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EFFICIENT SPECTRUM REALLOCATION WITH HOLD-UPS AND WITHOUT NIRVANA

Thomas W. Hazlett¹

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In 2010, the U.S. Federal Communications Commission (FCC) determined that up to 20 television channels should be shifted to mobile services. If successful, the reform could generate over \$1 trillion in social gains. To achieve these efficiencies, regulators rejected traditional tools, which would have terminated existing wireless licenses, as too contentious. Instead, they chose to create a two-sided auction in which incumbent TV licensees state their offer prices to exit (broadcasting), being paid from the winning bids for mobile licenses (granted access to the reallocated TV spectrum). The FCC conducts this “incentive auction” and, importantly, unilaterally reassigns TV channels for stations remaining on the air. These involuntary transfers are designed to eliminate station hold-ups, allowing new blocks of contiguous spectrum (more valuable than scattered frequencies of equivalent bandwidth) to be made available for mobile licenses. A rival policy option – “overlay licenses” -- would grandfather existing TV stations and then auction new licenses permitting liberal use of the TV Band (i.e., not restricted to broadcasting). Overlay winners could then bargain with TV stations to make more bandwidth available for mobile broadband. Policy makers rejected this approach on the grounds that incumbent TV licensees would engage in strategic hold-up, pre-empting efficient deals. But so, too, are hold-ups endemic in the design and implementation of incentive auctions; to asymmetrically ignore these costs is to commit the Nirvana Fallacy. This paper offers a template to avoid the Fallacy, evaluating transaction costs across the rival policy regimes. A first order quantification suggests that the costs of incentive auctions have been substantially under-estimated by regulators, perhaps reflecting confirmation bias and a principal-agent conflict in the assessment of policy options.

Key Words: Transaction Costs, Spectrum Policy, Auction Design, Overlays
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I. INTRODUCTION

In his compelling critique of A.C. Pigou's welfare economics, Ronald Coase (1960) demonstrated the importance of treating transaction costs symmetrically in comparing alternative regulatory regimes. The device, dubbed the "Coase Theorem" by George Stigler,² was to imagine markets operating under conditions of zero transaction costs. In this scenario, resources would inexorably migrate to their most valuable employments, such that market failures would disappear. Taxes, subsidies, or direct regulation would be unnecessary to fix pricing distortions.

The fact that transaction costs were never actually zero did not escape Coase, but was his fundamental point: there were always costs and rigidities to be faced in implementing market and non-market solutions.³ It was the asymmetry of the Pigouvian analysis, wherein such costs were assumed to be zero for governmental policies while (implicitly) positive for market bargaining, that was the object of his criticism.

Coase's thinking was shaped by studying the radio broadcasting market (Coase 1959). There, key spectrum inputs were controlled by government administrators. He saw that a system of private frequency ownership offered an alternative form of organization, potentially superior. But it would not come for free. Indeed, "As a practical matter, the market may become too costly to operate" (Coase 1959, 29). The efficiency of markets depended on the *relative costs* of markets versus administrative allocation. Coase augured, on scant evidence (given the lack of actual markets in spectrum), that private property rights could effectively reduce transaction costs. But evidence would have to await actual market deployments. When reforms were adopted, both in auctioning FCC licenses and in liberalizing some licenses to allow spectrum to be redeployed across rival employments, the Coasian prediction proved compelling (Hundt & Rosston 1995; Faulhaber 2006; Hazlett 2008a).

Today, the market for wireless services is again a test bed for transaction costs. In 2010, the Federal Communications Commission, the regulatory agency that defines and enforces spectrum use rights, determined that it had been over-allocating bandwidth to over-the-air TV broadcasting, while under-allocating to mobile (cellular) services. It proposed a "repurposing" of some portion of the TV Band (FCC 2010, Chapter 5). But it did not propose to execute the substitution using its administrative powers. Instead it explored novel ways of "expanding incentives and mechanisms to reallocate or repurpose spectrum."⁴

This innovative path away from pure administrative allocation led the Commission to adopt "incentive auctions."⁵ The approach combines a reverse auction, in which

² For a discussion of the trouble this appellation created, see Hazlett, Porter & Smith (2011).

³ As Coase was later to write: "The world of zero transaction costs has often been described as a Coasian world. Nothing could be further from the truth. It is the world of modern economic theory, one which I was hoping to persuade economists to leave." Coase (1988), 174.

⁴ FCC (2010), 81.

⁵ Papers by two FCC spectrum policy experts, economist Evan Kwerel and engineer John Williams, had presented the idea as a "Big Bang" in a 2002 FCC staff paper (Kwerel & Williams 2002).

incumbent television stations offer to sell their licenses back to the government (and exit broadcasting), with a forward auction for mobile licenses. The latter are allocated bandwidth reallocated from the TV Band. Both stages occur simultaneously, parallel to an FCC “repacking exercise” (moving remaining TV stations to new channels to create contiguous blocks of cleared spectrum for new mobile licenses), and winning bids in the forward auction must cover outlays in the reverse auction. The 2010 National Broadband Plan scheduled the auction to occur in 2012 or 2013, with actual “transition” taking place in 2015 (FCC 2010, 84).

The FCC effort to repurpose TV Band spectrum is rich with implications. First among them is the admission by the regulatory agency that, while charged with full authority to allocate spectrum according to “public interest, convenience or necessity,” it does not exercise such powers in fact. The agency vested with issuing and renewing (on a seven year cycle for TV stations) all wireless licenses has revealed that it must – to carry out its legal mandate to promote the public interest – *buy back FCC licenses from the private parties it has assigned them to* (and would use its discretion to otherwise renew). The importance of this admission is not that the FCC is engaged in a renegade policy experiment, but that it is proceeding rationally and *not* opportunistically. Compelling evidence supports the FCC in its judgment that TV Band spectrum is efficiently substituted from TV to mobile services, and the Commission’s belief that it would be hamstrung – by litigation, congressional backlash, or both – if it were to uproot existing broadcasting stations (i.e., deny license renewals) under its “public interest” authority. The crucial insight is that regulation, as judged by the regulators, is too unwieldy a tool to remedy the errors made in previous regulatory choices, such that using market mechanisms – reverse auctions, in this instance – will lower the cost and speed the delivery of efficient substitutions.

Second, while the Commission adopted competitive bidding mechanisms, it rejected an approach that would have delegated the spectrum reallocation process to the market. That was the essence of the policy suggested in a 2009 submission to the National Broadband Plan by the author of this paper.⁶ Using an “overlay license auction” applied elsewhere by the Commission, new rights would be assigned to winning bidders who would then exercise (a) liberal use rights for vacant TV Band spectrum (where no TV stations broadcast) and (b) secondary rights (for liberal use) of TV Band frequencies hosting TV stations. These new rights would permit overlay owners to bargain with incumbent stations to shift broadcasting to alternative platforms, reallocating bandwidth to higher valued opportunities. The FCC preferred “incentive auctions,” conducted by the regulator, due to the promise of lower transaction costs. Specifically, FCC authority could be used to involuntarily relocate TV stations, assigning them to new channels. As constructed, this would reduce hold-ups and speed the reallocation process.

The FCC’s choice is nested within the Coasian framework, in that it seeks to select the lower transaction cost path. The coercive power of government may be useful in overcoming hold-ups. It is elsewhere used to thwart socially deleterious rent-seeking in

⁶ Hazlett (2009).

the takings clause of the Fifth Amendment to the U.S. Constitution,⁷ to name one notable example.

Of course, it is ironic that the regulatory powers of the state are here offered as an efficient remedy for hold-up in that the “incentive auctions” process has been triggered by the regulatory agency proclaiming its impotence. New mechanisms have been sought to reallocate radio spectrum because the old mechanisms have been subject to extreme forms of lock-in. Whatever the source of regulatory hold-up, the agency has moved to “incentive auctions” in an attempt to overcome the very long delays embedded in the existing system.

In any event, the process was adopted in the National Broadband Report published by the FCC, and the projected transaction costs are becoming visible. The new plan required an act of Congress, and that legislation was obtained in 2012. Designing the two-sided auction is underway, as is the TV station relocation plan. It is proving a complex project, a “rubik’s cube” as described by the FCC Chairman who must administer it.⁸ An impressive fraction of the Commission’s total budget is devoted to the task: the FCC’s request for 2015 funding asks for \$375 million, of which \$106 million is “to support the timely implementation of the Incentive Auctions program” (FCC 2014, 2).

And delays have set in. The current scenario has the auction occurring not in 2012/13, as projected in 2010, but in mid-2015. Given that the FCC plans to give incumbent TV stations the time to continue to broadcast some 39 months to switch channels,⁹ would imply an actual spectrum reallocation in late 2018, nearly ten years after the commencement of the NBP Report that created “incentive auctions.” Of course, no direct counter-factual is available, but other spectrum reallocations have been achieved via overlay licenses, yielding some empirical basis for comparison.

Both Incentive Auctions and Overlays reallocate radio spectrum via a mix of markets and policy reforms. Both approaches incur transactions costs, including those associated with hold-ups by key players seeking to extract rents. In observing how the “incentive auction” process is progressing, we may better understand the nature and magnitude of the costs associated with regulatory decisions, and examine them in light of the costs and benefits anticipated by regulators.

⁷ Epstein (1985).

⁸ “I have often defined the complexity of this multi-part simultaneous process as being like a Rubik’s cube,” Wheeler wrote. ‘As part of our auction system development, we will check and recheck the auction software and system components against the auction requirements, and under a variety of scenarios replicating real life conditions. Only when our software and systems are technically ready, user friendly, and thoroughly tested, will we start the auction.’” Grant Gross, [FCC Chairman Aims for TV Spectrum Auction in mid-2015. The FCC Will Conduct the Complex Auction When Its Software and Systems Are Ready. Wheeler Says](#), NETWORK WORLD (Dec. 6, 2013).

⁹ Federal Communications Commission, *FCC Adopts Rules for First Ever Incentive Auction; Will Make Available Additional Airwaves, Increase Competition for Mobile Broadband*, News Release (May 15, 2014), 3.

II. HOLD-UP PROBLEMS IN MARKETS AND REGULATION

Transaction costs due to potential hold-ups are common throughout the economy. In all negotiated trades, from home sales to car purchases, buyers and sellers haggle over the distribution of the gains. When private firms engage in activities that are highly interdependent, as in the relationship of highly specialized supplier-buyer pairs, parties may be able to extract more than rents, but quasi-rents. As a result, companies in such situations rarely rely on simple spot market transactions to govern their relationship. Instead, they enact long-term contracts, perhaps with exclusive and/or reciprocal dealing clauses, to bind the interests of the two firms. In other cases, the operations will merge, allowing vertical integration to eliminate divergences in incentives (Klein, Crawford & Alchian, 1978).

Hold-ups also occur in regulatory contexts. These include a host of situations where government policies are set, but prove unenforceable due to the continued opposition of interest groups. Certain policies can then be thwarted by private parties that hold out for more favorable rules or regulations.

Perhaps best studied are pollution control situations. Whereas governments might set water or air emission taxes, or impose mandates to use a particular pollution-abating technology, firms can elect to ignore upcoming deadlines – specifically, by failing to invest. When the scheduled tax or regulation is scheduled to kick-in, the unprepared firm would then be forced to suspend production. This seemingly incurs large penalties for the company, but the firm has strategically taken hostages. The company, committed to a very costly path, imposes – should the regulations take hold – not only losses for its owners but in layoffs for workers and higher prices for consumers. If these outcomes are politically untenable, then political decision makers will relax the scheduled sanctions. The private party has held out, winning the game of chicken (Gersbach & Glazer, 1999).

In spectrum allocation, the FCC believes that incumbent licensees routinely engage in strategic hold-up. This hold-up takes place vis-à-vis government efforts to reallocate spectrum from TV broadcasting to mobile communications, forming the foundation of the FCC proposal to pay broadcast licensees, in “incentive auctions,” to relinquish their FCC licenses. Alternatively, the FCC identifies station hold-ups as a key complication in market reallocation of TV Band spectrum via overlays. These attempted rent extractions are seen as endemic. Because highly valuable services, such as those supplied by wireless communications networks, are supplied most efficiently when networks deploy relatively wide blocks of contiguous spectrum, there are strong complementarities between nearby channels. This incentivizes each station owner to demand not just the fair market value of the spectrum allocated to its license, but to hold-out for the enhanced value created for the surrounding bands. The result is an anti-commons (Heller 2008).

The FCC decision to pursue “incentive auctions” is based on the empirical judgment that the existing distribution of rights in the TV Band can be most productively reconfigured – at lowest transaction cost – by a two-sided auction designed and

implemented by the government. The competing market-based reallocation would be even more subject to hold-up, in more costly ways, than the “incentive auction” approach. This is an ambitious statement, in that the path chosen involves new congressional legislation, novel institutions, and a complicated political process. But, fortuitously, it is empirically testable. While the evidence is not all in, given the ongoing nature of the “incentive auction” formulation, this paper attempts to review that evidence which we are already able to observe. This should hopefully contribute to our understanding of transaction costs, hold-up strategies, and public policy, giving us a basis to interpret future outcomes and devise efficient regulatory solutions for new challenges in spectrum allocation and beyond.

