



**Asia-Pacific  
Economic Cooperation**

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Agenda Item: 1a

## **Macro-Economic Effects of Telecoms Reform**

Submitted by: University of Hong Kong



**JAPAN 2010**

**Seminar on Impacts of Structural Reform and  
Leaders' Agenda to Implement Structural  
Reform Stocktake  
Hiroshima, Japan  
25 February 2010**

# APEC Economic Committee

“Seminar on Structural Reform and LAISR Stock-take”

Hiroshima, Japan 25 February 2010

## Macro-economic effects of Telecoms Reform

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## Agenda

1. Macro-economic impact of telecom reforms
  - Investment
  - Employment
  - Trade
  
2. Reform and the state of telecoms
  - Carriers
  - Network equipment vendors
  - CPE or Access Devices
  
3. The impact on telecoms



# Macro-economic Impacts

- **Telecom typically contributes 2-4% of GDP in OECD countries**
  - Telecoms employment is typically < 1%
  - Telecoms is capital-intensive and potentially high value-added
  - Telecoms has enormous network effects across the economy
- **Social Overhead Capital** = name sometimes given to infrastructure supporting social capital (education, health, housing, security, transport, utilities, etc)
  - Evidence suggests that in the case of a *networked* industry like telecoms, there is a positive relationship between
    - multiplier effects of investment
    - accumulated social overhead capital, but the threshold is lower for mobile



# Telecom services contribution

- **Broadband/smartphones driving next generation Web applications, content, cloud computing, etc. = ancillary sectors of investment and employment**
  - Low-data usage:
    - M-banking, m-payments, m-remittances
    - VoIP, SMS, LBS, GPS, etc
  - Medium-data usage:
    - search and progressive download, social networking, enterprise software applications, etc.
  - Heavy-data usage:
    - Real time streamed video, MMORPG (massive multiplayer online role-playing games), etc.



# Structural Reform Impacts

- **Corporatization** = off the state books → market-focused
  - Key issue = how independent of the Ministry of Finance?
  - Key issue = how independent is the regulator?
- **Privatization** = new sources of capital + restructuring/accelerated technological unemployment
  - Key issue = how to manage the transition/fall in direct employment?
  - Key issue = can outsourcing of employment/non-core activities ('off-the-books') be a step towards a more efficient use of resources?

#### References:

1. John Ure (2003) 'Telecommunications Privatization: evidence and some lessons' paper delivered to APDIP/UNDP Asia Forum on ICT Policies and e-Strategies, [http://www.trp.trpc.com.hk/papers/2003/apdip\\_031017-2.pdf](http://www.trp.trpc.com.hk/papers/2003/apdip_031017-2.pdf)
2. John Ure and Araya Vivorakij 'Privatization of Telecoms in Asia' in in Wu Rong-I and Yun-Peng Chu, eds. (1997) Business Markets and the Government in the Asia-Pacific, Addison Wesley Longman, South Melbourne. (pp.237-263) – see <http://www.trp.trpc.com.hk/publications/private1.pdf>



# Structural Reform Impacts

- **Liberalization** = competition = *the* critical issue, but different models
  - Free market entry (e.g. open licensing regime)
  - Restricted market entry (e.g. limited licensing/national/ ownership restrictions)
  - Competition between state-owned telecom enterprises (SOTEs)
  - Industrial policy
    - Creates dynamic efficiencies (social overhead capital; pays the entry costs into new technologies; etc) ... or ...undermines the allocative efficiency of the market? [*How, realistically, is it possible to measure the opportunity cost here?*]

For discussion of role of competition see John Ure and Araya Vivorakij 'Telecommunications and Privatization in Asia' in D.Ryan ed. (1977) *Telecommunications: Privatization and Competition*, Philadelphia: Temple University Press (pp.1-20) [http://www.trp.trpc.com.hk/papers/1997/privtier\\_2004.pdf](http://www.trp.trpc.com.hk/papers/1997/privtier_2004.pdf)

- **Reform**: what impact has liberalization had upon innovation, market growth, trade and investment and therefore overall employment?



