Economics of Net Neutrality

CYBR 4400/5400: Principles of Internet Policy, Lecture 3-4

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Today's Lecture

- Homework discussion
- Finish Network Management Lecture
- Economics of Net Neutrality Lecture

Homework Feedback - Assignment #2

Step 4: Develop Policy Options and Analytical Factors

- Identify policy options with major variations in significant attributes linked to policy objectives
  - Always include *status quo* option of existing policy
- Identify important technical, economic and social factors that reveal substantial and important differences in the evaluation of the efficacy of policy options

Step 4 - Definition of Broadband

- Create a table that clearly using attributes to describe the policy options (there should be a paragraph that describes the table)

Policy Attribute	Option 1 (Status Quo)	Policy Option 2	Policy Option 3
Speed	25/3 Mbps	10/1 Mbps	100/1 Mbps
Broadband Technology	Fixed	Fixed and Mobile	Fixed
Latency	<30 ms	<75 ms	<10 ms

- Analytical Factors (description here should be sufficient to clearly define each factor)
  - Cost of network deployment to meet benchmarks
  - Diversity of applications supported
  - Existing footprint of advanced capability

Step 5: Compare Options

- Clearly support prioritization of factors
- Compare and present positive and negative impacts overall for each option based upon analysis using factors (e.g., cost benefit analysis)
- Identify preferred option

Step 5 Definition of Broadband

- Provide ranking (prioritization) of Analytical Factors
  - Existing footprint of advanced capability
  - Cost of network deployment to meet benchmarks
  - Diversity of applications supported
- Analysis (should include paragraph describing table, and concluding paragraph with recommendation)

Analytical Factor	Option 1 (Status Quo)	Policy Option 2	Policy Option 3
Advanced Footprint	More than 50%	More than 90%	Less than 30%
Application Diversity	High	Medium	High
Deployment Cost	Medium	Low	High

Economics of Net Neutrality

Economic Questions

Source: (Faulhaber Reading)

- What economic problem is net neutrality designed to solve? What is the empirical evidence concerning this problem?

- What can economic *theory* tell us about potential problems in the broadband ISP market?

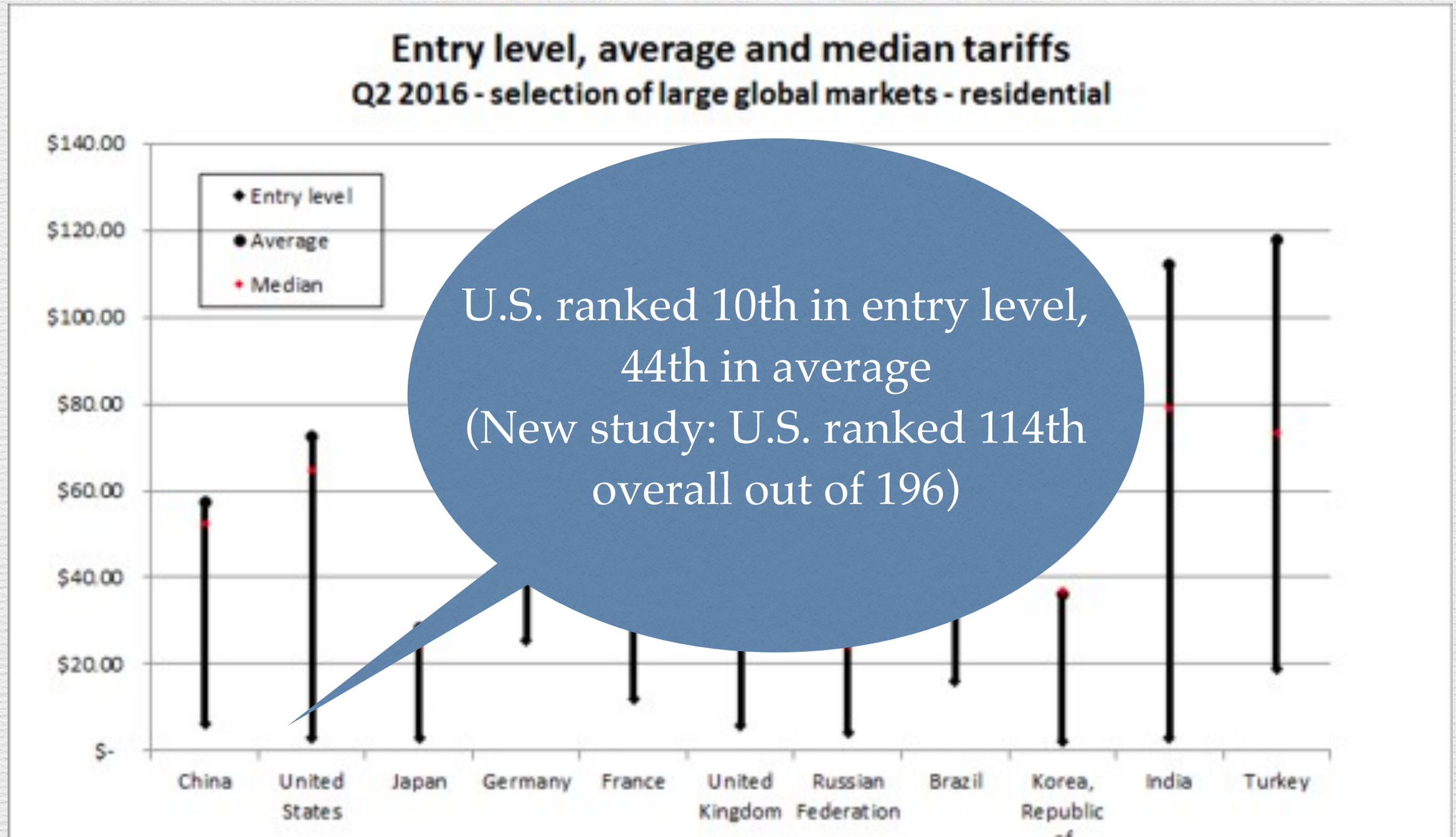
- What can *empirical political economy* tell us about likely outcomes of net neutrality policy interventions?

