

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, DC 20054**

In the Matter of	)	
	)	
Amendment of Parts 1, 22, 24, 27, 74, 80, 90,	)	WT Docket No. 10-112
95, and 101 To Establish Uniform License	)	
Renewal, Discontinuance of Operation, and	)	
Geographic Partitioning and Spectrum	)	
Disaggregation Rules and Policies for Certain	)	
Wireless Radio Services	)	

**COMMENTS OF VERIZON**

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**I. INTRODUCTION AND SUMMARY**

Verizon<sup>1</sup> fully supports the Commission’s related policy goals of closing the digital divide and expanding the availability of wireless broadband – particularly in rural areas, the focus of the Further Notice.<sup>2</sup> The Commission is taking several actions that will do much to advance those goals, such as launching the new Mobility Fund and addressing barriers to infrastructure deployment. Likewise, there are additional steps that it should take in this proceeding to encourage wireless broadband deployment in areas that remain unserved, such as creating incentives for expanding wireless coverage and removing unnecessary, outdated regulations that may distort the market. For example, it should:

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<sup>1</sup> The Verizon companies participating in this filing are the regulated, wholly-owned subsidiaries of Verizon Communications Inc.

<sup>2</sup> *Amendment of Parts 1, 22, 24, 27, 74, 80, 90, 95, and 101 To Establish Uniform License Renewal, Discontinuance of Operation, and Geographic Partitioning and Spectrum Disaggregation Rules and Policies for Certain Wireless Radio Services*, Second Report and Order and Further Notice of Proposed Rulemaking, WT Docket No. 10-112, FCC 17-105 (Aug. 3, 2017) (“Report and Order” and “Further Notice”).

- Adopt incentives to expand deployment in rural areas that lack wireless broadband. The Commission could, for example, grant a longer license renewal term to licensees that exceed specific buildout levels in those areas.
- Promote a unified, consistent regulatory framework by adopting a presumption that, upon grant of a licensee's renewal, the Commission will sunset certain rules that apply only to that wireless service but not competing services, as well as outdated license-specific conditions.
- Adopt a process to auction spectrum that is returned to ensure it is put in the hands of a new licensee that can put it to use.

These actions will correctly target economic and regulatory obstacles to deploying wireless broadband to reach all Americans.

In contrast, adopting stringent new buildout requirements upon license renewal would be unlikely to drive more wireless broadband coverage in areas that lack it and could lead to undesirable and unintended consequences. Additional buildout rules would impose substantial costs on wireless providers, forcing them to expand their networks for each and every license they hold to comply with a higher coverage mandate – even in markets that do not lack wireless broadband or that the provider may already serve using other spectrum. New buildout rules also would distort investment decisions. Such obligations would be particularly unjustified if they were applied to licensees that previously bid on spectrum, raised capital, and designed their networks to comply with existing buildout rules.

The incremental benefits of additional buildout requirements at renewal are also questionable. Driven by intense competition, wireless carriers continue to expand their coverage in rural areas and nationwide. The Commission set the existing buildout requirements on licenses based on its judgment that they will foster deployment in rural areas, and many wireless providers are still in the initial terms of their licenses and still subject to the mid-point and end-point buildout requirements. Further deployments into rural areas are expected as licensees meet those requirements. Moreover, the new Mobility Fund and other actions the Commission is

pursuing are far better and more targeted approaches to closing the digital divide where broadband remains unavailable.

## **II. THE FCC SHOULD CONTINUE ITS TARGETED ACTIONS AND POLICIES TO PROMOTE RURAL BROADBAND AND ADOPT NEW INCENTIVES TO DRIVE MORE BUILDOUT.**

The Commission’s framework for wireless regulation is premised on enabling market forces to drive investment and expand service to the public, under limited rules that it determines are necessary to promote public interest objectives. The current buildout requirements for wireless services reflect the Commission’s decision to balance reliance on those market forces with promoting expanded network coverage. For example, in the *Incentive Auction Order*, the Commission adopted buildout requirements to “ensure that the 600 MHz band spectrum is put to use expeditiously while providing 600 MHz Band licensees with flexibility to deploy services according to their business plans.”<sup>3</sup>

Wireless providers have made enormous investments in their networks under these existing rules, and continue to do so.<sup>4</sup> The Commission has facilitated access to spectrum through its auctions and through its secondary market rules, which have fostered a vigorous market that efficiently places spectrum in the hands of companies that can put it to use. And mobile broadband is being rapidly deployed to reach rural Americans – more each year. According to the Commission’s just-released 20th Mobile Wireless Competition Report, 84

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<sup>3</sup> *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Report and Order, 29 FCC Rcd 6567, 6877 ¶ 764 (2014).

<sup>4</sup> CTIA, Wireless Snapshot 2017, <https://www.ctia.org/docs/default-source/default-document-library/ctia-wireless-snapshot.pdf>; see also Letter from Scott K. Bergmann, Vice President, Regulatory Affairs, CTIA, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 17-84, at 1 (filed Apr. 7, 2017).

percent of the rural population is covered by at least three mobile LTE providers.<sup>5</sup> More than 95 percent of the rural population is now covered by at least two mobile LTE broadband providers and almost 99 percent is covered by at least one provider.<sup>6</sup> These figures have continued to rise each year.<sup>7</sup>

Verizon's LTE network provides extensive wireless broadband service in rural areas and currently encompasses 92 percent of the nation's rural population.<sup>8</sup> Its "LTE in Rural America" ("LRA") program, introduced in 2010, targets additional rural areas for wireless broadband deployment, by partnering with rural carriers that deploy LTE networks through spectrum leases. Verizon offers technical support and resources to assist the rural carriers in deploying new rural service. The rural carriers use their own brands and have their own customers. The LRA program currently covers more than 226,000 square miles across 172 rural counties in 17 states.

As the Commission has recognized in other contexts, it makes sense to take actions and pursue policies that encourage efficient private investment to the maximum extent possible, supplemented by targeted assistance to reach areas where, ultimately, there is unlikely to be a business case for making the substantial investment of capital needed to build out wireless

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<sup>5</sup> See *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services*, Twentieth Report, WT Docket No. 17-69, FCC 17-126, at Chart III.D.12 (rel. Sept. 27, 2017) ("20th Mobile Competition Report").

<sup>6</sup> *Id.*

<sup>7</sup> See *id.*; see also *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services*, Nineteenth Report, 31 FCC Rcd 10534, 10567 Chart III.A.6 (2016) ("19th Mobile Competition Report"); *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services*, Eighteenth Report, 30 FCC Rcd 14515, 14544 Chart III.A.5 (2015) ("18th Mobile Competition Report").

<sup>8</sup> 20th Mobile Competition Report at Chart III.D.14.

networks.<sup>9</sup> It should continue to pursue existing policies, supplemented by the new approaches discussed below, as the most effective ways to promote additional rural wireless broadband deployment. The Further Notice’s proposed stricter buildout mandates, however, are much blunter tools that are less likely to accomplish that objective effectively and efficiently, and might even undermine it.<sup>10</sup>

**A. Launching the Mobility Fund and Lowering Barriers Impeding New Infrastructure are Effective Ways to Target Rural Buildout.**

The Commission is implementing a much more targeted program to expand mobile wireless broadband coverage in those rural areas that are unserved or underserved. The new Mobility Fund will direct support to “geographic areas lacking unsubsidized, qualified 4G LTE service.”<sup>11</sup> The Commission created this new program because it found that, without subsidies, it is uneconomical to serve some sparsely populated areas (a finding that the Further Notice does not acknowledge). Providers that are interested in serving those areas will have access billions of dollars via the competitive bidding process of a reverse auction. Ultimately, much like the

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<sup>9</sup> For example, in adopting the framework for the new Mobility Fund, the Commission declared that the Fund’s purpose was to “advance the deployment of 4G LTE service to areas that are so costly that the private sector has not yet deployed there,” and in areas “where it would not be offered by the private sector in the absence of universal service support.” *Connect America Fund: Universal Service Reform – Mobility Fund II*, Report and Order and Further Notice of Proposed Rulemaking, 32 FCC Rcd 2152, 2156, 2173 ¶¶ 11, 51 (2017) (“Mobility Fund Report and Order”).

<sup>10</sup> Appended to these comments is a Declaration by economist Aren Megerdichian, Senior Vice President at Compass Lexecon (“Megerdichian Dec.”). Dr. Megerdichian concludes that “imposing new construction requirements would generally be counter to the Commission’s goals – namely, would be detrimental to investment, competition, consumer welfare, and could actually have the undesirable counter effect of reducing wireless coverage, all of which would be at odds with the intended goals of the Commission.” He urges the Commission instead to “implement market-based programs to close the digital divide by creating incentives for licensees to build in unserved areas, rather than mandating that they do so.” Megerdichian Dec. at ¶¶ 3-4.

