



Lecture 3: Market Tools Part I

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Spectrum Economics and Market Tools



Lecture III: Market Tools Part A

Spectrum Economics and Market Tools

- I. Introduction
 - 1. Spectrum in the News
 - 2. Nobel Prize Winners
- II. Spectrum Economics
 - 1. History of Auctions
 - 2. Spectrum Valuation Methods
 - 3. Spectrum Valuation Factors
- III. Market Tools Part A**
 - 1. Reallocation Challenges**
 - 2. Secondary Markets**
- IV. Market Tools Part B
 - 1. Incentive Auctions
 - 2. Other Tools
- V. New Developments
 - 1. Satellite Constellations
 - 2. Local Governance
- VI. Conclusion

III.1 Reallocation Challenges

The Reallocation Process

1. Before the auction
2. Windfalls
3. Holdup
4. The “Interference Veto”

III.2 Secondary Markets

Overview

1. History of Secondary Markets
2. Secondary Market Transactions
3. Perspectives on Spectrum Markets

III.2 Secondary Markets

History of Secondary Markets

Federal Communications Commission

FCC 03-113

**JOINT STATEMENT OF
CHAIRMAN MICHAEL K. POWELL and COMMISSIONER KEVIN J. MARTIN**

Re: Promoting Efficient Use of the Spectrum Through Elimination of Barriers to the Development of Secondary Markets; Report and Order and Further Notice of Proposed Rulemaking; WT Docket No. 00-230

Today's action is one of the most important spectrum reform decisions by this Commission in the last decade. For years, the Commission has rhetorically praised the concept and possibilities created by secondary markets in spectrum. Today that rhetoric turns into reality. Our decision unlocks value trapped for too many years in a regulatory box. That box was most clearly epitomized by the anachronistic 40-year old *Intermountain Microwave* standard, which required Commission prior approval for a license transfer any time a licensee ceded any of a panoply of responsibilities associated with equipment, salaries, personnel and sundry other activities. We are pleased to announce the passing of *Intermountain*, as we explicitly abandon that standard for spectrum leases. Built on the 2000 *Spectrum Policy Statement* as refined and developed by this Commission, today we adopt a new standard more narrowly tailored to the statutory requirements and more suited to today's marketplace. Our decision signals a new day of increased spectrum access and improved services for consumers.

Figure 4I. Joint Statement of Chairman Michael K. Powell and Commissioner Kevin J. Martin on Secondary Markets, FCC, WT Docket No. 00-230, FCC 03-113, Oct. 6, 2003, FCC, Public Forum on Secondary Markets in Radio Spectrum, DA 00-1139, Transcript, May 23, 2000, <https://www.fcc.gov/realaudio/tr053100.pdf>.

III.2 Secondary Markets

History of Secondary Markets

IN THE UNITED STATES FEDERAL COMMUNICATIONS COMMISSION

In the Matter of:)
SECONDARY MARKET FORUM)

Main Commission Meeting Room
Federal Communications
Commission
445 12th Street, S.W.
Washington, D.C.

Wednesday,
May 31, 2000

APPEARANCES:

DALE HATFIELD, Chief, Office of Engineering and
Technology, FCC
WILLIAM KENNARD, Chairman, FCC
SUSAN NESS, Commissioner, FCC
HAROLD FURCHTGOTT-ROTH, Commissioner, FCC
PETER CRAMTON, Chairman, Spectrum Exchange and
Professor of Economics, University of Maryland
MORGAN O'BRIEN, Vice Chairman, Nextel
Communications

Figure 42. Transcript from Public Forum on Secondary Markets, May 2000
FCC, Public Forum on Secondary Markets in Radio Spectrum, DA 00-1139, Transcript,
May 23, 2000, <https://www.fcc.gov/realaudio/tr053100.pdf>.

