Martin Cave: fibre in Europe

IEP Barcelona, 17 February 2015

Why is Europe slow to get fibre, and why does it matter?

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The views expressed belong to the author alone

agenda

- **The spread of broadband in Europe**
- Superfast and ultrafast broadband: the arrival of fibre
- Does it matter?

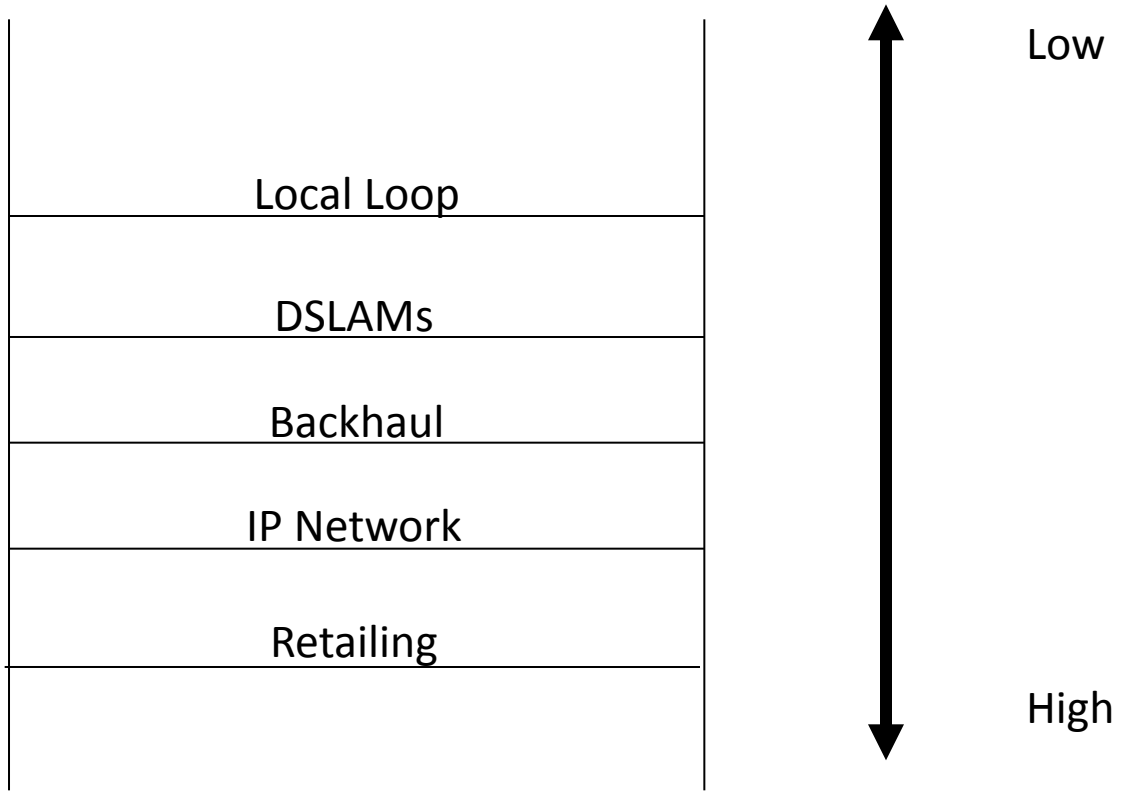
The growth of broadband in Europe

- Between 2000 and 2014, fixed broadband connections per 100 households grew from approx. zero to 83% (DE), 65% (ES), 74% (FR) , 51% (IT), 82% (UK)
- Over the same period penetration of businesses, including SMEs became nearly complete
- Most of this was accomplished using an early 20th century distribution channel, the copper local loop

The regulatory framework in Europe

- This goes back to the liberalisation agenda started in the 1980s in the age of voice
- Key dates:
  - 1998 - liberalisation of service markets
  - 2000 - Regulation on local loop unbundling
  - 2003 - European regulatory framework based on 5 Directives comes into effects, requiring periodic analysis of key markets and application of specified remedies, including mandatory unbundling where there is significant market power. This co-existed with end-to-end competition with cable companies.

