

A REJOINDER TO WEISER AND HATFIELD ON SPECTRUM RIGHTS

*Thomas W. Hazlett**

The current spectrum regulatory system generates an enormous volume of verbiage but precious little analysis. This makes the probing and provocative discussion initiated by Professors Phil Weiser and Dale Hatfield both rare and valuable. In particular, I thank either of them for their warm and generous comments. Yet, perhaps ungratefully, I take the closing moments of this discussion to briefly comment on two issues where we seem to remain at odds. As they say on the London Underground, “mind the gap.”

First, Weiser & Hatfield argue that spectrum zoning should put similar technologies together in frequency space.¹ Some bands would be used for “higher powered services with more spillover” and others for “lower powered services with less spillover.”² Their conclusion is that “a service like MediaFLO (which is lower powered than traditional TV broadcasting) could be introduced in a band [zoned] for TV broadcasting, but not vice versa.”³

This approach aims to remedy problems in defining spectrum ownership rights. It is correct to suggest that legal or regulatory authorities should be aware of factors impacting market transactions and craft institutions to facilitate efficient outcomes, as I stressed both previously and will return to below. But there is no free lunch. The rigidities imposed by zoning produce social costs, and in a balanced policy analysis these costs cannot be ignored. Quarantining bands by power levels blocks entry and bestows economic rents. Interest groups seek to exploit this. Eight decades of the present spectrum zoning experiment suggest that the attendant social losses are large. Without establishing substantial benefits in facilitating spectrum transactions, one which narrows in on the relevant bargaining issues which zoning is intended (under the land analogy Weiser & Hatfield here resort to), the approach remains dubious.

* Professor of Law & Economics, George Mason University. Contact thazlett@gmu.edu. The author wishes to thank Dean Brenner, Eric Claeys, Charles Jackson, and Wayne Leighton for helpful insights. Jason Arentz and Alyssa DaCunha supplied valuable research assistance. No liability escapes the author.

¹ Philip J. Weiser & Dale Hatfield, *Spectrum Policy Reform and the Next Frontier of Property Rights*, 15 GEO. MASON L. REV. 549, 593-94 (2008).

² Philip J. Weiser & Dale Hatfield, *Property Rights in Spectrum: A Reply to Hazlett*, 15 GEO. MASON L. REV. 1025, 1028 (2008).

³ *Id.*

The MediaFLO example is misinterpreted. Qualcomm effectively re-allocates spectrum for the use of its new mobile TV service by paying TV stations to accept spillovers⁴ in what could be called classic “Coasian bargaining.” However, MediaFLO is neither cellularized nor low power; it offers a wide-area broadcast service emitting at 50 kW—“high power.”⁵ While Weiser & Hatfield would presumably permit the opportunity seized by MediaFLO—a “high power” service contracting with incumbent “high power” licensees—it would bar such entry where MediaFLO contracts with “low power” incumbents.

This constitutes an anti-competitive barrier with no offsetting efficiencies. If MediaFLO were to pay Verizon Wireless (with a network that is low-power and cellularized) for the use of its licensed bandwidth, the costs of defining spillovers would be internalized between the parties. Disputes with non-contracting parties (neighbors of Verizon Wireless) can, in the first instance, be addressed just as they are pre-contract. If, in the second instance, complications arise related to Weiser & Hatfield’s fear of high-power mixing with low-power, then efficient dispute resolution mechanisms can be imposed. These may include binding arbitration based on existing regulatory precedents.

Weiser & Hatfield suggest that using cellular-type licenses to define spectrum within the TV band would render “the existing broadcast service unsustainable.”⁶ This proposition will soon be tested with the 700 MHz licenses recently sold at auction.⁷ Telecommunications firms bid \$19.6 billion to gain access to 52 MHz of bandwidth (straddling Channel 55, used by MediaFLO).⁸ It is understood that these licensees (largely Verizon and AT&T) will use the bandwidth to provide low power cellular.⁹ Bordering channels will likely supply high power broadcasting.¹⁰ Thus, the spectrum market is already transacting to create mixed uses in adjacent bands, a mar-

⁴ Thomas W. Hazlett, *A Law & Economics Approach to Spectrum Property Rights: A Response to Weiser and Hatfield*, 15 GEO. MASON L. REV. 975, 1002-03 (2008).