<sup>11</sup> See *Connect America Fund, Universal Service Reform—Mobility Fund*, Order on Reconsideration and Second Report and Order, 32 FCC Rcd 6282, 6283 ¶ 2 (2017). To ensure that funding is directed only to areas that lack mobile broadband, the Commission is requiring providers to file new coverage maps and has adopted a challenge process to confirm the accuracy of those maps.

goals in this proceeding, the Mobility Fund objective is to “incentiviz[e] the deployment of mobile wireless service” in those areas of the country that currently lack it.<sup>12</sup> The reverse auction mechanism has been “carefully calibrated” to preserve existing service and “expressly designed” to build networks where they are currently missing.<sup>13</sup> Winning bidders will have ten years to demonstrate LTE coverage of at least 85 percent of the square miles in the eligible area (with interim benchmarks along the way).<sup>14</sup> As Dr. Megerdichian concludes, “Market-based programs, such as the Mobility Fund, are an optimal means, and preferable way, to create an economic environment that will help increase wireless broadband coverage to underserved or unserved areas, consistent with the Commission’s goals.”<sup>15</sup>

The Commission should measure the success of the Mobility Fund in bringing mobile broadband to unserved areas prior to considering any new buildout requirements. In the meantime, the Commission is also exploring how it can promote broadband deployment, in rural as well as urban areas, by lowering federal, state, and local barriers that impose costs. In April it initiated a proceeding to examine “the regulatory impediments to wireless network infrastructure investment and deployment, and how we may remove or reduce such impediments consistent with the law and the public interest, in order to promote the rapid deployment of advanced wireless broadband service to all Americans.”<sup>16</sup> Lowering regulatory barriers will particularly benefit rural deployment, because in those areas it is more likely that infrastructure costs will

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<sup>12</sup> *Id.* at ¶ 1.

<sup>13</sup> *Id.* (Statement of Commissioner Mignon L. Clyburn), available at [https://apps.fcc.gov/edocs\\_public/attachmatch/FCC-17-11A3.pdf](https://apps.fcc.gov/edocs_public/attachmatch/FCC-17-11A3.pdf).

<sup>14</sup> 47 C.F.R. § 54.1015(d).

<sup>15</sup> Megerdichian Dec. at ¶ 34.

<sup>16</sup> *Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Deployment*, Notice of Proposed Rulemaking and Notice of Inquiry, 32 FCC Rcd 3330, 3331 ¶ 2 (2017).



exceed expected revenues, deterring investment. Incurring the costs of constructing new towers and backhaul facilities, conducting an environmental assessment or historic properties review, and paying rental and rights of way fees may not be justified in rural areas. Removing regulatory barriers will thus directly encourage more rural deployment.<sup>17</sup> As with the Mobility Fund, the Commission should take these actions and gauge their effectiveness in promoting rural deployment before it considers additional buildout rules.

**B. Additional Incentives Will Promote Further Deployment.**

The Commission should also adopt in this proceeding new buildout incentives that are structured as voluntary undertakings to spur buildout in areas where additional construction would otherwise not be economically feasible.<sup>18</sup> Verizon supports longer license terms as one such incentive. If, for example, a licensee exceeds an end-of-term buildout benchmark by 10 percent or more or provides service to previously unserved rural areas, the Commission could grant a longer renewal term of 15 years. Adopting an incentive-based approach would encourage carriers to exceed the coverage requirements, in turn fostering more investment in infrastructure and expanded service. The Commission has found that providing longer license terms “give[s] licensees sufficient certainty to invest in their systems,”<sup>19</sup> resulting in expanded deployment.

**C. Outdated Band-Specific Rules and Conditions Should Sunset at the End of a License Term.**

Another action the Commission should take to promote further wireless investment is to adopt a presumption that certain band-specific service rules and license conditions sunset at

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<sup>17</sup> See Megerdichian Dec. at ¶ 36.

<sup>18</sup> See Further Notice at ¶¶ 101-03.

<sup>19</sup> *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services*, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd 8014, 8077-78 ¶ 176 (2016).

renewal, absent a finding that they continue to be necessary and in the public interest.<sup>20</sup> This process would advance the Commission’s longstanding policy (recognized in this proceeding) to adopt uniform rules for competing providers because consistent rules promote efficient use of spectrum and encourage licensees to invest in new facilities and services.<sup>21</sup> This policy also directly advances Congress’ objective in enacting Section 332 of the Communications Act in 1993: symmetrical, consistent regulation of commercial mobile services. As the Commission declared in its seminal order implementing Section 332:

Congress created the CMRS regulatory classification and mandated that similar commercial mobile radio services be accorded similar regulatory treatment under the Commission’s Rules. The broad goal of this action is to ensure that economic forces – not disparate regulatory burdens – shape the development of the CMRS marketplace.<sup>22</sup>

Band-specific rules, in contrast, deviate from the Commission’s successful policies favoring the flexible use of spectrum and may favor some competitors over others merely because of the particular frequencies they are licensed to use. They skew competition and are contrary to the Commission’s symmetrical regulatory policies. Rules also become outdated due to rapid changes in the marketplace and in the products, services, and technologies that providers offer. As Commissioner Carr stated in supporting the Commission’s recent order updating its cable rules: “As technology evolves, our rules need to evolve with it. This means that we should not reflexively apply legacy regulation from the analog era to digital technology. Instead we

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<sup>20</sup> See Further Notice at ¶ 123.

<sup>21</sup> *Id.* at ¶¶ 5-6.

<sup>22</sup> *Implementation of Sections 3(n) and 332 of the Communications Act*, Third Report and Order, 9 FCC Rcd 7988, 7994, 8185-85 ¶ 4 (1994).

must always take a fresh look at our rules in light of today's technologies and marketplace realities.”<sup>23</sup>

Rules and license conditions that impose disparate or outdated requirements on competing services and licensees should sunset for each licensee upon grant of license renewal. For existing licenses, the Commission should identify here the specific rules and conditions that will presumptively sunset at renewal. If it determines at renewal that the rule or condition should be preserved, it could do so. But absent that determination, the rule or condition would no longer apply to the license. This good-government reform would prevent band-specific obligations outliving their usefulness.

The following service-specific rules and conditions should presumptively sunset:

- Section 22.921 – 911 call processing. This rule regulates processing of 911 calls by cellular providers (but not competing CMRS providers) when calls are made from analog devices. But mobile wireless carriers no longer offer analog devices or operate analog systems.
- Section 22.923 – cellular system configuration. This rule regulates how mobile and base stations in the cellular service must communicate. Other mobile services have no analogous rule, and the rule serves no apparent purpose.
- Section 22.925 – prohibition on airborne operation. This rule restricts the operation of devices on cellular frequencies, but devices operating on other frequencies are not restricted. There is no technical or other justification for maintaining this rule.
- Section 22.927 – responsibility for mobile stations. This rule requires a cellular licensee to maintain control over mobile stations operated by its own subscribers and roamers. Competing mobile services do not have such a rule.
- Section 27.16 – network access requirements. This rule subjects licensees of a single block of spectrum, the Upper 700 MHz C Block, to open platform and device obligations. Consumer demand for over-the-top and edge content has largely supplanted service provider applications, market forces ensure that providers will not restrict consumer

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<sup>23</sup> *Cable Technical and Operational Rules*, Report and Order, MB Docket No. 12-217, FCC 17-120 (rel. Sept. 25, 2017) (Statement of Commissioner Brendan Carr), available at [http://transition.fcc.gov/Daily\\_Releases/Daily\\_Business/2017/db0925/FCC-17-120A2.pdf](http://transition.fcc.gov/Daily_Releases/Daily_Business/2017/db0925/FCC-17-120A2.pdf).

access, and features such as VoIP and WiFi are not disabled or restricted. There is no rational basis to subject only one part of one spectrum band to such regulation.

- Section 101.705 – permissible communications. This rule applies only to the common carrier fixed point-to-point microwave service, and authorizes licensees to provide only those services that are “provided for in the legally applicable tariffs of the carrier.” But the Commission long ago forbore from tariffing wireless providers, so this rule serves no purpose.
- Bid repayment conditions. Some licenses contain a condition requiring that “the remaining balance of the winning bid amount will be paid in accordance with Part 1 of the Commission’s Rules” or that the licensee comply with the rules for installment payments for winning auction bids. While this condition was relevant to the initial license that was awarded after an auction, it continues to appear on renewed licenses, where it serves no purpose.
- License conditions involving divestiture. A number of licenses that Verizon acquired from other licensees contain conditions requiring the prior licensee to make certain divestitures pursuant to a Commission order approving a transaction. Even though Verizon had no connection to that transaction, the condition continues to appear on renewed licenses where, again, it serves no purpose.
- License conditions imposing obligations due to foreign ownership of the licensee. Other Verizon licenses contain conditions that were imposed on the prior licensee because that licensee was controlled by a foreign entity, and state that “the license is subject to compliance with” the terms of a national security agreement entered into by that licensee. Even though Verizon is not subject to the former licensee’s agreement, the condition still appears on renewed licenses.

By sunseting these rules and conditions and others that commenters may identify, the Commission will continue to remove unnecessary and outdated regulations, “ensuring that licensees in the WRS bands operate under the same basic set of rules.”<sup>24</sup>

### **III. STRICTER BUILDOUT MANDATES WOULD DISTORT INVESTMENT, FORCE UNECONOMIC INVESTMENT AND UNDERMINE LICENSEES’ EXPECTATIONS.**

In contrast to the above targeted actions to drive rural deployment, the Further Notice’s proposals for additional buildout requirements would impose an across-the-board mandate on all

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<sup>24</sup> Report and Order at ¶ 1.

licensees and in all markets that is not limited to unserved or underserved areas. It would be, at a minimum, premature for the Commission to adopt these proposals prior to conducting the Mobility Fund auction and pursuing the other more tailored approaches, discussed above, to bring broadband to unserved areas.

