Market entry & scarce resources 2

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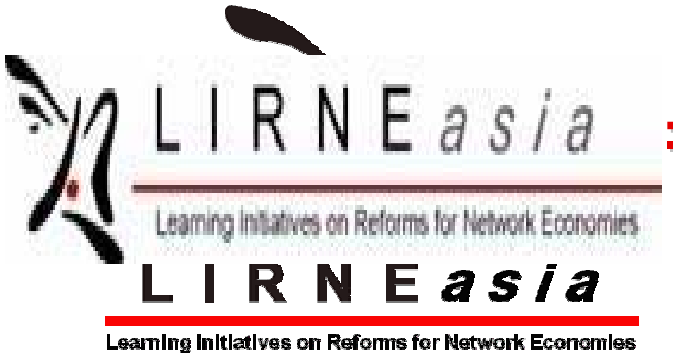
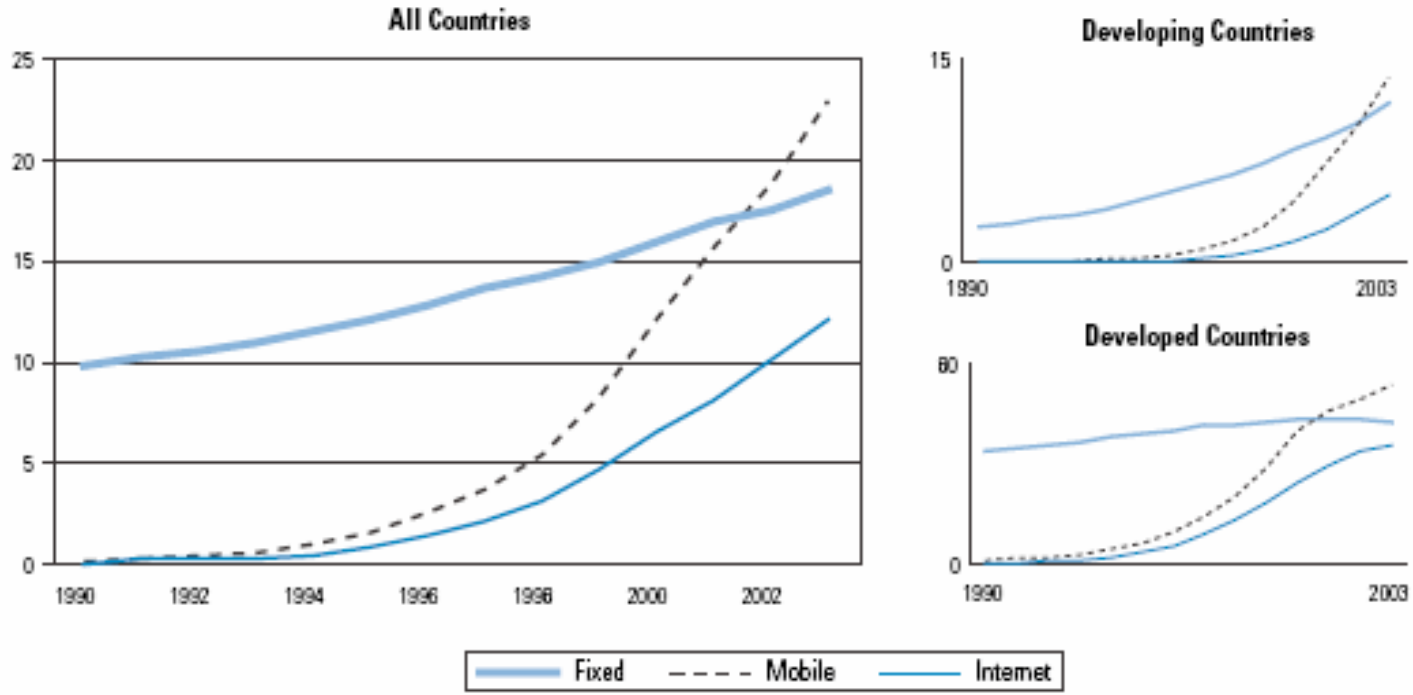


