Broadband Policy: Growth, Jobs, and Investment

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Motivating Broadband Policy

- The effect of ICT on productivity and growth
- Potential employment effects of broadband deployment, particularly in a (current or forthcoming?) recession
- The urban-rural “digital divide” in broadband access
- The imperative for investment in higher-speed broadband

Abundant Evidence of the Effect of Information and Communications Technology on Productivity Growth

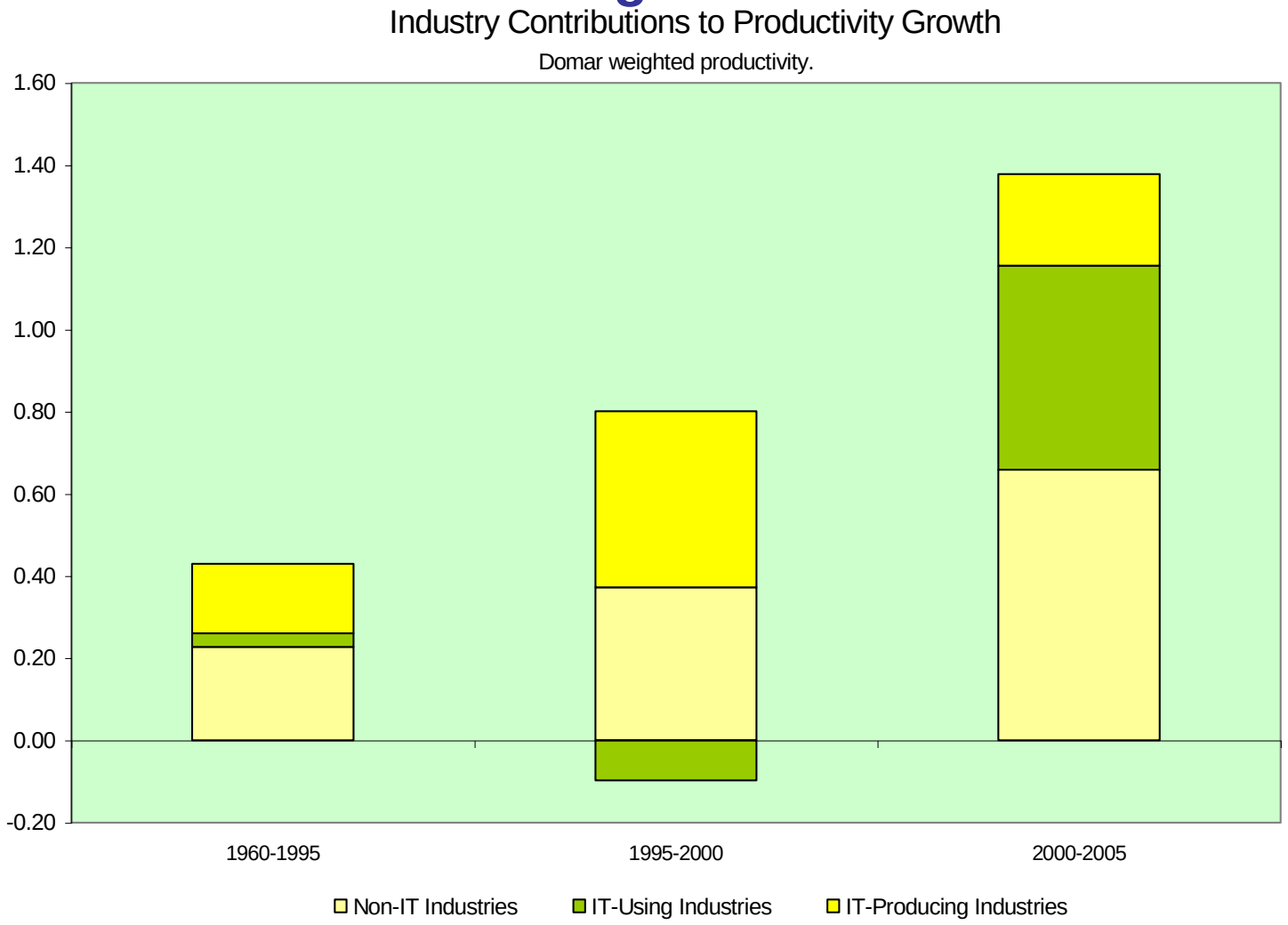
Labor Productivity Growth in Canada, the EU, and the United States, 1995-2000
(Contribution to Overall Growth in Brackets)

	Canada	EU*	United States
Overall Growth	1.8% (100%)	1.4% (100%)	2.5% (100%)
ICT-Producing Sectors	7.1% (24%)	8.7% (33%)	10.1% (30%)
ICT-Consuming Sectors	3.2% (47%)	1.6% (29%)	4.7% (56%)
Non-ICT Sectors	0.8% (30%)	0.7% (34%)	0.5% (14%)

* EU includes Austria, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Spain, Sweden and the United Kingdom.