Economic Theory

- Are there static efficiency losses due to broadband ISP monopoly? If so, who bears them?
  - Externalities or market failures in the market?
- Do regulations impact investment efficiency resulting in deviations from optimal investment path?
- Do regulations impact innovation efficiency?

"Competition (absent externalities) gives customers what they demand…Only in the presence of a serious market failure such as monopoly might firms get away with bad behavior."

Global Broadband Pricing



Source: https://www.telecompetitor.com/average-residential-broadband-costs-by-country-u-s-ranks-13th/; https://www.forbes.com/sites/niallmccarthy/2017/11/22/the-most-and-least-expensive-countries-for-broadband-infographic/#7d47924023ef

Broadband Pricing

- In the U.S., broadband generally priced in speed tiers with large usage caps by fixed ISPs
  - Mobile ISPs typically have tighter usage caps
- Some experimentation with usage-based pricing by fixed ISPs

TWC offers a broad range of HSD Speed Tiers and Values

Residential

Speed (Shared)	Lite	Basic	Standard	Turbo	Extreme	Ultimate 50	Ultimate 75
Downstream	1 Mbps	3 Mbps	15 Mbps	20 Mbps	30 Mbps	50 Mbps	75 Mbps
Upstream	1 Mbps	1 Mbps	1 Mbps	2 Mbps	5 Mbps	5 Mbps	5 Mbps
% Subscribers	5%	5%	67%	18%	1%	<1%	<1%