III.2 Secondary Markets

History of Secondary Markets

17. We believe that a secondary market for spectrum resources can develop as it has for wireline bandwidth, which is now being actively traded like traditional commodities such as oil, gas, and grains.²⁴ We believe that the limited secondary market activity in spectrum usage rights is the result of a combination of factors that include: 1) regulatory constraints, 2) the availability of equipment for operation, and 3) the lack of adequate systems and information for the conduct of effective trading and market operations. We believe that it is possible to achieve improvements in each of these areas, and thereby to move towards a more freely functioning system of secondary markets for spectrum usage rights. In developing specific initiatives for improving secondary markets, we believe it is appropriate to rely on the general economic theory of markets. Certain essential elements that need to be present for a market system to operate most effectively include: 1) clearly defined economic rights; 2) full information on prices and products available to all participants; 3) mechanisms for bringing buyers and sellers together to make transactions with a minimum of administrative cost and delay; 4) easy entry and exit to the market by both buyers and sellers; and 5) effective competition, with many buyers and sellers.²⁵

Figure 43. Essential Elements for Market System in Spectrum Assets
FCC, Policy Statement, Principles for Promoting the Efficient Use of Spectrum by
Encouraging the Development of Secondary Markets, FCC 00-401, Dec. 1, 2000,
<https://docs.fcc.gov/public/attachments/FCC-00-401A1.pdf>, at ¶ 17.

III.2 Secondary Markets

Secondary Market Transactions

Completed Assignments of Authorization and Transfers of Control by ULS Procedure[a]						
Receipt Year	Notification-Track[b]			Approval-Track[c]		
	Total	Assignment	Transfer	Total	Assignment	Transfer
Pre-1994 [d]	28	12	16	2,754	1,115	1,639
1994	130	51	79	371	116	255
1995	2	1	1	14	11	3
1996	115	49	66	62	42	20
1997	457	219	238	395	214	181
1998	365	88	277	558	236	322
1999	346	209	137	906	416	490
2000	514	311	203	2,136	1,557	579
2001	559	308	251	3,285	2,888	397
2002	287	217	70	3,181	2,646	535
2003	166	100	66	2,322	1,946	376
2004	308	158	150	2,151	1,677	474
2005	358	269	89	2,558	2,102	456
2006	327	243	84	2,671	2,020	651
2007	211	139	72	2,301	1,579	722
2008	325	130	195	1,994	1,515	479
2009	96	26	70	215	178	37
Unkown	474	447	27	31	19	12
Total	5,068	2,977	2,091	27,905	20,277	7,628

Figure 44. Completed Assignments of Authorization (Mayo and Wallsten, 2009, tbl.2)
 John Mayo and Scott Wallsten, "Enabling Efficient Wireless Communications: The Role of Secondary Spectrum Markets," Technology Policy Institute Working Paper, June 2009, <https://techpolicyinstitute.org/wp-content/uploads/2010/01/enabling-efficient-wireless-co-2007662.pdf>.

III.2 Secondary Markets

Secondary Market Transactions

Completed Approval-Track Assignments of Authorization and Transfers of Control[a] by Service Code Category,[b] 1994-2009[c]														
Receipt year	Cellular	PCS	Industrial/ Business	Land Mobile Commercial	Private	Broadband radio	Educational broadband	Public safety	Microwave	Paging	Coast & Ground	Other[d]	Unknown[e]	Total[f]
1994	0	1	0	0	0	0	0	0	0	0	0	0	370	371
1995	0	13	0	0	0	0	0	0	0	0	0	0	1	14
1996	0	54	0	1	0	0	0	0	0	0	0	0	7	62
1997	0	392	0	1	0	0	0	0	0	2	0	0	0	395
1998	136	177	0	14	0	0	0	0	81	135	0	8	16	558
1999	238	267	2	39	0	3	0	0	340	87	0	3	5	906
2000	234	295	534	489	12	0	0	5	584	95	0	94	1	2,136
2001	23	278	1,600	1,082	71	1	0	67	303	56	37	44	2	3,285
2002	38	188	2,017	589	47	0	0	217	325	68	93	10	7	3,181
2003	33	294	1,419	272	80	0	0	166	252	63	50	20	4	2,322
2004	98	235	1,431	173	50	0	0	94	260	57	58	10	0	2,151
2005	31	237	1,560	455	47	90	23	109	220	78	67	15	8	2,558
2006	100	220	1,500	373	75	70	27	302	264	76	43	9	5	2,671
2007	120	191	1,370	166	62	81	24	204	361	47	52	4	2	2,301
2008	103	182	1,075	93	57	189	43	163	308	31	50	5	2	1,994
2009	0	10	133	9	6	0	0	45	21	6	5	0	0	215
Totals	1,154	3,034	12,641	3,756	507	434	117	1,372	3,319	801	455	222	3,215 [g]	27,905 [g]