III. REALLOCATING RADIO SPECTRUM

Optimal resource use changes over time. The standard adjustments in market economies respond to prices, demands and technological advance, continuously substituting more valuable for lower-valued services, and lower for higher cost deployments. In wireless services, however, adaptation must run through a political process. Rights controlling essential inputs are not subject to private ownership (*in rem*) but are authorized for specific uses (*in personam*) via “radio spectrum reallocation” (Merrill & Smith 2001; Hazlett 2001a). A set of frequencies that is used one way cannot make an efficient migration merely by market transactions alone.

An example can be found in the economically important challenge that now confronts spectrum regulators in virtually all countries. Some sixty years ago, vast tracts of bandwidth¹⁰ were set aside for emerging broadcast television service. In the United States, for example, some 486 MHz were allocated, sufficient frequency space to support some 81 over-the-air broadcast channels (6 MHz is allocated to each channel). Only a small fraction of such channels have ever actively been used to supply TV service, and over the ensuing decades regulators have gradually chipped away at the allocation to accommodate new services, most notably, cellular telephony. When analog broadcasting was replaced digital TV in June 2009, the band had been reduced to 294 MHz (49 channels). See Table 1.

Yet, an apparent misallocation of resources continues. Compelling evidence suggests that were additional – perhaps all – TV band frequencies to be made available to cellular operators, the resulting loss of broadcast video service would be de minimus, given the easy substitutability of cable, satellite, and telco TV distribution networks, and be dominated by an increase in consumer welfare, via the expansion of mobile wireless services, made possible by reallocation.

¹⁰ The terms “spectrum,” “band,” and “frequencies” are used synonymously in this Article. They refer to defined spaces through which radio signals travel. The scope of such spaces is commonly defined in MHz. A television license is allocated 6 MHz, for instance, whereas a cellular operator like AT&T may have licenses allocated, in aggregate, some 100 MHz (depending on the market in question).

TABLE 1. THE U.S. TV BAND THROUGH HISTORY			
<i>Year</i>	<i>TV Channels</i>	<i>MHz</i>	<i>Spectrum Allocation Event</i>
1953	81	486	1952 TV Allocation Table plus 1953 UHF supplement
1982	67	402	84 MHz reallocated, 50 MHz for cellular
2009	49	294	Digital TV transition, 108 MHz reallocated, 70 MHz for cellular*
2015	29	174	“incentive auction,” 120 MHz for cellular**

* “Cellular” licenses are permissive, so services other than cellular can be supplied.

** As called for in FCC (2010).

Indeed, the case is overwhelming, and has been for at least two decades (Kwerel & Williams 1992; Hazlett 2001b). In the existing digital TV band the vast majority of channels go unused. In simple terms, there are 1,726 full-power TV stations licensed in the U.S., and 49 channels in each of 210 TV markets. This implies that just 16.8% of TV channels are used for broadcasting. See Table 2.

The digital TV transition has exacerbated broadcast spectrum over-supply. Each station can now transmit about six channels of programming. (The exact number depends on the quantity of high-definition, versus standard definition, programming offered, and other characteristics of the video product broadcast.) Whereas there were 10,290 channels (49 * 210), there are now some 61,740 (six times as many). Some full-power stations have used their “digital sub-channels” (the approximately five new program channels digitization yields) to broadcast second or third programming options to viewers, but very few broadcast across all six channels (including their “primary” program feed). This means that the total capacity utilization of the channels set aside for digital TV is only about 10%.¹¹

TABLE 2. CHANNELS USED FOR TV BROADCASTING (YEAR-END 2011) ¹²			
	<i>Full Power Stations</i>	<i>Digital Sub-channels</i>	<i>Total Broadcast Channels</i>
No. of TV Broadcasts	1726	4552	6278
Total Potential Channels	10290	51450	61740
Proportion of Channels Utilized	0.168	0.088	0.102

In fact, it is clear that over-the-air broadcasting (OTA) is largely obsolete as a video distribution platform. Cable and satellite TV networks serve over 90% of homes,

¹¹ In fact, effective utilization is much lower because the digital sub-channels that are in use are deployed to deliver relatively low-valued, cheap-to-produce programs such as infomercials.

¹² Data from FCC 2012, 7-8.

including virtually all of those with a high demand to watch television.¹³ These services deliver packages with 150-250 channels of programming, including retransmitted OTA television. Broadcast TV networks are the largest owners of these cable TV networks. Broadcaster Disney/ABC, for example, owns ESPN, the most profitable such network. In expanding this franchise, producing ESPN2, ESPN News and ESPN Classic, Disney ignores the vacant TV broadcasting channels its own ABC stations (and ABC Network affiliate stations) could use, virtually for free,¹⁴ and instead negotiates carriage agreements with multi-channel video program distributors. (Indeed, for ESPN3, Disney bypasses television altogether, negotiating access agreements with Internet Service Providers – such as Comcast, AT&T, Time Warner Cable or Verizon – so that customers subscribing to certain broadband providers can view the sports service online.) The owners of TV broadcasting facilities prefer to let the FCC’s TV Band lie fallow.

At the same instant, mobile voice and data networks beg for additional bandwidth. Since 2007, when the iPhone triggered the “smartphone revolution,” mobile network capacities have been stretched, expanded, and stretched again. Continuous upgrades have been undertaken – from 2G (Second Generation) to 2.5G to 3G to 3.5G and now 4G – with tens of thousands of base stations added. Every upgrade and each cell adds effective capacity. Yet, demand for additional spectrum inputs, which further expand network capacity for any given state of technology or architecture, has remained high, relative to demands for other licenses, given prices paid in major U.S. cellular license auctions (2006, 2008) and secondary market transactions since.

This is the position of the FCC, which characterizes the extant situation as a “mobile data tsunami.” U.S. regulators interpret the trends as promulgating a “spectrum crunch” or a “spectrum shortage,” and have moved to reallocate additional bandwidth for use in mobile networks. Specifically, the National Broadband Plan, reporting in March 2010, set a goal of 300 MHz to be reallocated to mobile markets by 2015, 500 MHz (200 MHz more) by 2020 (FCC 2010). The largest increment was 120 MHz of spectrum to be shifted from the DTV band by 2015. See Table 3.

¹³ [Nielsen Cross-Platform Report 3Q 2011](#) (Feb. 10, 2012) notes that “The vast majority (90.4%) of U.S. TV households pay for a TV subscription (cable, telephone company or satellite).”

¹⁴ Program rights would not be free, but broadcast distribution would be. That is because digital TV transmissions, by law, send a constant stream of digital information from broadcast towers (19.4 MBPS). To program an unused digital sub-channel would not increase transmission costs, which are sunk.

TABLE 3. FCC PLAN TO REALLOCATE RADIO SPECTRUM, 2010-2015 ¹⁵		
<i>Band</i>	<i>Key Actions and Timing</i>	<i>New MHz for Terrestrial Broadband</i>
Wireless Communications Services	2010--Order	20
AWS 2/3	2010—Order 2011--Auction	60
D Block	2010—Order 2011--Auction	10
Mobile Satellite Services	2010—L-Band and Big LEO Orders 2011—S-Band Order	90
Broadcast TV	2011—Order 2012/13—Auction 2015—Band transition/clearing	120
Total		300

The FCC is correct: there is a spectrum misallocation; enormous social welfare gains – in excess of \$1 trillion -- would ensue from reallocating substantial bandwidth from television to cellular (Hazlett, Muñoz & Avanzini 2012). Market mechanisms cannot be employed to arbitrage the imbalance as the *in personam* rights held by television broadcast licensees prohibit change of use (for the radio spectrum allocated to the license). Stations own their licenses, but they do not own “their” spectrum, and are legally unable to divert resources to their highest valued use. The necessary reconfiguration must involve regulatory action.

IV. TWO RIVAL APPROACHES TO REALLOCATING THE TV BAND

The Federal Communications Commission has considered two basic approaches to achieve the efficient reallocation.¹⁶ The first, “incentive auctions,” are a novel, two-sided process in which TV stations state offers to exit broadcasting (i.e., their stations go dark), while firms (including, presumably, mobile carriers and possible new entrants into cellular) bid for licenses allocated the TV Band spectrum made available as per the reduction in TV broadcasting. The connection between the two auctions – one reverse,

¹⁵ FCC (2010), 84 (footnotes omitted).

¹⁶ There are, of course, countless templates for allocating radio spectrum. We here deal with the two leading candidates for TV Band reallocation considered by the regulatory agency, which narrowed the choices. In fact, the FCC made it clear that traditional band-clearing under the “public interest” licensing regime was impractical, as it would be likely to engender opposition from incumbents sufficient to effectively block timely reforms.

one forward – is supplied by the FCC, which rearranges the TV Band and creates a “band plan” for new mobile licenses in between. This involves a coercive component, with the agency relocating TV stations (reassigning their channels), so as to “free up” contiguous spectrum and make the resulting mobile licenses more valuable in the forward auction.

The primary alternative policy considered by the FCC was an overlay auction (FCC 2010; 82, 92, 104). This approach vests existing TV stations, leaving FCC broadcast licenses, and their channel assignments, intact (Hazlett 2009). The rights to use the unoccupied TV channels would be allocated to new “liberal licenses” permitting any wireless service, technology, network architecture or business model. In addition, importantly, the new liberal licenses are assigned secondary rights to use the spectrum allotted TV stations. Hence, the five basic components are:

- grandfathering existing TV station licenses;
- spectrum allocated to unoccupied TV channels reallocated to overlay licenses;
- secondary rights to use occupied TV channels allocated to the overlays;
- overlays are liberal authorizations to use the defined frequency space;
- overlay licenses are assigned by competitive bidding.

This process effectively augments *in personam* rights with *in rem* spectrum ownership rights. Whereas TV licenses severely restrict how spectrum is employed, and unoccupied channels are held in inventory by the state, the overlays grant responsible economic agents the opportunity to redeploy such assets. New wireless employments can replace an existing TV broadcast application upon a deal between the incumbent and the entrant.¹⁷

The contracting to achieve such gains is not costless. In particular, the manner in which TV channels are sprinkled throughout the TV band, even as the spectrum blocks they occupy are highly complementary to one another (as engineering efficiencies result from the use of contiguous frequencies), create a situation prime for hold-ups. Indeed, the FCC’s National Broadband Plan explicitly rejected the overlay approach, endorsing incentive auctions, due to the anticipation of opportunistic behavior by incumbents:

Incentive auctions present a more efficient alternative to the FCC’s overlay auction authority, in which the FCC auctions encumbered overlay licenses and lets the new overlay licensees negotiate with incumbents to clear spectrum. These piecemeal voluntary negotiations between new licensees and incumbents introduce delays as well as high transaction costs as new licensees contend with holdouts and other bargaining

¹⁷ TV stations might well bid, separately or in consortium, for the overlay licenses. Winning these rights would integrate ownership with the initial overlay license distribution, and more easily facilitate spectrum reallocation. We do not further consider this possibility, dealing with the more transactionally demanding situation where separate parties – TV licensees and overlay licensees – bargain. We do note, however, that the opportunity to create integrated solutions should act as an important backstop on transaction costs. Were post-auction contracting seen as rife with hold-ups, for instance, non-station bidders would be bid less for overlays and broadcast TV stations (not subject to such hold-ups) relatively more. This forms an important constraint.

problems. Anticipating these delays and negotiating costs, bidders typically pay significantly less for encumbered spectrum. The value of spectrum that must be cleared through such a voluntary process is reduced even more by uncertainty about the final cost of clearing (FCC 2010, 82).

Two key issues emerge from this passage. First, the FCC's choice of incentive auctions was attributed to the high transaction costs associated with overlays, the considered alternative. Hold-ups occur when overlay winners, attempt to execute efficient bargains to reallocate TV Band spectrum, are thwarted by demands by incumbents. In this case, offers compensating incumbents' opportunity costs are insufficient, as stations hold-out for much more – extracting up to all of the possible (reallocation) gains. With multiple incumbents holding complementary parts to a puzzle that is much more valuable when all the holes are filled in, the conflicting rent extraction strategies can lead to a breakdown in negotiations.¹⁸

Of course, broadcaster hold-up also impacts the government's spectrum-clearing policies, a determinative fact leading the FCC to seek non-traditional reallocation methods. The FCC's rationale for seeing the incentive auction approach as superior to overlays is because the state can unilaterally (involuntarily) re-assign TV channels, countering broadcaster hold-up. But potential delays, compromises, and transaction costs are yet incurred in regulatory process (and the litigation it spawns). The extent of these costs, in comparison to those of overlays, was ignored. To select one policy on the grounds that the competing policy is imperfect is a classic illustration of what Harold Demsetz dubbed the Nirvana Fallacy.¹⁹

Second, the framing of spectrum reallocation via market transactions enabled by overlay licenses was unduly Spartan. When complementary assets are owned by multiple parties, each with incentives to hold-out for pay-offs equal to the entire surplus generated, bargains can break down, as in a “tragedy of the anticommons.” Yet, such hold-up problems may be remedied by market-based strategies. Take-over attempts of public corporations in capital markets are supported by the use of tender offers, for instance, and the creation of innovation ecosystems -- relying on investments by disparate firms who might later be held-up by the platform developer – have been successfully financed.²⁰ In general, when there are gains available from promoting better cooperation, innovative contractual forms often develop. Whether this would be likely in the case of overlay

¹⁸ That spectrum rights are held by parties that encounter such contracting problems is itself attributable to the manner in which regulators parceled out rights in the first place, a fact of seeming importance in considering how new rights should be defined and distributed.

