Incentive Auction Lessons

Duke University Law School
May 12, 2017
David Salant*
Toulouse School of Economics
and Auction Technologies

*Advised Comcast in the Incentive Auction but these views are mine alone
Overview of Incentive Auction Process and Outcome

What worked well

- Successfully re-purposed 84 MHz of spectrum re-auctioned into 7 blocks of 2x5 MHz each.
- Will contribute more than $7B to the US Treasury
- Allowed #3 MNO to win critical low-band spectrum bringing it closer to parity with #1 and #2 rivals

What did not work so well

- Auction did not help competition.
  - Only “real” entrant was DISH unless financial bidders and/or Comcast create a new MNO. This is despite Verizon never bidding and AT&T dropping to zero demand in Stage 1.
  - No effective discount for reserved blocks. So, what was the point of reserved blocks with restrictions on resale?
- Complexity
  - Why not just use a sealed-bid for reverse auction?
  - Unsold blocks in LA and SD
  - Intra-round bids, Extended Round, Assignment Phase exposure problems.
  - AUCTION DURATION – 1 year
- Price anomalies in reverse auction
  - Some DMA sold high e.g. Harrisburg nearly the same price as Philadelphia as both needed for adjacent regions.
  - However, smaller volume Chicago (Lasalle, IL) HiVHF station sold for approximately 2x price of higher volume Chicago UHF station. Difficult to see how except by taking apart black box CTO and feasibility checking algorithms.
Provisions favoring challengers

• In almost all previous spectrum auctions, incumbents with largest ex ante shares of market win largest blocks of spectrum.
  – AT&T essentially stopped bidding after round 26 of Stage 1.* Did FirstNet award (in 1Q 2017) or Time Warner affect their demand?
  – Verizon never entered a bid.
• T-Mobile had been very public in its desire to win low band spectrum and succeeded.
• However the policy question is whether regulation should try to favor a market with at least four nationwide competitors.
  – The theory and data is not conclusive – limited empirical work indicate some benefits of a 4th operator in some countries.
  – Theory and experience suggest a spectrum reserve is not effective in achieving this goal.
• Spectrum reserve, only triggered late in auction, resulted in average price differential of approximately 1%, with no price differential in 195 of 416 PEAs, and with HIGHER prices for reserved blocks in 81 PEAs.

*AT&T entered bids on Category 2 blocks, but these were unwinnable as the blocks would disappear in the next Stage.
Auction design with externalities – bidders care about how much spectrum rivals win.

Economics literature

Rey and Salant (2017) look at optimal auction design
- If regulator does not weigh auction revenues, it should try to equalize post-auction competition, possibly reserving spectrum for weaker firms.
- If regulator does weigh auction revenues, it will still want to ensure challengers obtain spectrum and possibly at zero cost but allow stronger firms to retain a possibly smaller lead.
Forward auction implementation

• Bidding complexity –
  – Simple bids to retain all activity
  – Simple bids to reduce
  – Shifts in activity could result in undesired reductions in eligibility.
    • EG suppose a bidder with 27,000 BU’s of eligibility wanted to shift from 3 Baltimore/DC blocks (24,900 BU’s) + 1 New Orleans block (740 BU’s) to one NYC block.
    • If all 3 reductions in Baltimore are processed but New Orleans is not processed, then this bidder’s eligibility would decrease to 778 BU’s ( = 740/0.95)
  – All or nothing bids with and without back stopping
  – Each price point for each bid needed checking.
  – Switch bids, especially a concern with reserved and non-reserved blocks.

• Extended round could require a bidder to increase all offers by 25% or more to retain eligibility not knowing which PEAs, if any, will actually go up in price.
Clock Auctions and the Assignment Round

- In theory a clock auction with generic blocks should be faster than an auction with concrete blocks in which bidders can name prices.
- Generic blocks creates an exposure problem, even with the discount in the bidding rules, if the differences in the blocks is large.
- As bidders paid on average less than 1% additional in the Assignment Rounds and there was zero impairment it might appear that any exposure problems were minimal.
- However, the availability of blocks can differ within a PEA by as much as 4 or 5 years. So, the blocks were not generic.
- And detailed analysis of bidding shows bidders were willing to offer up to 100% of clock prices for preferred positions and on average 20 % (24% in high value PEAs) and as much as 203% of the clock prices, and all for 0% impaired blocks!!
Reverse auction

- CTO minimized average impairment and not maximize cleared spectrum
- Why a clock auction?
  - Multiple round auctions only help bidders when there is new information reported between rounds.
  - Staging and CTO contributed to unsold LA and SD blocks
  - Bidders did not want to be required to report final offers except if considering dropping from the auction. But losing bids are not publicly released.
- Bidders were permitted to own multiple stations in DMAs may have adversely affected clearing costs
- Feasibility checker resulted in opaque rule for reducing clock prices.

<table>
<thead>
<tr>
<th>DMA1</th>
<th>Call Sign</th>
<th>Channel</th>
<th>Interference</th>
<th>Interferenc e-Free Population</th>
<th>Volume3</th>
<th>Scaled Volume4</th>
<th>Go Off-Air</th>
<th>Move to Low VHF</th>
<th>Move to High VHF</th>
<th>Final Price</th>
<th>Discount off opening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicago, IL</td>
<td>WOCH-CD</td>
<td>49</td>
<td>118</td>
<td>5,882,148</td>
<td>26,345.65</td>
<td>432004</td>
<td>$388,803,60 0</td>
<td>$291,602,700</td>
<td>$155,521,440</td>
<td>$9,219,110</td>
<td>2.37%</td>
</tr>
<tr>
<td>Chicago, IL</td>
<td>WPWR-TV</td>
<td>51</td>
<td>170</td>
<td>10,050,152</td>
<td>41,334.32</td>
<td>677782</td>
<td>$610,003,80 0</td>
<td>$457,502,850</td>
<td>$244,001,520</td>
<td>$160,748,259</td>
<td>26.35%</td>
</tr>
<tr>
<td>Chicago, IL</td>
<td>WSNS-TV</td>
<td>45</td>
<td>135</td>
<td>9,828,403</td>
<td>36,425.74</td>
<td>597293</td>
<td>$537,563,70 0</td>
<td>$403,172,775</td>
<td>$215,025,480</td>
<td>$141,658,837</td>
<td>26.35%</td>
</tr>
<tr>
<td>Chicago, IL</td>
<td>WWTO-TV</td>
<td>10</td>
<td>189</td>
<td>6,246,736</td>
<td>34,360.34</td>
<td>563426</td>
<td>$304,250,04 0</td>
<td>$177,479,190</td>
<td>NA</td>
<td>$304,250,040</td>
<td>100.00%</td>
</tr>
<tr>
<td>Chicago, IL</td>
<td>WXFT-DT</td>
<td>50</td>
<td>110</td>
<td>9,559,169</td>
<td>32,426.97</td>
<td>531723</td>
<td>$478,550,70 0</td>
<td>$358,913,025</td>
<td>$191,420,280</td>
<td>$126,107,725</td>
<td>26.35%</td>
</tr>
<tr>
<td>Chicago, IL</td>
<td>WYCC</td>
<td>21</td>
<td>111</td>
<td>9,271,314</td>
<td>32,079.84</td>
<td>526031</td>
<td>$473,427,90 0</td>
<td>$355,070,925</td>
<td>$189,371,160</td>
<td>$15,959,957</td>
<td>3.37%</td>
</tr>
</tbody>
</table>
End