Can Wireless Infrastructure Keep Up In Ultra Broadband?

Gigabits vs. Megahertz

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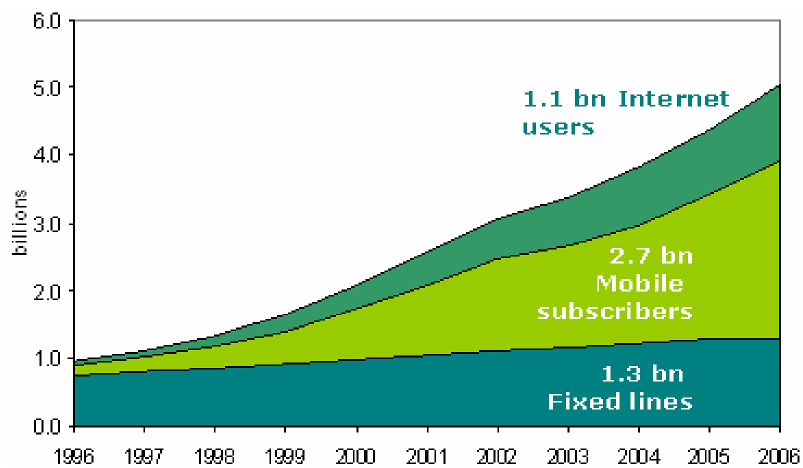
Overview

- Yes
- It will take Liberal Licenses
  - broad, exclusive spectrum rights productive
  - more bandwidth
  - overlays for reallocations
- mobile voice now dominating
- What Really Matters in Spectrum Allocation
  - Hazlett-Muñoz (2008)

Can Wireless Compete in UBB?

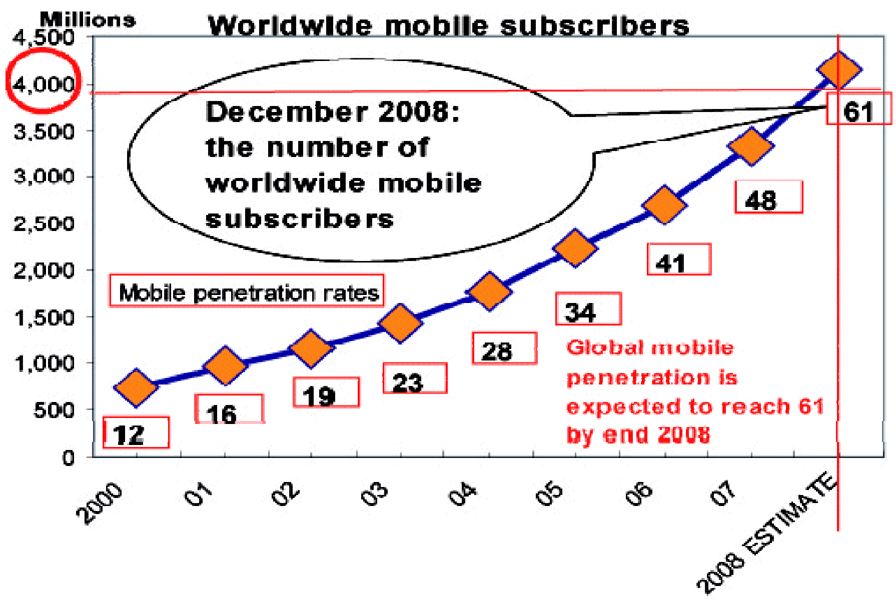
- Yes
- Underestimated in uni-dimensional tech view
- Mobility highly valuable
- Competitive networks → robust markets
  - iPhone v. Blackberry v. Android
- WiMAX via Clearwire ($30/mo, 4mbps/2mbps)
- Substitutes for lots of fixed

Global Voice & Data Subscribers



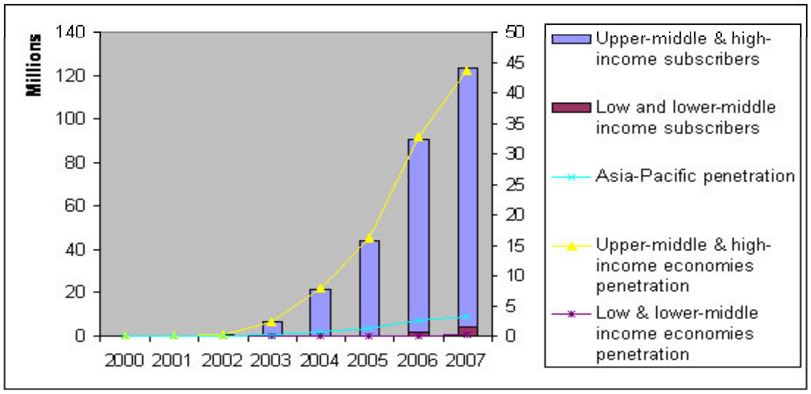
- "By the end of 2006, there were a total of nearly 4 billion mobile and fixed-line subscribers and over 1 billion Internet users. This includes 1.27 billion fixed-line subscribers and 2.68 billion mobile subscribers (61 per cent of which are located in developing countries) as well as some 1.13 billion Internet users." (ITU)

Update!