Stricter buildout mandates at renewal would create numerous concerns. As an initial matter, the Further Notice does not consider the effectiveness of existing rules in driving more deployment. For example, the final buildout deadline for the 700 MHz spectrum, which imposes stringent population-based or area-based minimum coverage requirements, does not occur until 2019. Many other wireless licenses are still in their initial terms, and licensees have not had to meet either initial or final buildout requirements imposed by existing rules. The initial and final buildout deadlines for most AWS-3 licenses occur in 2021 and 2027 respectively, and deadlines for the 600 MHz licenses occur in 2023 and 2029. The Commission adopted those requirements to drive buildout in rural and other underserved areas. It explained, for example, that the buildout requirements for the 600 MHz band were intended “to promote the productive use of spectrum, to encourage licensees to provide service to customers in a timely manner, and *to promote the provision of innovative services in unserved areas, particularly rural areas.*”<sup>25</sup> But the Further Notice does not acknowledge that existing buildout rules will generate substantial, additional deployment over the next few years across multiple spectrum bands.<sup>26</sup> Rather than imposing additional obligations, the Commission should allow the current rules to achieve their stated objectives.

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<sup>25</sup> *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Report and Order, 29 FCC Rcd 6567, 6843 ¶ 678 (2014) (emphasis added); *Service Rules for the 698-746, 747-72 and 777-792 MHz Bands*, Second Report and Order, 22 FCC Rcd 15281, 15348 ¶ 153 (2007) (adopting stringent performance requirements for the 700 MHz band “in order to better promote access to spectrum and the provision of service, *especially in rural areas*” (emphasis added)).

<sup>26</sup> See Megerdichian Dec. at ¶ 17.

Second, new buildout mandates could force uneconomic buildout, even where broadband coverage already exists. Wireless providers purchase spectrum and invest capital based on the returns they expect to earn from that investment.<sup>27</sup> They also take into account what services they need to offer to compete most effectively, and regulatory requirements, including the current performance standards. This has led to significant investments in rural areas as carriers compete for customers. As noted previously, Verizon’s LTE network covers 92 percent of the rural population. But there are diminishing returns for additional carriers to invest in coverage in those areas. Particularly in sparsely populated areas, the number of potential customers that a wireless carrier can attract to justify its investment may not be sufficient. The Commission has recognized that regulatory requirements can make deployment “expensive, cumbersome and time-consuming,”<sup>28</sup> and Chairman Pai has recently stated that “unnecessary rules make it more expensive to construct [wireless] networks.”<sup>29</sup> This economic reality does not mean that areas are not served, and the data establish that nearly all American in fact have access to service. But it does mean that some areas will have fewer competitors than others.

The proposed rules would likely result in inefficient investment of capital by forcing all existing licensees into duplicative buildouts in these costly, hard-to-serve areas. The Commission has awarded dozens of spectrum licenses in every county nationwide across multiple spectrum bands. Its band plans for these services include two cellular licenses, six broadband PCS licenses, six AWS-1, six AWS-3, two AWS-4 licenses, eight 700 MHz band

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<sup>27</sup> *Id.* at ¶ 6.

<sup>28</sup> *Acceleration of Broadband Deployment by Improving Wireless Facilities Siting Reviews*, Report and Order, 29 FCC Rcd 12865, 12869 ¶ 9 (2014).

<sup>29</sup> Statement of Ajit Pai at the Institute for Policy Innovation’s Hatton W. Sumners Distinguished Lecture Series, Irving, Texas (Sept. 7, 2017), [http://transition.fcc.gov/Daily\\_Releases/Daily\\_Business/2017/db0907/DOC-346600A1.pdf](http://transition.fcc.gov/Daily_Releases/Daily_Business/2017/db0907/DOC-346600A1.pdf).

licenses, and seven 600 MHz licenses. In addition to these separate geographic area licenses, it has granted many other licenses in each market,<sup>30</sup> and many licensees are competing to win and retain as many customers as possible. The proposed rules would compel all licensees to deploy coverage merely to meet the new mandates, even where competitors are already providing service using other bands or, conversely, where the economics fail to support additional providers.<sup>31</sup>

A PCS licensee, for example, may have met the PCS rules' 67 percent population coverage benchmark in a given market, but decided to forego further investment given service the licensee provides using other spectrum bands or the presence of multiple competitors. Instead, the licensee may have chosen to spend its capital to improve service to customers in other markets. But were the Commission to adopt its incremental 10 percent coverage mandate, that licensee would now be forced to invest in that market to reach 77 percent and then 87 percent (or more) of the population – even though customers in those areas already have access to service. It would have to divert capital away from where it can be invested most productively to meet consumer demand, and instead spend it to satisfy a regulatory mandate – even where doing so will not provide broadband to any unserved area.

Third, imposing more stringent incremental buildout requirements would also undermine licensees' investment-backed expectations when they acquired the licenses through auction or the secondary market, create uncertainty, and deter overall investment. When existing licensees decided to bid on or purchase licenses, they assessed the costs of acquisition and deployment

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<sup>30</sup> These include, for example, the many licenses granted in the Enhanced Specialized Mobile Radio Service, the Upper Microwave Flexible Use Service, and the Citizens Broadband Radio Service.

<sup>31</sup> In contrast to the over-inclusive mandate that new buildout rules would impose, the new Mobility Fund is specifically designed “to target universal service funding to coverage gaps, not areas already built out by private capital.” Mobility Fund Report and Order at ¶ 14.

against the need for the spectrum and their ability to generate revenues from it. That calculus included the costs of complying with Commission rules, including buildout requirements. And, as the Commission has recognized in other contexts, regulatory certainty is essential to enable regulated providers to evaluate how they will comply with rules.<sup>32</sup> To add new buildout requirements at this juncture adds new costs to spectrum rights and increased uncertainty. Uncertainty translates to risk, and increased risk translates to an increased discount rate that drives decreased valuation. Additional and complex build requirements also may affect the underlying accounting principle of license renewal expectancy, which enables a spectrum license to be classified as a long term intangible asset, an important financial classification.

Regulatory actions that increase the risk of uncertainty about renewal costs, possible future restricted license use, and threat of impairment, result in a decrease in the price a prospective licensee is willing to pay. It is likely to suppress carriers' willingness to acquire additional spectrum at auction, or decrease the value they place on it, adversely affecting auction results. As Dr. Megerdichian explains, "An increase in uncertainty brought about by an increase in buildout requirements can also reduce the prospective licensee's willingness to pay for the spectrum by lowering the present value of expected economic profits generated from the investment"<sup>33</sup> He concludes that new requirements are thus "likely to adversely impact licensees' incentive to expand wireless broadband coverage to areas where it is needed the most."<sup>34</sup>

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<sup>32</sup> See, e.g., *Restoring Internet Freedom*, Notice of Proposed Rulemaking, 32 FCC Rcd 4434, 4448, 4451, ¶¶ 44, 48 (2017).

<sup>33</sup> Megerdichian Dec. at ¶ 10.

<sup>34</sup> *Id.* at ¶ 5.



Stricter buildout mandates may also interfere with the secondary market. Chairman Pai has observed that “[W]e all benefit from a vibrant secondary market. It allows spectrum to flow to its highest valued use, thereby maximizing consumer welfare.”<sup>35</sup> Today, a prospective purchaser looking to buy a license during the initial term must factor in any remaining buildout requirements, but it knows that once those requirements are satisfied, further investment can be directed solely to meet market demand, whether that is enhanced service, more capacity, or greater coverage. If the Commission were to impose additional buildout mandates for subsequent license terms, however, those mandates would affect the purchaser’s decision whether to purchase spectrum and the price it is willing to pay. For this reason, stricter buildout requirements upon renewal may chill activity in the secondary market, impeding the transfer of spectrum to companies that are ready to put it to use to serve the public.

If the Commission decides to adopt more stringent buildout requirements – and it should not – at a minimum it should apply them only to new licenses that are granted after the new rule takes effect. Applicants for those new licenses would know that they could incur penalties for failing to meet the new requirements, and account for that risk in deciding whether and how much to bid for spectrum. This approach is consistent with the approach taken in the Report and Order, where the effective dates of new renewal standards and discontinuation of service rules were delayed to allow licensees time to come into compliance with the new rules.<sup>36</sup> But any new rules should not apply to existing licenses. As Dr. Megerdichian explains, “Purchasing spectrum and deciding where to invest finite capital resources depend on economic models of expected

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<sup>35</sup> *Policies Regarding Mobile Spectrum Holdings*, Report and Order, 29 FCC Rcd 6912 (2015) (Dissenting Statement of Commissioner Ajit Pai), available at [https://apps.fcc.gov/edocs\\_public/attachmatch/FCC-14-50A5.pdf](https://apps.fcc.gov/edocs_public/attachmatch/FCC-14-50A5.pdf).

<sup>36</sup> Report and Order at ¶¶ 35-37, 63.

market conditions and buildout requirements. Changing the buildout requirements after the fact will affect then-optimal capital deployment decisions, as well as firms' willingness to pay for licenses through increased uncertainty about future buildout conditions.”<sup>37</sup>

The Commission should not adopt penalties for existing licensees that do not meet new buildout rules. Licensees acquired their spectrum in reliance on the buildout rules in effect for a specific spectrum band at the time of acquisition. They should not be penalized if they comply with those rules but not with new obligations imposed at a later date. Compelling a licensee to surrender portions of its license area that it has not built out does not make service available in those areas: those areas will remain unserved. And a draconian penalty that forces a licensee to surrender its entire license or portions of the licensed area where it already deployed service unfairly punishes not only the licensee but also its subscribers. As the Commission recognizes, this penalty would “result in loss of longstanding service to the licensee’s subscribers and the disruption of a network that satisfied the renewal standard at the end of the initial license term.”<sup>38</sup> Moreover, Dr. Megerdichian concludes that penalties “are highly likely to create disincentives for future licensees to invest in wireless expansion,” and “will reduce future service providers’ willingness to pay for spectrum, and thus depress auction revenues.”<sup>39</sup>

Finally, the Further Notice seeks comment on how to auction returned spectrum.<sup>40</sup> While the Commission should not adopt additional buildout rules for subsequent license terms, there may be licensees that fail to meet existing minimum coverage requirements by the end of their initial license term. In that situation, where existing rules require that spectrum be returned to

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<sup>37</sup> Megerdichian Dec. at ¶ 14.

