

# Mobile network investment: strategic options.

Mark Falcon, Three  
Telecoms Regulation Forum 2014



[Three.co.uk](http://Three.co.uk)

# About Three.



Hutchison  
Whampoa  
Ltd

# Mobile: neither utility nor free market.



**x**



**x**

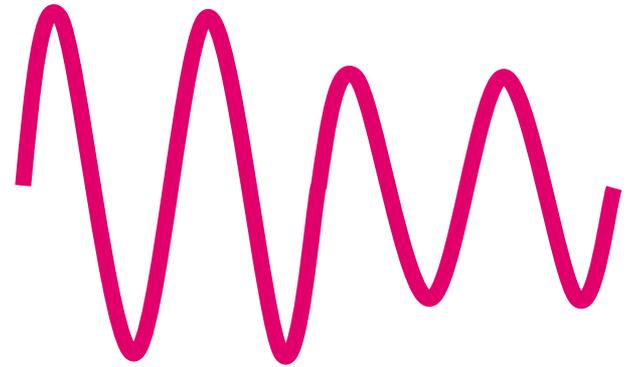
# Scarce/ monopolistic upstream inputs.



**Backhaul**

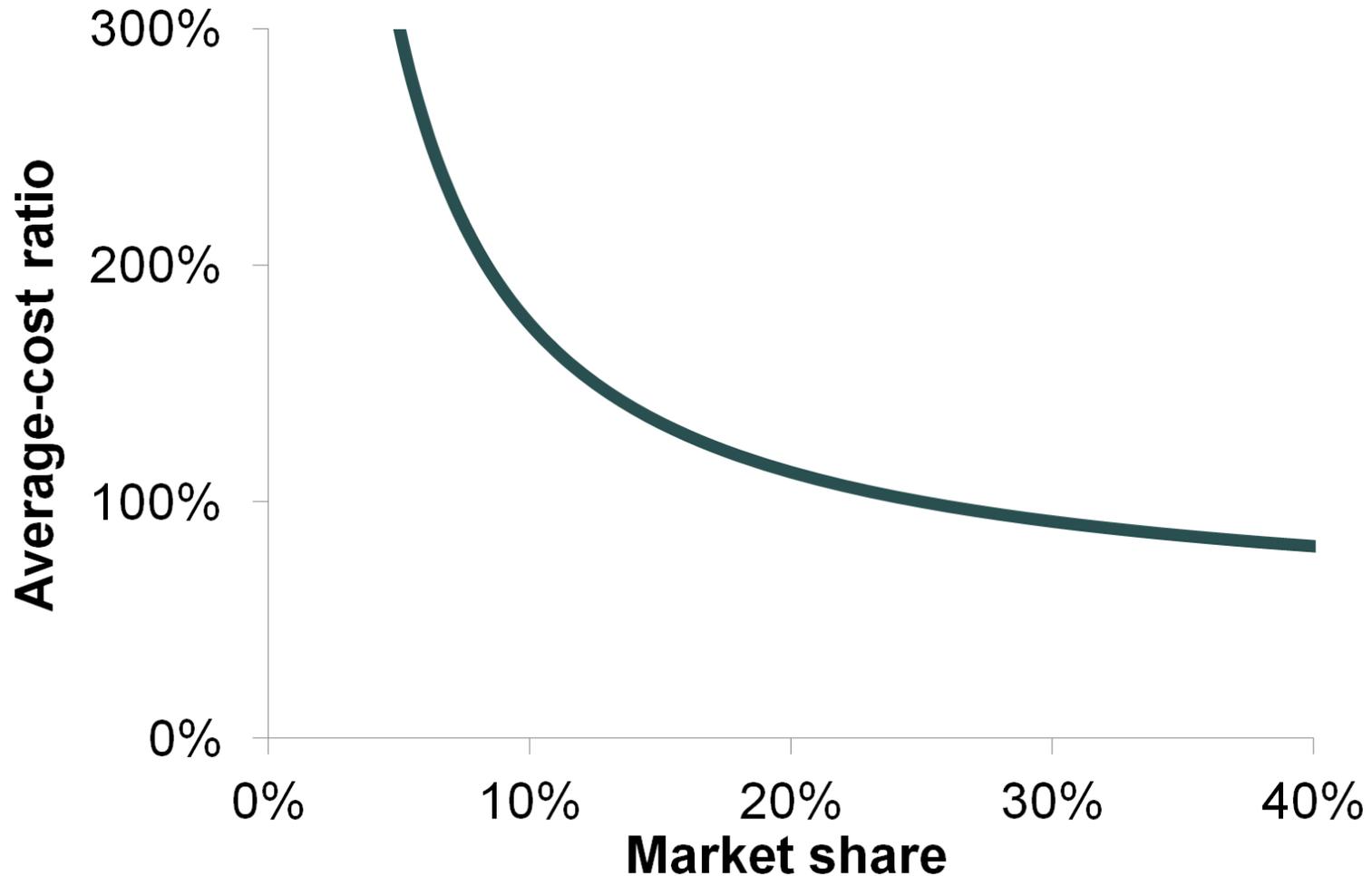


**Sites**



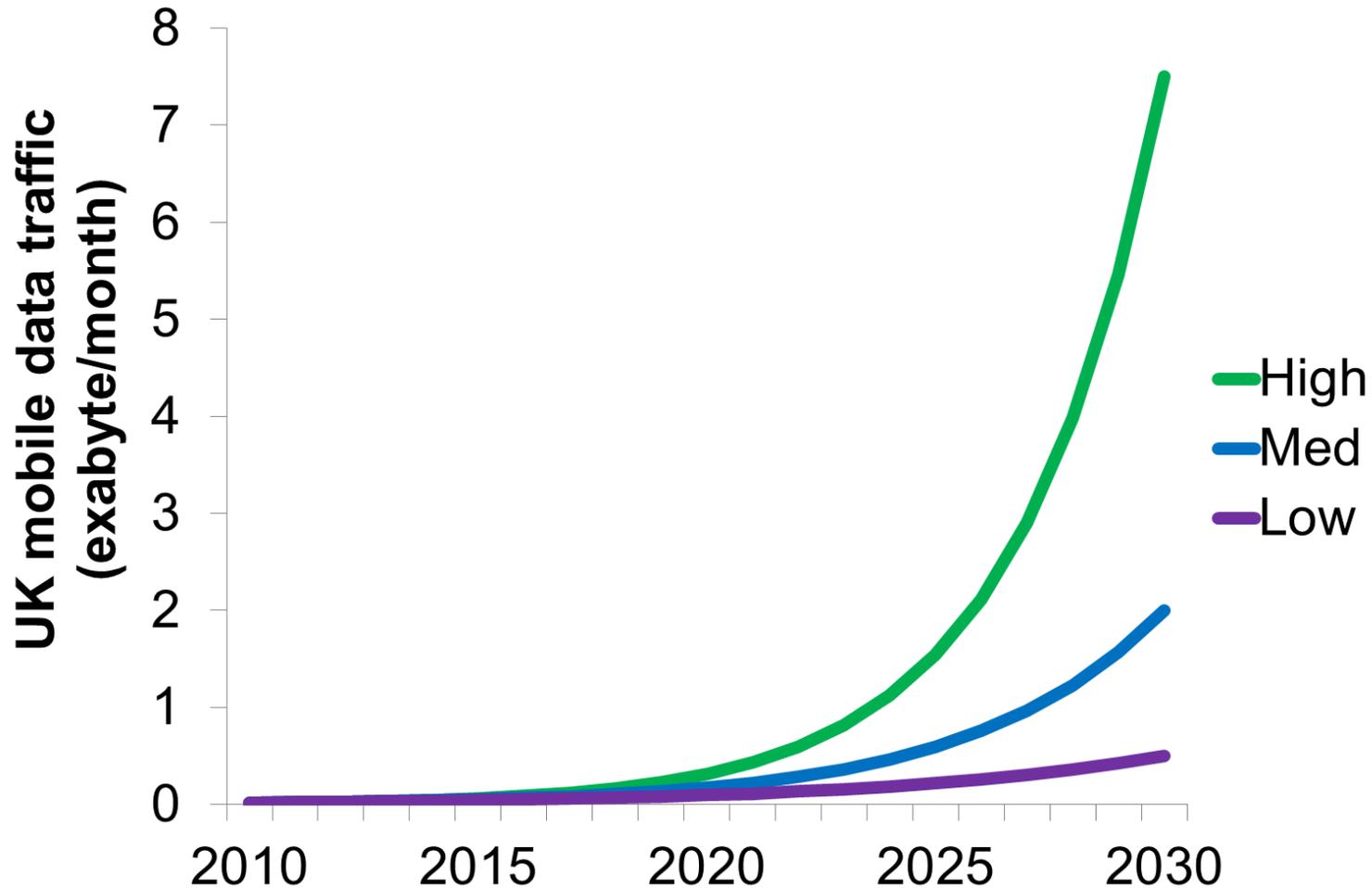
**Spectrum**

# And large network scale economies.



Source: Enders Analysis.

# Consumer demand: it's going up.

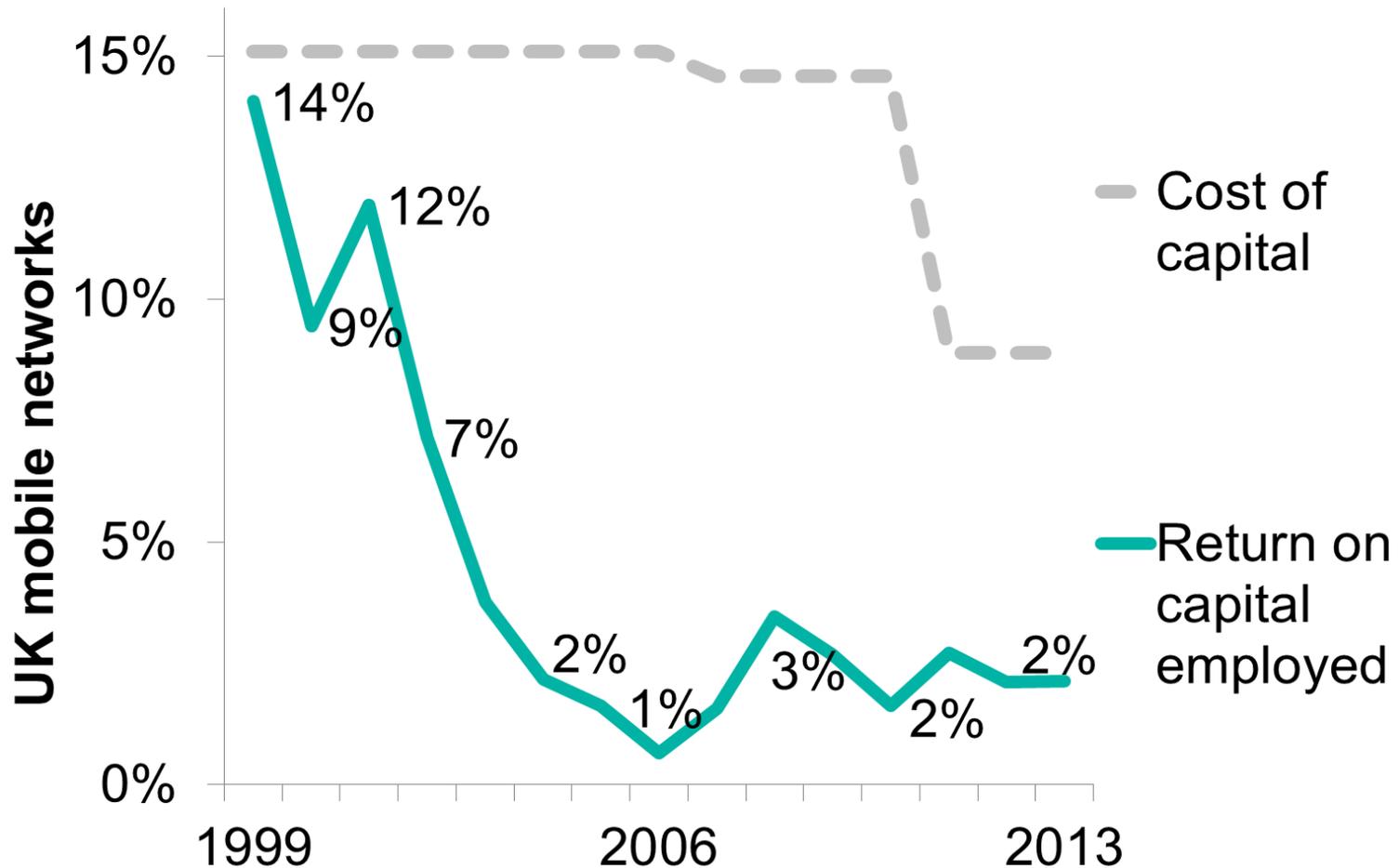


Source: Ofcom (ITU/Real Wireless).