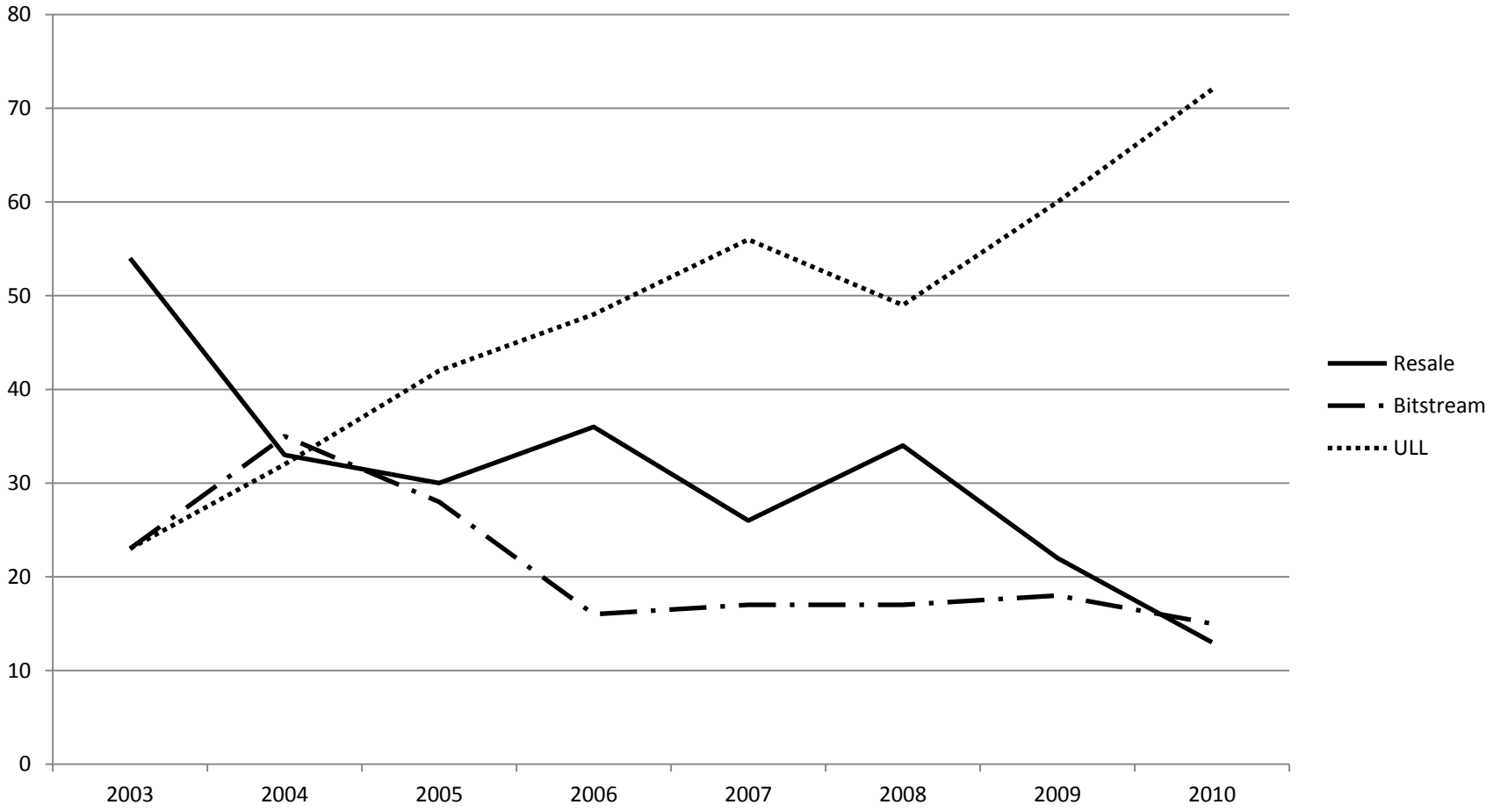
How to unbundle the broadband a value chain, noting the different degrees of replicability involved



The ladder of investment

- The EC and NRAs favoured infrastructure over service competition
- This led them to set access prices which encourage entrants to climb the ‘ladder of investment’: entrants gradually took more responsibility for the service they provided to their customers

The growth of LLU in the EU 15, as a %age of competitive lines



Did unbundling work?

- Hotly debated, but data suggest:

- inter-platform competition is the gold standard, conferring considerable benefits;

- bitstream access by itself produces limited benefits;

- competition based on unbundled loops has generally positive, but not very large results.

- But what is the counterfactual – full duplication or an end-to-end monopoly?

Did the ladder work?