Source: Melvyn Fuss and Leonard Waverman, "Canada's Productivity Dilemma: The Role of Computers and Telecom," Bell Canada's Submission to the Telecommunications Review Panel, Appendix E-1, 2005, Table 1.1.

U.S. Productivity Growth Has Recently Shifted to IT Consuming Industries



Source: Jorgenson (2008)

Unfortunately, the Effect of *Mass-Market Broadband* on Growth Has Not Been Established

- No empirical studies linking *broadband* subscriptions or broadband use to productivity growth
- Telecommunications output is a small share of total ICT
- And mass-market broadband is still a relatively small – albeit a growing – share of telecom output

Practical Difficulty: The Lack of Data to Estimate the Effects of Broadband on Economic Performance

- National broadband statistics capture both business and residential subscriptions in varying proportions [Wallsten (2007)]
- The definition of “broadband” varies substantially across countries
- High-speed business private lines are generally not captured in national mass-market broadband data
- In the U.S., data on broadband availability and/or subscriptions are not available on a community-by-community basis, thereby limiting micro-analytic studies of the effect of broadband in the United States

Studies of the Effect of Broadband on Growth Are Frequently Misinterpreted and Misused

- Broadband subscriptions may be strongly associated with growing areas, but what does this mean?
- The households found in growing areas may be more likely to subscribe to new services –TiVo's, IPods, Broadband – than are households in declining areas
- As a result, telcos, cable companies, and wireless companies are more likely to build broadband infrastructure in such areas
- Therefore, one should not conclude from a correlation of broadband penetration and employment growth that the diffusion of broadband necessarily promotes growth in employment

Our 2007 Study of the Effect of Broadband on Employment Growth

- Crandall, Lehr,& Litan (2007) was undertaken to try to establish a relationship between GDP and/or job growth and broadband deployment in the United States

- Data limitations required us to use BEA and BLS data on employment and GDP by state and FCC state data for broadband *subscriptions* (not *availability*)

- Empirical method: simple cross-section regression analysis of 2003-05 or 2004-05 growth of state non-farm GDP and employment included variables capturing mean temperature, unionization, business tax climate, education, wage rates, and broadband lines/capita.

Mixed Results of Effect of Broadband on Employment Growth

- We found that total non-farm employment growth across U.S. states is significantly related to broadband penetration, but results for GDP growth were not statistically significant

- Strongest effects of BB/capita were found for employment growth in finance and insurance, real estate, and educational services.

- It will be interesting to see if such results can be obtained for 2008/2007 or 2009/2007, given the current financial turmoil.

Broadband and the Digital Divide: Rural Subsidies for Broadband?

- Considerable policy discussion in the U.S. focuses on subsidizing rural broadband to overcome a “digital divide”

- Unfortunately, there is no evidence that the existing U.S. “high-cost universal service” subsidies reduce traditional voice telephone rates or increase telephone subscriptions in rural areas, despite their enormous and rapidly-rising cost of $4.3 billion per year

- Lower broadband penetration in U.S. rural areas may reflect lower demand for the service, not simply the effects of population density on the economics of deploying it

- Adding broadband to the menu of subsidized U.S. services may simply increase costs without commensurate benefits

