advances, very few CLECs exist today, and those that do are servants to the regulations that protect them.[100]

Nevertheless, it is possible that the different (non-profit) objectives of municipal networks may stimulate some new types of retail competition not often seen with private networks. In fact, some municipal networks are "open networks" that permit retailers to offer services over the underlying

96. *See, e.g.*, SUSAN CRAWFORD, CAPTIVE AUDIENCE (2013). For a thorough critique of Crawford, *see* George S. Ford, *Sloppy Research Sinks Susan Crawford's Book*, LAWANDECONOMICS BLOG (Jan. 18, 2013), http://www.phoenix-center.org/blog/archives/1075 [https://perma.cc/8YMA-9DQR].

97. Ford (2007), *supra* note 25. The conclusions of this Article have been frequently exaggerated to claim that municipal broadband increases all forms of entry even though the empirical analysis does not support such a claim. *See, e.g.*, Harlod Feld et. al, *Connecting the Public: The Truth About Municipal Broadband*, COMMUNITY NETWORKS (Apr. 2005), https://muninetworks.org/reports/connecting-public-truth-about-municipal-broadband [https://perma.cc/W9EN-BT87]. Conflicting evidence is presented in Janice Alane Hauge et al., *Bureaucrats as Entrepreneurs: Do Municipal Telecommunications Providers Hinder Private Entrepreneurs?*, 20 INFO. ECON. AND POL'Y 89, 89-102 (2008), http://ssrn.com/abstract=1082823 [https://perma.cc/4EQQ-P4U5].

98. Ford & Spiwak, *supra* note 61.

99. Regulation creates the incentive to sabotage rivals even when such incentives are absent without regulation. *See, e.g.*, Ford & Spiwak, *supra* note 61, at 116. The concept of "sabotage" is explored in technical detail in T. Randloph Beard et al., *Regulation, Vertical Integration, and "Sabotage"*, 49 J. OF INDUS. ECON. 319 (2001), http://onlinelibrary.wiley.com/doi/10.1111/1467-6451.00152/abstract [https://perma.cc/4DA4-G8T3]; *see also* David Mandy & David E. Sappington, *Incentives for Sabotage in Vertically Related Industries*, 31 J. OF REG. ECON. 235, 235-260 (2007).

100. Ford & Spiwak, *supra note* 61, at 113-14.

network.[101] These types of investments do not, however, increase the number of providers of wireline service, which for some is the primary goal of modern policy. Also, the retail overlay on municipal systems has not proven to be a solid business plan, but that may change over time as the video distribution and voice services continue their dynamic transformation.

If we embrace the idea of a benevolent fiber-to-the-home monopolist, then we may very well ask what is the point of competition among private firms? This question, we believe, is at the hidden core of the municipal broadband debate, though it rarely surfaces in the advocacy. Broadband may be privately provided or publicly provided, but likely not both in the same market. A hybrid approach—a public-private partnership—may be the most sensible approach for economically-marginal communities (as detailed later). Evidence suggests that municipal involvement in broadband is moving in the direction of such partnerships, a change driven largely by the poor financial history of government-run networks.

B. Municipal Broadband is Subsidized Entry

Evidence shows that municipal broadband systems are always, and sometimes heavily, subsidized by various levels of government, including the municipality. In fact, the "*no one else will*" argument for municipal broadband networks implies the need for subsidies.[102] It also indicates that the subsidies are asymmetric, since if the funds were generally available, we would likely see more private entry using those subsidies. While hardly disputable, we will nevertheless provide a simple economic analysis to illustrate the need for subsidies. This analysis syncs up well with the preceding discussion, but the

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101. Masha Zager, *Municipal Utilities Deliver Fiber to the Premises*, 2009 BROADBAND PROPERTIES 52, 54, http://www.broadbandproperties.com/2008issues/may08/BBP_May08_FiberDeployments.pdf [https://perma.cc/L65D-MXXX]; Andrew M. Cohill, *Worst Practices in Community Broadband – Part Two*, 2014 BROADBAND COMM. 30, 30, https://www.bbcmag.com/pub/doc/BBC_Aug14_WorstPractices.pdf [https://perma.cc/4276-QWTA].

102. Some cities have apparently tried to minimize the subsidization of the networks and have claimed to not use taxpayer funds. *See, e.g.*, Jon Brodkin, *Where Broadband is a Utility, 100Mbps Costs Just $40 a Month*, ARS TECHNICA (Aug. 4, 2015), http://arstechnica.com/business/2015/08/how-a-small-city-offers-60-gigabit-fiber-with-no-taxpayer-subsidies [https://perma.cc/UU6X-CA65] (where the author and city manager indicated the system did not require subsidy dollars). However, the Sandynet network received a federal grant, so it is a subsidized system. *See* U.S. GOV'T ACCOUNTABILITY OFF., GAO-14-203, FEDERAL BROADBAND DEPLOYMENT PROGRAMS AND SMALL BUSINESS, (2014), http://www.gao.gov/assets/670/660734.pdf [https://perma.cc/SSM2-RCLV]. It could be argued that these subsidy funds were generally available. It is also often hard to detect the extent of subsidization, especially when resources are shared between the city and broadband system. We cannot exclude the possibility that some of the networks are not subsidized in any way, but we would be very surprised to see it. Many municipal systems readily admit to subsidization.

discussion now changes a bit by looking at a simple incumbents-entrants game.

Say there is a market served by two identical firms (a symmetric duopoly). The incumbents each earn a stream of profit equal to *D*. Another firm is deciding whether or not to enter the market in competition with the duopoly knowing that, upon entry, it must spend an amount *F* to enter. If the firm chooses to enter the market as the third provider, then the three firms split the market evenly and each earns a gross profit of *T*. The potential entrant enters only if it can do so profitably, so it enters if $T > F$; that is, the expected gross profit from selling the good in competition with the incumbents (*T*) exceeds the entry fee (*F*). If $T < F$, then the potential entrant stays out and the market remains served by a duopoly. If we observe the persistence of duopoly, then entry as the third competitor is not profitable ($T < F$). Note that *T* is determined by the intensity of competition. If competition is intense, then *T* will be small and entry less likely. If competition is weak, then *T* will be larger and entry more likely. Paradoxically, the presence of few providers may be evidence of intense competition rather than a lack of it.

A numerical example may be helpful. Say that each duopolist earns a profit of $50 (for a total industry profit of $100). If a third firm enters, then each firm earns a profit of $25 (for a total industry profit of $75).[103] If entry costs are less than $25, then the potential entrant can profitably enter. If entry costs exceed $25, then it will not enter, and the duopoly persists. What we observe about a market tells us a great deal about the economics of that market.

On average, U.S. households may obtain wireline broadband service from two providers, so this "no entry" by the third firm scenario is a reasonable approximation of the existing situation. While there was some activity by private sector firms to increase that number to three providers—including, most prominently, Google—those efforts often met with failure.[104] Yet, municipal systems, particularly in cities with their own municipal electric utility, continue to be contemplated by cities and pop up across the country.[105]

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103. The additional competition is expected to reduce prices and industry profits.

104. Jon Brodkin, *Google Fiber's Biggest Failure: ISP Will Turn Service Off in Louisville*, ARS TECHNICA (Feb. 8, 2019), https://arstechnica.com/information-technology/2019/02/google-fiber-exits-louisville-after-shoddy-installs-left-exposed-wires-in-roads [https://perma.cc/5F5H-63R3]; Chris Mills, *What's Happening to Google Fiber?*, BGR (Jan. 31, 2018), https://bgr.com/2018/01/31/google-fiber-availability-new-cities-nope; Jim Burress, *The Big Disconnect: What Happened to Google Fiber in Atlanta?*, ATLANTA (May 15, 2018), https://www.atlantamagazine.com/great-reads/what-happened-google-fiber-atlanta [https://perma.cc/9PC9-HNZF].

105. Municipal electric systems operate as monopolies for electric services and thus do not require much, if any, subsidization. Economic studies suggest that municipal electric systems operate as efficiently as investor-owned utilities, at least if the municipal system is small or moderately sized. *See, e.g.*, Dong-Soo Koh et al., *A Comparison of Costs in Privately Owned and Publicly Owned Electric Utilities: The Role of Scale*, 72 LAND ECON. 56, 56–65 (1996).

Why are the municipalities doing something the private sector is not, or else has failed to do successfully when it has tried? To explain this, consider a case where one firm has an advantage over other potential entrants. Say, for instance, that one firm is offered a subsidy of some sort (labeled *S*). This subsidy may improve revenues, lower expenses, or reduce entry costs, but in all cases it alters the entry condition for this potential entrant. The third firm will enter if $T + S > F$. The larger the subsidy, of course, the more likely this condition is satisfied, and the firm can profitably enter. Going back to the numerical example, say entry costs are $30 so that being the third competitor is not profitable (i.e., $25 < $30). One potential entrant, however, qualifies for a $10 subsidy if it enters. Now, the benefits of entry include the post-entry profit and the subsidy ($25 + $10 = $35), which is above the entry cost of $30 (giving a net payoff from entry of $5). In this scenario, in the absence of a subsidy the duopoly persists, but with the subsidy a firm enters and we have three firms offering services.[106] The incumbent firms do not get the subsidy, so their ability to remain in business at below-cost rates is up for question.

The logic of this entry game is straightforward and useful. In most areas of the U.S., additional private entry is not profitable (or, from the model above, $T < F$) as is demonstrated by the lack of it. Even if a municipal entrant is as efficient as private sector firms, it is unprofitable for the municipality to enter as the third seller.[107] The argument that the municipality's decision to enter because "no one else will" requires that the municipality has an advantage that private firms do not.[108] That is, the municipal entrant receives a subsidy (*S*) of some sort sufficiently large to make entry profitable. If "no one else will," then this subsidy (or advantage) must be unique to the municipal entrant; *the government is subsidizing the government entity through asymmetric policies that grant subsidies only to the municipality's system.*

What do we mean by a subsidy? There is no standard definition of "subsidy." Rather, what is and is not a subsidy depends on the circumstances. Subsidies do take familiar forms. Most obviously, a subsidy may involve a direct cash transfer from the government to an entity, which is common for municipal networks. Subsidization can take many other and less direct forms. Loan guarantees or preferential interest rates on debt are types of subsidies also commonly seen for municipal networks. Another type of subsidy is when a government provides goods or services at no cost or below market prices to an entity. The use of a city's resources by its own municipal network is almost

106. Eventually, the equilibrium is likely to return to two firms as continued investments must be made to maintain and upgrade the network.

107. *See, e.g.*, Davidson & Santorelli, *supra* note 14, at 154 ("Municipalities are unlikely to have either scale in purchasing telecommunications equipment or experience in constructing and running broadband networks."); Michael J. Balhoff & Robert C. Rowe, *Municipal Broadband*, BALHOFF & ROWE, LLC (Sept. 2005), http://broadband.cti.gr/en/download/Municipal-Broadband--Digging%20Beneath%20the%20Surface.pdf [https://perma.cc/5FFA-K5BX].

108. Municipalities cannot point to the social benefits because they are not monetized.

certain to occur, whether explicit or implicit. Such sharing may very well constitute a subsidy.

Also, municipal networks today are very common in cities that provide their own electricity through a municipally-owned utility. The sharing of a municipal electric utility's resources with its broadband network and the shifting of broadband costs to electric customers are other potential sources of subsidy. Normally, policymakers, regulators, and even political interest groups frown upon cross-subsidization by a monopoly utility into a competitive market, yet municipal broadband systems are routinely recipients of such subsidies.[109] Differential regulation can also result in a subsidy to firms that have a more favored status. Are municipal systems forced to engage in the same type of franchising procedures as are private firms? Does the municipality charge the sometimes pole attachments rates paid to it by private providers to its own broadband division?[110] If not, then the regulatory system is providing a subsidy to the municipal system.

In contemplating the costs of subsidized municipal entry, it is important to recognize that subsidy dollars are costly. Monies used to support the losses incurred by government-run networks are obtained through various forms of taxation, whether national, state, or local. Taxes introduce distortions and create welfare losses. Economists refer to such costs as the marginal cost of public funds, and economic research indicates that subsidy dollars can be quite expensive.[111] Say, for example, that a dollar raised through taxation costs society $1.25 in resources, which is at the lower end of the estimates of the marginal cost of public funds. If the dollar of spending does not produce at least a return of $0.25, then the whole tax-subsidy scheme is socially

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109. The cross-subsidy issue was litigated for the Bristol, Virginia municipal system. Virginia law prohibits such cross-subsidies. Virginia's State Corporation Commission found the evidence did not support a cross-subsidy from the electric to the broadband network. Paul Miller, *Bristol's Broadband Push*, VIRGINIABUSINESS.COM (Nov. 2006), http://www.baller.com/wp-content/uploads/Bristol_VBM_Nov06.pdf. In other cities, however, transfers from the electricity utility and broadband system are not so limited. *See, e.g.*, Steven Titch, *Spinning its Wheels: An Analysis of Lessons Learned from iProvo's First 18 Months of Municipal Broadband*, REASON FOUND. (Dec. 2006), http://reason.org/files/33224c9b01e12f3b969f4257037c057e.pdf ("[R]equest $1 million in additional funds from the Provo's electric utility to meet its costs.").

110. *A Working Model for Broadband Expansion*, COALITION FOR THE NEW ECON. (May 14, 2014), http://www.coalitionforthenewеconomy.org/blog/2014/05/a-working-model-for-broadband-expansion [https://perma.cc/K5YP-T6CE] (claiming Chattanooga's broadband network does not pay the very high pole attachment rates that are set by the municipality and paid by private firms); Mattthew Glans, *Research & Commentary: Pole Attachment Fees*, HEARTLAND INST. (Mar. 12, 2013), https://www.heartland.org/publications-resources/publications/research--commentary-pole-attachment-fees [https://perma.cc/CRX6-KUZN]; Lawrence J. Spiwak, *Pole Tax: Government Slows Down Broadband*, TIMES FREE PRESS (Apr. 3, 2013), http://www.timesfreepress.com/news/opinion/freepress/story/2013/apr/03/pole-tax-government-slows-down-broadband/104172 [https://perma.cc/K3ML-EP67].

111. BEV DAHLBY, THE MARGINAL COST OF PUBLIC FUNDS 1 (2008); Edgar K. Browning, *The Marginal Cost of Public Funds*, 84 J. OF POL. ECON. 283, 283 (1976); Arthur Snow & Ronald S. Warren, *The Marginal Welfare Cost of Public Funds: Theory and Estimates*, 61 J. OF PUB. ECON. 289, 289 (1996).

wasteful. The higher the marginal cost of public funds, the harder it is to justify a subsidy.

When the finances of a municipal system are evaluated (usually for the policy debate), not only are the sometimes-enormous subsidies ignored, but the cost of producing the subsidy dollars is overlooked. Just because the federal government pays huge portions of the network costs of a municipal system does not mean those costs are nonexistent. Ignoring subsidies is especially problematic when municipal systems compete with unsubsidized private firms, as the municipal system is making decisions based on a cost level that is not equal to the true cost of providing service; the private firm must do so. The municipal system's managers may very well believe that they are pricing in a manner to cover costs, but if many of the costs are ignored, the pricing policies are anticompetitive in nature. Later in the text, we will discuss in more detail this "predatory" nature of municipal broadband.

C. Direct Subsidies

As the theory suggests would be the case, the evidence shows that subsidies to municipal broadband systems are commonplace. In fact, it is difficult to find an example where a direct subsidy was not provided, though we cannot exclude the possibility that it has happened. Many municipal systems received grants and favorable loans from federal programs including those made available from the American Recovery and Reinvestment Act of 2009 (for which funding has now ended) and programs offered by the Rural Utilities Service.[112]

Take, for example, Chattanooga's broadband system. It received a $111 million grant from the U.S. Department of Energy—funds made available by the American Recovery and Reinvestment Act.[113] This grant (not loan) covered about one third of the total construction costs. There are a number of interesting facts about this grant worth noting. First, this grant represents a gift from *all* Americans, not just Chattanoogans, of about $2,000 per subscriber.[114] The municipal broadband system in Bristol, Virginia has received $90 million in grants, which equals about $7,200 per-customer for

112. *See, e.g.*, Lennard G. Kruger, Cong. Research Serv., RL33816, Broadband Loan and Grant Programs in the USDA's Rural Utilities Service (2013), https://www.fas.org/sgp/crs/misc/RL33816.pdf [https://perma.cc/B488-TGTU]; Gregory T. Rosston & Scott Wallsten, *The Broadband Stimulus: A Rural Boondoggle and Missed Opportunity*, TECH. POL'Y INST. (Nov. 2013), https://www.techpolicyinstitute.org/files/rosston_wallsten_the_broadband_stimulus.pdf [https://perma.cc/Y8UG-HL7X].

113. CONN. OFFICE OF LEGISLATIVE RESEARCH, CHATTANOOGA HIGH SPEED BROADBAND RESEARCH INITIATIVE, 2012-R-0515 (2012), https://www.cga.ct.gov/2012/rpt/2012-R-0515.htm [https://perma.cc/528J-NAE4].

114. *See Senior Mangament Report & Financial Information 2013*, EPB 16 (2013), https://static.epb.com/annual-reports/2013/downloads/EPB_Financials_2013.pdf [https://perma.cc/794E-9RQJ].

its 12,500 customers.[115] Verizon, alternately, spent about $750 per home passed and $600 (without subsidies) to connect a customer to its fiber-optic system (located in more urban markets).[116] In this light, the magnitude of the subsidy received by some municipal systems is, quite bluntly, scandalous and should force some skepticism about the wisdom of municipal broadband.

Second, such government subsidies stand in stark contrast to the government's treatment of the private sector, as the nation's major broadband service providers do not receive such generous financial help from the federal government. Indeed, the FCC's subsidization rules for private carriers target only unserved areas, excluding areas already served by an unsubsidized carrier.[117] Plainly, subsidizing municipal systems in markets already serviced by the private sector is asymmetric subsidization by the government to a government entity. Even in areas where subsidization of the private providers does occur, the average subsidy available is much lower than that seen for many municipal systems, even though the private carriers would receive no subsidy to serve many cities where municipal systems have been deployed.[118]

Another interesting calculation is the subsidy size for a private carrier equivalent to the subsidy given to some municipal projects adjusted for subscriber counts. For example, a federal grant of $111 million to Chattanooga's system is the unit-passed equivalent ($650 per home) of a $35 billion grant to Comcast, which is about 11-times the annual investment of Comcast in its broadband infrastructure.[119] At the subsidy rate of the Bristol,

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115. David McGee, *Firm Agrees to Buy $50 Million Optinet Deal Approved by BVU Authority Board*, BRISTOL HERALD COURIER (Feb. 5, 2016), https://www.heraldcourier.com/news/local/50-million-optinet-deal-approved-by-bvu-authority-board/article_5619410b-8990-5245-a2c3-8b6ef24c160c.html [https://perma.cc/EX3V-UY66]; Davidson & Santorelli, *supra* note 14, at 49.

116. Marguerite Reardon, *Verizon Nears Fios Network Completion*, CNET.COM (Mar. 29, 2010), http://www.cnet.com/news/verizon-nears-fios-network-completion [https://perma.cc/3P65-KMH6].

117. Connect America Fund ETC Annual Reports and Certifications Petition of USTelecom for Forbearance Pursuant to 47 U.S.C. § 160(c) from Obsolete ILEC Regulatory Obligations that Inhibit Deployment of Next-Generation Networks, *Report and Order*, 29 FCC Rcd 15644, para. 73 (2014), https://apps.fcc.gov/edocs_public/attachmatch/FCC-14-190A1.pdf [https://perma.cc/YTK7-UAWT] ("[T]o ensure support is targeted to areas lacking 4/1 Mbps, we will exclude from the offer of Phase II model-based support to price cap carriers any census block served by a subsidized facilities-based terrestrial competitor that offers fixed residential voice and broadband services meeting or exceeding 3 Mbps/768 kbps speed requirement").