<sup>38</sup> Further Notice at ¶ 116.

<sup>39</sup> Megerdichian Dec. at ¶ 19.

<sup>40</sup> Further Notice at ¶¶ 118-20.

the Commission for reassignment, Verizon supports the two-phased, on-demand relicensing approach.<sup>41</sup> The Commission is familiar with this approach, which applies to returned spectrum in the cellular and 700 MHz bands. A two-phased auction where the initial licensee cannot participate in the first phase would give other interested parties the opportunity to purchase spectrum that may not otherwise be deployed. This approach appropriately prevents the initial carrier, which surrendered spectrum because it had failed to meet buildout requirements, from buying it back to keep it from being acquired by competitors.

#### **IV. THE COMMISSION SHOULD NOT IMPOSE BROADBAND ADOPTION AND AFFORDABILITY REPORTING ON RENEWAL APPLICANTS.**

The Commission should not require licensees to submit reports on broadband adoption and affordability in their license renewal applications.<sup>42</sup> Such reports would be burdensome for wireless providers but would not advance broadband adoption and affordability. Imposing reporting as a renewal condition conflicts with ensuring that “that the costs of the Commission’s rules don’t outweigh their benefits.”<sup>43</sup>

First, the Commission already obtains extensive information on adoption and affordability through its Form 477 process, and it is updating that process to ensure it captures the most useful data on adoption and affordability.<sup>44</sup> Chairman Pai recently noted that the revised Form 477 information collection will be used to help close the digital divide, but he recognized that every dollar providers spend on developing and submitting data is a dollar they

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<sup>41</sup> *Id.* at ¶ 119.

<sup>42</sup> *See id.* at ¶ 112.

<sup>43</sup> Statement of Ajit Pai at the Institute for Policy Innovation’s Hatton W. Sumners Distinguished Lecture Series, Irving, Texas (Sept. 7, 2017), [http://transition.fcc.gov/Daily\\_Releases/Daily\\_Business/2017/db0907/DOC-346600A1.pdf](http://transition.fcc.gov/Daily_Releases/Daily_Business/2017/db0907/DOC-346600A1.pdf).

<sup>44</sup> *Modernizing the FCC Form 477 Data Program*, Further Notice of Proposed Rulemaking, 32 FCC Rcd 6329 (2017).

cannot use to deploy services to rural America.<sup>45</sup> Imposing yet another reporting obligation on licensees would divert even more dollars away from deployment.

Second, some geographic areas that licensees would likely identify to comply with a new renewal reporting requirement would be the same as, or overlap with, areas that receive Mobility Fund Phase II support. Recipients of that financial support will have extensive reporting obligations about deployment and quality of service, making additional reporting obligations duplicative. It makes far more sense to obligate licensees that receive those subsidies to report on how those subsidies are spent than it does to impose new reporting obligations on all licensees.

Third, the renewal application process is an impractical context for collecting data on broadband adoption and affordability. The Form 477 process enables the Commission to assess obstacles to adoption and affordability across a geographic area because all providers in that area report at the same time. Renewal applications, however, are necessarily confined to a single licensee's actions in its licensed area and do not reveal what other licensees are doing. And renewal applications for different licensees serving the same area are filed at staggered times, based on the original license grant date. The renewal process would thus supply disjointed, incomplete information.

Fourth, imposing new reporting requirements conflicts with the policy objective of the Report and Order in this proceeding: to streamline and simplify the license renewal application process because “clearer and more certain renewal processes will benefit both licensees and the Commission.”<sup>46</sup> Requiring adoption and affordability information would inject uncertainty and

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<sup>45</sup> *Id.* (Statement of Chairman Ajit Pai), available at [https://apps.fcc.gov/edocs\\_public/attachmatch/FCC-17-103A2.pdf](https://apps.fcc.gov/edocs_public/attachmatch/FCC-17-103A2.pdf).

<sup>46</sup> Report and Order at ¶ 16.

significantly increase burdens on both licensees and staff. Licensees would also seek confidential treatment of such information, further taxing Commission staff with reviewing and acting on confidentiality requests. Moreover, the Further Notice does not indicate under what circumstances the Commission would find the showing incomplete or deficient. Adopting bright-line renewal standards was, however, a key objective of the Report and Order.

## **V. CONCLUSION**

Government policy to promote wireless deployment in rural areas should focus on providing targeted incentives to expand service, eliminating unnecessary and costly rules, and removing barriers to deployment. The Commission should implement the new Mobility Fund, remove regulatory barriers to infrastructure deployment, sunset outdated, disparately-applied rules, and adopt incentives for licensees to exceed the existing buildout rules. The Commission should not, however, impose increased buildout requirements or add broadband availability and affordability reporting to renewal applications. The substantial costs and burdens of those requirements would not be outweighed by any benefits in increased buildout to unserved areas.

Respectfully submitted,

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October 2, 2017

# **ECONOMIC ARGUMENTS IN THE WIRELESS RADIO SERVICES PROCEEDING**

**Aren Megerdichian, Ph.D.**

October 2, 2017

## **I. INTRODUCTION AND OVERVIEW**

### **A. Qualifications**

1. My name is Aren Megerdichian. I am a Senior Vice President at Compass Lexecon, an economics consulting firm. I was previously Associate Lecturer with the College of Business at San Diego State University and Teaching Associate and Lecturer with the Department of Economics at the University of California, San Diego. My fields of expertise are econometrics, industrial organization, and financial economics, particularly in the areas of oligopoly pricing models, demand system analysis, forecasting, and competition policy. I have conducted economic analyses on behalf of clients on a wide range of matters involving litigation and regulatory investigations and compliance, including for matters in the telecommunications industry. My work has been incorporated into numerous expert reports, white papers, and presentations submitted to courts and regulatory agencies, and I have presented work on the potential competitive effects of mergers to the Federal Trade Commission. I hold a Ph.D. in Economics from the University of California, San Diego. Additional details are available in my *curriculum vitae*, provided as Exhibit A.

### **B. Overview**

2. The Federal Communications Commission (hereafter, “Commission”) expects more than 50,000 renewal applications to be filed by geographic-area licensees and more than 625,000 renewal applications to be filed by site-based licensees over the next 10 years.<sup>1</sup>

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<sup>1</sup> In the Matter of Amendment of Parts 1, 22, 24, 27, 74, 80, 90, 95, and 101 To Establish Uniform License Renewal, Discontinuance of Operation, and Geographic Partitioning and Spectrum Disaggregation Rules and Policies for Certain Wireless Radio Services, Second Report and Order and Further Notice of Proposed Rulemaking, Before the Federal Communications Commission, WT Docket No. 10-112, FCC 17-105 (rel. Aug. 3, 2017 (hereafter, *Order* or *FNPRM*)), ¶ 5.

Related to the license renewals, the Commission seeks comment on “a range of possible actions that may advance our goal of increasing the number of rural Americans with access to wireless communications services.”<sup>2</sup> I have conducted an economic analysis of the Commission potentially imposing new construction requirements on wireless licensees at renewal in an attempt to bring wireless broadband to unserved and underserved areas.

3. The Commission intends to “promote the efficient use of spectrum resources, serve the public interest by providing licensees certainty regarding their license renewal requirements, encourage licensees to invest in new facilities and services, and facilitate their business and network planning.”<sup>3</sup> My analysis reveals that imposing new construction requirements would generally be counter to the Commission’s goals—namely, would be detrimental to investment, competition, consumer welfare, and could actually have the undesirable counter effect of reducing wireless coverage, all of which would be at odds with the intended goals of the Commission.

4. The Commission’s policy goal to bridge the digital divide is certainly an important endeavor, as providing unserved or underserved populations in the U.S. with additional wireless capacity would benefit those consumers. However, it would not come without cost. Imposing rules to force licensees to build out in areas where they have found no business case to do so is counter to a market-equilibrium outcome that allows firms to efficiently distribute their resources where the demand and best opportunity for earning economic rents from their investments exist. Thus, to the extent they are needed, the Commission should implement market-based programs to close the digital divide, by creating incentives for licensees to build in unserved areas, rather than mandating that they do so.

### **C. Summary of findings**

5. Based on my economic analysis of the Commission’s proposed new construction requirements on wireless licensees at renewal in an attempt to bring wireless broadband to unserved and underserved areas, I find that:

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<sup>2</sup> *FNPRM*, ¶ 99.

<sup>3</sup> *FNPRM*, ¶ 5.

- A policy that mandates additional buildout requirements will diminish the resources available to build in more economically feasible high demand areas, which forces a redistribution of resources to less economic areas and thus deviates from market outcomes;
- Changing buildout requirements for licensees is likely to adversely impact licensees' incentives to expand wireless broadband coverage to areas where it is needed the most;
- Additional buildout requirements can reduce the returns that the licensee expected to make from the initial license, meaning it would have reduced their previous willingness to pay for the spectrum, or even resulted in the licensee not purchasing the spectrum had the new construction requirements been known;
- The penalty rules proposed by the Commission will negatively impact both licensees and consumers, and the forfeited spectrum that is obtained through the proposed penalties is unlikely to be used by a second licensee to build in unserved areas the original licensee did not find a business case for; and
- Substantial investments by wireless service providers have resulted in significant gains in wireless broadband coverage, access, and quality, which have benefitted rural areas; should there be a need to promote investment in certain unserved or underserved areas, it would be better achieved with market-based programs and existing programs, such as the Mobility Fund.

