

Regulation in Financial Translation:

Will the Incentive Auction Increase Mobile-Broadband Competition in Rural America?

Anna-Maria Kovacs, Ph.D., CFA

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Anna-Maria Kovacs is a Visiting Senior Policy Scholar at Georgetown University's Center for Business and Public Policy. She has covered the communications industry for more than three decades as a financial analyst and consultant. The author thanks Professor John Mayo of the Center for his extensive, helpful comments.

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In his April 25th entry on the Federal Communications Commission's (FCC) blog, FCC Chairman Wheeler writes: "The low-band spectrum we will auction is particularly valuable because it has physical properties that increase the reach of mobile networks over long distances at far less cost than spectrum above 1GHz....Today, however, two national carriers control the vast majority of that low-band spectrum. This disparity makes it difficult for rural consumers to have access to the competition and choice that would be available if more wireless competitors also had access to low-band spectrum."¹

While it is true that low-band spectrum can travel greater distances than high-band spectrum, the extent to which that results in larger cell-sites, and therefore lower cost, depends on many factors, particularly terrain and the line-of-sight it permits. But even assuming cost per square mile could be equalized between rural and urban areas, that would only solve one of the two challenges that face rural wireless carriers. The greater disincentive to rural investment is lack of revenue per square mile.

Moreover, given the reality of carriers' nationwide pricing plans, the prices paid by rural customers are the same as those paid in urban areas; so the benefits of competition are surely flowing to rural areas even where there are fewer competitors.

Figure 1

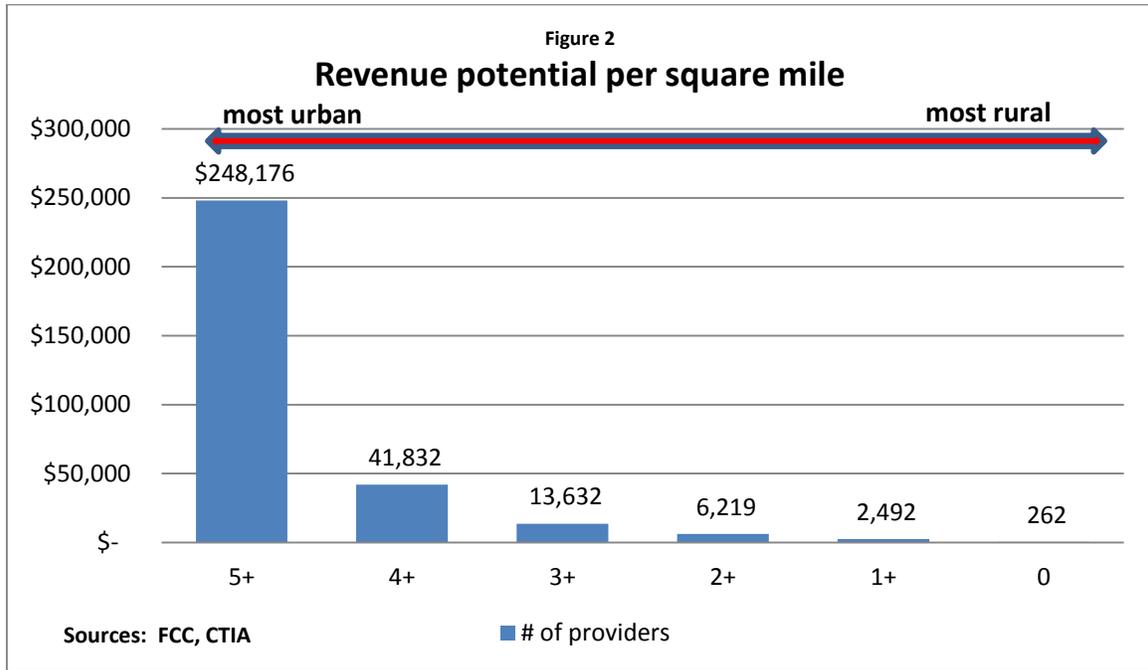
providers	Population (POPS)	sq miles	POPS per sq mile	% POPS	% land	revenue potential per sq mile (\$)	revenue potential per area (\$)
5+	251,071,000	607,000	413.6	80.4%	16.0%	248,176	150,642,600,000
4+	39,043,000	560,000	69.7	12.5%	14.7%	41,832	23,425,800,000
3+	13,564,000	597,000	22.7	4.3%	15.7%	13,632	8,138,400,000
2+	6,613,000	638,000	10.4	2.1%	16.8%	6,219	3,967,800,000
1+	1,753,000	422,000	4.2	0.6%	11.1%	2,492	1,051,800,000
0	427,000	978,000	0.4	0.1%	25.7%	262	256,200,000
total	312,471,000	3,802,000	82.2	100%	100%		187,482,600,000

