# Regulatory Response to Telecom-Video-Data Convergence


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# Abstract

With the emergence of true-facilities-based competition for wired voice, broadband, and video services in many markets, directly competing services are being offered by major carriers. However, these are still likely to be priced at other than competitive levels. The transition from monopoly to (less-than perfect) competition has also brought about distributional issues such as cream skimming. This talk provides a context for the analysis of this problem and explores possible solutions.

# Past approach to regulation

- Distinguished between "broadcasting" and "common carriage" (2 main sections of *Federal Communications Act of 1934*)
- Distinctions by technology: voice vs. data vs. video

# Problems with this approach

- Broadband policy failure
- Telecom policy failure
  - Despite rewrite of the *Telecomm Act*
- Video policy still emerging

# Focus

- Focus is on U.S. and Canada (not entirely)
- Traditional local telephone companies and local cable television companies use their networks to provide:
  - Broadband (DSL & cable modem service)
  - Voice (switched & VoIP)
  - Video (analog, digital & IP)
- Not all services available everywhere
  - Mix of copper (twisted pair, co-ax) & optical fiber plant
- Digression on the unexpected path toward convergence

# "Convergence"

- Slow to arrive
- But may actually be here, at least in part
- Affects different parts of telecom and broadcast
  1. Broadband (DSL & cable modem; 2000)
  2. Voice (switched & VoIP; 2004-05)
  3. Now video (2005-07; very limited, but growing)

(dates are indicative, at best)

# Broadband policy

- Notes:
  - Adapted from several studies from 2000 on
  - Some (but not all) of the data have been updated

# A comment on wording

- I prefer to use the term "policy failure" rather than "market failure" for two reasons:
  1. I have argued elsewhere that there is not a single "broadband market" in the U.S. because of the lack of direct competition in many regions.
  2. The classic definition of "market failure" is "the failure of a more or less idealized system of price-market institutions to sustain "desirable" activities." *
     In the case of broadband, the debate is often about quantities, prices, and allocations—rather than about complete failure to provide access. Furthermore, there is little agreement over what is "desirable". (In some regions, however, there is a complete failure.)

*** F. M. Bator, "The Anatomy of a Market Failure," *QJE*, August 1958. (Reprinted in many sources.)**

# My Approach

- Traditional industrial organization approach: Industry structure → firm conduct (pricing) → broadband penetration
- Policies and regulation can affect outcomes
- Therefore, we need to consider more than just the technology solutions if we want widespread broadband access
  - Underlying economics
  - Business models
  - Role of government & regulators

# What is the policy?

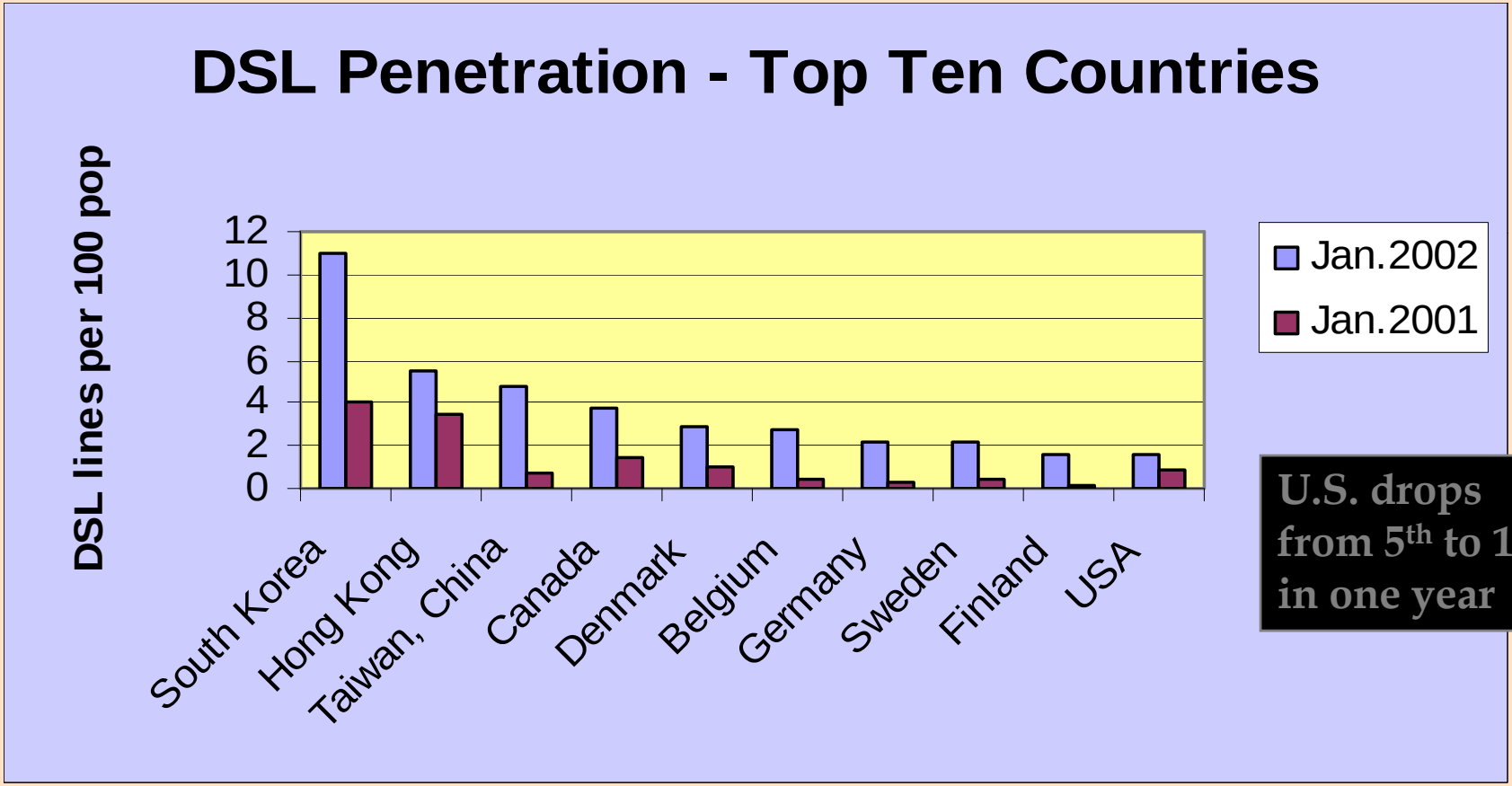
- Mostly unstated, so it is difficult to be certain
- Seems to have the following components:
  - Give up on any hope of "real" competition
    - No leased access or line sharing (*)
    - No UNE pricing at reasonable rates
    - No benefits from resale (more later)
  - Rely on "inter-modal" competition
    - A duopoly at best: DSL from the ILECs & cable modem service from cable MSOs
    - This will have implications for competition in voice & video (later)

* Note: Reinforced by the "Brand X" decision, June 2005.