## **II. ECONOMIC ANALYSIS OF NEW CONSTRUCTION REQUIREMENTS**

### **A. Changing the rules will have adverse economic consequences for licensees**

6. A licensee has a finite amount of available capital from which to make capital spending outlays on any number of investments and projects in a given period and in a given area. Its spectrum purchases and related investment decisions are based on expectations about the economics of the relevant marketplace. And its willingness to pay for spectrum is, in part, based on the returns it expects to earn from the investment, which will be determined by the expected profits generated from selling services to consumers. The profitability of the venture will hinge on infrastructure costs, prices that consumers are willing to pay for services, the amount of the services the licensee is able to sell at those prices, and the costs of providing those services.

7. Changing buildout requirements will affect the parameters that determine a licensee's willingness to pay for the spectrum license. Increasing the buildout requirement in a given area will require the licensee to incur additional infrastructure costs and costs of providing services, but will also provide additional revenues based on how many customers in the



newly built area buy services from the licensee. Whether the additional revenues sufficiently cover the costs will depend on any number of parameters, but given that the licensee chose not to build out to the additional area, the revealed preference suggests it is likely that the area is not sufficiently profitable or not as profitable as other areas competing for the licensee's limited resources.

8. Requiring the licensee to build out to additional areas could lower the expected return on the entire project the licensee is planning to build out (or has already built out). For example, changing buildout requirements could affect the licensee's internal rate of return ("IRR") of the entire geography covered by the license.<sup>4</sup> Figure 1 provides a simple hypothetical example of 7 areas, the first five of which (areas A – E) meet a hypothetical 15% hurdle rate and thus were built out; the latter two areas did not meet the 15% threshold and thus were not built out. Currently, the average IRR for the above-threshold areas is 17%. Should the Commission adopt rules requiring the licensee to build out to areas F and G after renewal, the average IRR for the entire geographic region would be reduced to 13%, which no longer meets the firm's 15% hurdle rate required for making the investment.<sup>5</sup>

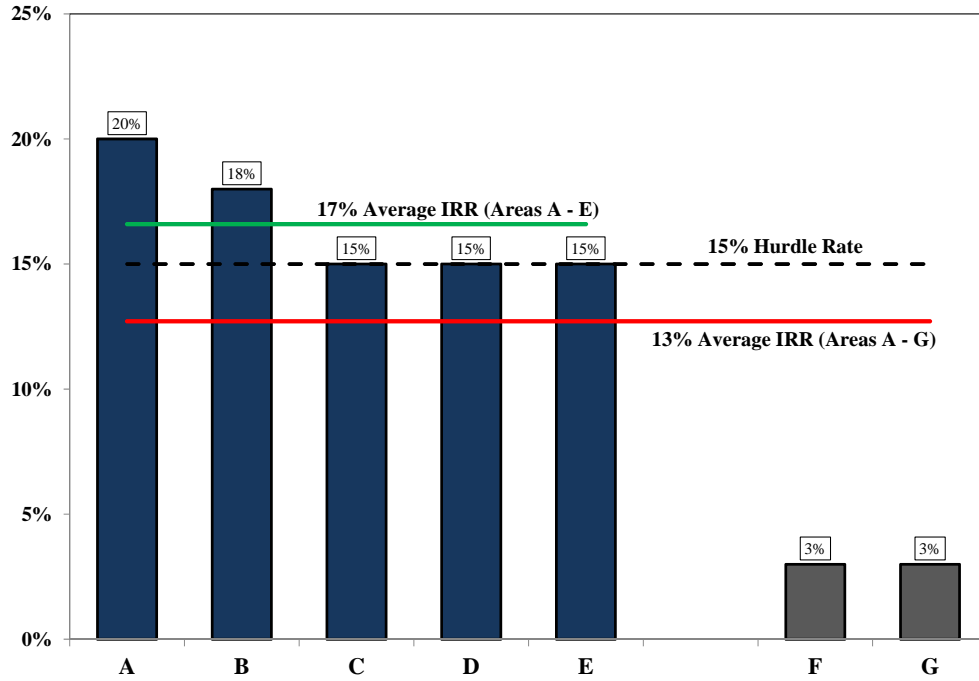
9. Thus, changing buildout requirements can have important economic consequences for the licensee. In fact, changing buildout rules, or even the prospect of changing the rules in the future, creates substantial uncertainty for the licensee. An increase in uncertainty brought about by potential changes in buildout requirements means the licensee must upwardly adjust its hurdle rate, making it less likely to undertake the investment.

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<sup>4</sup> The internal rate of return is one of many measures that firms typically use to determine whether a capital spending project ought to be undertaken. The IRR is the implied discount rate at which the net present value of the cash flows from the project equals zero. One rule for deciding to undertake the investment is if the IRR exceeds the firm's investment hurdle rate (a minimum threshold that the IRR has to meet), such as the firm's opportunity cost of capital. See, e.g., Eugene F. Brigham and Joel F. Houston, *FUNDAMENTALS OF FINANCIAL MANAGEMENT*, 8<sup>th</sup> ed., 1998, at 397-399.

<sup>5</sup> This is clearly a simple (and extreme) example, as the different areas will have different population sizes and other important considerations to account for, but the hypothetical serves to show that the additional construction requirements would likely pertain to low-return areas that will bring down the overall internal rate of return of the project.

**Figure 1: Hypothetical Example of Average Rate of Return**



10. An increase in uncertainty brought about by an increase in buildout requirements can also reduce the prospective licensee's willingness to pay for the spectrum by lowering the present value of expected economic profits generated from the investment. By creating uncertainty and thus generating more risk for the investment, a relatively higher risk-adjusted discount rate<sup>6</sup> would be used in the firm's economic models, which would have the effect of reducing the present value of economic profits and result in depressing the licensee's willingness to pay for the spectrum.

11. The following simple model demonstrates the tradeoff. Let the firm's willingness to pay ("WTP") be a function of the present value of economic profits expected to be generated by the license and a set of other variables that affects its demand for spectrum, given by the expression:

$$WTP = f(PV, Z, U).$$

The present value is given by  $PV = \sum_t \pi_t (1 + r)^{-t}$ , where the discount rate  $r$  is dependent on the buildout amount, denoted by  $B$ ; the economic profits in each period, denoted by  $\pi_t$ , are determined by the revenues and costs of servicing the area, which

<sup>6</sup> See, e.g., Brigham and Houston (1998), at 473.

depend on the economics of the marketplace and the buildout requirements ( $B$ );  $Z$  captures various attributes of the spectrum (e.g., bandwidth and frequency) that affect the value of the license to the buyer; and  $U$  denotes other variables that may affect the firm's willingness to pay. The function  $f(\cdot)$  is increasing in  $PV$  and may be increasing or decreasing in  $Z$  and  $U$ .<sup>7</sup> Assume that  $B$  is independent of  $Z$  and  $U$  such that changes in  $B$  do not affect  $Z$  or  $U$ . An increase in the buildout requirement results in a decrease in the willingness to pay for the spectrum:

$$\frac{\partial WTP}{\partial B} = -\frac{\partial f}{\partial PV} \left[ \frac{\partial r}{\partial B} \sum_t t \pi_t (1+r)^{-(t+1)} - \sum_t \frac{\partial \pi_t}{\partial B} (1+r)^{-t} \right] < 0,$$

given that the value function  $f(\cdot)$  is increasing in  $PV$ , the discount rate is increasing in the build requirement (higher risk from having to build out to additional areas towards the tail end of the geography covered by the license), assuming that profit levels tend to be sufficiently positive in most areas, and that the additional economic profits derived from the additional build (towards the tail end of the geography) are negative or zero.

12. In other words, the willingness to pay for the license would be depressed. This has two effects. First, it means that a licensee may have overpaid for spectrum that it purchased prior to the additional buildout requirements being imposed. Second, the Commission changing buildout rules, or leaving open the door to potentially changing rules in the future, increases future uncertainty and risks, resulting in a lower willingness to pay and thus suppressed demand for the license and reduced spectrum auction revenues, all else equal. If the willingness to pay of prospective licensees drops sufficiently, future auctions may not meet the reserve price for a given license, and the spectrum would not be available for new wireless coverage or expansion of existing coverage.

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<sup>7</sup> The higher the expected net present value of the stream of future economic profits to be generated from the license, the more willing the buyer is to pay for the spectrum. The function can be increasing or decreasing in  $Z$  or  $U$ . If  $Z$  represents the amount of spectrum bandwidth, the willingness to pay is generally expected to be increasing in  $Z$  (greater bandwidth is typically more valuable). If  $Z$  represents spectrum frequency, the willingness to pay could be increasing or decreasing in  $Z$ , depending on the particular needs of the provider at that time. Whether WTP is increasing or decreasing in the other variables also depends. For instance, if  $U$  denotes the amount of unused spectrum the firm currently has, WTP is expected to be decreasing in  $U$  (more unused existing stock of spectrum held by the firm, the less it will be willing to pay for additional spectrum). If  $U$  denotes the amount of time until the next auction for similarly suitable spectrum, then WTP is expected to be increasing in  $U$  (the further into the future the next spectrum procurement opportunity is for the firm, the more willing the firm will be to pay a higher price for the current spectrum license).