⁵ Murali R. Chari et al., *FLO Physical Layer: An Overview*, 53 IEEE TRANSACTIONS ON BROADCASTING 145, 157-59 (2007). In contrast, cellular operators typically emit 5-10 watts, which falls to 0.5-1 watt in dense urban environments—three or four orders of magnitude less. FCC, *Information on Human Exposure to Radiofrequency Fields from Cellular and PCS Radio Transmitters*, <http://www.fcc.gov/oet/rfsafety/cellpcs.html> (last visited Apr. 16, 2008). Of course, what constitutes “high power” and “low power” is subject to interpretation—and lengthy adjudication in any zoning scheme.

⁶ Weiser & Hatfield, *supra* note 2, at 1028.

⁷ FCC, 700 MHz Band Auction Summary, http://wireless.fcc.gov/auctions/default.htm?job=auction_summary&id=73 (last visited Apr. 16, 2008).

⁸ *Id.*

⁹ See Blair Levin et al., *Special Focus: The Wireless World After 700 MHz*, WASH. TELECOM, MEDIA & TECH INSIDER (Stifel Nicolaus, St. Louis, Mo.), Mar. 28, 2008, at 1-4; Barry Levine, *AT&T, Verizon Plan Next-Generation Wireless*, NEWSFACTOR.COM, Apr. 4, 2008, http://www.newsfactor.com/story.xhtml?story_id=59140.

¹⁰ In particular, the E license. Levin et al., *supra* note 9, at 4.

ket allocation that would be avoided were spillover costs to dominate the gains realized.

Second, Weiser & Hatfield express concern about “[a] central dividing line” in our approaches, noting that “certain industry facts are more complex than or open to change than [Hazlett] suggests.”¹¹ This point particularly grabbed my attention. The essence of the argument for a liberal property rights regime is that a system of decentralized ownership efficiently adjusts to—and in fact, relentlessly seeks—disruptive advances unanticipated by central planners. Weiser & Hatfield take issue with my assertion that Verizon Wireless, which provides service on a 25 MHz cellular band in Portland, Oregon is the most efficient use of that same 25 MHz band in Phoenix, Arizona.¹² They suggest that I underestimate industry dynamics, saying: “even if Hazlett’s conclusion is true for a particular point in time—say, today—it quite possibly may not be true at other points, raising the question whether the legal system should lock in or privilege particular uses.”¹³ Of course that is right, and is precisely the reason to reject the FCC framework as well as the Weiser-Hatfield zoning plan, either of which would impose wasteful rigidities blocking efficient technologies.¹⁴ The principle advantage of a liberal property rights regime is that it yields the information and incentives necessary to allow the wireless market to adjust quickly to new opportunities.

The observation of complementarities in spectrum ownership is not, as Weiser & Hatfield assert, a prescription as to how rigidities should be imposed. Indeed, it is just the reverse: it seeks to identify the most useful starting point for assigning flexible rights that can, with minimum friction, grease the skids for emergent efficiencies. In a zero transaction cost world, this is all irrelevant. One simply defines resource ownership rights in any way and relies upon cost-free trading activity to assemble rights into efficient bundles. For instance, if it is declared that every land owner has full legal title to all the radio waves above her real estate, then firms seeking to supply nationwide cellular service would acquire the spectrum rights needed. In reality, however, transaction costs (including hold-ups) would be

¹¹ Weiser & Hatfield, *supra* note 2, at 1028.

¹² *Id.* (citing Hazlett, *supra* note 4, at 979).