118. Press Release, Fed. Comm'ns Comm'n, Up To 600,000 Rural Homes and Businesses in 44 States and Puerto Rico Will Gain Access to Broadband for First Time: Over $385 Million From FCC's Connect America Fund To Leverage Private Investment For Expanding Broadband In Unserved Areas (Aug. 21, 2013), https://www.fcc.gov/document/connect-america-fund-expands-broadband-600k-homes-businesses [https://perma.cc/NZ8A-XUP9].

119. *Form 10-K Annual Report*, COMCAST CORP. (Feb. 27, 2015), https://www.cmcsa.com/static-files/fda80671-77bb-4dd6-bafa-f8d6a7e2d1f5 [https://perma.cc/7U32-WHLW]; *Form 10-K Annual Report*, COMCAST CORP. (Feb. 12, 2014), https://www.cmcsa.com/static-files/975711e7-9dd8-45e8-b34e-7507dfd55594 [https://perma.cc/8G9C-NN6P].

Virginia system, the customer-equivalent grant to Comcast would be a whopping $390 billion, or over 100-times Comcast's annual capital expenditure and greater than all annual investment in broadband infrastructure.[120] When put into context, the sizes of the subsidies received by some municipal systems are shockingly large.

D. Indirect, Implicit, and Cross-Subsidies

The explicit subsidization of municipal broadband systems is nearly ubiquitous, but there are also plenty of indirect and implicit subsidies as well. Subsidies flow not only from the federal government, but also from the cities themselves. In many cases, there is no attempt to hide such subsidies. In Paragould, Arkansas, for example, the city raised the property tax from 2.76 mills to 2.825 mills to fund the municipal system after financial projections did not meet the target.[121] In Ashland, Oregon, in addition to sizeable transfers from the electric and water utilities to the broadband network, the city approved a $7.50 per month fee on electric customers to subsidize the broadband network.[122] A manager for the system in Sallisaw, Oklahoma said, "[o]ur project is not yet paying for itself. We're still using other utility funds to pay for it."[123]

Internal subsidies are not always so apparent. Consider again the system in Chattanooga. Chattanooga's broadband system is constructed and maintained by the city's municipal electric firm (Chattanooga Electric Power Board, or "EPB"). The initial justification for Chattanooga's fiber deployment was the cost savings it might generate for the electricity division.[124] As such, the construction of the broadband network was paid for by $229 million in revenue bonds and a $50 million loan to the broadband division from the electric division.[125] It appears that the larger debt ($229 million) is being serviced by captive ratepayers, not the broadband customers, for the purposes

120. *Research*, USTELECOM, http://www.ustelecom.org/broadband-industry/broadband-industry-stats (last visited July 9, 2020) [https://perma.cc/TKR2-7RDM].

121. *Wi-Fi Waste*, *supra* note 14, at 24.

122. George S. Ford, *The Impact of Government-Owned Broadband Networks on Private Investment and Consumer Welfare*, ST. GOV'T LEADERSHIP FOUND. 41, https://sglf.org/wp-content/uploads/sites/2/2016/04/SGLF-Muni-Broadband-Study-1.pdf [https://perma.cc/PT8R-84MR] (citing Vickie Aldous, *Ashland, Ore., Transfers Funds to ISP*, MAIL TRIB. (Jan. 19, 2006)). The $.7.50 fee was later dropped in response to public outrage.

123. City Wire Staff, *Results Mixed with Municipal Cable Systems*, TBP (Apr. 3, 2012), https://talkbusiness.net/2012/04/results-mixed-with-municipal-cable-systems [https://perma.cc/K6QV-XF6B].

124. *See* The Electric Power Board of Chattanooga, Tennessee Petition for Preemption of a Portion of Tennessee Code Annotated Section 7-52-601, *Memorandum Opinion and Order*, 30 FCC Rcd. 2408, para. 22-23 (2015), https://www.epb.net/downloads/legal/EPB-FCCPetition.pdf [https://perma.cc/4EMT-7CSU].

125. *See, e.g.*, Christopher Mitchell, *Broadband at the Speed of Light: How Three Communities Built Next-Generation Networks* (2012), http://www.ilsr.org/wp-content/uploads/2012/04/muni-bb-speed-light.pdf [https://perma.cc/3P9C-QG9Z]; Davidson & M. Santorelli, *supra* note 14.

of Smart Grid technologies. Yet, Smart Grid applications do not require fiber optic connections to households, and home metering and real-time pricing can be accomplished using cheaper and available technologies (capable of a 500 Kbps connection).[126] Also, financial analyses, including one by an independent auditor, indicate that only about 4-6% of the costs of a broadband network are reasonably assigned to a municipal electric utility.[127] Even assuming a generous 10% allocation to Smart Grid, Chattanooga's captive ratepayers were forced to assume $206 million in debt for the broadband customers, or about $3,500 per broadband subscriber.[128] Shifting the costs of the fiber network to electricity customers is a subsidy. In fact, it is a cross-subsidy from the captive ratepayers of a monopoly electric utility to an affiliated broadband network in a competitive market.

Beginning in 2013, the city of Opelika, Alabama, became the state's first "Gig City," offering broadband Internet services to its 11,000 households over a $43 million fiber-optic network constructed and operated by the city's electric utility, Opelika Power Services ("OPS").[129] Like many other smaller cities struggling in the information economy, Opelika's city government saw the lack of the latest broadband technology as a key, if not only, handicap to success. And, like many cities operating both an electric utility and broadband network, the finances of Opelika's electric and telecommunications businesses were commingled.

Opelika expected the broadband network to cost the city $43 million.[130] The city initiated the construction of the network in 2011 when the electric utility (not the telecommunications division) borrowed $28.1 million. The revenue to finance the annual interest payment of $1.44 million, as well as the expenses and depreciation from the assets acquired with those funds, comes from the city's electric ratepayers. In addition to this first round of debt, an additional $13.5 million in loans was taken a few years later and assigned to the telecommunications division. Interest payments for this debt are about $390,000 annually.[131] Thus, about two-thirds of the debt related to the

126. TAKURO SATO, ET AL., SMART GRID STANDARDS: SPECIFICATIONS, REQUIREMENTS, AND TECHNOLOGIES 250 (2015); *An In-Depth Look at Click! Financials*, TACOMA PUB. UTIL. 23-24 (May 20, 2015), http://stickwithclick.com/images/Click!-May-20-PUB-Meeting-Presentation-Final.pdf [https://perma.cc/KLS4-YXWH] ("Tacoma Power doesn't need a wired telecommunications network for metering . . . [d]id not foresee the industry evolution to wireless power metering systems"); Kartheepan Balachandran et. al, *Bandwidth Analysis of Smart Meter Network Infrastructure*, 16TH INT'L CONF. ON ADVANCED COMM. TECH. (ICACT) (Mar. 27, 2014) http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.667.2265&rep=rep1&type=pdf.

127. *An In-Depth Look at Click! Financials, supra* note 126.

128. Subscriber count (58,000) obtained from *Financial Report 2014*, EPB 13 (2014), https://static.epb.com/annual-reports/2014/EPB-Financials-2014.pdf [https://perma.cc/5NH7-6HY7].

129. Jessica Armstrong, *Opelika Puts Itself on the Main Line*, BUSINESSALABAMA.COM (Aug. 27. 2014), https://businessalabama.com/opelika-puts-itself-on-the-main-line [https://perma.cc/AQ4W-ST83]. Demographic data available at: *Household Types in Opelika, Alabama*, STAT. ATLAS, http://statisticalatlas.com/place/Alabama/Opelika/Household-Types [https://perma.cc/8Z79-GPQJ] (last visited July 9, 2020).

130. *Household Types*, *supra* note 129.

131. *Id.*

broadband network had been assigned to the electric rather than the telecommunications division.

Assets purchased with the first round of debt also appear on the electric utility's books, impacting revenues, expenses, depreciation, and interest payments of the electric division. This rich mix of the financials of the electric and telecommunications division makes it difficult to clearly see the financial impact of the broadband network. Nevertheless, a full accounting of the finances of the broadband network can be approximated by constructing a *financial counterfactual* of the city's electricity operation; that is, what would be the finances of the electric division "but for" the construction of the broadband network. Comparing the commingled financials of the electric and telecommunications divisions to this counterfactual provides a clear picture of the financial impact of the broadband network.

Conceptually, the counterfactual is constructed as follows. We assume, for simplicity's sake, that only expenses are commingled. Let the observed revenues of the electric utility and broadband system be R_E and R_B, respectively, and let the observed costs of the electric and broadband divisions be divided into three types: costs that are identifiable for each division (c_E, c_B) and a commingled cost (c_X). Using historical data, the full costs of the electric division are estimated to be C_E. The full costs of the broadband division, C_B, are unknown, but can be computed by summing the costs for both divisions and then subtracting C_E: $C_B = (c_E + c_B + c_X) - C_E$. The same procedure could be used for revenues.

The finances of Opelika's electric utility were quite stable over time, making the construction of a counterfactual straightforward. Although revenues of the electric division have risen to cover the financial losses of the broadband network, we will not separate these cross-subsidies from the analysis. An approximation suggests that the cross-subsidy through an electric rate increase equals about $3 million.[132] The utility purchases wholesale electricity (it does not generate electricity), which it then distributes over its distribution network. Assuming electricity expenses are unaffected by the broadband network, all that is required to produce the counterfactual is a calculation of non-power expenses of the electric division; that is, non-power expenses free from the influence of the broadband network. Between 2007 and 2010, the four years before construction began, non-power expenses (depreciation and other costs) grew about $400,000 annually. We apply a linear trend based on expense over this period to approximate the non-power cost of the electric division for the 2011 to 2020 period.

Combining the finances of the electric and telecommunications division is straightforward, as the data are available in the city's financial statements. First, all operating revenues and expenses are included in the analysis. Second, as the electric utility receives a transfer from the telecommunications division for "Fiber Optic Line Leases," we include those (non-operating) revenues since they appear as operating expenses to the telecommunications

132. *Id.* Over the 2010-2014 period, the average ratio of electric revenues to power costs was 1.394. In 2015-2016, that ratio increased to 1.45, a $3 million differential in the markup of wholesale electric expenses.

division. (Thus, the two are a wash). Third, we also include all interest expenses (a non-operating expense) related to the broadband network, since these expenses arise solely because of the construction of the fiber network.

The financial losses for years 2012-2016 are reported in Table 1. In considering these figures, it is important to keep in mind that, for communications networks, losses are expected in the early years of operation. These networks require large upfront investments and revenues are not realized until after the network is constructed. For the network to be profitable (that is, have a positive net present value), it is necessary for revenues not only to exceed expenses on an annual basis in future years, but to do so by an amount sufficient to recoup all losses accumulated during the early years. As such, cumulative losses are reported in the table, and shed significant light on the prospects for the network's future profitability. The larger the cumulative losses, the less likely the network will ever break even (at least by any traditional financial metric).

Table 1. Financial Analysis of Opelika's Broadband Network

	2012	2013	2014	2015	2016
Electric + Broadband					
Revenues	35,271,849	34,131,980	40,218,323	44,874,861	47,001,981
Expenses	30,950,669	32,591,461	41,466,152	43,459,692	43,549,454
Income (loss)	4,321,180	1,540,519	(1,247,829)	1,415,169	3,452,527
Electric (no Broadband)					
Revenues	35,271,849	34,131,980	38,137,587	40,477,434	41,672,172
Expenses	31,033,161	30,748,699	34,148,994	35,535,759	35,290,399
Income (loss)	4,238,689	3,383,281	3,952,594	4,941,675	6,381,774
Broadband (Estimated)					
Income (Loss)	82,492	(1,842,762)	(5,200,423)	(3,526,506)	(2,929,247)
Cumulative Income (Loss)	(161,535)	(2,004,297)	(7,204,719)	(10,731,225)	(13,660,472)

To begin, we look at the finances of the standalone electric utility. Income averages about $4.6 million annually, which is consistent with the financial results prior to the construction of the broadband network (at $5 million for 2007 through 2010). In looking at the combined electric and telecommunications division, the cross-subsidy from the electric to the telecommunications division becomes plain. For the combined divisions, income is much lower than for the standalone electric division, but the joint income remains positive in all years but 2014. Income from the electric division was sufficient to cover the losses for the broadband network, but this does not imply the broadband network has had minimal financial impact. Prior to the broadband network, the city benefitted from the internal transfer of millions in profits from the electric division, and now those profits are substantially lower, impacting all taxpayers.

The true financial impact of the broadband network is the difference between the combined divisions and the standalone electric utility. For instance, in 2013, the standalone electric utility would have had a positive income of $3.38 million. The combined divisions, however, only had a

positive income of $1.54 million. Thus, the broadband network reduced the city's income by $1.8 million (= 1.54 – 3.38), raising cumulative losses to $2 million when added to the cumulative loss of $160,000 in 2012.

The financial impact of Opelika's broadband network is shockingly large. In 2016, for instance, the annual financial losses equaled $2.9 million, which is only slightly smaller than the $3.5 million loss in 2015. Over the four-year life of the network, cumulative losses are $13.7 million. This loss in income to the city equals about $1,140 per household in Opelika. At the rate of loss accumulation, the Opelika network is unlikely ever to be "profitable" by any meaningful financial definition of the term.

In addition to these losses, the city has taken on $41.6 million in debt. At the end of 2016, the broadband network had the city in a $55 million hole without any reasonable expectation of escape. The market value of the system is unknown, but faltering municipal systems typically sell for pennies on the dollar. In Groton, Connecticut, the city took on $38 million in debt to build a broadband network.[133] The network was sold to a private investor for $550,000 (about 1.4 cents on the dollar). In Provo, Utah, a network built with $39 million in debt was sold for $1.[134] Provo, like Opelika, added a $5.35 monthly fee to electric bills to cover the losses of the broadband network, but still could not rescue the faltering finances of the network. By these indicators, the market value of the OPS network is likely to be pennies on the dollar.

The difference between the actual losses of the Opelika broadband network and those reported for the telecommunications division by the city are likewise sizable. In 2016, for instance, the city's books reported a loss for the telecommunications division of $1.36 million (operating losses plus interest expense), about $1.6 million below the actual loss computed here. The difference is, in part, related to the shifting of broadband expenses to the electric division, including (but not limited to) the $1.4 million in interest expenses assigned to the electric division but caused by the broadband network. Other hidden expenses include the expenses related to the assets purchased with the $28.1 million loan and assigned to the electric division. The margins of the electric utility also were rising prior to the construction of the broadband network. Over the life of the broadband network, the city reports cumulative losses for the telecommunications division equal of only $6.45 million, when actual losses (see Table 1) are more than twice that at $13.7 million.

Opelika is a small Alabama town of approximately 11,000 homes, and OPS provides service to 12,142 electric customers. In 2016, OPS's telecommunications division had over 3,200 customers, or about one-third of

133. *See* discussion *infra* Section VII.D.
134. *See* discussion *infra* Section VII.B.

broadband subscribers.[135] Using these figures, it is possible to see the impact of the cross-subsidy on a more personal basis. In 2016, $20 of the average OPS electric customer's bill was used to subsidize the broadband network. By the end of 2016, the average electric customer had funded a subsidy of $1,125 from the electric to the telecommunications division. Not everyone subscribes to OPS's broadband service. In 2016, electric customers paid a subsidy of $900 per broadband account; through 2016 the electric customers had accumulated a total of $4,300 in subsidies per broadband account.

Table 1 above shows that the financial effect of the broadband network is sizable. Over the life of the broadband network, the cumulative losses through 2016 are $13.7 million, with $2.9 million added that year. Revenue growth in the broadband sector is far too slow to overcome this enormous deficit, so the losses will continue to mount. It is natural to ask how the financial situation will change over the next few years. To do so, we forecast the financials through 2020. Using simple forecast models, revenues and expenses are projected through 2020.[136] All non-operating revenues and expenses are set equal to the 2016 levels as they do not change much over time.

The forecasts through 2020 are summarized in Table 2. As the earlier data predict, the annual losses decline slightly over the years as telecommunications revenue increases. Still, the financial impact from the addition of the broadband networks to the city's business services results in a nearly $1 million loss in 2020. Cumulative losses in 2020 are $18.6 million. Before the network "breaks even," this sizable and growing cumulative loss must be recovered from annual income. Given the predicted loss in 2020, and the slow financial progress of the telecommunications division (reducing the loss by a few hundred thousand each year), the losses are expected to accumulate for many years after 2020. The broadband network has resulted in a sizable financial hole from which there is little hope the city would ever emerge. The city's network was sold in 2018 for $14 million, well below the debt and cumulative losses of the network, which summed to about $58 million.

135. Letter from Gary Fuller, Mayor, City of Opelika, Response to Yellowhammer Article (Feb. 16, 2017), https://opelika-al.gov/Archive/ViewFile/Item/353 [https://perma.cc/XJQ8-NQTL]; Andrew Burger, *LRG: U.S. Broadband Penetration Rises to 79% of Households, Smartphone Role Increasing*, TELECOMPETITOR (Oct. 24, 2014), http://www.telecompetitor.com/lrg-u-s-broadband-penetration-rises-to-79-of-households-smartphone-role-increasing [https://perma.cc/3F65-TM4X]; *Electric Sales, Revenue, and Average Price: 2015 Utility Bundled Retail Sales – Total*, ENERGY INFO. ADMIN. (Oct. 2016), https://www.eia.gov/electricity/sales_revenue_price/pdf/table10.pdf [https://perma.cc/RC8A-AUHJ].

136. Linear and log-linear trend models are employed, depending on which fits the data best.

Table 2. Financial Forecast for Opelika's Broadband Network

	2016	2017	2018	2019	2020
Electric + Broadband					
Revenues	47,001,981	47,941,112	49,755,977	51,448,272	53,055,983
Expenses	43,549,454	$44,691,877	$46,205,453	$47,650,617	$49,048,571
Income (loss)	3,452,527	$3,249,236	$3,550,524	$3,797,655	$4,007,412
Electric (no Broadband)					
Revenues	41,672,172	41,659,798	42,804,662	43,949,527	45,094,391
Expenses	35,290,399	36,809,063	37,925,091	39,041,118	40,157,145
Income (loss)	6,381,774	4,850,735	4,879,572	4,908,409	4,937,246
Broadband (Estimated)					
Income (Loss)	(2,929,247)	(1,601,499)	(1,329,047)	(1,110,754)	(929,834)
Cumulative Income (Loss)	(13,660,472)	(15,261,971)	(16,591,018)	(17,701,772)	(18,631,606)

The effect of shouldering the debt for the broadband network on electric ratepayers affected power rates in Opelika. In 2015, OPS raised it electricity rates to cover a $800,000 million revenue shortfall for its electric division.[137] The loss equaled a little over half the annual debt expense the electric division shoulders for the broadband network ($1.4 million), so the rate increase would have been unnecessary absent the broadband network. The rate increase—an explicit cross-subsidy—represented an increase in electricity rates of $5.39 per month for OPS's electric customers, both residential and commercial.[138] This rate increase is sizable for a city with an median household income a third of the nation's and just over 20% of its population living below the poverty level.[139]

State regulators would almost certainly forbid such cross-subsidization by investor-owned utilities, indicating that municipalities are operating under different standards than private companies. Indeed, the lack of fiber-to-the-home networks being built by investor-owned electric utilities is a potent piece of evidence. The incremental cost of adding broadband to an electric utility may be lower than it is for a firm without infrastructure and resources already deployed in the relevant market. Such spillovers need not be

137. Opelika, Ala., Ordinance No. 126-14 (Sept. 17, 2014), http://opelikaobserver.com/2014/09/ordinance-no-126-14-919 [https://perma.cc/P9W2-J4H4]; *Opelika City Council, Regular Meeting Agenda*, CITY OF OPELIKA 15-18 (Dec. 15, 2015), http://opelikacityal.iqm2.com/Citizens/FileOpen.aspx?Type=1&ID=1033&Inline=True [https://perma.cc/ND92-W54X].

138. The revenue shortfall was $784,935, an amount less than the costs the electric division covered for the telecommunications division. Dividing the shortfall by 12,142 total customers results in an increase of $5.39 per household, per month. *See Electric Sales*, *supra* note 135.

