

Afterword: Reflections for future auctions

Summary

- The analytical frameworks in this book can be applied to assist policy judgement on the set of decisions needed to design successful spectrum auctions.
- Designing auctions can benefit from a process of innovation, learning, and well-judged use of expertise. Auctions are not fixed in one or a few designs, but can be extensively reshaped in different ways by intelligent regulators, so as to cope with diverse and often problematic market situations. Some countries have preferred to manage complexity by sticking with a familiar auction format that is only incrementally tweaked. By contrast, the UK has tried to continuously evolve the regulators' toolkit in its auctions.
- While the book aspires to derive lessons about best practice, much can still be achieved by avoiding especially undesirable practices, such as not leaving scarce spectrum fallow, applying sufficient expertise to avoid auction design blunders, and refraining from overly restrictive spectrum caps.
- Auctions can also be harnessed in other public policy arenas like environmental challenges and infrastructure procurement to elicit market information which is otherwise hard to obtain, and so mitigate regulatory failure risks.

Spectrum is the lifeblood of mobile networks, delivering services that have transformed the way we live and conduct business, and accounted for 5 per cent of the world economy, more than \$4 trillion, in 2020.¹ The pace of change in technology and digital lifestyles offers the promise of exciting future developments, even if some could potentially also be unsettling. To unlock the dynamic future and address economic and societal challenges, an approach to spectrum management should form part of a coherent vision for designing markets to deliver wide-ranging benefits to the public as consumers, citizens and taxpayers, and to industry and the wider economy. We should not be slaves to an immutable 'market', because markets come in all shapes and sizes. This book shows that by applying

How to cite this book chapter:

Myers, Geoffrey (2023) *Spectrum Auctions: Designing markets to benefit the public, industry and the economy*, London: LSE Press, pp. 215–220. <https://doi.org/10.31389/lsepress.spa.l>. License: CC BY-NC-ND 4.0

expertise and paying attention to an inclusive set of public values, spectrum markets can be designed simultaneously to promote economic efficiency and public purposes through investment, innovation, competition, and universal connectivity.