Figure 45. Completed Approval-Track Assignments by Service Code Category (Mayo and Wallsten 2009, tbl.3)
John Mayo and Scott Wallsten, "Enabling Efficient Wireless Communications: The Role of Secondary Spectrum Markets," Technology Policy Institute Working Paper, June 2009, <https://techpolicyinstitute.org/wp-content/uploads/2010/01/enabling-efficient-wireless-co-2007662.pdf>.

III.2 Secondary Markets

Secondary Market Transactions

Completed Spectrum Leases
2004 - August 27, 2006

Receipt year	Leases and Subleases			Lease Assignments & Transfers
	Spectrum Manager	<i>De facto</i> Transfer	Total	
2004	50	70	120	2
2005	96	229	325	13
2006	54	301	355	38

Figure 46. Completed Spectrum Leases 2004-2006 (Mayo and Wallsten, 2009, tbl.4)
John Mayo and Scott Wallsten, “Enabling Efficient Wireless Communications: The Role of Secondary Spectrum Markets,” Technology Policy Institute Working Paper, June 2009,
<https://techpolicyinstitute.org/wp-content/uploads/2010/01/enabling-efficient-wireless-co-2007662.pdf>.

III.2 Secondary Markets

Secondary Market Transactions

Completed Spectrum Leases, Application Form 608													
New Leases and Subleases[a] by Service Code Category,[b] and Term Length,[c] 2006-2009[d]													
Receipt Year	Lease Term	Cellular	PCS	Industrial/Business	Land Mobile Commercial	Broadband Radio	Educational Broadband	Microwave	Paging	Coast & Ground	Other[e]	Unknown[f]	Total[g]
2006	Short	1	4	-	1	-	-	5	1	-	-	1	10
	Long	-	10	5	3	9	128	6	-	-	-	-	161
2007	Short	8	44	1	6	6	6	7	3	-	-	-	79
	Long	-	61	20	18	14	403	24	2	-	1	-	541
2008	Short	29	106	-	11	14	6	46	5	-	1	1	202
	Long	2	51	4	16	13	219	55	1	13	-	-	372
2009	Short	1	3	-	3	5	-	2	1	-	-	-	15
	Long	-	7	-	1	2	14	6	-	1	-	-	31
Total		41	286	30	59	63	776	151	13	14	2	2	1411

Figure 47. Completed Spectrum Leases by Service Code Category (Mayo and Wallsten, 2009, tbl.5)
 John Mayo and Scott Wallsten, "Enabling Efficient Wireless Communications: The Role of Secondary Spectrum Markets," Technology Policy Institute Working Paper, June 2009,
<https://techpolicyinstitute.org/wp-content/uploads/2010/01/enabling-efficient-wireless-co-2007662.pdf>.