Source: ITU World Telecommunication/ICT Indicators (WTI) database.

Mobile cellular broadband subscribers in Asia-Pacific



Source: ITU World Telecommunication/ICT Indicators database
Note: Mobile broadband refers to CDMA1X EVDO, WCDMA and HSDPA.

U.S.A. Wireless BB Subs

2004	2005		2006		2007
Jun	Jun	Dec	Jun	Dec	Jun
11,398,199	16,316,309	19,515,483	22,384,255	25,412,883	27,516,171
1,407,121	898,468	878,973	948,134	1,030,698	1,028,654
-	411,731	368,782	337,412	344,759	319,932
-	486,737	510,191	610,722	685,939	708,722
18,592,636	24,017,442	26,558,206	29,174,494	31,981,705	34,408,553
130,928	315,651	448,257	685,823	1,035,677	1,402,652
421,690	965,068	3,812,655	11,872,998	23,344,106	36,560,197
-	376,837	426,928	495,365	571,980	668,803
-	208,695	257,431	361,113	484,277	586,141
-	379,536	3,128,296	11,016,520	22,287,849	35,305,253
-	4,872	4,571	5,208	4,776	5,420
31,950,574	42,517,810	51,218,145	65,270,912	82,809,845	100,921,647

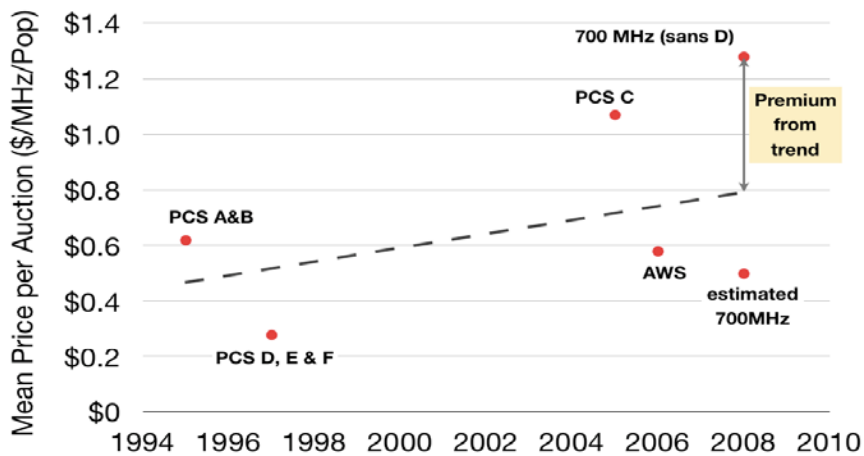
Two Policy Impediments

- policies to inefficiently increase license auction revenues
- case-by-case spectrum allocations

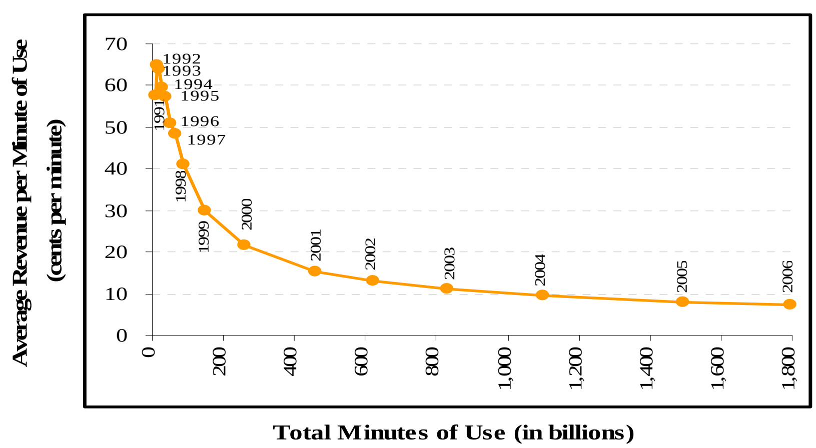
License Values: Tip of the Iceberg

- 1994-2005: $14 billion
- 2006-2008: $33 billion
  - AWS (2006), 90 MHz (1.7/2.1 GHz): $13.7 B.
  - 700 MHz (2008), 52 MHz (UHF TV): $19.4 B.