13. The same economic analysis applies to the firm's decisions to invest in construction in new areas and expand coverage in existing areas. A change in the buildout requirements would cause the licensee to revise its projections of investment viability in other areas downward, making it less likely to meet the licensee's hurdle rate. Thus, changing buildout requirements can have the deleterious effect of reducing firms' willingness to pay for licenses, and reducing incentives to expand capacity in other areas, to invest in infrastructure, and to build out in unserved and underserved areas. These effects are *counter* to the goals of the Commission.

14. As described above, purchasing spectrum and deciding where to invest finite capital resources depend on economic models of expected market conditions and buildout requirements. Changing the buildout requirements after the fact will affect then-optimal capital deployment decisions, as well as firms' willingness to pay for licenses through increased uncertainty about future buildout conditions. Licensees' finite capital budgets necessarily mean that capital that is mandated to be deployed to areas where there is no economic case for doing so will reduce available capital that would have been deployed to other areas that have greater demand for it, either as new builds or expanded capacity.

15. This effect is not merely an exercise in reallocating capital that only affects the licensee. It can have real effects on consumers who otherwise would have had better access to wireless broadband. While there are policy reasons to encourage buildout to underserved or unserved rural areas, doing so comes with a cost that should be taken into account. Diverting investment to such areas diminishes the resources available to build in more economically feasible high demand areas. Forcing redistribution of resources to relatively less economically favorable areas is inefficient because it deviates from market outcomes.<sup>8</sup> So while rules that are aimed at expanding wireless coverage to underserved or unserved areas would be expected to provide those consumers with benefits, they also would be expected to result in harm to other consumers relative to what would have prevailed in market equilibrium.

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<sup>8</sup> For a discussion of redistribution and efficiency, see, e.g., Anthony B. Atkinson and Joseph E. Stiglitz, LECTURES ON PUBLIC ECONOMICS, 2015, at 393; Andreu Mas-Colell, Michael D. Whinston, and Jerry R. Green, MICROECONOMIC THEORY, 1995, at 555-557; and Nicholas Economides, "Telecommunications Regulation: An Introduction" in THE LIMITS AND COMPLEXITY OF ORGANIZATIONS, 2005, at 65.

16. Requiring uneconomic investment also will affect mobile devices and information and content delivery that rely on the infrastructure investments and capital projects undertaken by licensees. In just the five years spanning 2012 to 2016, a total of nearly \$148 billion was spent on capital expenditures by the top-four wireless providers in the U.S.<sup>9</sup> Those capital expenditures, which have resulted in increased towers in rural communities, increased LTE coverage in rural communities, and lower prices and higher quality and output (see Section II.C), are funded by the economic rents that service providers earn on their investments. If the Commission wants to preserve this level of capital expenditure and competition in the marketplace, it should avoid changing the buildout requirement rules in a way that would adversely affect providers' profitability and thus their investment incentives.<sup>10</sup>

17. Finally, the Commission's proposed buildout requirements may be premature. Many licensees have not yet met their initial or final construction requirements.<sup>11</sup> Much buildout remains to occur over the next several years and is likely to result in the expansion of wireless broadband coverage and services to underserved or unserved areas in the near future without the additional buildout rules.<sup>12</sup> Thus, an efficient, less risky proposition would be to simply allow licensees their allotted time to meet the current build requirements.

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<sup>9</sup> In the Matter of Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services, Twentieth Report, Before the Federal Communications Commission, WT Docket No. 17-69, FCC 17-126 (rel. Sept. 27, 2017) (hereafter, *Twentieth Annual Report*), Chart III.C.1.

<sup>10</sup> Similarly, the Commission should avoid requiring additional burdensome reports, especially when the information is already being provided as part of other reporting requirements. (See *FNPRM*, ¶ 112.) Imposing more redundancies for service providers simply moves resources from broadband construction to unnecessary regulation compliance.

<sup>11</sup> I understand that the final buildout deadline for the 700 MHz spectrum, which imposes stringent population-based or area-based minimum coverage requirements, does not occur until 2019. The initial and final buildout deadlines for most AWS-3 licenses occur in 2021 and 2027, respectively, and deadlines for the 600 MHz licenses occur in 2023 and 2029.

<sup>12</sup> For example, T-Mobile's plans to deploy services to rural areas with 600 MHz spectrum. See <https://newsroom.t-mobile.com/news-and-blogs/tmobile-600mhz.htm>, site visited September 29, 2017. (Discussing T-Mobile's plans to deploy LTE on 600 MHz starting in rural America and markets across more than 1.2 million square miles.) See also, Sascha Segan, "T-Mobile's New 600MHz Band 71: What You Need to Know," *PC Mag*, available at <https://www.pcmag.com/news/356449/t-mobiles-new-600mhz-band-71-what-you-need-to-know>, site visited September 29, 2017. (Reporting that T-Mobile plans to cover rural areas with its 600 MHz spectrum, including parts of Wyoming, Northeast and Southwest Oregon, West Texas, Southwest Kansas, the Oklahoma panhandle, Western North Dakota, additional areas of Maine, Coastal North Carolina, Central Pennsylvania, Central Virginia, and Eastern Washington.)

**B. The Commission’s proposed penalty rules are unlikely to help achieve its policy goals**

18. The Commission is considering three penalty plans for licensees that fail to satisfy additional construction obligations:

- Keep What You Serve: “a licensee’s authorization would terminate automatically for those geographic portions of its license area in which the licensee is not providing services [...] and those unserved areas would be returned to the Commission’s inventory for reassignment.”<sup>13</sup>
- Use or Offer: “a licensee that fails to meet its additional construction obligation would retain its entire license area, but would be required to negotiate in good faith with any third party seeking to acquire or lease spectrum in the unserved areas of the license.”<sup>14</sup>
- Total Loss: “total loss of the license or a reduction in license area, including loss of areas that the license serves, as a penalty for failure to satisfy an additional construction obligation in a renewal term.”<sup>15</sup>

19. These penalties are highly likely to create disincentives for future licensees to invest in wireless expansion, resulting in less coverage or relatively poorer quality of service than otherwise would have occurred without penalties. Moreover, penalties, such as the ones the Commission is considering, will reduce future service providers’ willingness to pay for spectrum, and thus depress auction revenues. Nor are auctions of spectrum forfeited as a result of these penalties likely to expand investment in rural areas, as it is unlikely that a second license holder will find it profitable to build out to the underserved or unserved areas when the first licensee did not. The penalty rules are especially problematic given they would apply to licensees in areas where other wireless broadband networks already exist.

20. **Keep What You Serve.** The Commission notes that Keep What You Serve could “create an adverse incentive for licensees to serve the most desirable areas within the license area and leave the rest unserved.”<sup>16</sup> The Commission properly acknowledges that some licensees will focus on serving areas that are more economically favorable, and

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<sup>13</sup> FNPRM, ¶ 114.

<sup>14</sup> FNPRM, ¶ 115.

<sup>15</sup> FNPRM, ¶ 116.

<sup>16</sup> FNPRM, ¶ 114.

potentially be willing to lose spectrum in areas that are economically less favorable. The question is whether this forfeiture will promote the Commission's goal of investment in underserved or unserved areas. The answer is likely no, as there is no guarantee and a low likelihood that another service provider would find a favorable business case for building out in an area given that the first licensee did not. In fact, the initial licensee not building out to an area and thus forfeiting its license in that area serves as clear signal to the next prospective licensee that there is likely no business case for building out in the area.<sup>17</sup>

21. The Commission would effectively be repossessing spectrum from the licensee, diminishing the value of the spectrum to a level below the licensee's willingness to pay for the spectrum absent the penalty. Of course, the licensee has already paid the pre-rules market price of the spectrum, and thus the provider would be harmed by such rules. Moreover, it would depress future auction revenues as prospective licensees would not bid as high for the spectrum relative to the current no-penalty world. Thus, there is substantial uncertainty whether Keep What You Serve could even achieve the Commission's goal to expand service to underserved or unserved areas, but there is high certainty that it will result in depressed future auction revenues.

22. **Use or Offer.** Likewise, the Commission notes that Use or Offer could also "create an adverse incentive for licensees to serve the most desirable areas within the license area and leave the rest unserved."<sup>18</sup> Much like Keep What You Serve, the Commission has appropriately identified the economic disincentives such a penalty will create, as service providers will focus their efforts on buildout in economically favorable areas. Use or Offer is potentially a less offensive penalty scheme as compared to Keep What You Serve on one dimension: the unused spectrum has some chance of generating economic rents to the licensee (either by selling or leasing the unused spectrum) who has already paid for it based on its efficient-market value absent the penalty. But Use or Offer is still problematic. Like Keep What You Serve, it would create downward pressure on licensees' future willingness to pay for spectrum and current willingness to build out to relatively less economically favorable areas. And it forces licensees to forfeit spectrum that would have been used for future buildout and expansion to unserved or underserved

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<sup>17</sup> The signal would be even more potent if the initial license holder were the only provider that operates nearby and thus would be expected to have more market information about economic conditions in the area.

<sup>18</sup> *FNPRM*, ¶ 115.

areas, should a business case for doing so materialize after renewal. Such a redistribution of resources would clearly be an inefficient allocation of a critical input that was purchased at an efficient market price.