- There is no evidence that users of access products subsequently constructed their own local loops (the ‘long ladder’)
- But, ‘we observe that the development of [bitstream] lines favours the development of [unbundled local loop] lines thereafter. .. In other words, according to our estimation, an increase in bitstream access lines leads to an increase in local loop unbundling lines one year later. We therefore find an empirical support for the ladder-of-investment hypothesis for the short ladder.’ (Bacache et. al 2013)
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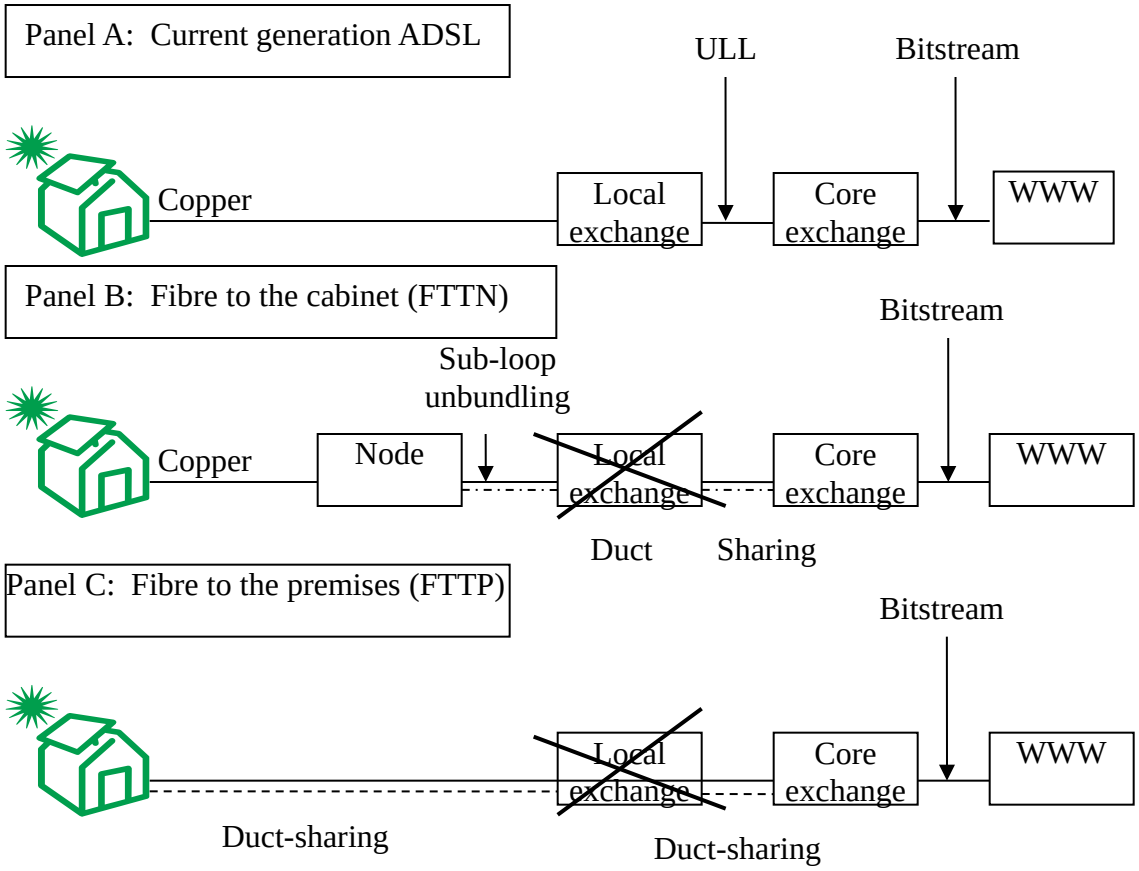
Fibre

- By 2000, fibre had entirely replaced copper in long distance transmission and ‘backhaul’ to local exchanges
- From about 1995, it began to penetrate closer to customer premises, beginning in Japan and Korea, then in later advanced countries, under the name of ‘next generation networks’

Versions of fibre network



NGA regulation in Europe

- Fibre moved up the regulatory agenda in Europe from about 2007
- The EC circulated 2 different drafts of an NGA Recommendation which was finally published in 2010
- It had little effect, and was superseded by a different recommendation in 2013
- This allowed divergences to develop

Policy issue 1: what form of NGA?