## Fixed Network Investment

- In 1996 Roller & Waverman = first to quantify the economic impact of telecoms on economic growth
  - Elasticity of GDP growth rises along with the stock of accumulated telecoms investment = higher in developed than in developing countries – examples

	Teledensity	Impact of 10% investment
<b>OECD average</b>	<b>30%</b>	<b>2.8% increase in GDP</b>
<b>USA</b>	<b>40%</b>	<b>7.8% increase in GDP</b>

See: Roller & Waverman (2001) 'Telecommunications Infrastructure and Economic Development: A Simultaneous Approach' *American Economic Review*, V.9.4 pp.909–923; for others, see for example, [http://www.nipfp.org.in/working\\_paper/wp04\\_nipfp\\_014.pdf](http://www.nipfp.org.in/working_paper/wp04_nipfp_014.pdf)

- Above 40% penetration rate, a 10% increase in telecoms investment results in an average 0.45% increase in GDP
- Note: Bottom-up micro case studies have tended to produce more positive results than top-down macro econometric studies



## Case Study from Hong Kong, 1997

- In 1997 = John Ure estimated for PECC the impact of PSTN liberalization in Hong Kong
  - 0.35 GDP elasticity → 0.8% increase in GDP from telecoms domestic investment multiplier over 5 years
  - This estimate is on the low side of the findings of R&W*

	Teledensity	Impact of 10% investment
Hong Kong, 1997	33%	1.15% increase in GDP

Source: John Ure (1977) 'The Economic Benefits of Telecoms Liberalization in Hong Kong' <http://www.trp.trpc.com.hk/papers/1997/PECC2.DOC>

- Note: teledensity = mainlines/population. Hong Kong had around 2 million families in 1997 ~ 3 per family = every family had a phone
- Note: Hong Kong had rising 2 million mobile phones by 1998!



# Mobile Network Investment

- Academic research:

- Several econometric models used to estimate economic impact of investment in mobile networks – for example:

	Teledensity	Impact of 10% investment
Torero et al.	5-15%	0.3% increase in GDP
Waverman et al.	10%	5.9% increase in GDP
Sridhar, Sridhar	< 20%	7% increase in GDP

See Torero, Shyamal and Arjun (2002); *Telecommunications Infrastructure and Economic Growth: A Cross-Country Analysis: Information and Communication, Technology for Development and Poverty Reduction*. Baltimore: Johns Hopkins University Press, pp. 21–63; Waverman, Meschi and Fuss (2005) 'The Impact of Telecoms on Economic Growth in Developing Countries' Paper, University of Michigan (also in *Africa: The Impact of Mobile Phones – Vodafone*, 2005); Sridhar and Sridhar (2004) 'Telecommunications Infrastructure and Economic Growth: Evidence from Developing Countries', [http://www.nipfp.org.in/working\\_paper/wp04\\_nipfp\\_014.pdf](http://www.nipfp.org.in/working_paper/wp04_nipfp_014.pdf)

- Benefits from mobile to less developed countries more in evidence



# Mobile Network Investment

- Sponsored research:

- *India: The Impact of Mobile Phones* (Kathuria, Uppal and Mamta) Vodafone 'Public Policy Series' Jan 2009

India	Teledensity	Impact of 10% investment
All	10%	1.2% increase in GDP
Low	<25%	1.3% increase in GDP
High	>25%	1% increase in GDP



## Fixed Broadband Network Investment

- Estimates by ITIF (2009) and Brookings Institute (2007) of employment elasticity for broadband in USA

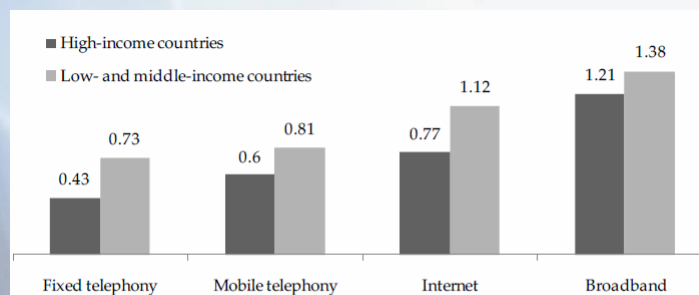
Stimulus Investment	Jobs created/saved
Broadband network \$10 billion	498,000 in 1 year
Health IT \$10 billion	212,000 in 1 year
Smart grid \$50 billion	239,000 in 5 years
USA – 1% increase in penetration (Brookings)	293,200 in 1 year

See 'The Digital Road to Recovery: A Stimulus Plan to Create Jobs, Boost Productivity and Revitalize America' (Atkinson, Castro and Ezell) pub. by the *Information Technology & Innovation Foundation* <http://www.itif.org/index.php?id=212>; *Issues in Economic Policy*, v6 (July 2007) Brookings Institute

- Structural and/or accounting separations –
  - UK: functional separation of BT's Openreach
  - New Zealand: operational/accounting separation of Telecom Corp
  - Singapore: structural separation of NetCo (infrastructure) and OpCo (wholesale)



## Fixed Broadband Network Investment



*Figure 1: Growth impact of telecommunications  
(GDP percentage point increase due to 10 percentage-point increase in penetration)*