¹³ *Id.* at 1029.

¹⁴ Weiser & Hatfield decry the fact that the FCC took 20 months to define “harmful interference” in the MediaFLO context, and are critical of my reaction that 20 months was relatively quick by FCC standards. Weiser & Hatfield, *supra* note 1, at 566-67; Weiser & Hatfield, *supra* note 2, at 1026. This warns me against using reduction ad absurdum argument. We should *all* agree that such regulatory lags are inefficient barriers to entry. The question is how to eliminate it. Weiser & Hatfield offer sympathy for the FCC’s approach to imposing spectrum sharing rules—and rule makings that generally take far longer than 20 months. Weiser & Hatfield, *supra* note 1, at 593-94. I recommend private property facilitating market transactions that generally take far less.

prohibitive. Private property rights, ill-devised, do not yield social efficiency but a tragedy of the anticommons.¹⁵

Economists are careful to note the importance of initial assignments.¹⁶ The general rule is that, just as reducing the number of borders reduces the cost of defining borders, reducing the number of transactions reduces transaction costs.¹⁷ Where courts or regulators observe or infer productive patterns of ownership, they create social wealth by initially assigning rights in this pattern. This is not to “lock in” such ownership but to promote productive employments and rights bundles that facilitate the reconfiguration of ownership rights over time.

The Verizon Wireless example is emblematic of what is seen in markets worldwide. Firms regularly seek to create efficiencies by aggregating adjacent frequencies and blocks. This does not (and cannot, short of an efficient “natural monopoly” over all wireless services) mean that this is categorically true. What it does imply is that there are generally substantial complementarities between small-sized spectrum assets, given the economics of organizing networks and producing radios, and that forcing radical disaggregation—say, by assigning airwaves to owners of real estate—would make highly productive applications prohibitively expensive to deploy.¹⁸ While U.S. policy stops short of the polar case (airwave rights bundled with real estate), it is the one market in the world where thousands of licenses are issued for mobile wireless. In the European Union, e.g., no country has issued more than six licenses for 3G (third generation) wireless services.¹⁹ The U.S., in contrast, created 1,122 licenses for Advanced Wireless Services²⁰ and 1,099 700 MHz licenses,²¹ the analogous service categories in the U.S. It is instructive that other nations avoid this outcome by typically issuing *national* licenses, and intensely revealing that the U.S. recovers from its initial allocations by permitting carriers to consolidate

¹⁵ The classic treatment is in Michael Heller, *The Tragedy of the Anticommons: Property in the Transition from Marx to Markets*, 111 HARV. L. REV. 621, 622-24 (1998).

¹⁶ Harold Demsetz, *When Does the Rule of Liability Matter?*, 1 J. LEGAL STUD. 13, 14-16 (1972).

¹⁷ See *id.* at 25-27.

¹⁸ In LAW'S ORDER, David Friedman uses the example of spectrum itself in explaining why it is efficient to separate airwave property rights from real estate property rights, as the extreme fragmentation associated with the former allocation would be socially inefficient. DAVID D. FRIEDMAN, LAW'S ORDER 113 (2000). I cited this logic in Hazlett, *supra* note 4, at 980.

¹⁹ AUDREY SELIAN, INT'L TELECOMM. UNION, 3G MOBILE LICENSING POLICY: FROM GSM TO IMT-2000 – A COMPARATIVE ANALYSIS GSM CASE STUDY 32-35 (2001), available at <http://www.itu.int/osg/spu/ni/3G/casestudies/GSM-FINAL.doc>.

²⁰ FCC, Advanced Wireless Services (Auction 66) Auction Summary, http://wireless.fcc.gov/auctions/default.htm?job=auction_summary&id=66 (last visited Apr. 29, 2008).