Commercial

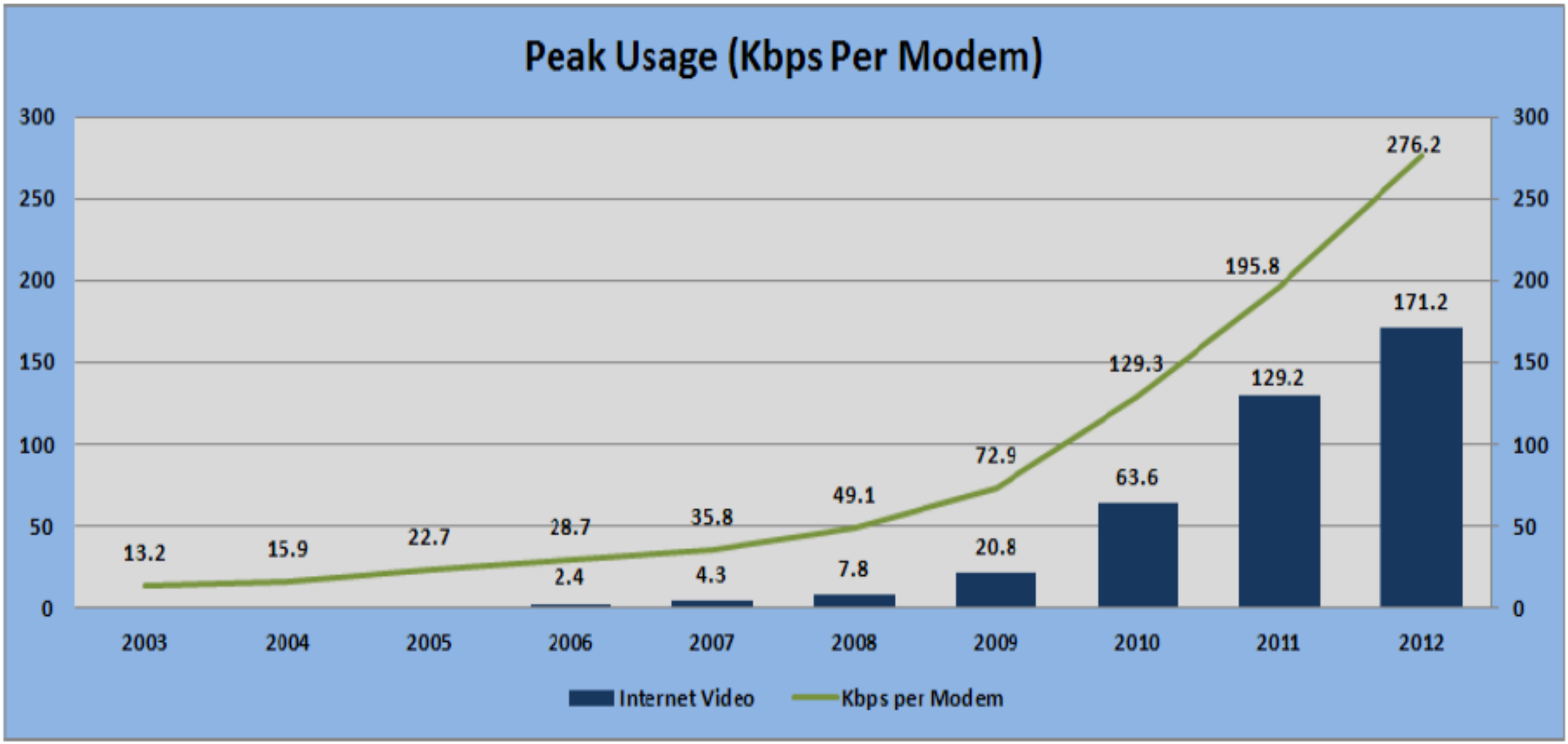
Speed (Dedicated)	Dedicated Internet Access	Dedicated Internet Access	Dedicated Internet Access	Dedicated Internet Access	Dedicated Internet Access	Dedicated Internet Access	Dedicated Internet Access
Downstream	10 Mbps	20 Mbps	30 Mbps	50 Mbps	100 Mbps	1 Gbps	10 Gbps
Upstream	10 Mbps	20 Mbps	30 Mbps	50 Mbps	100 Mbps	1 Gbps	10 Gbps

Source: As of early March 2013; representative of total footprint based on North TX market

Source: http://transition.fcc.gov/presentations/03272013/Kevin-Leddy.pdf

The real challenge for ISPs is traffic growth.