# The Results (in general)

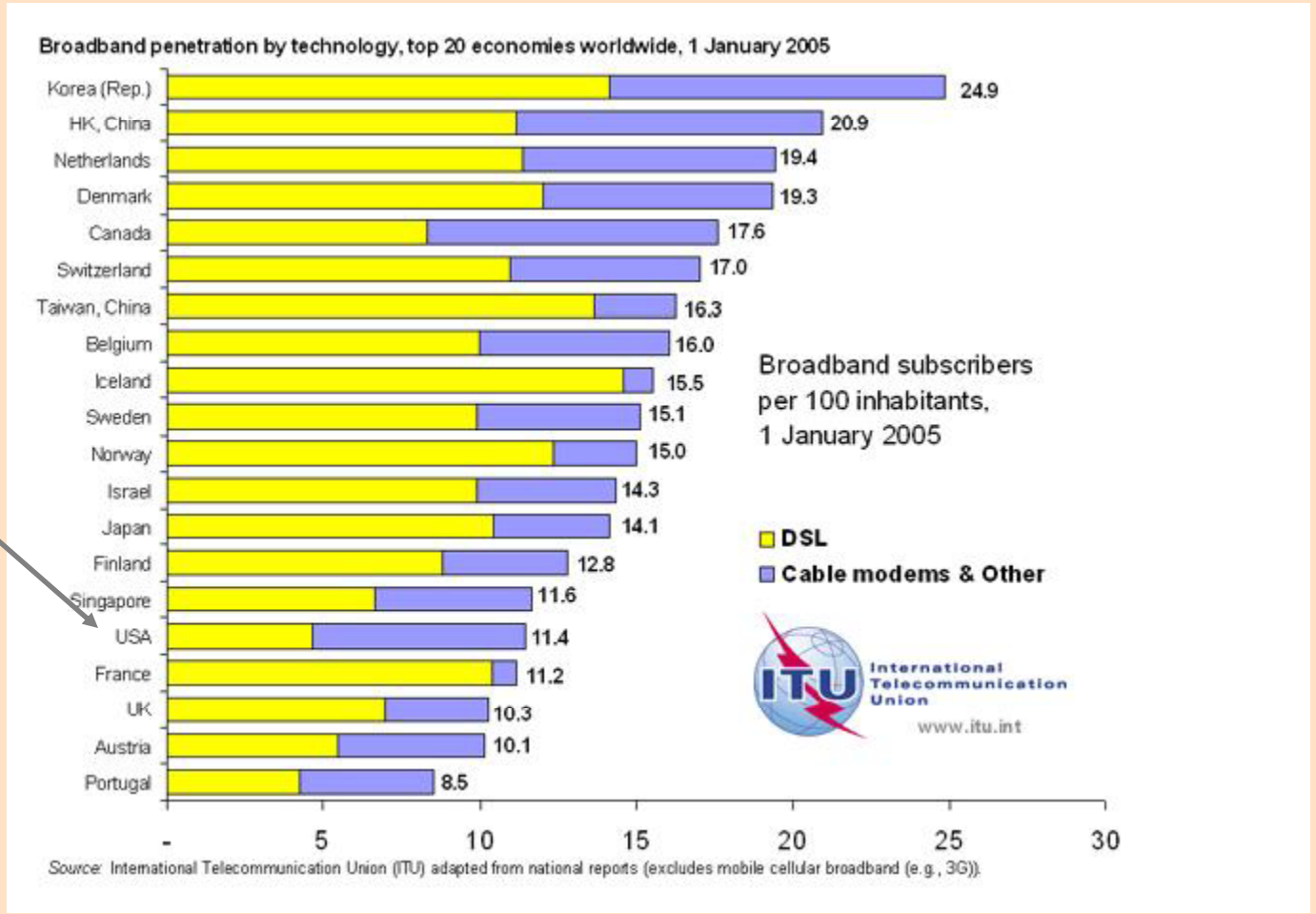
- Prices higher than necessary
  - Even after adjusting for speed and income
- Lower penetration than desired
- A “digital divide”
  - Across geographic regions
  - Across income levels

# Price Affects DSL Penetration - 1

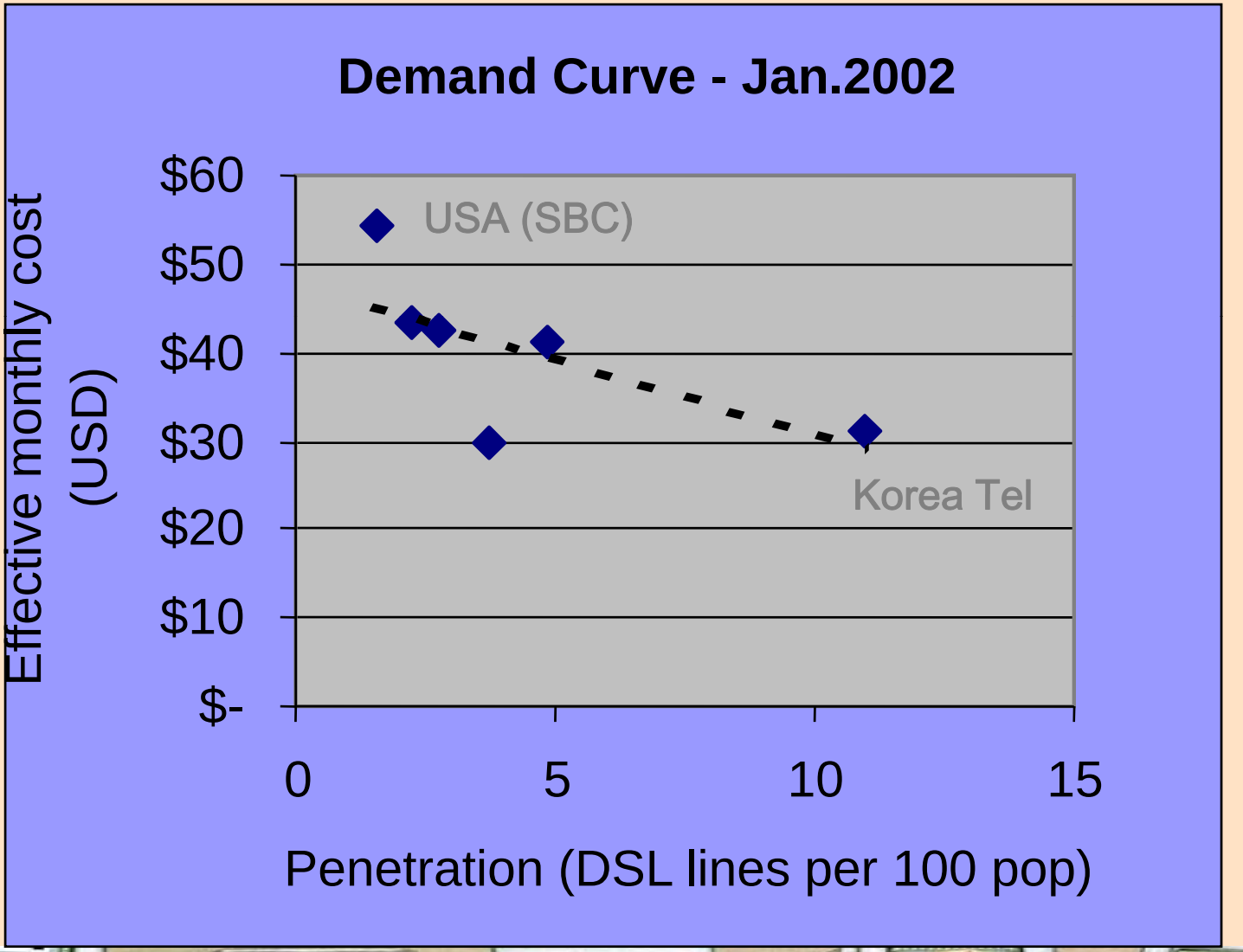


# ...and continues to drop

USA is 16th



# Price Affects DSL Penetration - 2



# Recent Comments - 1

- John Eger (May 19, 2005):

  "What happened to the urgent call for broadband -- the new information infrastructure that is vital to success and survival in the global knowledge economy -- President Bush promised he would push in his second term?

  "...Clearly our national communications policies are bankrupt. Since 1996 when the last major Act was written, we have seen cable television, telephone and Internet prices rise; media firms consolidate, and journalism and news outlets convert to the worst form of tabloidism. All at a time in our history when our very freedoms and culture are being threatened in the wake of globalism. Our cities -- center of commerce, crucibles of civilization and in the new economy the most likely incubators of creativity -- hamstrung by a backward-looking federal communications policy."

# Recent Comments - 2

- David Isenberg (May 23, 2005):

  "Whatever happened to the Bush broadband policy?

