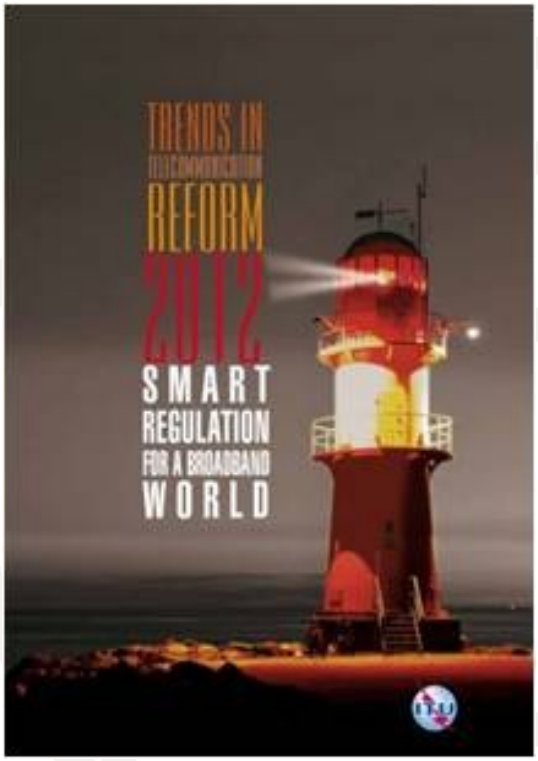

Spectrum: Its Value and Valuation

Exploring Market-Based Spectrum Management and the Value of Radio-Frequencies

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The Broadband Century

- Two tech trends have revolutionized ICTs:
  - Mobility
  - The Internet
- Mobile broadband = the nexus between them
- The key to universal access to broadband?
  - Satellites and terrestrial wireless services
  - Global reach, accelerating download speeds, lower build-out costs
  - Greater accessibility and flexibility of use
- What does this mean for spectrum access?

Spectrum: Exploding Demand

- By the end of 2010, there were 5.3 billion mobile wireless sul globally, including 940 million subscriptions to 3G services.
- Mobile communications and Internet are converged onto the same platforms
- With the race to be part of Info Society, spectrum for mobile data is being increasingly seen as a building-block to **national economic prosperity.**
- Meanwhile, there are multiple ways to assign spectrum
  - License-exempt/class license
  - First-come, first served
  - Administrative decision (beauty contest)
  - Competitive bidding
- **Assignment methods can be complementary**

Market-Based Approaches

- Liberalization has fundamentally changed the way we view and manage spectrum
- New paradigms of spectrum management
  - Property rights/flexible use model
  - Spectrum "commons" approaches
  - "Command and control" approach

- For operator-driven services, such as IMT, the fl rights model is becoming predominant
  - This has led to a growing **economic** predominance in views of spectrum

Spectrum Valuation

- Market Valuation is used for several purposes:
  - Regulatory fees (initial and recurring)
  - Initial spectrum assignments (auctions and tenders)
  - Secondary markets

- Several approaches can be taken:
  - Income approach – Determining the value of services that can be marketed using spectrum as an input
  - Market comparable approach – Deriving value through comparison with the same or similar spectrum rights marketed elsewhere (i.e. benchmarking)
- Net Present Value (NPV) Calculation
  - Calculates the sum of discounted cash flows from a project and compares them to the capital outlay and ongoing costs for the project
  - Can use a LRIC, fully allocated and "bottom up" approach to gauge investment costs

Opportunity Cost

- Definition: The value of the next-best choice in a series of choices, or the value of something one forgoes in order to choose something else.
  - E.g. – In choosing a Lamborghini over a Corvette, the value of the Corvette represents the opportunity cost.
- Opportunity cost in spectrum – The value that justifies investing in that spectrum opportunity rather than another investment opportunity
- Represents a proxy for market sale of spectrum
- **Problem**: Moving beyond economic theory

OR

Competitive Bidding

- Valuation is used to assess the opportunity
  - **Regulators** set reserve amounts/price floors and treasury revenue estimates
    - Can be expressed as price per megahertz pop
  - **Potential bidders and financial backers** use valuation to estimate bidding opportunity and determine participation
  - Results set true floor of spectrum value

Secondary Trading

- The Pioneers: UK, Australia, New Zealand, US
  - Results: Somewhat “thin”
- The theory: Leasing and trading help
  - Get spectrum into the hands of entities willing and able to use it,
  - Sets ongoing value of spectrum, and
  - Provides a safety net for initial auction failures
- Valuation: Different dynamics for secondary markets
  - Spectrum holder will need to generate profits from leasing
  - MVNO expectation of lower cost for spectrum inputs
  - Spectrum holder may perceive “private value” of foreclosing competition

Administered Incentive Pricing (AIP)

- An indirect costing regime
- Notable proponent is the UK's Ofcom
- Based on opportunity cost assessment
- Designed to act as a proxy for market forces
- Embodied in regulatory fees paid by essentially all users, including govt. entities
- Incentive is to induce holders to release spectrum in order to reduce fees.

Valuation: An Inexact Science

- **The reality**: spectrum valuation is kinetic, not static
  - "Intrinsic" variables are innate in the spectrum band:
    - Propagation characteristics
    - Manufacturing focus on the band
    - Degree of global harmonization

  - "Extrinsic" factors – depend on the specific market
    - Physical characteristics: topography, geographic isolation, climate, etc.
    - Socio-economic characteristics: demographics, population density, economic growth
  - General legal and political framework
    - The overall political, regulatory and business environments
  - Spectrum management and telecom regulatory regime
    - Market structure
    - Competition policy
    - Competitive bidding rules
    - Technology neutrality or service restrictions

Regulatory Factors

- **Regulations applying to spectrum use**
  - Spectrum caps
  - Service & network neutrality
  - License renewal periods and processes
  - Coverage & build-out obligations
  - Interference rules

- **Market structure and competition policy**
  - How many operators granted licenses
  - Roaming rules
  - Secondary markets – leasing, resale, disaggregation

- **Bidding rules and processes**
  - Bidding discounts or set-asides
  - Transparency & Accountability

Non-Market Viewpoints

- Unlicensed uses
  - WiFi – an unlicensed success story
  - The value of unlicensed spectrum is based on assessments of economic output, innovation and time-to-market
- Public safety, public service and government uses – they have economic value, too
  - Public safety – a "third rail" for spectrum pricing
  - How do taxpayers "bid" for spectrum
  - The tightening space for government spectrum uses

Fees and Auction Revenues:

Government Rent-taking or Legit Recovery of National Asset Value?

Issues To Discuss

- What situations call for market-based distribution of spectrum access?
- Are current economic models for spectrum valuation sufficiently robust to avoid undervaluing or overbidding?
- How can we broaden consideration of spectrum's economic value in the context of unlicensed, public safety and government uses?
- Do potential bidders have sufficient information on spectrum opportunities to engage in competitive bidding effectively?
- How can governments obtain access to valuation expertise in a cost-effective manner?

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