139. *QuickFacts: Opelika, Alabama*, UNITED STATES CENSUS BUREAU, https://www.census.gov/quickfacts/opelikacityalabama (last updated July 1, 2019) [https://perma.cc/885D-SK7C]; *QuckFacts: United States,* UNITED STATES CENSUS BUREAU, https://www.census.gov/quickfacts/fact/table/US/SEX255218 (last updated July 1, 2019) [https://perma.cc/4WWW-GD65].

subsidies. Indeed, spillovers allowed the cable companies into the phone business, the phone companies into the video business, and both into the broadband business. But if there were sizable spillovers from the electric utility into the residential communications business, then we should see investor-owned utilities doing so. We do not.

When the Telecommunications Act of 1996 was passed, there was hope that electric utilities would enter aggressively into telecommunications markets.[140] For the investor-owned utilities, however, that aggressive entry never occurred. Why? The principle reason is that politicians and regulators see it as their job to protect captive ratepayers from unnecessary risk and building, and operating a broadband network is exceedingly risky. For this reason, investor-owned utilities are closely-scrutinized by state Public Utility Commissions ("PUCs") to make sure that anything that goes into a utility's rate base is "used and useful" to the utility's core electric business.[141] If a utility tried to sneak in the costs of entry into the rate base—any costs not related to the core electric business—the prudency hearing would not be pleasant. The risk-averse investment culture that characterized electric utilities and their regulators effectively precludes investor-owned utilities from leveraging their electric monopoly into the communications business.

Yet, while entry from investor-owned utilities over the past twenty years has been minimal, municipal entry has been aggressive. In large part, we can attribute such entry by municipal utilities to the lack of regulatory oversight aimed at protecting the customers of the electric utility. Unlike their investor-owned counterparts, municipal utilities generally face no oversight from state PUCs as to what and what may not be included into the rate base. *Self-regulated* by their own city councils, municipal utilities have much more leeway to use captive electric ratepayers to subsidize entry into broadband.[142] State laws can act as a check, if not the only check, on municipal government's cross-subsidy of broadband services. The ease with which a cross-subsidy may be implemented between an electric utility and an affiliated broadband network goes a long way to explain why municipal networks are often built in cities operating an electric utility. In numerous cases, the captive ratepayers are paying for failed municipal broadband

140. *See* Implementation of Section 34(A)(1) of the Public Utility Holding Company Act of 1935, as Added by Section 103 of the Telecommunications Act of 1996, *Report and Order,* 11 FCC Rcd. 11377 (1996).

141. *See, e.g.*, *Electricity Regulation in the US: A Guide*, REG. ASSISTANCE PROJECT 29 (Mar. 2011), http://www.raponline.org/docs/RAP_Lazar_ElectricityRegulationInTheUS_Guide_2011_03.pdf [https://perma.cc/VS7L-GDFZ].

142. *See* Nixon v. Missouri Municipal League, 541 U.S. 124, 134 (2004) ("[W]hen a government regulates itself (or the subdivision through which it acts) there is no clear distinction between the regulator and the entity regulated. Legal limits on what may be done by the government itself (including its subdivisions) will often be indistinguishable from choices that express what the government wishes to do with the authority and resources it can command.").

projects.[143] While it is not possible to eliminate the potential for legitimate positive spillovers from the electric utility to the broadband network, the lack of investor-owned utility entry into the broadband market indicates that such spillovers are not large enough to motivate entry. Thus, subsidization is likely required to induce entry even by municipal electric utilities into the broadband business.

E. Private Investment and the Threat of Municipal Entry

When the FCC preempted state municipal broadband laws in Tennessee and North Carolina in 2015, the FCC's action was intended to spur municipal investment in networks.[144] Naturally, in response to the FCC's action, private firms will increase their assessment of the threat of municipal entry. In the FCC's *2015 Preemption Order*, the Agency expressed the view that "threat of entry or actual entry of a municipal provider spurs positive responses by the incumbent broadband provider" [which] serves the goals of section 706.[145] In contrast (and as noted above), the FCC observed the risk of municipal broadband in its *National Broadband Plan*: "Municipally financed service may discourage investment by private companies."[146] As is typical of the FCC, no supporting analysis is provided of either of these *conflicting* claims; a shortfall we make some attempt to remedy here. We have discussed the likelihood that municipal entry will lead to the exit of either the public or a private provider. Here, we will show, using the economic model presented above, that *the mere threat* of municipal entry may discourage private investment.

Consistent with the general claim that wireline broadband services are provided by a duopoly, take the model from the previous section and set $f = A^2/9$ so that $n^* = 2$. Suppose, however, that there is only one firm in the market and the second firm is only now considering the possibility of entering the market. Furthermore, suppose the second firm assigns the probability θ to the possibility that an equally efficient municipal firm (leading to a symmetric outcome) will also enter the market to compete with the existing private monopoly. As always, the second private firm would only enter the market if the expected profit were greater than or equal to zero. Hence, the private firm will enter if:

$$\mathrm{E}\{\theta\} = (1-\theta)0 + \theta A^2(1/16 + 1/9) \geq 0. \qquad (11)$$

The first part of the left-hand side of Equation (11) is the realized profit after entry (the marginal profit is 0 in the equilibrium structure) multiplied by the probability the municipality does not enter; the second part is the profit with three firms multiplied by the probability the municipality does enter.

143. *See, e.g.*, Davidson & Santorelli, *supra* note 14.
144. *2015 Preemption Order, supra* note 6.
145. *Id.* at ¶ 49.
146. *National Broadband Plan, supra* note 2, at 153.

Equation (11) can only be met if $\theta = 0$. In other words, if there is any credible threat of municipal entry ($\theta > 0$), then the second private firm would not enter, thus generating a private monopoly in the market. However, if there is no threat of municipal entry ($\theta = 0$), then the second private firm would enter. This example shows that even a small probability of municipal entry can prevent private sector entry, thus artificially generating monopoly conditions in the marketplace. States with laws overseeing municipal broadband may have some advantage in attracting private investment. The logic of this argument has a more general application. Broadband technology is constantly improving. Thus, at any given time, the technology used is somewhat dated. Of course, companies cannot invest in every technological advance that comes along, especially when an even better one is soon expected. At some point, however, the companies must upgrade their networks to provide the service quality their customers demand, knowing that it will not be long before the next upgrade At present, we are amid a massive technological upgrade—the move to very high-speed networks. Fiber is one technology, but the cable companies have proven their fiber-coaxial networks are capable of very high speeds as well. Private providers are making their computations about upgrading their networks and have already begun to deploy in many cities. The threat of municipal entry, or the realization of municipal entry, alters that calculation, likely weakening the case for investing in upgrades. In this respect, it is a bad time to push municipal entry. On the other hand, as larger cities get their upgrades, smaller cities likely feel an increasing pressure to keep up. Given the long-term nature of broadband investments, the temporal issues are complex and interesting.

VI. EXTERNALITIES, COMPETITION, AND SUBSIDIES

The "promoting competition" argument for municipal broadband is logically unsound. And we doubt most city officials are at all concerned about increasing competition and probably wish they didn't have to share the market with private firms. Most of the city officials involved in these projects simply want to increase broadband adoption to help their community transition more smoothly and robustly to the information economy. Building a network is difficult, expensive and risky, yet some city officials do so nonetheless, suggesting they perceive the stakes to be high but their options limited.

A. Subsidies vs. Entry

If obtaining positive externalities of broadband is the goal, then it is important to ask whether there are better methods to reap them than the financial risk of building a municipal broadband network. The presence of these positive externalities implies that the socially optimal aggregate quantity is above the level achieved in the private long-run equilibrium

because private firms cannot capture the value of the external effects.[147] We will now consider a subsidy as an alternative solution to the externality problem and compare it to the addition of a firm to a market already in equilibrium.

As noted above in Expression (12), to incorporate the external effects into the analysis, an additional term appears in the consumer welfare function, zQ_e, where z is the value of the external effect ($z > 0$) per unit consumed (Q_e). To make the case that a subsidized government-owned firm is worth the benefit of broadband's positive externalities requires that the additional positive term in the welfare function is sufficiently large to make the socially-optimal number of firms greater than the private long-run equilibrium. This argument, however, rests upon the assumption that the only available tool to increase aggregate quantity is an increase in the number of firms in the market, and to do so in a way that only the government is willing to be that firm. As noted above, what we need for broadband is more quantity, not more firms.

Rarely is it the case that the number of firms in the market is the only available tool. For example, various types of consumer subsidies can be utilized to achieve the same outcome in a far more efficient manner than the entry of a new firm.[148] As noted in one article about municipal broadband, "[L]ocal and state governments generally are not interested in operating broadband systems; most prefer to provide regulatory and financial incentives for private-sector carriers to make the necessary investments."[149]

To illustrate this point, consider a straightforward numerical example. Going back to the economic model, suppose that A=36 and f=\$144 so that the long-run equilibrium number of private firms is $N^* = 2$. The private long-run equilibrium would have an aggregate quantity of $Q_e = 24$. Suppose that this level is too small from a societal point of view due to a positive external effect associated with broadband. If a municipal firm enters ($N = 3$), then the competitive effect would increase the aggregate quantity by three units (up to 27). There would, however, be the additional societal burden of another 144 units of fixed costs. The predatory nature of additional entry can be seen here (though we have not specifically modeled the subsidization of the firm to induce entry). With three firms, each of the firms would sell 9 units at a price of \$9, resulting in revenue of \$81 compared to their fixed investment of \$144. Here, prices are below incremental cost.

As an alternative to entry, suppose we attempted to generate the same three-unit increase in aggregate quantity by a uniform consumption subsidy of s per unit. Hence, the demand curve would now be:

$$P = A - Q + s. \qquad (12)$$

147. In the presence of a negative externality (e.g. pollution), competitive markets produce too much. In the presence of a positive externality, competitive markets produce too little.

148. Governments may also eliminate taxes, regulations, or procedures that discourage private sector investments.

149. *Why States Should Support Broadband, supra* note 86.

With two firms in the market, the size of the subsidy required to generate the three-unit increase in the aggregate quantity would be $s = \$4.50$. The total cost of the subsidy would be $\$4.50 \times 27 = \$121.50$. Clearly, this is less than the fixed costs associated with setting up a municipal firm ($144). Furthermore, the two incumbent firms would cover their average total costs and profits would be positive. The firms would each have revenue of $\$13.50 \times 13.50 = \$182.25$ versus a fixed investment of $144. There would be no issues of predation or potential exit. Moreover, the profits could even be extracted via a lump sum tax to pay partially for the subsidy if necessary.[150]

In this example, we have shown that a simple uniform subsidy dominated the alternative of the entry of an additional competitor even though a uniform subsidy is not the most efficient type that can be used to increase the aggregate quantity. A subsidy targeted to those consumers with a lower willingness to pay, perhaps dubbed "broadband vouchers" would be even more efficient than a uniform subsidy since there is no benefit to subsidizing those that are already consuming the service in the private equilibrium.[151] Even in cases where substantial upgrades are required, some targeting may be possible, reducing the social cost of obtaining positive externalities. Some private companies are presently active in similar private programs without subsidies, including Comcast's *Internet Essentials* program (providing low-cost broadband and computers to low-income households)[152] and Facebook's *Free Basics* program (offering free but somewhat limited Internet access in developing economies).[153]

Furthermore, subsidies are a continuous (or scalable) instrument that can be easily adjusted in magnitude and targeted to particular groups to achieve the desired increase in quantity. The addition of a firm, by contrast, is a discrete (and inefficient) instrument that only provides a very imprecise targeting of desired increases in market quantity. In our example above, if the socially optimal quantity was really 26 units, then the use of firm entry could not hit the target but must either miss it on the low side with two firms (24 units) or miss it on the high side with three firms (27 units). The subsidy, however, could easily achieve the optimal 26 units by adjusting the size of the uniform subsidy down to 3 units.

Without doubt, the best argument for municipal broadband is that significant positive externalities result from broadband. Yet, as we show here, entry with a high fixed-cost technology is a terribly costly and clumsy way to increase quantity to obtain an externality. It is also, by any standard, a radical

150. Economic theory indicates that lump-sum taxes are the most efficient form of taxation. Such a tax would not fully pay for the full cost of the subsidy. N. Gregory Mankiw et al., *Optimal Taxation in Theory and Practice* (NBER Working Article No. 15071, 2009), https://www.nber.org/Articles/w15071.pdf [https://perma.cc/7JEH-8MYE].

151. In the same way, there is no benefit from offering households a quality of broadband that they couldn't possibly use (e.g., 1 Gbps). Targeted deployments may be more sensible.

152. *See* Internet Essentials, https://internetessentials.com (last visited July 10, 2020) [https://perma.cc/W7AE-ZCSD].

153. *See* Internet.org by Facebook, https://www.internet.org (last visited July 10, 2020) [https://perma.cc/UN73-HFTU].

and controversial approach. Theoretically, subsidies to existing firms and/or households is a far more efficient way to increase adoption and investment. Such subsidies avoid the controversy surrounding municipal broadband and do not lead to below-cost (predatory) pricing. For cities, practical problems implementing a subsidy scheme and the FCC's failure to craft any meaningful plan (other than passing the buck to municipalities to take on highly risky projects) may move municipal entry up the list of potential remedies, but entry is not pro-competitive. It is decidedly anticompetitive. In fact, municipal broadband makes far more sense when competition is not the goal.

VII. PRACTICAL CONSIDERATIONS FOR REASONABLE POLICY

Broadband is valuable and it is believed to have value above and beyond private values alone. As such, the private incentives to deploy and adopt broadband are too low. What is needed, consequently, are policies that encourage an increase in the deployment of modern broadband networks and the adoption of the services offered over those networks. We have a *quantity* problem (where quantity may be considered in terms of bandwidth as well), not a *competition* problem. Competition cannot solve a positive externalities problem—the private incentives are never enough. Again, we don't need more providers. We need higher quantities.

Forcing an additional provider into a market—especially a government-owned and highly-subsidized one—is a very poor and untargeted policy to deal with a quantity shortage. This option is better characterized as anticompetitive than competitive and may very well lead to a government or private monopoly in broadband. This approach to solving the broadband externality issue may have its advocates, but experience suggests the cracks in it will eventually begin to show (and already are). Subsidies may very well be necessary to address the externality, but it is hard to find rational, economic support for the asymmetric subsidization of a government-owned broadband network intent on "competing" with existing private-sector firms.

Not only are the economics of municipal broadband questionable, but the risks are great. In the vacuum created by the failure of federal policy for broadband deployment in marginal communities, more and more cities are contemplating the construction of networks, placing themselves at great

financial and possibly even litigation risk.[154] A few examples of the downsides of municipal systems may clarify the nature of the problem. Opelika was detailed above, so we do not repeat that analysis here.

A. Burlington, Vermont

One of the earlier municipal fiber projects was in Burlington-Vermont. The city elders, confident in their business plan, promised taxpayers that the broadband network would "be financially self-supporting, pay for all its own cost, and yield a return to the City budget."[155] Municipal broadband advocates took them at their word and praised the Burlington project as an example where "[c]ommunities can build a telecommunications network to provide better services at a lower cost while raising revenue."[156] Despite such potential, the Vermont legislature, exercising a bit of Yankee sensibility, passed a law which forbade the City of Burlington from providing any financial support to the fledgling telecommunications network.[157] While the legislature was pleased to see the project go forward, its intention was clear: taxpayers will not be on the hook in the event of bad times.[158] The legislature's concerns were prescient.

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154. David Elliot Berman & Victor Pickard, *Cities and states take up the battle for an open internet*, GCN (Nov. 19, 2019), https://gcn.com/articles/2019/11/19/municipal-broadband.aspx [https://perma.cc/VFZ6-L6YK]; Mike Farrel, *More Muni, More Money*, MULTICHANNEL NEWS (Nov. 18, 2019), https://www.multichannel.com/news/more-muni-more-money [https://perma.cc/TG2D-YBJF]; Chris Teale, *Municipal Broadband Internet: The Next Public Utility?,* SMARTCITIESDIVE (Mar. 5, 2019), https://www.smartcitiesdive.com/news/municipal-broadband-internet-public-utility/549461/ [https://perma.cc/4N9E-T6FT]. A recent document from the White House, *Broadband Opportunities Council*, *supra* note 4, offers a few and quite general recommendations on how to improve federal policy with respect to broadband deployment.

155. *Annual Financial Report*, BURLINGTONVT.GOV 62 (June 30, 2007), https://www.burlingtonvt.gov/sites/default/files/Mayor/AnnualReports/2007/burlington_vermont_fy2007_annual_report.pdf [https://perma.cc/K8ZT-ANK2].

156. *See, e.g.*, Christopher Mitchell, *Burlington Telecom Case Study*, INST. FOR LOCAL SELF-RELIANCE 5 (Aug. 2007), http://ilsr.org/wp-content/uploads/files/bt.pdf [https://perma.cc/595L-NPL4].

157. 24 V.S.A. App., § 3-438(c)(1) ("If the city exercises its authority under subdivision 431(4) or section 449 of this title, the public service board, in considering any application for a certificate of public good, shall ensure that any and all losses from these businesses, and, in the event these businesses are abandoned or curtailed, any and all costs associated with investment in cable television, fiber optic, and telecommunications network and telecommunications business-related facilities, are borne by the investors in such business, and in no event are borne by the city's taxpayers, the state of Vermont, or are recovered in rates from electric ratepayers.").

158. *See, e.g.*, Christopher Mitchell, *Burlington Telecom Case Study*, INST. FOR LOCAL SELF-RELIANCE 1 (Aug. 2007), http://ilsr.org/wp-content/uploads/files/bt.pdf [https://perma.cc/8EJP-WSCS]; Christopher Mitchell, *Learning From Burlington Telecom: Some Lessons for Community Networks*, INST. FOR LOCAL SELF-RELIANCE (Aug. 18, 2011), https://www.muninetworks.org/sites/www.muninetworks.org/files/bt-lessons-learned.pdf [https://perma.cc/4LDW-A3CM].

Soon after the project got underway, reports of mismanagement began to percolate. In response, the Vermont Public Service Board ("PSB") launched an investigation into Burlington Telecom, and its findings were staggering. Among other problems, including failing to meet buildout requirements, the PSB found that not only had the city had improperly advanced funds to keep the network afloat from the city's general cash pool, but that Burlington Telecom had failed to pay the money back to the treasury, leaving the taxpayers on the hook for $16.9 million—conduct, by the way, to which Burlington Telecom freely admitted. In the PSB's view, "the City's admitted conduct displayed a *wanton disregard* not only for a significant condition of the [network's certificate of public good], but also for provisions of the city charter that were enacted by the state legislature specifically to prevent such conduct."[159]

Burlington countered that the advance was no big deal because the cash pool was the "City's general bank account" in which the "majority of City funds are comingled." The PSB didn't buy this argument, finding that the "distinction that Burlington Telecom is seeking to make between city money and taxpayer money is largely immaterial." As the PSB observed:

> It was clearly the legislative intent to avoid having the residents of Burlington saddled with a debt resulting from a failed venture. It would undermine this intent to accept the argument that dollars may be contributed by the City to BT from parking receipts, sales tax, license fees, or whatever, but not from the property tax. Dollars are the ultimate fungible, and have no identity as to their source. Even were that not the case, clearly, a dollar (or a million dollars) removed from the City's checking account leaves a hole that must be filled from somewhere, and the residual source is the property tax.[160]

The PSB concluded that "Burlington Telecom now owes the cash pool $16.9 million with no immediate or probable prospects of full repayment by Burlington Telecom."[161]

But this is not the end of this story: Burlington Telecom was subsequently sued by a major vendor for $33 million for defaulting on an

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159. Petition of City of Burlington, d/b/a Burlington Telecom, for a certificate of public good to operate a cable television system in the City of Burlington, Vermont (In Re: Amended Petition to amend Condition No. 17 of CPG related to completion of system build-out and to grant temporary relief from limitation in Condition No. 60 of CPG on financing operations, *Order On Motions And Cross-Motion For Partial Summary Judgment*, Docket No. 7044, 12 (2010) (emphasis added).

160. *Id.* at 15.

