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30 years

Report for BT

International benchmarking report

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Contents

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1. Executive summary

1. In March 2015, Ofcom announced a new strategic review of the UK's digital communications market,[1] the first such review since 2005. As part of its input to this review, BT asked Analysys Mason to provide an independent assessment of key elements of the UK's fixed telecoms market, in particular the established markets for standard *narrowband* and *broadband* services, and the emerging market for *superfast broadband* (in this report, 'superfast broadband' means fixed[2] connections which typically can support a downstream bandwidth of at least 30Mbit/s[3].)

2. This report provides a series of benchmarks comparing these services in the UK with the four other large European countries and a selection of non-European countries that are known for their well-developed fixed broadband markets. The idea in collecting data for these countries was not just to compare the UK with other large European countries, but also to compare it against countries that are often cited as the most advanced in the world. The EU countries covered in this report are France, Germany, Italy and Spain. (We use "EU5" to refer to these countries plus the UK.) The non-European countries in this report are Japan, South Korea and the USA.

3. The report contains factual data up to the end of 2014. For certain benchmarks, we also include Analysys Mason's forecasts to 2020.

4. This report is in part an update of two 2013 reports on superfast broadband[4] and on all fixed-access services.[5]

5. Overall, as can be seen in the figures below, the UK does well on most metrics. It consistently outperforms the other four large European countries and is often competitive against the best-performing countries in the world. Based on our forecasts, we expect this strong performance to continue. More comprehensive tables detailing how the UK is performing relative to the other EU5 markets and how this is expected to change by 2020 can be found in Annex A.

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1 See http://media.ofcom.org.uk/news/2015/digital-comms-review/.

2 This report only considers fixed connections. While some mobile technologies may be able to support peak downstream speeds greater than 30Mbit/s, we do not believe they will be able to provide comparable services to fixed technologies.

3 Fibre-to-the-cabinet (FTTC) may deliver less than 30Mbit/s in some cases, mainly where sub-loop line lengths are too long to support that speed. Ofcom, in its 2014 Infrastructure Report, indicated 3% of UK households could be affected in this way.

4 See http://www.analysysmason.com/UK-broadband-2013.

5 See http://stakeholders.ofcom.org.uk/binaries/consultations/fixed-access-market-reviews/responses/BT_-_Analysys_Mason_report.pdf.

Figure 1.1: Summary of broadband availability and take-up in the UK compared with other EU5 countries, year-end 2014 (1 = best-performing country) [Source: Analysys Mason, 2015]

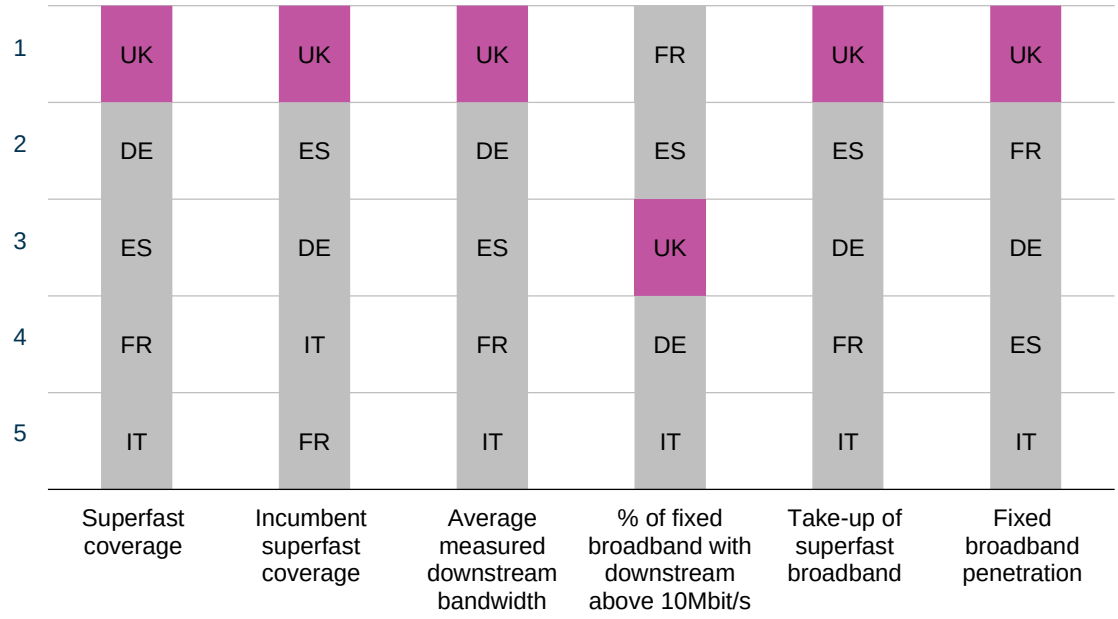


Figure 1.2: Summary of competition in the UK compared with other EU5 countries, year-end 2014 (1 = best-performing country) [Source: Analysys Mason, 2015]

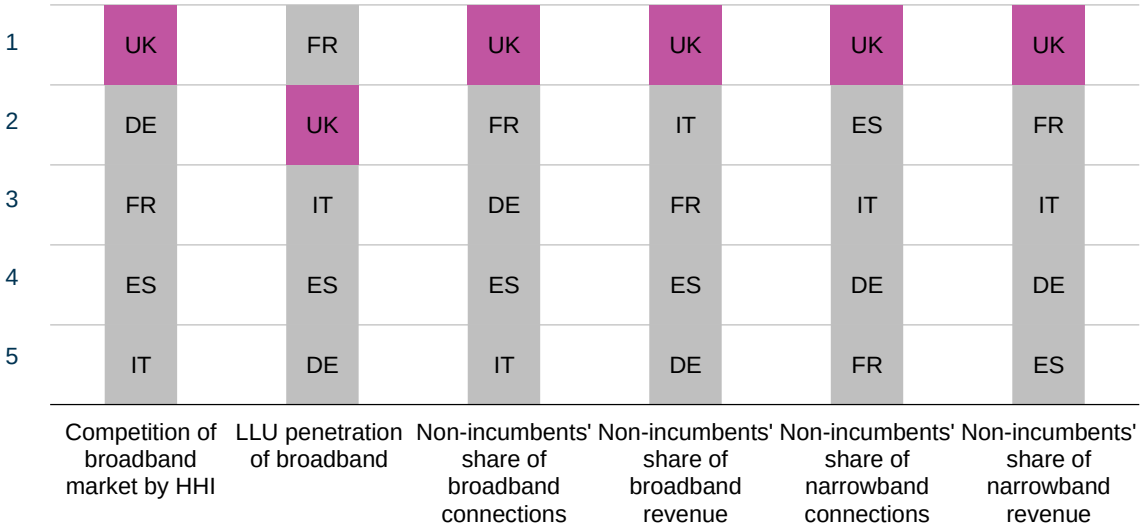


Figure 1.3: Summary of retail and wholesale pricing in the UK compared with other EU5 countries, year-end 2014 (1 = country with lowest prices)[6] *[Source: Analysys Mason, 2015]*

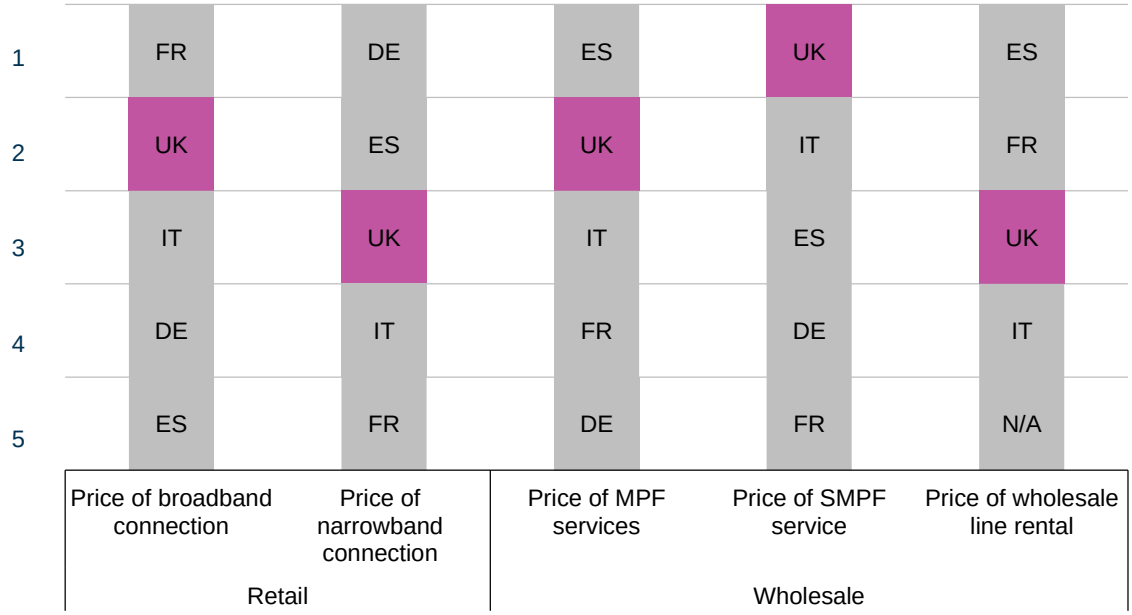
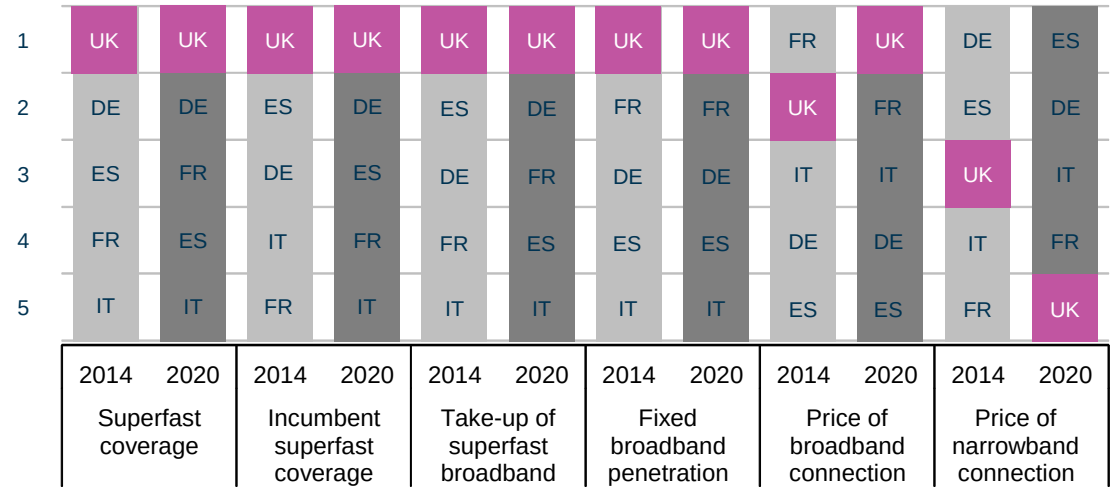


Figure 1.4: Summary of year-end 2014 and expected 2020 position of superfast broadband, broadband and narrowband in the UK compared with other EU5 countries (1 = best-performing country) [Source: Analysys Mason, 2015]



6 Germany does not have an equivalent wholesale line rental product.

6. There is a strong relationship between the different metrics. For example, in a country that has a highly competitive broadband market, as the UK does, retail prices and the retail market share of the incumbent will likely be low, and penetration high. The UK scores well on the key measures of adoption, retail pricing and infrastructure availability as it is a highly competitive country. Competition is also supported by wholesale products that are available for a relatively low price – prices for MPF, SMPF and VULA products in the UK are the lowest or second lowest of the countries surveyed. This provides some comfort that its strong position at the end of 2014 will continue.

7. This report also compares the cost of national broadband plans in the UK with those in other countries that have similar plans. The approach taken in the UK costs less, leverages private-sector capital to a greater degree, and provides extensive coverage of superfast broadband. For example, based on cost per premise passed, the UK government's final funding will be around GBP189 per premise passed, which is lower than Singapore (GBP639 per premise passed) and far less than planned in Australia (GBP2915 per premise passed).

8. As the UK approaches ubiquitous superfast broadband coverage, its lead over the Western European average will decline as other countries catch up. By the end of the decade, we expect all countries in the study to have at least 80% superfast broadband coverage. However, take-up of superfast broadband will be significantly higher in the UK than in most other European markets in 2020 (78% compared with the Western European average of 55%). This higher adoption will largely be a result of the UK rolling out a superfast network earlier and more rapidly than other European countries. The higher adoption levels put the UK in a good position to realise the benefits of using superfast broadband earlier than other countries.

2. Introduction

9. This report provides a series of benchmarks relating to the availability, take-up, level of competition and pricing of superfast broadband, broadband and narrowband services in the UK compared with a selection of countries in Europe, together with other countries that are known for their well-developed fixed broadband networks. The four EU countries covered are: France, Germany, Italy, and Spain (which, together with the UK, are collectively referred to as the "EU5"); the other countries are Japan, South Korea and the USA.

10. In this report, superfast broadband means fixed connections which typically can support downstream bandwidth of at least 30Mbit/s[7].

11. This report is structured as follows:

    - **Availability.** Section 3 compares the coverage of superfast broadband in the UK and benchmark countries, measured downstream bandwidth speeds and the use of public funds to support superfast broadband roll-out. (We do not discuss the availability of broadband or narrowband, as their coverage is assumed to be near-universal.)

    - **Take-up and competition.** Section 4 compares the *penetration* of broadband and superfast broadband products in the benchmark countries, as well as the *level of competition*. (Once again, we do not consider narrowband.)

    - **Pricing**. Section 5 compares the *retail and wholesale prices* for broadband and narrowband services, based on the prices actually paid (i.e. calculated using operators' revenues and numbers of connections) rather than publicly advertised prices. We do not provide pricing information for superfast broadband as revenue and connections data is not available. All prices are shown in GBP. Constant 2014 rates were used for all years (exchange rates used can be found in Annex B).