²¹ FCC, 700 MHz Band (Auction 73) Auction Summary, http://wireless.fcc.gov/auctions/default.htm?job=auction_factsheet&id=73 (last visited Apr. 29, 2008).

license holdings, which they have—such that just four national networks today account for 86% of subscribers.²²

The Weiser & Hatfield protest, citing the 2006 AWS auction results, misfires.²³ First, it cherry-picks, ignoring, e.g., the March 2008 700 MHz auction, the largest (in dollar terms) in U.S. history. There, the two largest networks, AT&T and Verizon, accounted for \$16 billion of the \$19.6 billion bid.²⁴ The prime, 22-MHz C block, with seven licenses covering the continental U.S., each won by Verizon.²⁵ AT&T spent \$6.6 billion all on B licenses²⁶ allocated frequencies adjacent to a 12-MHz block the company purchased in late 2007.²⁷ The E block went almost entirely to EchoStar.²⁸ Aggregation efficiencies were observed all around.

Second, the 2006 AWS auction went the same way. Some licenses were claimed in small parcels; the FCC, in auctioning 1,122 licenses,²⁹ did not permit combination bids to facilitate aggregation by reducing exposure risks.³⁰ Nonetheless, SpectrumCo, a cable TV consortium attempting to gain market access, won 134 of the 176 “B” licenses, securing use of the same 20 MHz over 86.4% of U.S. population.³¹ See Figure 1 below.

²² The top four carriers accounted for 86% of U.S. subscribers at year-end 2007. See Kristen Beckman, *By the Numbers: Top Ten U.S. Wireless Service Providers*, RCR WIRELESS NEWS (Apr. 24, 2008), <http://www.rcrnews.com/apps/pbcs.dll/article?AID=/20080424/FREE/462226730>; *CTIA Claims 255 Million Us Mobile Subscribers by Dec 2007*, CELLULAR-NEWS, Apr. 1, 2008, <http://www.cellular-news.com/story/30246.php>.

²³ Weiser & Hatfield, *supra* note 2, at 1029.

²⁴ FCC, Integrated Spectrum Auction System, <https://auctionsignon.fcc.gov/signon/index.htm> (last visited Apr. 30, 2008) (providing public access to results of auction for 700 MHz Band (Auction 73) including “Bidder Summaries” for Cellco Partnership d/b/a Verizon Wireless and AT&T Mobility Spectrum, LLC).

²⁵ RCR WIRELESS NEWS, <http://www.rcrnews.com/apps/pbcs.dll/section?category=700MHzwhoswinning> (last visited Apr. 29, 2008).

²⁶ Barron’s Tech Trader Daily, <http://blogs.barrons.com/techtraderdaily/2008/03/20/verizon-att-big-winners-in-700-mhz-auction-verizon-wins-much-discussed-c-block-no-spectrum-for-google/> (Mar. 20, 2008, 15:33 PST).

²⁷ *The Historic 700 MHz Extravaganza (Auction) is Finally OVER*, WiMAX.COM, Mar. 21, 2008, <http://www.wimax.com/commentary/blog/blog-2008/the-historic-700-mhz-extravaganza-auction-is-finally-over>.

²⁸ RCR WIRELESS NEWS, <http://www.rcrnews.com/apps/pbcs.dll/section?category=700MHzwhoswinning> (last visited Apr. 29, 2008).

²⁹ FCC, Advanced Wireless Services (Auction 66) Fact Sheet, http://wireless.fcc.gov/auctions/default.htm?job=auction_factsheet&id=66 (last visited Apr. 30, 2008).

³⁰ See, e.g., Paul Milgrom, *Topics in Market Design: Part II: Auctions and Exchanges* 165 (June 2007), <http://cema.cufe.edu.cn/downloads/Paul%20Milgrom%20Lecture%20notes%20for%20June%2015.pdf> (last visited Apr. 29, 2008); see also Hemant K. Sabat, *Spectrum Acquisition Strategies Adopted by Wireless Carriers in the USA*, 10 INFO. SYSTEMS FRONTIERS 77, 97 (2008).