U.S. Auction Prices ($/MHz/pop)



Social Value of Cellular (USA) at least $150 billion annually



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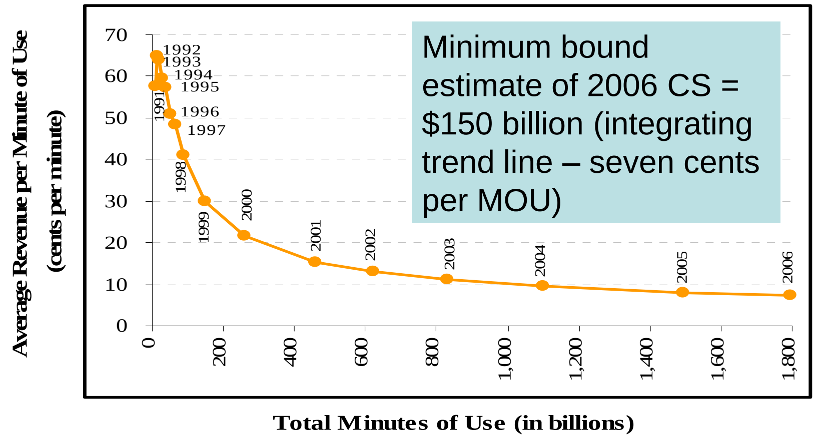
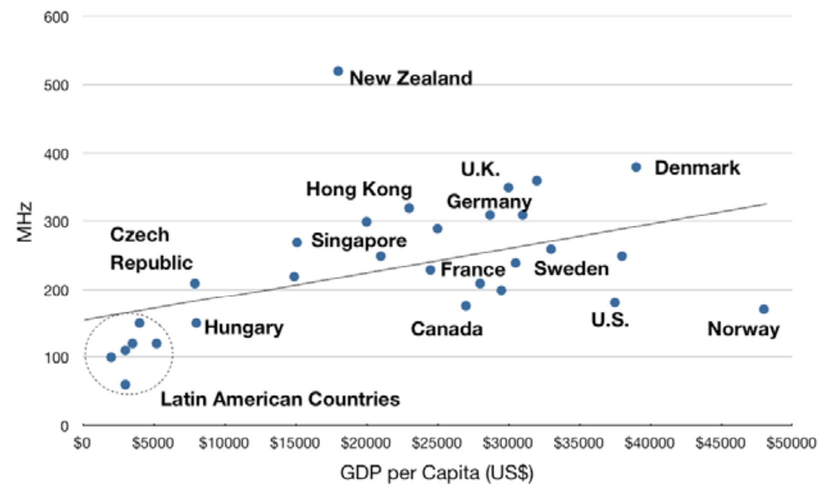


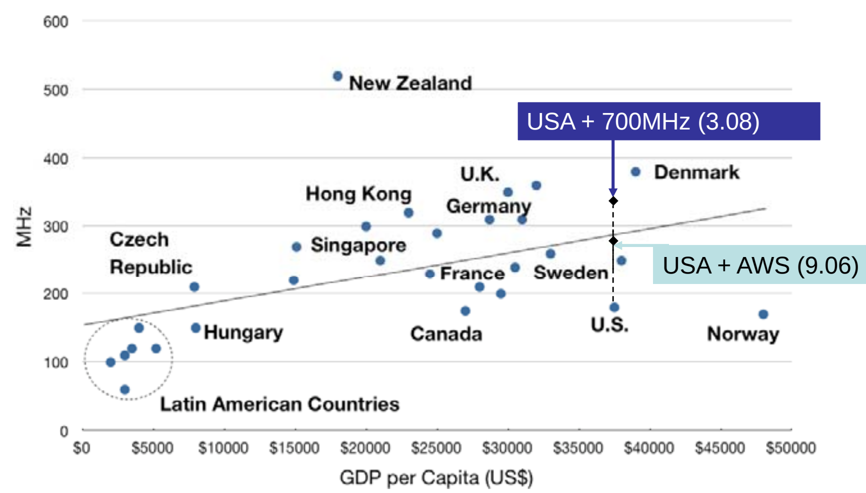
Intense Use of Cellular/PCS

- But only 190 MHz allocated
- Far below other developed countries
- Recent auctions help remedy
  - 90 MHz (AWS – Sept. 2006)
  - 52 MHz (700 MHz – March 2008)