  Answer: It went to the same place that, 'Mission Accomplished,' went, to a magic land where thankful people throw rose pedals to celebrate imagined events. It went to the same place Kevin Martin imagined when he said that the U.S. had 'the best communications system in the world.' "

# Recent Comments - 3

- Kevin Martin, Chair of the Federal Communications Commission (May 2005):

"Making sure that all consumers have the opportunity and are connected to those advanced telecommunications services increases productivity, allows more overall economic growth, makes it easier for people to do work from home, take medical information to and from home [and] communicate and gather information in all kinds of ways.

"It [broadband] affects the way that we entertain ourselves, the way that we educate our children, the way that we work. I think that the opportunity for the growth of individuals and for our society by increasing that connectiveness through broadband is critical, so I think that is our No. 1 priority."

# Problems - DSL

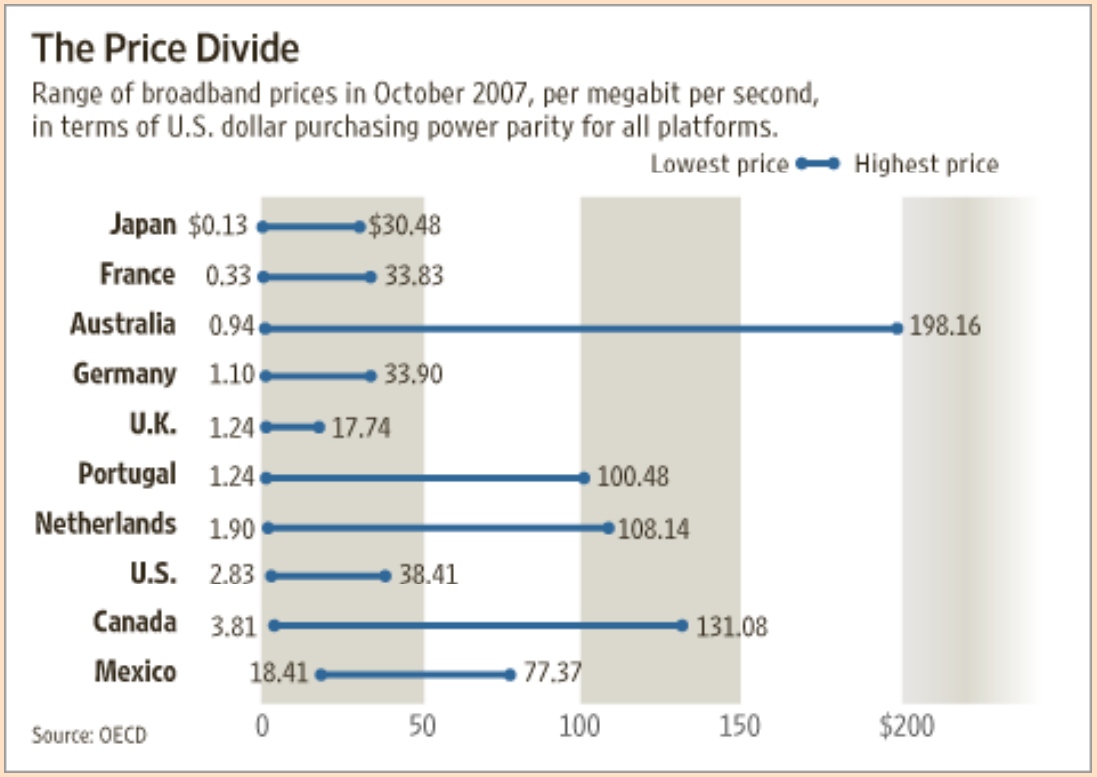
- Speed-adjusted price still high (see next slides)
  - Despite economies of scale
  - Despite “decreasing cost industry”
    - Economies of scale for suppliers → decreasing cost of inputs
  - Cause: Increasing concentration (?)

# Broadband costs, adjusted for speed and monthly income (2003)

| Country/ Economy | Monthly sub. (US $) | Price per 100 kbps (US $) | 100 kbps as % mo. inc. |
|---|---|---|---|
| Japan | 24.19 | 0.09 | <0.01% |
| Rep. of Korea | 49.23 | 0.25 | 0.03% |
| Belgium | 34.41 | 1.15 | 0.06% |
| Hong Kong | 38.21 | 1.27 | 0.06% |
| U.S. | 33.18 | 2.21 | 0.13% |

Source: ITU, *Birth of Broadband* (Sept. 2003), Table 3.3, p. 43

# Broadband costs, adjusted for speed (2007)




Source: WSJ, Feb. 7, 2008 (adapted from OECD)

# Recent DSL price increases (again)

- (DSL Reports, Feb 2, 2008) The Chicago Tribune is reporting that AT&T will be tacking on an additional $5 a month for its DSL service:
  Most customers with AT&T's high-speed DSL Internet service will be charged an additional $5 a month, the company said Friday. The increase affects DSL plans, each with a different connection speed, that now have monthly charges of about $15, $20 and $25.
- Apparently, customers paying for the highest-speed elite plan will not see an increase nor will those who have long-term contracts. Additionally, people who don't now have DSL can still sign up for service at $10 a month if they order online from AT&T's Web site. That price was a concession required by government authorities to approve AT&T's takeover of BellSouth last year.
- AT&T is claiming in a statement that popularity of video and music downloads as well as photo sharing and online gaming are behind the increase, citing the "billions of dollars [AT&T invests] each year to stay ahead of these trends" plus the current "market conditions".

  However, DSLprime.com's Dave Burstein points out that "Total cost to the company for the bandwidth it delivers is about $1 a month per customer. AT&T is raising its rates because it can. It has the market power to do so. Increased costs aren't the reason."
- In December AT&T hiked the price of its dial-up Internet connections by $6 for existing customers. It also set a price of nearly $23 a month for new dial-up customers in a bid to nudge dial-up customers to take up DSL.

# Problems - Cable Modem

- Shared service
- Prices increased in 2000-2002
  - Introduction of tiered services, so some speed increases
- Lack of universal coverage
- Change in business model in 2001
  - Death of @Home

# Problems – Cellular Mobile

- Limited bandwidth & slow speed
- Batteries can not support “always on”
- 3G / UMTS will <u>not</u> solve all the problems
  - Q: Will 3G effectively compete for broadband customers? A: "Absolutely not. Not enough bandwidth.“

    -- CEO Keiji Tachikawa of NTT DoCoMo (March 2002)
  - Spectrum auctions → high license fees → high prices for services (history varies by country)

# Problems – Wireless LANs

- For 802.11x systems
  - Has anyone seen a viable business model?
  - For public venues: owners of properties want share of the revenue
  - Interference
  - Lack of roaming
    - Despite 802.11x family of standards
  - (Not to mention authentication, billing, etc.)
  - Will the hybrid WiFi/3G phone in Korea be the solution?
- For others (fixed wireless, etc.)
  - Bandwidth, line-of-sight, other technical issues
  - Plus all of the above

# Essential Facilities and the Web

- Should DSL or Cable Modem users be able to choose their ISP?
- Should cellular users be able to choose their home page or portal?
- Changes coming with the 700 MHz spectrum (?)

# Summary

- Ownership & industry structure → broadband prices → penetration & access
- Ownership & industry structure may affect content (not covered today)
- Industry structure → ownership and the distribution of wealth across business sizes and ownership types

# Telecom policy

- Based on studies of:
  - UNE-based entry in U.S. (2002-4)
  - “Local forbearance” (Canada & California, 2005-present)

# Telecom policy failure

- Focus on local residential voice service
  - Does this even exist as an identifiable service/technology/market?
- Managing the transition from monopoly to competition

# Analysis

- Two analytical frameworks
  - Model the market under regulation (the effects of regulation on the consumer)
    - Alfred Kahn, *The Economics of Regulation*, 1970-71
  - Model the strategic responses of the regulated firm
    - Michael Porter, *Competitive Strategy*, 1980

# Approximate timeline

## Selected dates

1996: Telecom Reform Act in US

2000 (approx.): Telcos & cablecos offer broadband

2002-04: Local voice competition via unbundling of lines (UNE-P)

2004-present: VoIP “takes off” (two “flavors”: Vonage, Skype)

2005 (approx.): Cable companies offer voice services--some switched, some VoIP

2006: Telcos offer video—some via copper, some over new fiber

# Key features of the networks

- Telco networks are interconnected (and use SS7); cable systems were traditionally not interconnected.
- Cable networks divided into 6 MHz channels that can provide video (basic & premium), broadband & voice.
  - Trunked (not “star”) architecture in North America
- Telephone local access is valuable because both it provides basic telephony services to the customers (they can call one another) and it enables the delivery of additional (“vertical”) features and services such as voice mail, caller ID, etc.