Data from the FCC's *16th Wireless Competition Report* helps elucidate the issue.² Figure 1, based on the FCC *Report's* Table 5, shows that 93 percent of all Americans currently have access to four or more wireless voice carriers, and over 98 percent of American have access to 2 or more wireless voice service providers. Most important, 99.9% of Americans have access to at

¹ Chairman Tom Wheeler, "Ensuring a Fair and Competitive Incentive Auction," April 25, 2014, Federal Communications Commission blog.

² Federal Communications Commission, *Sixteenth Wireless Competition Report*, March 19, 2013, Table 5, p. 48, (showing a range of 0 to 5+ carriers), and tables 2 and 3, pp. 45-46. Figure 1 above uses the data provided in the FCC report's Table 5, which shows the number of carriers that provide wireless voice service to various parts of the U.S. as well as the population (POPs) and landmass of those areas. FCC Tables 2 and 3 show the number of POPs served by each carrier.

least one provider. FCC Table 2, which shows how many POPs each carrier currently serves, shows that much of the area served by only one wireless voice carrier is served by AT&T, one of the two national carriers whose ability to buy spectrum in the Incentive Auction would be restricted.³



That nearly universal coverage exists is all the more remarkable in view of the nearly thousand-fold disparity in revenue per square mile between the most urban and most rural areas. As Figures 1 and 2 show, the area with 250 million POPs, at \$600 per POP, represents potential revenue of \$150 billion. Spread over 607 thousand square miles that translates to \$248 thousand per square mile. An area with 427 thousand POPs represents a revenue potential of \$256 million. Spread over 978 thousand miles, that represents \$262 per square mile.⁴

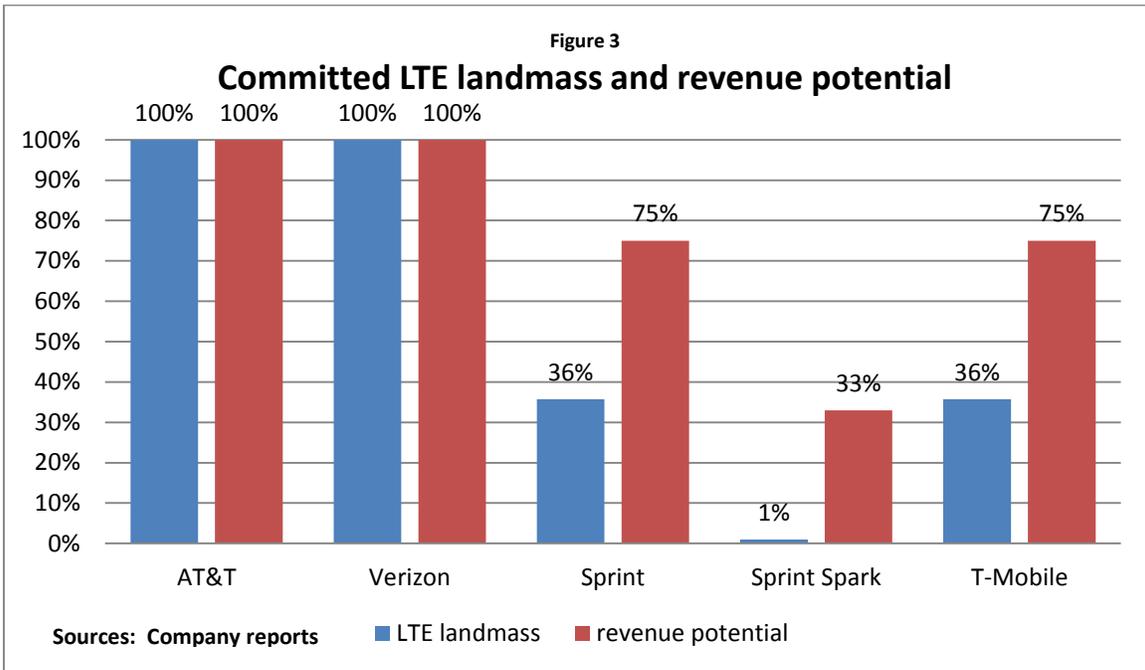
The discussion in the record of this proceeding of low- v. high-band spectrum has focused almost entirely on cost per square mile and on the hope that providing low-band spectrum to additional competitors will induce them to enter sparsely-populated areas. However, these extreme variations in revenue per square mile are not affected by the type of spectrum that is deployed. Revenue per square mile is a function of the number of people available to buy the service, pure and simple. Even if the cost of network infrastructure could be lowered to parity between the two areas—which is not expected-- the difference in revenue potential is prohibitive. The proposed design of the Incentive Auction is based on the hope that Sprint and T-Mobile, if given cheap low-band spectrum, will be motivated to expand their coverage to rural areas, beyond the traffic corridors that must be covered to serve their densely populated urban areas.