Agenda

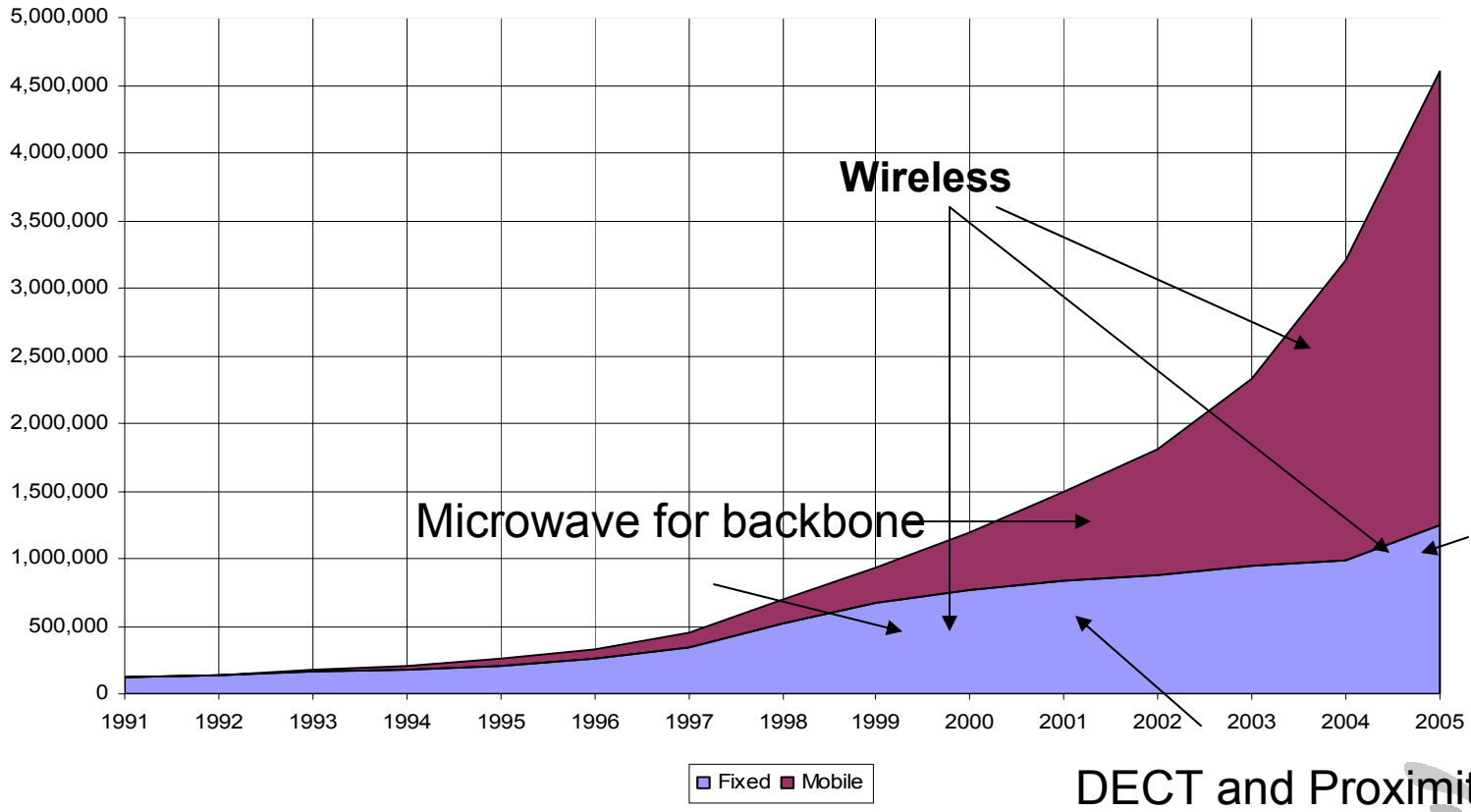
- Centrality of spectrum
- Approaches to managing spectrum
  - Administrative
  - Market-based
  - Commons
- Equipment licensing (not!)

How important is spectrum to telecom today?



Source: World Bank (2006), ICT4D: Global trends and policies

In reality, spectrum is important even for non-mobile services



Sri Lanka telecom growth 1991-2005

Understanding spectrum

	Spectrum	Land	Oil reserves	Water
Is the resource varied?	Yes	Yes	Not very	Not very
Is it scarce?	Yes	Yes	Yes	Yes
Can it be made more productive?	Yes	Yes	Yes	No
Is it renewable?	No	Partially	Yes	Yes
Can it be stored for later use?	No	No	Yes	Yes
Can it be exported?	No	No	Yes	Yes

- Most like land
- Think differing uses of land
- Need to reassign from low-value to high-value uses
- As value goes up, more efficient use

GATS Regulatory Reference Paper

- "Any procedures for the allocation and use of scarce resources, including frequencies, numbers and rights of way, will be carried out in an objective, timely, transparent and non-discriminatory manner. The current state of allocated frequency bands will be made publicly available, but detailed identification of frequencies allocated for specific government uses is not required."