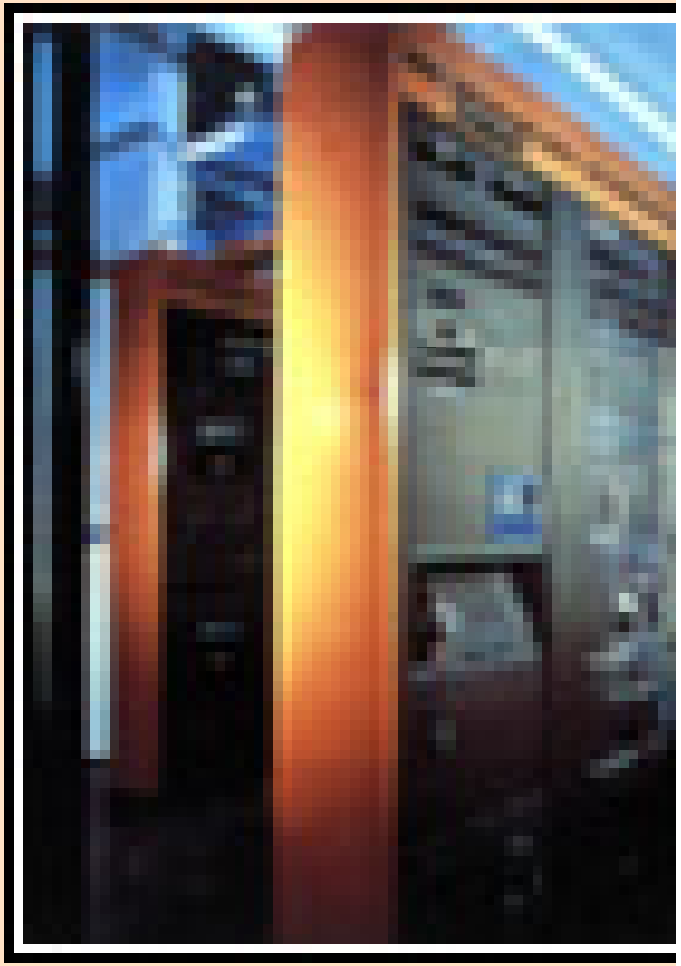
# Competing views
## (Is there effective competition?)

2002-2004: Non-facilities-based competition in the U.S.

- Used unbundled network elements (UNEs) purchased from the ILECs.
- Significant entry into residential fixed-line markets in several states.
- EU policies follow this model

# Competing views

## (Is there effective competition?)



### Two case studies:

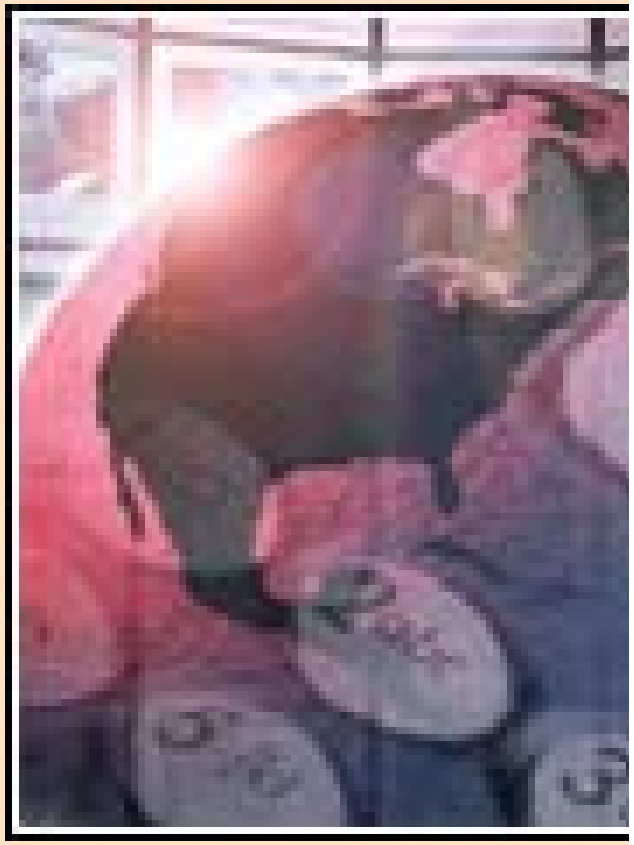
- Verizon is the ILEC serving virtually all of the state of New Jersey. UNE-P based local telephone competition started in July 2002. By the end of 2003, approximately 18 months later, the CLECs, predominantly AT&T and MCI, were serving just under 16% of the residential lines.
- California has two major ILECs, each having a regional monopoly. SBC lost 13% of its residential market, as measured by access lines, to the new entrants, again predominantly AT&T and MCI by the end of 2003, and Verizon lost 10% of its residential access lines in the first year of competition.

•Now the competition to the ILECs in the residential voice market is mostly by VoIP providers. Approximately 60% of VoIP users in the U.S. and Canada are subscribers of the cable companies. There are also over 2 million cable subscribers using circuit-switched voice services.

•Along with this competition has come pressure for "local forbearance", consisting primarily of price deregulation. Although there are a number of possible service providers in any given region, in practice the resulting market structure is or closely resembles a duopoly with the ILEC having the highest market share and cable company with most of the rest.

To assess whether local forbearance makes economic sense, we need to ask:

- Is there truly effective competition?
- Who are the beneficiaries?
- What are the likely short-run and long-run results?
- What are the strategic implications?

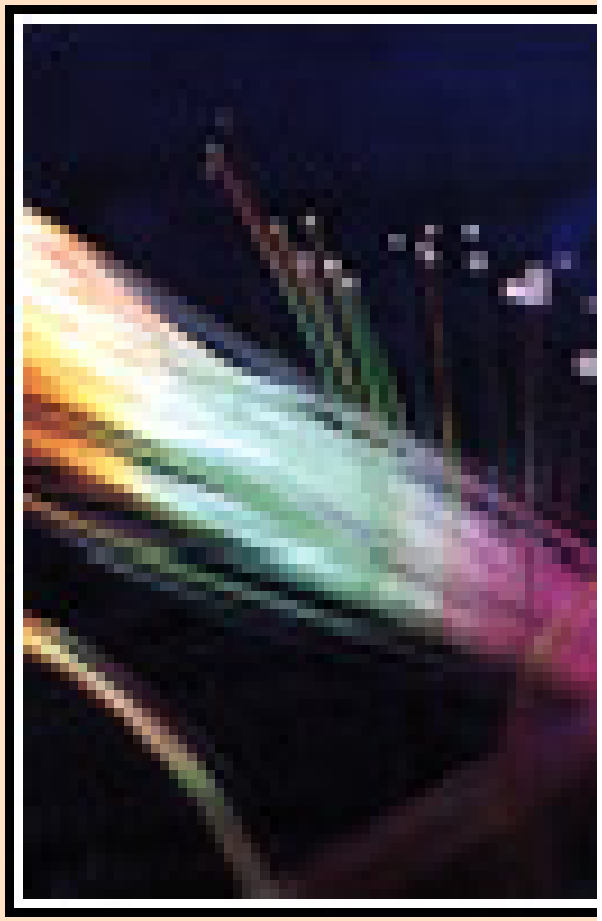


# Alternate views of competition

- Having two or more providers, in and of itself, does not make competition.
- Instead we go back to economic principles and ask two questions:

a. Does the entrant (or set of entrants) have sufficient market power and provide sufficient competition to provide pricing pressure—above a trivial level—on the incumbent?

b. Is this competition likely to be sustainable for a reasonable period of time?