Yongsoo Kim, Tim Kelly, and Siddhartha Raja (Jan 2010) *Building broadband: Strategies and policies for the developing world* Global Information and Communication Technologies (GICT) Department, World Bank




	Review
<p><u>Investment</u></p> <p>* Poor or uncertain regulation is a barrier to (i) Investment scale (ii) Investment effects</p>	<ol style="list-style-type: none"> <li>1. Alternative sources of finance = reduces the opportunity cost of competing state expenditures (telecoms vs. health, roads, etc)</li> <li>2. Well-designed <u>regulation</u> * can spread the effects nationwide, e.g's <ul style="list-style-type: none"> <li>• Interconnection sharing can benefit rural areas</li> <li>• Low-cost or no-cost spectrum for rural community use</li> <li>• Licences can include USO or similar obligations, etc.</li> </ul> </li> <li>3. Multiplier effects ~ 0.8% (1997 PECC/HK)</li> <li>4. Static effects = lower transactions costs → downstream efficiencies</li> <li>5. Dynamic effects = competition drives innovation = lowers costs + new sectors of growth</li> <li>6. Network effects = when society is networked, productivity starts to 'show up in the figures' (network effects kick in after a threshold has been reached)</li> </ol>


	Review
<p><u>Employment</u></p>	<p>'Off-the-books' employment very common</p> <ol style="list-style-type: none"> <li>1. Initially employment may fall</li> <li>2. New entrants create new jobs</li> <li>3. Skill set requirements change dramatically</li> <li>4. Employment created in ancillary sectors (network equipment and components; telecom services; etc)</li> <li>5. Indirect employment in all sectors using telecoms as a mode of output, e.g. calling centres, BPO, etc</li> </ol>



	Review
<u>Trade</u>	<p>WTO's 4 modes of delivery</p> <ol style="list-style-type: none"><li>1. Mode 1 (international trade) is very strong as communications is the basis of all trade</li><li>2. Mode 2 (consumption aboard) is often resisted, e.g. by-pass via Skype, calling cards, callback, etc.</li><li>3. Mode 3 (foreign commercial presence) is the most controversial, e.g. often FDI caps = a NTBT</li><li>4. Mode 4 (movement of natural persons) not so important, e.g. most overseas employees are local or on work permits</li></ol>



Reform  
and the state  
of telecoms



# Carriers



- Competition --→ 'independent' regulation → regulation of asymmetric market powers
  - Interconnection, unbundling, 'must carry', etc.
  - SMP and dominance regulation, accounting and structural separations, etc.
  - Scarce resources regulation (numbers, spectrum, rights of way)
  - Laws and licensing (new, unified, class, special, unlicensed, liberal use, etc)
  - Other including cross-ownership, data protection, privacy, etc.



# Network Equipment Vendors

- National champions → competitive bidding
- Trade and investment (and GATTs/ WTO) on a global scale
  - Examples in Asia Pacific: Alcatel in Shanghai; Fujitsu in Sydney; Huawei in India in Bangalore
- *Internetworking* → entry of IT companies into the telecom space = IP-based server, S/W and networking companies, e.g. Cisco, HP, IBM, SAP, Oracle, etc...



## CPE or Access Devices

- Customer premises equipment = last part of the industry to transform → OS-based access devices
  - Smartphones, PDAs, games consoles, e-Books, Networks, iPad and tablet computers, etc
  - Bringing Web 2.0 into the telecoms domain, e.g. social networking, etc. = driving the uptake of “data” (vs. voice)
  - Creates chain of ancillary demand for flash memory, LCD displays, assembly, touch-screen technology, etc... most of them in Asia
  - Entry of IT companies into telecoms domain, from OEMs and ODMs (e.g. HTC graduated to Smartphones), to companies like Dell
- Standards issues
  - Telecom world = interoperable standards
  - IT world = proprietary standards
  - Web world = open standards

} IPR issues



## The Impact on Telecoms

- Network Evolution:
  - Digital → Internet → Broadband → High Speed Broadband Networks (HSBN) → All-IP 'Next Generation' HSBN (NGHSBN)
- Services Evolution:
  - Voice → Low speed data → medium speed data → high speed data
- Prices:
  - levels reduced (s'times to zero) = *revenue model issues!!*
  - Structural changes (bundling, cross-selling, flat-rate, bit-rate, pay-per-use, etc.) = *business model issues!!*
- Network by-pass:
  - Competition, e.g. international calling cards
  - Substitution, e.g. fixed-mobile substitution (FMS)
  - Internet, e.g. Skype, IM, social networking, emails, etc



Thank You

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