- Some MS (DE & UK) have adopted the cheaper FTTC – ‘quick and dirty’ route to fibre, with current speeds up to 50-100 Mbit/sec
- Others (ES, FR, Portugal) have adopted the more expensive, but faster FTTH

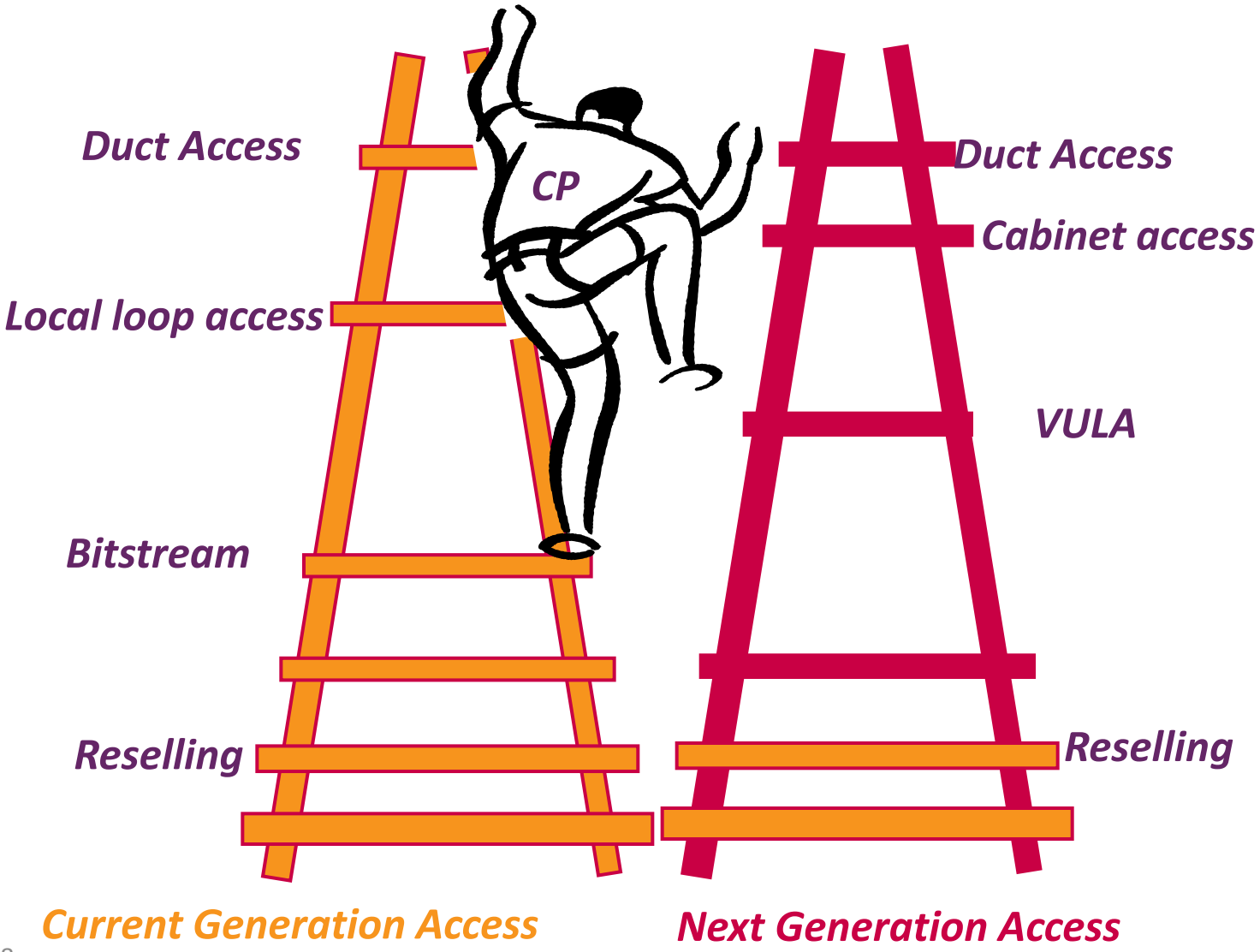
Availability and take-up of superfast broadband (end 2013)

	availability(%)	take-up (%)
DE	70-75	5
ES	60-65	4
FR	45-50	3
IT	20-25	0
UK	80-85	9

Policy issue 2: Is the ladder still relevant?

- FTTC access is often accomplished by a ‘virtual unbundled local access’ or VULA means, which permits service differentiation but gives access further from the customer
- FTTH is available in two forms - point to point, which can be unbundled, or point to multipoint, which cannot presently be unbundled
- The ‘high rung’ option of duct sharing is still available

Switching ladders



Policy issue 3: what access regime?