# Alternate views of competition

- Structure (number & size of firms) and conduct are related
- Questions to ask about conduct:
  - Likely effect on pricing
  - Is collusion likely?
  - Is predation (Bepreisung unter Herstellkosten / Dumpingpreis Strategie) likely?
  - Is cream skimming (den Rahm abschöpfen / den Markt abschöpfen) likely?
- Note that these are not strictly “monopoly” problems, but arise from an imbalance in market power.

# Why cream skimming is a major issue -1


In the two examples of UNE-based entry described previously, the entrants targeted “high value” customers. The entrants only offered bundles that included all of local access, several vertical services such as call-waiting, caller ID, etc., and virtually unlimited local and long-distance (trunk) calling. To some extent this was the result of (old) AT&T’s and MCI’s background as inter-exchange carriers, and to some extent it was the result of the existing regulated tariffs. The overall impact of this “experiment” in competition was that most of the gains were concentrated on the “high value” customers and significant number of those in lower socio-economic groups saw no benefits at all.

# Why cream skimming is a major issue - 2


More recent example from a Canadian cable company:

Cogeco's digital telephony offering in Quebec is limited to a single package that includes unlimited calling in Canada and the continental US (excluding Hawaii and Alaska), voice mail, call display, call waiting, visual call waiting, and call forwarding.

Pricing: C$44.99 per month if one already subscribed to Cogeco's high speed Internet or cable TV service or at C$39.99 per month if one subscribed to both the Internet and cable TV.

# Why cream skimming is a major issue - 3


## Why is this cream skimming?

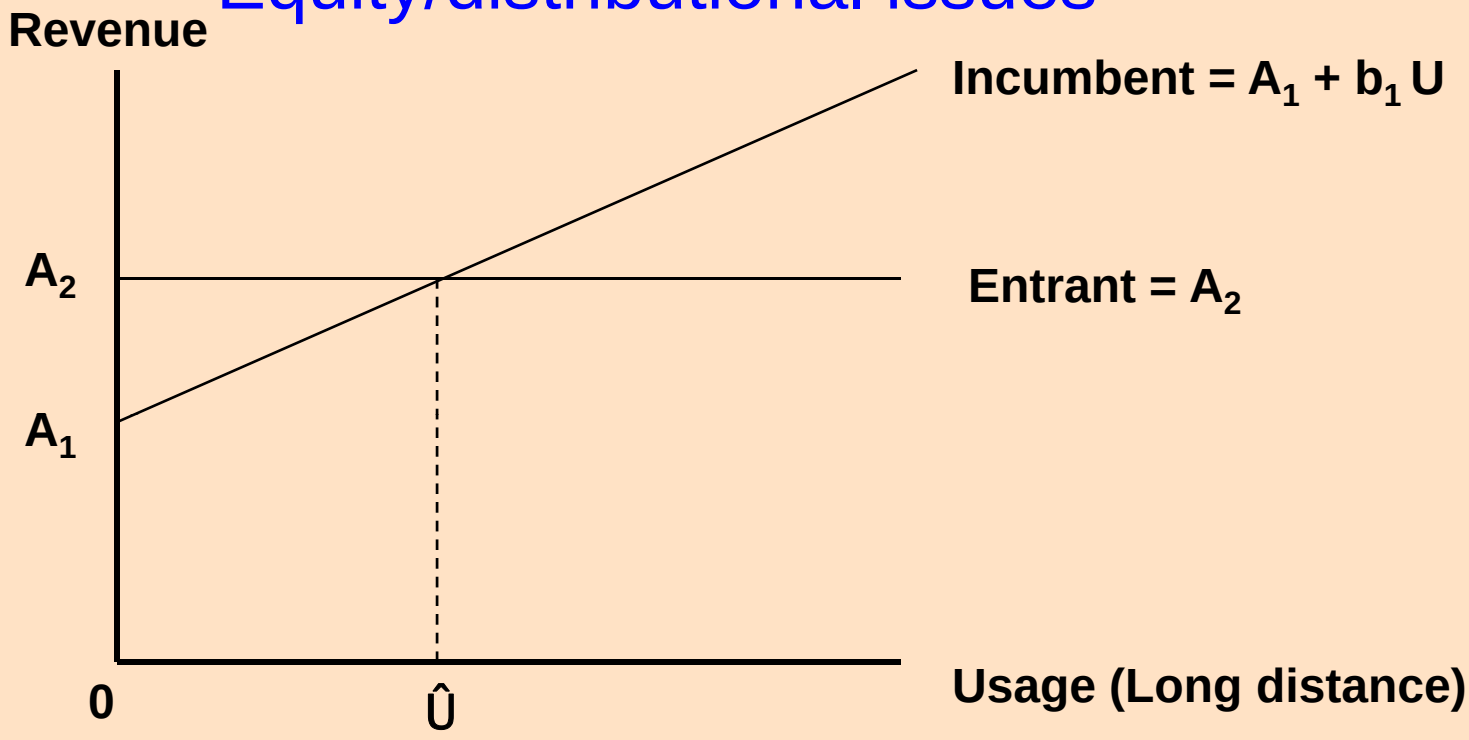
These packages are only desirable to “high value” customers.

## Why is this a problem?

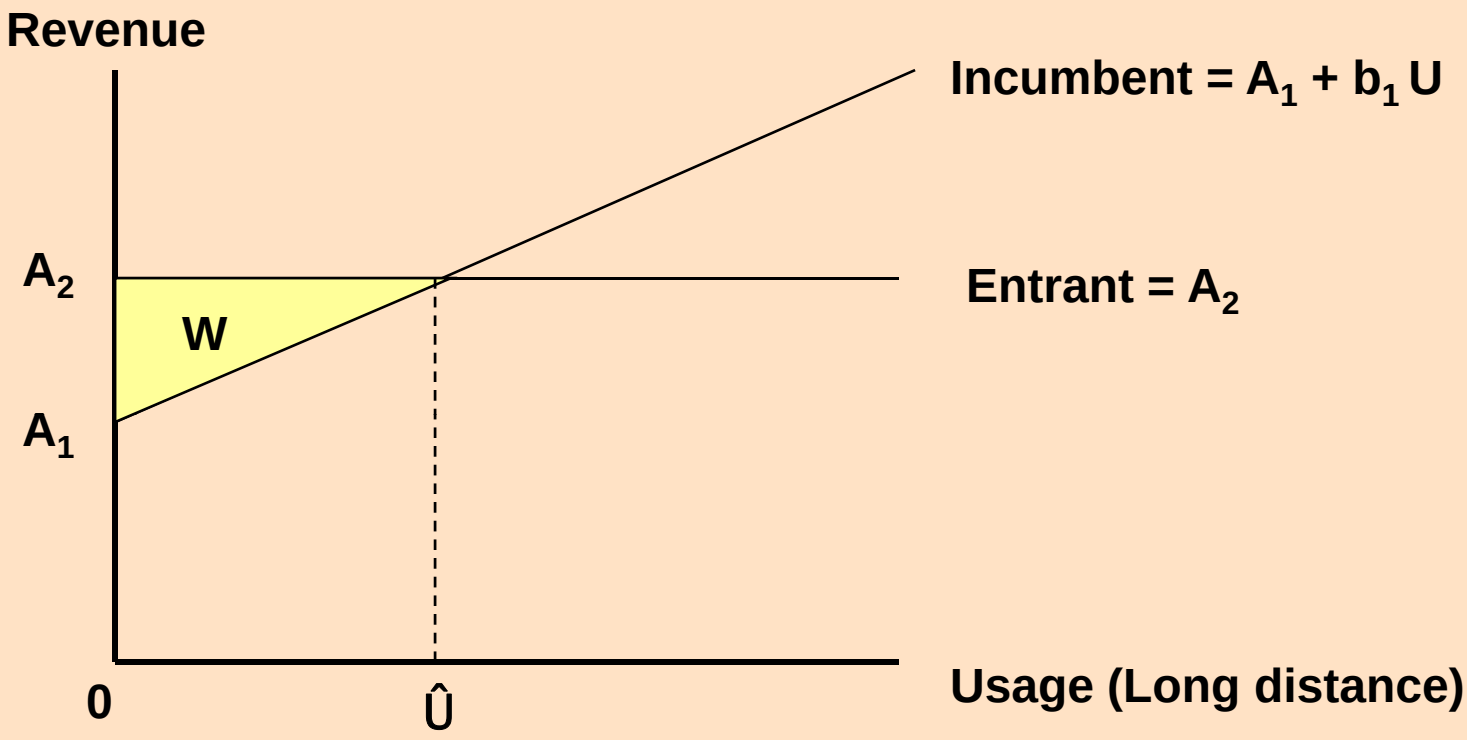
1. Equity/distributional issues: Gains from competition go only to high-value customers, who—for the most part—are likely to be high-income.
2. Sustainability issues: ILEC loses revenue & (more than proportionally) profits. Puts further pressure on pricing of basic service.