³¹ See FCC, Top Bidders, http://wireless.fcc.gov/auctions/66/charts/66press_3.pdf (last visited Apr. 29, 2008); FCC, Bidder Data, <http://wireless.fcc.gov/auctions/66/charts/66cls1.pdf> (last visited Apr. 29, 2008). This assumes a U.S. population equal to 300 million.

FIGURE 1: SPECTRUMCO “B” LICENSE AGGREGATION IN AUCTION 66³²

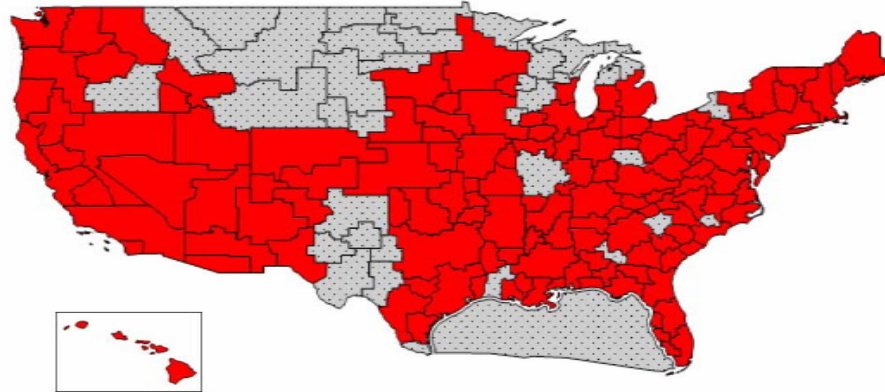
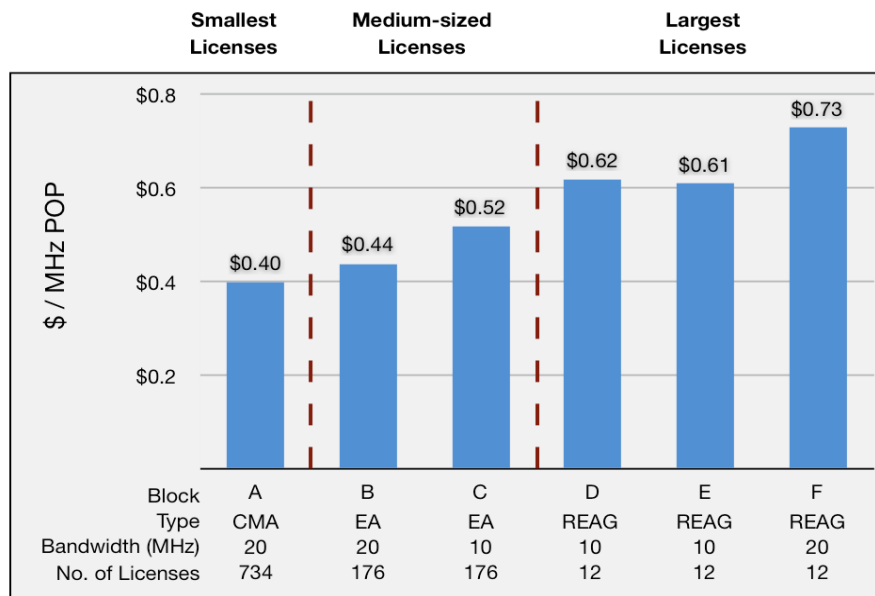


FIGURE 2: MEAN PRICES IN FCC AUCTION 66 (\$/MHZ/POP).³³



³² Milgrom, *supra* note 30, at 168. Auction 66, for Advanced Wireless Service licenses, concluded in September 2006. See FCC, Advanced Wireless Services (Auction 66) Auction Summary, *supra* note 29.

³³ Presentation by TerreStar Corp., available at http://www.terrestar.com/news/gfx/TerreStar_Investor_Slides.pdf (last visited May 13, 2008) (scroll to slide 20).