161. *Id.* at 16. It should be noted that given such chicanery, the FBI also investigated whether the City of Burlington had violated Federal law. *See Vt. Officials Say FBI on Burlington Telecom Case,* ASSOCIATED PRESS (Dec. 1, 2010), http://www.boston.com/news/local/vermont/articles/2010/12/01/vt_officials_say_fbi_on_burlington_telecom_case [https://perma.cc/85DW-2DJA].

equipment lease. This case was eventually settled for $10.5 million, forcing the private sector to absorb the loss.[162] To help finance this settlement, the City of Burlington entered into a sale/leaseback arrangement with a local businessman in November 2014, effectively privatizing what was once a poster child of municipal broadband.[163]

B. Provo, Utah

City officials in Provo, Utah, began constructing a municipal broadband network in 2004. Provo's business plan was to forge partnerships with various Internet Service Providers ("ISPs") under which Provo would own and operate the network while the ISPs would sell the service to the end consumer. To pay for the network, the city issued $39 million in bonds, committing to monthly payments of $278,000 for 20 years. Over time, most of the ISPs on the network were unprofitable and the network eventually went bust. In 2008, Provo sold the network to the one remaining ISP on the network, but it too could not sustain financial viability. Eventually, the network reverted back to Provo.[164]

As a stop-gap measure, city officials in November 2011 began charging $5.35 a month on residents' electric bills to pay the bond payment (an explicit cross-subsidy).[165] Finally, in 2013, the City of Provo sold the network to Google for $1 in exchange for providing a free basic 5 Mbps service to all Provo residents for seven years (a below-cost price under nearly any measure of cost), as well as offering a free gigabit service to 25 public institutions, including public schools and recreation centers.[166] It's hard to compete with free services, and the loss of public customers certainly hurt the financial prospects for private providers.

Provo taxpayers were left holding the bag, forced to pay off a $39 million bond that the city originally issued to build the network. With interest, taxpayers still have to pay $3.3 million in bond payments per year for the next 12 years. And on top of that, the city will have to front an additional $1.7 million to cover costs not assumed by Google. These additional costs include (a) $722,000 for equipment in order to continue using the gigabit service for

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162. *See* Robyn Estabrook, *City Council Approves Burlington Telecom Settlement*, WPTZ NEWS (Nov. 17, 2014, 11:31 PM), http://www.wptz.com/news/city-council-approves-burlington-telecom-settlement/29788148 [https://perma.cc/T9YS-VAYJ].

163. *Burlington Telecom Sale OK'd by State*, BURLINGTON FREE PRESS (Nov. 3, 2014), http://www.burlingtonfreepress.com/story/news/local/2014/11/03/state-oks-burlington-telecom-sale-lease/18432671 [https://perma.cc/8SQM-NLZW].

164. Vince Horiuchi, *Provo Googled its Way Out of Fiber-Optic Network But Costs Live On*, SALT LAKE TRIB. (June 3, 2013, 8:47 AM), https://archive.sltrib.com/article.php?id=56288307&itype=CMSID [https://perma.cc/96CF-76CN].

165. *Id.*

166. Vince Horiuchi, *Council Approves iProvo Sale to Google*, SALT LAKE TRIB. (Apr. 24, 2013, 9:35 AM), https://archive.sltrib.com/article.php?id=56206589&itype=cmsid [https://perma.cc/35U4-RB42].

government operations already using the network, such as the operation of traffic lights and police and fire services; (b) $500,000 to a civil engineering firm to determine exactly where the fiber optic cables are buried because the construction company originally retained by the city to install the fiber cables underground did not keep records of where they buried all of them; and (c) $500,000 for an insurance policy to help mitigate any possible legal damages should Provo's network not be presented to Google as promised.[167] Finally, if things don't work out for Google, it was reported that the city has to buy-back the network for $1.[168]

C. Tacoma, Washington

In 1997, Tacoma, Washington approved a plan to build a municipal communications network for about $200 million.[169] Ushered in with great fanfare, the project earned Tacoma the nickname of "America's most wired city."[170] Like other municipal ventures, the Tacoma system received high praise for its benefits:

> Since its approval in 1997, Tacoma's hybrid fiber coaxial network has, among other things, ushered in a cable television service, offered customers three high-speed retail Internet service providers, enhanced Tacoma Power's electrical system and created a communications network among government institutions. In turn, the network and its programs have drastically reduced market rates for cable TV and Internet subscribers; saved local governments about $700,000 in annual expenses; and created several promising projects, such as "smart meters" that can gauge utility consumption electronically and "pay as you go" account options for electricity customers . . . .[171]

Unfortunately, as with many municipal projects, economic reality finally caught up with the hype. By 2014, Tacoma's municipal network was hemorrhaging $7.6 million a year. It was projected to lose $38 million over

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167. *Id.*

168. Charlie Osborne, *Google to buy $39m Provo fiber service for $1*, ZDNET (Apr. 19, 2013), https://www.zdnet.com/article/google-to-buy-39m-provo-fiber-service-for-1/ [https://perma.cc/6348-JC3L].

169. Kate Martin; *How to Stop Click from Bleeding Money? Tacoma Looks at Option,* THE NEWS TRIB. (June 27, 2015), https://www.thenewstribune.com/news/politics-government/article26354104.html; David Wilma, *Tacoma City Council Approves Click! Network on April 8, 1997*, HISTORYLINK.ORG (Jan. 30, 2003), http://www.historylink.org/index.cfm?DisplayPage=output.cfm&file_id=5149 [https://perma.cc/M7RS-S7AZ].

170. Halverson, *supra* note 33.

171. Christopher Mitchell, *Tacoma Offering Tips to Seattle*, MUNINETWORKS.ORG (Sept. 19, 2010), http://muninetworks.org/content/tacoma-offering-tips-seattle [https://perma.cc/TF3L-U5GZ].

the next ten years, and it has yet to pay back off the original investment.[172] The utility thus concluded that "Tacoma Power doesn't need a wired telecommunications network for metering."[173]

The massive financial losses eventually fell to the municipal electric company's captive ratepayers who had to provide an annual subsidy to the failing broadband network to the tune of about $8- to $9 million a year, regardless of whether they buy broadband or not[174] For the consumer, this cross-subsidy is no small matter. This subsidy represents 2.5% to 3% of a customer's electric bill. Therefore, for a typical customer, the subsidy costs about $3.20 to $3.84 on a $128 total monthly bill.[175]

The citizens of Tacoma got fed up. Seventy percent of captive ratepayers said they would rather see the municipal network shut down than have power customers or the city government provide any additional subsidies.[176] This sentiment is important because it demonstrates what constituents are willing to pay for the alleged "positive externalities" of broadband. Given this financial situation, the fact that a senior official from Tacoma's mayoral office conceded that the "utility would not make the same decision today" speaks volumes.[177] After losing a major court case that found that the electric system was improperly subsidizing the broadband operations and floating the idea of a $10/month take on a base cost charged to every Tacoma household regardless of whether they're Click customers (which proved to be politically dead on arrival), as of this writing the City of Takoma

172. The News Tribune, *A New Era Needs a New Plan for Tacoma's Click Cable TV (Opinion)*, BELLINGHAM HERALD (Nov. 7, 2014), http://www.bellinghamherald.com/opinion/article22256331.html; *How to Stop Click From Bleeding, supra* note 172.

173. *An In-Depth Look at Click! Financials, supra* note 126.

174. Kate Martin, *Proposal to Lease Click Network to Private Company Leaves Tacoma Leaders Uneasy*, THE NEWS TRIB. (Mar. 31, 2015 12:00 PM), http://www.thenewstribune.com/news/local/politics-government/article26273497.html.

175. Kate Martin, *Poll Results Differ from Public Feedback on Potential Click Lease*, THE NEWS TRIB. (June 18, 2015, 3:33 PM), https://www.thenewstribune.com/news/politics-government/article26337643.html.

176. *Id.* Not surprisingly, many attendants at the public meeting opposed the lease of the system, but this group was not representative of the population ("'It's safe to say a majority of the speakers [at the public meetings] said they did not support the Wave proposal,' said Bob Mack, TPU deputy director for public affairs. 'Not very many expressed concerns about Click's financial distress.' Mack said that's likely because many who attended the meetings have a financial interest in the outcome of the lease discussions and want to defend the status quo. This group includes Click employees and their family members, as well as owners or employees of the companies that sell Internet service on Click's wires.").

177. Halverson, *supra* note 33.

continues to contemplate its strategy for the future, including leasing the system to a private provider.[178]

D. Groton, Connecticut

Success isn't guaranteed even in markets where a municipal electric utility builds a broadband network. Consider the case of Groton-Connecticut. Groton Utilities is a municipal utility offering electricity service. The city decided to build a modern cable, telephone, and broadband network to compete with Comcast.[179] The city borrowed $27.5 million to build the network. After incurring $11 million in losses from the operation of the network, the city found itself subsidizing the operating expenses of the company at a cost of about $2.5 million a year. Bankruptcy was not an option because the broadband operation is part of Groton Utilities and the utility is a city department, so the broadband division could not declare bankruptcy unless the city itself declared bankruptcy. Still, the city wanted out of the broadband business. Eventually, the broadband network was sold to a private investor for $550,000, far more expensive than the initial agreed upon selling price of $150,000.[180] Now, the $38 million tally of debt and losses will be passed on to the city's captive electric ratepayers.

E. Lake County, Minnesota

In 2010, Lake County, Minnesota decided to build its own GON called Lake Connections. The motivation to construct the GON was the typical refrain. According to one county Commissioner, "No other provider was going to build a broadband network with the speeds and capabilities that we

178. John Larson, *Negotiations Underway On Click! Network Transition,* TACOMA WKLY. NEWS (June 21, 2019), https://tacomaweekly.com/news/negotiations-underway-on-click-network-transition [https://perma.cc/D3JM-232U]; *Tacoma Council Asks Public Utility to Investigate Municipal Broadband Service*, The News Tribune Editorial Bd., *$10-A-Month Tax On Every Tacoma Household To Keep Click! Public? That's A Dream Killer,* THE NEWS TRIB. (Aug. 29, 2018), https://www-1.thenewstribune.com/opinion/article217537590.html; *Presentation to the Tacoma City Council and Public Utility Board - Options for Click!*, TACOMA PUB. UTIL. (Sept. 1, 2015), http://www.clickcabletv.com/file_viewer.php?id=2003 [https://perma.cc/N3N4-8SAH].

179. GROTON UTILITIES, http://www.grotonutilities.com (last visited July 10, 2020) [https://perma.cc/PZX6-H5SH]; Greg Smith, *Groton's Deal to Shed TVC Finalized as New Owners Take the Reins*, THEDAY.COM (Feb. 1, 2013), http://www.theday.com/article/20130201/NWS01/130209982 [https://perma.cc/ZF4S-M344]; Deborah Straszheim, *How a Promising Idea Went Terribly Wrong in Groton*, PATCH (Jan. 6, 2013), http://groton.patch.com/groups/politics-and-elections/p/how-a-promising-idea-went-horribly-wrong-in-groton [https://perma.cc/N9RV-238X].

180. Greg Smith, *Groton's Deal to Shed TVC Finalized as New Owners Take the Reins*, THEDAY.COM (Feb. 1, 2013), http://www.theday.com/article/20130201/NWS01/130209982 [https://perma.cc/D9RS-Y885].

have for our rural constituency."[181] To construct the GON, Lake County received a bounty of federal subsidies, including a $56 million loan and a $10 million grant from the Department of Agriculture's Rural Utility Service ("RUS"), along with a $3.5 million grant from the FCC. On top of that, the county pledged $15 million of its own general funds to pay for local fiber drops for individual home connections.[182]

Despite these massive subsidies, Lake Connections never became financially viable. By 2017, the county owed approximately $48.5 million on the RUS loan and entered into a deferral agreement with RUS for principal and interest on the condition the county sell the network to a private company or entity.[183] In August 2017, the county executed a memorandum of understanding with RUS in which RUS agreed to accept the sale price of Lake Connections in full satisfaction of the county's debt. In June 2019, Lake Connections was ultimately sold to Pinpoint Holdings, Inc., for $8.4 million, effectively transferring to federal taxpayers the $40 million in residual debt.[184]

F. Salisbury, North Carolina

In 2010, the City of Salisbury North Carolina launched a GON called Fibrant. Five years later, Fibrant upgraded their network so it could provide a 10 Gbps service throughout the city both to businesses and residents, proudly proclaiming that Salisbury had become "America's first 10 gigabit city."[185] Although both Time Warner Cable (later acquired by Charter and renamed "Spectrum") and AT&T also provided Internet service in Salisbury, city officials concluded that they needed to construct a GON because they deemed current speeds offered by the private sector to be insufficient.[186]

Despite high expectations, Fibrant could only garner only a 20% take rate, far below expectations, ultimately bringing total losses to about $20

181. Jamey Malcomb, *Rural Minnesota County Built a Fiber Network, but Now Taxpayers Face Huge Bills,* LAKE COUNTY NEWS CHRON. (Aug. 3, 2018), https://www.govtech.com/network/Rural-Minnesota-County-Built-a-Fiber-Network-but-Now-Taxpayers-Face-Huge-Bills.html [https://perma.cc/V2RB-QWDG].

182. *Id.*

183. *Id.*

184. Teri Cadeau, *Zito Media Takes Over Lake Connections,* LAKE COUNTY NEWS CHRON. (June 20, 2019), http://econdev.greatriverenergy.com/news/p/item/17266/zito-media-takes-over-lake-connections [https://perma.cc/56CH-VC6R]. Apparently, local taxpayers also were not immune. According to press reports, the Minnesota Auditor's Office found that as of 2016 the county's broadband enterprise fund owed more than $14.3 million to the general fund and $3.3 million to the Health and Human Services fund. *See* Malcomb, *supra* note 181.

185. Jon Brodkin, *City-Run ISP Makes 10Gbps Available to all Residents and Businesses,* ARS TECHNICA (Sept. 3, 2015), https://arstechnica.com/information-technology/2015/09/city-run-isp-makes-10gbps-available-to-all-residents-and-businesses [https://perma.cc/H9Y4-YLAU].

186. *Id.*

million over its short, six-year lifespan.[187] Equally as important, short and long-term debt for the system grew to just over $34 million.[188] As a result, 81 percent of voters supported a plan to lease Fibrant's network to Florida-based communications company Hotwire.[189] Under the terms of the lease, Hotwire must pay target rents of nearly $1 million annually over the next 20 years.[190] Much of that payment is offset by higher debt costs that arise from the lease deal. Under the agreement, the city avoids operational costs, but still incurs debt and depreciation expenses of about $4 million annually.[191] So, the city will lose roughly $3 million per year if things go as planned, most of it in cash payments for debt. As the city's auditor noted, "Fibrant would have a negative cash flow of $2.2 million after payment of debt service."[192] Tacking on depreciation, the present value of the city's ongoing support of the network is probably about $40 million over the 20-year life of the lease (assuming a 3% discount rate).

If the lease deal falls through in ten years, as the contract permits, then the present value of the subsidies to the network are nearly $48 million. Assigning a probability of about 50% to that event, the expected future subsidies of the network are $45 million. It's not a bad deal for Hotwire. The private company will receive a $3 million subsidy each year from the city to compete with unsubsidized private providers of broadband service (AT&T and Charter/Spectrum), while the city continues to shoulder the financial risk of the network.

G. Summary

When advocates promote municipal broadband, they don't talk about Groton, Provo, Tacoma, Burlington, Opelika, Bristol, Lake County, Salisbury, or any one of the many financial failures leaving taxpayers holding the bag, even though these financial disasters (among others) are surely part

187. *City of Salisbury and Hotwire Fiber Asset Lease Overview*, COLUMBIA TELECOMMS. CORP. 3 (Mar. 2018), https://salisburync.gov/Portals/0/Documents/Administration/Communication%20Consultant%20Report.pdf?ver=2018-04-04-103810-030 [https://perma.cc/3KBG-88SP]. Author's calculations using city audit documents.

188. Author's calculations using city audit documents.

189. David Boraks, *Private Company Taking Over Salisbury's Money-Losing Internet Network,* WFAE CHARLOTTE (June 1, 2018), https://www.wfae.org/post/private-company-taking-over-salisburys-money-losing-internet-network#stream/0 [https://perma.cc/VPH4-3MRH].

190. Jessica Coates, *An In-Depth Look at the Fibrant-Hotwire Lease,* SALISBURY POST (Apr. 3, 2018), https://www.salisburypost.com/2018/04/03/an-in-depth-look-at-the-fibrant-hotwire-lease [https://perma.cc/FHN5-7PW3].

191. Author's calculations using city audit documents.

192. City of Salisbury, *Analysis of Proposed Broadband System Lease And Business Plan: Comparison Of Expected Lease Payments Versus Continued Fibrant Operations*, BAKER TILLY (Mar. 27, 2018), https://salisburync.gov/Portals/0/Documents/Administration/Independent%20Accountant%20Report.pdf?ver=2018-04-04-103650-713 [https://perma.cc/489X-QP9S].

of the story. Instead, advocates point to highly-subsidized systems like Chattanooga (replacing the failed Burlington and Salisbury systems as the poster children for municipal broadband).[193] Cities contemplating broadband networks must, however, weigh the totality of the evidence. All the evidence should be front and center in the policy debate. The need for broadband is real, but there are no simple solutions where broadband service is absent or lacking. There are good reasons why the service is absent or lacking, and those reasons must be overcome in one way or another.

VIII. RECENT EMPIRICAL EVIDENCE ON MUNICIPAL BROADBAND

There is very little empirical evidence on the effects of municipal broadband. In this section, we review recent research projects covering economic development, investment, and prices. The evidence is broadly consistent with the theoretical analysis provided above.

A. Labor Market Outcomes

Though economic development, especially positive impacts in the labor market, is used often to justify municipal investment in high-speed Internet to underserved areas, systematic evidence of economic rewards from city-wide fiber-optic GONs is scarce. Most development claims are informal, anecdotal or else based on the estimated effects of broadband generally. A recent study reviewing the GON in Chattanooga, Tennessee by Ford and Seals (2019) provides a direct test of the labor market effects of municipal broadband.[194] To our knowledge, it is the only empirical analysis of labor market impacts of municipal broadband to date. The study constructs a large dataset (no fewer than about 50,000 observations) on multiple employment outcomes using the U.S. Census Bureau's American Community Survey. With these data, econometric techniques are applied to look for differences in labor market outcomes, including labor force participation, employment, wages, information sector employment, among others, between Chattanooga and a set of matched control areas similar but do not have municipal broadband networks. To obtain plausibly causal estimates, the study applies the difference-in-differences estimator and matching techniques.

Across a variety of empirical models and hypothesis testing procedures, Ford and Seals (2019) report no differences in labor market between

193. *Cf.* George S. Ford, *Why Chattanooga is not the "Poster Child" for Municipal Broadband,* PHX. CTR. (Jan. 20, 2015), http://www.phoenix-center.org/perspectives/Perspective15-01Final.pdf [https://perma.cc/JHP9-KZP4].

194. George S. Ford & R. Alan Seals, Jr., *The Rewards of Municipal Broadband: An Econometric Analysis of the Labor Market*, PHX. CTR. (May 2019), http://www.phoenix-center.org/pcpp/PCPP54Final.pdf [https://perma.cc/QME8-YENU].

Chattanooga and comparable places.[195] Despite multiple claims that Chattanooga's network created jobs in the city, a review of the actual employment activity indicates the broadband network has had no impact on employment, wages, self-employment, and other labor market outcomes.

The absence of evidence is not evidence of absence. Statistically insignificant results may be the result of bad data or inadequate statistical methods. Recognizing this fact, Ford and Seals (2019) also study the labor market impact of an auto plant opened in Hamilton County, Tennessee, about the same time as the city's broadband network began taking customers.[196] As expected, the statistical model revealed substantial increases in automobile manufacturing employment. In fact, the estimated increase in auto manufacturing jobs closely matched the employee count of the plant. Thus, the statistically insignificant findings with respect to the broadband network cannot be blamed on either the data or the empirical strategy used in the study.