III.2 Secondary Markets

Secondary Market Transactions

Spectrum Traded in Voluntary, Non-Pro Forma Transfers and Full Assignments of Market-Based Licenses							
by Service Code Category							
in billions of MHz-Pops							
Year	PCS	Land Mobile Commercial	Broadband Radio	Microwave	Paging	Coast & Ground	Total
1997	0.307	0.004					0.311
1998	3.051	0.013		10.576			13.640
1999	12.106	2.530		170.974			185.610
2000	13.436	0.716		9.035	0.004		23.191
2001	9.175	0.468		87.200	0.005		96.848
2002	5.390	0.354		577.000	0.012	0.014	582.770
2003	12.613	0.121		49.100	0.016	0.001	61.851
2004	14.575	0.188		14.674	0.056	0.015	29.509
2005	7.659	7.510	12.600	56.200	0.030	0.035	84.034
2006	8.918	1.100	1.030	133.000	0.052	0.093	144.192
2007	9.143	2.200	2.400	37.899	0.027	0.043	51.712
2008	12.581	0.326	18.699	10.052	0.009	0.087	41.754
2009	0.613	0.034	0.014	1.130	0.006		1.797

Figure 48. Spectrum Traded by Service Code Category (Mayo and Wallsten, 2009, tbl.6)
 John Mayo and Scott Wallsten, "Enabling Efficient Wireless Communications: The Role of Secondary Spectrum Markets," Technology Policy Institute Working Paper, June 2009,
<https://techpolicyinstitute.org/wp-content/uploads/2010/01/enabling-efficient-wireless-co-2007662.pdf>.

III.2 Secondary Markets

Perspectives on Spectrum Markets

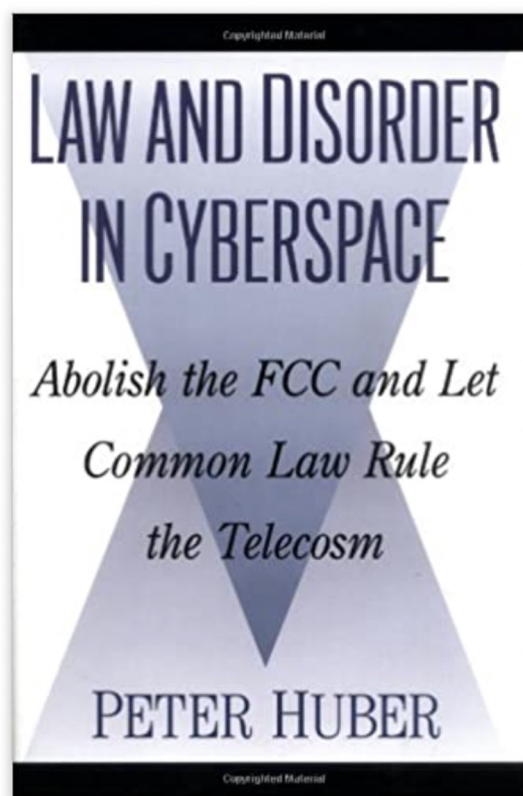


Figure 49. Law and Disorder in Cyberspace (Peter Huber, Oxford University Press, 1997)