(These are modeled in the following slides.)

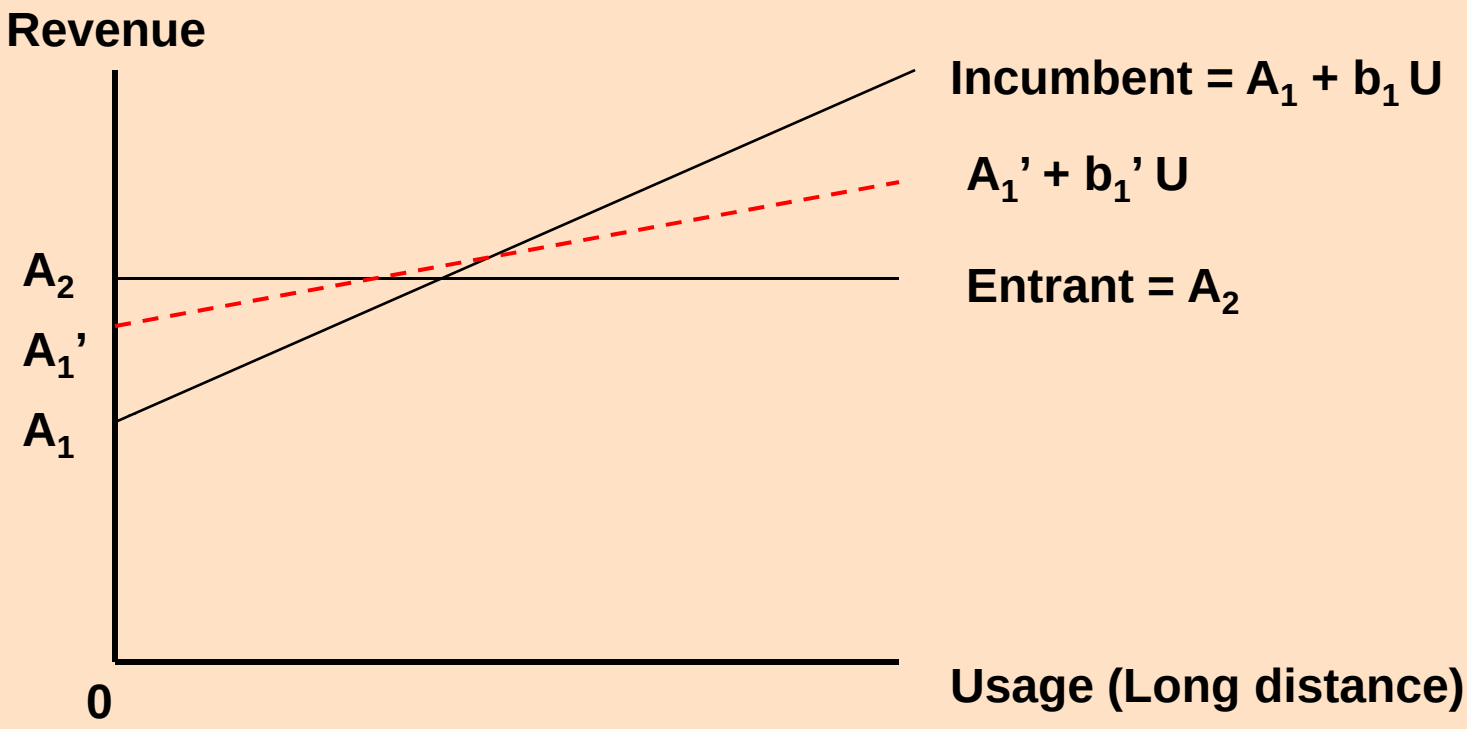
# Equity/distributional issues




Residential subscribers are offered service from an ILEC with a **two-part tariff**. The fixed monthly fee $A_1$ includes access and unlimited local calling while there is a usage fee of $b_1$ per minute of long-distance calling. If an entrant offers a package of local service and unlimited long-distance calling for a fixed amount $A_2$, those consumers with average usage levels above Û will save money by switching to the entrant.




How can the ILEC restore its revenue? One option is to switch to a flat price at or near $A_2$. In addition to the efficiency loss of pricing usage below marginal cost, there is the distributional problem in that the low-volume users now suffer a welfare loss equal to the shaded triangle labeled W .

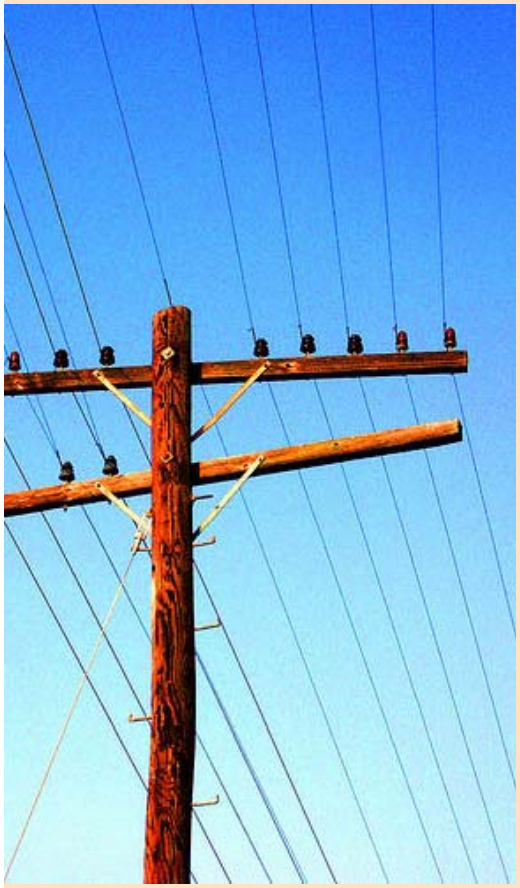



Another option is to increase A and reduce b, flattening the revenue curve to $A_1' + b_1' U$. This will both reduce economic efficiency (as $b_1'$ is below marginal costs) and reduce the welfare of some or all of the low-volume users.

# Why cream skimming is a major issue - 4


One can increase the realism of this analysis by explicitly including consideration of vertical services. For example, in New Jersey the average Verizon residential customer subscribes to approximately one-and-one-half to two services, not including voice mail. To make the tariff changes more acceptable, either to consumers or to regulators, the ILEC can bundle additional vertical services in with the increased access fee. The marginal cost of these services is close to zero, so that is not an issue. However, many consumers chose not to take these services at their old price, so one has to be careful before assigning a value to them to offset some or all of the welfare loss.

