

# Spectrum Auctions - Lessons from North America, Europe and beyond

**Tim Miller**

**TechUK spectrum management seminar**

31 August 2016

# Topics for discussion

- Spectrum Auction Design
- Cleared Spectrum and Incentive Auctions
- Approaches on Spectrum Blocks and Lots
- Regulatory Restraint or Regulatory Intervention
  - designing for competition and level playing fields
  - use it or loose it
  - coverage and other licence conditions and durations

# Seminar agenda

- Keynote presentations

- Tim Miller, Plum Consulting
  - Recent trends in auctions and spectrum values
- Johanne Lemay, Lemay – Yates Associates Inc
  - Experience from the US auctions
- Robert Leese, Smith Institute
  - Future trends in spectrum use and impacts on auctions

- Panel discussion

- As above, and including:
- Graham Louth, Aetha Consulting (formerly of Ofcom)
- Mark Falcon, Zephyre (formerly of Three)

Are auctions always the best way to award spectrum?

# Auctions have grabbed headlines ...

## CNNMoney


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### German phone auction ends

August 17, 2000: 1:59 p.m. ET

**UMTS mobile phone license auction raises \$46 billion; six licenses awarded**



LONDON (CNNfn) - Germany's third-generation mobile phone auction finally ended Thursday, much to the relief of competing rivals, after bidding topped \$45.8 billion as Group 3G dug in its heels and refused to throw in the towel.

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## BBC NEWS


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You are in: Business

Friday, 26 January, 2001, 18:48 GMT

### US wireless auction raises \$17bn

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**3G licence battles**

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**Key stories**

- Spiralling costs
- Europe-wide debt woe
- Telecom debt warning
- Nervous investors
- Licence rollercoaster
- Pressures to merge
- 3G costs slashed?
- Race to be first

**Consumer choice?**

- Vodafone's first trial
- DoCoMo delays launch

## FierceWireless

WIRELESS TECH EUROPE DEVELOPER 5G IOT

Wireless

### Spectrum auction pushes past \$13B in round 10

by Colin Gibbs | Aug 23, 2016 1:36pm

... but sometimes for the wrong reasons

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### Mexico postpones spectrum auction to 2017

23 AUG 2016

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Mexican regulator Federal Telecommunications Institute (IFT) said it will delay a planned spectrum auction to next year, in a bid to generate more competition.

live  
**mint**

26 August 2016 | E-Paper

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2G AUCTION SPECTRUM SISTEMA SHYAM SSTL DOT

## 2G spectrum auction fails before it begins

Only one telecom firm applies to participate, likely delaying sale and potentially upsetting budget calculations

**THE TIMES OF INDIA**

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### Upcoming spectrum auction will be the most one-sided: Suresh Mahadevan, UBS

ET Bureau | Aug 20, 2016, 01:58 PM IST

[email] [print] A- A+

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## Jasmine fails to make payment, forcing Thai 4G re-auction

22 MAR 2016

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# Are regulators getting it wrong?

- Auctions are theoretically efficient
  - Reveal preferences of buyers
  - Lead to efficient allocation of spectrum
  - Lead to benefits for consumers
- But ...

Regulators may  
have objectives  
other than efficiency

Obligations and  
restrictions on lots  
distort values

Sudden expansion of  
spectrum availability  
reduces criticality of  
any one band

Use of spectrum is  
changing over time

Operators are facing  
changes in  
technology and  
usage patterns

# Trends in spectrum awards



# Are regulators adapting their processes?

Licence periods are lengthening

UK now tends to award indefinite licences

EU set to mandate 25 years

Growing tendency to avoid auctions for renewals

What were expectations in 2000 for 2100 MHz?