B. Incumbent Responses to Municipal Entry

In another empirical study of the effects of municipal broadband, Seamans (2012) evaluates the timing of upgrades by private cable systems from one-way to two-way communications between 2001 and 2009.[197] One factor Seamans believes may affect this timing is the threat of municipal entry, which he defines to be the presence of a municipal electric utility in the cable system's market. Whether or not the cable system is in a state that limits the cross-subsidization of municipal broadband networks is also considered in the empirical model. Setting aside the numerous complexities of his model, the relationships of interest may be written concisely as,

$$y_i = \alpha + \beta M_i + \lambda M_i X_i \tag{13}$$

where y_i is the timing of the upgrade by cable system i, M is a dummy variable equal to 1.0 if the cable system is in a market serviced by a municipal electric utility (0 otherwise), and X is a dummy variable equal to 1 if the cable system is in a state that prohibits the cross-subsidization of a municipal broadband network (0 otherwise). There are many variables in the model accounting for cable system characteristics, market demographic, and geographic indicators, which we subsume into the parameter α for expositional purposes.

If we think of the variable y as the *speed of upgrade*, as does Seamans, the model can be interpreted as follows: In a state without a cross-subsidy prohibition ($X = 0$), then the upgrade effect of being in a market with a municipal electric utility ($M = 1$) is measured by the coefficient β. If β is positive, for instance, then the presence of a municipal electric utility makes for a faster upgrade. Alternately, if a cross-subsidy prohibition is in effect

195. *Id.* at 5.

196. *Id.* at 25.

197. Robert C. Seamans, *Fighting City Hall: Entry Deterrence and New Technology Deployment in Local Cable TV Markets*, 58 MGMT. SCI. 461, 461-475 (2012), https://www.jstor.org/stable/41431664 [https://perma.cc/7JPU-WQAE].

($M = X = 1$), then the effect of the municipal utility on the upgrade timing is $\beta + \lambda$.

The estimates of the parameters of interest are:

$$y_i = \alpha + 0.056 \cdot M_i - 0.068 \cdot M_i X_i \quad (14)$$

where both the estimated coefficients (β and λ) are statistically different from zero at the 10% level or better. The positive coefficient β indicates that cable systems operating in markets with a municipal electric utility and no cross-subsidy law upgrade *faster* ($\beta > 0$). Recall, however, that if the cable system operates in a state with a cross-subsidy restriction, then the effect of the municipal utility is $\beta + \lambda$, which is negative ($\beta + \lambda = 0.056\ 0.068- = -0.012$).[198] A Wald Test confirms this small difference (-0.012) is not statistically different from zero.[199] Since $\beta + \lambda = 0$, the cross-subsidy prohibition appears to entirely eliminate the "threat" of municipal entry into the communications market. This portion of Seamans' empirical results is consistent with what the theoretical analysis predicted—municipal entry requires cross-subsidization. In states where cross-subsidies are prohibited, municipal entry is no longer a threat.

But what about the positive effect on upgrades in markets where cross-subsidized entry is possible? Seamans concludes this faster upgrade decision is strategic in nature. That is, it is an attempt to reduce the incentives of the municipal electric utility to cross-subsidize its entry into the communications market.[200] This conclusion is based on the empirical results indicating that cable systems in markets with a municipal electric utility do not offer advanced services more quickly despite the faster upgrades in network capability. So, while the systems upgrade sooner, they do not offer advanced services sooner because, as Seamans reasons, there is inadequate demand for these advanced services.

Seamans' results are consistent with our analysis suggesting municipal entry is uneconomic. Seamans' results imply that cable systems facing the threat of municipal entry make uneconomic upgrade decisions to deter entry. Even after making such investments, the private systems are unwilling even to incur the additional cost of using those assets to provide advanced services, reflecting low consumer demand. What type of entry is deterred by uneconomic investments? A plausible answer is that only uneconomic entry is deterred by uneconomic investments. Thus, Seamans' empirical evidence supports our theoretical claim that municipal entry is uneconomic and requires cross-subsidization. Consequently, Seamans' empirical work suggests that municipal entry into communications markets likely reduces economic welfare.

198. *Id.* at Table 6, Column 7.
199. *Id.* at 471.
200. *Id.*

C. Welfare Effects of Municipal Entry

We have also demonstrated theoretically that the threat of municipal entry into communications markets may reduce private investment in broadband networks. Wilson (2016) offers evidence supporting that expectation, concluding: "The probability of private provision of fiber increases by 0.76 percentage points under a ban on municipal provision."[201] While the effect is very small (as municipal entry is rare), the empirical result is consistent with our theoretical prediction that municipal entry crowds out private investment.

Wilson concludes, however, from simulations based on his empirical model that municipal entry increases economic welfare (or, more accurately, that laws limiting municipal entry reduce economic welfare). Specifically, his simulations indicate that a prohibition on entry increases the profits of private providers by $3.01 billion and reduces consumer surplus by $1.21 billion (these sums are discounted over 30 years). Theoretically, this tradeoff between firms and consumers, which increases welfare (the gains exceeds the losses) is uncontroversial. Wilson states further that the ban reduces the profits to municipal systems by $20.87 billion, so that the net effect of the prohibition is a reduction in welfare of $19.07 billion. This "profit" to municipal networks is inconsistent with our analysis and the financial performance of municipal systems. There is no evidence (of which we are aware) that municipal systems are ever profitable, but plenty of contrary evidence exists.

While Wilson's simulation involves a number of questionable assumptions (perhaps necessary for computation), such as assuming that revenues equal profits and that firms offer only a standalone broadband product,[202] there is a simple explanation for this discrepancy related to profit. In Wilson's simulations, he assumes that no private firm will enter a profitable market; that is, if there are two private providers, then it is assumed a third will not enter even if entry is profitable. Municipalities are then permitted to build networks in these areas. If private firms pursue profits, as they do, then there would be no profitable markets for municipalities to enter. Wilson's welfare claims are based, therefore, on assumptions we find implausible. Municipalities enter where private firms will not, implying that there are insufficient returns to justify private entry. These peculiar assumptions apply to Wilson's simulation analysis. His empirical finding that the threat of municipal entry deters investment is not based on such assumptions.

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201. Kyle Wilson, *Does Public Competition Crowd Out Private Investment* 34 (NET Inst. Working Article No. 16-16, 2017), https://Articles.ssrn.com/sol3/Articles.cfm?abstract_id=2848569 [https://perma.cc/K3EF-G2TD].

202. *Id*. at 21-22, Equation 11.

D. Municipal Provider Prices

A few studies have, over the years, attempted to perform price comparisons between municipal and private broadband providers. These studies universally—and incorrectly—compare the prices of municipal systems to the prices of private operators within the same market. By the economic principle of the "law of one price," however, the quality-adjusted prices of firms in the same market must be equal.[203] Within a single market, sellers compete for the patronage by offering attractive price-quality combinations to consumers, and if one firm offers a highly favorable price-quality combination relative to its rivals, then all consumers will choose that firm's offering, leaving the higher-priced firms without revenue. Rational, efficient sellers will keep their price-quality offerings in line with rivals so as remain profitable. Therefore, prices within a market will converge to equal (quality adjusted) prices. The proper comparison is to compare prices across markets and determine whether market prices in cities with municipal broadband systems are systematically lower than in cities without government-run networks.

There are other significant errors in pricing studies. For instance, in order to make meaningful price comparisons across public and private-sector broadband providers, it is first essential to collect prices on nearly identical services, since there is no expectation that prices for different things will be similar. Studies by Cooper (2014) and Talbot, Hessekiel, and Kehl (2018) were criticized for failing to compare prices for similar services.[204] Like these prior studies, a recent study by Chao and Park (2020) ignores the law of one

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203. P. DAVIS AND B. GARCÉS, QUANTITATIVE TECHNIQUES FOR COMPETITION AND ANTITRUST ANALYSIS 170-1 (2010). This idea is normally attributed to George Stigler. G.J. Stigler, *Imperfections in the Capital Market*, 75 J. OF POL. ECON. 287, 287-92 (1967), http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.541.5796&rep=rep1&type=pdf ("The function of a market is to permit the exchange of goods, so an efficient market (clearly a normative concept) permits all exchange which the traders prefer to nonexchange. If we assume away all costs of trading, the efficient market will achieve every desired exchange for homogeneous goods when there is only one price. This condition is clearly necessary: with two (or more) prices, one seller is receiving less than some other buyer is paying, and both would prefer to trade with one another than with whomever they are trading.").

204. Mark Cooper, *Comparing Apples to Apples: How Competitive Provider Services Outpace the Baby Bell Duopoly*, CONSUMER FED'N OF AM. (Nov. 21, 2013), http://www.consumerfed.org/pdfs/comparing-apples-to-apples-11-2013.pdf [https://perma.cc/8L3N-EWHE]; George S. Ford, *A Review of the Berkman Center's Price Survey of Municipal Broadband Markets*, PHX. CTR. POL'Y (Jan. 24, 2018), http://www.phoenix-center.org/perspectives/Perspective18-01Final.pdf [https://perma.cc/NB26-47MH]; George S. Ford, *Do Municipal Networks Offer More Attractive Service Offerings than Private Sector Providers?*, PHX. CTR. POL'Y PERSPECTIVE (Jan. 27, 2014), https://Articles.ssrn.com/sol3/Articles.cfm?abstract_id=2407148 [https://perma.cc/E3FZ-5RS9]; David Talbot et al., *Community-Owned Fiber Networks: Value Leaders in America*, BERKMAN KLEIN CTR. FOR INTERNET & SOC'Y (Jan. 2018), https://cyber.harvard.edu/publications/2018/01/communityfiber [https://perma.cc/PH9W-DFMW].

price by comparing within-market prices.[205] Data errors also plague this recent report. All these reports drew criticism for failing to account for the cross-subsidies inherent in the municipal supply of broadband services.

Like all these mentioned studies, Cooper (2014) ignores the law of one price and conducts within-market price comparisons. That error is fatal, but as detailed in Ford (2014), the analysis is a good example of the failure to compare the prices among like services.[206] In one comparison, Cooper (2014) relates prices between the triple-play service offerings (video, voice, and broadband) of Charter Communications and the municipal provider in Bristol, Virginia (BVU).[207] The municipal provider offered a triple-play service for $54.39 monthly, whereas its private-sector rival offered a triple-play service for $99.97. This near $45 difference is sizeable and incompatible with the law of one price. Upon inspection of the service offerings, however, it is immediately apparent that the services are dissimilar. First, consider the triple-play offer of the municipal provider. For $55, BVU offered the customer a broadband service of 6 Mbps, 27 channels of video (8 in High Definition), and a fully-featured phone service but without unlimited calling. BVU also offered a somewhat limited local calling area. It did not provide long-distance minutes. The customer was charged $0.08 per minute interstate and $0.10 per minute in-state rates for long-distance calls. Charter's offering of service in the city (at the time the review of Cooper's work was written) was $89.97.[208] For this fee, the customer received a 30 Mbps broadband connection (5 times faster than BVU), at least 125 channels of video (60 HD signals), and a fully-featured, unlimited-calling voice service. Plainly, these two services are in no sense comparable.

Cooper (2014) also ignored the fact that in Bristol the corruption-plagued municipal broadband system was cross-subsidizing its broadband service. An audit of that system by the state's Auditor of Public Accounts concluded the system did "not have the resources to continue operating without cross-subsidization."[209] The audit also concluded that the "BVU Authority [had] cross-subsidized services within OptiNet over the years [including] improperly writing off $13.7 million of interfund debt between OptiNet and the Electric Division."[210] This one instance of cross-subsidy from the electric division amounts to over $1,000 per customer. Bristol spent $185

205. Becky Chao & Claire Park, *The Cost of Connectivity 2020*, OPEN TECH. INST. (July 15, 2020), https://www.newamerica.org/oti/reports/cost-connectivity-2020.

206. Ford, *supra* note 204.

207. Cooper, *supra* note 204. A detailed analysis of Cooper (2014) is provided in Ford (2014).

208. This differential may simply be the consequence of price reduction occurring between surveys.

209. Martha S. Mavredes, *Review of Bristol Virginia Utilities Authority*, AUDITOR OF PUB. ACCTS. (Oct. 2016), http://www.apa.virginia.gov/reports/BVUA2016-web.pdf [https://perma.cc/76GG-TFZE].

210. *Id*. at Executive Summary.

million to build the network ($23 million from the federal government) and it was sold in 2016 for $50 million.[211]

Cooper (2014) also offers several statistical tests of differences between private and municipal providers using data from both domestic and international firms.[212] In all, Cooper conducts fifty-two statistical tests. While Cooper concludes the evidence shows lower prices by municipal systems, only nine of these tests indicate that municipal providers charge lower prices than their private counterparts (at the 5% significance level). For twenty-four comparisons, municipal providers charge higher prices. Sixteen of the tests do not render statistically significant results, implying that the prices between the two types of providers are no different. Cooper's conclusions, therefore, were inconsistent with his evidence. The majority of Cooper's (2014) statistical tests indicate either no difference in prices or that municipalities charge higher prices.

Talbot, Hessekiel, and Kehl (2018) compare prices between municipal and private providers collected from a survey in 2015 (three years prior to the study's release) concluding that municipal systems typically charge lower prices—often substantially lower—for broadband services than do the private providers operating in the same market. Like Cooper (2014), the authors erroneously compare within-market prices and do not compare prices for the same services but rather compare "prices for the lowest-cost program."[213] This selection of packages to compare suffers from a serious statistical problem. The authors are selecting the service package based on prices for the purpose of comparing prices. This error is referred to as selection bias, and any comparison subject to that error is presumably biased.

Like Cooper (2014), the authors compare service packages that are not alike. In a number of cases, the services compared have speed differences (measured in Mbps) of 400% (100 Mbps versus 25 Mbps). It is little surprise that prices differ for different things. This empirical strategy of comparing prices of unlike things in a sample collected based on price, is plainly not a good one.

In response to Talbot, Hessekiel, and Kehl (2018), Ford (2018) obtained updated data from several markets for comparison purposes in January 2018.[214] This new survey was limited to markets in which Charter Communications competed with a municipal broadband provider. Charter charges a uniform price across markets whether with or without a municipal

211. James A. Bacon, *Broadband Boondoggles in Southwest Virginia*, BEARINGDRIFT (Nov. 30, 2017), https://bearingdrift.com/2017/11/30/broadband-boondoggles-southwest-virginia [https://perma.cc/MV2Y-SBBZ]; Tiana Bohner, *Bristol, Va. Approves Sale of BVU's Optinet to Sunset Digital*, WCYB NEWS (Mar. 15, 2016), http://www.wcyb.com/news/bristol-va-approves-sale-of-bvus-optinet-to-sunset-digital/14609711 [https://perma.cc/L3CW-3EC9]; Nick Shepherd, *Sunset Digital Clears Hurdle in Bid to Purchase BVU OptiNet*, KINGSPORT TENN. TIMES NEWS (Aug. 3, 2017), http://www.timesnews.net/Business/2017/08/03/Sunset-Digital-clears-hurdle-in-bid-to-purchase-BVU-OptiNet [https://perma.cc/MEC2-VYLM].

212. Cooper, *supra* note 204.

213. Talbot, *supra* note 204, at 3.

214. *Id.*

system, and it was a listed provider in about half the markets surveyed in the *Berkman Report*.[215] The company imposes no cap on usage and imposes no charge on the modem, thus simplifying the construction of a "price." Ford surveyed 14 cities.

For its 100 Mbps residential service (its baseline service at the time), Charter charged $64.99 with a first-year promotion of $44.99. To account for the promotion, Ford (2018) calculated the average price over a three-year window with the promotion applying only in the first year. The average monthly price over three years was $58.32. To maximize the comparability of the services for the municipal systems, Ford (2018) obtained prices for municipal providers for a standalone Internet service closest to a 100 Mbps service level, which many offered.

Table 3. Price Comparisons (Jan 17, 2018)
(Δ = Muni Price - Charter Price)

City	Mbps	Δ: Year 1	Δ: 3 Year
Morristown, TN	100	-5.04	-18.37
Highland, IL	100	19.96	6.63
Pulaski, TN	100	38.56	25.23
Dalton, GA	100	19.96	6.63
Bristol, VA (1)	75	4.96	-8.37
Bristol, VA (2)	150	14.96	1.63
Opelika, AL	100	20.00	6.67
Clarksville, TN	250	-0.04	-13.37
Monticello, MN	100	0.96	-12.37
Bristol, TN	80	24.96	11.63
Reedsburg, WI	100	4.96	-8.37
Crosslake, MN	90	54.96	41.63
Tullahoma, TN	100	14.96	1.63
Jackson, TN	100	80.01	66.68
Churchill, NV	100	5.00	2.79
Average		19.94	6.61
Conf. Interval (95%)		(10.0, 32.1)	(-3.3, 18.7)

For his statistical analysis, Ford defined P_M as the price for the municipal system and P_C as the price for Charter's service. He computed the average monthly difference in prices between the municipal system and Charter, or $\Delta = P_M - P_C$. A negative number indicates that the municipality charges a lower price than Charter. The differences are summarized in Table 3 for both the first-year and three-year averages. Charter's prices were lower than the municipality's prices for thirteen of the fifteen comparisons in the sample during the first year of service. For the two municipalities charging lower prices, the monthly difference was only $5.04 in one case and $0.04 the other. On average, Charter's prices were lower by $19.94 per month. Table 3 shows some very large price differences. In Jackson, Tennessee, for example, a residential 100 Mbps service was priced at $125 per month, well above the prices charged by Charter for the same service level. Large differences were

215. *Id.*

also found in other cities, including Bristol, Pulaski, Opelika (Alabama), and Crosslake (Minnesota). Clarksville, Tennessee's minimum service level of 250 Mbps was well above the 100 Mbps benchmark, but the price was roughly equal to Charter's 100 Mbps service. The difference over the three-year span was smaller ($6.61), but Charter's prices remained well below that of the municipal systems.

The sample size is relatively small, but some statistical analysis is feasible. Assuming the price differences in Table 3 reflect the typical pricing differentials in markets where both a public and a private broadband firm (at least a major private provider) operate, Ford (2018) constructed an empirical distribution of price differences using the bootstrap method (Δ_b).[216] The bootstrap is a relatively low power technique, so the confidence intervals could be relatively wide, which favors a finding of "no difference." For the 1-year comparisons in Table 3, the 95% confidence interval of Δ_b is bounded by $10.0 to $32.1.[217] This confidence interval does not include zero (marked by the vertical lines in the figure), indicating that the municipal systems' prices were systematically higher for customers in the first year where promotional discounts were available from private providers. Over the three-year window, Charter's prices were lower in ten of the fifteen comparisons. The average savings offered by the private provider is $6.61 per month. The empirical distribution of this differences has a 95% confidence interval of -$3.3 to $18.7. Though most of the distribution is positive, the confidence interval includes zero, so it was impossible to reject the hypothesis that private and municipal systems charge equal prices for something very close to a 100 Mbps standalone broadband service over a three-year period that includes promotional discounts.

Ford (2018) also conducted statistical analysis of the prices reported by Talbot, Hessekiel, and Kehl (2018). Given the wide disparities in the service offerings—the authors compared, for instance, the price of a 100 Mbps service to a 25 Mbps service in Chattanooga—Ford (2018) converted the

216. BRADLEY EFRON & R.J. TIBSHIRANI, AN INTRODUCTION TO THE BOOTSTRAP (1994). The bootstrap employs 1,000 replications.

217. The bootstrap employs 1,000 replications.

prices into a price-per-megabit index.[218] Price-per-megabit is not a very informative statistic because it is highly non-linear and can render perverse results.[219] For instance, a price-per-megabit of $1 is not necessarily better for consumers than a price-per-megabit of $2. The price-per-megabit of $1 is based on a gigabit service level having a monthly price of $1,000, more than nearly any consumer could afford. The price of $2 per-megabit might be for a 25 Mbps service for a monthly price of $50. Nearly every consumer would prefer the lower priced service despite its lower speed. Despite these flaws, Ford (2018) used price-per-megabit (*PMB*) out of necessity to make comparisons across the widely disparate service levels listed in the Talbot, Hessekiel, and Kehl study.