[7] Fibre-to-the-cabinet (FTTC) may deliver less than 30Mbit/s in some cases, mainly where sub-loop line lengths are too long to support that speed. Ofcom, in its 2014 Infrastructure Report, indicated 3% of UK households could be affected in this way.

3. Availability

12. This section concentrates on the *availability* of *superfast broadband* connections and on the *downstream bandwidth of broadband* connections. We do not discuss the availability of broadband or narrowband connections, as the coverage of these services is assumed to be near-universal.

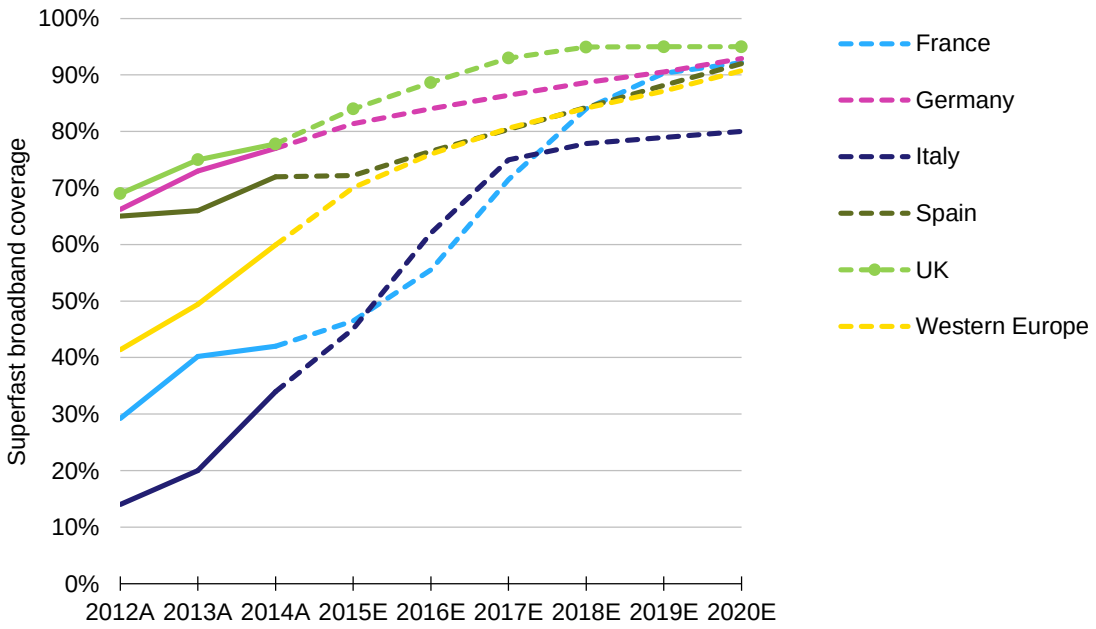
> In terms of the availability of superfast broadband, the UK is ahead of all other EU5 countries. By 2020, we expect the UK to also rank alongside the best-performing non-European countries in the world.

3.1 Overall coverage of superfast broadband

13. In this subsection we illustrate and compare the present and forecast coverage of superfast broadband in the benchmark countries. Our analysis includes all mass-market,[8] fixed-network technologies that can typically deliver downstream speeds of over 30Mbit/s, namely cable (DOCSIS 3.0), VDSL/FTTC and FTTH/FTTB. Figure 3.1 compares the coverage in the EU5 countries, showing the percentage of premises passed by at least one superfast broadband network. Forecasts are based on what Analysys Mason believes to be the most likely outcome, considering operators' stated plans, government initiatives and approved funding.

[8] Leased lines are not considered in this analysis.

Figure 3.1: Coverage of superfast broadband (% of premises passed) including all fixed network technologies, EU5 countries [Source: Analysys Mason,[9] 2015]



14. At the end of 2014, the UK had the highest coverage in the EU5. With nearly 78% of premises passed by at least one superfast broadband network,[10] the UK was nearly 44 percentage points ahead of Italy and outperformed the Western European[11] average by 18 percentage points.

15. By 2020, coverage in the UK will still be greater than in the other EU5 countries, although the UK's advantage over the Western European average will decline to less than 10 percentage points. Even Italy, the country with the least coverage in 2014, is anticipated to have 80% coverage by 2020.

16. Between 2014 and 2018, the UK will enjoy a period in which superfast broadband coverage is higher than most countries in Europe, and at least 10 percentage points greater than the Western European average. Partly as a result of this good coverage, we expect a greater share of premises to adopt a superfast connection by 2020.

17. Looking beyond Europe, at year-end 2014, the UK was still lagging behind the most advanced markets in Asia–Pacific, namely Japan and South Korea, where over 90% of premises were passed by at least one superfast broadband network, as well as the USA which had 85% of premises

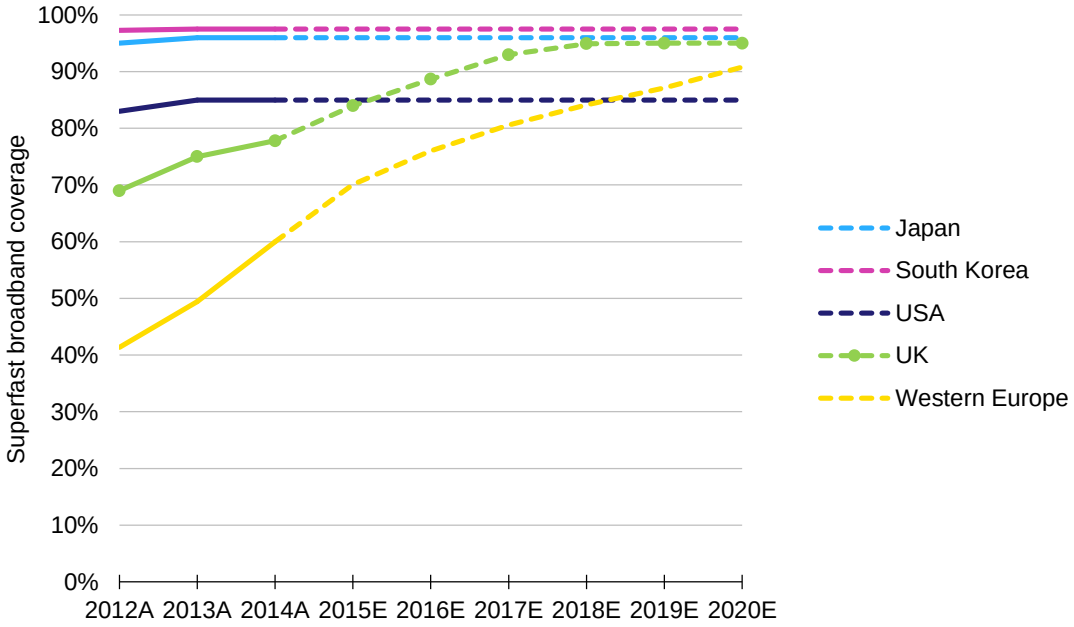
9 Historical and forecast data are based on Analysys Mason's forthcoming report, "FTTx roll-out and capex worldwide: forecast and analysis 2015–2020". The current edition can be found at http://www.analysysmason.com/Research/Content/Reports/FTTx-worldwide-forecasts-Jun2014-RDTW0/#26%20June%202014.

10 As of December 2014, based on Ofcom data, around 78% of UK premises have access superfast broadband networks from both Openreach and Virgin Media. Of those premises, 68% were passed by Openreach's superfast network and 44% passed by Virgin Media's cable network. See http://stakeholders.ofcom.org.uk/binaries/research/infrastructure/2014/infrastructure-14.pdf.

11 This is all countries in Western Europe, not just EU7 countries.

passed.[12] This is shown in Figure 3.2 below. However, as coverage will remain flat in these markets, the UK will surpass the USA in 2015 and approach Japan towards 2019.

Figure 3.2: Coverage of superfast broadband (% of premises passed) including all fixed network technologies, UK and non-European benchmark countries [Source: Analysys Mason,[13] 2015]



18. Considering now the superfast networks of incumbent operators in Europe, BT is one of the incumbents with the greatest share of premises passed (see Figure 3.3 below). Between 2012 and 2014, BT pulled ahead of Telefónica, to have the highest percentage of premises passed by superfast broadband. In 2014, it outperformed incumbents in the other major European markets by between 8 percentage points (Telefónica) and 46 percentage points (Orange), and surpassed the average of Western Europe incumbents by 17 percentage points.

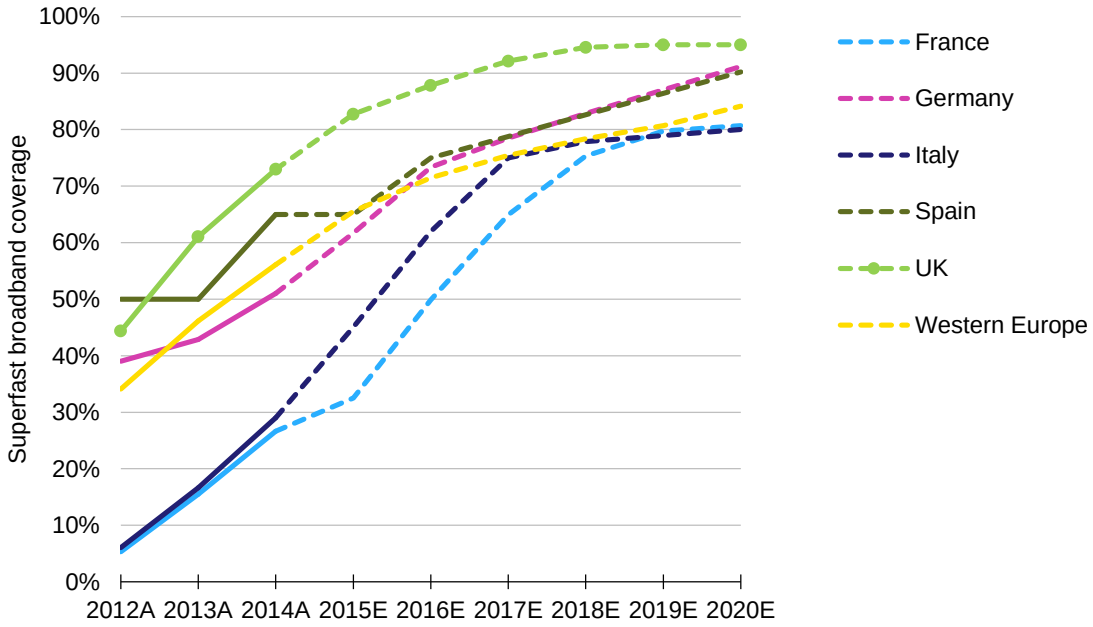
19. We expect BT to be responsible for the majority of superfast broadband coverage needed to achieve the 95% mark set out by BDUK. Apart from the GBP10 million funds to explore solutions to pass the last 5% of UK premises with superfast broadband, there is no finalised funding to attain universal coverage. Accordingly, we have not included any assumptions for the coverage of the final 5%, though we note that the UK has a strong record in achieving coverage plans.

12 The USA projection of around 85% coverage is driven by the cable footprint, which we do not expect to increase materially in size over time. Furthermore, based on announcements from AT&T and Verizon, we do not expect any material rural fibre deployment outside the cable footprint.

13 Historical and forecast data are based on Analysys Mason's forthcoming forecast: "FTTx roll-out and capex worldwide: forecast and analysis 2015-2020". The current edition can be found at: http://www.analysysmason.com/Research/Content/Reports/FTTx-worldwide-forecasts-Jun2014-RDTW0/#26%20June%202014.

20. By the end of 2020, the gap between BT and incumbents in the other EU5 markets will reduce to between 5% (Deutsche Telekom) and 16% (Telecom Italia). The gap with the average Western Europe incumbent will narrow to 12%.

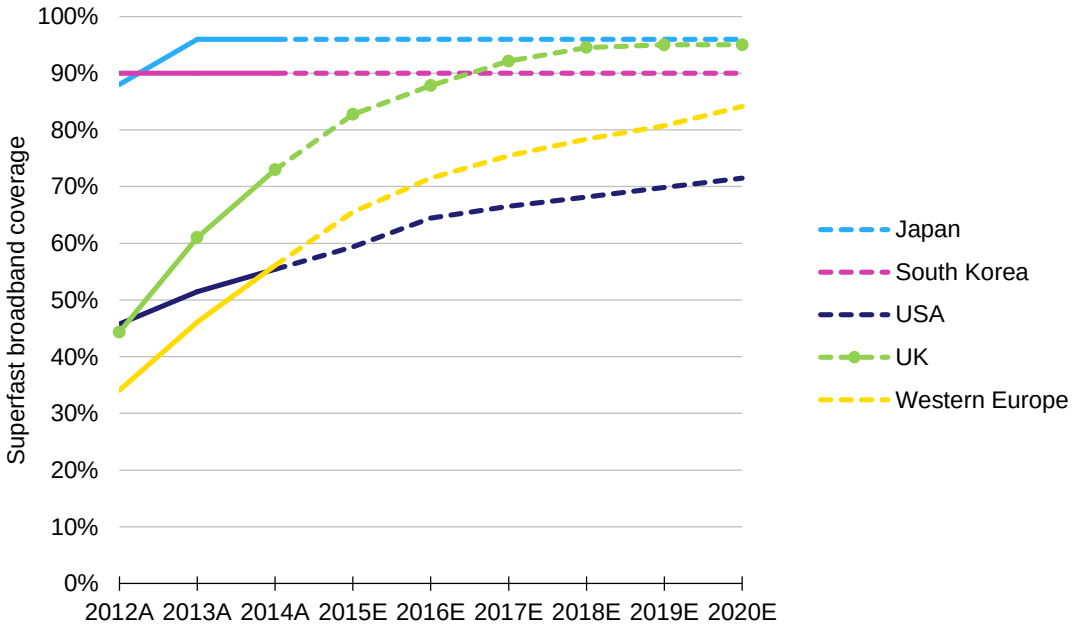
Figure 3.3: Coverage of superfast broadband (% of premises passed) provided by incumbent operators, EU5 countries [Source: Analysys Mason, 2015]



21. The incumbents in Japan and South Korea have had superfast coverage of 96% and 90% respectively since 2013 (see Figure 3.4 below). Given these very high coverage levels, they are unlikely to make much further progress, and BT is set to overtake KT in 2016 and NTT in 2020.