Greater certainty for operators

Recognition that high auction prices impacts on investment

Payment terms extended or annual fees redefined

Business case for 5G already uncertain

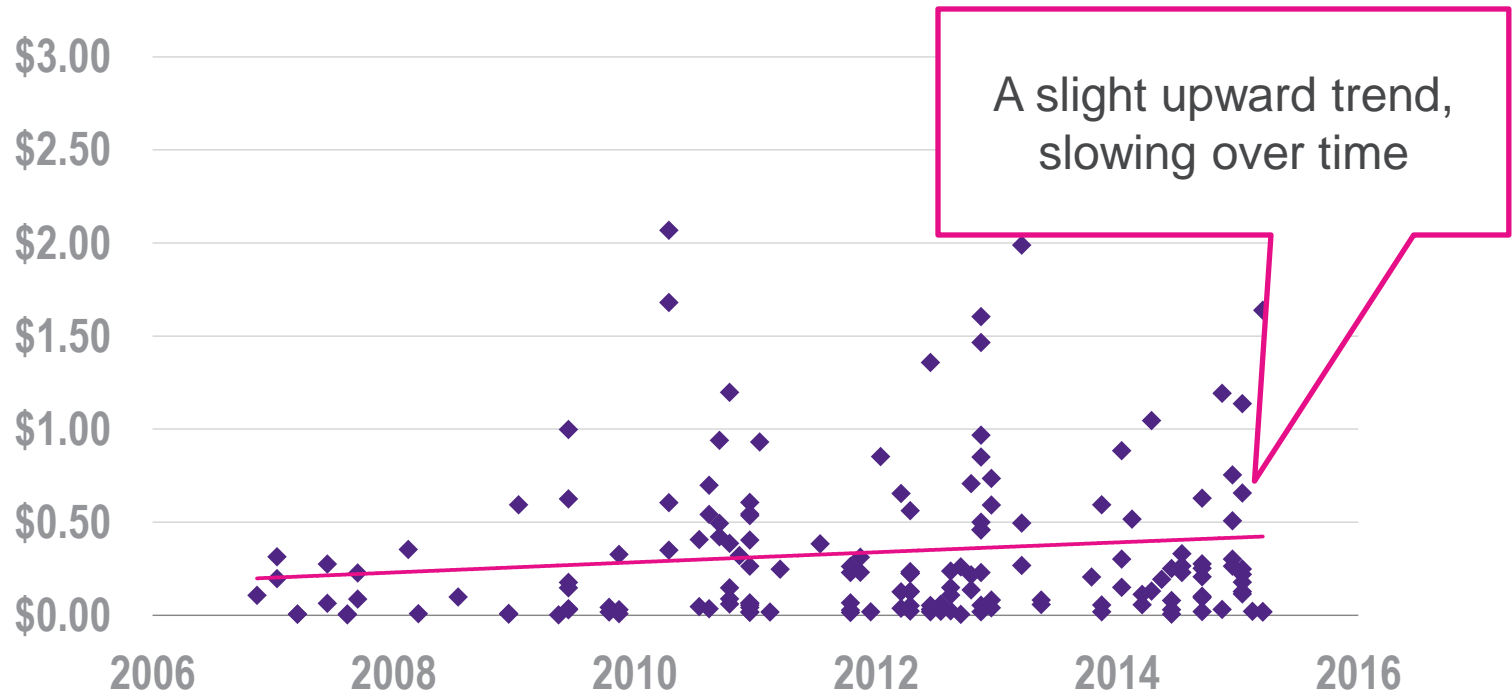
# Trends in spectrum value

# Is spectrum value growing?

- “Networks are expanding fast, and spectrum is more valuable than ever” – Pete Pachal, Mashable

## Spectrum auction prices

USD/MHz/pop



Source: Plum Consulting

# Why aren't we seeing exponential growth in value?

## Market issues

- ARPU is falling – consumers may be using ever more data but they are not paying more for it
- Multiple technologies lead to the need for new base station equipment
- Small cell technologies are less reliant on particular spectrum bands
- Carrier aggregation and refarming enable better use of more spectrum
- Sharing (infrastructure and spectrum) means less need for additional spectrum