23. Like Keep What You Serve, there is no guarantee and a low likelihood that Use or Offer will result in another service provider finding a favorable business case for building out in the area. The fact that the initial licensee didn't build out in the area provides a clear signal to the next prospective provider that there is likely no business case for doing so. The Commission's secondary market and leasing rules already allow licensees to sell or lease spectrum to other providers. If there were sufficient demand by providers for the spectrum at issue, the secondary sale or lease would have happened. To the extent it did not, that reveals that other providers did not have a business case for building out to the areas in question. Thus, the Commission's policy goal of promoting wireless investment in underserved or unserved areas is unlikely to be achieved with Use or Offer.

24. **Total Loss.** Of the three penalty plans, Total Loss will have the most deleterious effects in terms of diverging from a normal, efficient market outcome. As noted by the Commission, Total Loss could "harm consumers[] as it could result in loss of longstanding service to the licensee's subscribers and the disruption of a network that satisfied the renewal standard at the end of the initial license term."<sup>19</sup> The Commission's concern is appropriate. Should one provider be required to forfeit its entire spectrum, it would disrupt services to existing consumers who would lose access to their chosen provider. Even if another provider were to offer service, the rule would force customers to switch to a new unknown provider. This penalty thus creates uncertainty not just for providers, but also for consumers. The new provider could end up charging higher prices or reducing discounts, providing lower quality wireless services, reducing service plan flexibility, changing billing terms and customer service, etc., all of which would adversely affect consumers in the entire area.

25. In addition to the Commission's noted concern, Total Loss deviates entirely from a normal, efficient market outcome. A licensee determines its willingness to pay for the license covering a set of areas in a particular geography (see, e.g., discussion in Section II.A). It purchases the spectrum through an efficient market auction, and must build out to

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<sup>19</sup> *FNPRM*, ¶ 116.



some, but not necessarily all, areas to meet the license requirements. One version of Total Loss proposes to repossess the provider's spectrum in the entire license area if it does not satisfy the additional construction obligation. There may be areas within the geography of a given license that are too costly to build out. Forcing the licensee to construct in those areas (or else forfeit the entire license) reduces the economic surplus the provider expects from its investment, resulting in distortions that could harm wireless coverage in the industry overall. Total Loss will inevitably reduce the rate of return on buildout projects related to the license because the provider is forced to build out to areas that could be unprofitable.

26. Total Loss is also problematic because when licensees bid for spectrum, they do not have perfect knowledge of the profit streams that will result from all the areas covered by the license, despite their pre-auction due diligence. As discussed in Section II.A, they must rely on predictive economic models to determine the likely return from the investment. Thus, even if in the pre-purchase planning stages the prospective licensee thinks the economics support some of the additional construction, reality can diverge from the predictions of the economic model. So it is important for the licensee to have some flexibility not to build out to an unreasonably high percentage of the population or area. Removing this flexibility would reduce the future licensees' willingness to pay, reduce demand for spectrum (including secondary markets), and ultimately depress auction revenues.

**C. An economically more efficient path to achieve the Commission's goals is with market-based programs**

27. Sound economic analysis supports the view that new construction requirements that create market distortions and reduce economic welfare should be avoided in favor of market-based solutions for expanding services to unserved and underserved areas, or targeted government subsidies for areas that may remain unserved even with economically sound policies that maximize private investment. As described above, imposing additional buildout requirements will create adverse incentives for service providers to spend less on licenses, invest less in infrastructure, and potentially reduce expansion of mobile broadband. A more efficient and welfare-enhancing path is to use market-based programs where needed.

28. Retrospectively changing the parameters of spectrum usage rules, which were not reflected in market prices for existing licenses, is tantamount to raising licensees' costs or reducing "quality" of the license, and will create adverse economic externalities in the marketplace. And reducing licensees' flexibility to use spectrum in an optimal manner effectively reduces the value of spectrum licenses and will result in lower demand and lower future spectrum auction revenues, as well as adversely affecting secondary markets for spectrum. Thus, implementing rules that require multiple licensees to build out in areas where not even one licensee has a business case for doing so is counterproductive and diverges from market-based equilibrium outcomes. Having to redistribute capital in this manner reduces competition and could lead to higher prices and degraded performance and quality for consumers, especially in heavy-demand areas where additional capacity is needed the most.

29. The Commission's proposals would threaten a competitive marketplace that continues to invest in expanding wireless coverage. The Commission's recently released annual report and analysis of competition in the U.S. mobile wireless industry finds that the wireless marketplace is functioning efficiently and benefitting consumers, as output and quality continue to increase, while prices continue to fall:<sup>20</sup>

- Consumer demand and output continue to increase. The total number of mobile wireless subscriber connections grew by about 5%, data volume increased by 42%, monthly data usage per smartphone subscriber increased 39%.
- Average revenue per subscriber (or ARPU) fell by 7%.
- Wireless service providers have invested \$200 billion over the past seven years, and hundreds of billions of dollars are expected to be invested during the next several years. Between 2013 and 2016, nearly 4,000 new cells sites were added.
- Service quality and speeds continue to improve. The average LTE download speed increased over 60% between 2014 and 2017.
- Access to spectrum continues to improve as the Commission continued to make spectrum available at auctions in recent years.
- Innovation and new technologies continue to come to market as evidenced by the rapid deployment of and upgrades to LTE, and 5G cellular is in trial phases and could come to market soon.

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<sup>20</sup> *Twentieth Annual Report*, ¶¶ 5-10.

30. There is no economic justification for adopting additional buildout requirements. The current construction obligations have resulted in an economic environment that has benefitted consumers in terms of pricing, quantity, quality, and access. There is no market failure by any reasonable metric considered, and all indications point to highly competitive behavior by wireless providers. And this is not limited to metropolitan areas; the Commission's current policies have also benefitted rural areas. The current construction requirements have resulted in very high proportions of the rural population gaining access to LTE service providers. As shown in Table 1, the average number of tower sites per county in rural areas has increased by over 30% between 2015 and 2017.<sup>21</sup> Even counties with extremely low population densities have seen increases in tower sites.<sup>22</sup>

31. Not only has the number of tower sites increased, but Table 2 shows that there have been steady increases in the share of the rural population in the U.S. with LTE coverage. In 2016, nearly 99% of the rural population had at least 1 LTE service provider and over 95% had at least two providers. Large gains have been made in the percentage of the rural population with access to at least three providers—an increase from about 65% in 2014 to 84% in 2016. Thus, the current economic environment (without the proposed construction requirement rules) has not hampered the expansion of LTE coverage by service providers in rural communities, and there is no reason to believe this will not continue.

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<sup>21</sup> Density is based on county population density measured in persons per square mile. See *Twentieth Annual Report*, Chart II.F.2, and In the Matter of Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services, Eighteenth Report, Before the Federal Communications Commission, WT Docket No. 15-125, FCC DA 15-1487 (rel. Dec. 23, 2015) (hereafter, *Eighteenth Annual Report*), Chart IV.B.2.

<sup>22</sup> Even counties with fewer than 1 person per square mile had an increase in the number of tower sites from 5 to 6.1, or 22% growth. These are extremely sparsely populated counties in rural areas. To put it in perspective, if Manhattan had such a population density, fewer than 23 people would live there.

**Table 1: Average Tower Sites per County (Rural Areas)**

Density	2015	2017	Growth
<= 1	5.0	6.1	22.0%
(1, 10]	9.3	12.8	37.6%
(10, 25]	15.4	20.3	31.8%
(25, 50]	20.9	27.6	32.1%
(50,75]	27.9	38.3	37.3%
(75, 100]	33.3	45.2	35.7%
Average	18.6	25.1	34.4%

Sources: *Eighteenth Annual Report*, Chart IV.B.2;  
*Twentieth Annual Report*, Chart II.F.2.

**Table 2: Percentage of Rural Population with LTE Coverage**

Number of Providers	2014	2016	Growth
At Least 1	97.9%	98.7%	0.8%
At Least 2	90.0%	95.1%	5.7%
At Least 3	64.8%	84.0%	29.6%
At Least 4	40.7%	56.9%	39.8%

Sources: *Eighteenth Annual Report*, Chart III.A.5;  
*Twentieth Annual Report*, Chart III.D.12.

32. Access to additional service providers in the marketplace would be expected to enhance consumer welfare (all else equal), but a proper analysis of the Commission’s proposed rules must consider the economic reality that some areas are inevitably too costly for multiple providers to build out. Programs that are already in place are better suited to address any lack of wireless broadband coverage to unserved and underserved areas. One example is the Mobility Fund, which will allocate up to \$4.5 billion over the next ten years to “advance the deployment of 4G LTE service to areas that are so costly that the private sector has not yet deployed there and to preserve such service where it might not otherwise

exist” so that “that rural consumers will be adequately served by the mobile carriers receiving universal service support.”<sup>23</sup>

33. The Mobility Fund program is designed to ensure that the winning bidders provide robust LTE services to rural areas that are comparable to the quality and pricing enjoyed by non-rural areas.<sup>24</sup> Because it will employ a multi-round reverse auction, funding is awarded to the bidder willing to provide the LTE services for the lowest subsidy level. Thus, the use of a reverse auction allows the market to determine the support necessary to bring LTE to underserved or unserved areas, and that the support is distributed efficiently and in a timely manner.<sup>25</sup>

34. Market-based programs, such as the Mobility Fund, are an optimal means, and preferable way, to create an economic environment that will help increase wireless broadband coverage to unserved and underserved areas, consistent with the Commission’s goals.<sup>26</sup> Current incentive programs that are working to close the digital divide obviate the need to implement additional rules that will be burdensome, create uncertainty and depress future auction revenues, will likely have adverse effects on buildout, and could result in other unintended consequences that impede wireless broadband expansion.