¹⁹ Harold Demsetz, *Information and Efficiency: Another Viewpoint*, 12 JOURNAL OF LAW & ECONOMICS 1 (April 1969).

²⁰ Jonathan Barnett describes how firms will sink substantial investments to commit to a certain technology and business model, assuring partner firms – which help develop a supporting ecosystem by supplying complementary products – that they will not be held-up (say, by higher licensing fees, or exclusionary software design features) in later periods. One notable approach involves “strategic forfeiture,” as when Nokia unilaterally gave away valuable intellectual property, donating the Symbian mobile operating system to a non-profit foundation controlled by diverse parties. Jonathan M. Barnett, *The Host's Dilemma: Strategic Forfeiture in Platform Markets for Informational Goods*, 111 HARVARD LAW REVIEW 1861 (June 2011).

licensee bargains with incumbent TV stations is an empirical matter, one that is necessary to consider. As shown below, the bilateral monopoly problem at the root of the FCC's alleged hold-up problem undermining the use of overlays is possible to counter.

Next, we describe the two alternatives more fully, before returning to the FCC's policy analysis.

V. INCENTIVE AUCTIONS

A. Strategic Logic

As an initial matter, the term "incentive auction" bears explanation. All auctions rely on bidder incentives, why the redundant descriptor? It is because the FCC characterizes the problem of spectrum misallocation as being a product of incumbent TV licensee obstinance. To break the logjam they create, the regulator proposes to extend both a carrot and a stick: payments to those stations owners who make competitive offers to exit, and regulatory lock-in for those that do not. The *incentive* in *incentive auctions* derives from the threat, by regulators, to permanently continue the inefficient allocation of spectrum (as determined by the agency).

This is a problematic formulation of the problem confronting regulators. First, it freezes current spectrum misallocations already found, by the regulator, to be inefficient. The FCC plan is to purchase only about ten percent (some 200 of 1,800 full-time stations, as discussed below) such that the great majority of stations will continue to broadcast, blocking the reallocation of most TV Band spectrum into the indefinite future. It is an "incentive plan" that provides mal-incentives for 90% of its targets.

Second, the approach misconstrues the problem. Broadcast stations are operating rationally under rules created by the regulatory agency. Licensees cannot reallocate radio spectrum to mobile services because FCC rules bar it. Were stations to own TV Band spectrum, they would auction these resources to their highest valued uses, no incentive auction needed.

Third, in seeing TV stations as a problem, rather than inflexible FCC rules, the FCC has created a strategic game that is difficult for the agency to negotiate. In attempting to buy-off a relatively small number of stations, the reality is that the great majority of stations will be left only with the lock-in. Far more stations will absorb the "sticks" than will receive the "carrots," and will predictably lobby to slow the process. This is a form of regulatory hold-up, wherein incumbents who exercise political clout can potentially extract rents by posing as obstacles. This happened explicitly when, in the 2012 legislation authorizing incentive auctions, incumbent stations won legal protections and cash payments (for changing channels) of \$1.75 billion.

Fourth, portraying TV stations as the hold-up problem needlessly provokes responses by incumbents. This is seen in Duke law professor Stuart Benjamin's

provocative 2009 paper, “Roasting the Pig to Burn Down the House: A Modest Proposal.”²¹ In it, Benjamin suggests – ironically, and with playful “modesty” so as to leave his seriousness in doubt -- enacting regulatory policies which, while counter-productive in isolation, reduce the profitability of TV licensees. This would presumably assist policy makers in shifting spectrum away from broadcasting, a reform widely opposed by the broadcasters, because these parties would have fewer rents to protect and therefore muted incentives and diminished resources with which to resist.

This is, in fact, the basic logic of the “incentive auction” approach, with broadcast license lock-in – clearly considered a poor policy by the FCC (which is trying to reallocate spectrum away from TV) -- enacted so as to help produce another set of productive reforms. It did not go without notice that the FCC, in embarking on the “incentive auction” path, hired Benjamin to serve as “Distinguished Scholar in Residence,” a newly created position. A broadcasting trade magazine reported, “[FCC Chair Julius] Genachowski Hires Broadcast TV Hitman.”²²

Benjamin seeks measures to counter the historical “coziness between government actors and incumbent broadcasters.”²³ The weapon of choice is broadcast TV license rules, such that the FCC adopts “broadcast regulations that impose costs and/or reduce revenues” of licensees.²⁴ His policy advice: “We should look to see what impact, if any, the regulations would have on broadcasters’ behavior, and what impact they would have on government officials’ desire to keep broadcasting alive because broadcasting benefited them.”

At the first level, it is curious that the regulatory agency that claims it cannot reallocate spectrum without paying TV license holders to voluntarily relinquish licenses, unable to exercise its statutory own authority to renew or not renew them, would make such reallocations easier by engaging in new regulatory vendettas specifically designed to reduce broadcaster rents. The latter policy would appear to exacerbate, not mitigate, the political backlash thought to bind agency action.

At the second level, Benjamin inadvertently unveils an additional political exposure: rent seeking by third parties who stand to benefit from the anti-broadcaster rules. In considering only how the FCC changes “broadcasters’ behavior,” Benjamin identifies reductions in rent defending activity by incumbent licensees as unambiguous policy gains. But that assumes that there are no other interest groups influential in lobbying policy makers. Yet, to constrain broadcast licensee rents via regulation typically involves a transfer of rents to other constituencies. These constituencies will then *join broadcasters in defending the extant spectrum allocation.*²⁵

²¹ Stuart Benjamin, *Roasting the Pig to Burn Down the House: A Modest Proposal*, 7 JOURNAL ON TELECOMMUNICATIONS & HIGH-TECH LAW 95 (2009).

²² Harry Jessell, [Genachowski Hires TV Hitman](#), TV NEWSCHECK (Dec. 11, 2009). It should go without saying that Benjamin does not consider himself a “hitman,” nor to be anti-broadcaster.

²³ Benjamin (2009), 100.

²⁴ *Ibid.*

²⁵ With the advent of commission-type regulation, administrative law experts discovered that regulators identified with industry interests, enacting protectionist measures limiting competition to incumbents. This

As an example of how the FCC might “support broadcast regulations that seem undesirable on their own terms,” he offers additional restrictions on chain broadcasting, a policy the FCC has long referenced as “localism.” These rules limit the number of local TV stations a network may own, capping the percent of U.S. population that such network-owned stations reach (over the air).²⁶ Rules had been in place limiting coverage to 35% of U.S. households. In 2003, the FCC sought to expand the limit to 45%, but a firestorm of protest was launched. Congress quickly passed legislation setting the cap at 39%.

Benjamin concedes that the limits make little economic sense, and that relaxing them would improve efficiency. But that is exactly why the strategy he has advanced would retain or even tighten broadcast ownership limits.

[I]ncreasing the national ownership limit will have a desirable result, enhancing the viability of broadcast television networks.... But the matter is not so simple. In my view, the demise of broadcast television would be a salutary event. It would free up valuable spectrum, lead to more innovative and more variegated programming, and limit the incentive for and scope of government control over communications. In other words, what is bad for the viability of broadcasting is good for the country.²⁷

What is omitted from the analysis is that, even if the inefficient rules would reduce broadcaster rents, they enhance other rent-seeking opportunities. Such regulations are extremely valuable to various constituencies that lobby for them. Here, with station ownership rules, opposition to the FCC’s relaxation moved Congress to legislate, blocking the relaxation. Whatever blow this delivered to station owners or broadcast TV networks were offset by perceived gains for non-profit organizations, including conservative activists (who sought lessened network control over local station content) and media access activists (who sought rules designed to limit media concentration), and

was shown to be a standard, even necessary, part of such regulation, as regulators would need a healthy industry in order to direct cross-subsidies to “public interest” investments that the regulators deemed appropriate. The late Harvard law professor Louis Jaffe went so far as to mock the surprise of some over the reality of regulatory capture: “There are those who say that the ICC is ‘railroad-minded,’ as if actions of the ICC favorable to the railroads were a deviation.” Jaffe explained that, to get the desired regulatory outcomes, policy makers had to support the financial health of regulated firms; industry protectionism was not in conflict with regulatory goals, but a key factor of support. Louis L. Jaffe, *The Effective Limits of the Administrative Process: A Reevaluation*, 67 HARVARD LAW REVIEW 1105 (May, 1954), 1107.

²⁶ The rules have something to do with rent distribution within the TV broadcasting sector, but little else. That is because the major networks’ programming distributed in essentially all 210 U.S. TV markets via a combination of network-owned stations and network affiliates. The rules, when binding, simply increase the use of affiliate stations, predominantly owned by station groups such as Sinclair, Bonneville, Hearst, Gannett, Belo and Tribune. Doug Halonen, *Sinclair Hops from Sixth to Third in Top 30*, TVNEWSCHECK (May 20, 2013).

²⁷ Stuart Minor Benjamin, *Evaluating the Federal Communications Commission’s National Television Ownership Cap: What’s Bad for Broadcasting is Good for the Country*, 46 WILLIAM AND MARY LAW REVIEW 439 (2004), 442-43.

to Group Station Owners such as Sinclair, Tribune and Belo. These latter organizations were further protected against network rivalry in the market for TV station properties.

Hence, the waterbed effect. Suppressing the rents of one set of private players raises rent seeking opportunities for others. By the logic of Benjamin's (and the FCC's) political strategy, this would incentivize such interests to devote more resources to keeping TV broadcasters on the air, protecting their regulation-induced rents. This would offset gains in weakening broadcaster support for the status quo. Without evidence that the former dominates the latter, the strategy fails on its own terms. And it saddles the market with policies that are "undesirable on their own terms."

This directly relates to the incentive auction approach where, by design, most of the TV Band will be left as is, allocated to over-the-air broadcasting. On that post-auction band, TV stations will be left with inefficient restrictions, spectrum frozen in place. Regulators will then be saddled with the implicit promise that no liberalization will allow such licensees to undertake new opportunities to repurpose radio spectrum, their punishment for failing to sell their licenses to the FCC during the incentive auction.

B. Policy Development

The "incentive auction" idea was formally put forward in an FCC Working Paper published in 2002 (Kwerel & Williams). The idea languished until the National Broadband Plan Task Force was created with funding from the American Recovery and Reinvestment Act of 2009. Under the auspices of the FCC, the NBP formulated the basic proposal. It moved forward in March 2010 when the NBP was published, and then in February 2012 when the Congress passed, and the President signed, the Middle Class Tax Relief and Job Creation Act of 2012. This statute permitted the FCC to use monies from one auction to pay participants in another, as the FCC had requested (in order to conduct the incentive auction). It also contained important provisions that the FCC had not requested, however, and which form important constraints going forward.

Here then are the four major components of the anticipated process. The first three are designed to happen simultaneously; the fourth, involving post-auction adjustments in actual wireless deployments, is to occur post-auction.

1. *Reverse Auction.* TV stations state their offer prices, what they would take to sell their licenses back to the government. Since post-auction channel sharing will be allowed, stations may sell half of their license rights, continuing to broadcast (jointly with another station) by using the other half. This option might limit high-definition services, but will allow continued broadcasting of primary, standard definition program channels. It will also allow stations to continue to possess "must carry" rights. These yield free retransmission on cable and satellite TV distribution platforms serving the local market. Stations that exit the market completely do not retain must carry rights.

2. *TV spectrum reallocation.* The FCC will conduct an optimization based on bids in both the reverse and forward auctions -- selecting the most efficient set of TV

licenses to eliminate, the channels for remaining stations, and the winning bids for sale of the mobile licenses. The current TV band stretches from channels 2-13 (VHF) and channels 14-51 (UHF), with Channel 37 used for radio astronomy (not TV). (The UHF TV Band ranges from 470 MHz to 698 MHz; see Figure 1. In general, stations will not be relocated to VHF frequencies which, ironically given the superior TV reception such assignments historically delivered, exhibit inferior propagation properties for digital systems.) The anticipated reallocation will leave Channel 37 as is, but move all TV broadcasts out of the higher channels; the NBP target was to remove stations from all of 31-51 – leaving twenty channels, 120 MHz, for mobile licenses. This bandwidth will be “cleared” by TV stations either exiting or relocating to lower UHF channels, channels already vacant or made vacant by exiting stations.