Using analytical frameworks to make structured judgements

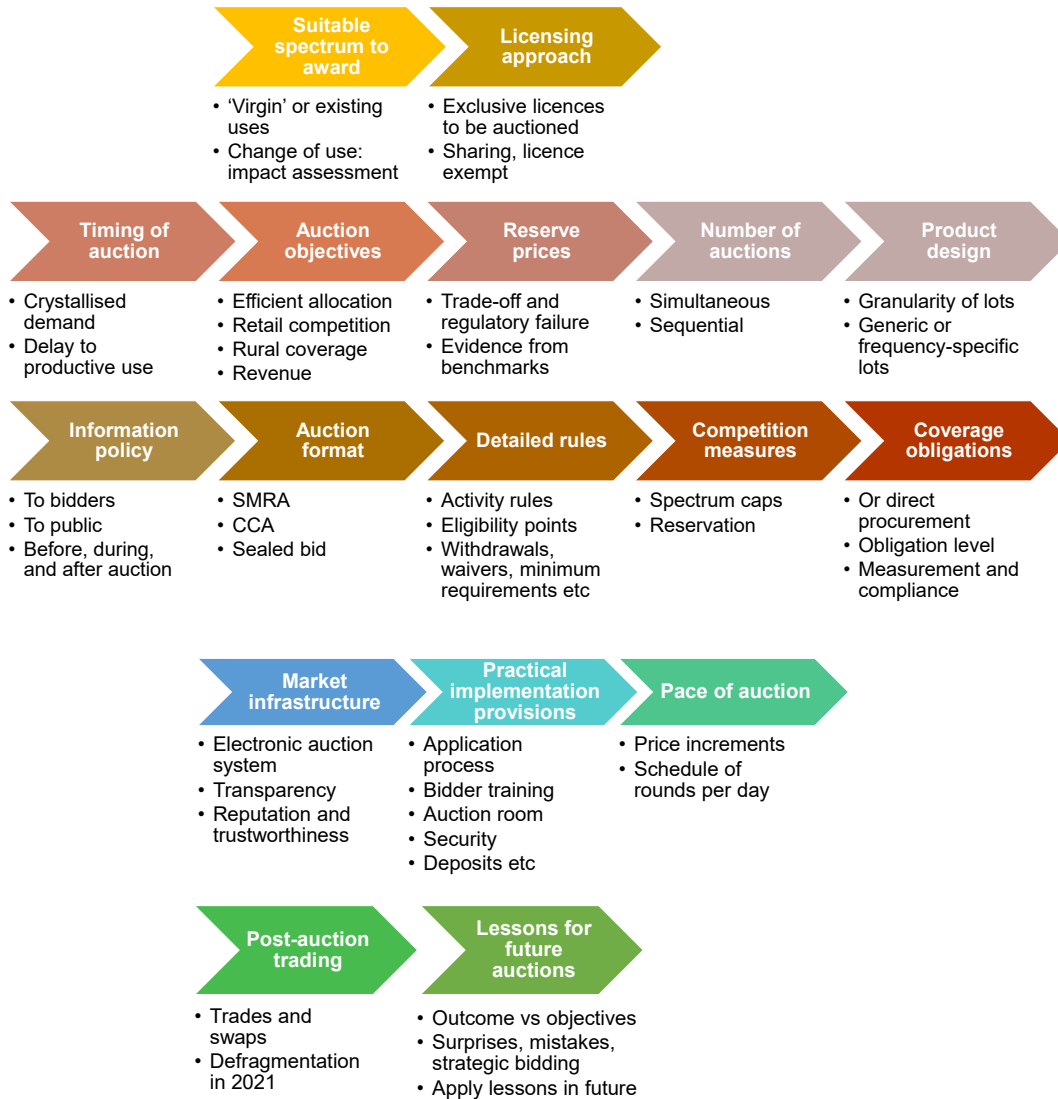
There are many regulatory decisions in designing an effective spectrum auction process, summarised in the 17 categories in Figure AF.1, covering prior steps before the auction (first row), designing the auction itself (second and third rows), running it (fourth row), and post-auction events (final row). Within each category there are large and small choices to fit the design decisions to the situation prevailing in a given country, the characteristics of the spectrum on offer, prevailing market conditions in the industry, and key public and political values. I hope that the preceding chapters have demonstrated that this repertoire of choices can also cope with some of the complex recurring problems of oligopolistic markets and strategic behaviour by large, well-resourced companies – problems that are likely to be permanently present for regulators in most mobile markets. Both the high-level and tailored analytical frameworks set out in preceding chapters can assist policymakers in taking balanced decisions to cope with these exceptionally difficult conditions. Analytical frameworks help to organise the relevant considerations, to structure the analysis such as identifying the most important trade-offs, and to guide decision-makers to take account of differences in circumstances within a consistent overall approach.

Stick or innovate?

Auctions can work out broadly as expected, be highly successful, or go embarrassingly wrong. In some countries, one regulatory response to manage this risk has been to resist innovations (which could heighten the risks of mistakes and surprises) and instead stick with a tried and trusted design across different circumstances, like backing the same horse on different racecourses. For instance, this is the route that the German regulator has generally chosen, which does not avoid risk but instead shifts it away from using untested auction features, and towards a potential loss of effectiveness or unintended consequences arising from a design that may not be sufficiently attuned to the particular situation. Some German auctions have seen very evident strategic bidding, such as signalling and market division by large firms (see Section 8.3), and others have come close to creating undesirable outcomes for economic efficiency, although these have mostly been avoided.²

By contrast, the UK's path has been very different, choosing an adaptive, horses-for-courses approach. Each stage of the UK's auction development has included some innovative elements, with a challenge of risk and reward. For example, the 2013 auction used a complex CCA design including several new features, which some stakeholders considered too complicated. The complexities for the more minor issues did not pay off. But the main sources of complication seemed justified: package bidding allowed bidders to express their synergistic values; and the flexibility of reservation in spectrum floors mitigated regulatory failure.