22. In the USA, due to the fragmented nature of its broadband market, the figures for 'incumbent operator' are actually for three players: AT&T, CenturyLink and Verizon. Due to the problems of covering the large rural areas of the USA, the coverage gap between BT and its US counterparts will widen further from 18 percentage points in 2014 to 25 percentage points in 2020.

Figure 3.4: Coverage of superfast broadband (% of premises passed) provided by incumbent operators, UK and non-European benchmark countries [Source: Analysys Mason, 2015]



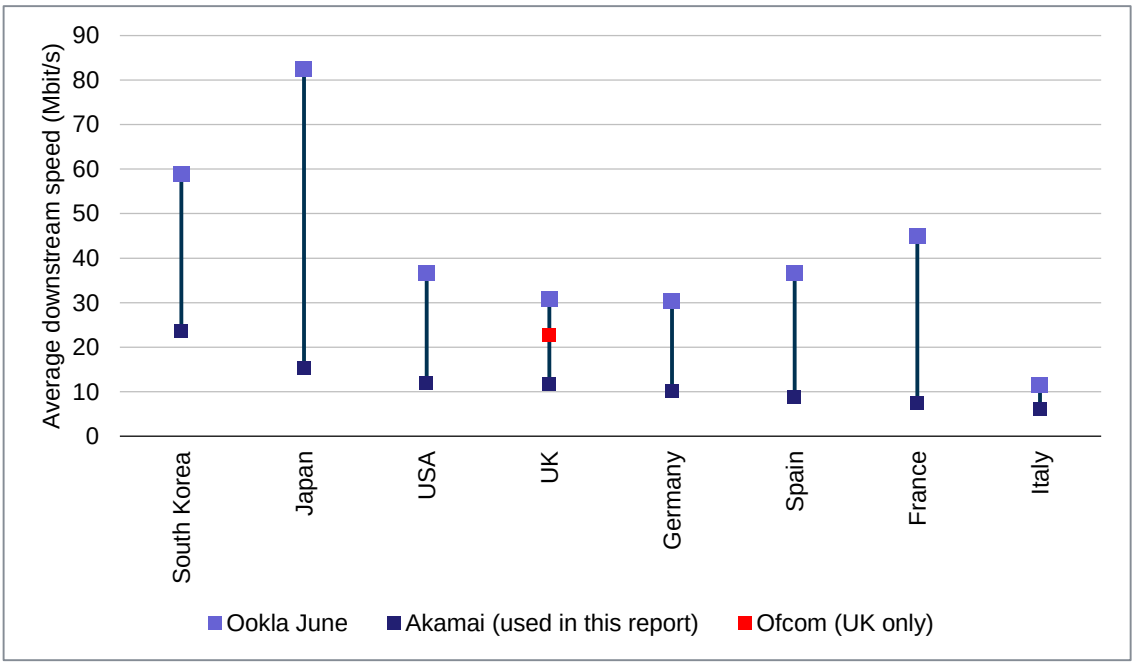
3.2 Average measured downstream bandwidth

23. Producing consistent data on downstream bandwidths is problematic. The EU provides no consistent information, and companies offering information do so using different methodologies and are subject to issues such as sampling bias. The figures available vary widely and need to be treated with some caution. This variation is illustrated by Figure 3.5 below, which shows the average downstream bandwidths in the benchmark countries as reported by Ookla[14] and Akamai.[15] No breakdown is provided for superfast broadband. Downstream bandwidth in the UK is similar to equivalent European markets: Ookla shows around 38Mbit/s, while Akamai shows 11.6Mbit/s. Ofcom's own research suggests a figure for the UK of 22.6Mbit/s, sitting between the results of Ookla and Akamai. (Ofcom does not produce data on other countries.)

14 As of 10 June 2015. The value is a 30-day rolling mean, and thus subject to further changes over time. Ookla's speed data can be found at http://www.netindex.com/download/allcountries/

15 Akamai data taken from the 4Q2014 report "The State of the Internet", available at: http://www.akamai.com/dl/soti/q1-2015-soti-fullreport-a4.pdf.

Figure 3.5: Illustration of the variability of average downstream speed measurements [Source: Analysys Mason based on Ofcom,[16] Ookla and Akamai, 2015]



24. Despite the differences in the figures produced by these sources, some conclusions can be drawn:

    - The relative ranking of the countries is broadly consistent: Italy is the worst-performing country among our benchmarks, and the non-European countries are the best.
    - Regardless of the ranking, the UK's performance is in line with the other EU5 countries.
    - The strong performance of non-European countries is largely due to the higher take-up of superfast broadband, in part because the service has been available for longer.

25. The charts below show the average downstream speeds in the benchmark countries as measured by Akamai (Figure 3.6) and Ookla (Figure 3.7). Based on Akamai's measurements, made at the end of Q1 2015, the UK has the fastest broadband access speed among the EU5.

26. Since the UK has superfast connections available more widely than in most other countries (as shown in Figure 3.1 earlier), it can expect to see speeds improve.

[16] See http://stakeholders.ofcom.org.uk/market-data-research/other/telecoms-research/broadband-speeds/broadband-speeds-november2014/.

Figure 3.6: Average measured downstream speeds in benchmark countries, Q1 2015 [Source: Akamai, 2015]

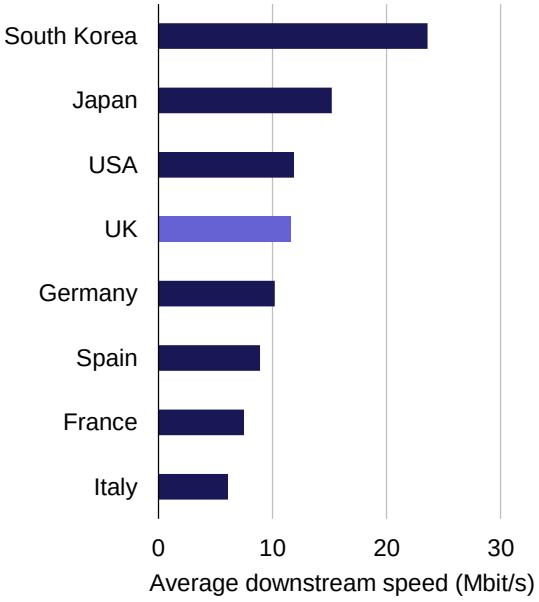
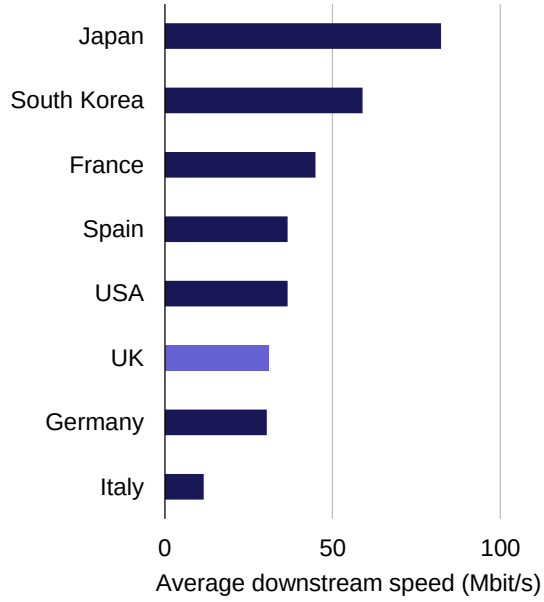


Figure 3.7: Average measured downstream speeds in benchmark countries, June 2015 [Source: Ookla, 2015]



27. Based on the Digital Agenda scoreboard of the European Commission in January 2015, the UK had the third-highest percentage of broadband connections with speeds faster than 10Mbit/s among the EU5 countries, after France and Spain. France may do well on this measure due to the early deployment of ADSL2+ (including in some rural areas, where government support was available).

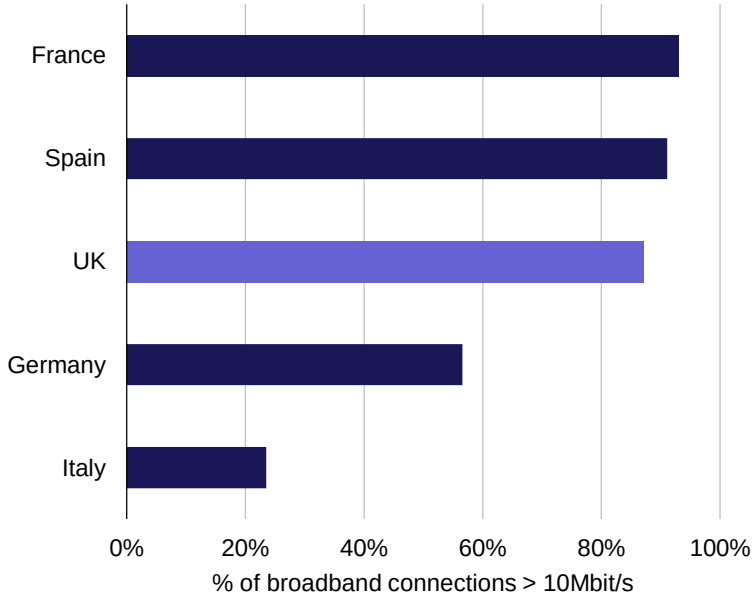


Figure 3.8: Percentage of fixed broadband connections with downstream connections above 10Mbit/s [Source: European Commission, 2015[17]]

[17] See http://ec.europa.eu/digital-agenda/en/download-scoreboard-reports.

3.3 Use of public money to fund superfast broadband

28. Along with the UK government's rural broadband programme, a number of European projects – notably in Germany, Italy, Spain and Sweden (and to a lesser extent, France) – have been granted State-aid approval by the European Commission. Out of the EUR20 billion funding required for these projects, EUR4 billion has already been announced by various government statements, and EUR7 billion remains to be sourced.

29. In 2013, France set ambitious objectives to achieve 100% coverage with ultra-fast broadband by 2022, of which 80% will be achieved using FTTH. In June 2015, Germany received the go-ahead from the EC for EUR3 billion of aid to roll out superfast broadband throughout the country. By comparison, the UK government committed GBP530 million to superfast broadband roll-outs back in 2010, and by March 2015 Broadband Delivery UK (BDUK) had spent over GBP300 million to cover over 2.4 million premises[18] (excluding investment from local authorities). Information on the total scale of projects in other EU5 countries (i.e. the number of homes passed or connected), costs and public funding to be provided is not always available in the public domain, thus comparison with the UK is not straightforward.

30. In addition to these European projects, a number of other high-profile, international projects provide a sense of the scale of investment that governments worldwide are committing to superfast broadband networks:

    - **Australia** – the projected cost of the National Broadband Network (NBN) is AUD41.5 billion (GBP24 billion), of which government funding is capped at around AUD29.5 billion (GBP17 billion). The change of government in September 2013 led to a change in the direction of superfast broadband deployment: instead of the predominantly FTTP approach proposed originally, the strategic review of December 2013 opted for an approach termed Optimal Multi-Technology Mix (OMTM). This includes five access technologies, namely FTTP, FTTN/B, HFC, fixed wireless and satellite, and is intended to minimise peak funding levels and maximise long-term gains. The NBN, however, has been running behind schedule and only managed to pass around 1 million premises with FTTx in the four years from June 2011 to June 2015, out of a target of 7.2 million.

    - **New Zealand** – the government is providing NZD1.35 billion (GBP700 million) of funding for the Ultra-Fast Broadband (UFB) programme. The network will connect up to 75% of premises (around 1.5 million premises) by 2020. The total cost has been estimated at NZD3 billion (GBP1.56 billion). UFB had passed 420 000 premises with 39 510 connections as of June 2014, out of the overall total of 1.39 million broadband connections.

    - **Singapore** – the government is providing grants of up to SGD750 million (GBP375 million) to the OpenNet consortium (led by the incumbent Singtel) to build the Next Generation National Broadband Network (NGNBN). It is providing a further SGD250 million (GBP125

[18] See https://www.gov.uk/government/statistics/broadband-performance-indicator-march-2015.

million) to the operating company Nucleus Connect (led by the cable operator StarHub). The private sector is expected to invest SGD200–300 million (GBP100–150 million). From January 2013, the network was required to meet all requests for fibre connections in the country (i.e. to provide universal service).

- **Japan** and **South Korea** have a long history of providing tax incentives and subsidised loans to stimulate fibre deployment. However, no reliable data is available to allow direct comparison with the above projects.

31. The following two charts compare the government initiatives in Australia, New Zealand and Singapore with those in the UK. In each case we have estimated the government funding as a proportion of the final total investment (i.e. including commercial investment): this figure is an indicator of the intensity of government investment in delivering a superfast broadband outcome – measured here in terms of coverage, although it does not reflect the different technologies that will be used to provide that coverage.

32. The charts show the final expected investment and rollout. If we look at situation in mid-2015, while the network rollout is complete in Singapore, the UK programme has passed 2.4 million premises (at a cost of GBP130 per premise passed), NBN in Australia has passed 1 million (at a cost of AUD8600 (GBP4961) per premise passed). Current data is not available for New Zealand.

33. For the purposes of this comparison, for the UK we have assumed that BDUK's GBP790 million[19] is matched (1:1) by local authority funding. Together with the GBP150 million funds for Superconnected Cities, UK government funding totals GBP1.73 billion. We have assumed that BT will invest an additional GBP500 million,[20] on top of the GBP2.5 billion it has committed to superfast broadband upgrades in commercially viable areas.

