

**STATEMENT**  
**OF**  
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**FOR HEARING**  
**“PROMOTING BROADBAND, JOBS AND ECONOMIC GROWTH**  
**THROUGH COMMERCIAL SPECTRUM AUCTIONS.”**

**BEFORE THE**  
**SUBCOMMITTEE ON COMMUNICATIONS AND TECHNOLOGY**  
**COMMITTEE ON ENERGY AND COMMERCE**  
**UNITED STATES HOUSE OF REPRESENTATIVES**

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Thank you, Chairman Walden, Ranking Member Eshoo, and other members of the subcommittee for this opportunity to testify on the topic of promoting Broadband, jobs and economic growth through commercial spectrum auctions.

My name is Michelle Connolly. I am an Associate Professor of the Practice in the Economics Department and served as the Chief Economist of the FCC from 2006-2007 and again in 2008-2009. Please also note that I worked under the Republican administration and am supporting the FCC proposal because of its economic and social value and not because of any political affiliations.

It is in my capacity as an economist and someone familiar with FCC and its auction design that I am here today. The FCC is currently requesting authorization from Congress to undertake incentive auctions to allow at up 120 MHz of high quality spectrum currently used by Television (TV) broadcasters to be reallocated to a more economically beneficial use. The goal is to free up additional spectrum for broadband. Inherently this assumes that the economic and social gains to our country from gaining additional spectrum for broadband outweigh the economic and social costs of compensating TV broadcasters for voluntarily agreeing to vacate their current channels in favor of either relocation to new channels, channel sharing, or ceasing over the air transmissions.

### **Economic and Social Benefits**

Given the fact that the TV broadcasters will only participate in this auction if the gains from participation outweigh the costs to the broadcasters and that two of the three options for the Broadcasters would not tremendously affect the availability of over the air broadcasts, incentive auctions will help to minimize the impact on broadcasters.

In terms of the economic impact of broadband, there is extensive evidence from academic research of positive effects of broadband on productivity and welfare. Macroeconomic level studies have generally focused on Information Communications Technology (ICT) and its impact on labor productivity and per capita gross domestic product (GDP). For example academic research by different authors has found that ICT contributed to between 56 to 67% of labor productivity in the U.S. in the late 1990s and 38% of labor productivity growth from 2000 to 2006.<sup>i</sup>

More disaggregated studies suggest that these observed aggregate effects are specific to particular communities and industries. In other words, the observed positive effects of broadband appear to occur in particular industries and/or communities with specific traits and do not appear to lead to productivity and growth effects in other industries/communities.<sup>ii</sup> Conversely, on the consumer side, gains are not region-specific, but are likely affected by network effects.

Broadband availability, speed, and usage are crucial to continued U.S. growth, innovation, and welfare. This means that our goals should not only be to make more spectrum available for broadband, but also that we should make it available as soon as possible. Allowing Broadcasters to voluntarily participate in a reverse-auction (“incentive auction”) and thereby receive compensation for vacating their licensed spectrum is expedient and will allow for more timely repurposing of hopefully a large amount of this premium spectrum. To this effect, I think that the current FCC proposal for incentive auctions are of great potential benefit to our economy, and further, will help generate income for the government.

### **Incentive Auctions**

FCC has a tremendous amount of experience and expertise in the design of auctions. Still this will be a far more complex auction than held in the past and will require a great deal of research and planning. The FCC undertook similar research when it first began auctioning spectrum. This included, but not limited to, working with academic specialists in auction theory and design. I have confidence in the ability of the FCC staff to again undertake such a task. However, given that the FCC itself does not yet know exactly how to optimally execute the auction, it will need flexibility in designing the auction.

I have been asked to estimate a range of possible prices/MHz/pop for both the reverse and forward portions of an auction of the spectrum under consideration. This is a delicate proposition given that there will likely be a wide range of valuations both on the sell and the buy side.

From the perspective of the broadcasters, they will participate (if they wish) in the reverse-auction. A reverse-auction is an auction where bids reflect the price required by bidders to undertake a certain action. In this case, it will be the price required by a broadcaster to be willing to

vacate their current channel. Hence, broadcasters will be bidding based on the impact of this action on their profits. Broadcasters who lose fewer profits from vacating their current bands, will be willing to move for less compensation, and hence will bid a lower price. Those who would lose greater profits and are less willing to vacate their channel will require a higher price to commit to relinquishing their channel.

Note that this reverse-auction will likely ask for different bids for offers to do different pre-specified actions. For example, the FCC may ask for bids for offers from the broadcasters to do one of three possible things: 1) channel share in the same market, 2) move to an upper VHF or lower VHF band, or 3) discontinue over the air broadcasting. The bids by a broadcaster would differ for each of these since the impact on their profits would differ based on which of these offers is accepted in the auction. Individual TV broadcasters will know their true valuation of these possible outcomes. If there is sufficient competition within a market, and the reverse-auction is designed properly, they will have the incentive to bid their true valuations.