Spectrum vs. GDP per Capita (2003)



MHz against GDP per Capita – U.S.A. Adds AWS (2006) and 700 MHz (2008)



Summing Up a Bit

- U.S.A. under ‘spectrum-ed’
- constraints mitigated by
  - liberal rules (1G = 2G = 3G)
  - mergers
  - AWS, 700 MHz
- no reason not to liberalize further

Two Pronged USA Delay Mode

- Attempt to ‘maximize’ auction receipts
  - Bush Administration’s “win win” to delay 2001 license auctions to 2004 – and beyond (not yet held)
- Confusion over Unlicensed
  - unlicensed not unregulated
  - unlicensed allocations unnecessary for “unlicensed apps”
  - pre-empts residual claimants necessary for successful reallocations (as DTV white space)

Hazlett-Muñoz (2008)

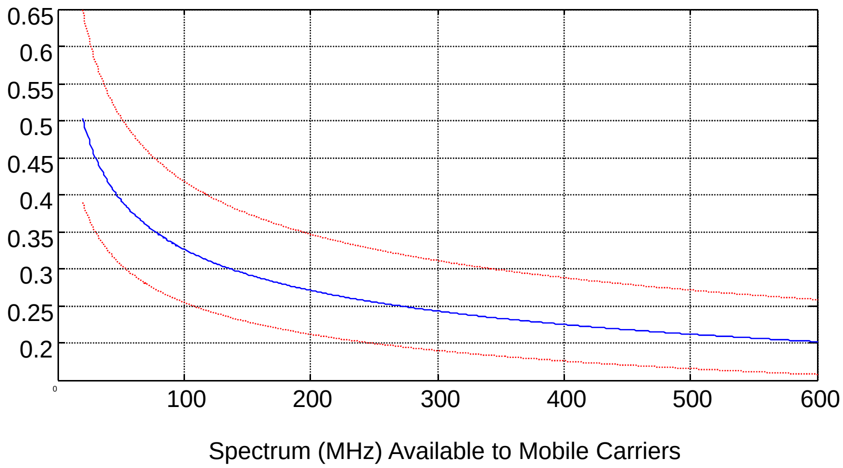
A Welfare Analysis of Spectrum Allocation

- Arguments to extract maximal revenue in license auctions
- Efficiency from saving \$0.33 per dollar raised → avoiding tax distortions
- Devices like: reserve prices, bidding credits, delays, reducing licenses
  - PCS C block DE's in 1996
  - Bush Adm. 2001: 'win win'
  - Reserve prices in Belgium, Greece (3G, 2001)

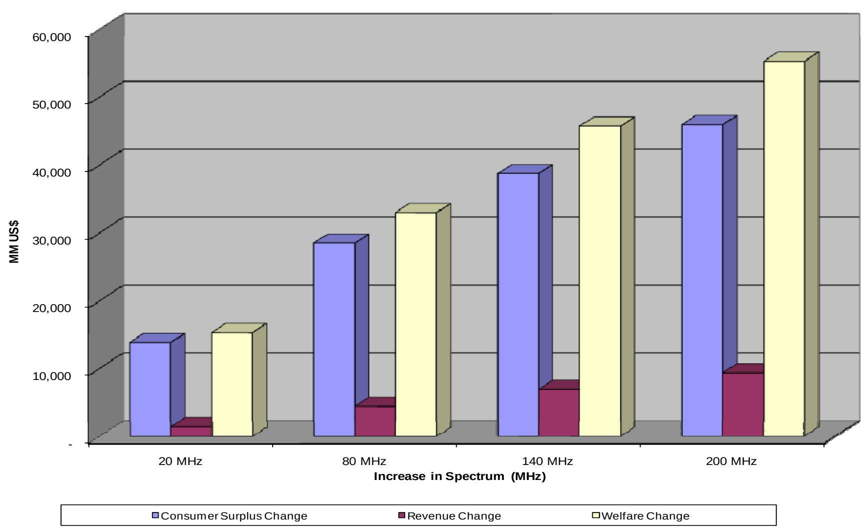
At what cost to retail customer?

- 29 countries
- mobile sector quarterly data 1999-2004
- Prices (average revenue per minute)
- Quantities (minutes of use)

U.K. MHz-Price Simulations



Strong MHz-Price effects ➔ large costs from revenue extraction schemes



Message: Don't do it.

- Liberalize spectrum allocations.
- Allow markets to access more bandwidth.
- Competition policy backstop.

THANK YOU.