

ITS Conference

Spectrum Policy and Auctions: Best Practices from Around the World

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‘The Place of Spectrum Auctions in the Era of 5G’

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What have spectrum auctions ever done for us?

- Efficiency effect: a properly designed auction can direct spectrum to the most efficient users (subject to the winners' curse)
- Rent capture effect: scarcity rents from the natural resource can be captured for public benefit - in an unusually non-distortive way.*

** It looks as if spectrum auction revenues from the start of auctions might amount to something like USD 1 trillion at 2019 prices.*

What happened before auctions?

- Spectrum regulators were subject to capture or adopted strategies of ‘squawk minimisation’
- Assignments were made in incumbents’ interests by discretionary beauty contests
- Broadcasting entrants/innovators were excluded; cf. Tom Hazlett’s tales of the strangling of AM radio in the 1930s and of the ‘murder by spectrum management’ inflicted on the Dumont network in the 1950s
- The strenuous efforts of the UK broadcasting regulator to stifle cable TV is another example

What can possibly go wrong in an auction?

- Auction design: a triumph of the economics profession.

“Everything should be made as simple as possible, but no simpler.”

Choice of design has varied over time, across clock auctions, SRMA, and combinatorial designs, as the disadvantages of each were revealed themselves

Some evidence that more complex designs have generated marginally higher revenues...., possibly in return for lower bidding risk

What else can possibly go wrong?

- Collusion
- Poor design of lots
- Limitations of one-sidedness (save for the wonderful ‘incentive auction’)
- The winner’s curse

Supply-side problems

- Governments can restrict supply to push up auction revenues; the price is paid by consumers of downstream services
- Policy varies over how much spectrum to release and when. When is scarcity artificial?
- Slightly more subtly, packaging of lots can generate a less competitive and more lucrative downstream market place; which enhances auction revenues: cf. Italy

Who sets the auction rules?

- Options are Parliament (eg the Netherlands), government (eg Canada) or an independent agency (most common choice)
- It is a common principle of regulatory design to leave policy choice with government but insulate firm-specific technical or other decisions from political actors

A cautionary tale

- Australian Minister of Communications 2012: “ The regulation of telecommunications powers in Australia is exclusively federal. That means I am in charge of spectrum auctions, and if I say to everyone in this room ‘if you want to bid in our spectrum auction you’d better wear red underpants on your head’, I’ve got some news for you. You’ll be wearing them on your head ... I have unfettered legal power.”
- What resulted: (according to one account) the government, wanting to ‘fix’ a prospective deficit, set a high reserve price; in fact, failure to sell all the spectrum aggravated the deficit and sterilised spectrum for years.

NB: some auctions have been messed up by spectrum agencies too

Can spectrum auctions achieve more than efficiency and scarcity rent extraction at once?

- Yes: they can pursue additional downstream competition goals (via spectrum caps) and recycle some rents via competitively assigned coverage requirements etc. in some or all licences
- Enforceable coverage requirements can discreetly combat the digital divide*
- Over-bidding/hoarding by one or more large operator can attempt to foreclose smaller operators or ‘knockout’ larger rivals. Spectrum caps can control this

** Note: it is generally preferable to promote an output (more coverage) than an input (more investment)*

Can spectrum auctions achieve more than efficiency and rent extraction objectives at once? (cont)

- Enforceable and generic coverage requirements can unobtrusively combat the digital divide, while maintaining competition
- But they are becoming more granular: for example a ‘free of charge’ 4G spectrum licence renewal was offered in France in return for obligations to connect individually specified areas
- This risks loss of all competitive tension and degeneration into bilateral negotiations between the regulator and better informed operator

Impact of auction prices on service prices

- This is constantly at issue - and the subject of unfavourable comment by operators frustrated at what arises from competitive bidding:

“The network rollout in Germany has suffered a significant setback. The price could have been much lower. Once again, the spectrum in Germany is much more expensive than in other countries... Network operators now lack the money to expand their networks. With the auction proceeds one could have built approximately 50,000 new mobile sites and close many white spots.”

Dirk Wössner, Member of the Board of Management of Telekom Deutschland, 2019

Impact on auction prices on service prices 2

- Do high auction prices lead to high service prices or does an expectation of high service prices elevate auction prices? Any proper empirical test must acknowledge this endogeneity
- The ‘surplus’ from below-competitive spectrum prices may accrue to investors, or consumers, or to collateral factors (in the form of the ‘quiet life’)
- The pure ‘sunk cost’ assumption implies zero impact, but the world is much messier
- No need to anticipate a corner solution, especially in view of variability in degree of ‘sunkness’ of the expenditure, and complexity of firms’ forecasting of market outcomes
- Recent studies, using different data sets, have not shown service price effects but have reported coverage impacts
- Policy makers must assess the risks and make the coverage/revenue trade-offs they are paid to make

5G auctions: background

- Distinguish ‘limited’ 5G (cheaper and better than 4G) and ‘expansive’ 5G (densified networks, numerous verticals)
- Both versions will co-exist in any country in proportions determined by number of small cells (currently far more numerous in Asia)
- Increasing difficulty in duplication of dense RANs
- Assignments to verticals (including shared) and bespoke network slicing likely to reduce direct network access to end users

5G strategies and results

- Different approaches:
 - Accelerated/centralised (eg China)
 - Accelerated/deregulatory/market-led (eg US)
 - Gradualist (eg most EU countries)
- Inheritance of small cells (4 times as great in some Asian countries than in US/EU) has a big effect
- New Street Research forecasts for end 2019:

	China	Europe	South Korea	US
5G sites (thousands)	150	5	130	10
5G subscribers (million)	20	3	7	4

Novel features of 5G auctions

- Auctioning of higher bands (so far with fairly predictable results)
- Direct assignment to verticals (requiring set-asides and non-uniform pricing)
- Enhanced facilitation of localised sharing (eg in UK)
- More payment by instalments (eg current Thai auction: 10% down; holiday for 3 years; then 15% a year for 6 years)

Auction design and 5G strategic goals

- Where on the 'limited/expansive' 5G range does the govt. want initially to be?
- The auction could sacrifice revenues to promote more or less territorial coverage and small cell construction
- In both German and Italian auctions, 98/99% population coverage is required in short order, and coverage on major road and rail transport routes. Both countries experienced high auction prices despite - see discussion above.

Winding up

- Spectrum auctions have benefits clearly visible in practice:
 - they promote efficiency and capture rents for society (which can be redeployed in the sector)
 - they can achieve additional objectives relating to competition and the digital divide
 - the alternatives (rather than adaptations) have genuinely awful properties
- But auctions risk defaulting to bad outcomes, absent competitive tension or with-holding of supply
- Auctions should be guided by government policy but otherwise depoliticised

Some more refined lessons*

- Align auctions with policy goals
- Promote competitive bidding
- Avoid artificial scarcity
- Maximise licence duration
- Accompany with secondary trading
- Provide a clear road map of future assignment

*Cave & Solomon: <https://www.ericsson.com/en/public-policy-and-government-affairs/optimizing-spectrum>

“The advanced forum of spectrum resource marketization launched in Beijing May 2018”

<http://www.srrc.org.cn/en/news3900.aspx>



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