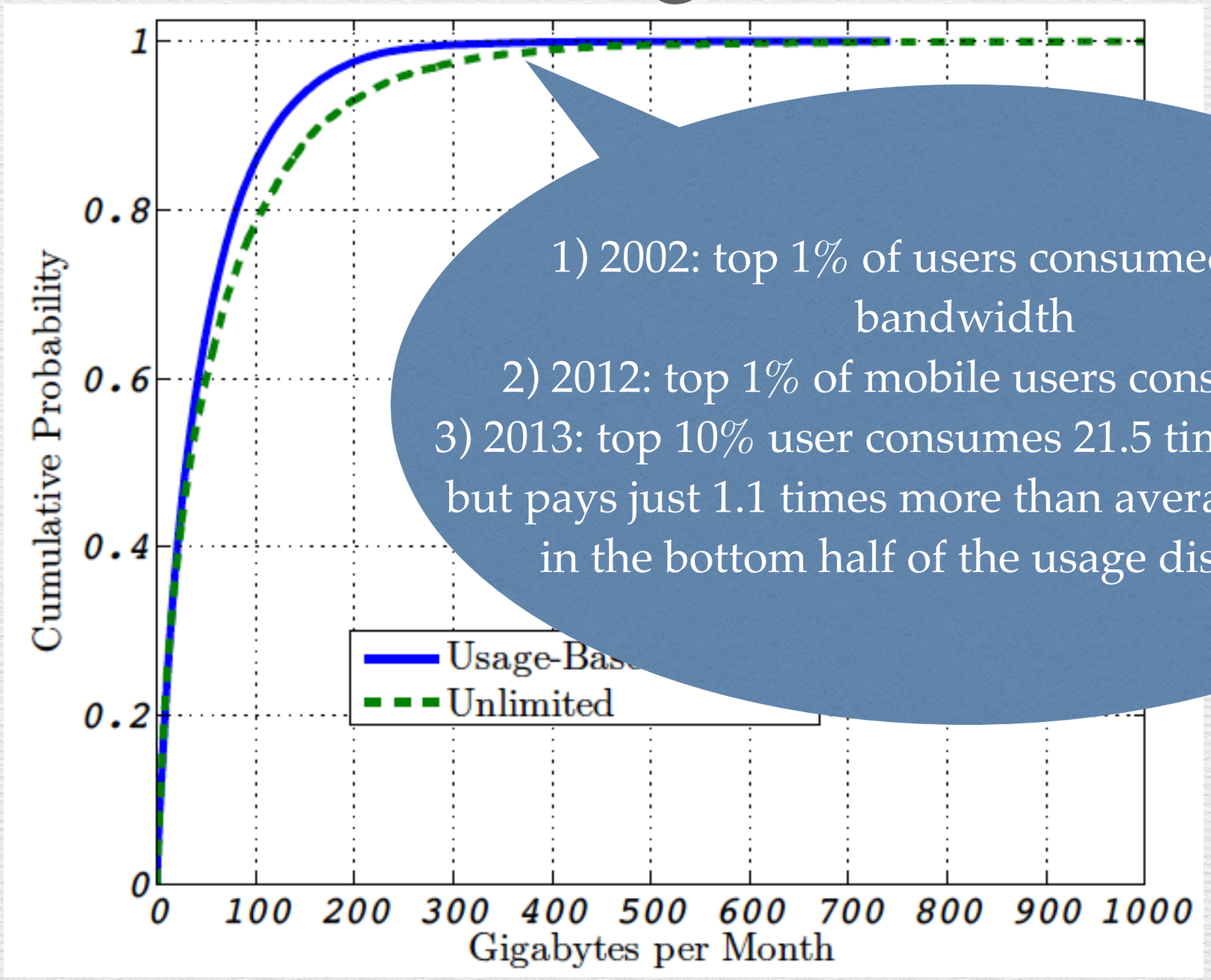
Peak Usage per Sub has grown at a 40% CAGR since 2003



Source: TWC internal data

Source: http://transition.fcc.gov/presentations/03272013/Kevin-Leddy.pdf

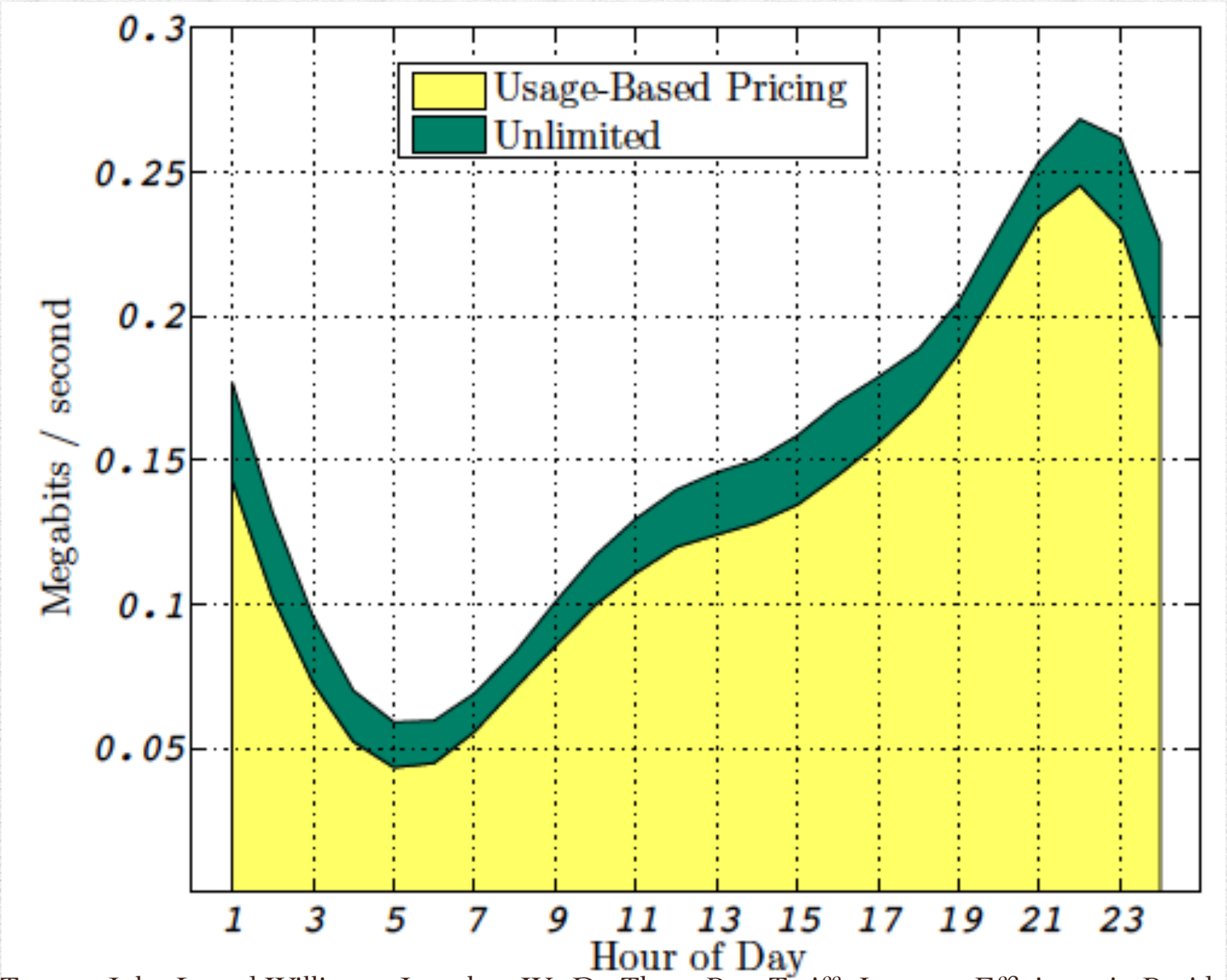
Cumulative Distribution of Broadband Usage over Cable