# Alternative solutions - 1



One effect of cream-skimming is that the incumbent is placed in the unusual and counter-intuitive position of arguing the need to raise prices in response to competition. The regulatory response can be to protect the lower-end consumers or to ignore the problem. The recent decisions by the CRTC (Canada) and the CPUC (California) are illustrative of these two approaches.

# Alternative solutions - 2

In its 2006 decision the CRTC includes the following provision:

> "In light of these concerns, the Commission considers that a ceiling on residential stand-alone PES [primary exchange service] would be appropriate. The Commission considers that such a ceiling would provide vulnerable and uncontested customers with a safeguard against unreasonable rate increases in a forborne environment while only minimally limiting the ILECs' pricing flexibility in forborne markets." (Paragraph 452)

# Alternative solutions - 3

This can be contrasted to the approach taken in California the same year:

> For AT&T, Verizon, SureWest, and Frontier, the four largest ILECs regulated under NRF, the geographic averaging requirement shall be lifted for all services addressed in this proceeding that are not subsidized ….
>
> Price caps on basic residential services that are not subsidized by CHCF-B shall be automatically lifted on January 1, 2009. (Paragraphs 1-3)

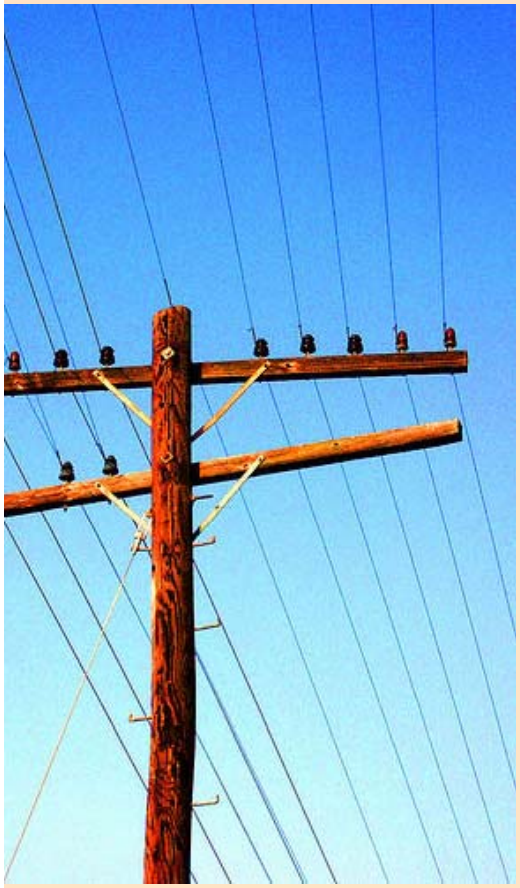
*[Decision in Uniform Regulatory Frameworks Proceeding (R.05-04-005), August 2006]*

# Recent developments

- Price changes for residential vertical services in California
  - January 2007
  - July 2007
  - Many customers used to paying $6.17 for caller ID in December, who had already seen one price increase to $7.99 a month, will now pay $9. Call waiting, speed dialing and other features that cost $3.23 in December now run $5 after two price hikes. An unlisted number now costs $1.25 a month, a 346% increase over the previous charge of 28 cents a month.

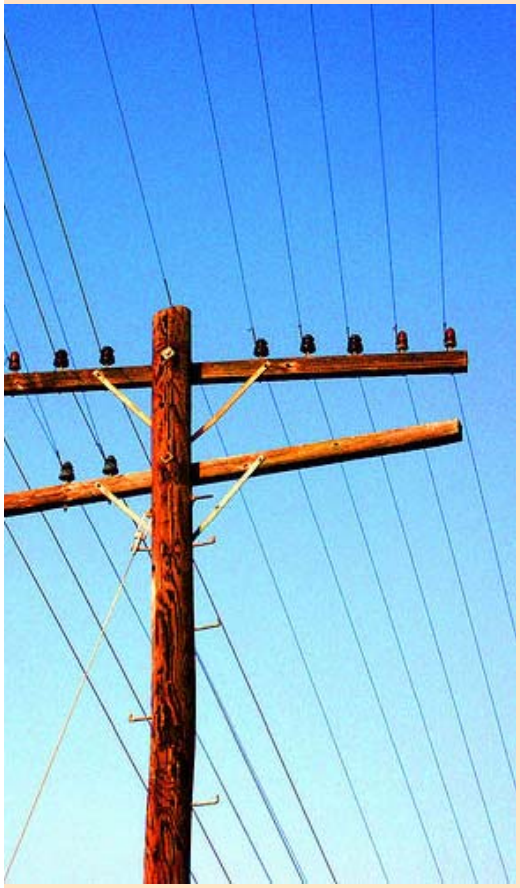
Source: http://www.turn.org/article.php?id=603

# Concluding comments -1



I have focused on one aspect of emerging duopoly in North American residential voice telephony—cream skimming—and the policy challenges and responses that arise. There are additional possible problems such as collusion and predation that are not addressed here. To some extent these are inter-related. For example, once forbearance has been implemented in a substantial portion of the market, the temptation of the two main operators to cordon off non-competitive segments or reduce the market share of a third competitor could arise.

# Concluding comments - 2



Whether one is focused on the residential market in its entirety or on specific segments, this analysis indicates the social benefits from maintaining specific, narrowly drawn, regulatory authority over prices in a post-monopoly environment.

It also underscores the need to keep the option of re-regulation on the books, even though it will ideally remain unexercised.

# Wired Video Delivery Systems

- Based on:
  - Research and testimony (2006)
  - Cable TV research dating back 30 years
  - Service as chair of local cable television commission in New England

# Background

- "Traditional" video delivery systems
  - Over-the-air broadcast ("OTA", analog & digital, terrestrial)
  - Local & regional cable franchises (co-ax)
  - Satellite
  - Pre-recorded (VCR & DVD)

# Slight digression: Is “wired video” a separate market or a separate segment or ??

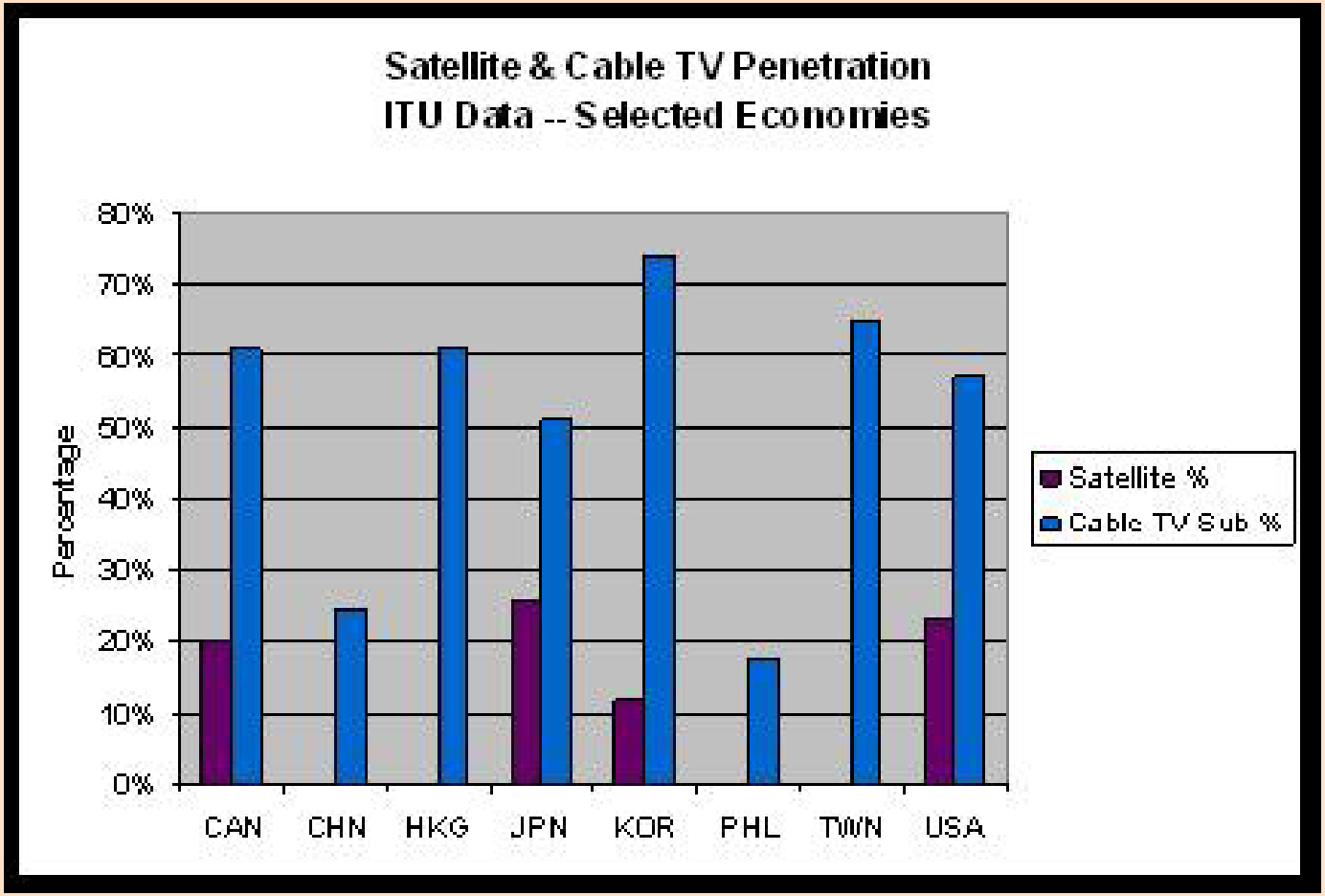
Rupert Murdoch once had a vision of a satellite broadcasting operation that would span the world.