# Political demand: just a few things.

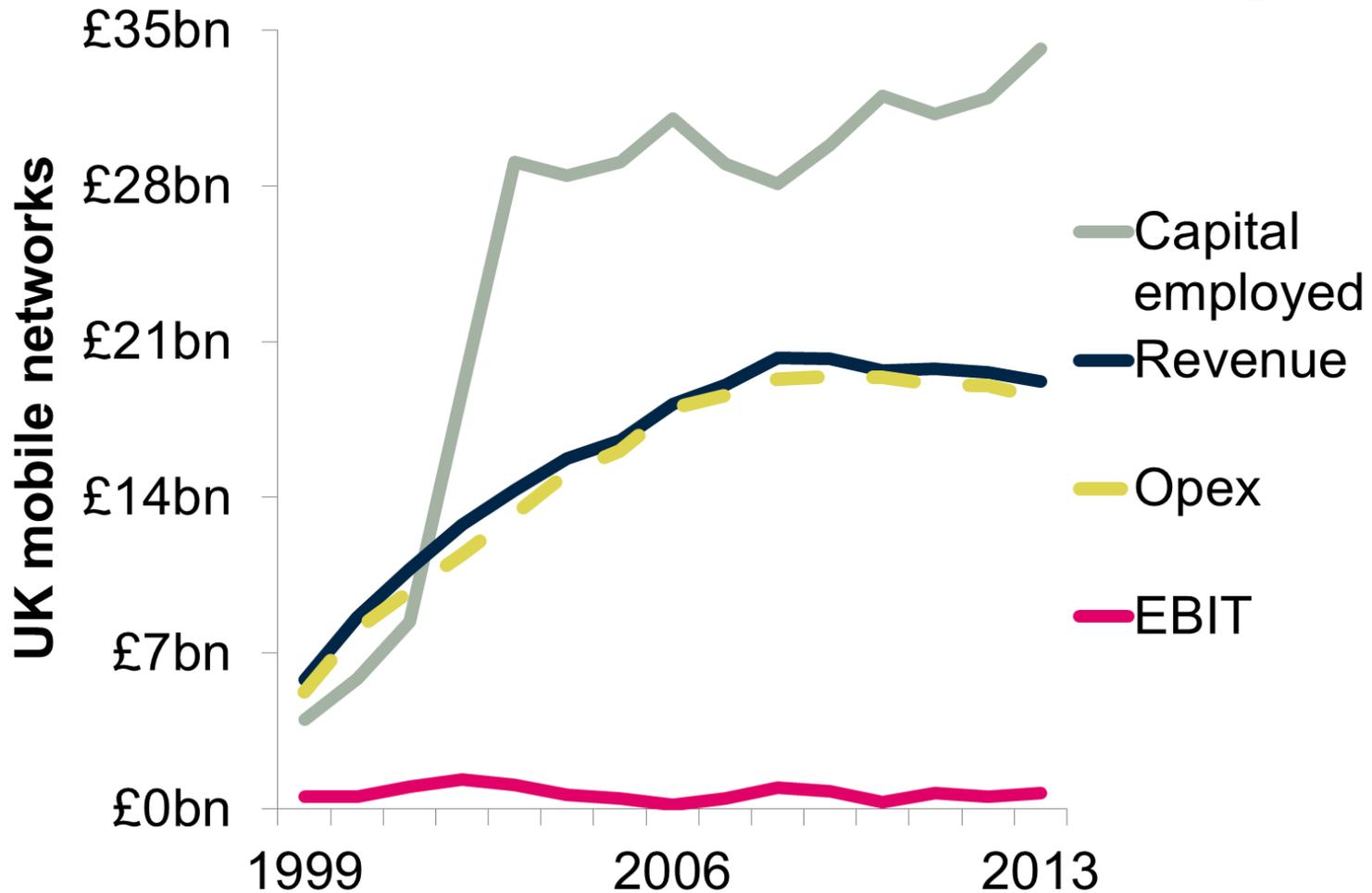
- Ubiquitous coverage
- Always sufficient bandwidth
- Always on

# Supply: underwater and still sinking...



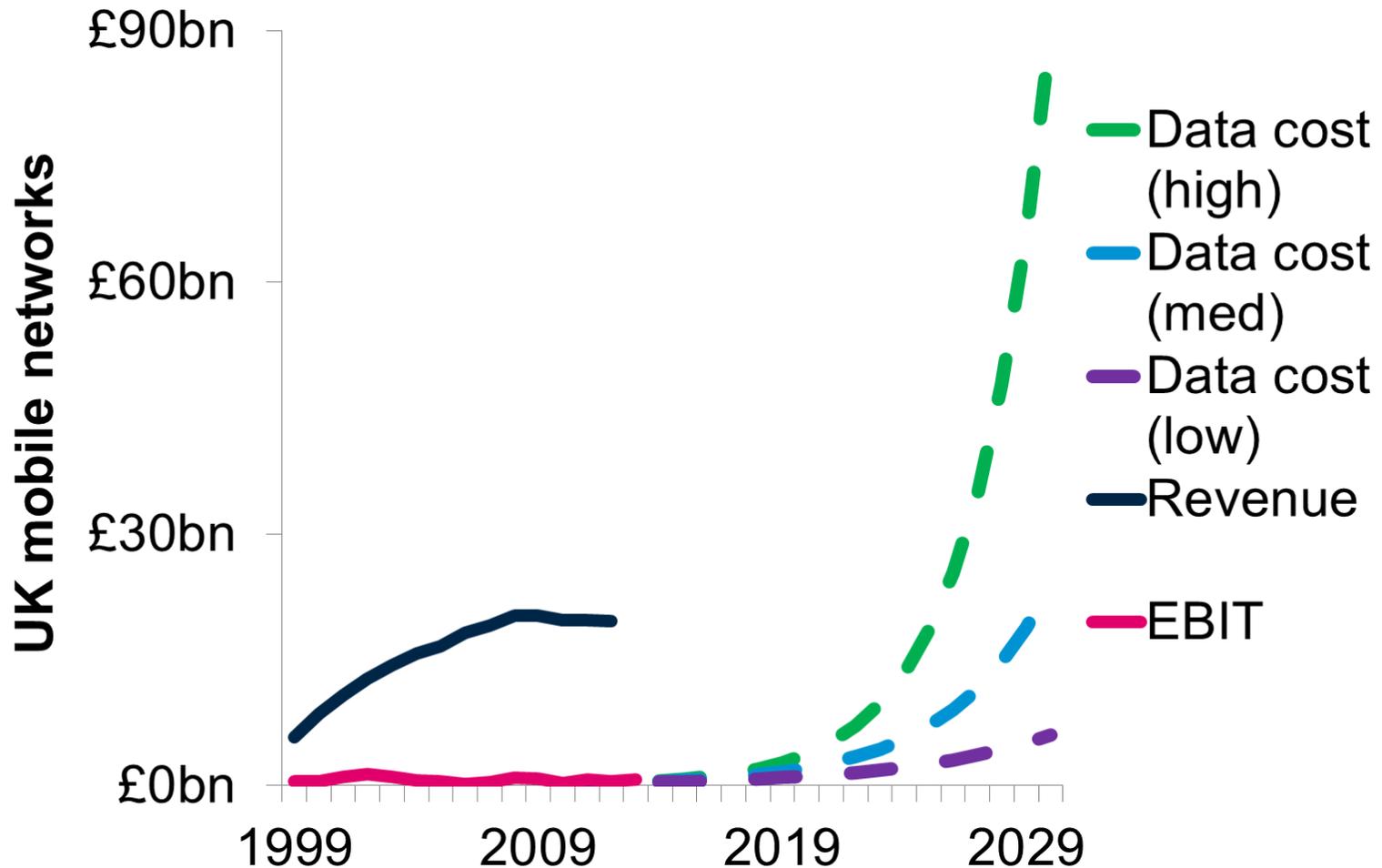
Source: statutory financial reports, Economic Insight, Ofcom.