1) 2002: top 1% of users consumed 30% of bandwidth
2) 2012: top 1% of mobile users consumed 50%
3) 2013: top 10% user consumes 21.5 times more data, but pays just 1.1 times more than average subscriber in the bottom half of the usage distribution

Malone, Jacob B. and Turner, John L. and Williams, Jonathan W., Do Three-Part Tariffs Improve Efficiency in Residential Broadband Networks? (April 1, 2014). Available at SSRN: http://ssrn.com/abstract=2399308 or http://dx.doi.org/10.2139/ssrn.2399308

Broadband Subscriber Traffic by Hour of Day



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Usage-Based Pricing

- Comcast and Open Internet Orders: application-specific judgements presumptively problematic
- 2010 Open Internet Order: Permits usage-based pricing
    - Otherwise lighter users forced to subsidize heavy users
- 2015 Open Internet Order: Review case-by-case
- 2017 silent on the issue

Sandvine Industry Whitepaper

- Zero Rating
  - Unlimited usage of certain applications or content bundled "for free" into data plans
- Sponsored data plans
  - Third party pays for certain data usage, like a toll-free phone call
- Best practices
  - **Openness** (to all content/app providers of a data class)
  - **Same commercial terms** to all data sponsors/ISPs not compensated per unit of zero-rated data
  - **No prioritization** of plan data
  - **Transparency** of plan terms and availability to subscribers/ notifications when accessing plan content

Electronic Frontier Foundation
Concerns for Zero Rating

- Distorting content consumption
  - Traffic spikes reported for Twitter and WhatsApp in S. Africa
- Distorting access markets
- Walled garden effect
  - Facebook Free Basics concern (Facebook claims 50% upgrade to full access in 30 days)
- Privacy and security
- Centralizing power in new Internet Gatekeepers

FCC Policy Review of Mobile Broadband Operators Sponsored Data and Zero-Rated Plans (2017)

T-Mobile Binge On

- Concern regarding "gatekeeper" control over edge providers
  - No charge for edge providers or end users
    - Easy to enable or disable user settings
    - Over 100 edge providers able to connect
    - No affiliated content
- Finding: no discrimination against any edge provider or end user
- Subsequent
  - Purchased Layer 3 startup to launch streaming 'TVision Home' service in April, 2019

T-Mobile VISION

AT&T Sponsored Data

- Contrast in how affiliated and non-affiliated zero-rated services are offered
  - Anti-competitive concerns to what unaffiliated mobile video service must pay to offer streaming video programming to AT&T subscribers on a zero-rated basis
    - Estimated to be $5/Gbyte
    - While AT&T does not incur comparable expenditure to offer DIRECTV Now on zero-rated basis
- Finding: May violate General Conduct standard

Summary

- What did we learn about sponsored data and zero-rating plans
- Innovation or market failures?
- Future service plans or reason for regulation?