With DirecTV, News Corp is the biggest satellite broadcaster in the world with more than 30m subscribers across North and South America, the UK, Italy and Asia, where it operates Star TV.

However, the rapid spread of broadband internet access, combined with fiercer competition from strong cable rivals in the US, has reduced the relative attractiveness of DirecTV versus News Corp’s other satellite businesses

The broadband factor plays out differently in the US for regulatory reasons, which limit the ability of companies to access telephone lines which can be used to offer broadband access.

Source: “DirecTV hit by the broadband internet factor,” Aline van Duyn and Andrew Edgecliffe-Johnson, *Financial Times*, December 10, 2006.


Satellite & Cable TV Penetration
ITU Data -- Selected Economies
Percentage
80%
70%
60%
50%
40%
30%
20%
10%
0%
CAN
CHN
HKG
JPN
KOR
PHL
TWN
USA
Satellite %
Cable TV Sub %

# Current U.S. & California data

| | Penetration % |
|---|---|
| United States | |
| Percentage of HH with Television | 98.2% |
| Percentage of TV HH with Cable | 69.4% |
| Percentage of HH with Cable | 68.2% |
| | |
| California | |
| *Percentage of TV HH with Cable* | |
| Los Angeles DMA | 55.1% |
| Sacramento/Stockton/Modesto DMA | 53.9% |
| San Diego DMA | 72.9% |
| San Francisco DMA | 66.3% |
| Weighted Average of four DMAs | 59.3% |

Approximate national market shares: Cable: 70%; Satellite: 15%; OTA: 15%

# But, technology is changing

- Conversion to digital
  - For OTA, cable & satellite
- Use of IP
- Deployment of optical fiber (in selected regions)

Remember this slide? …

# "Convergence"

- Slow to arrive
- But may actually be here, at least in part
- Affects different parts of telecom and broadcast
  1. Broadband (DSL & cable modem; 2000)
  2. Voice (switched & VoIP; 2004-05)
  3. Now video (2005-07; very limited, but growing)

(dates are indicative, at best)

# IPTV Subscribers – 2005-07, by region

| Region | H1 2005 | H1 2006 | H1 2007 |
|---|---|---|---|
| Asia Pacific | 612,000 | 987,000 | 2,176,000 |
| Europe | 521,000 | 1,505,000 | 4,984,000 |
| Americas | 267,000 | 409,000 | 1,059,000 |
| Other Users | 70,000 | 50,000 | 0 |
| **Total Worldwide** | **1,470,000** | **2,950,000** | **8,229,000** |

Source: Data provided for the DSL Forum by Point Topic

# What is holding back wired video competition ?

- Infrastructure
- Capital
- Management
- Regulation

Not necessarily in that order !

# Our assignment

- Develop a method to estimate the savings cable television subscribers could expect if alternative wired distribution of video programming were to become widespread.
- Primary purpose: to provide policy makers in California with objective information about likely effects of competition.
- Secondary purpose: develop a generalizable tool for other markets / regions.

# Our approach

- Use current population data
- Use existing data on cable subscription rates
- Use existing data on cable subscription demand patterns
- Develop reasonable estimates of the effects of competition on subscription prices
  - Using results of two government studies of areas with wired video competition

# California video "markets"

- Over 90% of the households live in four "Designated Market Areas" (DMAs)
- DMAs are different from political boundaries or census areas
- Basically, they are limited by coverage of TV signals and reflect viewing & advertising patterns.
  - There are 210 DMAs in the U.S.
  - Other countries have similar constructs (e.g., "media markets" in Canada)

# DMA Size and Cable Television Prices

90% of the state's HH are in the 4 DMAs

| | Households | Average Cable TV Monthly Price |
|---|---|---|
| Los Angeles DMA | 5,536,430 | $ 58.29 |
| Sacramento/Stockton/Modesto DMA | 1,345,820 | $ 53.41 |
| San Diego DMA | 1,026,160 | $ 49.54 |
| San Francisco DMA | 2,355,740 | $ 57.38 |
| Four DMAs overall | 10,264,150 | $ 56.40 |
| California state total | 11,502,870 | |

These calculations were very complex: multiple cablecos in some regions, several programming packages, package definitions in the subscriber data did not match those in the pricing data.

# Two studies estimate possible savings from competition

- FCC "Report on Cable Industry Prices" (February 2005)
  - Cable television service was provided in 32,510 "non-competitive" communities while there were only approximately 400 communities with competitive wireline overbuilds. Based on a stratified random sample, the monthly subscription rates for basic and expanded basic services were on average 15.7% lower in the competitive group than in the non-competitive group and 27.2% lower on a per-channel basis.
- GAO "Wire-Based Competition Benefited Consumers in Selected Markets" (February 2004)
  - Compared the monthly cable television rates in six markets with broadband service providers who offered a full range of services including subscription television with six comparable markets without such competition. Averaging the results from all six markets, the average price was 22.2% lower when competition was present.

# Combining the savings estimates (in %) with the California data

| | Current | Scenario A | Scenario B |
|---|---|---|---|
| Estimated percentage savings | -- | 15% | 22% |
| Average monthly bill | $ 56.40 | $ 47.94 | $ 43.99 |
| Average monthly savings | -- | $ 8.46 | $ 12.41 |
| Annual savings ($ million) | -- | $ 692 | $ 1,015 |

# Further results

- We modeled the changes in viewership of terrestrial, satellite & cable broadcasters to determine the “source” of IPTV subscribers.
- We modeled the likely effects on franchise fees.

# Additional considerations - 1

- Time needed to get from “before” to “after” is unstated.
- The FCC Pricing Study found that the average price per-channel was, on a percentage basis, even lower than the average overall price for wired video service in competitive markets than in markets without competition.

# Additional considerations - 2

- Competitive operators offer a wider variety of packages and options as they seek to serve additional market segments.
- We did not include non-English-language channels, etc.

# Conclusion

- Possible to combine business data (packages, pricing, penetration) with economic model to estimate gains to consumers from increased competition in wired video delivery