There are pros and cons, but my argument unashamedly favours evolution and innovation in how auctions are designed and implemented, mirroring both the development of auction expertise and wider historic patterns. The USA's first spectrum auction in 1994 used a format, the SMRA, which had

Figure AF.1. Choices and decisions for a spectrum auction

Source: Author.

previously been tested in the lab but not in a live auction. It has remained the workhorse model for many subsequent auctions over the next three decades, although with significant enhancements and embellishments to learn from experience. Sometimes a challenge benefits from a fresh approach. New auction formats such as the CCA have been developed and deployed with some success, although the experience has unsurprisingly been far from problem-free. In an overarching story, such difficulties provide an opportunity for learning and improvement through well-judged use of expertise.

Avoiding undesirable practices

In seeking to derive lessons about best practice, it is important to avoid making the perfect the enemy of the good – there are substantial benefits just from avoiding especially undesirable spectrum management practices:

- Spectrum that is scarce should be put to productive use. Even short of optimal use, a second-best use is still far preferable to spectrum being left fallow, which can arise from the regulator withholding it or failing to sell it in an auction.
- Impact assessments can assist decision-making without having to be elaborate. Much can be achieved just by bringing organised thinking and available evidence to bear, and by placing impact assessments in their proper role as a guide for judgement, not as providing an abstruse ‘black-box’ answer.
- Measures to promote downstream competition are important. But their formulation should also reflect the risks of regulatory failure. Examples are avoiding overly restrictive caps or unnecessary reservations that substantially narrow down allocation possibilities and unduly limit rivalry in the auction itself.
- Onerous coverage obligations on all licences in auctions are not the only way to achieve improved mobile coverage. Direct procurement or a more targeted approach can sometimes achieve more in practice for people on the ground.
- While there are sophisticated analytical questions in auction design, the highest priority is to get the basics right. An example is to avoid reserve prices that are too high, and instead rely on competition in the auction to set prices – even if bidding rivalry is weak, it is still desirable to get the spectrum into productive use.
- Applying sufficient expertise can avoid many design blunders, which can be caused by failing to respect key requirements like nurturing trust, providing bidders with information and flexibility to make their decisions, and maintaining an appropriate pace to the auction such as avoiding excessively small price increments. In addition, the regulator should be sure to represent interests that are not ‘in the room’, especially safeguarding consumer benefits and public value.

The wider relevance of auctions

A fundamental feature of well-designed auctions is that they can incentivise powerful commercial actors like mobile phone companies to reveal information about their preferences and intrinsic values. While talk is cheap, auctions bids are binding commitments. Market design solutions can harness auctions to elicit otherwise unavailable market information, such as reliable data on the opportunity cost of policy alternatives. The 2016–17 incentive auction in the USA is one example of this class of solutions, revealing information on the costs and benefits of different amounts of band clearance (see Section 6.1). The choice of spectrum floor in the UK’s 2013 auction used information from bids to assess the benefits and opportunity costs of alternatives, mitigating the risk of regulatory failure from choosing the wrong spectrum to reserve to promote downstream competition (see Section 10.1). In addition, the UK regulator proposed in 2018 to unbundle coverage obligations and use auction bids to obtain better information about their costs, so that part of the cost-benefit analysis could be conducted within the auction itself on the number and level of obligations (see Section 10.2). Critics might say that spectrum floors were affected by strategic bidding, illustrating problems of auctions,

and that the coverage obligation case was theoretical and contentious (for instance, it was strongly opposed by mobile operators). There is something to both of these criticisms. It is important to balance enthusiasm for the strengths of auctions with recognition of their limitations.

However, in my view, the downsides of this use of auctions do not overturn the wider advantages. Strategic bidding is an occupational hazard in auctions with a small number of bidders. But the evidence revealed in the 2013 auction is still consistent with the economically efficient choice of spectrum floor having been made, despite H3G's bid strategy (designed to ensure that it only paid the reserve price). Without the use of spectrum floors, it is likely that the regulator would have made the wrong choice of spectrum to be reserved. Unbundled coverage obligations were not implemented in the UK, and again strategic bidding could affect the efficiency of the cost-benefit choices in such an auction. However, this design proposal built on established insights about combining buying and selling within the same auction. New solutions face opposition and sometimes need refinement. This is not a strong argument against innovation, but in favour of learning, if the prize is worthwhile.