# ...Driven by huge capex and flat margins.



Source: statutory financial reports.

# Future predicted demand not viable.



Source: statutory financial reports, Ofcom, Three.

**Strategic  
options.**

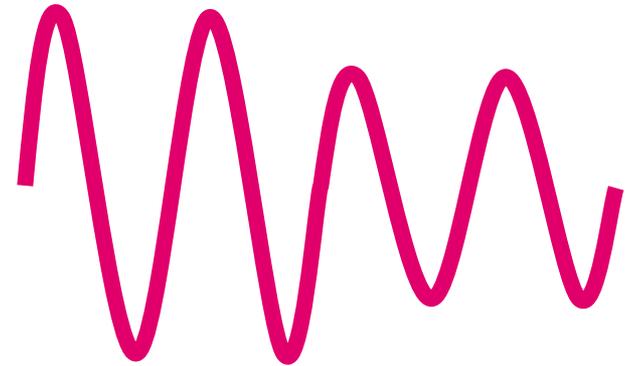
# #1. Better regulation of upstream inputs.



**✘ Semi-regulated:  
need better coverage**

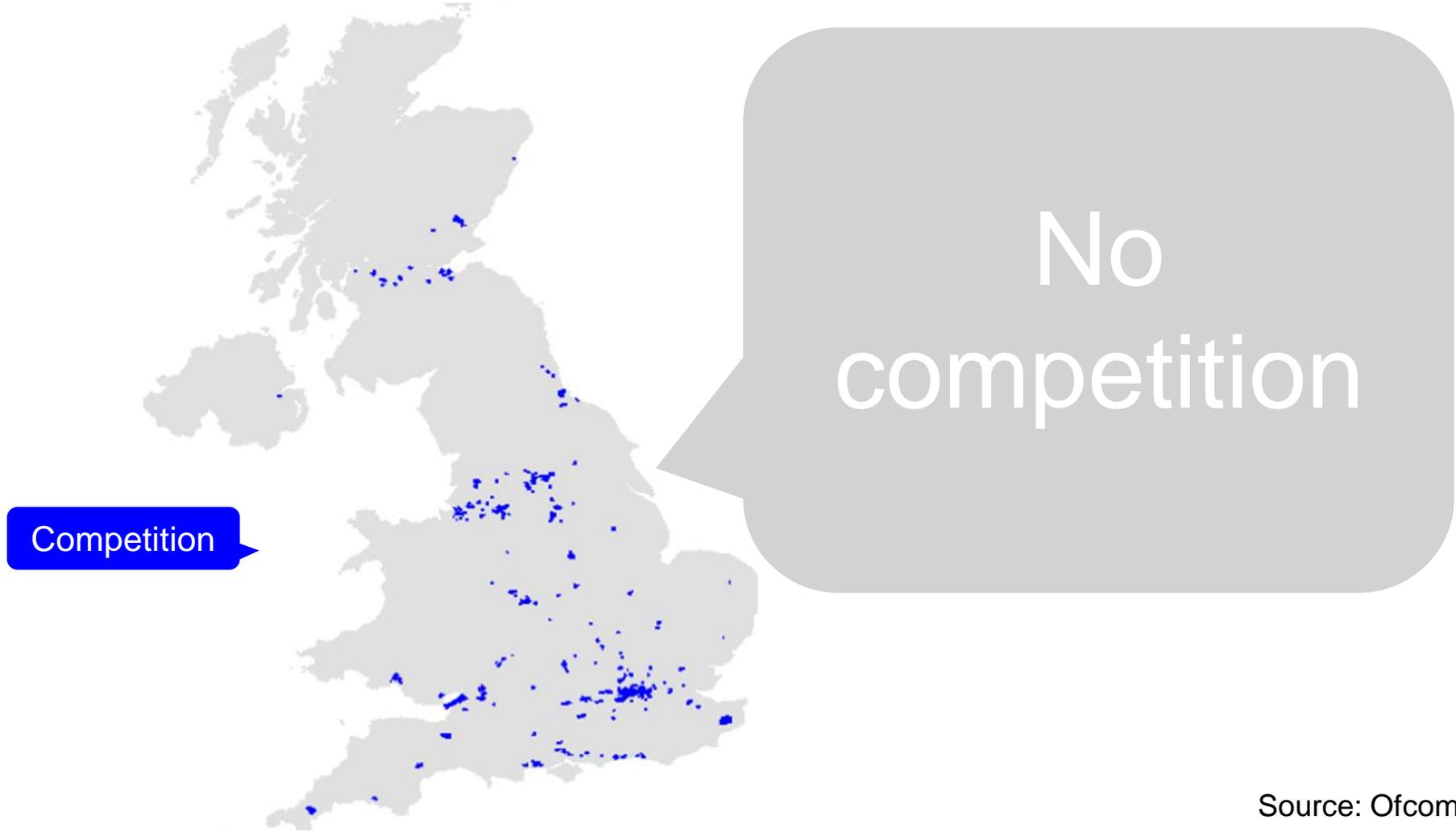


**✘ Unregulated:  
ransom pricing**



**✘ Auctioned:  
scarcity/  
foreclosure pricing**

# Backhaul: 92% of UK no competition.



# Mobile sites: extortionate rentals.



**100m<sup>2</sup> farmland  
£5**

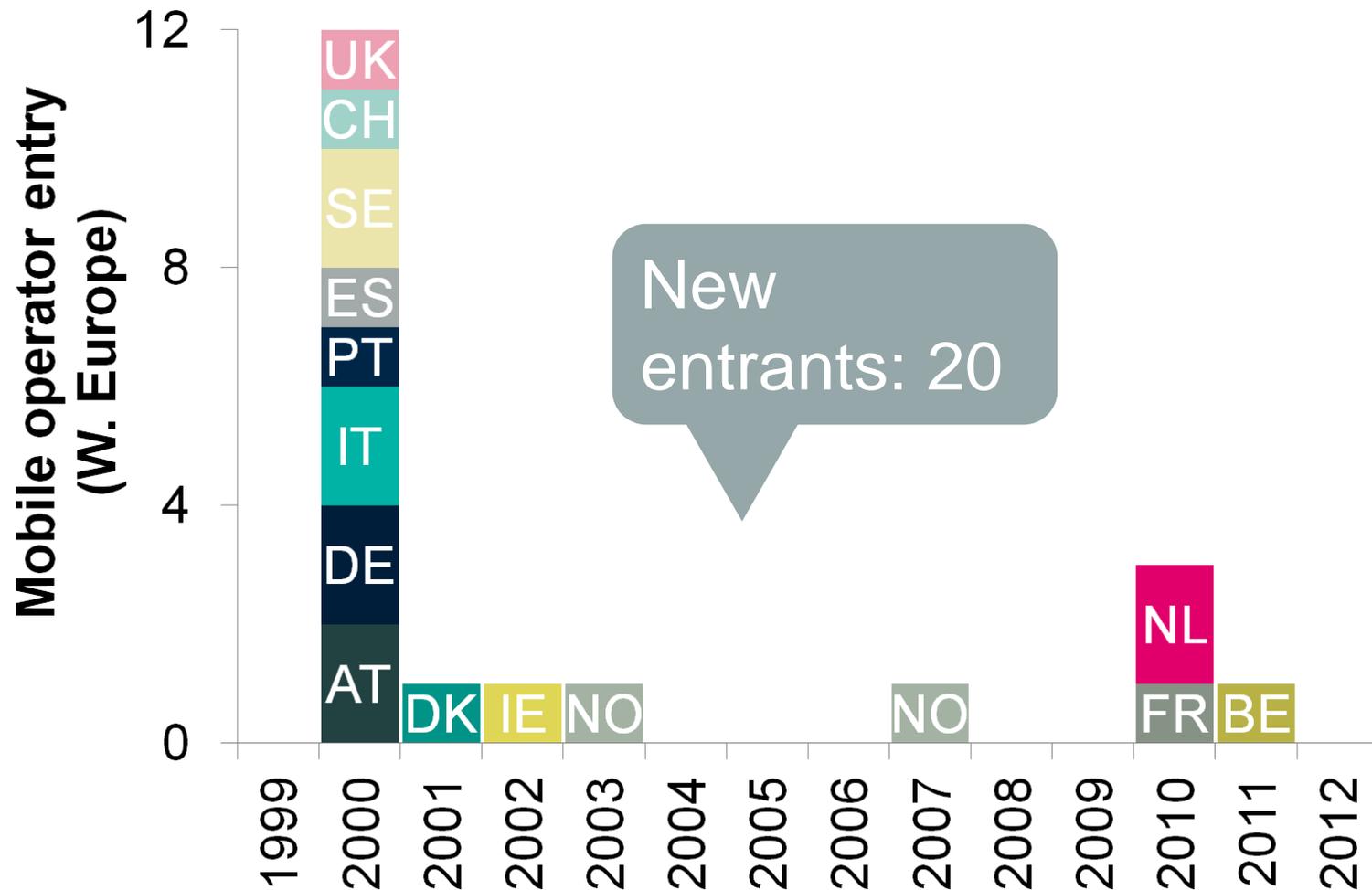


**Electricity pylon  
£100**

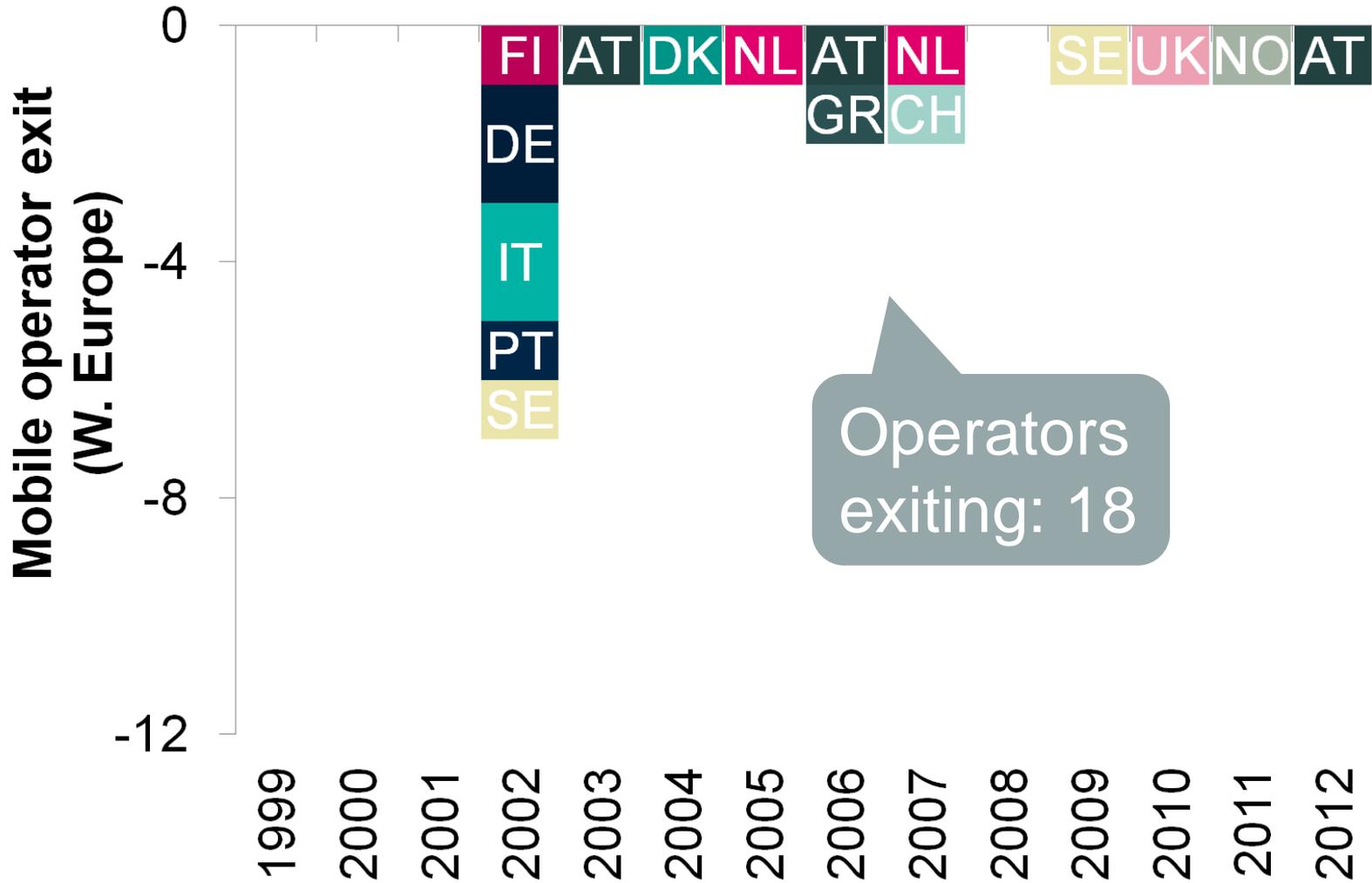


**Mobile mast  
£10,000+**

# #2. Strategic policy approach to entry...

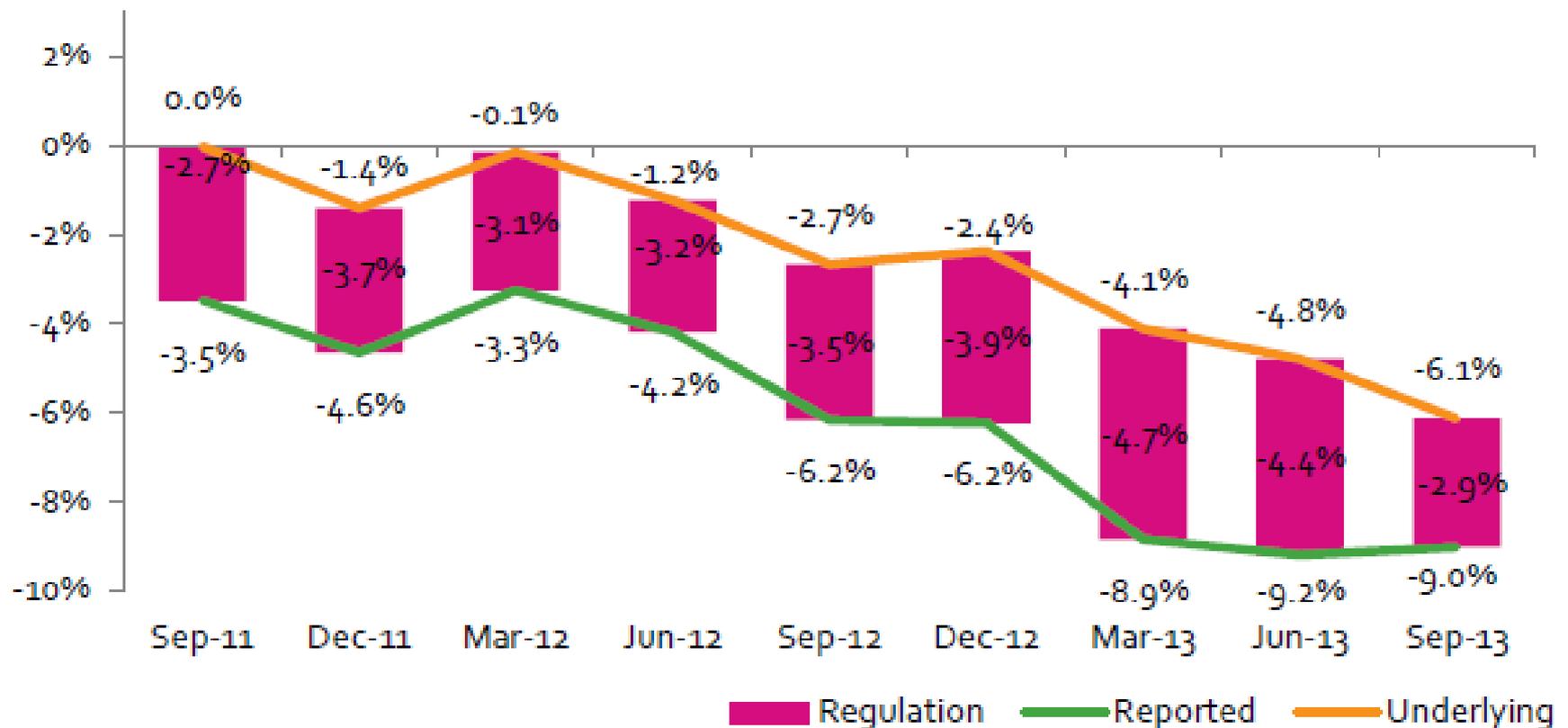


# ...and market exit.



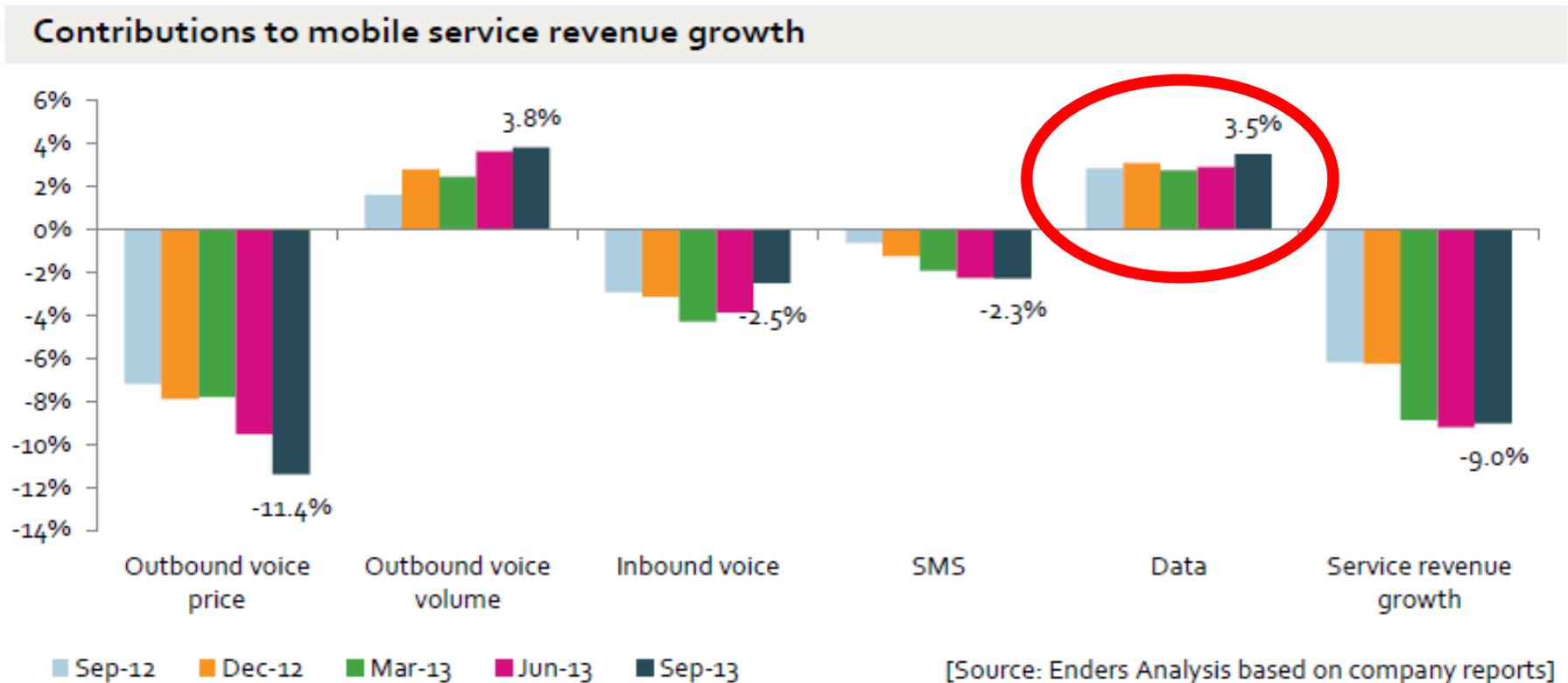
# #3. Review regulatory revenue impacts.

## Underlying service revenue growth – Top 5 European markets



Source: Enders Analysis.

# #4. Search for new revenue...



# ...Although opportunity limited.



**Thank you.**



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# Telecoms Regulation Forum 2014, Mark Falcon, notes