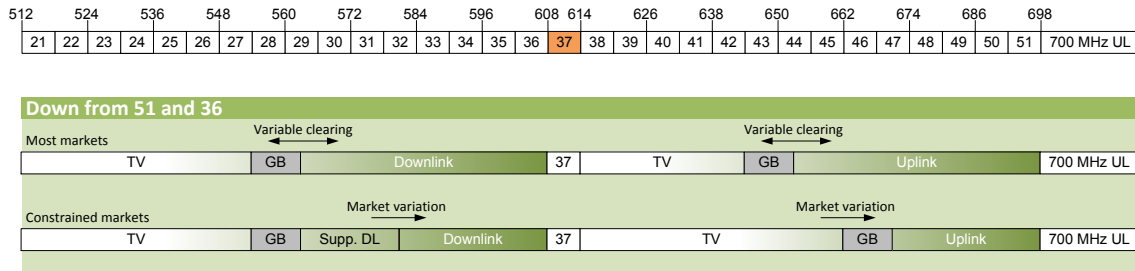


FIG. 1. REALLOCATING THE TV BAND²⁸

3. *Forward Auction.* Using a band plan designed ex ante by the FCC, bidders (including mobile carriers, presumably) bid on the new flexible-use licenses. This auction mirrors those previously conducted. The twist is that the aggregate bids will need to be compared to the Reverse Auction bids, as the auction progresses, to determine whether the market clears – the payments to the government equal or exceed the payments out.

4. *Transition.* Once the auction has occurred, there follows a period during which TV stations prepare to either (a) exit, or (b) switch broadcasting frequencies. Either may involve delay, but (b) is the more serious. The FCC has proposed that there be an 18-month time limit for this process; broadcasters have proposed at least three years.

Overall, the process is summarized as in Figure 2.

²⁸ Federal Communications Commission, *Incentive Auctions: LEARN Workshop: 600 MHz Band Plan* (May 3, 2013). The chart lists two types of band plans, for use in Most Markets and Constrained Markets (where less spectrum is reallocated). (Several other band plans are being considered by regulators.) MHz and TV channel numbers are indicated on the top bar. GB indicates Guard Band (buffer space between assigned licenses). UL and DL refer to Uplinks and Downlinks. Most (but not all) mobile wireless systems perform better when separating these bands in frequency space.

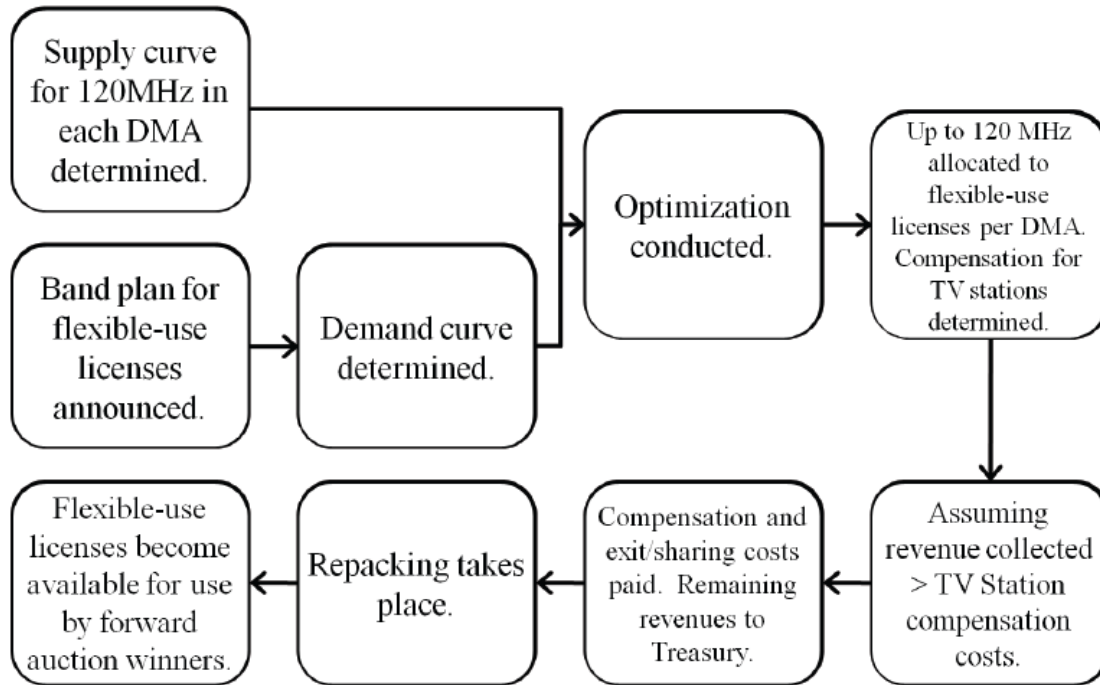


FIG. 2. “INCENTIVE AUCTION” FLOW CHART²⁹

VI. OVERLAYS

The overlay proposal has been briefly described. Incumbent TV Band users are vested and overlay rights are defined, granting the owners liberal use rights for unallocated TV channels and secondary rights for the channels occupied by TV stations.³⁰ The overlays should be auctioned such that inefficient fragmentation -- in time, geography or spectrum space – is avoided. This is achieved by embedding licenses with expectation of renewal (standard for licenses auctioned by the FCC), while allocating licenses large blocks of radio spectrum covering wide geographic areas.

An example is given in Table 4, which offers a band plan (one among an infinite number of possible choices) for TV Band overlays – suggestive, not definitive. It allots seven equal-sized frequency bands, 42 MHz each, to seven overlay licenses. This divvies up the entire 294 MHz TV Band. It additionally defines licenses as national in scope, although local or regional licenses could be defined. Were the latter approach taken,

²⁹ Thomas W. Hazlett, David Porter & Vernon L. Smith, *“Incentive Auctions”*: Economic and Strategic Issues, Arlington Economics White Paper (June 12, 2012).

³⁰ The overlays, to avoid unnecessary regulatory complexity or delay, should include standard “harmful interference” terms governing the level of permissible emissions, both for “out of band” transmissions and for in-band (conflicts with protected incumbents). Streamlined adjudicatory mechanisms, such as binding arbitration for interference disputes, may also be found useful. On the economics of interference rules, see Hazlett (2008b).

allowing for package bidding in the overlay auction would usefully permit efficient aggregations (Hazlett et al. 2012). It is important that licenses be defined broadly with respect to bandwidth (MHz) and spectrum use (flexibility). These measures counter incumbent hold-ups.

TABLE 4. SIMPLE BAND PLAN FOR DTV BAND OVERLAYS							
<i>License</i>	A	B	C	D	E	F	G
<i>TV Channels</i>	2-8	9-15	16-22	23-29	30-36	38-44	45-51
<i>MHz</i>	42	42	42	42	42	42	42

Overlays benefit from three crucial factors. First, the authority for overlays resides within the Commission, no additional statutory authority needed. (Notably, the 2012 statute authorizing incentive auctions limited the FCC to but one such exercise, so the Commission would need new legislative action to conduct incentive auctions in the future.) Obtaining new legislation creates significant risks, both with respect to time delays and with the potential imposition of politically inspired terms and conditions that undermine efficient allocations. Second, the overlay approach, having been deployed several times by the Commission and so the policy uses “off the shelf” regulatory technology. Third, the overlay licenses empower private agents, who internalize substantial gains from investments made in overlays, to direct the reallocation.

These actors may not only have superior information and incentives to those of government administrators, permitting entrepreneurial business forms to emerge, but they bring a different tool kit to the task at hand. In particular, private firms can write contracts and access capital markets. In aggregating property rights, and in countering hold-ups, contingent agreements can be highly useful tools, as are investments that pay existing licensees to cooperate in the form of equity shares in joint ventures or other enterprises.

Still, broadcast TV stations may hold-up overlay licensees, which lack the power of coercion; government regulators can, ostensibly, reassign TV channels without the consent of the stations. This is the essential advantage that the incentive auction brings to the task of TV Band reallocation. Compared with incentive auctions, the FCC finds overlays would yield “greater uncertainty over the amount and timing of spectrum recovered” due to rent extracting demands of incumbent stations (FCC 2010, 92; footnotes omitted).

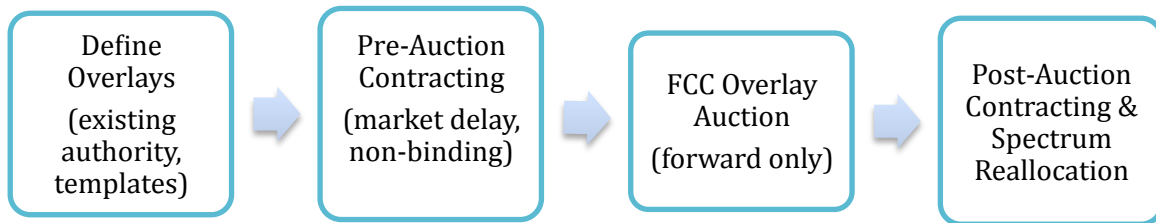


FIG. 3. OVERLAY AUCTION FLOW CHART

Overlay licenses are cluttered with encumbrances. The value of the overlays vary with respect to at least four variables:

- the underlying spectrum (propagation characteristics change across frequencies);
- the availability of complementary radio equipment;
- how the bandwidth complements spectrum portfolios of bidders;
- the expected cost of dealing with conflicting spectrum users.

The last factor is the one of primary concern in both incentive and overlay auctions. The incentive auction approach relies heavily on government action to resolve conflicts. The overlay approach largely delegates reconfiguration to transactions between marketplace actors. In the latter instance, it is clear that bidders in the overlay auction will anticipate hold-ups, shading the bids to reflect the costs of dealing with them. The FCC recognizes these price effects (NBP 2010, 92), but implicitly assumes that all conflict resolutions would be executed in post-auction bargaining. In particular, the hold-ups are seen to emanate from bilateral monopoly. In a given band, a particular TV station might block effective use of much or all of that band; the (one) overlay owner and the one TV station own complementary assets, each needing the other. In such situations, it is well known to game theorists that there is no determinative solution and haggling is likely. When the situation is altered slightly, such that there are multiple parties which must be haggled with in order to piece together complements, it is further seen that bargaining can break down. In this instance, transaction costs prove prohibitive and a tragedy of the anticommons results. The value of the asset (here, spectrum) is squandered.

A policy strategy to avert such tragedy is to put rules in place that allow competition to undercut the bargaining position of incumbent licensees. This can be achieved by structuring an overlay auction that (a) offers wide bandwidth per license (or the ability to aggregate, through combination bids, to such), (b) offers multiple, competing licenses, and (c) allows for pre-auction contracting. The latter condition is provided automatically (announcing auctions months before they are conducted is standard practice, a non-binding constraint). The first two conditions reduce hold-up opportunities. When the overlay licensee faces more substitutes, either by being able to utilize a band without gaining unanimous cooperation from incumbents or by choosing among overlay licenses (with distinct sets of incumbents), asset specificity – which enables hold-ups (Klein et al. 1978) -- is reduced.

A properly structured overlay auction allows overlay bidders to contract with incumbent licensees pre-auction. At this stage, rival bands are available for purchase. Incumbents in the different bands can be played against each other. This pre-auction negotiation performs the function of the reverse auction in the FCC's incentive auction. TV station licensees would reveal the price of their cooperation. With this information, overlay bidders rank licenses, A-G, reflecting differences in technical and business characteristics as well as the anticipated costs of clearing. Importantly, these private sector actors have a complement of market-based transaction devices at their disposal. It

is possible, for example, that overlay bidders would pay incumbent licensees not fixed cash payments, but equity shares, either in the existing enterprise (bidding on the overlay) or in a venture to be formed to bid for, and then manage, the overlay. This shifts incentives for incumbents, eliminating hold-up, post-auction. And because of competitive constraints, their asking prices are moderated.

The FCC asserts that buy-out costs will be high for overlay licensees, and highly uncertain, because they consider only post-auction contracting. The assumption of endemic hold-ups should be tested empirically, not in isolation but in comparison with the level of hold-ups that delay and compromise the alternative – for example, the FCC-managed incentive auction. But it is clearly misdiagnosing the situation to frame the overlay auction as necessarily producing negotiations under conditions of bilateral monopoly. And the relevant empirical evaluation pits overlays embedding pre-auction bargaining with incentive auctions as they are designed and deployed by the regulator.