The issue of sufficient competition within a market is not trivial in this case. In order to encourage full competition amongst TV broadcasters within a market, it is necessary that the FCC have the ability to relocate broadcasters to other channels, while compensating the broadcasters being moved for the actual costs of the move. If the FCC were not able to do so, then a broadcaster within channels that the FCC needs to clear to create enough contiguous spectrum, could hold out in an attempt to command a higher than its true valuation required for moving. By allowing the FCC to relocate broadcasters, then all broadcasters within the same market (even if located outside the primary band the FCC hopes to clear) will be competing for the lowest bid.

Since it is impossible for me to know the exact impact on profits each of these actions might have on a given Broadcaster, I cannot accurately estimate the range of bids. It is possible to estimate a wide range based on the minimal and maximal possible impact on profits. The lowest bid will be offered by broadcaster's who's profits are least affected. The highest bid will be offered by broadcasters whose profits would be greatly disrupted by these offers.

To the extent that moving to a different channel might have the least impact on profits, especially if the FCC additionally compensates for the physical costs of moving, then the lower bound on

the range is likely quite low, perhaps as low as \$.05/megahertz-pop. The upper range would occur in the markets with greatest profitability per population. Moreover, the highest bid in that market would likely occur for an offer to discontinue over the air transmission in such a market. With true valuation, that bid would be based on the contribution of over the air households to the broadcaster's overall profitability. An upper estimate of this could be estimated based on the percentage of TV viewing households that rely exclusively on over the air broadcasts. This would further assume that over the air households contribute the same profitability to a broadcaster as all other TV viewing households. Both of these assumptions are likely overestimating the potential impact of losing over the air viewers and hence are reasonable for considering an upper bound. Using the FCC's estimate for the total value of the Broadcast TV Industry of \$63.7 Billion and its estimate that in 2010 only 10 percent of all U.S. TV households watched primarily over the air broadcasts, then the upper range for bids would be \$.08/megahertz-pop.<sup>iii</sup> Of course, if there is not sufficient competition within a market, this range could go significantly higher.<sup>iv</sup>

To estimate a possible range of bids from the forward market, FCC Auction 73 (700 MHz Auction) is quite useful, since the bands under consideration are reasonably similar in traits to the bands in the 2008 auction. In that auction there was wide variation by market. The lowest winning bid was for \$.03/megahertz-pop and the highest bid was for \$3.86/megahertz-pop. Overall values also depended on the exact frequencies being sold. In this proposed auction, there will be similar variation by market and frequency.

It is crucial to further realize that any additional rules imposed either by the FCC or Congress over the use of these bands of spectrum will lower the overall value to bidders in the forward auction and will lower the winning bids. As important as the impact of rules imposed on the spectrum being auctioned, is the impact of uncertainty. Rules that increase uncertainty for bidders will also lead to lower bids.

The FCC will work to find the least costly way to clear various amounts of contiguous spectrum in each market based on the price offers from TV broadcasters. This will allow the FCC to estimate the potential supply of spectrum at different prices. Bids from the forward-market will allow the FCC to estimate the demand for this spectrum at different prices. Given that the goal is to only repurpose up to 120 MHz of spectrum, along with general estimates of the value placed

on use of that spectrum by TV broadcasters relative to mobile broadband, there will be a wide difference in the offer prices and the purchase prices. Hence, even with payments to TV broadcasters, the FCC incentive auction would likely generate large revenues for the government, perhaps in the range of that generated by the 700 MHz auction, which generated close to \$19 billion. More importantly for the overall U.S. economy, it will help move a scarce resource to a more valuable use to our economy and society. The value of optimal usage of this spectrum will likely dwarf the revenues to the government

This will be a difficult undertaking for the FCC. However, if given the authority and flexibility to properly design the incentive auction, it is an undertaking of which the FCC is capable. The benefits of this auction will so greatly outweigh the costs that it is my sincere hope that congress will allow the FCC to undertake this incentive auction.

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<sup>i</sup> Jorgenson (2001). Oliner and Sichel (2000). Stiroh's (2002) Jorgenson, Ho, and Stiroh (2008). Other papers demonstrating positive effects of ICT include Brynjolfsson and Hitt (2003), Waverman, Meschi, and Fuss (2005) Bloom, Sadun, and Van Reenen (2007), and Greenstein and Spiller (1995). For a more complete overview of these studies see Connolly and Prieger (2010).

<sup>ii</sup> Bresnahan, Brynjolfsson, and Hitt (2002), Autor (2001), Corali and Van Reenen (2001), Beaudry, Doms, and Lewis (2006), Kolko (1999, 2002), Autor, Levy, and Murnane (2003), Brynjolfsson and Yang (1997), Koellinger (2006), and Yildmaz and Dinc (2002). Jorgenson, Ho, Samuels, and Stiroh (2007) estimate that "... much of the post-2000 gains reflect faster TFP growth in industries that were the most intensive users of information technology." For a more complete overview of these studies see Connolly and Prieger (2010).

<sup>iii</sup> FCC OBI Technical Paper No. 3, "Spectrum Analysis: Options for Broadcast Spectrum," June 2010, p. 7.

<sup>iv</sup> In the 2010 OBI Technical Paper No. 3 the FCC made a valuation of the range as being from \$0.11 to \$.15. This calculation was however based on an assumption that Broadcasters might fully lose OTA based profits and including both primary and secondary OTA households which would raise the range to between 14 to 19% of total TV households.