The demand to aggregate is so pronounced that price premia are established for larger licenses, in both geography and bandwidth (as indicated in Figure 2 above). The regional licenses, D, E, and F, all sold for considerably more than the smaller license areas, A, B, C (adjusting for bandwidth [MHz] and population in the license areas [pop]). The D and E licenses, being similar, sold for about the same price, but for much less than the F license, with twice the bandwidth. There was one surprise: B licenses sold for less than C licenses despite having twice the bandwidth.³⁴ Anomalies happen. But everywhere else, average prices were higher for the larger aggregation.

Efficient rights allocations have been revealed. These lessons are important for policy makers crafting spectrum rights. The message is not that these parcels should define rights rigidly, but in a manner that enables competitive asset owners to freely deploy frequencies, adapting to changing circumstances, and exploiting new entrepreneurial methods. The large, non-fragmented bundles assembled in the market illuminate how to define rights *ex ante*, an outcome wholly consistent with the basic Weiser & Hatfield assertion that interference disputes are costly.

The essence of my Response can be simply stated. Defining frequency rights to enable market allocation of radio spectrum is not without complexity, but the traditional administrative allocation regime confronts the same technical challenges. The task for any property regime is to induce the most productive outcomes, taking all costs and benefits into account. A half century ago, Coase hypothesized that the radio spectrum resource could be most efficiently managed by private property rights. The winds of politics blew against him. Yet, over time, decentralized spectrum ownership models were gradually introduced. Coase's basic model passed the market test, producing large social benefits compared to the state-managed alternative.

Today, we no longer rely on theoretical conjectures or property metaphors. The prime institutional ingredients composing a liberal property regime in spectrum are being observed in wireless markets around the world. The challenge ahead is to expand the scope of market spectrum allocations, developing the property institutions that guide entrepreneurs, inventors, lawyers, and regulators as to how rival frequency uses can be efficiently coordinated. It is a tragedy that firms need to have the scale of Qualcomm to successfully obtain FCC rulemakings that deliver regulatory definitions of radio interference, as Weiser & Hatfield bemoan,³⁵ and standardizing property contours so that upstarts do not face regulatory barriers is not only the desired outcome of a liberal property regime—it is a proven result. In

³⁴ As an economic consultant to the SpectrumCo bidding team, I was happy to see this anomaly.

³⁵ See Weiser & Hatfield, *supra* note 2, at 1026 (“[T]he FCC has left in place a framework whereby firms like Qualcomm can afford to pursue lengthy and expensive ad hoc proceedings to define their rights more sharply, but upstarts do not have the resources to do so, thereby ensuring inefficient uses of spectrum and less innovation.”).

regimes that bestow markedly extensive property rights on private licensees, the price of wireless licenses is substantially less than in more traditional regimes.³⁶

In 1985, the FCC relaxed regulations governing which radio transmitters could use unlicensed bands.³⁷ This deregulation, spearheaded by Dr. Michael Marcus, then a FCC policymaker, made it possible for spread spectrum devices—such as Wi-Fi routers and cordless phones—to be utilized. Two aspects of the experience with spectrum reform are immediately relevant. The first is that, during the six years the initiative was being formulated, the key opposition argument was not substantive but a plea to delay reform while the topic received further study. “[L]awyers . . . have a function key programmed for, ‘proceed slowly,’” Marcus notes.³⁸ This reflects the bias of administrative spectrum allocation, which tends to ignore the efficiency losses of the status quo while over-weighting potential problems associated with new rivalry.³⁹ The second is that the rules describing the permissible devices, including technologies and power limits, consisted of just one page. Marcus argues that this simplicity accounts for the success of the ISM bands involved in the proceeding, where thousands of devices have been approved for use and millions of customers use such devices, as opposed to the far more extensive rules used to define unlicensed devices in the U-PCS band, generally considered a failure.⁴⁰ The moral: if the spectral

³⁶ Thomas W. Hazlett, *Property Rights and Wireless License Values*, 51 J. L. & ECON. (forthcoming Aug. 2008) (manuscript at 3, 33), available at <http://ssrn.com/abstract=519602>.