However, neither Sprint nor T-Mobile has committed to bringing LTE to rural areas, i.e. the 84% of the U.S. landmass that houses 19.6% of the population. Instead, they have each committed to Wall Street that they would cover about 250 million POPs with LTE, far fewer than their current

³ FCC, *Sixteenth Wireless Competition Report*, Table 2, p. 45.

⁴ That is, if there were a carrier in the area that is currently unserved and averages roughly 0.4 POPs per square mile, that carrier could aspire to \$262 per square mile in revenue.

voice coverage.⁵ Indeed, those are just the urban areas whose revenue potential is \$248,176 per square mile.⁶



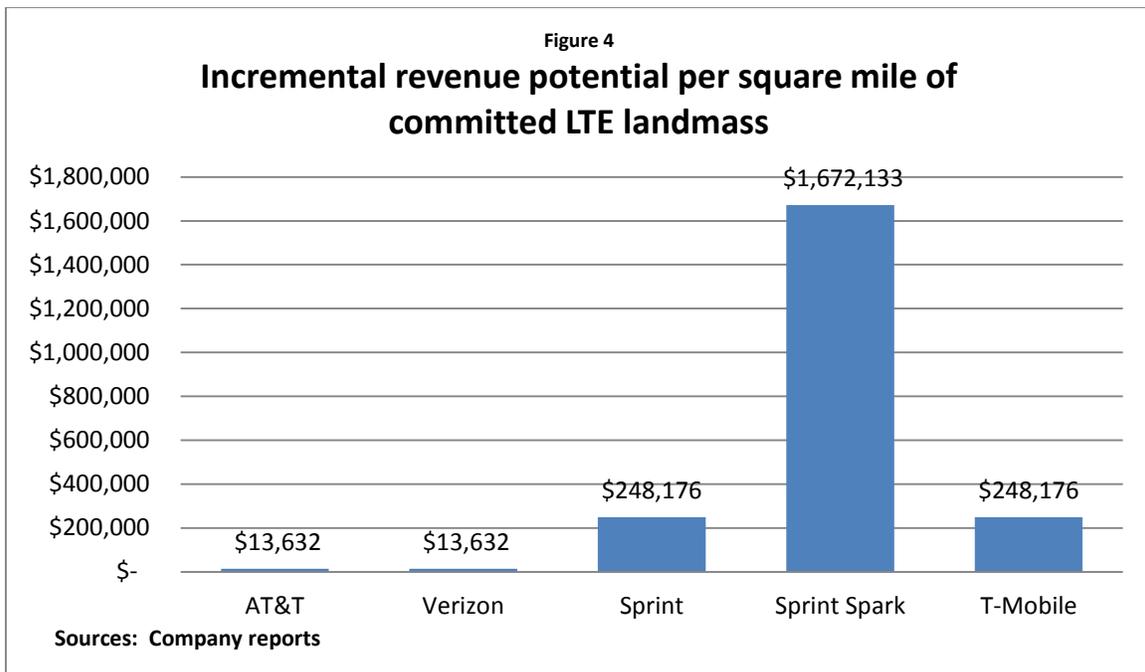
Sprint is even more focused on the 100,000 million POPs who live in an even higher revenue-potential subset of urban America, the top 100 U.S. markets. These occupy roughly 1% of the U.S. landmass, 37 thousand square miles.⁷ Sprint plans to use its ample 2.5 GHz spectrum to bring Spark, super-high-speed LTE, to those very dense urban areas, where the revenue potential is an astounding \$1,672,133 per square mile.