19 See http://www.nao.org.uk/wp-content/uploads/2015/01/The-Superfast-Rural-Broadband-Programme-update.pdf.

20 BT has stated that additional investment could rise to GBP1 billion.

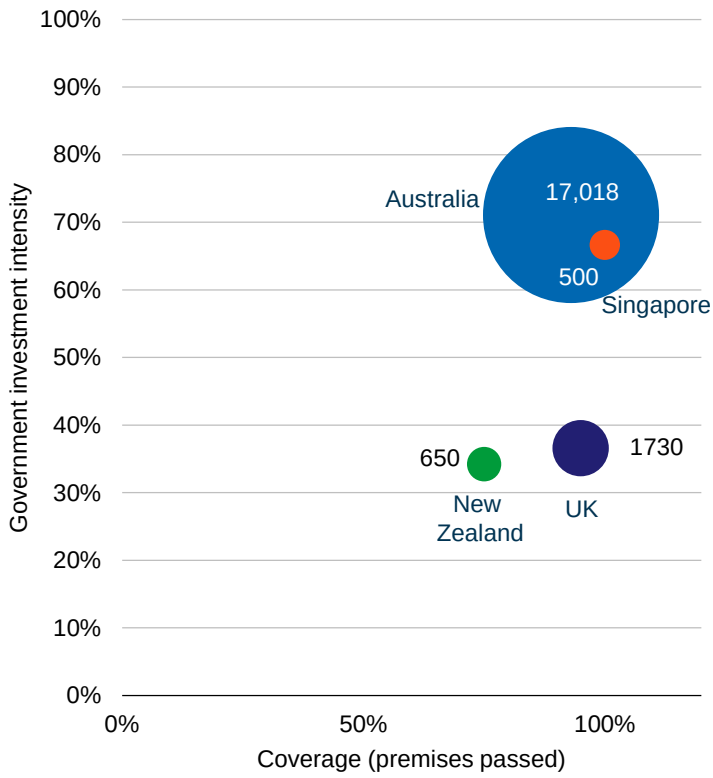


Figure 3.9: Total government funding for superfast broadband in selected countries [Source: Analysys Mason, 2015]

Relative amount of funding is shown as size of bubble, with value in GBP alongside. This is plotted against government funding intensity and coverage

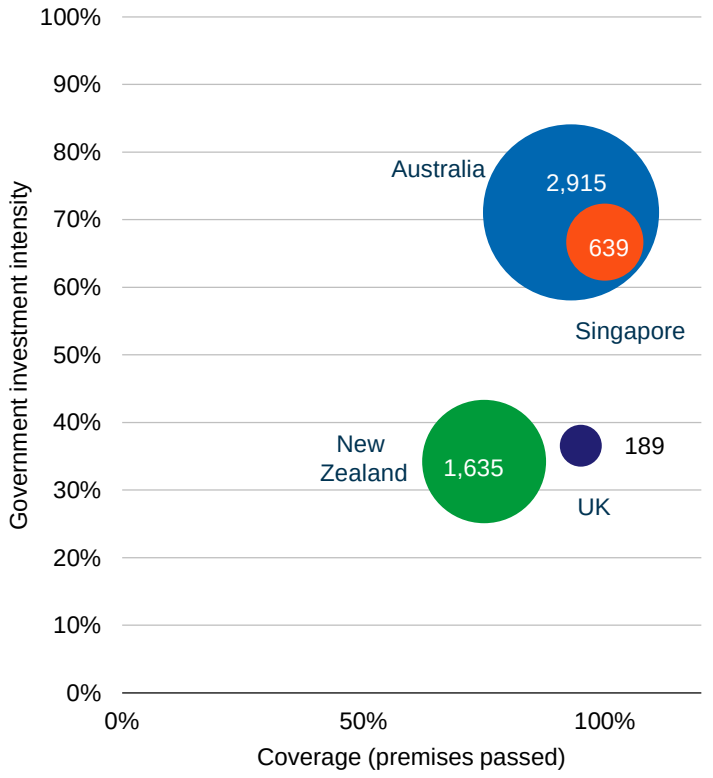


Figure 3.10: Total final expected cost of superfast initiatives per premises passed in selected countries [Source: Analysys Mason, 2015]

Relative cost is shown as size of bubble, with value in GBP alongside. This is plotted against government funding intensity and coverage

34. Unlike the other three countries considered, the UK government's approach has been gradualist, with a focus on rural areas. The strategy adopted in the UK has also had less impact on the market structure: since the other three projects involve significant amounts of FTTH, the impact will be

more far-reaching. The approach taken in the UK costs less, leverages private-sector capital to a greater degree, and provides extensive coverage of superfast broadband.

4. Take-up and competition

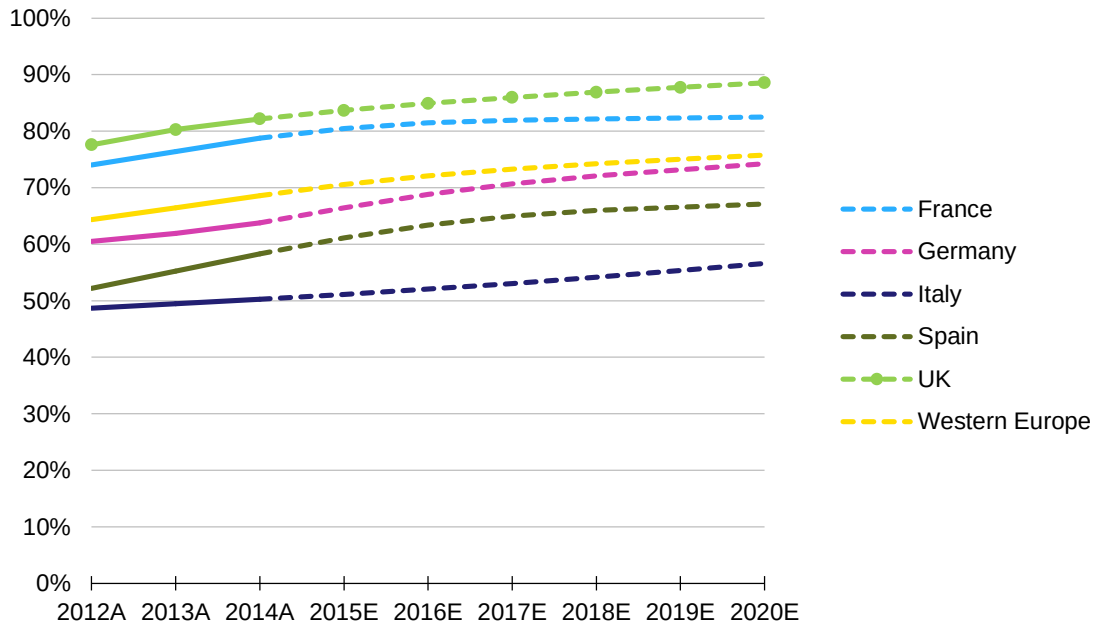
35. This section explores the adoption of broadband and superfast broadband, and the overall level of competition in broadband markets.

> The UK has the most competitive fixed broadband market out of all the countries in this study. Partly due to this strong competition, the UK's adoption of broadband is bettered only by South Korea.
>
> At the end of 2014, the UK was also ahead of the other EU5 economies in terms of superfast broadband adoption. By 2020, we expect that among the benchmark countries only South Korea will have higher penetration of superfast broadband.

4.1 Take-up of fixed broadband

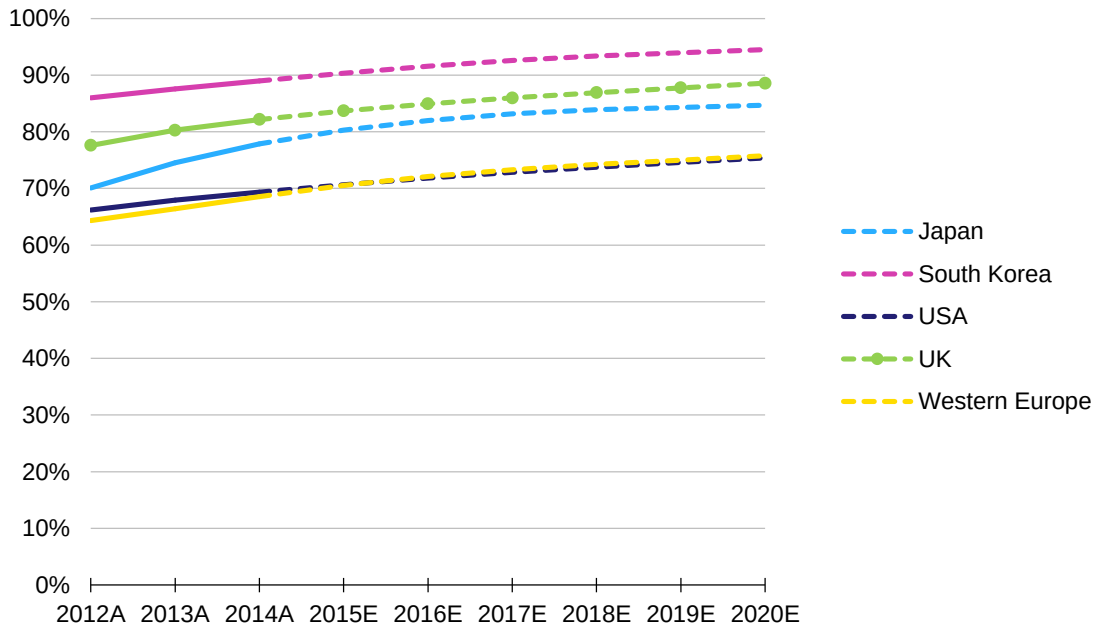
36. The charts below show the percentage of residential premises that have taken up a fixed broadband connection in the EU5 countries (Figure 4.1) and the non-European benchmark countries (Figure 4.2). The figures include all connections provided using ADSL, SDSL, VDSL, FTTP, cable modem and other fixed broadband technologies, as well as dedicated leased connections. Historical data has been used up to 2014, and the forecast for future broadband penetration of residential premises comes from Analysys Mason's regional market reports for 2015–2020.[21]

Figure 4.1: Residential fixed broadband connections as a percentage of total residential premises, EU5 countries [Source: Analysys Mason, 2015]



21 Figures are based on upcoming editions. The current versions can be found at http://www.analysysmason.com/Research/Content/Regional-forecasts-/WE-interim-forecast-16-countries-Dec2014-RDDF0/#11%20December%202014 and http://www.analysysmason.com/Research/Content/Regional-forecasts-/DVAP-interim-forecast-Jan2015-RDRP0-RDDG0/#08%20January%202015.

Figure 4.2: Residential fixed broadband connections as a percentage of total residential premises, UK and non-European benchmark countries [Source: Analysys Mason, 2015]



37. In Europe, overall broadband penetration in the UK was the highest among the EU5 and higher than the Western European average in 2014. Furthermore, the UK's competitive broadband market and affordable prices will help it to maintain its position ahead of the Western European average.

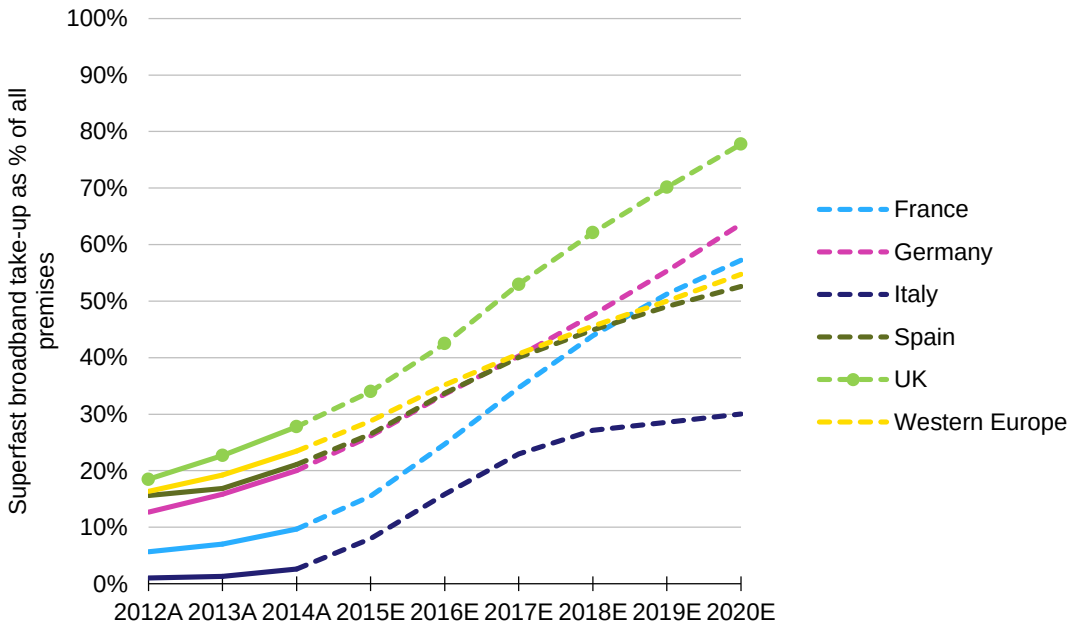
38. By the end of 2020, all EU5 countries except for Spain and Italy will have broadband penetration greater than 70%. We anticipate that close to 90% of UK's residential premises will have taken a fixed broadband connection, compared with the Western European average of 76%.

39. Among the non-European countries, penetration of fixed broadband is lower in the USA and Japan than in the UK, despite the early investment in – and higher coverage of – superfast broadband in those two countries. The average broadband penetration in Western Europe is set to overtake that of the USA in 2016.

4.2 Take-up of superfast broadband

40. As the availability of superfast networks in the UK reaches over 90% of premises after 2016, the take-up of superfast broadband connections is also expected to grow, to reach the highest in the EU5 by 2020 (see Figure 4.3).