- Because the copper network was a sunk cost, access to it could be priced almost at will: not so with fibre
- In ‘FTTP countries’, access was restricted to passive assets such as ducts
- The 2013 Recommendation also permitted ‘retail minus’ pricing on certain conditions. This was adopted in the UK, subject to both ex ante and ex post (competition law) scrutiny

Policy issue 4: the price of copper

- In the copper era, broadband prices were controlled via the (low) price of unbundled copper loops
- But these acted as a constraint on fibre investment
- Ideally, the loop price would be high (to keep retail prices high) and low (to make copper unprofitable for incumbents)
- A tax on copper was considered in the UK, but not applies
- In 2013, the EC proposed an averaging up of copper prices

Policy issue 5: public investment

- Many countries have invested in fibre in less commercial areas
- Some have implemented an overall project – Australia wholly with public funding, Singapore via a PPP
- This ‘solves’ the investment problem
- But it does leave a legacy separation problem

‘Superfast’ vs. ‘ultrafast’

- Ways of getting speeds going up to 1 Gbit/sec:

- based on FTTC – new techniques such as vectoring (up to 500Mbit/sec)
- variants intermediate between FTTC and FTTH using very short copper wires (up to 800Mbit/sec)
- FTTH, replacing FTTC
- cable upgrades (to 1 Gbit/sec)
- LTE-Advanced (up to 150 Mbit/sec)

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The European digital agenda targets

Full broadband coverage by 2013

Full coverage with speeds in excess of 30 Mbits/sec by 2020

> 50 % of broadband subscribers get 100 Mbit/sed by 2020

The background hypothesis

- ICT (or broadband) has features of a general purpose or ‘enabling’ technology, affecting nearly all consumption and production activities
- This applies to both producing and using sectors
- Not all of these affects are mediated by transactions: they include ‘external effects’ such as

- better access to market
- new business processes and organisational structures
- more innovation in general, mediated for example by social networks

EU/US ICT comparisons

- Several studies show a higher ICT contribution to labour productivity growth in the US than in Europe, due more to differences in ICT investment, than to lower effectiveness per unit of investment

Yoo's US/EU broadband comparison

High-Speed Access: A far greater percentage of US households had access to Next Generation Access (NGA) networks (25 Mbps) than in Europe. This was true whether one considered coverage for the entire nation (82% vs. 54%) or for rural areas (48% vs. 12%).

- Fiber Deployment: The US had better coverage for fibre-to-the-premises (FTTP) (23% vs. 12%).
- Investment: Other data indicate that the US broadband industry has invested more than two times more capital per household than the European broadband industry every year from 2007 to 2012.
- Download Speeds: US download speeds during peak times (weekday evenings) averaged 15 Mbps in 2012, which was below the European average of 19 Mbps.
- Pricing: The European pricing study reveals that US broadband was cheaper than European broadband for all speed tiers below 12 Mbps. US broadband was more expensive for higher speed tiers

For broadband the scale of these total effects was estimated by the World Bank

'The average growth rate of per capita GDP between 1980 and 2006 was used as the dependent variable and regressed onto the following variables, selected as representative of conditioning variables in the growth literature:

- Per capita GDP in 1980;
- Average ratio of investment to GDP between 1980 and 2006
- Primary school enrolment rate in 1980 (a proxy for human capital stock)
- Average penetration of broadband and other telecommunications services between 1980 and 2006 for developed and developing countries (a proxy for technological progress and the focus of the analysis).

The impact of broadband penetration on GDP

Authors	**Countries**	**Effect on growth of each 10% broadband penetration**
Czernich *et al.*	OECD, 996-2007	0.9-1.5%
Katz &Avila	24 Lat Am countries	0.2%
Gruber & al	EU15, 2003-2006	0.3-0.4%
OECD	EU countries, 1980-2009	1.1%
Gruber & al	EU countries, 2005-11	0.8%

Evidence on the impact of superfast

UK houses with access to superfast broadband are worth 5% more (Ahlfeldt et al.)

Doubling connection speed increases GDP by 0.3% (Rohman & Bohlin)

Positive effect on employment (Forzati & Mattsson)

What do we conclude?

- Fixed broadband has spread fast in Europe, and wireless is following even faster
- The EU has followed a market-based strategy with some divergence across MS
- It lags behind the US (and Asia), but not disastrously so
- There is fairly good evidence of the external economic benefit of broadband in the data up to 2011, justifying some level of public expenditure
- The evidence from superfast and ultrafast is less clear; and firm-level efficiencies may be the major source
- The real European lag is in 'high value' content and applications.