There were 61 such prices, with 27 belonging to municipal systems and 34 to private providers. For the municipal sample, the average price-per-megabit was $1.464, and for the private providers it was $1.482, for a difference of 0.018. The t-statistic of the means difference was 0.11 with a probability level of 0.91. The null hypothesis of equal prices could not be rejected at anywhere near standard significance levels. Thus, by this measure

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218. U.S. GOV'T ACCOUNTING OFF., GAO-10-49 CURRENT BROADBAND MEASURES HAVE LIMITATIONS, AND NEW MEASURES ARE PROMISING BUT NEED IMPROVEMENT 3 (2009), https://www.gao.gov/new.items/d1049.pdf [https://perma.cc/VQ7L-VC5H] ("While some stakeholders suggested additional measures, such as price per megabit per second, opinions were mixed on these alternatives, with consumer advocacy groups, academicians, and representatives from think tanks generally in favor of and broadband providers and related trade and industry groups generally against them."); *Further Reply Comments of Consumers Union, Consumer Federation of America, Free Press and Public Knowledge*, WC Docket No. 07-38 (Sept. 2, 2008), at 8, https://ecfsapi.fcc.gov/file/6520064157.pdf [https://perma.cc/D26J-F5GS]; Mark Cooper, *The Central Role of Wireless in the 21st Century Communications Ecology: Adapting Spectrum and Universal Service Policy to the New Reality*, Unpublished Manuscript presented at the 2011 Telecommunications Policy Research Conference (2011), https://ssrn.com/abstract=1979789 [https://perma.cc/2BM3-N6Q5]; Cyrus Farivar, *DC Think Tank Tells Americans that Their Broadband is Really Great,* ARS TECHNICA (Feb. 13, 2013), https://arstechnica.com/information-technology/2013/02/dc-think-tank-says-state-of-us-broadband-is-good-and-getting-better [https://perma.cc/L443-E932]; Chiehyu Li & James Losey, *Price of the Pipe*, NEW AM. (Apr. 15, 2010), https://www.newamerica.org/oti/policy-Articles/price-of-the-pipe [https://perma.cc/75HQ-6PEK]; R.D. Atkinson, *The Role of Competition in a National Broadband Policy*, 7 J. ON TELECOMMS. & HIGH TECH. L. 1, 1-18 (2009), http://www.jthtl.org/content/articles/V7I1/JTHTLv7i1.pdf [https://perma.cc/9YFH-89XG]; Robert D. Atkinson et al., *Explaining International Broadband Leadership*, INFO. TECH. & INNOVATION FOUND. (Feb. 2013), https://www.itif.org/files/ExplainingBBLeadership.pdf [https://perma.cc/WTK7-W527]. Others reject it. *See*, *e.g.*, Richard Bennett et al., *The Whole Picture: Where America's Broadband Networks Really Stand*, INFO. TECH. & INNOVATION FOUND. 14 (Feb. 2013), https://www.unh.edu/broadband/sites/www.unh.edu.broadband/files/media/kb-reports/2013-whole-picture-america-broadband-networks.pdf [https://perma.cc/B7QS-YHAC]; *Next Generation Connectivity: A Review of Broadband Internet Transitions and Policy from Around the World*, BERKMAN CTR. FOR INTERNET & SOC'Y (Feb. 2010), http://cyber.harvard.edu/sites/cyber.harvard.edu/files/Berkman_Center_Broadband_Final_Report_15Feb2010.pdf [https://perma.cc/7BM2-NSKX].

219. George S. Ford, *The Misuse of International Broadband Rankings Continues*, @LAWANDECONOMICS BLOG (Feb. 19, 2013), http://www.phoenix-center.org/blog/archives/1156 [https://perma.cc/H9PH-4N9V].

of price, the prices of the two sorts of providers are the same. Testing for a difference of medians rather than means using the non-parametric Wilcoxon rank-sum test, Ford (2018) reported a z-statistic is -0.20 with a probability of 0.83.[220] The non-parametric Hodges-Lehmann test rendered a Δ of -0.069 with a confidence interval bounded by -0.31 and 0.33.[221] Based on both tests, it was impossible to reject the null hypothesis that the medians are the same.

Ford's (2018) analysis of the Cooper (2014) and Talbot, Hessekiel, and Kehl (2018) studies performed within-market price comparisons. As would be expected by the law of one price, the prices were approximately the same. Data from a recent study by Chao and Park (2020), however, permitted a between-market comparison of prices because the study surveyed market with and without municipal broadband systems. While Chao and Park (2020) ignored the law of one price by comparing within-market prices, Ford (2020) used the data from this study to conduct the proper comparison.[222]

Chao and Park (2020) surveyed data on the prices of municipal and private providers in fourteen cities. This data included multiple prices for most providers and included modem fees and promotional pricing. About 10% of the sample prices were by municipal providers; municipal providers operated in five of the fourteen cities. Ford (2020) used this data to conduct *within*- and *between*-market price comparisons by regression analysis. Due to incorrect data, Ford (2020) eliminated one municipal city from the sample.

For the within-market comparison (which is senseless by the law of one price), Ford (2020) analyzed 165 prices across 13 cities and 26 providers for service with at least 100 Mbps download speeds. Mean prices for municipal systems was found to be $74.13 and for private providers to be $74.79, a small difference of $0.66. Statistical tests indicated that the average prices were statistically equal (the t-statistic on the means differences was only 0.16). For broadband services with download speeds of at least 25 Mbps, the price difference was even smaller, with municipal systems charging about $0.26 more. Again, statistical testing indicated that the mean prices were statistically equal. The law of one price holds.

Comparing prices across markets with and without government-run networks, which is the proper comparison, the average broadband prices in cities with municipal systems were found to be higher than those in cities without government-run networks. The average price in cities without municipal networks was $70.85, lower than the $87.80 average in cities with government-run networks (a 24% difference). The price difference was statistically different from zero at the 5% level. Accounting for differences among cities in median income, population age, and average housing rents, the difference was slightly smaller—about 12%—but still statistically

220. H. B. Mann & D. R. Whitney, *On a Test Whether One of Two Random Variables is Stochastically Larger than the Other*, 18 ANNALS OF MATHEMATICAL STAT. 50, 50-60 (1947).

221. Roger Newson, *Parameters Behind "Nonparametric" Statistics: Kendall's Tau, Somers' D and Median Differences*, 2 STATA J. 45 (2002).

222. George S. Ford, *The Open Technology Institute's Cost of Connectivity 2020 Report: A Critical Review,* PHOENIX CTR. POL'Y PERSP. No. 20-06 (July 20, 2020), https://www.phoenix-center.org/perspectives/Perspective20-06Final.pdf.

different than zero. The Chao and Park (2020) data reveal that prices in cities with municipal networks are higher.

In all, the statistical evidence comparing prices for like services between municipal and private providers within the same market mostly indicates that private providers charge equal prices on average. This result is expected by the law of one price. Comparing prices across markets with and without a government-run networks, however, reveals that prices are higher in markets with government-run networks. There is no reliable evidence, either for within- or between-market comparisons, that government-run networks lower prices.

IX. OUTSTANDING LEGAL ISSUES: PREEMPTION, PREDATION, AND DUE PROCESS

Our interest in municipal broadband is not limited to the economics. There are several significant legal issues that come into play when the government provides services in competition with private firms.

To wit, state laws overseeing municipal broadband include (almost exclusively) provisions that restrain the subsidization and cross-subsidization of municipal systems. One critic of such laws sums up the municipal broadband issue, and oddly enough the economic analysis above, quite well, stating:

> While [these subsidy] restraints serve a critical function in preserving private ISPs' ability to compete effectively, they also impede public network construction by making the public network less financially viable. Assuming private ISPs refuse to enter the market because they do not believe they can provide service at a profit, or even at a break-even point, no municipality would be able to enter an unserved market given these restraints. The entire reason for municipal networks in unserved markets is to overcome the private sector's unwillingness to enter the market.[223]

While this quote is from an article *advocating* for municipal broadband, it lays out, perhaps inadvertently, the dangers of municipal entry and the reason state laws exist.[224]

As noted above, municipal broadband is unquestionably subsidized entry, a finding that flows directly from the "no one else will" argument made

223. Jeff Stricker, *Casting a Wider "Net": How and Why State Laws Restricting Municipal Broadband Networks Must be Modified*, 81 GEO. WASH. L. REV. 589, 615 (2013).

224. The FCC's *2015 Preemption Order*, *supra* note 6, at ¶¶ 62, 107, 112, made the same type of argument, describing the North Carolina law's restrains on subsidization as a deterrent to entry ("even if we focus on taxpayer protection, as some request, the evidence before us suggests that the Tennessee and North Carolina laws before us actually increase the likelihood of failure because of the barriers that they erect to the successful deployment of broadband infrastructure by these entities").

in this quote and by advocates of municipal entry. Without subsidies, municipal entry is highly improbable, for the same reasons private entry does not occur. Municipal entry cannot "promote competition." If anything, the count of providers will remain unchanged or fall. Moreover, when the government subsidizes the entry of its own firm into a market and drives down price, there is a reasonable case that the entry is predatory and thus anticompetitive. Finally, it is always the case that a municipality operating a broadband network is simultaneously a regulator of the private sector providers with which it competes. Naturally, important legal questions surrounding preemption, antitrust, and due process arise.

A. Preemption of State Laws Governing Municipal Entry

Considering both the potential predatory nature of municipal entry plus the very real possibility that taxpayers (and captive ratepayers) could be left holding the bag for uneconomic ventures, it is little surprise that some states have passed laws to oversee municipal entry. Municipal broadband is not a means to "promote competition;" it is a means to displace or *eliminate it*. Moreover, it is not unreasonable to question how the private sector can compete with government-owned firms receiving thousands of dollars in subsidies for each of their customers. Unlike the claims of municipal broadband proponents, these laws do not simply reflect the lobbying prowess of the broadband companies;[225] instead, these laws reflect a reasoned assessment by state legislatures of the nature and risks of municipal entry. Perhaps some provisions of these laws are poorly crafted, but state control of municipal entry has sound economic support. State control over its political subdivisions is certainly no more radical and has far better support than does the government subsidizing itself to enter a business to *compete* with the private sector.[226] Still, having lost in state legislatures, opponents of municipal broadband laws have turned to the FCC for relief, hoping that the agency can use its authority under the Communications Act to preempt such laws. In the next section, we review the relevant precedent.

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225. *See, e.g.*, T. O'Boyle & C. Mitchell, *The Empire Lobbies Back: How Big Cable Killed Competition in North Carolina*, INST. FOR LOCAL SELF RELIANCE (Jan. 2013), http://ilsr.org/wp-content/uploads/2013/01/nc-killing-competition.pdf [https://perma.cc/F7EY-F92V]; *2015 Preemption Order*, *supra* note 6, at ¶ 38, and attached Statement of FCC Chairman Tom Wheeler ("In Tennessee and North Carolina, and in 17 other states, community broadband efforts have been blocked or severely curtailed by restrictive state laws—laws often passed due to heavy lobbying support by incumbent broadband providers"). Intense lobbying says nothing about the wisdom of a particular piece of legislation. *See also* Donna Leinwand & Emily Bazar, *Walsh's Murder Had Impact Across State,* USA TODAY (Dec. 17, 2008), http://usatoday30.usatoday.com/news/nation/2008-12-17-walshinside_N.htm [https://perma.cc/PR5N-T4R6] ("Influenced by the Walsh case and intense lobbying by the child's parents, Congress passes the Missing Children Act").

226. *Cf.* Nixon v. Missouri Mun. League, 541 U.S. 125 (2004).

1. *Nixon v. Missouri Municipal League*

One of the boldest provisions in the Telecommunications Act of 1996 was Section 253, which provided the FCC with the then-new and narrow authority to preempt state laws and regulations. Under Section 253(a), "No State or local statute or regulation, or other State or local legal requirement, may prohibit or have the effect of prohibiting the ability *of any entity* to provide any interstate or intrastate telecommunications service."[227] If the FCC determines that a "State or local government has permitted or imposed any statute, regulation, or legal requirement that violates subsection (a)" then the "[FCC] shall preempt ... to the extent necessary…."[228] Using this authority, the FCC has a successful track record of preempting state laws and regulations which that deter entry for private-sector network deployment.[229]

Seizing upon the language of Section 253(a), in 2001 proponents of municipal broadband argued that because municipal providers are an "entity," the FCC should preempt those state laws which either prohibit or restrict municipal broadband deployment.[230] While there was tremendous political pressure placed upon the Agency to preempt state legislatures at the time, a Democratic-controlled FCC unanimously (albeit "reluctantly") ruled that the agency lacked any legal authority to preempt such laws.[231]

Undeterred, proponents of municipal broadband appealed the FCC's rejection all the way to the United States Supreme Court in the case of *Nixon v. Missouri Municipal League*.[232] The Court, however, agreed with the FCC, finding that Section 253 does not provide the agency with preemption authority in this instance.[233] According to the Court, the phrase "any entity" in Section 253 did not include "the State's own subdivisions, so as to affect the power of States and localities to restrict their own (or their political inferiors') delivery of [telecommunications] services."[234]

Indeed, the Court's rationale for rejection was straightforward: "[F]ederal legislation threatening to trench on the States' arrangements for

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227. 47 U.S.C. § 253(a) (emphasis added).

228. 47 U.S.C. § 253(d).

229. *See, e.g*., Public Utility Commission of Texas*, Memorandum Opinion and Order*, 13 FCC Rcd 3460, (2007).

230. Missouri Municipal League*, Memorandum Opinion and Order* 16 FCC Rcd 1157 (2001).

231. *Id.* Concurring Statement of William E. Kennard ("We vote reluctantly to deny the preemption petition of the Missouri Municipals because we believe that HB 620 effectively eliminates municipally-owned utilities as a promising class of local telecommunications competitors in Missouri. Such a result, while legally required, is not the right result for consumers in Missouri. Unfortunately, the Commission is constrained in its authority to preempt HB 620 by the D.C. Circuit's *City of Abilene* decision and the U.S. Supreme Court's decision in *Gregory v. Ashcroft* that require Congress to state clearly in a federal statute that the statute is intended to address the sovereign power of a state to regulate the activities of its municipalities.").

232. *Nixon*, 541 U.S. 125.

233. *See id.* at 131-32.

234. *Id*. at 128-29.

conducting their own governments should be treated with great skepticism, and read in a way that preserves a State's chosen disposition of its own power…"[235] Thus, reasoned the Court, permitting preemption in this circumstance "[W]ould come only by interposing federal authority between a State and its municipal subdivisions, which our precedents teach, 'are created as convenient agencies for exercising such of the governmental powers of the State as may be entrusted to them in its absolute discretion.'"[236]

Significantly, the Court went out of its way to note that "it is well to put aside" the public policy arguments favoring municipal broadband to support any "generous conception of preemption." Why? Because the issue of preemption is one of Constitutional law and, as such, "*the issue here does not turn on the merits of municipal telecommunications services.*"[237] This holding is critical and helpful in sniffing out weak arguments for preemption. In essence, the Court determined that it matters not how sweet municipal broadband can be made to sound, nor how bountiful its alleged benefits—as a matter of Constitutional law, the federal government—and by extension the FCC—has no legal authority to intervene into the relationship between states and their political subdivisions.

2. The FCC's *2015 Preemption Order*

Despite this defeat in *Nixon*, proponents of municipal broadband spent the next decade trying to find an alternative legal theory of preemption of state laws controlling how municipalities offer such services. With the D.C. Circuit's 2014 ruling in *Verizon v. FCC*,[238] many believed they had perhaps finally found one—namely, Section 706 of the Communications Act.[239] As shown below, the use of Section 706 could not pass Constitutional muster.

i. *Background*

Under Section 706(a), the FCC may use, "[I]n a manner consistent with the public interest, convenience and necessity, … regulatory forbearance, measures that promote competition in the local telecommunications market, or other regulating methods that remove barriers to infrastructure investment."[240] Section 706(b), in turn, states that if the FCC determines that advanced telecommunications capability is not "being deployed to all Americans in a reasonable and timely fashion," then the FCC "shall take immediate action to accelerate deployment of such capability by removing

235. *Id.* at 141.
236. *Id.*
237. *Id.* at 131-32 (emphasis added).
238. Verizon v. FCC, 740 F.3d 623 (D.C. Cir. 2014).
239. 47 U.S.C. § 1302; George S. Ford & Lawrence J. Spiwak, *Justifying the Ends: Section 706 and the Regulation of Broadband*, *supra* note 81.
240. 47 U.S.C. § 1302(a).

barriers to infrastructure investment and by promoting competition in the telecommunications market."[241]

Whether Section 706 provides the FCC with an affirmative grant of authority has been hotly debated over the last several years. While the FCC had originally viewed Section 706 as hortatory, searching for a sustainable legal theory under which to justify its *2010 Open Internet Rules,* the FCC reversed course and held that Section 706 did provide an affirmative source of regulatory authority.[242] Viewing Section 706 in the context of the broader Communications Act, the D.C. Circuit ultimately held in *Verizon* that the FCC's interpretation of Section 706 as a grant of regulatory authority was "a reasonable interpretation of an ambiguous statute."[243]

While a proper reading of the caselaw would have revealed that the FCC's new-found authority under Section 706 should be limited,[244] the exact opposite occurred: Section 706 became an overbroad tool that the agency believed conferred upon it almost unlimited power.[245] Accordingly, seizing upon this statutory language of Section 706, then-FCC Chairman Tom Wheeler, a vocal proponent of municipal broadband,[246] boldly stated after the *Verizon* decision came down that "I believe the FCC has the power—and I intend to exercise that power—to preempt state laws that ban competition from community broadband."[247]

Taking up Chairman Wheeler's invitation, the municipal provider in Chattanooga, Tennessee, filed a petition with the FCC asking the agency to use its authority under Section 706 to preempt a Tennessee state law which, the municipal entity claims, prevents it from expanding beyond its existing

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241. 47 U.S.C. § 1302(b).

242. *See* Preserving the Open Internet, *Report and Order*, 25 FCC Rcd. 17905 (2010) at para. 117 et seq., https://apps.fcc.gov/edocs_public/attachmatch/FCC-10-201A1.pdf, *rev'd, Verizon v. FCC*, 740 F.3d 623 (D.C. Cir. 2014).

243. 740 F.3d at 637. There was some debate whether Section 706(a) is independent from Section 706(b), which states that if the Commission determines that advanced telecommunications capability is not "being deployed to all Americans in a reasonable and timely fashion", the FCC "shall take immediate action to accelerate deployment of such capability by removing barriers to infrastructure investment and by promoting competition in the telecommunications market." While the agency once believed that Section 706(b) was required to trigger Section 706(a), the FCC ultimately read the D.C. Circuit's opinion in *Verizon* to mean that Sections 706(a) and 706(b) are independent grants of authority. For a full discussion, *see* Lawrence J. Spiwak, *What Are the Bounds of the FCC's Authority over Broadband Service Providers?—A Review of the Recent Caselaw,* 18 JO. OF INTERNET L. 1 (2015).

244. *Id.*

245. *See* Lawrence J. Spiwak, *USTelecom and its Aftermath,* 71 FED. COMMS. L. J. 39 (2019).

246. Tom Wheeler, *Removing Barriers to Competitive Community Broadband,* FED. COM. COMISSION BLOG (June 10, 2014), http://www.fcc.gov/blog/removing-barriers-competitive-community-broadband [https://perma.cc/8YKE-R8SU].