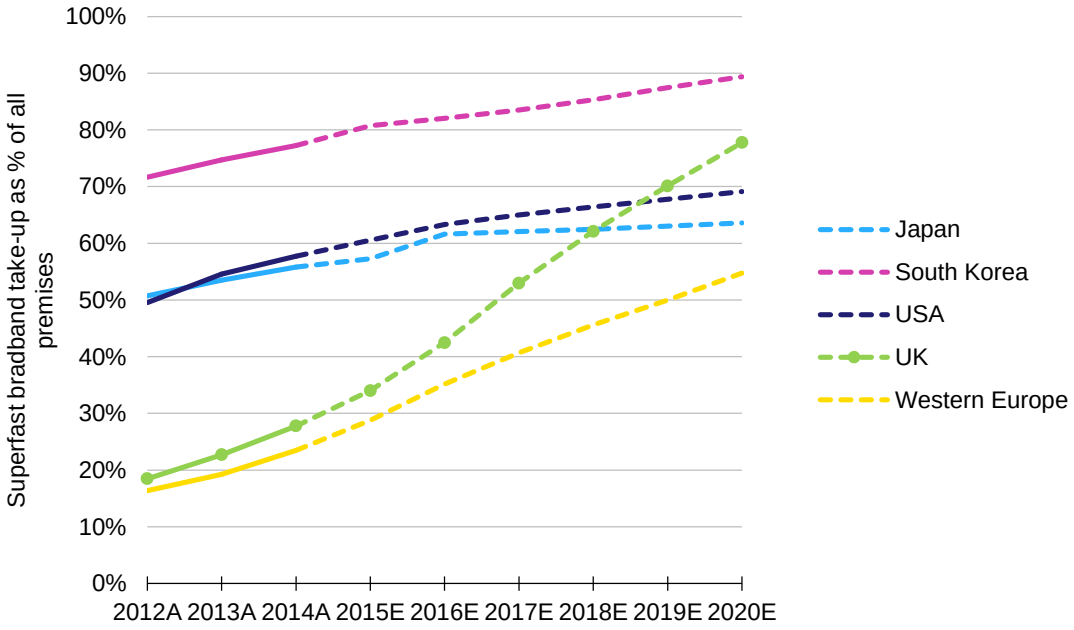
Figure 4.3: Superfast broadband take-up as a percentage of all premises, EU5 countries [Source: Analysys Mason, 2015]



41. We have already seen that by 2020, coverage of superfast broadband in most EU5 countries will converge at over 90% (see Figure 3.1 above). Nevertheless, in terms of actual adoption, the UK is expected to enjoy a significant lead over the other EU5 countries, achieving take-up of 14 percentage points higher than Germany, its closest follower in the EU5, and 48 percentage points ahead of Italy. This higher adoption rate in the UK is due to a very competitive market (see Figure 4.8 below) and the earlier availability of superfast broadband: close to 90% of premises will be passed by 2016, three to four years ahead of most other European markets.

42. Compared with non-European markets (see Figure 4.4 below), take-up of superfast broadband in the UK has lagged behind Japan, South Korea and the USA, largely due to lower levels of availability. However, the UK's adoption rate is expected to grow more quickly than any of these countries, surpassing Japan and the USA in 2018 and 2019 respectively, and coming within 12 percentage points of South Korea in 2020.

Figure 4.4: Superfast broadband take-up as a percentage of all premises, UK and non-European benchmark countries [Source: Analysys Mason, 2015]



43. As an alternative measure, we have used superfast broadband adoption as a percentage of total premises covered by superfast broadband, which yielded similar results. As shown in Figure 4.5 below, by 2020 the UK will have the highest adoption rate in the EU5. In addition to early availability in the UK, competition from cable and other broadband players (and the consequent lower prices) should help to drive take-up.

44. Relative to the non-European benchmarks, by the end of the forecast period the UK is expected to have overtaken all non-European countries except for South Korea (see Figure 4.6 below).

Figure 4.5: Superfast broadband take-up as a percentage of all available superfast connections, EU5 countries [Source: Analysys Mason, 2015]

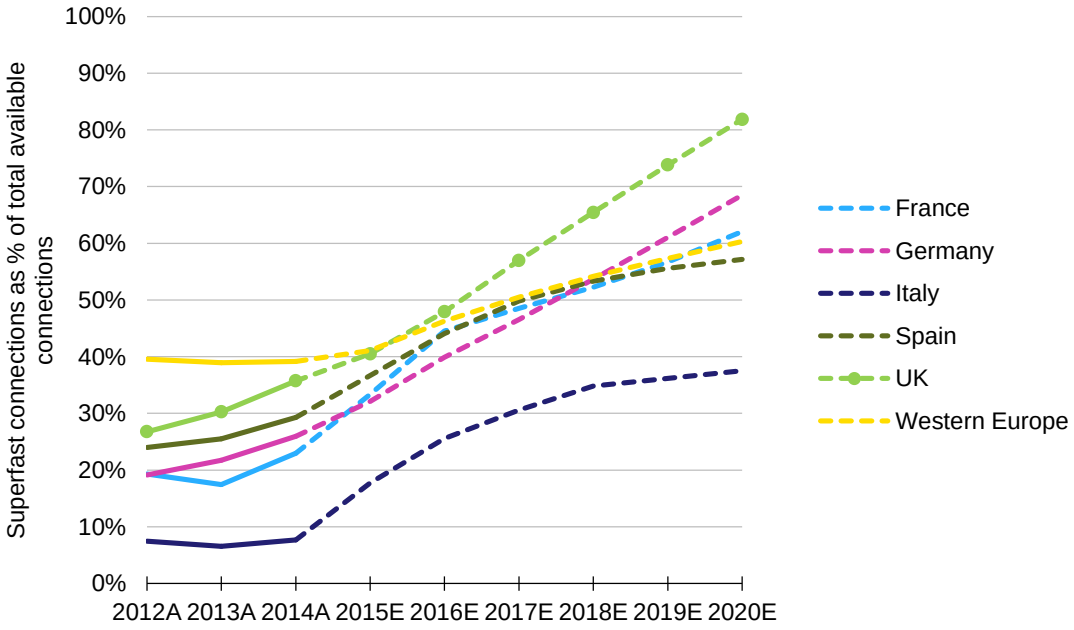
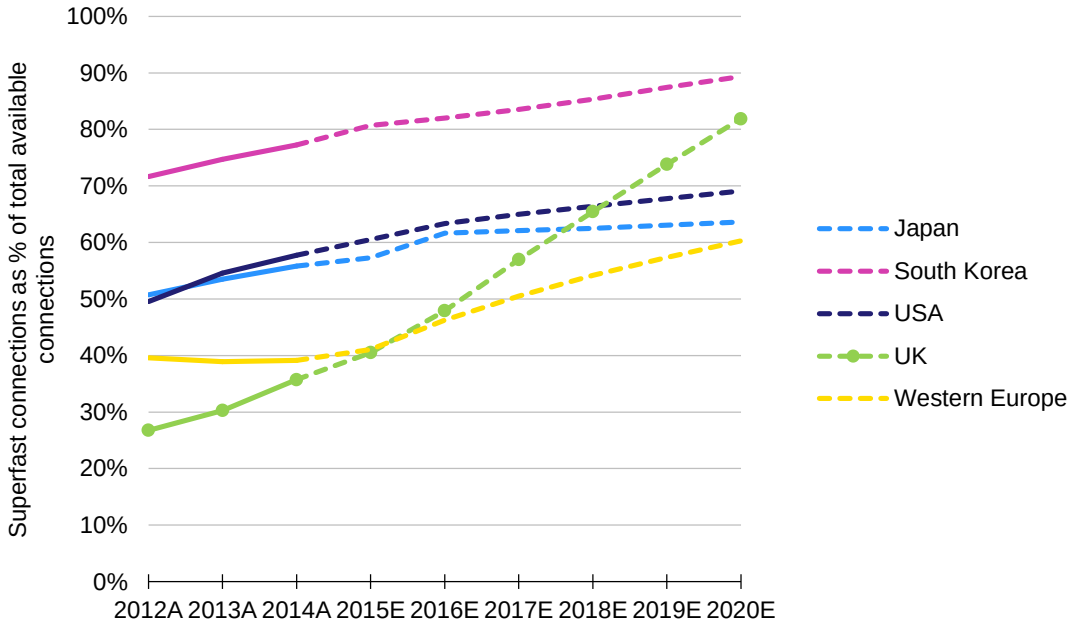


Figure 4.6: Superfast broadband take-up as a percentage of all available superfast connections, UK and non-European benchmark countries [Source: Analysys Mason, 2015]

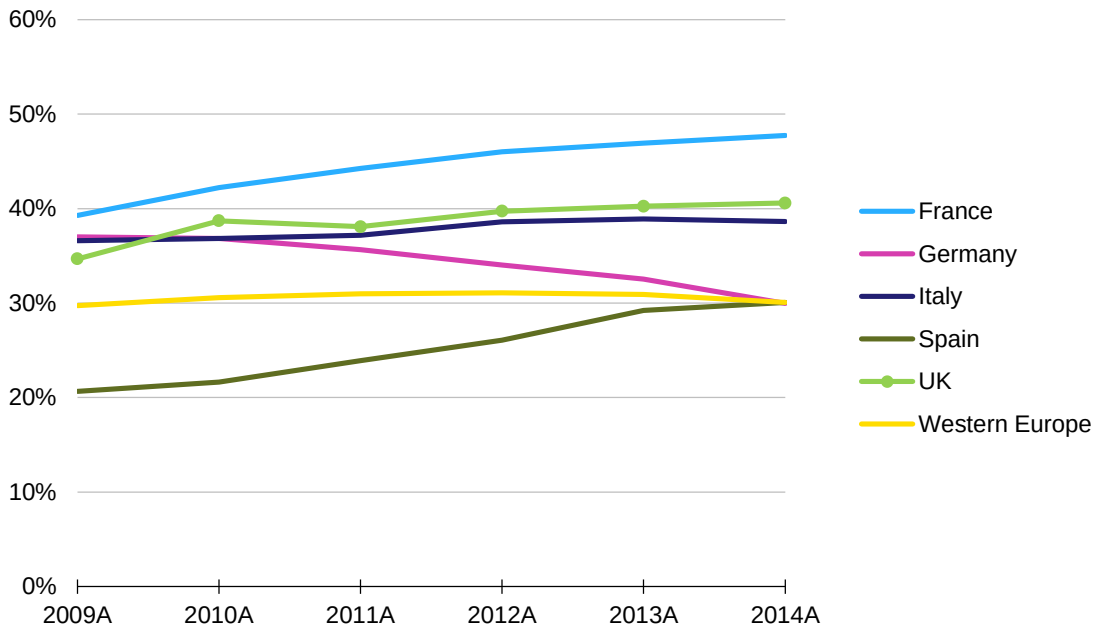


4.3 Unbundled local loop penetration

45. Figure 4.7 shows the percentage of all broadband connections that are provided over unbundled local loops, including all SMPF (shared metallic path facility) and MPF (metallic path facility)

connections, or their local equivalents. The chart illustrates the level of success of unbundling in each market. Historical data has been used up to Q4 2014, from Analysys Mason's report *Telecoms Market Matrix 4Q 2014*.[22]

Figure 4.7: Total unbundled local loops as a percentage of all broadband lines, UK and selected other European countries [Source: Analysys Mason, 2015]



46. The percentage of local loop unbundling (LLU) has stabilised at around 30% on average across Western Europe. The UK exhibits the second-highest LLU percentage among the EU5, behind France. After a slight dip in 2011 it edged above 40% by the end of 2014. A mix of factors contribute to the rise of LLU in the UK, most notably alternative operators such as Sky and TalkTalk gaining market share then transferring these connections to unbundled loops. France has a higher LLU percentage due to its policy of promoting unbundling to increase infrastructure competition.

4.4 Intensity of competition in fixed broadband

47. In order to assess the competitive intensity in the EU5 and Asia–Pacific benchmark countries, we have compiled and compared the Herfindahl–Hirschman Index[23] (HHI) – see Figure 4.8. Note that since we do not have market data specifically for superfast broadband, we have instead used figures for the *overall* broadband market.

22 See http://www.analysysmason.com/Research/Content/Data-set/TMM-WE/#20%20April%202015.

23 The HHI is calculated by squaring the market share of each operator in a market and summing the results.

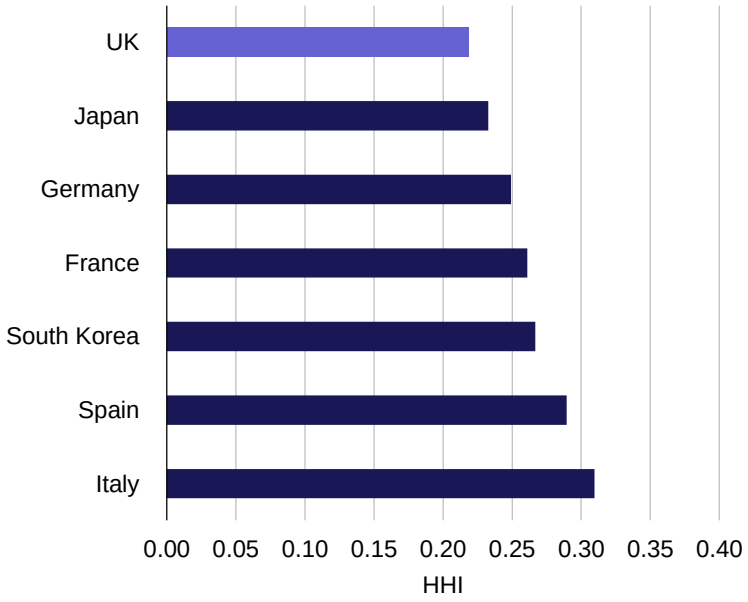


Figure 4.8: Broadband competition in the UK and selected countries in 2014, measured in terms of the HHI[24] *[Source: Analysys Mason, 2015]*

48. This analysis shows that the UK is the most competitive fixed broadband market of all in this study.[25] As well as having four major fixed broadband providers (BT Retail, Virgin Media, Sky and TalkTalk), the UK has an abundance of smaller operators, such as Zen Internet, which continuously exert price pressure on larger operators.

49. The HHIs of the countries analysed suggest that a mix of government focus, regulatory intervention and availability of cable networks is conducive to a highly competitive fixed broadband market.