VII. TRANSACTION COSTS

U.S. regulators have learned that liberal property rights afford distinct social efficiencies in allocating spectrum resources. The debate engaged in this paper – Incentive Auctions v. Overlays – considers the optimal transition path. On this, the Commission makes the following comment:

In general, a voluntary approach that minimizes delays is preferable to an antagonistic process that stretches for years. However, the government's ability to reclaim, clear and re-auction spectrum (with flexible use rights) is the ultimate backstop against market failure and is an appropriate tool when a voluntary process stalls entirely (FCC 2010, 79).

The Commission may prefer a “voluntary approach” to the option of reallocation by government fiat, but in formulating a policy strategy to get to spectrum markets, elects to retain the power to reassign TV station channels coercively. The motivation for the FCC's preference for Incentive Auctions over Overlay Auctions has been given: “piecemeal voluntary negotiations between new licensees and incumbents introduce delays as well as high transaction costs as new licensees contend with holdouts and other bargaining problems” (FCC 2010, 82). There statement is true, but asymmetric. The transaction costs of the selected FCC path are themselves significant, but nowhere does the FCC policy choice reflect them. The costs of the government intervention are simply assumed away.

The quantification of transaction costs across policies is an exercise beyond the scope of this paper. But a qualitative delineation of the rival advantages and disadvantages, combined with what plausible economic magnitudes are available, should

help to produce a more satisfactory analysis. Here we discuss several factors, listing them in Table 5.³¹

A. Delays

Delaying an efficient spectrum reallocation is socially costly. In a study which compared international mobile markets using quarterly data 1999-2003, Hazlett & Muñoz (2009) show that an increment of 30 MHz added to the U.S. mobile market during that time frame would have added about \$10 billion annually in consumer welfare. While wireless services have evolved over the past decade (more bandwidth has been added, as have more services such as text, data, audio and video) the estimate supplies an order of magnitude forecast for the value of the 294 MHz – nearly ten times as much³² – now consumed by the FCC’s TV set-aside.

The FCC sees the delays inherent in spectrum reallocation as overly long and economically destructive. The 2010 National Broadband Plan proposed Incentive Auctions as part of its proposed solution to that problem, projecting a timeline to produce 120 MHz of new bandwidth for mobile licenses by 2015. This would constitute a six-year time frame, counting the year that the NBP took to formulate its policy proposals. Yet, that projection was rendered moot when auctions, scheduled for 2012/2013, did not occur. As of this writing, they have been tentatively rescheduled for Aug. 2015. In that the Commission forecasts that spectrum reallocation will not occur until two years post-auctions, the optimistic timeline for the Incentive Auction program is currently ten years.³³ The less optimistic view sees the process stretching out even longer. The 2012 enabling statute allows the FCC to take until 2022 just to conduct the auction.³⁴

Ten years is now the minimum span for Incentive Auction implementation, and regulators have abandoned hope that the process will much improve upon history, where the Commission has estimated an average nine year process.³⁵ If Incentive Auctions do not solve the spectrum allocation lag, overlays might. The approach is far simpler in terms of regulatory overhead. This can be inferred from the shorter list of tasks falling to regulators, and their less complicated nature, as seen on the flow charts. (Figures 2 and

³¹ Disentangling the various considerations is difficult, and it is done very imperfectly here. The need for new “Statutory Authority,” e.g., is considered as a separate factor when, in fact, it overlaps with “Delay” and the “New Spectrum Use Rigidities.” Alas, it still seems a useful way to organize the comparative analysis.

³² The lower frequencies in the current U.S. digital television band are valued substantially higher than the frequencies allocated the licenses evaluated in the 2009 study. This suggests that the order of magnitude estimate is conservative.

³³ The May 15, 2014 FCC ruling schedules the Incentive Auction for the third quarter of 2015 and then allows 39 months for TV station relocation.

³⁴ “Even if the proposed auction process were not unnecessarily complex, it is unnecessarily time-delaying. It will take many years, perhaps 10 or more, to complete the auction and reallocation process” (Harold Furchtgott-Roth 2012, 10).

³⁵ “[Federal Communications Commission Chairman Julius] Genachowski pointed out that it takes a long time--an average of over nine years--to get spectrum back, so there will be no ‘instant spectrum recovery.’” John Eggerton, [*FCC Chairman Not Sure FCC Can Gauge Spectrum Demands; Genachowski made it clear wireless industry would need more*](#), BROADCASTING & CABLE (Nov. 18, 2009).

3.) While the incentive auction attempts to load complexity onto the regulatory agency, reducing transactional overhead for market agents, the overlay policy strategy is structured to achieve the reverse.

- *Overlays can be defined with respect to existing rights.* Incumbents have the right to continue existing operations; entrants have the right to use spectrum in the band for any purpose that does not compromise these rights (or, of course, those of operators outside of the DTV Band).
- *Overlays have been used on multiple occasions.* In Personal Communications Services (2G, second generation, wireless) licenses auctioned in 1995; in Advanced Wireless Services (AWS) licenses auctioned in 2006; in 700 MHz licenses auctioned in 2008. (See Cramton, Kwerel & Williams 1998; Hazlett 2008b.)
- *The wholly voluntary nature of overlays mitigates opposition.* It is less risky for incumbents or other interests to let the regulatory process move forward when they are vested with the right to veto reallocations directly impacting their operations. Conversely, the Incentive Auction embeds mandatory reassignment of TV station channels. Predictably, interested parties will resist not only wealth-reducing relocations, but even economically neutral changes (as parties to a trade bargain for more than zero percent of the gains).

Because overlays leave existing rights intact, simply endowing incumbents and new players with new rights, they avoid renegotiations over existing rights. A reasonable estimate for the time frame associated with overlays, from planning process through spectrum reallocation, would be three years. This is based on the U.S. PCS spectrum allocation. Petitions were received by the FCC to allocate spectrum for digital “2G” (Second Generation) wireless services in 1989; a proceeding was formally initiated by the agency in 1990. Meanwhile, 2G licenses were being allocated among most West European nations, from 1989 to 1992. In the U.S., delays were encountered via regulatory hold-up: some 4,500 microwave licensees occupied the band designated for PCS, and argued that it would be impossible for them to move their operations to other bands or to wired links.³⁶ The proceeding bogged down, and the goal of licensing PCS by year-end 1992 was dashed.³⁷ The overlay solution was initiated in 1992-94 to resolve the impasse.³⁸ In Dec. 1994, the major PCS auction, for A and B licenses allocated 60 MHz (30 MHz each license), began. It concluded in March 1995; licenses were distributed to winning bidders over the following months. The process to implement rules for overlays in PCS consumed about two years. Perhaps TV Band overlays would have required a somewhat longer agency proceeding – say, three years. This estimate suggests that Incentive Auctions produce a net delay of at least five years.

³⁶ Anita Faff, *Users Bent on Keeping Their Spectrum*, NETWORK WORLD (June 15, 1992), 31.

³⁷ The author served as Chief Economist of the FCC during 1991-1992; the goal of year-end 1992 for PCS licensing was the target during that time.

³⁸ Peter Cramton, Evan Kwerel & John Williams, *Efficient Relocation of Spectrum Incumbents*, 41 JOURNAL OF LAW & ECONOMICS 647 (Oct. 1998).

B. Legislative Authority

Asking Congress for new authority is socially expensive. First, it delays whatever (mutually exclusive) reforms could be undertaken without the reforms. Second, it invites new rules that will further politicize whatever reforms the agency is asking to execute.

An advantage of overlays is that they may be implemented without additional statutes. The statute authorizing the FCC to conduct an Incentive Auction took two years – from March 2010 to February 2012 – to implement. This is lightning speed; the policy effort was fortunate not to have hit a roadblock. Much legislation languishes. Other bills, of course, never pass.

The relatively fast result, however, came in the form of a 205-page bill. Congress did not simply rubber stamp the request for a two-sided auction process outlined in the National Broadband Plan. In particular, it added

- key protections for broadcast TV stations, mandating that the FCC ensure that OTA broadcast audiences following the transition are “reasonable comparable” to existing audience;
- a revenue requirement mandating that, in addition to raising sufficient funds in the forward auction to cover all payments to TV stations and to fund TV station relocation (a fixed sum of \$1.75 billion, far exceeding station costs), auction bids would have to pay \$7 billion for a new, nationwide public safety radio network.

These are substantial, costly requirements – indeed, they come close to being “poison pills.” The director of the FCC’s National Broadband Plan, Blair Levin, attacked the broadcaster protections as so onerous as to undermine the purpose of the reallocation altogether. A news article reported, “Levin: TV Spectrum Auctions Likely Doomed”:

The chief architect of the FCC's National Broadband Plan says the incentive auction of TV spectrum is unlikely to produce much spectrum for wireless broadband or money for the federal treasury. Why? NAB-backed provisions designed to protect broadcasters in the authorizing legislation will expose the auction to crippling litigation. "Congratulations to [NAB President] Gordon Smith," he says. "He did a great job. He did the job he was hired to do.... But let's not kid ourselves: That's not putting the United States first."³⁹

The protections increased “litigation risk,” allowing incumbent stations to hold up regulators. Broadcasters could argue that their new channel assignments were not comparable to their old ones, or that the costs of moving exceeded the dollar compensation they were offered by the Commission – or both. These threats could force

³⁹ Kim McAvoy, *Levin: TV Spectrum Auctions Likely Doomed*, TVNEWSCHECK (Jan. 5, 2012); <http://www.tvnewscheck.com/article/56476/levin-tv-spectrum-auctions-likely-doomed>. The provisions to which Levin objected to were, indeed, included in the bill that was enacted.

policy makers to set-aside more spectrum for post-auction TV, reducing the reallocation. It might also reduce forward auction bids, endangering the entire auction.

The explicit demand for another \$7 billion in revenues would exacerbate this. If these monies are not covered, then the auction will not “clear.”⁴⁰ In that event, the reallocation will be halted and years of regulatory process will have achieved naught.

The national public safety network is the pet project of Commerce Committee Chairman Jay Rockefeller (D-WV). The problems with dedicating an entire network to emergency radio service are legion. Generally, the idea is that it is highly inefficient to build special roads and highways for police cars and fire trucks. When they share “civilian” infrastructure they can access far better infrastructure at much lower cost – which, in turn, effectively pays for redundancy, applications, and a host of additional capabilities. When the need arises, in an emergency, to requisition additional network resources, non-emergency traffic can be pushed out of the way – as is done routinely on public roads, and which is far cheaper and easier to do with electronic communications. These arguments have been elaborated elsewhere (Brito 2007; Faulhaber 2007; Peha 2007; Weiser, 2007).

If FirstNet, the public safety radio network, is worthwhile, it should be authorized in the appropriations process and paid for with general government revenues. As it is effectively an “earmark” for a powerful Senator, it reveals hold-ups in the policy process. Such demands are deeply embedded, as demonstrated here:

Released in 2010, the plan envisioned a connected future, but also a spectrum crunch, a sense of urgency in finding space if the country is to stay competitive and meet the demand for mobile. The plan called for reallocating some 120 MHz of broadcast spectrum space, and proposed the idea of incentive auctions, rooted in market forces. The framework almost immediately met with skepticism from broadcasters. After howls from the NAB and others, that plan was never pursued.

What gained traction in Congress was the idea that proceeds from the auction would be used to create a broadband public safety network, unprecedented in scope.⁴¹

C. MHz Reallocated

The most direct way to quantify the various difficulties in the FCC’s scheme is to look at the *incredible shrinking reallocation*. The size of the DTV Band is 294 MHz. The NBP sought to reallocate 120 MHz of that. As the Commission proceeded, informed participants began talking about 84 MHz. In early 2014, informed observers set the

⁴⁰ As of this writing, the FCC plans to cover the mandated payments with funds collected in other auctions (conducted prior to the Incentive Auctions). John Eggerton, [Verveer: First Two Auctions Should Cover Most of Statutory Financial Obligations](#), BROADCASTING & CABLE (March 18, 2014).

⁴¹ Ted Johnson, [It’s Big TV vs. Big Telecom Over Broadcast Spectrum](#), VARIETY (March 28, 2013).

likely bandwidth “reclamation” at just 20 to 40 MHz.⁴² When the FCC released its preliminary Incentive Auction rules in May 2014, 84 MHz was set as the maximum reallocation, with actual totals (allowed to vary by market) to be determined by supply and demand side bids.⁴³

The contraction occurs because regulators managing the spectrum reallocation see step-downs as a way to move the process forward. Leaving more bandwidth allocated to TV tends to enlarge degrees of freedom for TV station relocations. Because the opportunity cost of the set-aside is not born by the regulators, they see it as a relatively cheap way to mitigate opposition. Conversely, overlays impose opportunity costs on the parties who seek to delay efficient spectrum deployments. And, in avoiding the government queue (wherein the FCC directs the reallocation), the entire 294 MHz of DTV spectrum can be reallocated via overlay licenses without forcing disruptive outcomes.