III.2 Secondary Markets

Perspectives on Spectrum Markets

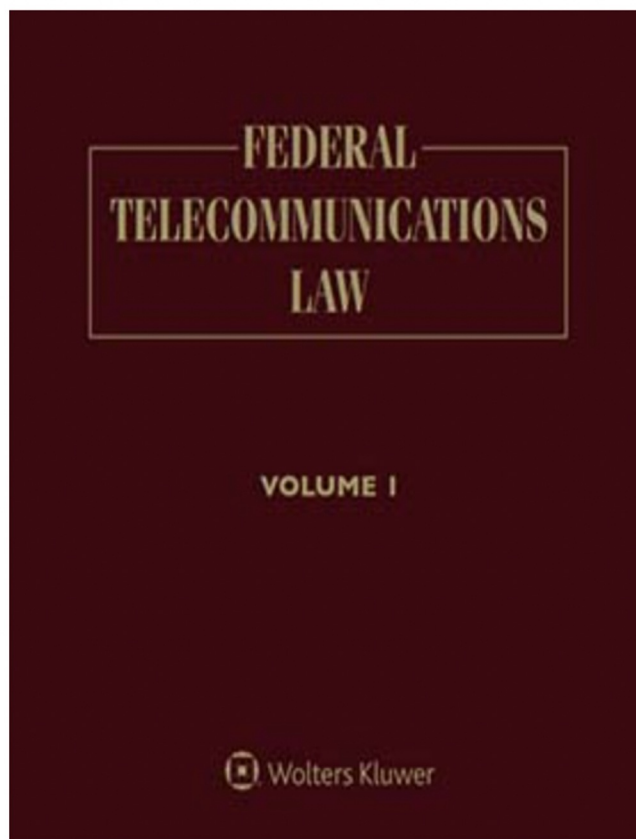


Figure 50. Federal Telecommunications Law by Peter Huber, Michael Kellogg, John Thorne

III.2 Secondary Markets

Perspectives on Spectrum Markets

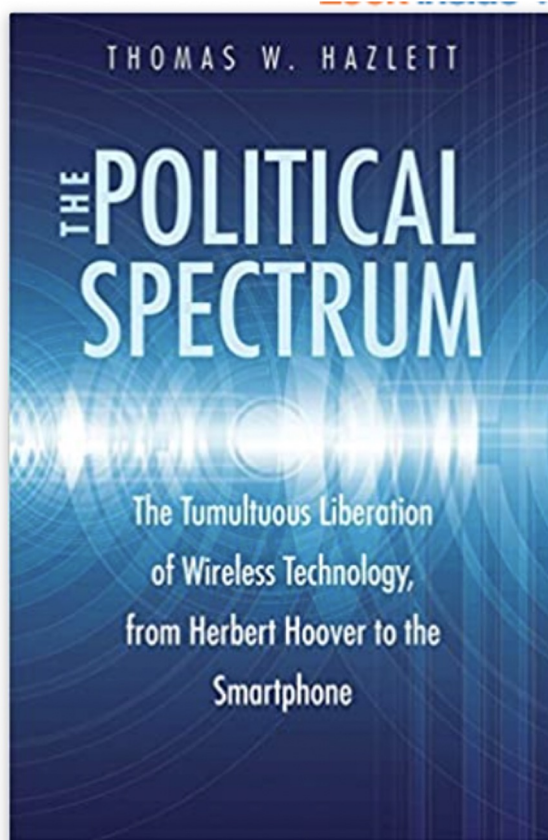


Figure 51. The Political Spectrum: The Tumultuous Liberation of Wireless Technology, from Herbert Hoover to the Smartphone (Thomas Hazlett, Yale University Press, 2017)

III.2 Secondary Markets

Perspectives on Spectrum Markets

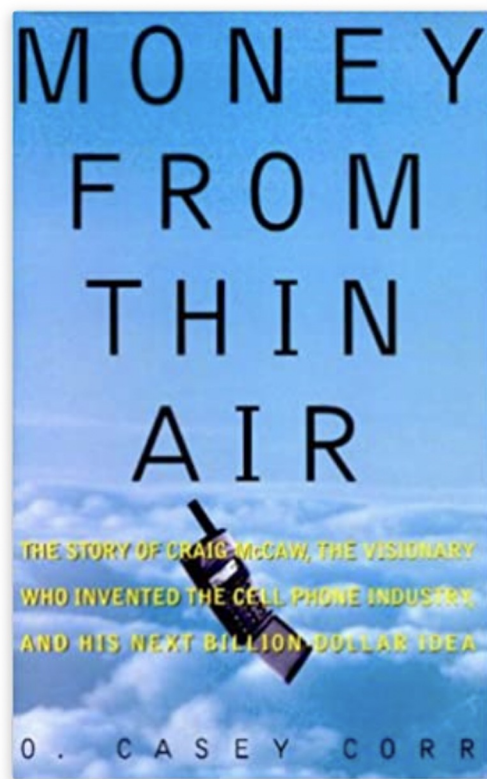


Figure 52. Money from Thin Air: The Story of Craig McCaw (O. Corey Corr, 2000)

Lecture III: Market Tools Part A

Spectrum Economics and Market Tools

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 - 1. Incentive Auctions
 - 2. Other Tools
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