4.5 Incumbent's share of retail broadband

50. In this subsection we look at incumbent operators' share of broadband connections and revenues.

51. We have first analysed each incumbent's market share of total fixed broadband connections, including ADSL, SDSL, VDSL, FTTP, cable modem and other fixed broadband. For the EU5, historical data has been taken from Analysys Mason's report *Telecoms Market Matrix 4Q 2014*. For non-EU countries, data is based on company reports and regulator data. These charts only include historical data, as Analysys Mason does not forecast market shares for individual operators.

52. As shown in Figure 4.9, relative to the other EU benchmarks BT ranks lowest in terms of fixed broadband connection market share at just 31.4% at year-end 2014, nearly 10 percentage points below the Western European average of 42%.

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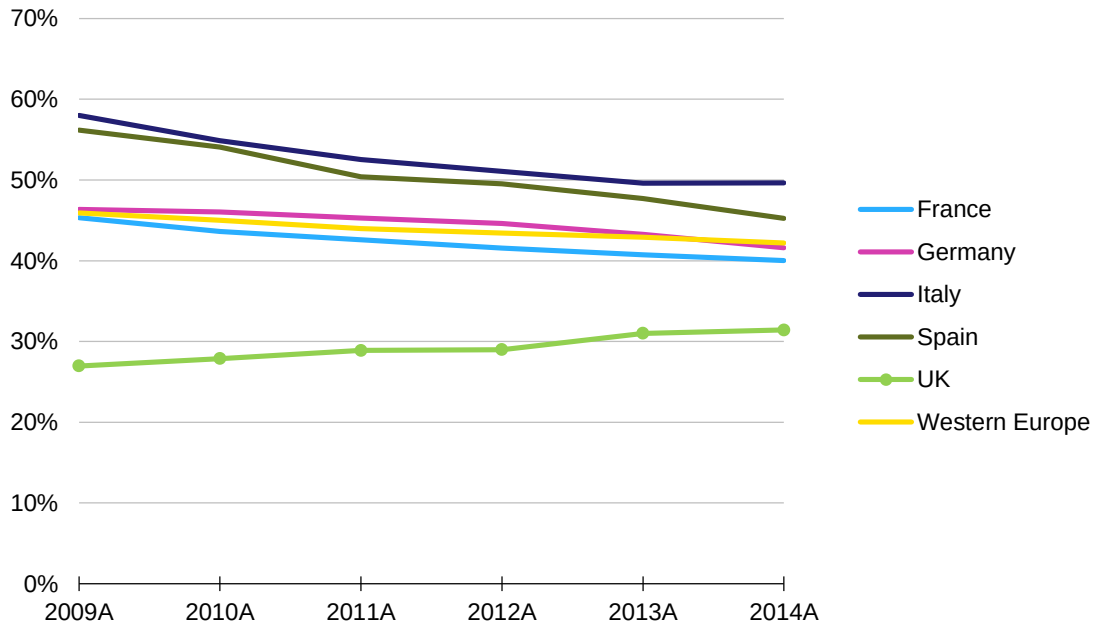
24 For the UK, subscribers to Plusnet are counted as BT subscribers.

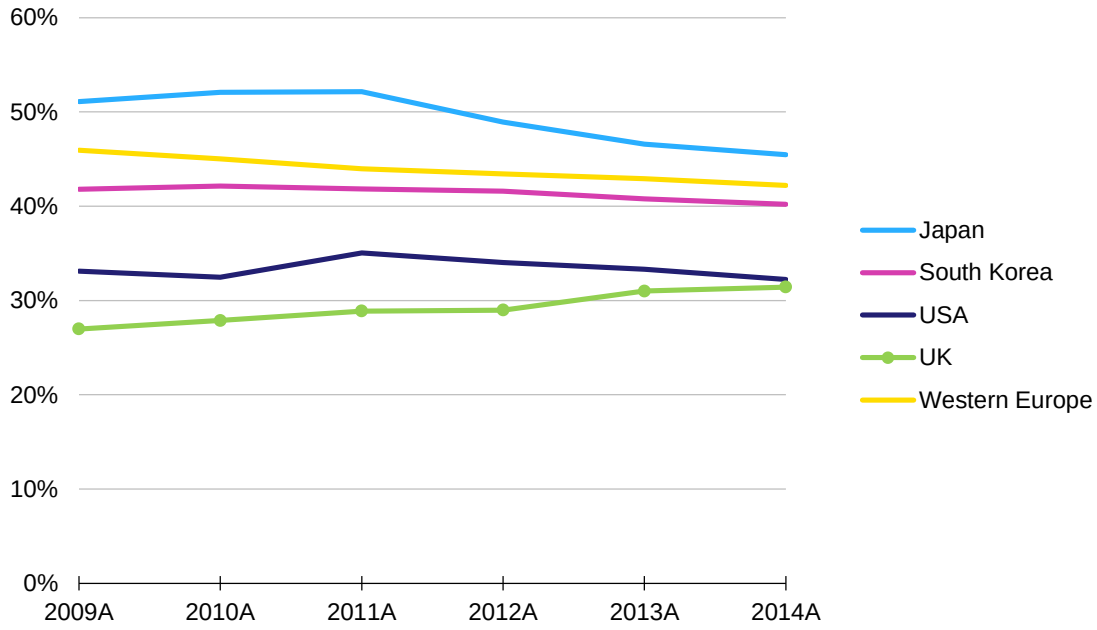
25 The USA does not provide a suitable benchmark as its market structure is different from that in the UK and other EU countries.

Figure 4.9: Incumbent's retail fixed broadband market share as a percentage of total fixed broadband connections, EU5 countries [Source: Analysys Mason, 2015]



53. Compared with non-European countries (see Figure 4.10 below), BT has the lowest connection market share, while the other incumbents have similar market shares as in Europe. (Note that once more the figures for the USA come from three players: AT&T, CenturyLink and Verizon.)

Figure 4.10: Incumbent's retail fixed broadband market share as a percentage of total fixed broadband connections, UK and non-European benchmark countries [Source: Analysys Mason, 2015]

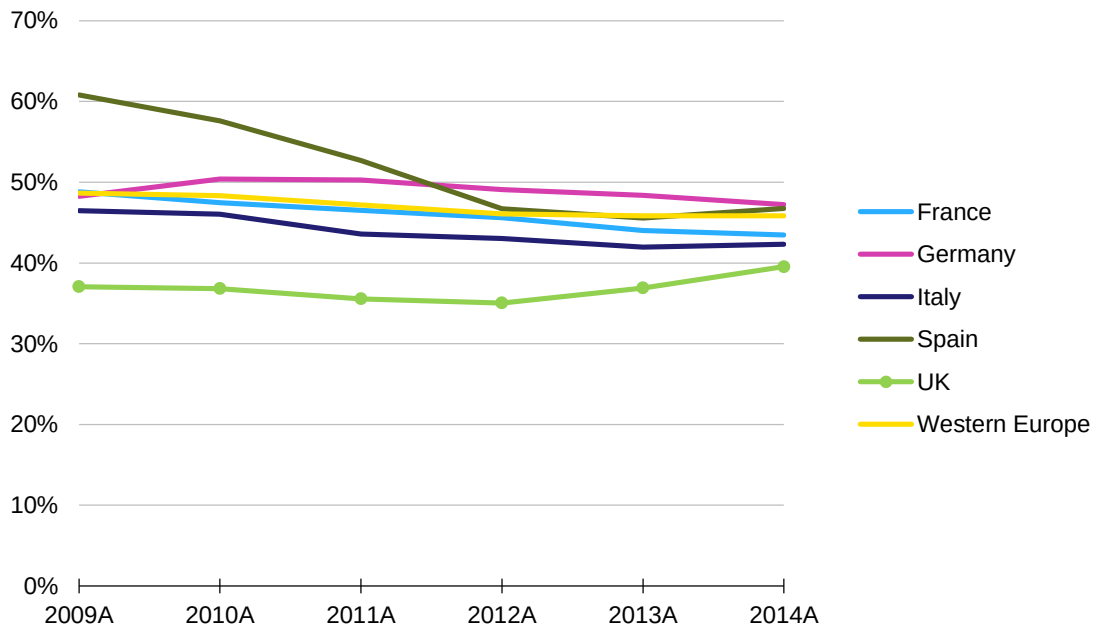


54. We have also analysed incumbents' fixed broadband retail *revenue* as a percentage of the total revenue for fixed broadband retail in the market (defined as ADSL, SDSL, VDSL, FTTP, cable modem and other fixed broadband services). For EU5 countries, historical data has been taken from Analysys Mason's report *Telecoms Market Matrix 4Q 2014*. Data for non-EU countries comes from operator and regulator reports. Note that these charts only include historical data, as Analysys Mason does not forecast market shares for individual operators.

55. As shown in Figure 4.11 below, incumbent operators in almost all EU5 markets have less than 50% of broadband retail revenue. BT had the lowest share from 2009 to 2014, although it increased slightly starting from 2013 to reach almost 40%. This increase is likely to be due to the decision by BT Retail to enter and promote the superfast broadband ahead of its main competitors.

56. No data is available on the incumbent's share of fixed broadband retail revenue in the non-European benchmark countries.

Figure 4.11: Incumbent's broadband retail revenue as a percentage of total broadband retail revenue, EU5 countries [Source: Analysys Mason, 2015]



4.6 Incumbent's share of retail narrowband

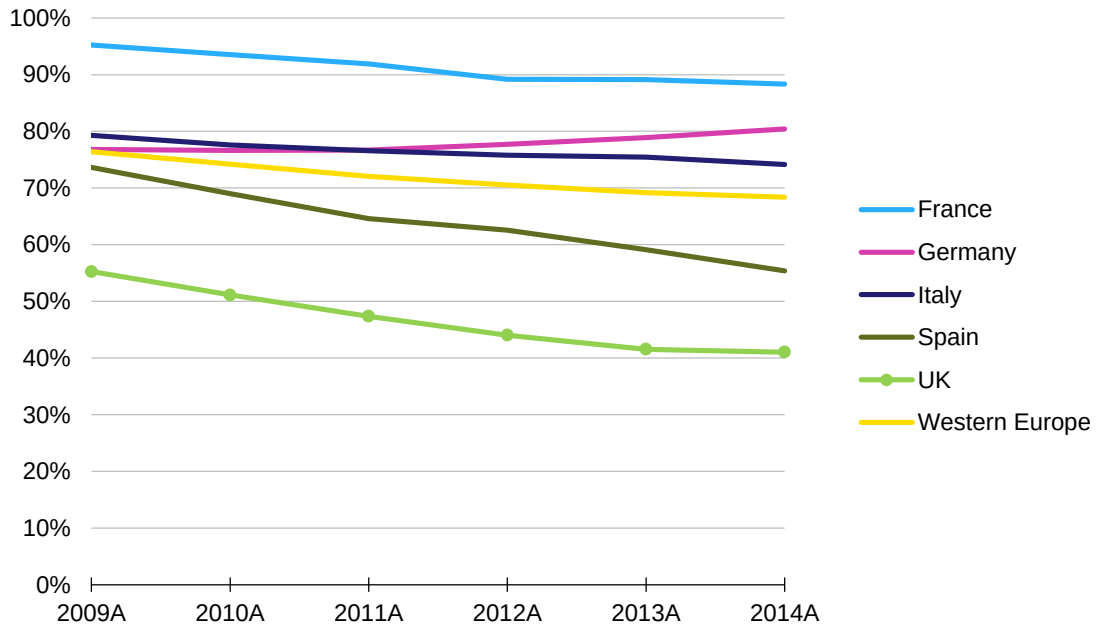
57. This subsection looks at incumbent operators' share of narrowband *connections* and *revenues*.

58. Figure 4.12 below shows European incumbents' narrowband retail connections as a percentage of total narrowband retail connections (defined as PSTN and ISDN, including non-VoIP cable telephony). BT Retail's share of total narrowband connections fell steadily from 55% in 2009 to 42% in 2013, then stabilised at around 41% by year-end 2014. It has the lowest share of connections among all EU5 incumbent operators, most of which have shares of over 70% (while

Orange in France commands nearly 90%). BT Retail's share is also more than 27 percentage points lower than the Western European average of 68%.

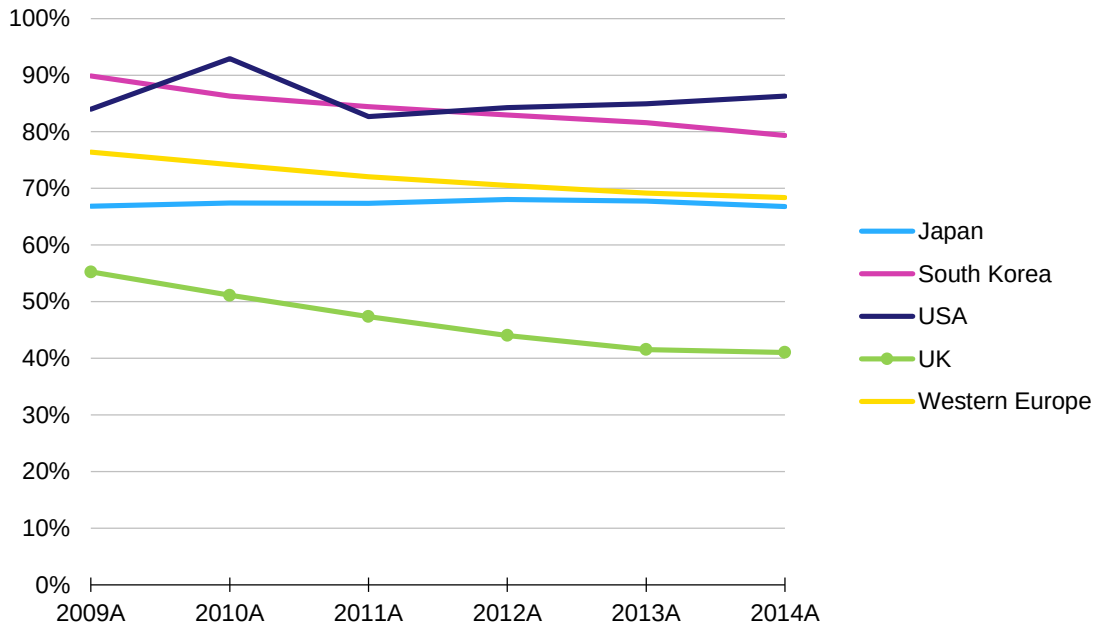
59. The reason behind BT's much lower share of narrowband retail connections is the high level of competition in the UK from alternative operators using full LLU to provide voice and broadband services.