D. New Spectrum Use Rigidities

A costly aspect of the policy reform undertaken in the Incentive Auctions is the regulatory commitment to freezing the TV Band allocation, including the rights of TV licensees to choose services, technologies and business models. This is the implicit threat intended to provide an “Incentive” for the “Incentive Auction,” as discussed above.⁴⁴ More accurately, though, the threat is largely credible. TV license assignments are being stacked up in the 174 MHz (or more) that will continue to constitute the ongoing allocation for terrestrial OTA video service. Should the FCC, following the Incentive Auction process, seek to then start yet another reallocation, the process could require another ten-year lag.

The FCC has announced that it intends to buy licenses (and induce exit) from only about 200 stations (of about 1,800 total), all in the top 40 U.S. TV markets (of 210 total). This will leave 1600 TV stations locked into an obsolete wireless deployment. This is a

⁴² “[W]e think low double-digit spectrum reclamation (in the range of 20, 30, 40 MHz) is more likely than the FCC’s original goal of 120 MHz.” Robert Kaminski, *TMT Three Things: State of the Union and 2 Spectrum Auctions*, Capital Alpha (Jan. 26, 2014), 2.

⁴³ [Divided FCC Approves Rules for Incentive Auctions; Appeal by Broadcasters Possible](#), BLOOMBERG BNA (MAY 16, 2014).

⁴⁴ Some have suggested that the threat is not credible; that after the Incentive Auction, the FCC will then conduct another such procedure, again paying TV stations to exit. There are multiple problems with this view. First, if true, the “incentive auctions” lose their “incentives.” This would raise TV stations’ offer prices in the reverse auction, making reallocation of the existing TV Band more expensive and difficult. Second, the Incentive Auction procedure requires an act of Congress. (The 2012 enabling statute authorized just one such event.) This makes the threat explicit and enforceable, to the degree that gaining national legislation is a barrier to action, which is assuredly is. Third, the FCC has, parallel to implementing Incentive Auctions, taken actions to enhance broadcaster “incentives” to exit. These include a 2014 initiative to restrict joint sales agreements, or JSAs, wherein two stations in a local market share sales departments, cutting costs. This appears to follow the “burn the house” strategy laid out by Stuart Benjamin (see discussion above), although other rationales are both consistent and likely. Katy Bachman, [FCC Chairman’s Proposal to Prohibit Joint Sales Deals Strikes Partisan Nerve: Commissioner O’Rielly says new rule is not in the public interest](#), AD WEEK (March 10, 2014).

troubling policy outcome, given the FCC's analysis of the "mobile data tsunami" and the reality that video delivery has migrated to cable, satellite, and broadband networks, making the TV Allocation Table of 1952 obsolete. Leaving such spectrum locked into place is a cost that the Overlay Auction avoids.

E. OTA Losses

One factor that seems to clearly advantage the Incentive Auction is that it guarantees that over-the-air television receivers will continue to work. In terms invoked on Capitol Hill: *Aunt Minnie in Peoria, who holds the key to electoral happiness, will continue to see her TV set flap its rabbit ears.*

Aunt Minnie is a delight, and it is surely a good thing that she be happy. The question is whether the value she receives from this particular gift is worth in excess of \$1 trillion.

Under the overlay approach, the price might be whittled down to nothing, and Aunt Minnie would be enjoying even more television quality and program choice than she currently knows to exist. Free OTA broadcasting could continue. While there is a prima facie case that the DTV Band would not continue to be employed as is, there is a business case that offers terrestrial OTA survival – with a rational reconfiguration that rearranged transmission towers, densified video broadcasts via intensive channel sharing and use of the digital sub-channels that remain idle today. Dozens of digital TV channels could be broadcast, per market, using, e.g., 25 MHz (less than one tenth the current band) via simple coordination techniques (such as "co-location," placing all local broadcasters on the same tower).

But let us consider the case where the FCC decides that it is in the "public interest" for Aunt Minnie to continue receiving free, OTA broadcasts, and not to pay for a new receiver or a new subscription to do it.⁴⁵ For over 90% of U.S. television households, there is already a substitute platform – cable or satellite – delivering video to the home. For 100% of U.S. households, there is a cable, telco or satellite platform available to deliver such video services.⁴⁶ Local TV signals are retransmitted to video receivers in these households. That leaves about 10 million homes where there is no subscription service. For these homes, a satellite dish can be purchased and installed. For the cost of \$295 per home (Armstrong et al. 2009, 40), the total cost to bring the last increment of U.S. TV households into the cable/satellite video delivery platform is less than \$3 billion. Were a reverse auction to be held (as described in Hazlett 2009), the cost could be substantially less. A long-term contract to distribute broadcast programming without subscription charge – as it is distributed from TV towers now – could be

⁴⁵ U.S. policymakers believe that protecting Aunt Minnie's free OTA is an absolute political constraint, but it is a curious one. Is a country improved because its citizens enjoy free OTA television? Countries like England believe not, and do the reverse of the U.S., taxing OTA receiver sets about \$250 annually (license fees fund public broadcasting). This question is not our concern here, however. We assume the policy constraint.

⁴⁶ A small number of households in extremely remote areas of the U.S. may not be able to receive reliable any subscription video service, but these areas cannot receive terrestrial broadcast television, either.

executed in the policy. The shift to a more efficient form of system of broadcasting, using satellite dishes for antennae, for instance, is straightforward.

Aunt Minnie's off-air TV may not be worth even \$1 billion or \$2 billion, surely not – given the options -- worth \$1 Trillion. As for the political feasibility of such an approach, it bears noting that the U.S. government has earmarked \$4 billion in recent years to subsidizing traditional TV broadcasting technology. To keep households using OTA receivers, the Department of Commerce distributed \$2.2 billion in Digital TV vouchers in 2009, assisting the analog TV station switch-off. In the Incentive Auction reallocation plan, the TV station relocation fund will dispense \$1.75 billion as per terms of the 2012 enabling statute.

While the Incentive Auction will be likely to maintain Aunt Minnie's OTA service, it will cost some order of magnitude more than what a 'new and improved' TV antenna would cost were the more efficient transition path chosen.

F. Revenues Raised for the Treasury

The FCC characterizes Overlay Auctions as reducing overall demand for mobile licenses due to the cost of band clearing. It is true that the expense of organizing the incumbent licenses will reduce bids against a baseline scenario in which band clearing costs are zero. Now there exists no such alternative. Moreover, an offsetting factor is omitted by the FCC: overlays permit much more bandwidth to be shifted to mobile services. Total winning bids in the Overlay Auction may well exceed the total bids in the Incentive Auction, depending on:

- the amount of bandwidth (MHz) cleared in the Incentive Auction;
- the elasticity of demand for bandwidth in mobile services;
- the cost of pre-auction contracting in the Overlay Auction;
- the cost of post-entry contracting in the Overlay Auction;
- the uncertainty (or risk) factor in both the Incentive and Overlay Auctions.

Relative revenue results are ambiguous. If 65 MHz, cleared in the Incentive Auction, are allocated to mobile licenses, auction receipts could be higher or lower than an Overlay Auction of encumbered licenses allocated, in aggregate, some 294 MHz. The asymmetric analysis applied by the FCC incorrectly considers only the former possibility.

The differential consumer welfare effects are less ambiguous. The Overlay Auction will likely move more TV Band spectrum into mobile services. Observing the low utilization of digital TV sub-channels, opportunities for channel sharing and for extending cable/satellite/broadband retransmission via contract, and the prices of mobile licenses allocated UHF spectrum, it is discernible that most if not all the TV Band would be reallocated. But much less than half of the TV Band is sought for reallocation under the Incentive Auction approach, and regulators now believe that they will be lucky to emerge with a policy that clears even half of what was initially sought.

This produces a stark outcome. Standard estimates place consumer surplus gains, with additional mobile market bandwidth increases, at more than ten times the producer gain (Hazlett & Muñoz, 2009). License bids at auction reflect producer, not consumer, gains. Given this, social welfare is dominated not by government auction receipts, which are relatively unimportant, but by the value generated in wireless markets. (These values will, over time, produce far greater welfare *and* tax revenue than initial bids to the government.) Policies that restrict productive spectrum allocations, relative to other options, on the premise that government revenues will increase are penny wise, pound foolish.

G. Post-Auction Contracting

Finally, the FCC asserts that holdup problems will be endemic once overlays have been auctioned. This reveals a crucial, unwarranted assumption: that mobile license buyers will not engage in pre-auction contracting. Before bidding, when potential bidders are able to use competitive forces to constrain holdups, alliances and partnerships can form. Cooperative TV stations making reasonable bargains would join forces, perhaps sharing equity positions, in ventures aimed at providing new and more profitable wireless services. Those stations aiming to appropriate the entire value of the relevant band, gaining a “blocking premium,” would prove expensive partners. Importantly, they would face substitutes. Networks aiming to utilize bandwidth to feed the mobile data tsunami would shift their demands to more reasonable bidders.

An example of how the overlay approach may reduce transaction costs is seen in a debate raging within the FCC’s Incentive Auction rulemaking. The question is: how much time should broadcast stations have, post-auction, to curtail broadcasts. Those TV stations winning the reverse auction, as well as those relocated by the Commission, will switch-off their old broadcast channels at a coordinated date. That deadline is not set by contractual agreement, as in the Overlay Auction, but by edict. The former incentivizes both parties; overlay licensees would pay something to end broadcasts sooner rather than later. The mechanism for determining such cooperative outcomes can be set pre-auction.

With a government edict, conversely, broadcasters are evicted at a particular date; evictees tend not to cooperate. They can delay the move by appealing to the Commission, litigating in the courts, or pressuring Congress to intervene with the FCC. Hence, it is not the case, as the FCC implicitly asserts, that market bargains are uniquely subject to incumbent licensee hold-up. It is an empirical question as to which policy approach will constitute the more costly set of transactions.

TABLE 5. TRANSACTION COSTS: COMPARING INCENTIVE AUCTIONS AND OVERLAY AUCTIONS				
<i>Auction Type</i>	<i>Transaction Cost Source/Objective</i>	<i>Qualitative Description</i>	<i>Evidence/Rationale</i>	<i>Auction Advantage</i>
Incentive	Policy Delay	10 years	best-case FCC scenario as of mid-2014	Overlay
Overlay		3 years	off-the-shelf technology; voluntary; PCS experience	
Incentive	FCC Authority	Statute needed: 2 year delay plus constraints	2012 statute, FCC officials' reaction	Overlay
Overlay		pre-existing	NBP	
Incentive	MHz Reallocated	FCC goal = 120 MHz; reduced to 84 MHz	NBP and 2013 FCC statements; 2014 FCC rules	Overlay (by > \$100B)
Overlay		up to 294 MHz subject to efficiency test	mechanism design	
Incentive	New Spectrum Use Rigidities	Lock-in of ~1500 TV stations; set-aside for public safety allocation	Mechanism design	Overlay
Overlay		flexible use rights in the market	Mechanism design	
Incentive	OTA Loss	small loss (~300 of 1800 stations)	NAB projections	Incentive (margin < \$3B)
Overlay		switch to alternative platform for < \$3 bil.	\$295 per each of 10 mil. non-MVPD homes	
Incentive	Revenues to Treasury	harmonized spectrum raises license bids	Mechanism design	Ambiguous (but FCC: Incentive)
Overlay		greater bandwidth increases license bids	Mechanism design	
Incentive	Post-auction Contracting	reduces these costs	Mechanism design	Ambiguous (but FCC: Incentive)
Overlay		reduces these costs	Mechanism design	

H. Summary

The incentive auctions are so complicated in design that the FCC has enlisted Nobel Prize winners to help create the models. But the complexity seems to have only added to a Washington scramble to influence how the plan is ultimately carried out, with wireless firms and many telecom companies anxious to see a quick transfer of spectrum, while broadcasters take umbrage at what they see as a land-grab that will benefit their media and entertainment competitors, being engineered by the federal government.⁴⁷

⁴⁷ Ted Johnson, [It's Big TV vs. Big Telecom Over Broadcast Spectrum](#), VARIETY (March 28, 2013).

Incentive Auctions are complicated. On every margin, choices must be made between competing interests, inviting rent seeking and stretching out regulatory decision-making. The administrative task is formidable. The FCC's annual budget is about \$375 million (FY 2015). The agency will spend about \$106 million of that on the design and implementation of the Incentive Auction (FCC 2014). "The enormous sucking sound you hear at the [FCC] is the incentive auction pulling every single member of the staff into its ambit, essentially consuming almost every bureau and every part of the organization."⁴⁸

Contrasting the Incentive Auction program with the alternative Overlay Auction approach can be done qualitatively if not quantitatively. One such formulation is offered in Table 5. Surely, such comparisons are subject to judgment, and competing grids, with distinct scoring, might be offered. But the fundamental methodological point is Coasian: it makes sense only to compare and contrast apples to apples. The imperfections of governments and markets needs to be acknowledged and appraised, across the full scope of the welfare outcomes involved.