247. Tom Wheeler, Chairman, Fed. Comm'ns Comm'n, Remarks before the National Cable & Telecommunications Association (Apr. 30, 2014), http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0430/DOC-326852A1.pdf [https://perma.cc/WU7Q-7K6C].

franchise territory.[248] In addition, the City of Wilson, North Carolina, filed a similar petition for the FCC to preempt "level playing-field" requirements designed to prevent government-owned networks from "crowding out" private sector investment[249] (a risk, by the way, which the FCC specifically recognized in its *2010 National Broadband Plan*).[250] The White House, sensing political gold with its base, jumped on the bandwagon and sent a subtle signal of support for the Chattanooga and North Carolina petitions by having President Obama call for policies that promote broadband connectivity in his 2014 State of the Union speech.[251] Given such Presidential political cover, the FCC, although an independent agency, followed through on President Obama's promise and granted both petitions under Section 706 of the Communications Act.[252]

ii. *The FCC's Legal Argument*

Recognizing that they were bound by the Supreme Court's holding in *Nixon*, the FCC did not seek to preempt the Tennessee and North Carolina laws outright. Instead, the FCC came up with a rather innovative legal argument: According to the FCC, once a state has made the decision to permit municipal broadband generally, then the FCC has the authority under Section 706 to preempt any state laws which impose restrictions on the ability of these municipalities to deploy broadband infrastructure—in the case of Tennessee, territorial restrictions, and in the case of North Carolina, "level playing" field restrictions to ensure that municipal broadband providers did not crowd out private investment. The argument was that such state laws were a "barrier to

248. *EPB Petitions FCC to Enable Local Broadband Choice*, EPB (July 24, 2014), https://www.epb.net/downloads/legal/EPB-FCCPetition.pdf [https://perma.cc/4DV6-QDQJ]. With a speed generally unheard of for the Commission, four days later the agency established its pleading cycle. *See* Public Notice: Pleading Cycle Established for Comments on Electric Power Board and City of Wilson Petitions, Pursuant to Section 706 of the Telecommunications Act of 1996, Seeking Preemption of State Laws Restricting the Deployment of Certain Broadband Networks, *Public Notice*, 29 FCC Rcd. 9239 (2014), http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0728/DA-14-1072A1.pdf [https://perma.cc/5K78-T2JR].

249. Petition of the City of Wilson, North Carolina, Pursuant to Section 706 of the Telecommunications Act of 1996, for Removal of Barriers to Broadband Investment and Competition, WC Docket No. 14-115 (filed July 24, 2014), http://apps.fcc.gov/ecfs/document/view?id=7521737310 [https://perma.cc/PV5S-9Q8W].

250. *National Broadband Plan*, *supra* note 2, at 153 ("Municipal broadband has risks. Municipally financed service may discourage investment by private companies. Before embarking on any type of broadband buildout, whether wired or wireless, towns and cities should try to attract private sector broadband investment.").

251. Barack Obama, President, United States, State of the Union Address (Jan. 28, 2014).

252. *2015 Preemption Order, supra* note 6.

infrastructure investment" generally rather than an outright prohibition (the latter being the focus of the *Nixon* case).[253]

At the root of the FCC's argument was the following logic: (1) broadband Internet access is inherently an interstate service and thus subject exclusively to FCC jurisdiction; (2) Congress charged the FCC to promote the deployment of broadband "to all Americans" under Section 706; (3) under the Supremacy Clause of the Constitution federal laws trumps state laws[254]; and, therefore, (4) the FCC may use Section 706 to preempt state laws which restrict the deployment of municipal broadband overall. As the FCC explained, because in its view the state laws at issue were *not* enacted to protect taxpayers[255] but instead enacted "under pressure from national cable companies, telephone companies, and the American Legislative Exchange Council (ALEC)",[256] the "states here are deciding that incumbent broadband providers require protection from what they regard as unfair competition and regulating to restrict that competition."[257] Thus, according to the FCC, such laws "step[] into the federal role in regulating interstate communications. Where those laws conflict with federal communications policy and regulation, they may be preempted."[258]

iii. *Legal Problems with the FCC's 2015 Preemption Order*

While clever, the agency's legal argument was perhaps too clever by half. Indeed, despite its protestations to the contrary, the FCC still had multiple *Nixon* problems.

For example, while the FCC conceded that it lacked the authority to preempt state laws that prohibit municipal broadband outright, the FCC argued that it has the authority to preempt the state laws in question because "a state has permitted a political subdivision to enter the market as a

253. *See, e.g.*, *id.* at ¶ 147. ("To be sure, as explained below, a different question would be presented if we were asked to preempt under section 706 a law that goes to a state's power to withhold altogether the authority to provide broadband. But where a state has authorized municipalities to provide broadband, and then chooses to impose regulations on that municipal provider in order to effectuate the state's preferred communications policy objectives, we find that such laws fall within our authority to preempt.").

254. *See, e.g.*, City of New York v. FCC, 486 U.S. 57 (1988); Capital Cities Cable, Inc. v. Crisp, 467 U.S. 691 (1984).

255. Indeed, the Commission was quick to dismiss any argument that such laws were designed to protect taxpayers from the well-documented record of municipal broadband failures. Instead, employing a rather remarkable bit of circular logic, the Commission turned the taxpayer protection argument on its head, arguing that "even if we focus on taxpayer protection, as some request, the evidence before us suggests that the Tennessee and North Carolina laws before us actually increase the likelihood of failure because of the barriers that they erect to the successful deployment of broadband infrastructure by these entities." *2015 Preemption Order, supra* note 6, at ¶ 62.

256. *Id.* at ¶ 37.

257. *Id.* at ¶ 147.

258. *Id.*

broadband provider, but also seeks to impose regulations on the municipal provider in order to effect separate communications policy goals."[259] In this case, argued the FCC, "[T]he state has crossed from a 'decision of the most fundamental sort for a sovereign entity' into a matter in which conflicting federal law is presumed to preempt under the Commerce Clause."[260] However, while the FCC was correct that federal law generally trumps inconsistent state law when it comes to communications policy, the focus of the FCC's preemption efforts here—i.e., territorial restrictions and "level playing field" rules—go directly to a state's control of its political subdivisions and, by extension, how it governs its citizens.

Moreover, the Court in *Nixon* appeared to reject specifically the FCC's argument that it was not preempting state laws that prohibit municipal broadband outright but only those laws which deter deployment after authority was provided. To illustrate the point, the Court offered the following hypothetical:

> [C]onsider the result if a State that previously authorized municipalities to operate a number of utilities including telecommunications changed its law by narrowing the range of authorization. Assume that a State once authorized municipalities to furnish water, electric, and communications services, but sometime after the passage of §253 narrowed the authorization so as to leave municipalities authorized to enter only the water business."[261]

In this circumstance, the Court noted that the:

> [R]epealing statute would have a prohibitory effect on the prior ability to deliver telecommunications service and would be subject to preemption. But that would mean that a State that once chose to provide broad municipal authority could not reverse course. A State next door, however, starting with a legal system devoid of any authorization for municipal utility operation, would at the least be free to change its own course by authorizing its municipalities to venture forth. *The result, in other words, would be the federal creation of a one-way ratchet. A State or municipality could give the power, but it could not take it away later.*[262]

In the Court's view, such as result made little legal sense and would interfere with the relationship between states and their political subdivisions:

259. *Id.* at ¶ 156.
260. *Id.* (citations omitted).
261. *Nixon*, 541 U.S. at 136.
262. *Id.* at 136-37 (emphasis added).

> Private counterparts could come and go from the market at will, for after any federal preemption they would have a free choice to compete or not to compete in telecommunications; governmental providers could never leave (or, at least, could not leave by a forthright choice to change policy), for the law expressing the government's decision to get out would be preempted.[263]

Nixon also comes up in the agency's overall interpretation of Section 706. At bottom, it is important to recognize the simple fact that nowhere in Section 706 does any derivation of the word "preemption" appear—only the word "forbearance"—and there is a big legal difference between the two concepts.[264] To wit, Black's Law Dictionary defines the concept of forbearance simply as "refraining from action." In contrast, Black's defines preemption as the "doctrine adopted by the U.S. Supreme Court holding that certain matters are of such a national, as opposed to local character that federal laws preempt or take precedence over state laws." Given the Constitutional implications of preemption, therefore, there is a much higher legal standard to meet if an agency of the federal government would like to preempt a state law. Indeed, as the Supreme Court observed in *Wyeth v. Levine,* there are:

> [T]wo cornerstones of our pre-emption jurisprudence. First, "the purpose of Congress is the ultimate touchstone in every pre-emption case." Second, "[i]n all pre-emption cases, and particularly in those in which Congress has 'legislated ... in a field which the States have traditionally occupied,' ... we 'start with the assumption that the historic police powers of the States were not to be superseded by the Federal Act unless that was the clear and manifest purpose of Congress.'"[265]

So, given that Congress deliberately chose to exclude the term "preemption" from Section 706(a), it is difficult to see how the FCC's use of Section 706 to preempt state laws would reflect a "clear and manifest purpose of Congress."

In its *Order*, the FCC side-stepped this point by arguing that "Congress need not 'explicitly delegate' the authority to preempt"[266] because "Congress delegated the authority [to the FCC] to act in this sphere."[267] According to the FCC,

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263. *Id.* at 137.

264. 47 U.S.C. § 1302.

265. Wyeth v. Levine, 555 U.S. 555, 565 (2009) (citations omitted); *see also* Gregory v. Ashcroft, 501 U.S. 452, 460 (1991) ("[I]f Congress intends to alter the 'usual constitutional balance between the States and the Federal Government," it must make its intention to do so 'unmistakably clear in the language of the statute.'") (citations omitted).

266. *2015 Preemption Order, supra* note 6, at ¶ 145.

267. *Id.* at ¶ 142.

> Our preemption authority falls within the "measures to promote competition in the local telecommunications market" and "other regulating methods" of section 706(a) that Congress directed the [FCC] to use to remove barriers to infrastructure investment. It likewise falls within the available "action[s] to accelerate deployment" we may take in order to "remove barriers to infrastructure investment" and to "promote competition" described in section 706(b). As Congress would have been aware in passing the 1996 Act, the [FCC] has in the past used preemption as a regulatory tool where state regulation conflicts with federal communications policy. Given this history against which Congress legislated, the best reading of section 706 is therefore that Congress understood preemption to be among the regulatory tools that the [FCC] might use to act under section 706.[268]

The FCC's logic was a bit of a stretch for two fundamental reasons.

First, the FCC's logic rested upon the notion that Section 706 provides an independent source of preemption authority. A simple reading of the caselaw reveals that it did not. According to the clear language of the D.C. Circuit's holding in *Verizon,* "[A]ny regulatory action authorized by Section 706(a) [must] fall within the [FCC]'s subject matter jurisdiction over such communications—*a limitation whose importance this court has recognized in delineating the reach of the [FCC]'s ancillary jurisdiction.*"[269] According to the D.C. Circuit's holding in *Comcast v. FCC*, this means that *any use of Section 706 must be tied directly to a specific delegation of authority in "Title II, Title III, or Title VI…*"[270] So what does this language mean in practice? It means if the FCC wants to preempt under its Section 706 mandate, then it needs to look exclusively at Section 253. Section 706 does not provide an independent source of authority.

This reading of Section 706 is nothing new to the courts. In fact, the D.C. Circuit's ruling in *Ad Hoc Telecommunications Users Committee v. FCC*—a case the FCC cited with approval several times in its *2015 Preemption Order*—is directly on point.[271] In *Ad Hoc,* the court was asked to rule on the FCC's decision to use its Section 10 authority to forbear from dominant carrier price regulation for special access services. To support its decision to forbear, the FCC also argued that its actions would further Section 706's goals of promoting broadband deployment. After review, the court held that the "general and generous phrasing of § 706 means that the FCC

268. *Id.* at ¶ 144.

269. *Verizon*, 740 F.3d at 639-40 (emphasis added). It is interesting to note that when the Commission cited this exact passage from *Verizon* in its *Order,* the agency specifically omitted the italicized language above. *See 2015 Preemption Order, supra* note 6, at ¶ 138.

270. Comcast v. FCC*,* 600 F.3d 642, 654 (D.C. Cir. 2010) (emphasis added).

271. Ad Hoc Telecoms. Users Comm. v. FCC, 572 F. 3d 903, 907 (D.C. Cir. 2009).

possesses significant, albeit not unfettered, authority and discretion to settle on the best regulatory or deregulatory approach to broadband—a statutory realty that assumes great importance when parties impose courts to overrule FCC decision on this topic."[272] However, the court made it crystal clear that the FCC's forbearance authority did not lie in Section 706 itself, but exclusively in Section 10. As the court stated bluntly, "*As contemplated by § 706 . . . [f]orbearance decisions are governed by the Communications Act's § 10*...."[273]

Given the court's ruling in *Ad Hoc*, the FCC's argument that Section 706 provides the agency with independent preemption authority falls apart. Section 706's *explicit* forbearance authority is governed by Section 10, which means that Section 706's *implicit* preemption authority (to the extent it exists) is governed by Section 253. And, if Section 706's preemption authority is, in fact, grounded in Section 253, then *Nixon* is directly on point and the FCC's actions were unconstitutional.

The FCC's argument that it need not have an express indication of Congressional intent to preempt using Section 706 was also belied by the plain language of *Nixon*. As the Court observed, while the FCC has ample authority to preempt state laws and regulations that create barriers to entry for *private* entities, the Court in *Nixon* specifically found that "neither statutory structure nor legislative history [of Telecommunications Act of 1996] points unequivocally to a commitment by Congress to treat governmental telecommunications providers on par with private firms."[274] Thus, reasoned the Court, the "want of any 'unmistakably clear' statement to that effect is fatal" to any argument that Congress intended the FCC to have any authority to preempt state laws which restrict municipal broadband.[275]

3. Sixth Circuit Review

As to be expected, the FCC's *2015 Preemption Order* was appealed to the Sixth Circuit in *Tennessee v. Federal Communications Commission* and it did not go well for the Agency.[276] As the Sixth Circuit observed, the FCC's *2015 Preemption Order* "essentially serves to re-allocate decision-making power between the states and their municipalities."[277] To do so, the court held that this "preemption by the FCC of the allocation of power between a state and its subdivisions requires at least a clear statement in the authorizing federal legislation."[278] As Section 706 lacked such a clear statement, the Sixth Circuit reversed.

According to the Sixth Circuit,

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272. *Id.* at 906-07.
273. *Id.* at 907.
274. *Nixon,* 541 U.S. at 141.
275. *Id.*
276 Tennessee v. FCC, 832 F.3d 597 (6th Cir. 2016).
277. *Id.* at 600.
278. *Id.*

> What the FCC seeks to accomplish through preemption is to decide *who*—the state or its political subdivisions—gets to make these choices. The FCC wants to pick the decision-maker for the discretionary issues of expansion, rate setting, and timeliness of rollout of services. It wants to provide the EPB and the City of Wilson with these options notwithstanding Tennessee's and North Carolina's statutes that have already made these choices.[279]

However, recognized the court, "[a]ny attempt by the federal government to reorder the decision-making structure of a state and its municipalities trenches on the core sovereignty of that state."[280] In the absence of a clear statement in Section 706 that Congress wanted to disrupt that relationship, therefore, the court ruled that the FCC had no authority to preempt the two state laws.[281]

The court also did not bite on the FCC's other two related arguments that (a) its ruling applied to circumstances where a state has already permitted a political subdivision to enter the market as a broadband provider and, ergo, (b) the FCC's authority trumps a state's authority due to the Commerce Clause. First, similar to the Supreme Court's reasoning in *Nixon*, the court recognized that the Agency's argument could produce an "anomalous" result due to the fact that a state could "flatly prohibit municipalities from engaging in telecommunications altogether, but they cannot do it in limited steps or with conditions based on the governmental nature of the municipalities."[282] In the court's view, such an outcome would be highly "intrusive on state-municipal relations…."[283] The court then tersely disposed of the FCC's Supremacy Clause argument: "[T]he statutes at issue here implicate core attributes of state sovereignty *and* regulate interstate communications services…. These effects are not mutually exclusive."[284]

Finally, the court went out of its way to note that its holding in *Tennessee* was limited. First, like the Supreme Court in *Nixon*, the court made clear that it did not question the purported public benefits that the FCC identified in permitting municipalities to expand Gigabit Internet coverage.[285] The court also made clear that it would not address the following legal issues debated by the parties, including (1) whether Section 706 provides the FCC any preemptive power at all; (2) whether Congress, if it is clear enough, could give the FCC the power to preempt as it did in this case; (3) whether, if the FCC had such power, its exercise of it was arbitrary or capricious in this case; and (4) whether and to what extent the clear statement rule would apply to

279. *Id.* at 610.
280. *Id.* at 611.
281. *Id.* at 613.
282. *Id.* at 611.
283. *Id.*
284. *Id.* at 611-12 (emphasis in original).
285. *Id.* at 613.

FCC preemption if a State required its municipality to act contrary to otherwise valid FCC regulations.[286]

4. Postscript: *Mozilla v. FCC*

In October 2019, the D.C. Circuit released its much-anticipated ruling in *Mozilla v. FCC*[287] which upheld, in large part, the FCC's *2018 Restoring Internet Freedom Order*.[288] Among a multitude of disputes at bar, one major issue on appeal was the Agency's decision to view once again Section 706—the primary legal authority relied upon by the previous FCC in the *2015 Preemption Order*—as hortatory rather than as an affirmative source of authority. Consistent with its 2014 ruling in *Verizon v. FCC*,[289] the court found that because the language of Section 706 was ambiguous, the FCC's interpretation to view Section 706 once again as hortatory was reasonable under step two of *Chevron*.[290]

But as one FCC can do, a subsequent FCC can un-do, let's assume *arguendo* that the first action a Democratic-controlled FCC takes upon regaining office is to re-instate Section 706 as an independent grant of authority.[291] Would it matter to the preceding preemption analysis? Probably not.

Both *Nixon* (which involved Section 253) and *Tennessee* (which involved Section 706) make clear that state preemption of municipal broadband laws is not an issue of agency interpretation under *Chevron* but a matter of Constitutional principle. (Indeed, even if we assume *Chevron* applies, we would not be able to move past step one because neither Section 253 nor Section 706 contains a clear statement by Congress.[292]) As the Supreme Court noted, absent a clear statement, "that is the end of the matter."[293] But the promise of future federal legislation that delineates a "clear statement" should not give hope to municipal broadband advocates. Although

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286. *Id.* at 613-14.

287. Mozilla Corp. v. FCC*,* 940 F.3d 1 (D.C. Cir. 2019), *reh'g en banc denied* 2020 U.S. App. LEXIS 3726 (D.C. Cir., Feb. 6, 2020). Interestingly, the D.C. Circuit's ruling in *Mozilla* also involved significant questions about whether the FCC can preempt state laws that seek to regulate the Internet. *See generally*, Lawrence J. Spiwak, *The Preemption Predicament Over Broadband Internet Access Services,* 21 FEDERALIST SOC'Y REV. 32 (2020), https://fedsoc.org/commentary/publications/the-preemption-predicament-over-broadband-internet-access-services [https://perma.cc/A64K-LVVB].

288. Restoring Internet Freedom, *Declaratory Ruling, Report And Order, And Order*, 33 FCC Rcd. 311 (2018).

289. Verizon v. FCC*,* 740 F.3d 623 (D.C. Cir. 2014).

290. *Mozilla*, 940 F.3d at 46 (citing *Chevron USA v. Nat. Res. Def. Council*, 467 U.S. 837, 842-43 (1984)).

291. For a full exploration of the bounds, and ultimate abuse, of this authority, *see* Lawrence J. Spiwak, *What Are the Bounds of the FCC's Authority over Broadband Service Providers?, supra* n. 243; Lawrence J. Spiwak, *USTelecom and its Aftermath, supra* note 245.

292. *See, e.g.*, *Tennessee,* 832 F.3d at 612 ("[the] intent of Congress is clear in this case: § 706 does not authorize the preemption attempted by the FCC.").