An Example: The Effect of Rural High-Cost Subsidies and Telephone Rates in Iowa

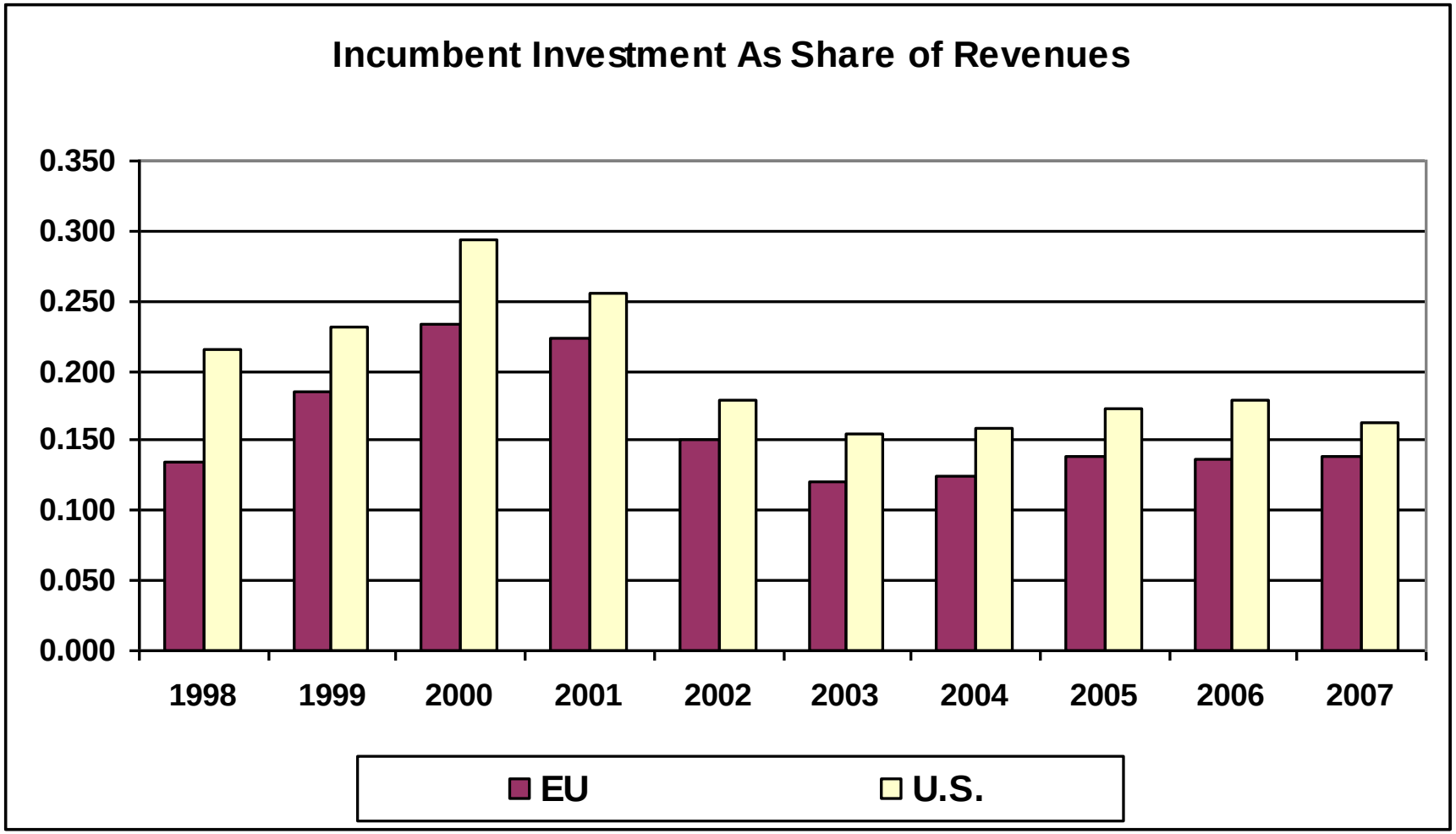
Communities	Population Density	Average Telephone Rate ($/Mo.)	Average Subsidy per Line ($/Mo.)	Average Telephone Rate Plus Subsidy ($/Mo.)
Rural With High-Cost Subsidies	50	21.22	19.40	40.62
Rural With Limited High-Cost Subsidies	35	25.91	1.63	27.54
Urban	349	25.10	0.04	25.14

Source: Crandall, RNE, forthcoming

More Important Issue: Providing Incentives for Investment in Higher-Speed Broadband

- Increasing broadband speed is very expensive if it requires large deployments of fiber in the last mile
- Verizon and AT&T are spending heavily on FTTH and FTTN networks that deliver much greater speed, but analysts question the economic viability of these network investments, given current demand forecasts
- The principal focus of public policy should be on stimulating demand, rather than mandating competitive access to these new networks

Europe Should Be Concerned that EU-15 Incumbent Capital Expenditures Are Consistently Below U.S. Incumbents' Levels