The over-arching goal of quick reallocation has been eloquently described by the FCC in its documentation of the need for an Incentive Auction. And, yet, Incentive Auctions will – under the best-case scenario – entail at least a 10-year regulatory lag, about what the FCC has found to be the historic average. Overlays are less complicated to define or assign, and less contentious to produce. The speed-to-market test seems to decisively favor overlays.

In terms of the scope of reallocation, the Incentive Auction aims to make 120 MHz of the 294 MHz TV Band available for mobile services. That goal looks highly ambitious. In contrast, overlays could reallocate most if not all of the TV Band to more productive employments. The ability to move more spectrum – faster – into the marketplace dominates the policy outcome, given the enormous consumer welfare gains possible.

Among other considerations, it is possible that Incentive Auctions would produce higher revenues in license auctions, or that the program would protect Aunt Minnie's OTA program delivery system. But the former trades penny gains for pound losses, and the latter is offset by a policy to maintain "free" TV by subsidizing it directly – at costs two orders of magnitude less than required under Incentive Auctions.

⁴⁸ Comment of law professor Christopher Yoo from the University of Pennsylvania, who "said he hoped the 'political exigency' of the auctions did not stop the commission in its other goals."⁴⁸ John Eggerton, [*Verveer: First Two Auctions Should Cover Most of Statutory Financial Obligations*](#), BROADCASTING & CABLE (March 18, 2014).

VIII. TWO BASIC STRATEGIC CONSIDERATIONS

However one quantifies the transaction costs associated with given policy regimes and their counterfactuals, at least two important strategic considerations have been exposed in the FCC's current policy initiative. The first involves the basic logic of Incentive Auctions, which is to buy cooperation from incumbent TV licensees. The second is the development of a customized policy, the Incentive Auction process itself, to accommodate the regulatory objective. Each pursuit is rich with implications for future policy making, in spectrum allocation and beyond. We consider them in order.

A. Buying Political and Economic Cooperation

The Incentive Auction approach rejects traditional band-clearing mechanisms. That approach would restrict the future license rights of incumbent TV licensees, either by non-renewal of licenses or shifting channel assignments into tighter configurations (stations have less frequency buffer space between broadcasting contours). Such unilateral actions by the Commission could be taken according to "public interest, convenience and necessity." Indeed, under that standard, the FCC found in 2010 that substantial reallocation of radio spectrum from television broadcasting to mobile broadband services was appropriate. It was also under that policy that the TV Band was previously collapsed from 81 channels to 67 (reallocating some of the bandwidth to cellular licenses, distributed in the 1980s) and then, in the digital TV transition, to 49 (allowing 700 MHz licenses to be auctioned in 2008).

But, in the FCC's estimation, political constraints would not permit so direct a policy. The bargaining position of incumbent licensees, who were expected to strongly oppose edicts pushing existing service providers out of the way to accommodate new platforms, was too strong. Resistance through political lobbying (bringing Congressional pressure to bear), petitions filed with the FCC, and litigation were anticipated. The result would be interminable delays. The Commission conceded that "a voluntary approach that minimizes delays is preferable to an antagonistic process that stretches on for years."⁴⁹ The innovation of the Incentive Auction was the result: "Given the practical challenges of reallocation, the FCC needs to create new incentives for incumbent licensees to yield to next-generation users."⁵⁰

As noted above, all auctions rely on the *incentives* of bidders and seller. The "incentive auctions" crafted to assist in remedying the FCC's reallocation problem were notable for being two-sided and, in particular, paying existing licensees to step aside. While taking bids from parties demanding access to additional spectrum was the standard license auction format, incumbent licensees were now to be paid to relinquish their "public interest" licenses. This formal recognition (and monetization) of TV station owners' broadcasting rights was undertaken to "create new incentives for incumbent licensees to yield."

⁴⁹ FCC (2010, 79).

⁵⁰ *Ibid.*, 81.

The regulatory strategy is not objectionable. Despite having been criticized as granting “windfalls” to firms that do not, in fact, own radio spectrum,⁵¹ the reality of the situation is that the regulator was in practice already recognizing such rights. To solve the underlying allocation problem – that the rights were not being used to generate the greatest social surplus, but were being largely wasted – the incentive payments were seen as the price of progress. If, indeed, the transfers to stations would speed the spectrum reallocation process, the resulting gains in wireless services would produce consumer surplus increases obviating concerns about either cost or equity.

The question is: has the strategy succeeded in buying broadcaster support?

The answer will not be fully supplied until the Incentive Auctions play out and alternative mechanisms – most obviously, overlays – are evaluated as the counterfactual. But it is safe to say that, after for years of implementation, the regulatory authority has not substantially mitigated the antagonism expressed by broadcast incumbents to the Commission’s spectrum reallocation efforts.

This outcome was and is predictable. Given the structure of the policy, the FCC aims to buy (via the reverse auction bids) only about 200 TV station licenses. These will presumably all be in the Top 40 markets. Overall, however, there are about 1800 full-power TV stations broadcasting in 210 TV markets. It is not clear exactly which stations will sell their licenses, which awaits the auction. But it is clear for the great majority of stations – network affiliates in the Top 40 markets (about 200 stations), and all stations outside of the Top 40 markets (about 1200 stations) – that there will be no sale, and no rents earned. Their involvement in the process will consist of possibly being assigned a new TV broadcast channel (and paying for the costs of the switch, presumably with funds allocated by the FCC under the 2012 statute) and, with certainty, being left to broadcast in a more crowded TV band. It is this asymmetry, which has very few stations winning auction rents and so many stations being involuntarily moved to a new channel assignment, that forms a strategic policy failure. It is being played out in the two following respects.

B. Incentive Auction Political Economy Arithmetic

First, in developing Incentive Auctions, the FCC was forced wait for a new statute granting it the legal authority to conduct the two-sided auction. The transaction costs entailed in this process have been noted. Among them were those flowing from the opportunity afforded incumbent licensees to lobby Congress for protectionist rules. In the event, the TV broadcast industry succeeded, gaining a mandate that the FCC, in

⁵¹ The contention was sufficiently salient that the National Association of Broadcasters hired a consultancy to counter it. The paper commissioned demonstrated that the great majority of TV stations had been purchased (along with their licenses) in secondary markets. See Jeffrey A. Eisenach, *The Equities and Economics of Property Interests in TV Spectrum Licenses*, Navigant Consulting (Jan. 2014); http://www.nab.org/documents/newsRoom/pdfs/011614_Navigant_spectrum_study.pdf.

reassigning channels, “make all reasonable efforts” to preserve off-air coverage areas.⁵² Because it is inevitable that there will be some variance in the new and old contours, with some changes in household reach, the provision gives almost any broadcaster veto power: simply by filing a federal lawsuit, a station may halt the reallocation.⁵³ Such legal rights, dispersed across hundreds of players in the industry, forms precisely the common interest tragedy regulators sought to avoid via Incentive Auctions.

Second, while this trip-wire creates an obstacle for regulators going forward, TV broadcasting interests have already made it clear that they have little to gain from the permitting the Incentive Auction process to play out. There is a footnote to that: some station owners, particularly those purchased by investors in recent years specifically to participate in the FCC’s reverse auction, are enthusiastic about the process and lobbying to push it forward. Well-known broadcast industry executive Preston Padden formed the “Expanding Opportunities for Broadcasters Coalition” in 2012 to “to advocate for [the] successful auction of broadcast spectrum.”⁵⁴ It has publicly supported the FCC’s efforts to craft rules, mitigate delays, and encourage high revenue generation, all of which would benefit stations posting offer prices to exit the market.

It has been a minority voice within the industry, however. The much larger and long-established industry trade organization, the National Association of Broadcasters, has taken a decidedly negative tone on Incentive Auctions. Of primary concern are the rules that will be used to “repack” the TV Band, a process involving unilateral reassignments (involuntary) by the FCC. By 2014, the NAB and the FCC were openly hostile, a situation rare in the annals of FCC regulation (where regulated interests are typically careful to express complete public confidence in agency officials no matter their private view of matters). At the NAB’s annual convention in Las Vegas, the group’s head, former Republican Senator Gordon Smith, was particularly blunt, garnering the headline: “Broadcast lobbyist Gordon Smith blasts FCC in speech at NAB show.”⁵⁵ Smith’s chief complaint was that the Commission was treating broadcasters “as if we are dinosaurs and does what it can to encourage TV stations to go out of business.”⁵⁶ The observed tactic of the NAB was not only to oppose particular FCC auction rules but to slow the entire process, delaying the reallocation. As another NAB official noted, “The sky is not falling. Broadcasters [Kaplan said NAB represented the ‘true’ interest of broadcasters] are patient, digesting what emerges from the FCC and recognize that this is a long, complex

⁵² David Oxenford, *Congress Authorizes FCC Incentive Auctions to Clear Part of Broadcast TV Spectrum for Wireless Broadband Users – The Details of the Legislation*, Broadcast Law Blog (Feb. 20, 2012); <http://www.broadcastlawblog.com/2012/02/articles/congress-authorizes-fcc-incentive-auctions-to-clear-part-of-broadcast-tv-spectrum-for-wireless-broadband-users-the-details-of-the-legislation/>.

⁵³ This encountered the vehement objection of National Broadband Plan Task Force chief, Blair Levin. See discussion above.

⁵⁴ *New Coalition Formed to Advocate for Successful Auction of Broadcast Spectrum: The group, Expanding Opportunities for Broadcasters Coalition, will represent broadcast stations that, under the right conditions, would consider participating in this historic auction*, Press Release (Nov. 13, 2012); http://www.broadcastcoalition.org/uploads/Expanding_Opportunities_for_Broadcasters_Coalition_Press_Release_-_November_13_2012.pdf.

⁵⁵ Joe Flint, [*Broadcast lobbyist Gordon Smith blasts FCC in speech at NAB show*](#), L.A. TIMES (April 7, 2014).

⁵⁶ *Ibid.*

process.”⁵⁷ The split in the industry became vivid. “NAB has been asking the FCC not to rush the auction, while the [Padden-backed pro-auction] coalition has been urging it not to drag its feet.”⁵⁸

In winning the hearts and minds of obstructionist interests, the Incentive Auction design is the product of poor arithmetic. Those economic agents with significant sunk costs in the industry have been very little bought off. The policy to leave most broadcasting intact has not only resulted in relatively little spectrum being slated for reallocation. It has also left the hold-up problem mostly in place. If individual broadcasters elect to sue the Commission when channel reassignments are issued, the entire process could be thwarted. (Indeed, broadcasters were quick to issue such a threat upon release of FCC auction rules in May 2014.⁵⁹) In the meantime, powerful interests are left to fight for procedural delays, a game in which the playing field tilts strongly towards policy procrastination.

C. The Efficiency of Generic Templates

1. The Generic Case for Generic Policies

An essential margin on which to evaluate public policies involves ease of implementation. Because the design and execution of regulatory processes is costly, an important trade-off exists between customized solutions and generic templates. Standard forms are useful when they economize on transaction costs, or allow policies to move forward expeditiously. The trade-off is that such existing formats may not be the ideal approaches for the particular problem at hand; one size does not fit all. On the third hand, generic policy platforms, as a general proposition, are adaptable over a wide variety of situations. They become standard due to the usefulness of their flexibility.

In the end, the choice between *sui generis* policy initiatives and generic policy templates must focus on the cost of customization, for the former, and the adaptability to specific circumstances, in the latter. The facts specific to any given policy effort must be examined to make such a determination. It is clear that neither approach dominates in every situation. The “perfect” solution may not be optimal, given the time and expense

⁵⁷ John Eggerton, [NAB: EOBC Is Being Alarmist About Auction Says NAB represents 'true' broadcasters](#), BROADCASTING & CABLE (Dec. 16, 2013).

⁵⁸ Ibid.

⁵⁹ The involuntary reassignment of TV channels – the mechanism employed to relieve the hold-up problem feared for private overlay licensees – is the source of broadcaster hold-up in the Incentive Auction. When the FCC announced that it would use a new software program to determine how TV broadcast stations would be assigned new channels, “the National Association of Broadcasters, which has been advocating for TV stations that do not wish to participate in the FCC's incentive auctions, issued a strongly worded statement of opposition to the agency's vote.... The statement suggests an appeal by broadcasters may be forthcoming.” FCC member Ajit Pai, a Republican who voted against the FCC Order, bemoaned the Commission's actions on the grounds that the FCC's efforts “will be all for naught if a court postpones or invalidates the incentive auction having found those changes are unlawful.” [Divided FCC Approves Rules for Incentive Auctions: Appeal by Broadcasters Possible](#), BLOOMBERG BNA (MAY 16, 2014).

needed to implement it, and the easiest, most familiar policy approach may not outperform a novel model. Indeed, it can be shown that every “new” policy combines both innovative features and established formats. Comparing “custom” versus “generic” policy platforms involves differentiating by degree.

