

Telecommunications Regulation:
Network Sharing, and Economic Incentives for Innovation

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I. Technological and economic background

1. New product and service innovation an important factor in telecommunications
 - a. Effect of cellular telephones
 - b. Broadband Internet
2. Technology changing rapidly
 - a. Digital convergence allows potential competition with cable
 - b. 2G to 3G in mobile
 - c. Important difference from some other network industries.
3. Investments are typically sunk investments with significant risk
 - a. Spectrum costs in billions of dollars
 - b. New network costs also in billions of dollars
 - c. Uncertainty both in technology and in consumer demand
4. Regulation with network sharing
 - a. Begins with implementation of Telecom Act of 1996 in US.¹
 - b. For wireline networks rapidly adopted in many other countries
 - c. Price set by regulation at TSLRIC
 - d. Gave a “free option” to competition.
 1. Different situation from “regulatory bargain” previously in effect
 2. Previous “guarantee” of payback no longer in place
 - e. Economic incentive effects can be potential large
 1. Truncation of returns from new investment
 2. Significant reduction in expected value of investment
 1. Reduction increases with amount of risk of investment
 2. Especially important for long-lived investments

¹ Required resale of cellular existed previously in US. FCC eliminated requirement in October 2002.

II. Empirical Evidence of Effect of Required Network Sharing

1. Innovation and investment rationale for mandatory sharing
 - a. FCC claimed that more competitors in the market would lead to greater investment
 - b. Claims is that greater competition from new entrants (CLECs) would lead to incentive for greater investment by incumbents
 - c. Other claims is “stepping stone” approach
 - i. After new entry CLECs would decide to invest in their own facilities in the long run
 - ii. They would use revenue from sharing for facilities investment
2. US experience
 - a. FCC attempt to define “necessary and impair” and Court reversals of FCC attempts
 - b. Use of UNEP for entry (entire network sharing)
 - c. Investment effects in US—review of empirical studies
 - i. Less investment but other factors involved: end of telecom bubble, technological change
 - ii. Decreased investment by incumbents
 - iii. Little investment by new entrants
 - d. Autumn 2004 FCC revised mandatory sharing rules
 - i. No mandatory sharing of new investment, e.g. fiber to the home (FTTH)
 - ii. Increase in price of elements shared
 - iii. Removal of residential sharing, essentially only small business
 - iv. AT&T and MCI announced they would exit residential
 - v. End of AT&T as predicted by J. Hausman in 1994
3. UK experience
 - a. Regulation initially favored facilities based competition and not sharing
 - b. Changed to mandatory unbundling in Dec 1998
 - i. Only broadband
 - ii. In Nov 1999 included loops and collocation—near full unbundling.

- iii. Called LLU for local loop unbundling
 - c. BT's capital investment decreased greatly after network sharing began
 - i. Again problems with disentangling effect of telecom boom and other factors
 - ii. Little investment by new entrants
 - iii. Cable operators who provide telephone service in UK claim it decreased their investment incentives
 - d. Question whether BT will invest in FTTH or other video delivery
- 4. New Zealand
 - a. Did not decide until December 2003 while after most countries had implemented network sharing
 - b. Decided against network sharing mainly on ground of disincentives to dynamic efficiency (investment)
 - c. Did an explicit cost-benefit analysis
 - i. Use "long term benefit of end users" criterion
 - ii. Explicit welfare analysis rather than imprecise "public interest" standard used in US
 - d. Did require "bitstream access"—resale of ADSL
 - e. Investment has again decreased in NZ
 - i. However incumbent is upgrading network to provide video to the home over telephone network
 - 1. Little cable deployment in NZ
 - 2. Main satellite provision of pay TV
- 5. Canada
 - a. Unbundled entire network in 1997
 - i. Only unbundled loops in non-urban areas, not switching
 - ii. Had 5 year sunset provision
 - b. Eliminated sunset provision in 2001
 - i. CLEC investment initially increased and ILEC investment remained stable
 - ii. Beginning in 2001 investment decreased

- iii. However, in 2004 Bell Canada (eastern Canada ILEC) announced it would provide video to the home over its network using DSL

6. Germany

- a. Have network unbundling beginning in 1997 but not using TSLRIC pricing
- b. In 1997 at the inception of network unbundling incumbent's (DT) investment decreased significantly
 - i. Counter to telecom boom
 - ii. Most other countries had increased investment until 2000
 - iii. Very Little investment by new entrants

III. MVNOs in Mobile

- 1. "Mobile virtual network operators" use network of incumbent and offer value added services, customer care and billing
- 2. Initially not required by regulation
 - a. Commercial deal between companies to "expand the market" by increased distribution
 - b. Virgin Mobile extremely successful in Australia (Optus), UK (T-Mobile), and US (Sprint). Unsuccessful in Singapore.
 - c. Tesco now entered in UK and 7-11 in US
- 3. Regulation would seem unlikely to be needed given that in every developed country sufficient spectrum exists for at least 4 competitors
- 4. 3G auctions in Hong Kong and Ireland required new entrants to resell to MVNOs
 - a. Hong Kong had unsold 3G spectrum
 - b. IE also had unsold 3G spectrum
 - c. IE had mandatory MVNO on A license but not on B license
 - i. Difference in bides was €48 million
 - ii. Demonstrates expected value loss in mandatory sharing
- 5. EU has now decided to allow national regulators to enforce mandatory sharing of mobile networks to MVNOs
 - a. Pricing principles not established

- b. IE in Dec 2004 required mandatory MVNOs and EU affirmed decision in Jan 2005.
 - c. France investigating mandatory MVNOs and likely to require them
- 6. Interesting that unused spectrum exists in both countries for 3G
 - a. Question of barriers to entry with unused spectrum
 - b. No Stiglerian barriers to entry since incumbents must construct new 3G networks
 - i. UMTS (WCDMA) allows little re-use of existing 2G networks
 - ii. Different from CDMA networks in US
 - c. Europe appears to be heading in direction of requiring MVNOs
 - i. Will either have commercial agreement
 - ii. Otherwise, regulatory requirement
- 7. 3G head for 3.5G and 4G will require very large investments