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The Challenges and Benefits of Valuing Federal Spectrum

by

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I. Introduction and Summary

With the rise of wireless broadband and now artificial intelligence, spectrum has become an increasingly valuable resource for ensuring America's economic prosperity and social well-being. However, there is wide agreement that the present use of allocated federal spectrum is suboptimal, largely because it is the product of a bureaucratic process in which economic efficiency does not play a major role. As a result, current spectrum allocations often reflect products and technology from decades ago and do not always support new services and sources of innovation.

Improving the use of federal spectrum requires better methods of measuring its value and a willingness to reflect those measurements in achieving better public policy outcomes. To the extent bands of federal spectrum are being used sub-optimally, identification of such sub-optimally used spectrum should facilitate transfer of the spectrum to the private sector for commercial use.

The federal government uses a large amount of spectrum for diverse purposes including defense, weather prediction, air traffic control, and law enforcement. The National Telecommunications and Information Administration (NTIA) is tasked with the job of managing federal use of spectrum. A large part of this is ensuring that agencies have enough spectrum to fulfill their missions while not impeding more valuable uses in the private sector. Unfortunately, it is very difficult to measure the value of federal spectrum, largely because spectrum value depends on a large number of factors, many of which lack good estimates. A recent paper by Randall Berry,

Thomas W. Hazlett, and Michael Honig addresses this problem by looking at the various methods of determining the value of federal spectrum and suggesting ways to improve them.¹ More precise measurements will allow for better spectrum allocations, which in turn will produce significant public benefits, including improved service, new products, and faster innovation.

There are good reasons for believing that the reallocation of many existing bands of federal spectrum would generate large increases in social benefit over time. In addition to the direct benefits of reassigning spectrum to an entity that values it more highly, the transfer usually increases the welfare of other stakeholders such as consumers who benefit from better services, providers who enjoy lower spectrum prices, and contractors who benefit from more physical investment. Most important, however, are the general gains from the better reallocation of one of the economy's main assets. Reallocation provides private sector licenses with a strong incentive to innovate and to invest in new areas of business.

The new paper provides a good framework that is helpful for making these tough decisions. They point out that the principal challenge is not simply developing valuation methodologies but also obtaining reliable information on which those methodologies can be implemented. Private firms and federal agencies possess information that regulators cannot readily observe, while also facing incentives that may influence how that information is developed and communicated. Institutional mechanisms including competitive auctions, Administrative Incentive Pricing, the Spectrum Relocation Fund, and other market-oriented approaches can realign these incentives, but none eliminate the need for careful economic analysis or resolves the uncertainty surrounding future technologies, spectrum demand, and public missions.

For many decades spectrum policy on the federal side has been determined by bureaucratic processes that have moved slowly and discouraged innovation. The future could be different, and the BHH paper helps point the way to reforms. With the growing need for both licensed and unlicensed spectrum on the private commercial side, the economic and social costs imposed by not improving the efficiency of federal spectrum use are likely to continue to grow.

II. The Importance of Measuring the Value of Federal Spectrum

Deployments of federal spectrum often do not achieve their purpose efficiently. Two main reasons are the influence of political criteria and the difficulty of estimating economic value. Because the underlying statutes often give regulators very little guidance, they have tremendous leeway to follow their own subjective criteria. Meanwhile, regulators often face political and bureaucratic resistance whenever they attempt to reform federal uses of spectrum.

In the absence of objective measures of value, political influence becomes even stronger, making it difficult to adapt policies to current technologies. Unfortunately, better measurement is very difficult to accomplish. Any common measure of value would require consensus around an econometric model that takes into account spectrum markets, alternative sources of demand and supply, accurate data, and likely innovation, among dozens of other variables.

¹ Randall Berry, Thomas W. Hazlett, and Michael Honig, "Valuing Federal Spectrum," August 1, 2026, Available at SSRN: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=7237898.

The BHH paper addresses this problem by suggesting ways to develop an accurate measure of the value of federal spectrum. The 2025 budget reconciliation bill requires NTIA and FCC to create and assign 500 MHz of federal spectrum to commercial uses. However, the authors point out that measurements of a fixed megahertz target such as “500MHz” do not capture the economic, technical and strategic value of individual frequency bands. This is difficult to do without a good measure of what spectrum is worth in specific settings. In response, BHH develop new economic frameworks for valuing federal spectrum by distinguishing among auction prices, opportunity cost, and net social benefits, while examining the methodological and institutional challenges of doing so.

III. Auction Value

BHH’s first measurement is auction value, which measures the worth of a band of spectrum if it were cleared of incumbent users and auctioned for licensed commercial use. Auctions force parties to reveal information about how valuable the spectrum is to them. They also help ensure that the spectrum ends up with the party that values it most. This in turn can shed light on the spectrum’s potential for innovation. Finally, auctions provide valuable information about how other bidders value the spectrum, letting regulators see the depth and variety of demand.

There have been no auctions of federal spectrum, however. This matters because the result of each auction depends on a large variety of factors including permissible uses, the presence of current users, and rules governing future use, each of which makes commercial auctions less relevant for federal uses. In response, economists turn to three alternative concepts of value. *Market comparables* tries to benchmark value by looking backward at the results of similar auctions. It has the advantage of being transparent, relatively easy to implement, and based on observed market transactions. *Discounted cash flow* tries to look forward to the net value of revenues and expenses discounted by an interest rate. It represents the minimum amount a party should pay for ownership. It depends on the accuracy of predictions about the future, however. Finally, *econometric analysis* tries to build an economic model based on a large group of data. It looks at the details of a large number of independent variables over several auctions. These three methods are often used together. Even then, the wide variability in rules and conditions governing a limited number of auctions limits their usefulness in valuing other deployments.