1. Mobile network investment - key Q for investors, regulators and consumers.
2. About Three - present in 6 countries. HWL.
3. Also key Q for investors and regulators - is mobile a utility or a free market. A - neither.
4. First, key upstream scarce/monopoly inputs.
5. Second, large scale economies in mobile networks. Only room for small number of firms.
6. So what's happening to demand - all know it's going up. Do we believe it? Will come on to show why we don't.
7. Other big dimension of demand is political. Mobile is now defined as de facto utility: coverage, capacity and 24/7 service. All central to Govt digital communications infrastructure strategy to make UK leading digital nation by 2025.
8. From supply perspective, industry underwater and sinking. Returns below CoC for past 15 years. New Ofcom licence fees reduce in half again.
9. What's driving this - yes revenue grew up to 2008, but so did opex, and capex has just kept on going. So unsurprising that financial returns so bad.
10. Going back to predicted demand, if multiply predicted demand by most conservative unit cost estimate, then implied cost still dwarfs industry revenue several times and industry profit by 100 times. Political demand for ubiquitous coverage has similar cost implications. So not going to happen, unless something else big changes.
11. So what are options?
12. First, better regulation of upstream inputs. I will talk a bit about the first two.
13. Backhaul - really almost no competition and not much regulation either, especially at bringing competition to BT and getting BT to extend coverage to rural areas. Share Public Account Committee's repeated findings that Govt has just subsidised BT to continue its monopoly. Means high prices and no coverage.

14. Mobile sites - is completely unregulated, as highlighted by this comparison. Mobile pays 100 times rental of electricity and 2,000 times underlying land value.

Those are two big UK issues or improve mobile coverage and capacity.

15. More widely is question of entry and exit. Entry normally a strategic national policy - have been 20 new mobile network entrants in W Europe since 2000.

16. But exit decisions almost all made by DG Comp. Have now been 18 exits. This is not a joined up policy approach.

17. Mobile networks losing revenue from successive regulation across the board. Each has own rationale, but not a holistic approach.