Those goals are unlikely to change simply because the FCC provides low-band spectrum at below-market prices. No matter how cheap the spectrum, no matter how good its propagation characteristics, the lack of revenue potential in the markets that are not currently addressed by Sprint and T-Mobile remains a deterrent to investment.

⁵ FCC, *Sixteenth Wireless Competition Report*, Table 2, p. 45.

⁶ Analyst presentations and webcasts of Sprint and T-Mobile for year-end 2013 financial reports, available on their investor relations websites. To be precise, T-Mobile’s Chief Technology Officer Neville Ray said on March 5, 2014 at the Morgan Stanley Technology, Media & Telecom conference that T-Mobile plans to reach “approximately 250 million POPs, maybe a little bit more.” Thomson Reuters transcript, p. 2.

⁷ U.S. Census, 2010 Decennial Census Summary files used to rank U.S. population by density.



AT&T and Verizon have, in contrast, committed to covering 300 million POPs with LTE over their own networks. Covering 300 million POPs with LTE requires covering roughly 3 times the landmass that is needed to cover 250 million POPs, 1.7 million square miles v. 0.6 million square miles. They will not only cover the areas Sprint and T-Mobile cover, but will cover areas whose revenue potential is \$13,632 per square mile, less than a tenth of the potential of the Sprint and T-Mobile areas. Verizon already does so, AT&T is within 5% of the goal and will complete the final stretch by mid-summer.⁸

Not only do AT&T and Verizon cover rural America, but they do so using national pricing plans which assure rural subscribers of the same prices as urban subscribers. Thus, the absence of additional national competitors will not create higher prices for rural Americans, who will continue to enjoy the same benefits as urban Americans from AT&T and Verizon, as well as from rural carriers.

While this paper has focused on the four national carriers, small and midsize rural carriers provide a valuable service in covering parts of rural America. It is important for them to have access to spectrum and they have, indeed, been able to buy spectrum in prior auctions which were open to all bidders. Some rural carriers have also become part of Verizon's partner program to provide LTE on Verizon's spectrum outside Verizon's own 300 million POP footprint. U.S. Cellular operates on licenses, including 700 MHz licenses, it bought either at auction or in the secondary market.⁹ Bluegrass Cellular, Cellcom, and Cellular One, to give a few examples,

⁸ Analyst presentation, investor relations bulletins, and webcasts for Verizon, third quarter 2013 and first quarter 2014 and AT&T, fourth quarter 2013 and first quarter 2014. Verizon committed to covering its current 3G footprint with its own LTE and partnering with others on Verizon's spectrum for additional coverage. Its own buildout was completed in q3'13. As of the end of first quarter, Verizon and its partners covered 305 million POPs with LTE.

⁹ LeRoy Carlson, President and CEO of TDS/U.S. Cellular said at the February 10th Stifel Nicolaus conference: "We have assembled a lot of spectrum over a number of auctions and purchases in the secondary market." Thomson Reuters transcript, p. 4.

operate via licenses owned by themselves or affiliates in the 700 MHz and or 850 MHz bands and are also partners in the Verizon program.

Other small carriers, having bought spectrum and decided that they could not afford to build out, have sold the spectrum in the secondary market. Given the economics of rural areas—high cost and very low revenues per square mile—it is unfortunate but not surprising that some chose to exit by selling their spectrum. It is fortunate, however, that an active secondary market in spectrum existed to enable them to do so, not just for their sake but for the sake of those rural carriers who continue to serve. Those carriers who have retained and operate their spectrum would not have been able to get the financing they needed to buy that spectrum if they had not been able to show their investors a potential exit strategy.