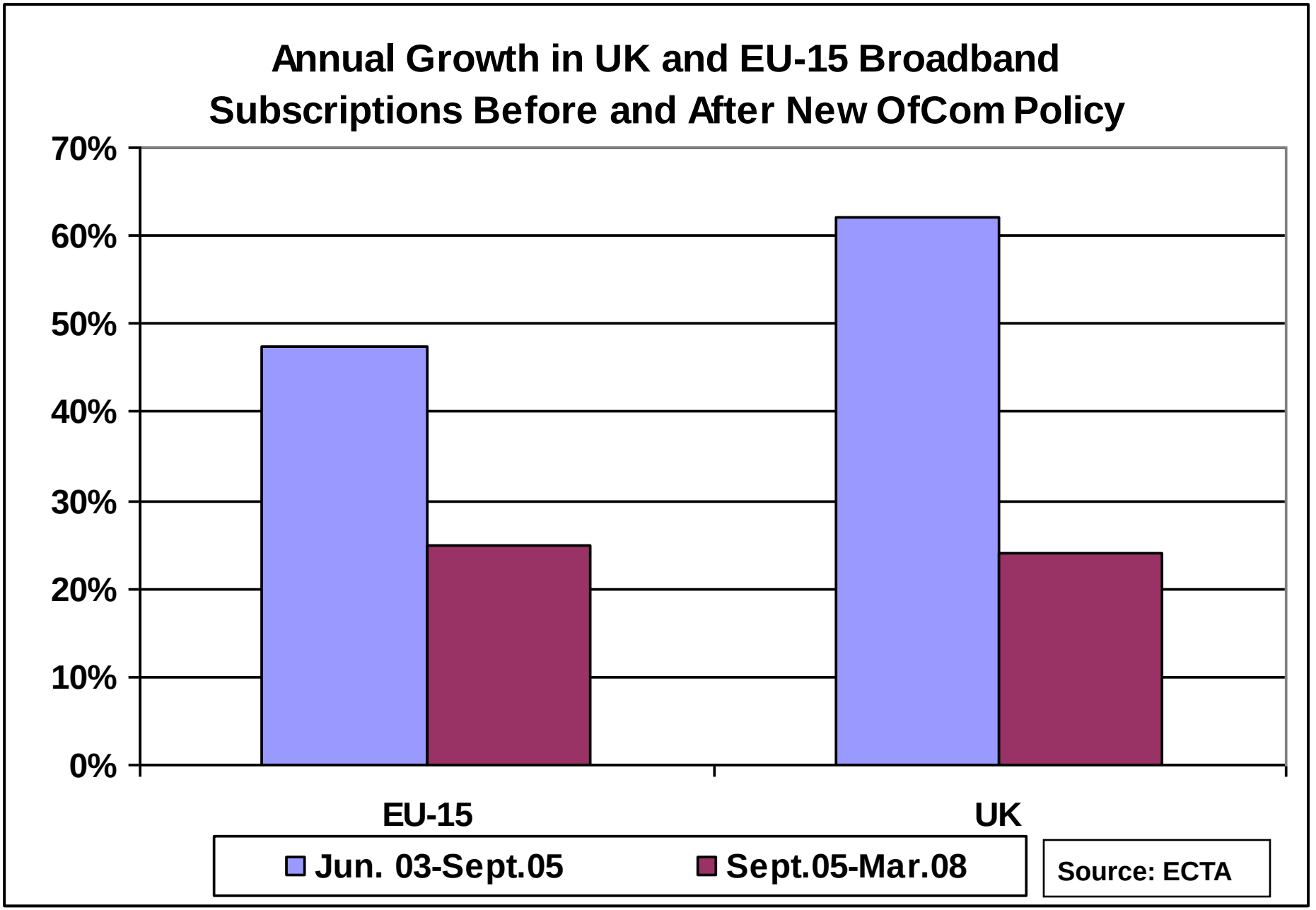
Source: Company Financial Reports

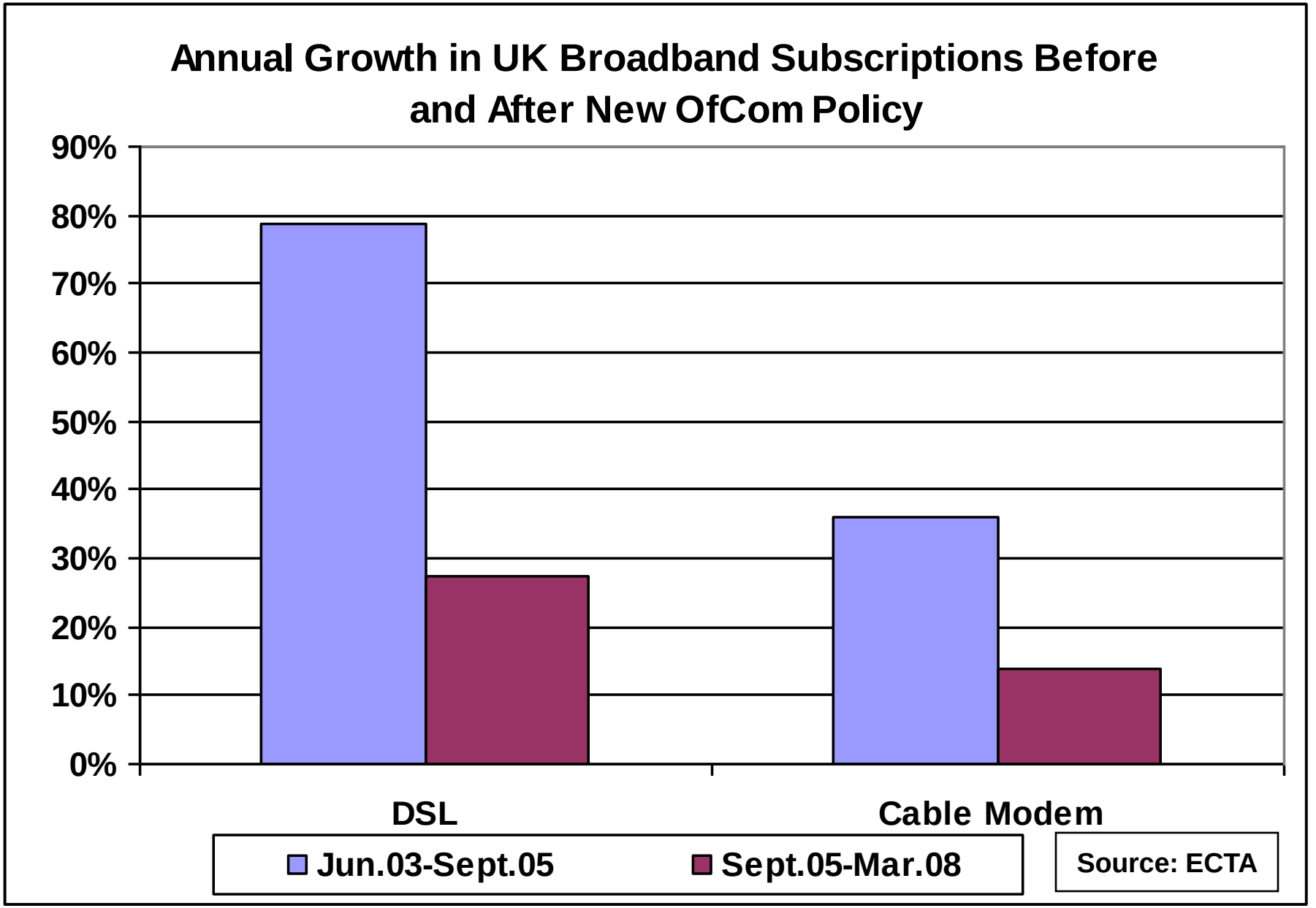
Does Empirical Evidence Affect Telecom Policy? The U.S. Experience

- In the U.S., the FCC continued its aggressive narrowband unbundling policy for several years after the evidence clearly showed that it was not working
- As mentioned earlier, U.S. “universal service” policy continues despite any evidence that it provides benefits
- Despite overwhelming evidence that taxing more price-elastic services to subsidize less price-elastic services reduces economic welfare [Crandall and Waverman (2000); Hausman (1998)], U.S. continues to tax national and international calling to subsidize local access

What is the Evidence Supporting Current (and Prospective) EU Policy?

- Is there any evidence that the EU policies of network unbundling and (forthcoming) functional separation are working?
- Waverman, et.al. (2007); Crandall, Ingraham, & Singer (2004) have shown that network unbundling reduces investment in competitive platforms
- But does unbundling or functional separation increase broadband deployment? Best evidence comes from the United Kingdom, which introduced both policies in late 2005


Annual Growth in UK and EU-15 Broadband Subscriptions Before and After New OfCom Policy
70%
60%
50%
40%
30%
20%
10%
0%
EU-15
UK
Jun. 03-Sept.05
Sept.05-Mar.08
Source: ECTA


Annual Growth in UK Broadband Subscriptions Before and After New OfCom Policy
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
DSL
Cable Modem
Jun.03-Sept.05
Sept.05-Mar.08
Source: ECTA