

## Economic and Business Dimensions Incentive Auctions

*Reallocating valuable wireless spectrum can generate billions of dollars in revenue to the U.S. federal government while also benefiting consumers.*

**T**HE FEDERAL COMMUNICATIONS Commission (FCC) is charged with managing the wireless spectrum in the public interest. The U.S. Congress is considering legislation that would allow the FCC to conduct “incentive auctions” (Granted, it is difficult to think of an auction without incentives, but we seem to be stuck with the phrase for now.) The most likely use of such auctions would be to reallocate spectrum from lower value over-the-air television and satellite services to more highly valued general mobile wireless services. The Congressional Budget Office (CBO) estimated that these auctions could generate \$24 billion in revenue for the federal government.

Reallocating the valuable spectrum resource could generate substantial benefits to consumers, yet, there is substantial debate. What is behind that debate? Mainly it is parties trying to position the auction so they can secure more of the value for themselves.

### Moving from Command and Control

Prior to the mid-1990s, the FCC allocated spectrum for specific wireless services such as AM or FM radio, television, satellite, cellular telephone service, ham radio, and even ice delivery. Whenever a company wanted spectrum, it went to the FCC and argued that its service was extremely valuable and merited a block of spectrum. But this was cumbersome. Even when the FCC agreed with the company’s claims, the FCC still had to find unallocated spectrum or to reallocate spectrum rights from existing users. The latter could be very contentious.

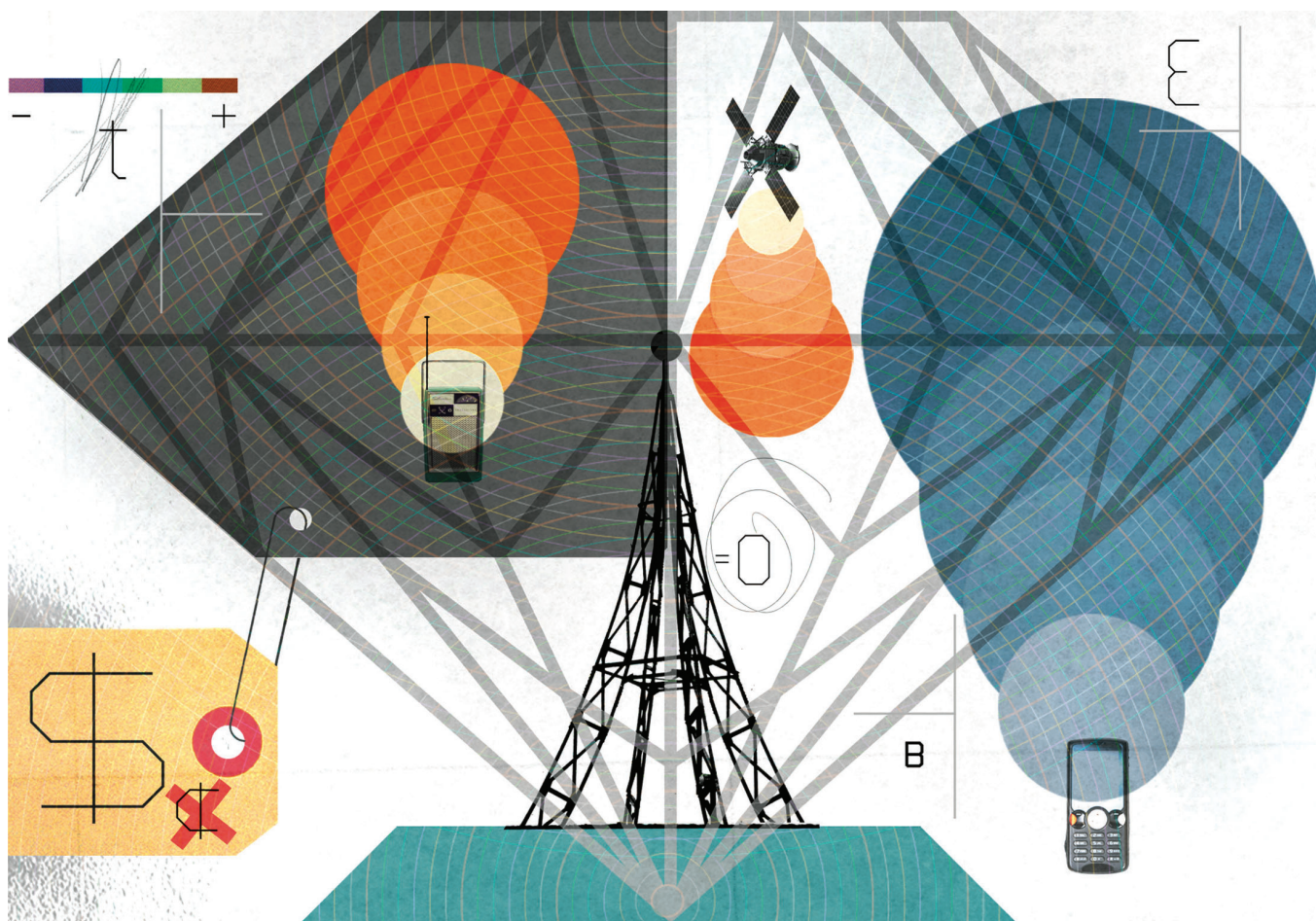
It was also suboptimal. Technological change and change in consumer preferences is inevitable. Repurposing spectrum can accommodate these changes and increase welfare.