Furthermore, there is wider potential to utilise auctions to surface reliable information in complex market situations, and thus reach better-informed policy decisions – going well beyond spectrum auctions. One example is how prices in markets for pollution control (such as permits or offsets) can provide better cost information, assisting environmental policymakers to reach an improved balance between costs and benefits.³ In many cases this could justify tightening the regulation in order to permit less pollution, mitigating a common regulatory failure of overestimating producers' costs of making changes.⁴

Another potential area is in public procurement. The public agency procuring major infrastructure projects, some potentially costing billions of pounds, could in some cases improve the balance between benefits and costs by using an auction to determine the choice of contract duration.⁵ This is somewhat similar to the proposal for unbundled coverage obligations. Both relate to procurement, and involve the government or regulator specifying the benefits side of the equation. Auction bids then provide information on the cost side, in this case that different contract durations may vary in their financing costs. Improving procurement choices from better information about costs can deliver benefits for the public, industry, and the economy.

Other potential areas of application for sophisticated market design may take time to come to fruition. Different aspects of timing matter for successful markets, and similarly for ideas to gain traction they need to be timely and presented in ways that capture the moment. Ronald Coase was ahead of the policymakers in proposing auctions for spectrum in 1959, and it took more than thirty years for his idea to be taken up. A great deal more is now understood about how to harness market mechanisms for widespread benefits and public value. However, economic activity fits within social contexts, and the 'mood of the times' in public policy is not always conducive to an expansion of the remit of markets. Realising the wider potential indicated here will require not only developing further our market design know-how, but also a wider set of skills in public value creation and policymaking processes.

Notes

¹ See GSMA 'Mobile Economy 2021: Infographic', <https://perma.cc/P65Z-RENQ> .

² Jehiel and Moldovanu (2003, section 4.4.5), and Cramton and Ockenfels (2017).


³ Kwerel (1977), McMillan (2002, chapter 14), and Shapiro and Walker (2020). The market mechanisms could include auctions and trading markets (see Section 6.2).

⁴ Harrington, Morgenstern and Nelson (2000).

⁵ Greve and Pollitt (2017).

References

Note:  means an open access publication.

Cramton, Peter and Ockenfels, Axel (2017) ‘The German 4G Spectrum Auction: Design and Behaviour’, *Economic Journal*, vol. 127, no. 605, F305–324. <https://doi.org/10.1111/econj.12406> 

Greve, Thomas and Pollitt, Michael (2017) ‘Determining the Optimal Length of Regulatory Guarantee: A Length-Of-Contract Auction’, *Economic Journal*, vol. 127, no. 605, F325–33. <https://doi.org/10.1111/econj.12405>

Harrington, Winston; Morgenstern, Richard; and Nelson, Peter (2000) ‘On the Accuracy of Regulatory Cost Estimates’, *Journal of Policy Analysis and Management*, vol. 19, no. 2, pp.297–322. [https://doi.org/10.1002/\(SICI\)1520-6688\(200021\)19:2%3C297::AID-PAM7%3E3.0.CO;2-X](https://doi.org/10.1002/(SICI)1520-6688(200021)19:2%3C297::AID-PAM7%3E3.0.CO;2-X)

Jehiel, Philippe and Moldovanu, Benny (2003) ‘An economic perspective on auctions’, *Economic Policy*, vol. 18, no. 36, pp.269–308. <https://doi.org/10.1111/1468-0327.00107>

Kwerel, Evan (1977) ‘To Tell the Truth: Imperfect Information and Optimal Pollution Control’, *Review of Economic Studies*, vol. 44, no. 3, pp.595–601. <https://doi-org/10.2307/2296911>

McMillan, John (2002) *Reinventing the Bazaar: The Natural History of Markets*, New York and London: WW Norton.

Shapiro, Joseph and Walker, Reed (2020) ‘Is Air Pollution Regulation Too Stringent?’, *Energy Institute at Haas*, Working Paper 312, December. <https://perma.cc/LM4H-7VLE> 