IV. Opportunity Cost

While auction value and discounted cash flow are important factors in determining spectrum’s value to private parties, they are not necessarily the best criteria when making public policy about who should be given spectrum rights and what those rights should be. This is because the transfer of spectrum rights usually has important effects on third parties, including the general public, who are not directly involved in the transfer. Assuming regulators want to maximize total welfare, concepts such as opportunity cost matter a great deal.

Opportunity cost equals the value of the next best use for the spectrum in question. It takes into account concepts such as consumer surplus (the difference between spectrum’s value to a buyer and what the buyer has to pay) as well as increases in productivity and innovation. For example,

when licensed spectrum is used to supply wireless services, consumers benefit from lower prices, better service, expanded coverage, and other advancements even though they are not directly involved in the transfer. Moving spectrum to support expanded wireless services may generate productivity spillovers that greatly exceed the revenues earned by providers and the consumer surplus users enjoy.

Opportunity cost also matters because, unlike commercial spectrum, whose value can often be roughly calculated from market prices or revenues, the value of federal spectrum comes primarily from the public services and missions it enables, including national defense, space operations, and scientific research. The value (or cost) of these services may not be subject to market forces or easily measured. Uncertainty about future technologies, markets, and spectrum use introduces further doubt into the valuation of federal uses. The challenge then is to find good estimates of nonmarket methods of valuation.

V. Net Social Benefit

While auction prices and opportunity cost measure important concepts, decisions about the basic allocation of federal spectrum should ultimately be evaluated from the viewpoint of society as a whole. The goal is to maximize the net social benefit of spectrum allocations, considering any transition costs. Net social benefit is meant to provide an alternative value for federal spectrum that captures both the current uses as well as the potential benefits of increased economic activity. However, an important limitation is that measurements of the current social value of federal spectrum are rarely revealed through market transitions.

There are good reasons for believing that the reallocation of many existing bands of federal spectrum would generate large increases in social benefit over time. In addition to the direct benefits of reassigning spectrum to an entity that values it more highly, the transfer usually increases the welfare of other stakeholders such as consumers who benefit from better services, providers who enjoy lower spectrum prices, and contractors who benefit from more physical investment. Most important, however, are the general gains from the better allocation of one of the economy's main assets. Reallocation gives owners a strong incentive to invest in new areas of business. This not only increases the pace of innovation, it directs research to areas that value it more highly. A particularly important effort is to continue the historic increases in the amount of information that can be conveyed by a given band of spectrum. Cooper's Law states that the maximum number of voice and data communications that can be conducted simultaneously in a given radio frequency spectrum block doubles every 30 months. Spectrum should therefore not be viewed as a fixed asset over the long term.

Federal spectrum assignments occur through administrative processes rather than market mechanisms. As a result, regulators need to take a broader view of their role. Rather than turn all decisions over to the market, they need to answer questions such as these: What concept of value is being measured? Whose perspective does the valuation represent? What evidence and institutional mechanisms can be used to estimate that value reliably? These are difficult decisions and the reasoning behind them should be subject to public comment and made part of the public record. According to BHH, the relevant concept of value for federal spectrum is society as a

whole. This concept should incorporate nonmarket inputs into social value. Regulators should search widely for relevant data and invest in developing more accurate measures.

VI. General Thoughts and Conclusion

The authors stress the importance of choosing methods that encourage stakeholders to invest in developing accurate estimates of spectrum value and to reveal that information truthfully. As stated above, auctions are valuable not only as a mechanism for assigning spectrum rights but also as a procedure for revealing private information about commercial spectrum values.

Regulators have also adopted new policies for identifying desirable reallocations of spectrum. Administrative Incentive Pricing charges agencies a shadow price reflecting the estimated cost of their spectrum holdings. This gives them an incentive to use it more efficiently or not at all. The U.S. Spectrum Relocation Fund reimburses agencies for the costs of relocating or altering their existing systems when spectrum is reassigned for commercial use. Recent changes to the Fund give agencies a share of the gains from successful reallocations, providing a strong incentive to participate. Both programs seek to make the users of federal spectrum consider its costs when making major changes.

BHH provide a good framework for making these tough decisions. They point out that the principal challenge is not simply developing valuation methodologies but also obtaining reliable information on which those methodologies can be implemented. Private firms and federal agencies possess information that regulators cannot readily observe, while also facing incentives that may influence how that information is developed and communicated. Institutional mechanisms including competitive auctions, Administrative Incentive Pricing, the Spectrum Relocation Fund, and other market-oriented approaches can realign these incentives, but none eliminate the need for careful economic analysis or resolves the uncertainty surrounding future technologies, spectrum demand, and public missions.”

The task may not be easy, but it deserves strong public support. For the last 30 years spectrum policy has been determined by a political process that moved slowly and discouraged innovation. The future could be different. With the growing need for both licensed and unlicensed spectrum the costs imposed by the old system are likely to grow. Basing future decisions on a search for objective facts will create tremendous value in the system, unlocking economic growth, consumer surplus, and innovation. This benefits us all.

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