Figure 4.12: Incumbent's share of narrowband retail connections, EU5 countries [Source: Analysys Mason, 2015]



60. Turning to the non-European countries, Figure 4.13 shows incumbents' narrowband retail connections as a percentage of total narrowband retail connections. Historical data has been used up to 2014, from Analysys Mason's *Developed Asia–Pacific telecoms market: interim forecast update 2014–2019*.

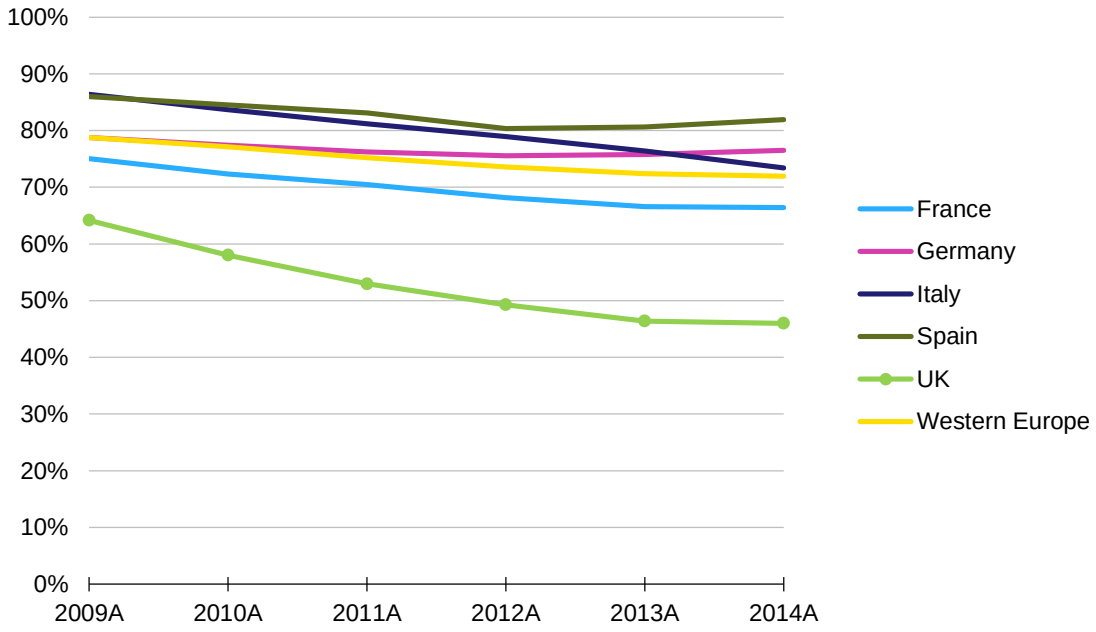
Figure 4.13: Incumbent's share of narrowband retail connections, UK and non-European benchmark countries [Source: Analysys Mason, 2015]



61. Incumbents in these countries hold shares of total narrowband retail connections similar to Western Europe incumbents. (Note that, as before, the data for the 'incumbent' in the USA includes AT&T, CenturyLink and Verizon.)

62. Looking now at revenues, Figure 4.14 shows European incumbents' narrowband retail revenues as a percentage of the total narrowband retail revenue in the market (defined as PSTN and ISDN, including non-VoIP cable telephony).

Figure 4.14: Incumbent's share of narrowband retail revenue, EU5 countries [Source: Analysys Mason, 2015]



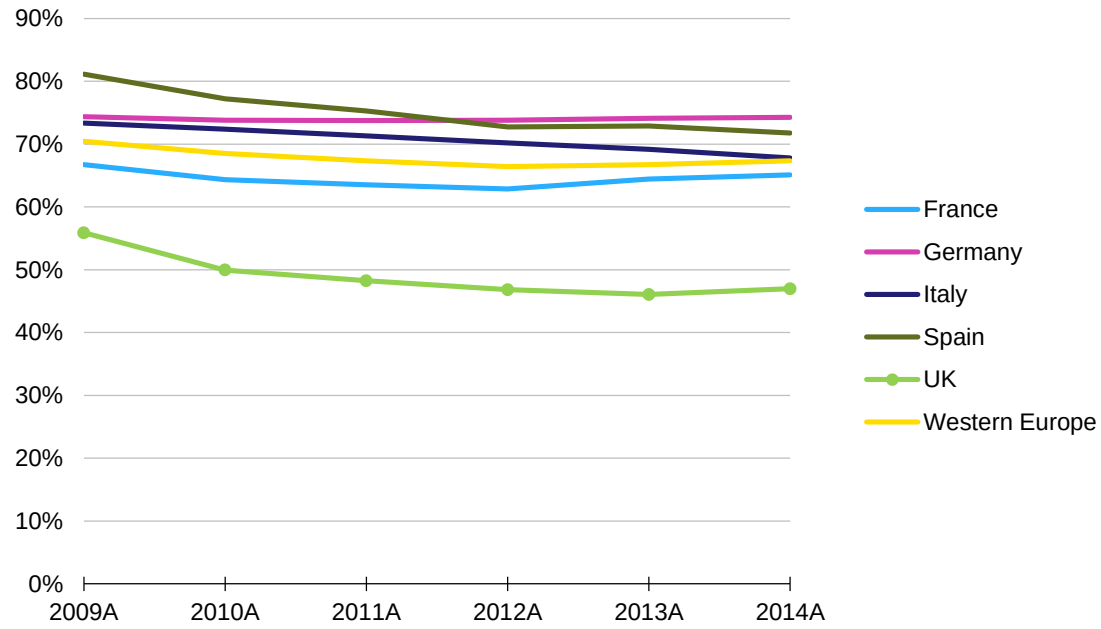
63. Between 2009 and 2014, BT Retail's share of narrowband revenues declined by nearly 10 percentage points, falling from 56% in 2009 to 47% in 2014. This is much lower than the market shares of incumbents in the other EU5 countries, the majority of which exceed 70%.

64. It is noteworthy that BT Retail has the lowest share while Orange in France holds the highest share (88%). Underlying this difference is the different choices made by local loop unbundlers between PSTN and VoIP. Local loop unbundlers in France tend to use VoIP as opposed to PSTN to deliver voice services, while competitors of BT Retail, such as Sky and TalkTalk, use full LLU to deliver PSTN-based voice and broadband services.

65. Figure 4.15 below shows European incumbents' revenues from narrowband access and calls. BT Retail's share fell steadily from 56% in 2009 to 46% in 2013, and then rebounded slightly to 47% at year-end 2014. As with the preceding narrowband metrics, BT Retail's revenue share is the lowest among EU5 incumbents, and the only one to fall below 50%: the bulk converges around 70%, and the Western European average is 67%.

66. Across EU5 markets, incumbents' shares of revenue from narrowband *access* and *calls* are lower than those from narrowband retail, because alternative operators carry an ever-larger proportion of voice traffic: in the UK, for example, the share of voice traffic carried by alternative operators rose from 57% in 2009 to 62% in 2014. Similar data for non-European benchmark countries is not available.

Figure 4.15: Incumbent share of retail revenue from narrowband access and calls, EU5 countries [Source: Analysys Mason, 2015]



5. Pricing

67. This section explores the retail and wholesale prices paid for broadband and narrowband connections. Separate prices paid for superfast broadband are not provided as supporting data is not available, though data on superfast is incorporated in the overall price information.

> Retail broadband prices in the UK are among the lowest in Europe, while for narrowband, prices are in the middle of our EU5 benchmarks.
>
> For wholesale products (i.e. VULA, MPF, SMPF and WLR), the UK's prices range between the lowest available and the European average.

5.1 Fixed broadband prices

68. To generate the results in this section we have calculated revenue per line based on the average number of connections and total revenues for each period. We believe this approach should be more representative of prices paid than advertised prices as it incorporates any discounts or promotions. Competitive markets are more likely to offer introductory promotions and below-the-line discounts as well as to waive installation and equipment fees. All these promotions result in consumers paying less than the advertised price.

69. We have considered the average monthly retail revenue per fixed broadband connection, using all fixed broadband technologies (ADSL, SDSL, VDSL, FTTP, cable modem and other fixed broadband connections). Historical data has been used up to 2014, and the forecasts come from Analysys Mason's regional market forecast reports. (Note that revenue per connection figures do not include any line rental costs that may be charged in addition.)

70. Figure 5.1 shows that an average broadband connection in the UK costs GBP15.11 per month, the second lowest among the EU5 and GBP1.70 lower than the Western European average. The relatively low prices in the UK are consistent with the high adoption levels and strongly competitive market observed in previous sections. Monthly broadband bills for the UK and the other EU5 markets lie in a very close range.

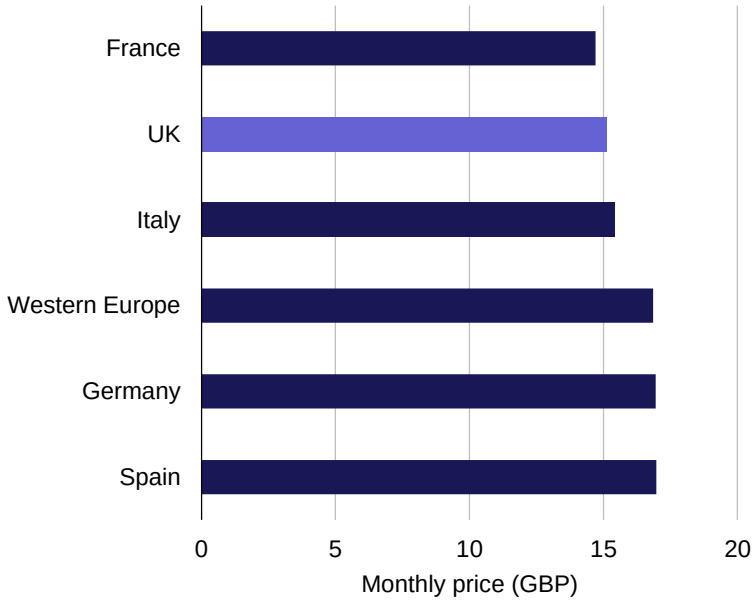
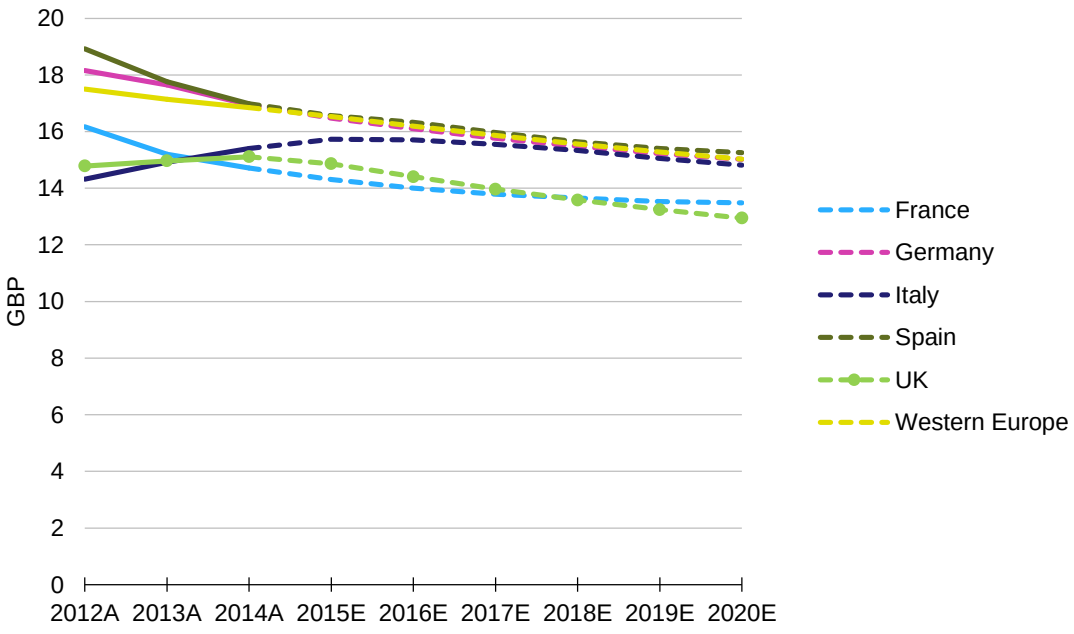


Figure 5.1: Monthly broadband revenue per connection in the EU5 countries in 2014 [Source: Analysys Mason, 2015]

71. Figure 5.2 shows Analysys Mason's forecasts for the evolution of broadband revenue per connection up to 2020. As can be seen, the UK is expected to replace France as the country with the lowest broadband revenues per connection (i.e. reflecting the lowest prices overall). The consistent trend across all EU5 countries shows that competitive conditions in the broadband market will continue to exert downward pressure on prices.