Rural carriers present a very different profile in the Incentive Auction than T-Mobile and Sprint. Not only are the rural carriers willing to serve the low-revenue areas, but some may be financially more fragile.¹⁰ Given that the rural carriers have been able to buy spectrum in open auctions and on the secondary market in the past, one can debate whether they need the FCC to guarantee that they will be able to buy spectrum at a discount from the prices paid by AT&T and Verizon.¹¹ But there is, at least, a basis for that debate in that they serve rural America. The challenge they present to the FCC is also relatively mild—the amount of low-band spectrum a rural carrier would need to enhance its service is relatively small.

Sprint and T-Mobile, on the other hand, have made no commitment to bring LTE to rural America. They are owned by Softbank and Deutsche Telekom, multinational corporations that can easily help them raise the funds needed to buy spectrum at full market value.¹² They have asked the FCC to reserve large portions of the Auction spectrum for them to buy at low prices with no commitment to bring LTE to rural Americans and no financial hardship to justify that gift from American taxpayers.

¹⁰ For the most part, rural carriers are privately held and their financials are not publicly available for analysis.

¹¹ Chairman Wheeler's blog explains that the Auction is designed "to prevent one or two wireless providers from being able to run the table at the auction." Once the auction reaches a trigger based on meeting a yet-to-be-determined threshold, he writes: "wireless providers with a dominant low-band position in a license area will be constrained from bidding on a few "reserved" spectrum blocks" while the others bidders will be able to bid on all spectrum. He also notes that the reserve will not exceed 30 megahertz. How much of the amount of spectrum available for sale that represents will not be known until the broadcasters offer their spectrum for sale. How much they offer will, in turn, depend on the prices they can get for their spectrum.

Given that the FCC controls the auction, AT&T and Verizon have no way to "run the table," i.e. win spectrum away from others, except by bidding a higher price than the other bidders. Thus, the reserved blocks are a way of ensuring that bidders other than AT&T and Verizon will be able to buy considerable amounts of spectrum at below-market prices. That, in turn, will not only lower the amount AT&T and Verizon can buy, but may lower the total amount available for sale to all bidders, since it may lower the total proceeds of the Auction and, thus, the amount of spectrum broadcasters are willing to sell.

¹² Softbank raised \$16.7 billion in cash (and issued additional equity) to buy Sprint. Reuters is reporting on May 1, 2014 that it has raised another \$50 billion to buy T-Mobile. Deutsche Telekom has made it clear that it wants to exit the U.S. However, it has a very strong balance sheet and could help T-Mobile raise funds for the Auction, were that necessary. In fact it is unlikely to be necessary. In May, 2013, T-Mobile acquired MetroPCS for \$1.5 cash plus additional equity. T-Mobile also raised \$3.8 billion in a combination of \$1.8 billion debt and \$2.0 billion equity in January 2014 to buy spectrum from Verizon for \$3.3 billion. Softbank and Deutsche Telekom are, of course, also investing currently outside the U.S.

While the propagation characteristics of the low-frequency spectrum which will be auctioned in the Incentive Auction are attractive for rural areas, that is not their only use. While low-frequency spectrum may lower the costs of serving rural areas, a critical determinant of what firms will do with the spectrum will depend on the revenue side. As we have seen, the revenue potential is massively higher in the more densely populated areas than in remote areas. The reality is that not many customers exist in rural areas and this fact drastically shifts the profit calculus for firms as they bid for spectrum. The result is that attempts to lower the cost to favored competitors under the assumption that they will compete for rural customers is likely to backfire. The FCC is unlikely to incent T-Mobile or Sprint to use any newly-gained spectrum to build out into rural areas, as their LTE commitments to Wall Street show.

By limiting the additional low-band spectrum that can be bought by those two national carriers who actually serve rural America in the hope that the other two national carriers will enter those markets, the FCC is more likely to harm than help rural consumers, who need all the bandwidth their serving carriers can supply. Those willing to serve will lack capacity to meet rural subscribers' explosive demand for mobile broadband, while those who are given capacity have indicated no willingness to serve.