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**The Airwaves as a Toll Road**

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**BODY:**  
WHEN President Clinton signed the telecommunications act into law on Thursday, one of the major unresolved issues was whether television broadcasters should pay for their licenses for next-generation digital TV. Senator Bob Dole insists that they should. And the most-discussed way would be through an auction in which they would bid, just like mobile phone operators, for the spectrum they plan to use. Broadcasters are appalled, divining political motives. They successfully fought similar suggestions for decades, but their problem now is that it seems almost everyone loves a spectrum auction: liberals, because it makes companies pay their way; conservatives, because it substitutes market mechanisms for government controls; economists, because it allocates the spectrum quickly and efficiently, and budget balancers, because it raises much money.

Those who oppose auctions are either existing broadcasters arguing on behalf of traditional "free" and new digital TV, or public-interest advocates who regard the spectrum as a public sphere subject to public-service obligations.

It seems fair and efficient to charge for a scarce resource. That makes auctions a useful tool for now, especially if they are linked to flexible usage that encourages competition, such as letting a cellular phone company also use its access for broadcasting. But there is a better free-market option, one that can preserve flexibility for the future: an open-entry spectrum system.

The current auction system compares the spectrum to land. But that is based on today's relatively primitive state of technology in which information is basically coded onto a single frequency to prevent interference with other users. For similar reasons, most bands are dedicated to a single purpose, like mobile phones or radio. It is as if a highway were divided into wide lanes for each type of usage -- trucking, busing, touring -- and then into narrow lanes, one for each transportation company. One can then debate how to distribute the lanes, whether, for instance, by economics, politics, luck, priority or ethnic diversity.

But why not instead mingle the traffic of users, and if the highway begins to fill up, charge a toll to every user? And make that toll depend on traffic conditions, so it is higher at rush hour than at midnight? In such a system, a user does not buy part of the highway, but instead pays for access to the road. On certain frequency bands that

would be dedicated to this system, nobody would control any particular frequency and anybody could enter at any time, without need for a license.

All spectrum users in this system would be subject to an access fee, or toll, that would be continuously and automatically determined by the supply-and-demand conditions at the time. They would transmit not on one frequency, but anywhere on a wide band; in New York, for instance, CBS would not come in on the frequency now commonly known as Channel 2, but would enter anywhere along the TV or other bands, with one or multiple programs. With new "smart" technology, TV sets would then select the broadcaster or program that the viewer had chosen from a menu on the screen. Or the viewer might choose to hear music or visit the Internet, and the smart TV would pick those off the band.

THIS is not farfetched. Evolving technology can squeeze much more information into a spectrum band by having the bits of information seek temporarily unoccupied frequencies and time slots rather than stick to one dedicated frequency. And economics, through variations in the access price, can allocate the scarce spectrum most efficiently.

How would the price be set? Users of spectrum bands would run clearinghouses that would function like commodity exchanges, but for spectrum rights instead of orange juice or pork bellies. In practical terms, a clearinghouse would be a computer that sends out price signals; users who accept the price would respond with a return signal. When capacity is underutilized, prices drop and an updated signal is sent.

This system need not be applied to every band. For example, some frequencies could be dedicated to educational or governmental users, which could also resell parts of their capacity to raise operating revenue. Similarly, election candidates could get a "bit endowment" to gain access to the spectrum.

Some auction enthusiasts believe that establishing firm property rights in the spectrum would mean the end of government regulation. But that is naive. Such rights, by themselves, would not end government intrusion any more than private ownership of land stops government from regulating it in detail. Indeed, an auction could lead to regulation if the highest bids are made by companies seeking oligopolistic pricing. To maintain competitive markets, it is thus important to create the possibility of continuous entry by other companies because high prices would then not be sustainable.

Who gets the proceeds from the access charges? As in auctions, it would be the United States Treasury, but with the revenue flow smoothed, rather than dependent on one-time sales. Proceeds now disappear into the black hole of the budget, taking money out of the telecommunications infrastructure when there is a need to upgrade it. This suggests the need for some funds to be designated for reinvestment in communications.

The concept of pay-as-you-go spectrum access, rather than exclusive licenses, is unfamiliar. But it is no different from the situation of an independent gas station that cannot be certain of the price of wholesale gasoline, but buys it at market prices. Where certainty of price is essential, markets for capacity futures will no doubt evolve just as they did for crude oil.

Is the concept practical? In the 1950's, when a law student, Leo Herzel, and the future Nobel laureate Ronald H. Coase proposed spectrum auctions, they were met with a host of spurious objections based on their impracticality. Technologically, this next-generation system is not now available, but its components either exist or are in reach.

The point is that spectrum allocation can take new forms. This suggests that Congress, instead of legislating this matter in detail now, should delegate authority to its expert agency, the Federal Communications Commission, to devise appropriate systems of fees. And it suggests that the F.C.C., whose auctions have been a success story,

should not sit on its laurels but should approach free-market spectrum allocation in a pragmatic and searching fashion. We should be ready to bring the invisible hand fully to the invisible resource.

**GRAPHIC:** Drawing.

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