Perhaps the clearest expression of the value of generic templates is found in the use of boilerplate contracts. When parties cooperate to create gains from trade, they typically draft and executive agreements that rely in large part, or in whole, on standard form contracts. Specifics can be inserted into such generic forms, specifying the parties and the nature of the immediate transaction, but economies are realized. In short, the parties do not have to re-invent the wheel. Because such forms accommodate a wide variety of cooperative ventures, and can be easily modified to note the particulars of the instant case, they prove efficient. This is true even when more complete, customized contracts would ideally fit the circumstances better. Those options are complicated to devise and involve substantial legal and negotiating costs.

What develops is a “trade-off between tailoring and portability.”⁶⁰ The ability of contracts to be “portable,” used in a variety of similar or even dissimilar situations, captures economies that can dominate the gains available from crafting a particular agreement to particular circumstances. “[C]ommunal boilerplate – fixed language that is common to an industry”⁶¹ achieves net gains via scale economies. Interestingly, legal scholars writing about contract law long tended to ignore such economic margins, arguing that more complete contracts were necessarily superior. The approach failed to take account of the transaction costs of new designs or the constraints of complexity: the “current tendency of scholars to focus on completeness and neglect complexity has resulted in an inadequate understanding of contracts and contract law.”⁶² When factoring in these relevant aspects it quickly becomes clear that, “given the positive transaction costs of drafting complex clauses, a simple contract, rather than a complex one with many unimportant details, will be optimal in a simple environment.”⁶³

Indeed, simple contracts may prove relatively efficient even in complex environments. In the policy setting facing FCC spectrum allocators, it is implicitly conceded that imposing regulatory solutions, while technically feasible, is too complex a process to effectively execute. Market institutions, including auctions to establish values for stations taken off the air and for new rights authorized, are embraced because they make the regulatory task simpler. This, in turns, permits the objective of spectrum reallocation to proceed more expeditiously and efficiently than under more ambitious models of reform that rely on more complicated designs.

2. Overlays as Generic Policy Devices

⁶⁰ Henry E. Smith, *Modularity in Contracts: Boilerplate and Information Flow*, 104 MICHIGAN LAW REVIEW 1175 (2006), 1176.

⁶¹ Michelle E. Boardman, *Contra Proferentem: The Allure of Ambiguous Boilerplate*, 104 MICHIGAN LAW REVIEW 1105 (2006), 1109.

⁶² Karen Eggleston, Eric A. Posner & Richard Zeckhauser, *The Design and Interpretation of Contracts: Why Complexity Matters*, 95 NW. U. L. REV. 91 (2000), 92.

⁶³ *Ibid.*, 104.

Within this context the choice between Incentive Auctions and Overlays becomes clearer. The former, while availing itself of certain regulatory precedents (and administrative boilerplate) and modular market solutions such as competitive bidding (in both the reverse and forward auctions), requires a relatively high degree of specificity in policy design. In creating a new architecture for the auctions, imposing a particular band plan, determining exactly (or approximately) how much spectrum will be reallocated from TV to mobile, and carrying out the reassignment of TV channels requires a central role for the regulator. This role, in turn, requires continual policy choices, each of which risks political opposition, additional regulatory process, and litigation.

Thomas Wheeler, the FCC Chairman who assumed office in October 2013, advises that “managing a complex undertaking such as this also requires an ongoing commitment to continuously and honestly assess its readiness and its project plan.”⁶⁴ These information flows are seen to be vital because of the important interests implicated by FCC rule makings; if such interests are compromised, political backlash could derail the entire process. That makes “the world's first-of-a kind incentive auction”⁶⁵ a delicate operation strewn with potential hazards. The FCC Chairman professes to be aware of the risks associated with ambitious policy innovation:

I have often defined the complexity of this multi-part simultaneous process as being like a Rubik's cube. As part of our auction system development, we will check and recheck the auction software and system components against the auction requirements, and under a variety of scenarios replicating real life conditions. Above and beyond our normal auction preparation procedures, our project plan for the incentive auction includes several software demonstrations for potential users in addition to the 'mock auction' we typically hold to ensure the software and system performance. Only when our software and systems are technically ready, user friendly, and thoroughly tested, will we start the auction.⁶⁶

The source of advantage in overlay licenses lies in the simplicity of their policy design. The Commission has defined and distributed overlays in a number of proceedings, and those templates are modified for use in the TV Band or elsewhere with relative ease. Procedures for dealing with incumbents are regularized: each are grandfathered to continue existing activities. Templates exist for determining transmission contours. Such rules both enable band clearing efforts, while mitigating opposition from incumbent interests (which retain opt-in rights for whatever changes are made). The hold-ups that the FCC sees as overlays bugs, can also be seen as features. Complex business dealings are delegated to market participants, overlay and incumbent licensees that internalize the costs of delays and complexity, and symmetrically enjoy the gains from breaking bargaining deadlocks. Such firms are also able to avail themselves

⁶⁴ Phil Goldstein, [FCC Pushing 600 MHz Broadcast Incentive Auction to mid-2015](#), FIERCE WIRELESS (Dec. 6, 2013).

⁶⁵ Ibid.

⁶⁶ Ibid.

of the assistance supplied by capital markets. Funds to by cooperation in band clearing can be obtained by investors who are repaid from the proceeds generated by more efficient wireless deployments. Markets routinely solve what are “rubik’s cubes” for regulators.

One of the most promising uses of overlays lies in their issuance for government spectrum. It is well known that non-profit agencies, particularly those with state ownership, have comparatively strong incentives to hoard spectrum and very weak incentives to engage in value-creating trades. That is because the price information supporting efficient transfers is lacking in bands dominated by government users, and because government officials in such agencies cannot be easily compensated (or disciplined) for creating gains from trade. Instead, such decision makers benefit, career-wise, by defending the interests of their agency, resisting resource sharing or reallocations, even when socially advantageous.

Overlays can be useful in just such a situation. Take a band currently allocated to a mix of federal agencies. Currently, the spectrum allocation approach is to conduct government engineering studies to see if alternative wireless deployments could permit other users – commercial or government – to access some or all of the frequency space. Options are always present; technology is continually presenting new opportunities, and the optimal mix of services, networks, and technologies changes dynamically. But in attempting to gain the cooperation of the various government players, most pointedly the Department of Defense (which is, by far, the single most important spectrum user, and enjoys access to capacious spectrum allocations), U.S. regulators face considerable hurdles. Decades-long delays are common.

An overlay can not only shift the economic calculations, forcing price information into the negotiating process, but can bring capital markets and other private sector institutions to bear. In that government band, an overlay could be issued, even with incumbent government users vested with full and exhaustive transmission rights. The overlay would then consist entirely of a secondary right, dependent on the new licensee gaining the cooperation of the incumbent agencies to share spectrum or exit. The exact nature of that transition could be complex – with new radios, networks, or bands substituting for existing wireless communications – and financially sophisticated in terms of funding sources. But those complexities are worked out by the profit-maximizing firm, gaining economic returns via spectrum reallocation. The regulatory policy enabling that outcome is relatively simple to construct and assign.

As seen by at least one member of the FCC. In a 2013 policy statement, Commissioner Jessica Rosenworcel recommended that overlay licenses be used to reallocate federal spectrum more expeditiously in the AWS-3 proceeding:

I propose we auction 2155-2180 along with an additional right – the right to work with federal incumbents in the 1755-1780 band. [This would be an] exclusive right to negotiate with federal incumbents. [B]y creating a source of agency, it will create opportunity for specific parties to negotiate

with federal users and come up with creative ideas for near-term testing, sharing and even long-term relocation. Given the real statutory constraints, I think this is an elegant solution.⁶⁷

This thoughtful appraisal is itself elegant. In the event, the FCC rejected Rosenworcel's suggestion. That was an error that should be corrected. Given the unfortunate delays observed in virtually every FCC spectrum reallocation, the Commission will likely have many chances to reconsider.

IX. CONCLUSION

.... I did not immediately jump to the conclusion that a market with pricing would be superior to regulation by the FCC. It was necessary to take into account the existence of transaction costs. However, my investigation... led me to believe that the problem of establishing a system of property rights which could be the subject of trading was not as difficult as one might have supposed, and they certainly made it clear to me that the Federal Communications Commission conducted its affairs in an extremely imperfect way (Coase 1993, 249).

Much of what Coase explained about regulating radio spectrum a half-century ago has gained traction not just among scholars but among policy makers. One important indicator of this influence was seen in the 2010 National Broadband Plan when, upon finding that TV Band spectrum should be reallocated to mobile services, regulators sought to facilitate the transition with a two-sided auction.

But there are multiple market-based reform approaches. In searching for the optimal path, the classic error of Pigouvian welfare economics -- asymmetric transaction cost assumptions -- should be avoided. The Commission implicitly accepts that policy choices all come with imperfections when it suggests (also in the NBP) considering a Plan B:

Explore alternatives – including changes in broadcast technical architecture, an overlay license auction, or more extensive channel sharing – in the event the preceding recommendations [including the “incentive auction”] do not yield a significant amount of spectrum (FCC 2010, 88).

Alternatives are worth exploring even if the other policies *do manage* to “yield significant spectrum.” And suggestions for altering “broadcast technical architecture” or “channel sharing” are non-reformist: administrators have set such rules for sixty years.

Overlays will entail substantial costs in reconfiguring TV Band spectrum. This is not the result of market failure but an outcome of public policy. In rejecting overlays, the

⁶⁷ Remarks of Commissioner Jessica Rosenworcel, CTIA 2013 – The Mobile Marketplace, Las Vegas, Nevada (May 22, 2013), 4.

FCC posits: *The rights we've issued have messed this market up so much that only government coercion – including mandatory relocation of TV channel assignments – can fix it.*

Indeed, that argument may be correct. But it is not correct on the factors considered thus far by regulators. The fact that holdups may occur is a fact shared by the chosen FCC alternative. There are government mechanisms available for dealing with holdups that are unavailable to the private sector, but then, too, there exist market mechanisms for mitigating holdups unavailable in the public sector. As the empirical evidence concerning transaction costs in the Incentive Auction reallocation mounts, overlays become relatively attractive as a policy option. While the quantification of such costs is fraught with difficulty, the first approximations considered herein are highly suggestive of this conclusion.

Indeed, overlays have performed well, compared to alternatives, in reallocating spectrum under perhaps the most trying circumstances – when the incumbent users are government agencies. Following 2006 AWS license auctions, licensees were forced to negotiate terms under which incumbent government radio systems (from a variety of agencies) would cease or relocate their operations to make way for new services. The transition was funded by the AWS licensee. The overlay approach allowed, for instance, T-Mobile to acquire substantial new bandwidth, enabling the carrier to build-out 3G service. While the auction concluded in Sept. 2006, and licenses were awarded some months later, T-Mobile was using AWS spectrum to commence 3G service in New York City in May 2008⁶⁸ – lightening fast in spectrum reallocation time.⁶⁹ The implementation of this policy innovation deserves more serious comparative analysis.

In the mobile market, the U.S. has pursued a path of radical license de-concentration. While other countries routinely issue national wireless licenses, the four major wireless carriers with national networks in the U.S. have been constructed with spectrum rights conveyed in *over 50,000 mobile licenses*. Auctions and, to a much greater extent (in numbers of licenses), secondary markets have allowed mobile carriers to purchase thousands of these fragmentary assets, piecing them together into more efficient spectrum portfolios. Each individual license was a complementary asset to the network that purchased it. Each transaction harbored a potential holdup.

⁶⁸ [*T-Mobile Offers 3G in New York*](#), ASSOCIATED PRESS (May 6, 2008).

⁶⁹ Curiously, and perversely, government reports have dismissed the AWS overlays as producing ineffectual reallocation results. One found that “even 4 years after the initial auctions, the winning bidders for the AWS-1 spectrum were unable to make full use of the spectrum they had bought because agencies had not been totally cleared.” Karen D. Gordon, Jonathan R. Agre, Daniel K. Correa, Bill Brykczynski, J. Katharine Burton, Leo H. Jones, Jr., Michael C. Mineiro, & Brian David A. Mussington, *A Review of Approaches to Sharing or Relinquishing Agency-Assigned Spectrum*, Institute for Defense Analyses, IDA Science & Technology Policy Institute (Jan. 2014), 54-55. This result, however, is not only unsurprising (given the timelines for FCC reallocations) it does not imply inefficiency. The clearing of spectrum in major markets (like New York City for T-Mobile’s 3G) where additional bandwidth was in high demand took place much faster. In markets where such pressing demands did not exist, a multi-year clearing process would prove optimal, not a roadblock.

These natural experiments in transaction cost economics are informative, as are the experiences with overlays in the U.S. and the “incentive auctions” now being constructed. Further research that identifies differences in economic outcomes across policy approaches, bringing resources into more efficient use, should prove helpful in allowing “the invisible resource” (Levin 1980) to contribute more fully to social and economic development.

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