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<sup>23</sup> In the Matter of Connect America Fund Universal Service Reform – Mobility Fund, Report and Order and Further Notice of Proposed Rulemaking, Before the Federal Communications Commission, WC Docket Nos. 10-90 and 10-208, FCC 17-11 (rel. Mar. 7, 2017) (hereafter, *Mobility Fund Order*), ¶ 2.

<sup>24</sup> Key aspects of the Mobility Fund include: (i) Support will be available for geographic areas that are unserved by LTE at a speed of 5 Mbps or more, or have LTE coverage only from a “subsidized” carrier; (ii) The Commission will use a nationwide multi-round “reverse auction” to select funding recipients, and it will fund only one provider in any area; (iii) Winning bidders must meet certain LTE service standards, including requirements on upload/download speeds, service plan requirements, and that rates are within reasonable ranges of similar service plans offered by mobile wireless providers in urban areas; (iv) Carriers must meet certain build out coverage requirements (at least 85% of their funded area in a state within 6.5 years from the end of the auction, with a minimum of 75% buildout in any census tract); and (v) Mobility Funding recipients must allow for reasonable collocation by other providers on all towers that they own or manage in the areas for which they receive support.

<sup>25</sup> *Mobility Fund Order*, ¶ 18. (“Utilizing an auction mechanism will allow us to distribute support consistent with our policy goals and priorities in a transparent, speedy, and efficient manner. An auction provides a straightforward means of identifying those providers that are willing to provide 4G LTE service at the lowest cost to the budget, targeting support to prioritized areas, and determining support levels that awardees are willing to accept in exchange for the obligations we impose.”)

<sup>26</sup> Moreover, reducing regulatory burdens would also be a more efficient path to encouraging buildout in rural areas. Regulations can cost time, money, and divert resources away from the core function of the business. See, e.g., Gary Banks, “Reducing the Regulatory Burden: The Way Forward,” Inaugural Public Lecture, Monash Centre for Regulatory Studies, May 17, 2006.

35. The Mobility Fund and other market-based programs to expand wireless broadband access to rural areas should be given sufficient time to work before additional buildout requirements and penalties are considered. And any new requirements, should they be necessary, ought to only apply to new licenses in the future. This would allow the market to efficiently price in the new rules, and thus would avoid creating negative externalities and effectively punishing licensees who purchased the spectrum years ago and who have fulfilled or are on their way to fulfilling the existing buildout requirements.

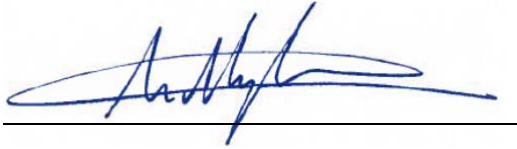
36. Finally, removing barriers to wireless infrastructure investment will increase investments in underserved or unserved areas. As the Commission has recognized, service providers must continue to invest in wireless infrastructure to meet the nation's wireless broadband needs and there is "an urgent need to remove any unnecessary barriers to such deployment [...]" as part of the Commission's effort to "expedite wireless infrastructure deployment."<sup>27</sup> Reducing unnecessary rules and regulations that increase the cost of wireless broadband expansion to underserved or unserved areas will more efficiently achieve the Commission's policy goals without any of the adverse effects and unintended consequences that are likely to result from requiring additional construction.<sup>28</sup>

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<sup>27</sup> In the Matter of Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Investment, Notice of Proposed Rulemaking and Notice of Inquiry, Before the Federal Communications Commission, WT Docket No. 17-79, FCC 17-38 (rel. Apr. 21, 2017), ¶¶ 2-3.

<sup>28</sup> See, e.g., Michael L. Katz, "Antitrust or Regulation? US Public Policy in Telecommunications Markets" in Pierre A. Buigues and Patrick Rey (Eds), *THE ECONOMICS OF ANTITRUST AND REGULATION IN TELECOMMUNICATIONS*, 2004, at 251. ("The decision whether to keep regulation should be based on forward-looking costs. In doing so, it should be recognized that the largest and most important costs are likely to be the costs of unintended consequences (for example, the stifling of investment or innovation incentives) [...]" )

Executed on October 2, 2017



Aren Megerdichian  
Los Angeles, CA

# **Exhibit A**

## *Curriculum Vitae*

Aren Megerdichian, Ph.D.



## AREN MEGERDICHIAN

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### **EDUCATION**

Ph.D., University of California, San Diego, 2010  
 M.A., University of California, Santa Barbara, 2005  
 B.Sc., California State Polytechnic University, Pomona, 2000

### **EXPERIENCE**

Sept. 2010 – Present	<i>Senior Vice President</i> (as of March 2017) – Compass Lexecon, Los Angeles
Sept. 2005 – Mar. 2010	<i>Lecturer, Teaching Associate</i> – University of California, San Diego
Aug. 2007 – Aug. 2009	<i>Associate Lecturer</i> – San Diego State University, College of Business
Feb. 2001 – Sept. 2004	<i>Senior Associate</i> – LECG, Los Angeles
Sept. 2000 – Dec. 2000	<i>Intern</i> – Office of Congressman Tom Campbell, Washington DC

### **PRESENTATIONS**

New York State Bar Association Antitrust Law Section, participating economic expert in a price-fixing mock trial, May 2017

*Econometrics or Just a Con? Uses and Abuses of Data and Statistics in Competition Cases*, Los Angeles County Bar Association, May 2015

*Demand Estimation, Optimal Pricing, and Product Downsizing*, Kellogg Corp., August 2010

*Identification of Price Effects in Models of Demand for Differentiated Products*, UC San Diego Economics Department, Applied Microeconomics Seminar, November 2009

### **RESEARCH**

*Further Results on Interpreting Coefficients in Regressions with a Logarithmic Dependent Variable*, forthcoming in JOURNAL OF ECONOMETRIC METHODS, July 2017, pre-print version available at:  
<https://www.degruyter.com/view/j/jem.ahead-of-print/jem-2016-0015/jem-2016-0015.xml>

*Statistical Sampling in Legal and Regulatory Proceedings: Methods, Insights, and an Economic Model of Optimal Sample Size*, Working Paper, 2017, available at:  
[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3037483](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3037483)

*Identification of Demand for Differentiated Products*, Economics Ph.D. Dissertation, UC San Diego, 2010

## **SELECTED CONSULTING ENGAGEMENTS**

Mars Inc. + VCA (2016-2017): FTC merger investigation. Analyzed competition and geographic markets for pet hospitals based on customer draw data; Conducted econometric analyses to quantify effect of competition on pricing; Presented results to FTC.

Plum PBC v. SunOpta and Cheer Pack (2016): Litigation. Estimated econometric models to determine the adverse effects of a product recall on sales and profitability.

Mars Inc. + Pet Partners LLC (2016): FTC merger investigation. Analyzed competition and geographic markets for pet hospitals based on customer draw data; Presented results to FTC.

AT&T (2016-present): Consulting. Assisted with compiling fiber-to-the-premises location data for biannual submissions to the FCC in requirement of the AT&T-DIRECTV merger conditions.

Dell + EMC/VMware (2015-2016): FTC merger investigation. Analyzed competitive effects in enterprise storage systems; Developed vertical foreclosure model analyzing the post-merger incentive to foreclose server virtualization software. Presented results to FTC.

Valspar v. DuPont et al. (2015-2016): Litigation. Estimated overcharge regression models on behalf of defendants to rebut plaintiff's claims of damages from alleged price fixing in the titanium dioxide industry.

AT&T + DIRECTV (2014-2015): FCC/DOJ merger investigation. Analyzed the competitive effects and efficiencies of the merger; Developed economic models to assess the impact of the merger on AT&T's incentives to expand its fiber broadband footprint.

Nestlé USA (2014, 2016): Consulting. Estimated econometric models to determine the adverse effects of a product recall on sales and profitability.

Kellogg Co. (2014): Consulting. Estimated demand systems for cereal bars in the U.K. using supermarket scanner data; Conducted merger simulation to assess unilateral effects from a hypothetical merger.

Sterigenics + Nordion (2014): FTC merger investigation. Developed vertical UPP models to assess foreclosure and pricing incentives of upstream and downstream firms.

In Re Optical Disk Drive Antitrust Litigation (2012-2015): Litigation. Estimated overcharge regression models to rebut direct & indirect plaintiffs' allegations of common impact and to discredit plaintiffs' proposed econometric methodology for damages; Analyzed alleged bid-rigging in procurement auctions.

Western Pacific Kraft v. Duro Bag Manufacturing (2012-2014): Litigation. Analyzed data and other evidence on behalf of defendant to assess liability related to price squeeze allegations and other alleged anticompetitive pricing practices in the paper bag industry.

In Re Chocolate Confectionary Antitrust Litigation (2013): Litigation. Estimated pass-through regression models to rebut indirect purchaser plaintiffs' damages model and allegations of commonality.

Verizon + Comcast/Time Warner/Cox/Bright House (2012): DOJ/FCC investigation. Developed UPP models to assess the potential impact of the agency arrangement and joint venture on pricing incentives and footprint expansion; Analyzed coordinated effects theories.

Advantest + Verigy (2011): DOJ merger investigation. Developed econometric models to determine the relationship among profit margins, market concentration, and firms' bidding activity in the semiconductor testing equipment industry; Assessed unilateral and coordinated effects.

Kellogg Co. (2007-2010): Consulting. Estimated demand systems using supermarket scanner data for cereals to assess optimal pricing and analyze the effect of product downsizing on sales.