## Regulatory intervention

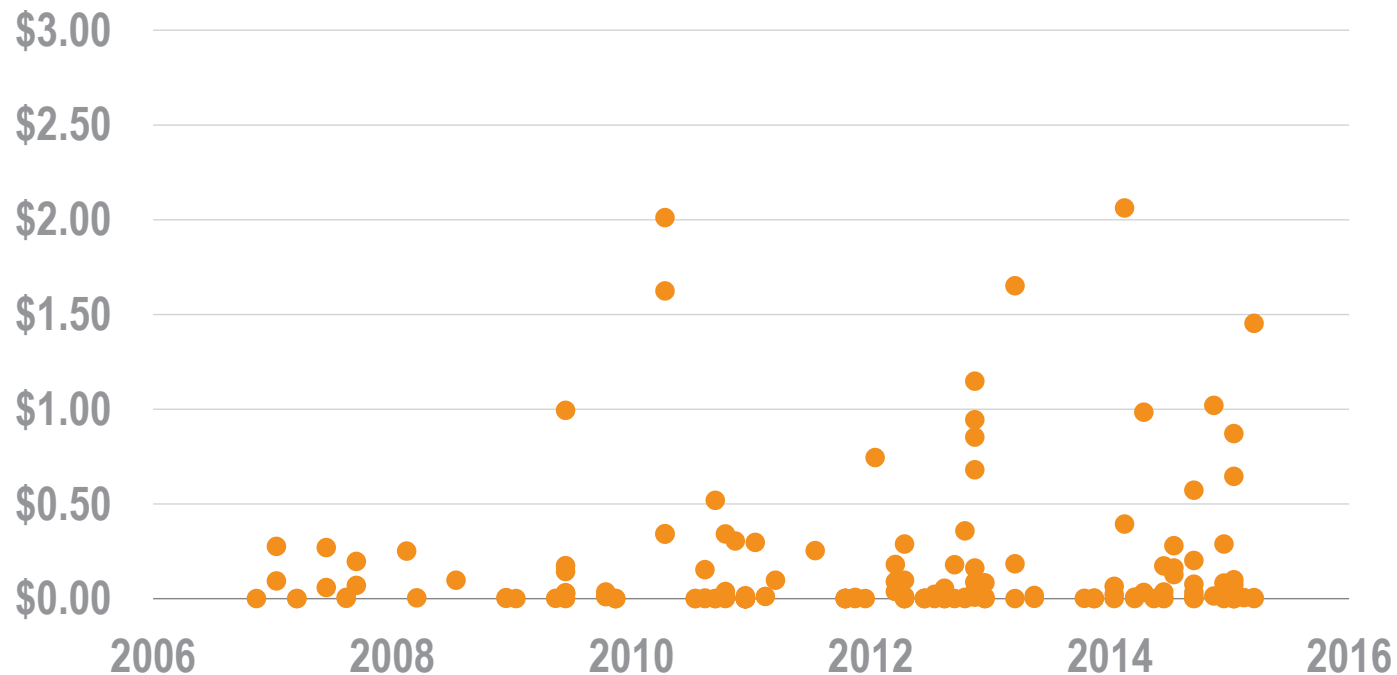
- Greater spectrum availability makes each individual band worth less
- Coverage obligations, social welfare funds, quality of service rules remove value to non-monetary instruments
- Auctions are often ill-designed and poorly run

# More auctions are being sold at reserve price

- Regulators may be driven by financial motives or poor valuations
- Growing disparity between how operators and regulators value spectrum