Three approaches to managing spectrum

- Administrative
- Market-based
  - Quasi property rights
  - Full property rights
- Commons

- Need not be seen as either/or choices; three can coexist

OFCOM's projections for 2010

SPECTRUM MANAGEMENT METHOD	% OF SPECTRUM ALLOCATED IN:	
	Year 2000	**Year 2010**
Administrative	96 %	22 %
Market	0 %	71 %
Commons	4 %	7 %



Administrative

- How spectrum is managed now
  - Licences to specific users for specific purposes
    - Users selected on administrative criteria
    - Standard fees
      - Money not a factor in selection, in theory at least
    - Often it has involved specifying what equipment can be used and where, and at what power levels
  - Assumes a high level of knowledge and skills on the part of regulator
    - More difficult to support in present environment of rapid change

Example

- In 1997, Sri Lanka Telecom Regulatory Commission, assigned spectrum on both sides of 2.4 GHz ISM Band to "wireless cable" MMDS operator
- High-power broadcasts to a small number of households in the capital reduce the ability to make full use of WiFi

Market-based (quasi-property rights)

- Auctions allow those who value the frequencies the most, to obtain the resource
  - Consistent with economic principles
  - Provides a source of funds for refarming
- But alienation not permitted
  - Unless operator sells itself with frequencies
- Regulator still specifies use, power, etc.

Market-based (quasi property rights)

- Still requires regulator to make the "big" planning decisions regarding band, standard, size of allotment; how many allotments, etc.
  - These decisions can be influenced
    - Unless public consultation occurs, etc.
  - Decisions can be driven by desire to increase government revenues or favor some potential bidders

Pros and cons of auctions

- Improves transparency; reduces discretion
- Allows better allocation of resources
- But,
  - Governments can go too far in seeing spectrum as a source of revenue, starving the sector of needed capital
  - Can make refarming even more difficult by giving operators greater sense of ownership

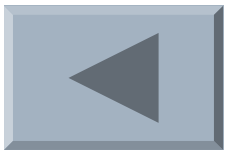
Market-based (full property rights)

- Here, trades can occur directly between willing buyers and sellers
- Makes market entry much easier and creates incentives for all operators to be more efficient and innovative
- Difficulty is adequately specifying the item to be bought and sold

Checklist for full market approach

1. The rights and obligations associated with a tradable licence are sufficiently clear, in relation to such things as duration, area and interference restrictions that buyers know they are getting.
2. Where the licensee can change the use to which the spectrum is put there must be a suitable regime in place to regulate interference (e.g. one which limits emissions at the boundary) to protect other licensees from changes.
3. Potential traders must be able to acquire information from a public register about adjacent licensees (those in neighbouring areas or bandwidths). This is necessary to allow them to evaluate the consequences of their trades accurately.
4. To reduce transactions costs, there must be a simple and clear procedure from registering licensee changes with the spectrum regulator.
5. Procedures for scrutiny and reaction by the regulator responses must be in place to prevent or avert the consequences of trades which confer high levels of market power on firms acquiring licenses.

Spectrum use information must be public for market-based approaches

- Necessary to make master register public
  - See GATS RRP requirement 
- Examples
  - http://web.acma.gov.au/pls/radcom/register_search.main_page
  - http://www.trc.gov.lk/spectrum.htm

Commons

- Basis lies in 1985 FCC decision that allowed development of spread spectrum technologies, including CDMA, that did not require dedicated channels and were tolerant of high levels of interference
- The communication devices figure out how to cut through noise
- But this requires access to a range of frequencies, not just a few

Unavoidability of commons

- Almost every laptop comes equipped with WiFi nowadays
  - Practical problems of enforcement
- With “motes” and the Internet of Things, commons will be unavoidable

Difficulties of co-existence

- Difficult to refarm
  - No obvious source of funds to clear frequencies for commons
- Commons users will be happy with non-assured quality standards, but others may object if some commons users increase power and cause interference

Equipment licensing

- As part of spectrum management, regulators have historically also regulated frequency emitting devices
- In large and mature markets, this is done through laboratory certifications and mutual recognition agreements, e.g.,
  - APECTEL MRA (what is certified by one country is accepted in another)

Simplifying equipment licensing for small countries

- Class licenses
  - No need to apply
  - Regulator publishes class license, specifying terms and conditions of use (e.g., mobile handsets are not licensed for use in aircraft)
  - If terms violated, in breach of license
- MRAs (accept what is approved in major trading partners)
- Prohibited lists
  - What is not prohibited is allowed, subject to non-interference
  - Heavy penalties if prohibited equipment is found (used or in possession)

Pragmatic approach for countries with limited resources for regulation

- Spectrum is a valuable resource that must be managed well
  - Procuring automated frequency monitoring & management systems (AFMMS) not enough; skills improvements/organizational changes essential
  - Create/strengthen regional study groups for sharing knowledge
- Link spectrum to licensing
- Introduce commons approach; study auctions
- Simplify equipment licensing, using MRAs and class licenses