18. So is there new revenue to offset the declines? Only coming slowly.

19. Is there pot of money that mobile could capture from Google, Apple, Facebook? Not really.

20. To conclude: two big UK priorities are backhaul and sites. Beyond this, digital communications infrastructure strategy needs to reevaluate regulatory model.

# How will mobile operators meet the cost of providing data?

Jun 03, 2014 by Toby Youell

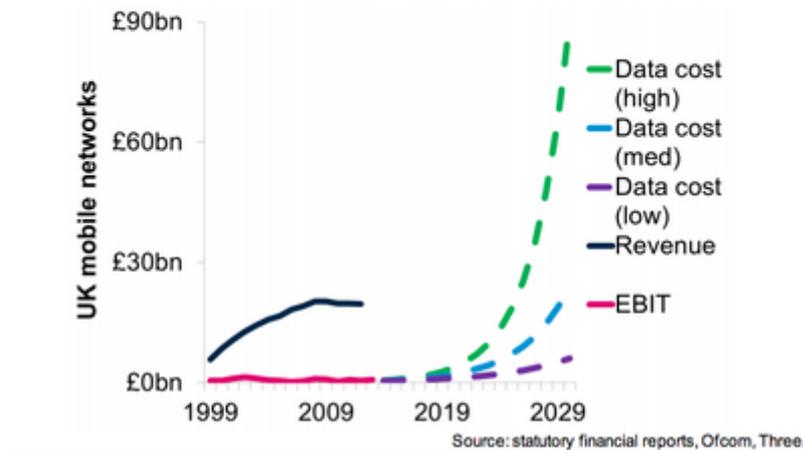
**Moore's Law estimates that processing speeds double every 18 months to two years. What implications does this have for mobile operators' business models?**

Mark Falcon, head of economic regulation at Three UK, told a recent conference that if you assume the cost of providing a gigabyte of data to consumers is £1 or €1, then predicted increases in demand mean mobile operators will be unable to meet that cost in the future.

Falcon has a genuinely valid point which is that people want more and more data but they aren't paying more for it

"It implies a level of cost of many times the industry revenue," he said. "Clearly that is not going to happen unless other factors change the cost structure, or mobile operators find ways to increase revenue."