For example, the original cellular telephone licenses issued in the 1980s came from reallocating UHF television channels 70–83 in the 800MHz band. The television stations that had been operating in those bands either applied for new channel assignments in the

lower UHF channels or shut down. The initial high demand for cellular service demonstrated the substantial value of mobile telephony, and the FCC decided to allocate more spectrum for mobile wireless service.

What happened? In the 1990s the FCC reallocated and auctioned spectrum in the 1.8GHz band for “Personal Communication Service” (PCS). The FCC was able to use market mechanisms to repurpose the spectrum from its low-value point-to-point microwave service to a higher-value use. The new PCS licensees had to pay the relocation costs of the incumbent microwave licensees. Both of those spectrum reallocations created substantial value to consumers—and revenue for the government in the case of the PCS spectrum.

The FCC’s PCS rules (ultimately also applied to the original cellular bands) were flexible; instead of picking a standard for technology or services to be provided, the FCC allowed firms to choose their own technology and business plans. At the time CDMA technology was unproven and would likely not



have been chosen over GSM and all of the benefits from the introduction and use of that technology would not have occurred. Ultimately, providers have been able to implement their own choice of technology and upgrade from 2G to 3G and now to 4G without FCC approval. And firms could offer voice, video, and data without having to apply for a change of service.

While the FCC has made great strides in flexibility, it has not adopted full flexibility and still specifies some spectrum for particular uses such as satellite or broadcast television. Incentive auctions are one way to facilitate the move to flexibility.

#### Current Bands for Reallocation

Even with the reallocation of channels 50–69, additional valuable spectrum is currently allocated for broadcast television. Allocating a lot of spectrum to television may have been optimal in the 1950s, but with only approximately 10% of U.S. households watching free over-the-air, instead of subscription, television, it is unlikely to be optimal today.

At the same time, the last 25 years have seen an explosion in the usage of handheld mobile wireless devices and the value of spectrum for such services has increased substantially relative to the value of spectrum for television.

The FCC relocated television broadcasters from channels 50–69 during the transition to digital television and has auctioned this 700MHz spectrum. Verizon is already using some of the allocation that it purchased at auction for new LTE services that promise to pro-

**There is debate about how much more spectrum should be reallocated from over-the-air terrestrial television.**

**vide higher capacity and faster mobile broadband service.**

There is debate about how much more spectrum should be reallocated from over-the-air terrestrial television. Current legislation targets up to 120MHz, but more or less may be socially optimal. One way to resolve this debate is to create an efficient marketplace where rights can be traded while minimizing transactions costs.

The leading contender as a method for facilitating this transition is an incentive auction. In such auctions broadcasters would put their transmission rights up for auction in combination with additional rights from the FCC. Each broadcaster would be able to set its own minimum price to cease over-the-air transmission. The auction would aggregate broadcaster rights and FCC rights (for example, rights for unused frequencies) into packages for which new providers would bid.

Incentive auctions are likely to be somewhat complex, but we know they must include a few crucial factors. First, broadcasters must be able to



profit from parting with their spectrum rights willingly. Economics says that such profit should be at least as large as the returns broadcasters would get from running their business without surrendering their broadcast license; otherwise they have no incentive to cease broadcasting voluntarily.