293. *See Chevron,* 467 U.S. at 842-43.

the Sixth Circuit in *Tennessee* declined to rule on the matter, as noted in the discussion of *Nixon supra*, the Supreme Court appeared to indicate that *no* Congressional attempt to intervene into the relationship between a state and its political subdivisions would pass Constitutional muster.[294]

5. Summary

Promoting the rapid deployment of broadband to all Americans, as Section 706 commands, is certainly a worthy social goal. And, in some select cases, municipal broadband may even make a positive contribution towards achieving this goal. Yet, regardless of whatever one may feel about the pros and cons of municipal broadband, it is *completely irrelevant* to the Constitutional issue raised by the FCC's *2015 Preemption Order—the federal government simply may not intervene into the relationship between the states and their respective municipal subdivisions*. As Justice Sandra Day O'Connor wrote for the majority in *Gregory v. Ashcroft*, if our federalist system "is to be effective, there must be a proper balance between the States and the Federal Government. These twin powers will act as mutual restraints only if both are credible. In the tension between federal and state power lies the promise of liberty."[295]

B. Municipal Broadband and the Antitrust Laws

Private entry does not occur when it is unprofitable, which means that expected revenues after entry are insufficient to cover expected costs. Yet, as discussed *supra*, municipal systems enter when "no one else will" implying asymmetric subsidies are involved. The evidence affirms the logic.

If sparse revenues are the result of the municipal system offering high prices and low quality, thereby obtaining low market share, then the municipal system won't last long and it will have accomplished nothing. Instead, advocates for municipal entry claim that municipal systems offer lower prices and higher quality in pursuit of the positive externalities associated with broadband. Whatever the goal, these systems take market share from the private incumbents.[296] As detailed above, eventually this additional entry will drive some, if not all, private incumbents from the market, or at least substantially reduce their presence and investments and reduce their returns. It is in this sequence of events where the problem with subsidized entry becomes apparent. If a subsidy is required for entry and sustained operations, then by implication average price is below average

294. *See Nixon*, 541 U.S. at 141.
295. *Gregory,* 501 U.S. at 459.
296. St. John, *supra* note 35; Karami, *supra* note 54.

incremental cost.[297] Subsidized entry, therefore, may lead to predatory pricing (prices below incremental cost). While increased availability and adoption are noble goals, strangely enough it is this drive to increase output (and thus the externality benefits) that makes municipal entry more likely to be predatory.

The word "predatory" typically invokes antitrust law.[298] Cities are likely to believe they are immune from antitrust law, both because of their status as "government" and because they are merely serving the interest of the public and not pursuing profit. Interestingly, in 1978, the United States Supreme Court in the case of *City of Lafayette, Louisiana v. Louisiana Power and Light* rejected this public interest argument when it held that municipalities are not immune from the antitrust laws under the "state action" doctrine of *Parker v. Brown* when they compete directly for customers with the private sector.[299] There, municipalities argued that the antitrust laws are intended to protect the public from abuses of private power and not from utilities "that exist to serve the public weal."[300] The Court rejected this argument, finding that the municipalities' argument that "their goal is not private profit but public service" to be only "partly correct." As the Court explained:

> Every business enterprise, public or private, operates its business in furtherance of its own goals. In the case of a municipally owned utility, that goal is likely to be, broadly speaking, the benefit of its citizens. But the economic choices made by public corporations in the conduct of their business affairs, designed as they are to assure maximum benefits for the community constituency, are not inherently more likely to comport with the broader interests of national economic well-being than are those of private corporations acting in furtherance of the interests of the organization and its shareholders. The allegations of the counterclaim, which for present purposes we accept as true, aptly illustrate the impact which local governments, acting as providers of services, may have on other individuals and business enterprises with which they interrelate as purchasers, suppliers, and sometimes, as here, as competitors.[301]

297. In regard to the entry decision, "below costs" implies that the total revenues of the entrant are below the total cost, since all costs are incremental. In the presence of legitimate spillovers, total costs are the incremental cost of adding the broadband network to whatever resources are already in use.

298. W. KIP VISCUSI ET AL., ECONOMICS OF REGULATION AND ANTITRUST 272, 285 (1995) ("pricing at a level calculated to exclude from the market an equally or more efficient competitor . . . . Areeda and Turner propose [] a price below reasonably anticipated average variable cost should be conclusively presumed unlawful.").

299. *City of Lafayette*, 435 U.S. 389.

300. *Id.* at 403.

301. *Id*.

While the Court noted that municipal systems "may, and do, participate in and affect the economic life of this Nation in a great number and variety of ways," the Court held that:

> When these bodies act as owners and providers of services, they are fully capable of aggrandizing other economic units with which they interrelate, with the potential of serious distortion of the rational and efficient allocation of resources, and the efficiency of free markets which the regime of competition embodied in the antitrust laws is thought to engender. If municipalities were free to make economic choices counseled solely by their own parochial interests and without regard to their anticompetitive effects, a serious chink in the armor of antitrust protection would be introduced at odds with the comprehensive national policy Congress established.[302]

So while a city may view its actions to be to the "benefit of its citizens," doing so does not imply the city is excused from antitrust law or incapable of anticompetitive conduct that may lead to a "serious distortion of the rational and efficient allocation of resources, and the efficiency of free markets." "Parochial interests" do not nullify "anticompetitive effects."

Furthermore, externalities are, by definition, external, which means they are not monetized by the seller. Choosing prices, quality, or other factors without consideration of their financial implications is certain to reduce profit margins. A profit-maximizing firm chooses its prices to maximize the spread between revenues and incremental (or marginal) cost. Any other strategy will lead to a lower spread between the two. Thus, the argument that a city may pursue objectives other than profit only strengthens the case for predatory entry, since subsidies must rise to account for the larger losses caused by the deviation from profit maximization.

Whether or not the inherent predatory nature of municipal entry in a market already served by others is actionable on antitrust grounds is an interesting question. For the most part, economic and legal experts frown upon predatory pricing claims, though some have been successful.[303] In the normal thinking, predatory pricing is not profitable unless the firm can raise price after its rivals exit. Doing so, however, may draw an entrant back in, thereby making the predatory strategy unprofitable. Such an argument depends on profit maximization and municipal systems often claim not to be profit-maximizers. Thus, predation in the context of municipal entry is uncharted territory from a theoretical (both legal and economic) perspective. A lack of a profit motive makes existing caselaw and economic theories about predation mostly uninformative.

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302. *Id.* at 408.

303. For a thorough review of predatory pricing in antitrust, *see* Patrick Bolton et al., *Predatory Pricing: Strategic Theory and Legal Policy*, U.S. DEP'T OF JUST. (2006), http://www.justice.gov/sites/default/files/atr/legacy/2006/10/30/218778.pdf [https://perma.cc/J4C6-A7U4].

C. Municipal Entry as A Due Process Problem

Over the last decade, there has been much debate over whether local governments should get into the broadband business by building their own networks. While most generally don't view municipal broadband as controversial in rural high-cost areas where it is too expensive for the private sector to enter, it is a very different story when municipalities seek to overbuild in established metropolitan areas that are already served by multiple private sector providers. As detailed above, these government-owned networks typically require massive injections of federal, state, and local tax dollars for their construction and operation. Some city governments have taken to raising taxes, shifting funds between other government services like a city electric utility, or just dipping straight into the city's coffers to cover seemingly perpetual financial shortfalls.[304]

Motivations for the private sector's distaste for such systems are plain enough. Taxpayer subsidies permit the GONs to charge below-cost rates—a type of predatory pricing that is both sanctioned and financed by the government. Competing under such conditions is difficult, at best, for unsubsidized private firms. Municipal entry could very well be a poison pill for private sector investment. Indeed, even the threat of municipal entry makes investors skittish about committing billions of their own money to build Internet networks for fear of competing with uneconomic pricing by a self-subsidized government network. As the FCC recognized in its *2010 National Broadband Plan*, ''Municipal broadband has risks. Municipally financed service may discourage investment by private companies."[305]

Making matters worse, as the private sector attempts to compete against City Hall for market share, local governments operating GONs control the many key inputs of production essential for private sector broadband deployment. For example, if a private firm wants to provide multichannel video programming over its network, then it needs local government approval in the form of a cable franchise in which the local government sets the rate terms and conditions of this franchise approval.[306] If a private communications firm wants to put up a cell tower, once again it needs local government approval.[307] Want to use municipal duct works? Same thing. And, in many cases where the municipal broadband provider is also the local municipal electric utility monopoly, if a private firm needs to attach a wire to a utility pole, guess who it has to deal with? Municipalities are known to

304. *See* discussion *supra*, at Section V.

305. *National Broadband Plan, supra* note 2.

306. *See generally*, T. Randolph Beard et al., *Infrastructure Investment and Franchise Fee Abuse: A Theoretical Analysis*, PHX. CTR. (Apr. 2019), https://www.phoenix-center.org/PolicyBulletin/PCPB45Final.pdf [https://perma.cc/E9PL-9Q8U].

307. As the FCC has documented, this cell tower siting process can be arduous, Accelerating Wireline Broadband Deployment by Removing Barriers to Infrastructure Investment, *Declaratory Ruling And Third Report And Order,* 33 FCC Rcd 9088, para. 25-28 (2018).

charge highly inflated rates for pole access.[308] Finally, but certainly not least, the government has the power to tax, again affecting private sector entry costs. The conflicts of interest abound.[309]

Which brings us, oddly enough, to railroads.

A 2016 decision by the D.C. Circuit Court of Appeals in *Association of American Railroads v. U.S. Department of Transportation* addresses the fundamental fairness of the private sector being forced to compete against City Hall.[310] In this case, the plaintiffs argued that the Passenger Rail Investment and Improvement Act of 2008 (PRIIA) violated the Due Process Clause of the Fifth Amendment because it permitted Amtrak effectively to regulate the rates, terms and conditions of key inputs of production required by its competitors. The court agreed.

In the court's view, the "power to self-interestedly regulate the business of a competitor is … anathema to 'the very nature of things,' or rather, to the very nature of governmental function."[311] As such, Amtrak's self-interest constitutes "an intolerable and unconstitutional interference with personal liberty and private property" and is "clearly a denial of rights safeguarded by the due process clause of the Fifth Amendment."[312] More to the point, the court found that "government's increasing reliance on public-private partnerships portends an even more ill-fitting accommodation between the

308. Letter from Steven F. Morris, Vice President & Deputy Gen. Counsel, The Internet & Television Association, to Marlene H. Dortch, Sec'y, Fed. Commc'ns Comm'n (July 22, 2019), https://www.ncta.com/sites/default/files/2019-07/NCTA%20Muni%20and%20Coop%20Poles%20Connolly%20Article%20Ex%20Parte%20Filing%207-22-19.pdf [https://perma.cc/7LK2-LEQH]; T. Randolph Beard et al., *The Pricing of Pole Attachments: Implications and Recommendations*, 9 REV. OF NETWORK ECON. (2010), https://www.degruyter.com/view/journals/rne/9/3/article-rne.2010.9.3.1192.xml [https://perma.cc/SEQ6-4RYE].

309. It should be noted that on several occasions, the Federal Communications Commission has had to step in to deal with recalcitrant municipalities to speed up the approval process for private sector deployment. Fortunately, the courts have tended to side with the FCC in this regard. *See, e.g.*, Petition for Declaratory Ruling to Clarify Provisions of Section 3329(c)(7)(b) to Ensure Timely Siting Review & to Preempt Under Section 253 State & Local Ordinances that Classify All Wireless Siting Proposals as Requiring a Variance, *Declaratory Ruling*, 24 FCC Rcd 13994, para. 4 (2009), *aff'd sub nom. City of Arlington v. FCC*, 668 F.3d 229, 262 (5th Cir. 2012), *aff'd*, 133 S. Ct. 1863 (2013); *see also* Acceleration of Broadband Deployment by Improving Wireless Facilities Siting Policies, Acceleration of Broadband Deployment: Expanding the Reach and Reducing the Cost of Broadband Deployment by Improving Policies Regarding Public Rights of Way and Wireless Facilities Siting; 2012 Biennial Review of Telecommunications Regulations, *Report And Order*, 29 FCC Rcd 12865, para. 1 (2014); Implementation of Section 621(a)(1) of the Cable Communications Policy Act of 1984 as amended by the Cable Television Consumer Protection and Competition Act of 1992, *Report and Order And Further Notice Of Proposed Rulemaking*, 22 FCC Rcd 5101, para. 1 (2007); *aff'd sub nom. Alliance for Cmty. Media v. FCC,* 529 F.3d 763, 785 (6th Cir. 2008), *cert. denied,* 557 U.S. 904 (2009).

310. Ass'n of Am. R.Rs. v. U.S. Dep't of Transp., 821 F.3d 19, 31 (D.C. Cir. 2016).

311. *Id.* at 29.

312. *Id.* (citing *Carter v. Carter Coal Co.*, 298 U.S 238 (1936)).

exercise of regulatory power and concerns about fairness and accountability."[313] Thus, concluded the court, "[w]herever Amtrak may fall along the spectrum between public accountability and private self-interest, the ability—if it exists—to co-opt the state's coercive power to impose a disadvantageous regulatory regime on its market competitors would be problematic."[314]

Defendants argued in response that because Amtrak is a government entity, it was not advancing its own private interests because it instead fulfils a variety of "public interest" obligations. The D.C. Circuit would have none of it. As the court observed, concluding that Amtrak is not an autonomous private enterprise "is not the same as concluding it is not economically self-interested."[315] According to the court,

> [M]any corporations are obligated to compromise profit-seeking ambitions pursuant to statutory goals aimed at public goods. Corporations must, for instance, comply with the Americans with Disabilities Act, the Clean Air Act, and the Affordable Care Act, even though doing so may not otherwise have been the most economically prudent choice. Compliance with these statutory directives does not somehow negate economic self-interest.[316]

Viewing the totality of the circumstances, the D.C. Circuit concluded that PRIIA violated the Due Process Clause of the Fifth Amendment because Amtrak's "economic self-interest as it concerns other market participants is undeniable"[317] and, as such, PRIIA improperly allowed Amtrak effectively to regulate the rates terms and conditions of key inputs of production of its competitors.

Proponents of municipal broadband will likely seek to distinguish *American Railroads* on the ground that Amtrak is affirmatively charged under its statutory charter with making a profit, while municipal broadband systems are generally organized as not-for-profit entities.[318] Thus, so the argument will likely go, as municipal networks are not interested in profit but rather the local good, GONs cannot be "self-interested entities" and *American Railroads* does

313. *Id.* at 31.
314. *Id.*
315. *Id.* at 32.
316. *Id.*
317. *Id.*
318. *See, e.g.*, *id.*, where the D.C. Circuit observed:

Amtrak's self-interest is readily apparent when viewed, by contrast, alongside more traditional governmental entities that are decidedly not self-interested. The government of the United States is not a business that aims to increase its bottom line to achieve maximum profitability. Unlike for-profit corporations, government strives—at least in theory—for an equilibrium of revenues and expenditures, where the revenue obtained is no more and no less than the operating costs of the services provided.

not apply.[319] According to established caselaw, however, that argument doesn't hold water.

GONs are in the business of obtaining market share, and they are typically successful in obtaining market shares in the 40-60% range. Municipalities are clearly "competing" with private firms to capture customers. In fact, advocates for municipal broadband point to "increased competition" as a justification for GONs. Whether the GONs are officially not-for-profit entities, it is abundantly clear that they are not, as *American Railroads* held, "presumptively disinterested" participants in the broadband market.[320] Also, as GONs wrestle with private providers for market share, municipal networks' "economic self-interest as it concerns other market participants is undeniable."[321] Without dispute, local governments have the "power to regulate the business … of a competitor," a coercive authority the D.C. Circuit in *American Railroads* found to be "'an intolerable and unconstitutional interference with personal liberty and private property' and transgresses "the very nature of' government function."[322]

As noted above, the Supreme Court rejected this public interest defense both in *City of Lafayette, Louisiana v. Louisiana Power and Light* and in *Nixon*. For example, in *City of Lafayette,* the Court deemed the argument that the goal of municipal entry "is not private profit but public service" as "partly correct." To highlight once again, the Court found that when municipalities act "… as owners and providers of services, they are fully capable of aggrandizing other economic units with which they interrelate, with the potential of serious distortion of the rational and efficient allocation of resources, and the efficiency of free markets which the regime of competition embodied in the antitrust laws is thought to engender."[323] So while a city may view its actions to be to be benefit of its citizens, doing so does not imply the city is incapable of or excused from anticompetitive conduct that may lead to a "serious distortion of the rational and efficient allocation of resources, and the efficiency of free markets." As the Court in *City of Lafayette* observed, "parochial interests" do not nullify "anticompetitive effects."[324] The Supreme Court was blunter in *Nixon*.[325] As the Court found:

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319. *See, e.g.*, Tom Wheeler, *Removing Barriers to Competitive Community Broadband,* FED. COMMS. COMMISSION (June 10, 2014), https://www.fcc.gov/news-events/blog/2014/06/10/removing-barriers-competitive-community-broadband [https://perma.cc/DR54-KYLW] ("Commercial broadband providers can pick and choose who to serve based on whether there is an economic case for it. On the other hand, [a municipal broadband network] … has a duty to ensure that *all* of its citizens have affordable broadband Internet access.").

320. *Am. R.Rs.*, 821 F3d at 29 (citing *Carter*, 298 U.S 238 (1936)).

321. *Id.* at 32.

322. *Id.* at 34.

323. *City of Lafayette*, 435 U.S. at 408.

324. *Id.*

325. *Nixon*, 541 U.S. at 134.

> [W]hen a government regulates itself (or the subdivision through which it acts) there is no clear distinction between the regulator and the entity regulated. Legal limits on what may be done by the government itself (including its subdivisions) will often be indistinguishable from choices that express what the government wishes to do with the authority and resources it can command.[326]

Given this precedent, it would be hard to argue that municipal networks are not "self-interested entitles."

Accordingly, the argument against municipal broadband is about more than mere unfairness of competing against City Hall; it's worse. The argument is that it is inherently unfair to compete against City Hall when the government can use its sovereign power to regulate rates, terms and conditions over key inputs of production required for private sector entry. With the D.C. Circuit's ruling in *American Railroads,* a court has formally affirmed that due process of law is violated when a self-interested entity is entrusted with the power to regulate the business of a competitor—even when that self-interested entity is the government. Whether a private broadband provider will choose to bring a case against municipal operators based on this legal theory remains to be seen. Given the cases outlined herein, if one does, we think there is a good probability of success.

X. CONCLUSION

At the outset of this Article, we posited that the economic essence of the municipal broadband debate can be boiled down to a simple question: *why is the municipality the only one willing to build the network*? The frequent answer is generally "*because no one else will*." But as we walked through the law and economics of the problem, we realized that there is a more fundamental question at play: even if "no one else will," *should* a municipality step into the void and construct its own broadband network? The answer ultimately lies in the relationship among local officials, their respective constituents, and state legislative masters. This Article aims to establish the legal and economic parameters of such discussions.

At the core of the issue is the uneconomic nature of municipal broadband. The construction of these systems normally requires massive subsidies from federal, state, and local governments. When a municipal broadband network is an offshoot of the local electric utility, as they often are, captive electric ratepayers are routinely required to cross-subsidize the communications network. Nonetheless, despite the subsidies, many if not most municipal systems are financially unviable; they will eventually go bust and the unrecovered costs are left to electric ratepayers, local constituents, and even federal taxpayers. These observations are not intended as disparagement; they are simply a statement of the empirical facts. Local

326. *See id.*

governments contemplating building a broadband network should do so with eyes wide open to the financial history of such ventures.

Being unsound financially, municipal broadband cannot promote competition. Given the massive amount of direct- and cross-subsidization enjoyed by GONs, municipal broadband is better characterized as predatory entry and anticompetitive. As a result, state laws overseeing municipal broadband have a sound economic policy foundation, especially those that limit cross subsidies. Considering the caselaw, federal preemption of these state laws seems improbable. Also, the uneconomic nature of municipal broadband invokes legitimate antitrust and due process concerns, though so far, no challenges to municipal broadband relied on either of these theories.

So while ensuring that advanced telecommunications capability is "deployed to all Americans in a reasonable and timely fashion" is certainly a worthy and aspirational social goal,[327] it is important to remember that the operative word here is "*reasonable.*"[328] Unfortunately, as we see it, the debate over municipal broadband has become more emotional than rational. We hope this Article helps tips the scale back toward more reasoned policymaking.

327. Section 706(b), 47 U.S.C. § 1302.

328. *Cf.* George S. Ford & Lawrence J. Spiwak, *Justifying the Ends: Section 706 and the Regulation of Broadband, supra* note 81.