## Future predicted demand not viable.



He added that political demands for high bandwidth and universal coverage add to these problems. "The cost of providing ubiquitous geographical coverage is like meeting these types of demand forecasts, so again, it's not going to happen, or it can only happen to an incremental extent," he said.

Nick White, executive vice president of the International Telecommunications User Group, asked Falcon whether he had halved the data costs every 18 months for his graph, in accordance with Moore's Law. Falcon said he felt this was unnecessary because economies of scale savings would be offset by the need to install newer, more expensive technology.

"Moore's law no longer applies?" said White. "I have my answer [as to whether Falcon included Moore's Law], so we can draw our own conclusions on whether we should."

## Data does get cheaper

*PolicyTracker* asked various influential analysts what they thought of this discussion. Ian Streule, partner at Analysys Mason, agreed with White that costs went down over time but thought the matter was too complex for a general law. Streule is inclined to think that as mobile data traffic grows and new technologies become widespread within user equipment, the unit cost per megabyte of traffic carried declines.

According to his research, 4G technologies will provide even cheaper data per megabyte than 3G currently does. He also found that mobile data costs have declined rapidly because 3G networks can support HSPA+. However, he also told *PolicyTracker* that it was too complex to apply any hard and fast rule about future costs that would be analogous to Moore's Law.

Streule also found that improvements do not materialise overnight, and that it was necessary to consider spectrum costs. "The cash outlay for additional spectrum and the requirements to make a return on spectrum investments add another layer of complexity to the evolving cost of data on HSPA and LTE networks," he wrote.

## Many caveats

Simon Saunders, director of technology at Real Wireless, told *PolicyTracker* that Moore's Law does mean that the capabilities of wireless technology can advance rapidly over time and has underpinned huge advances in spectrum efficiency. However, it does not mean that the overall cost of delivering a service to a given user necessarily always reduces.

While it helps to reduce the cost per megabyte of the electronics in a wireless network, it "doesn't necessarily go off into infinity and there are those within the wireless chip vendors who are telling us they are starting to see limits in the cost/performance tradeoff".

The best way to meet growing demand for mobile data is by  
building as many small cells as possible

Moore's Law is "fantastic", says Weightless chief executive and IET president William Webb. "Memory goes up and processing power goes up and those are the two things that are in a computer so the performance of the computer pretty much tracks Moore's Law. It's still doing that, although there's much debate over whether it's going to run out of steam. But it doesn't apply directly to radio systems."

Saunders and Webb both said Moore's Law does not solve the problem of power. Twice the number of transistors on a chip means a chip requires twice as much power. Chips also require more power when they work at higher frequencies. This adds to the energy bills both of consumers who need to keep their devices charged, and mobile operators who need to maintain base stations.

Even if you did find a way to make the battery power increase, the device would become twice as hot. "We're already starting to get to the point where laptops and similar devices are running a little bit too hot for comfort in some situations," Webb said.

In any case, the cost of processing data only amounts to a small proportion of the cost of delivering the data to the end user. Saunders told *PolicyTracker* that if the total cost of deploying a new base station is £100,000, then around £10,000 of that will be spent on the base station electronics.

Within that £10,000, only a very small part is the actual processing that is affected by Moore's Law. And in the running costs of the network, big-ticket items such as power and site rental are entirely independent of Moore's Law.

"Moore's Law helps you keep pace with people's expectations that things will go faster and get more reliable over time, and without it we wouldn't make many advances in the wireless industry in terms of our use of spectrum," Saunders said. "But to imagine that Moore's Law allows us to do this with substantially lower overall costs is not the case at all."

## A question of business models

According to Webb, Cooper's Law, the observation that the traffic capacity of wireless networks doubles every 30 months, has mostly held because of shrinking cells. "I'm with Mark on his broad analysis that it's really an issue of economics," he said. "You can deploy as much capacity as you want with current technology, simply by putting it in smaller cells and more of them, but that costs you money."

"It's true that costs go down but Falcon has a genuinely valid point, which is that people want more and more data but they aren't paying more for it," said Aetha Consulting partner Amit Nagpal. He agreed with Webb that meeting growing demand will be an economic rather than a technical question and said that the largest cost per megabyte is the cost of building and maintaining a network. "You need people to maintain the network, and people's salaries don't halve every 18 months," he said.

Satellite and spectrum consultant Tim Farrar of TMF Associates told *PolicyTracker* that the cost of providing each megabyte is "certainly going to fall," but mobile operators are going to have to embrace new business models in order to make it happen. The best way to meet growing demand for mobile data is by building as many small cells as possible.

In order to do this, he said, operators must "shift away from a traditional model of having to pay a lot for a big cell to a tower company to alternative models where you get access to a location much more quickly". He highlighted BT's initiative to use its huge network of home broadband Wi-Fi hotspots as picocells in a cellular-like network using unlicensed spectrum as one example of such a model. •

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# Viewpoint: Three questions "data tsunami" predictions (part II)

May 12, 2014 by Mark Falcon, Head of Economic Regulation, Three

## **PolicyTracker reported recently that Three didn't really believe predictions of exponential growth in demand for mobile data.**

What Three said, at the recent Telecoms Regulation Forum, is that most predictions of mobile data demand ignore basic economics – namely, the cost of building mobile networks and consumers' willingness to pay.

What Three didn't mean is that demand isn't going up. It is. By a lot. This is a great thing for consumers of mobile data, especially if someone else would pay for it all.

But demand for most things would be going up fast if they were free. We would all like a free Ferrari.

And mobile data isn't free either. It's very costly, because it needs lots of expensive spectrum and costly base stations to produce. This is the main reason why the mobile industry makes such low returns on investment.

The best estimate of the underlying cost of mobile data – i.e. including spectrum and network costs – is about £1-£5 (€1.2-€6.1) per GB. Multiply this by the standard industry mobile data growth forecasts and the total figure soon dwarfs total mobile network industry revenues by several times.

So, the mobile industry can't go on buying more spectrum and building bigger networks for ever – that is, not unless costs start to come down (or customers are willing to pay more...)

But policy intervention can help to bring mobile networks' biggest costs down – the costs of spectrum and the costs of renting mobile base station sites.

For example, why does site rental for an electricity pylon cost £100 (€122) a year, but the same space for a mobile base station cost £10,000+ (€12,272+) a year?

Government now expects mobile networks to provide a utility-like service: *ubiquitous* coverage, *always sufficient* capacity and *always on* reliability. So why shouldn't mobile networks have the same rights as utility companies, such as energy networks?

In conclusion, if the "internet everywhere" mobile data tsunami is going to happen, then the industry will need some help from government and regulators to deliver it. •

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