A second big question for the auction is whether a broadcaster has only the right to broadcast in general or the right to broadcast on a specific frequency. If a broadcaster has the right to any specific frequency, each broadcaster has the possibility to make spectrum reallocation much more difficult.

A single broadcaster with rights in the middle of a block of spectrum could devalue the entire block. Multiple broadcasters might each have such blocking power, complicating the transition.

Such blocking rights would not, by themselves, make spectrum reallocation impossible. Consider construction projects as an analogy. Many urban revitalization projects require aggregating many different rights, such as property from different sellers, zoning changes, and rights of way. The aggregation of rights necessary for such projects takes place frequently, however, such projects were probably more expensive and took longer than they might have had rights been distributed differently.

In the case of spectrum, there is likely to be a substantial increase in the ability of new wireless providers to aggregate efficient-sized blocks of spectrum if the FCC has the right (and asserts it) to reassign broadcast frequencies (and pay for the relocation and compensate for the marginal differences in audience size). Such relocation is likely to have only very small effect on the ongoing value of a broadcaster that wants to maintain over-the-air service because the vast majority of broadcasters' audiences view the signal via cable and satellite, not over the air.

In most cases, around 90% of the audience would be unaffected if the broadcaster simply ceased over the air transmission; a small change in the coverage area would therefore have a *de minimus* effect on audience and ongoing station value. As a result, the FCC can facilitate efficient aggregation by exercising its right to reassign broadcaster frequencies.

## The auction would aggregate broadcaster rights and FCC rights into packages for which new providers would bid.

### Auction Mechanics

The auction will have several components. First, broadcasters will state the prices they would accept for termination of their over-the-air-transmission rights; and companies will bid to acquire the enhanced spectrum rights. After the auction, the money will be divided between the broadcasters who cease transmission and the government, with compensation given to those broadcasters required to change frequencies.

In the auction, bidders would not bid simply for a 6MHz block of spectrum around a television tower, but instead would bid for geographic area licenses with rights to provide all sorts of services, subject to interference rules.

In some areas, the demand for new services would be low and in other areas high. Similarly, the value of continuing broadcasting would likely vary. At the market-clearing price, no additional broadcasters would want to give up their rights and no new provider would want to buy additional spectrum.

This mechanism is quite flexible. If the FCC wanted to protect at least a minimal amount of over-the-air television, it could set a limit on the amount of spectrum that could be converted away from television. Broadcasters who do not participate in the auction would be able to continue their broadcasting business, with the possible need to change the frequency on which they transmit. Because of digital signals and receiver boxes, it is possible for them to retain the same "channel identity" for over the air viewers as boxes can easily be re-initialized.

One possible reason some broadcasters have been voicing opposition

to incentive auctions is that they would like a larger share of the auction revenue. This is not the only consideration in coming to a deal, however. Combining the broadcaster rights with the remaining rights for white spaces and additional service flexibility should increase the value of the spectrum. With budget concerns, the government will also want to have as much of the surplus as it can. Lastly, and importantly, society wants the spectrum to be put to more efficient use. These are compelling reasons to come to a deal.

A second proposal to clear the broadcast television band would be to auction "overlay rights" as advocated by Tom Hazlett. A small number of overlay licenses would have the additional rights in any geographic area not covered by incumbent television licensees. The overlay licensee would then have the incentive to pay the broadcaster to move from the spectrum so that the overlay licensee could make use of the spectrum.

Using overlay licenses represents more closely the model required to build a high-rise building or shopping mall. While it can work, there are significant transactions costs and aggregations without a centralized marketplace can take substantial time, especially if the FCC does not have the rights to change the specific frequency.

### Conclusion

Incentive auctions designed to facilitate the transition of spectrum used for low-value services to higher-value services have the potential to unlock substantial value for consumers. By speeding the transition and minimizing holdout requirements, incentive auctions should lower transactions costs so that providers will be able to aggregate blocks of spectrum and geographic areas suitable to provide competitive services to wireless consumers. The key is to ensure that transactions costs are low, rights are clearly defined, and the auctions move ahead in a relatively rapid manner. ■

**Gregory Rosston** (grosston@gmail.com) is the deputy director of the Stanford Institute for Economic Policy Research and Stanford Public Policy Program. He has served in many roles at the Federal Communications Commission, working to design spectrum auctions, implementing the Telecommunications Act of 1996, and evaluating the AT&T/T-Mobile merger among others.

Copyright held by author.