## Gap between auction and reserve prices

US\$/MHz/pop



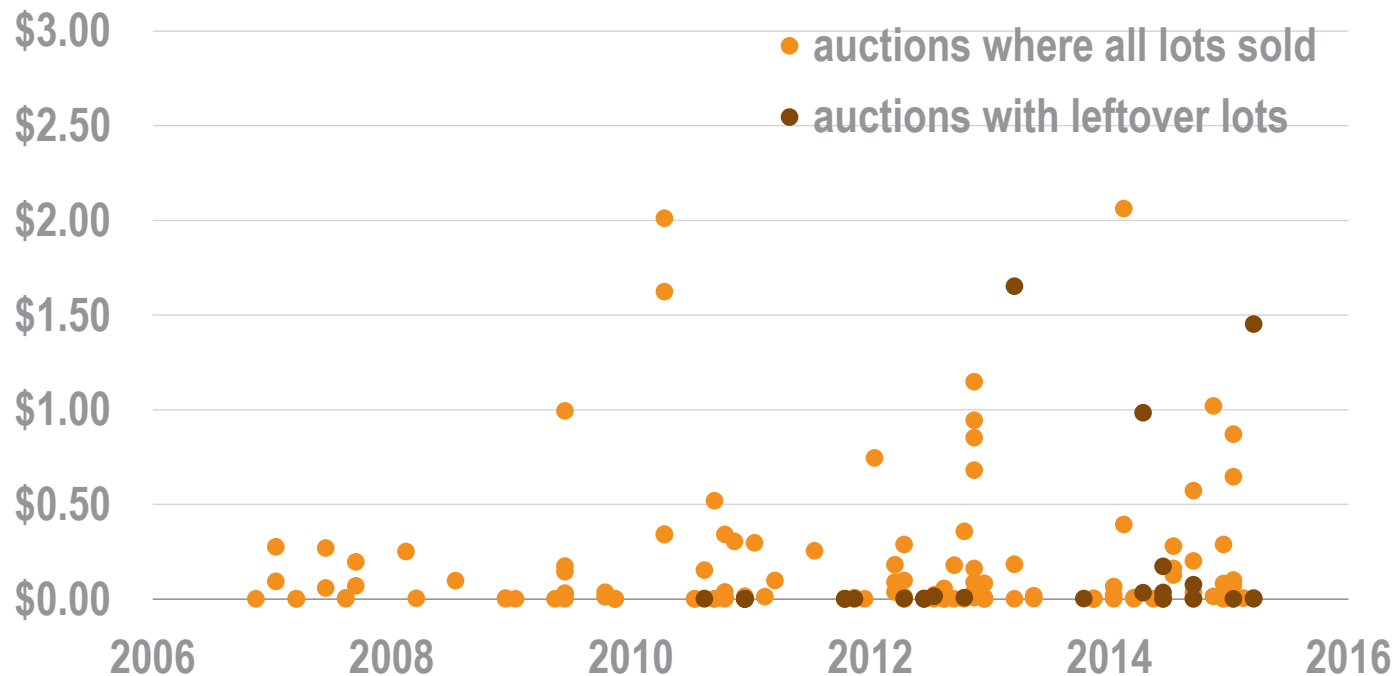
Source: Plum Consulting

# More auctions are resulting in unsold lots

- Many auctions fail to sell due to overly high reserve prices
- Others fail to sell due to a lack of demand

## Gap between auction and reserve prices

US\$/MHz/pop



Source: Plum Consulting

# What can we learn?

# Auctions that go right

## US AWS-3

- Clearly defined need for spectrum
- Well-designed lots and process
- Well timed auction

## German multi-band

- Simultaneous auctions enable operators to build optimum profile
- Obligations did not reduce value but encouraged competition
- Complicated auction process lead to signalling

## UK 800 and 2600 MHz

- Lots designed to facilitate new entrant
- Clear differences between blocks
- Revenue lower than expected – but were expectations realistic?



# Auctions that go wrong

## Thailand 900 MHz

- Reserve prices set very high – one winner defaulted on payments
- Investment in networks suffering
- Reauction sold at (again very high) reserve price

## Mexico AWS-1

- Spectrum sold at reserve price – set above benchmark levels
- One lot unsold despite industry need
- Operators investigating sharing and wholesale solutions

## Paraguay AWS-1

- Largest operator did not take part – instead refarming existing spectrum and building more network
- High costs of obligations