³⁷ Michael Marcus, *Wi-Fi and Bluetooth: The Path from Carter and Reagan-era Faith in Deregulation to Widespread Products Impacting Our World*, Morning Keynote Address at the Conference on the Genesis of Unlicensed Wireless Policy: An Information Economy Project Conference (Apr. 4, 2008), available at <http://www.iep.gmu.edu/documents/WiFi-rev.pdf>, at 14-19.

³⁸ Michael Marcus, *Wi-Fi and Bluetooth: The Path from Carter and Reagan-era Faith in Deregulation to Widespread Products Impacting Our World*, Morning Keynote Address at the Conference on the Genesis of Unlicensed Wireless Policy: An Information Economy Project Conference (Apr. 4, 2008) (recording available at http://www.iep.gmu.edu/assets/media/gen_un_wireless/1.mp3).

³⁹ Weiser & Hatfield counter my argument that FCC spectrum allocation is heavily biased towards Type II errors, over-protecting against possible interference from new competition. Weiser & Hatfield, *supra* note 2, at 1029-30. They note that, in some regulatory situations, policy makers can make the opposite error, failing to sufficiently protect existing services. *Id.* That is not the standard FCC outcome but, in certain circumstances, the conclusion is correct. The direction of error can switch depending on the political coalition that exercises determinative influence. But that leaves the essential point entirely intact: public regulators do not have incentives for maximizing social welfare. Resource owners interacting in competitive markets, on the contrary, do. This regularity of error is key, the direction of little relevance.

⁴⁰ ISM bands (“Industrial, Scientific, and Medical”) are located in the 900 MHz, 2.4 GHz, and 5 GHz frequencies, and were the subject of the 1985 rule making. The U-PCS band (“unlicensed personal communications systems”) band, located at 1.9 GHz, was allocated in the early 1990s. Michael Marcus, *Wi-Fi and Bluetooth: The Path from Carter and Reagan-era Faith in Deregulation to Widespread Products Impacting Our World*, Morning Keynote Address at the Conference on the Genesis of Unlicensed Wireless Policy: An Information Economy Project Conference (Apr. 4, 2008), available at

interference issues are getting too complicated, maybe you're doing it wrong.

Proceeding with caution in the liberalization process is beneficial so long as the requisite delay is worth the gain. The inefficiencies of the extant regime are extremely large, and very well known. More liberal spectrum regulatory models have been introduced, tested, and been found to produce overwhelmingly positive results for consumers, information networks, and economic development. Where Professors Weiser and Hatfield fear that the argument for rapid policy reform "glosses over the challenges of creating use rights for spectrum,"⁴¹ I respectfully disagree. The risks of liberalization must be contrasted with the costs of stasis, a trade-off that is lost when it is unilaterally asserted that "clarifying the rights to spectrum will be a complex task."⁴² Of course that is the case, but maintaining the current regime is also administratively complex and a *net cost* in terms of consumer welfare. Better options have been shown. Getting stuck on the lawyers' "proceed slowly" button offers a defense of a wealth-reducing status quo which no party to this debate wishes to embrace.

<http://www.iep.gmu.edu/UnlicensedWireless.php> (follow "Presentation (PPT)" hyperlink under "Morning Keynote"; then scroll to slide 35).

⁴¹ Weiser & Hatfield, *supra* note 1, at 552.

⁴² *Id.* at n.20 (quoting John W. Berresford & Wayne Leighton, *The Law of Property and the Law of Spectrum: A Critical Comparison*, 13 *COMMLAW CONSPECTUS* 35, 37 (2004)).