SPECTRUM MANAGEMENT: PROPERTY RIGHTS, *GOSPLAN*, MARKETS, AND THE COMMONS

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Abstract

Since 1927, the electromagnetic spectrum has been allocated to uses and users by the Federal government, covering broadcast radio, microwave communications systems, broadcast television, satellites, dispatch, police and national defense needs, among many others. Assignees receive a license to broadcast certain material (say, taxi dispatch) at a specified frequency and a specified power level (and perhaps direction). For many purposes, this license is time-limited, but with a presumption of renewal; in fact, radio licenses are almost always renewed. Licensees can only use the spectrum for the specified purpose and may not sell or lease it to others. The current system is similar to that of the former Soviet Union's GOSPLAN agency, which allocated scarce resources by administrative fiat among factories and other producers in the Soviet economy.

Economists since Ronald Coase (1959) have argued strongly and persuasively that allocating a scarce resource by administrative fiat leads to gross inefficiencies in the use of that resource; establishing a market for spectrum, in which owners could buy, sell, subdivide and aggregate spectrum parcels would lead to a much more efficient allocation of spectrum. But only in the last ten years has the Federal Communications Commission (FCC) received authorization from Congress to conduct auctions, and only for the 180 Mhz of spectrum used in wireless (cellular) communications and without resale to others.

Meanwhile, substantial strides have been made in radio technology, including ultra-wideband (UWB) and software-defined radio (SDR), or "agile" radio. The developers of these technologies note that the products based on these technologies undermine the current system of administrative allocation of exclusive-use licenses, and call for an "open range," or commons, approach to the spectrum that would do away with exclusive use. "Removing the fences," in this view, will lead to more efficient use of the spectrum.

While both economists and radio engineers believe the present system of spectrum allocation is inefficient and wasteful, they appear to have diametrically opposed views of what should replace it. Economists seek to unleash the power of the market to achieve efficient outcomes; engineers seek to unleash the power of the commons to achieve efficient outcomes. Which is right?

We argue in this paper that this is a false dichotomy, based on a misunderstanding by economists of the new radio technologies and a misunderstanding by engineers of the flexibility of property rights and markets. We show that there are several property rights regimes that can simultaneously support both markets and the rapid diffusion of the new radio technologies, leading to a far more efficient allocation of this important national resource.

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