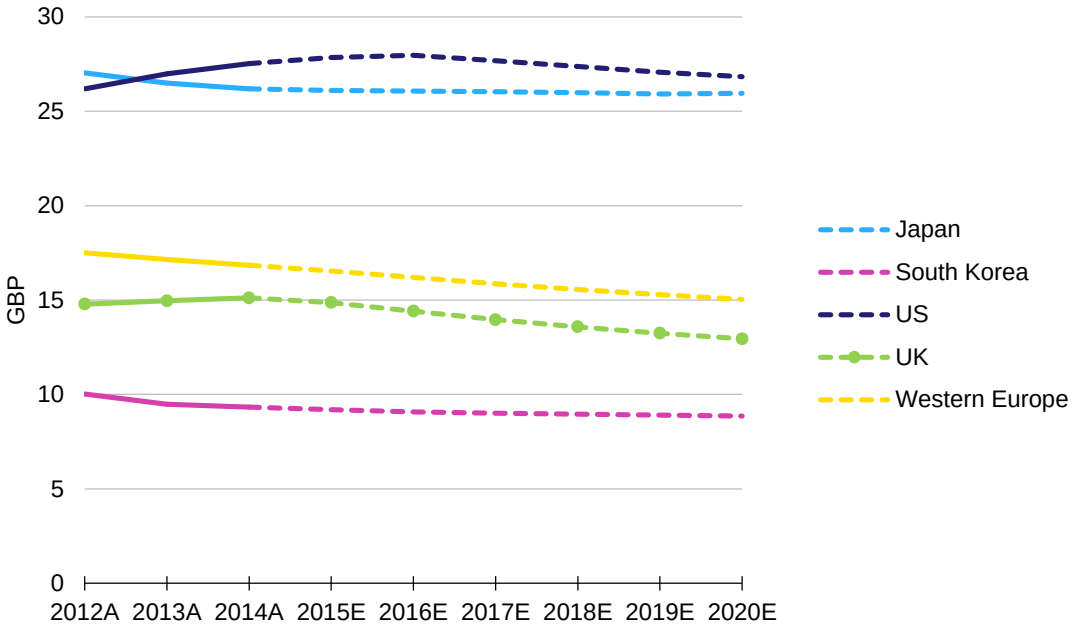
Figure 5.2: Monthly broadband revenue per connection in the EU5 countries [Source: Analysys Mason, 2015]



72. In contrast to Europe, non-European benchmark countries exhibit wide variations in broadband prices: an average South Korean connection costs less than GBP10 each month, while a consumer

in the USA pays nearly GBP30. The UK has the lowest broadband prices among all these countries, except for South Korea.

Figure 5.3: Average monthly retail revenue per fixed broadband connection, UK and non-European benchmark countries [Source: Analysys Mason, 2015]



5.2 Narrowband retail prices

73. Figure 5.5 below shows the monthly revenue per narrowband connection (defined as PSTN and ISDN, including non-VoIP cable telephony) in the EU5 countries. Historical data has been used up to 2014, with the forecast data taken from Analysys Mason's report *Western Europe telecoms market: complete trends and forecasts 2014–2029*.

74. We anticipate that the UK's monthly retail revenue per narrowband connection will hover just above GBP20 between 2015 and 2020, in line with the broader trend in the European market.

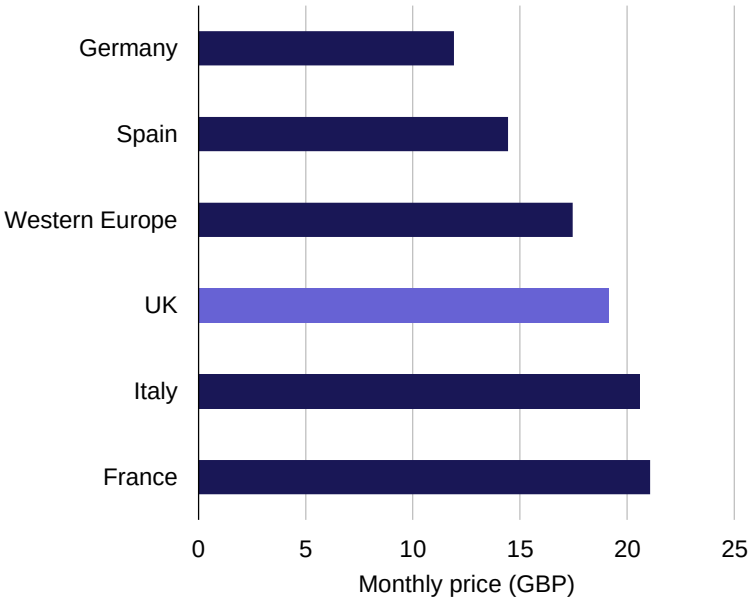
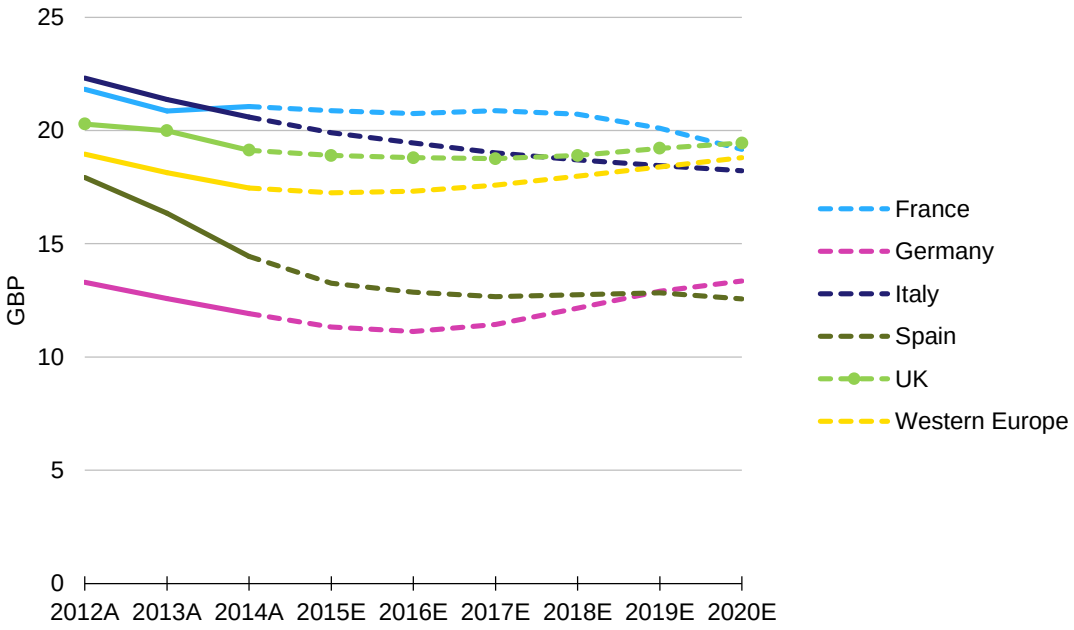


Figure 5.4: Monthly narrowband revenue per connection in the EU5 countries in 2014 [Source: Analysys Mason, 2015]

Figure 5.5: Monthly retail revenue per narrowband connection in the EU5 countries [Source: Analysys Mason, 2015]



75. Equivalent revenue-per-connection data for non-European countries is not available.

5.3 Wholesale price of superfast broadband, broadband and narrowband

76. In this subsection, we compare the wholesale prices of superfast broadband, standard broadband and narrowband. All the data is based on Analysys Mason's *Wholesale FTTx tariff tracker 2014*.[26]

77. The availability of VULA products remains limited in Western Europe. As Italy is the only EU5 country apart from the UK with a VULA product, for this comparison we have included other Western European countries beyond the EU5 with an offer in order to make an effective comparison. Naked VULA products include the cost of copper connection in the end-user charge. As the UK does not have a naked VULA offer, in Figure 5.6 we compare the price of Openreach's Generic Ethernet access 40/10 FTTC product *plus* the cost of an MPF connection, with the price of naked VULA products in selected other European countries. The price in the UK is GBP17.28, the lowest price of the countries that have a naked VULA product.

Figure 5.6: Monthly price for naked VULA products in the UK and selected other European countries [Source: Analysys Mason, 2015][27]

Figure 5.7: Naked VULA products shown in Figure 5.6 [Source: Analysys Mason, 2015]

Country	Shared VULA product
Austria	Virtual Unbundling: 51200/10240
Ireland	Fibre Unbundled Access FUAF - FTTH 150/30
Italy	FTTCab Naked 30/3
UK	Generic Ethernet access 40/10 FTTC + MPF connection

78. Figure 5.8 below shows the monthly price for an MPF service (or the local equivalent) in EU5 markets. Prices are calculated using the monthly charge plus the one-off set-up charge amortised

26 See http://www.analysysmason.com/Research/Content/Data-set/Wholesale-FTTx-tariff-tracker-RDTW0/#18%20November%202014.

27 This chart was updated on 7 January 2016 to correct a mistake in the price of the Openreach product.

over 48 months. The prices hover around GBP8 per month for most EU5 countries. In the UK the price is GBP7.82, marginally below the average across all EU5 countries.

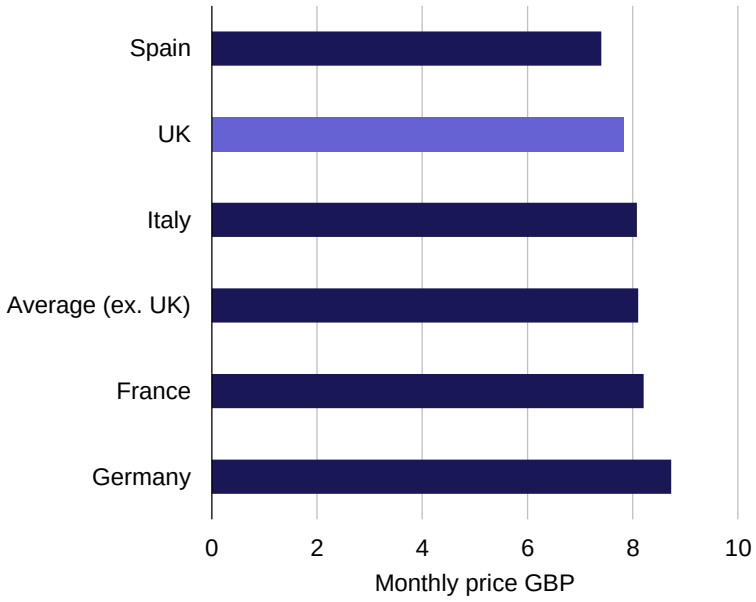


Figure 5.8: Monthly price for MPF service in the EU5 countries [Source: Analysys Mason, 2015][28]

79. Figure 5.9 shows the monthly price for an SMPF service (or the local equivalent) in EU5 countries. The price in the UK is GBP1.10 per month, the lowest within the EU5. Across all EU5 countries (excluding the UK) the average price for an SMPF service is GBP1.90 per month, 73% higher than in the UK.

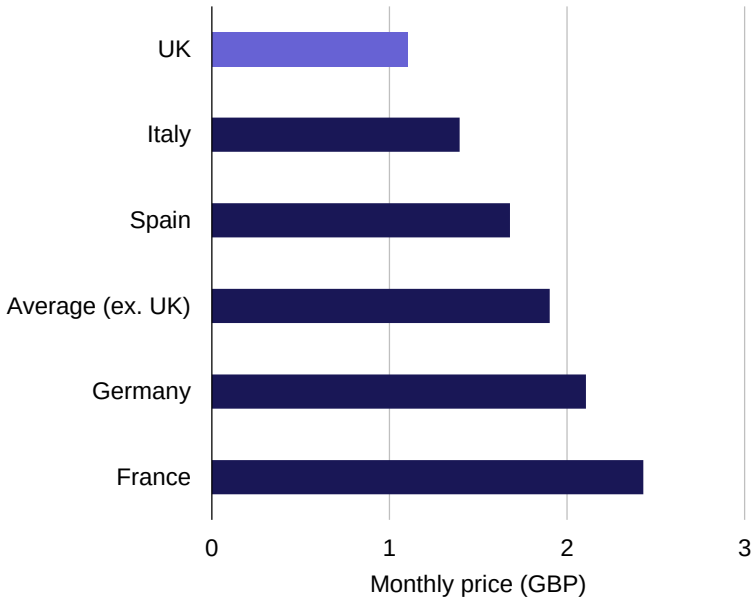


Figure 5.9: Monthly price for SMPF service in the EU5 countries [Source: Analysys Mason, 2015][28]

[28] This chart was updated on 7 January 2016 to correct a mistake in the calculation of the average price.

80. Figure 5.10 below shows the monthly price for a WLR product (or local equivalent) in the EU5 countries, where this is available (there is no WLR product in Germany). The price has been calculated using the monthly charge plus the one-off connection charge amortised over 48 months. The price for a WLR product in the UK is GBP9.07 per month, slightly higher than the average across the other countries (GBP8.93).

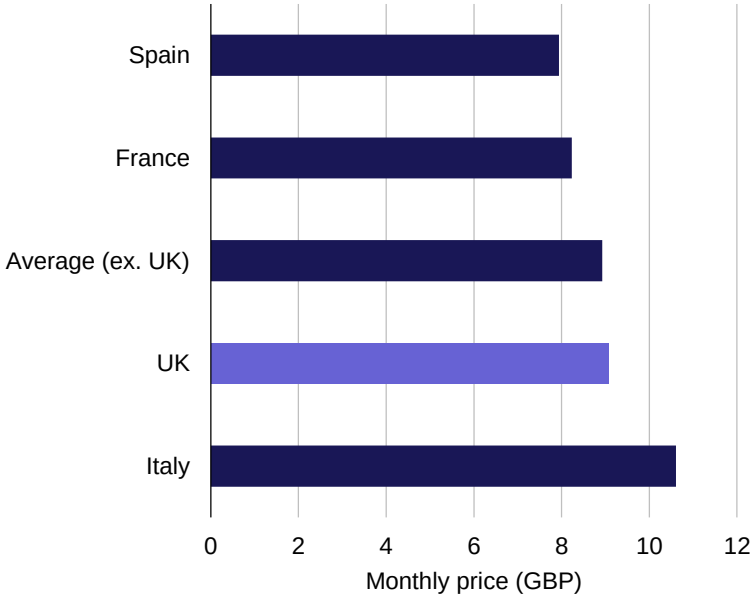


Figure 5.10: Monthly price for wholesale line rental (GBP) [Source: Analysys Mason, 2015][28]

81. Wholesale tariffs for the above products in the non-European benchmark countries are not tracked by Analysys Mason's *Wholesale FTTx tariff tracker 2014*, and so are not included here.

Annex A Table summary

Figure A.1: Summary of the position of superfast broadband, standard broadband and narrowband in the UK compared with EU5 benchmark countries, year-end 2014 [Source: Analysys Mason, 2015]

Benchmark	UK position among EU5	Comments
Superfast coverage – nationwide, all networks (2014)	1st	The UK was narrowly ahead of Germany
Superfast coverage – nationwide, incumbent operator's networks (2014)	1st	The UK had a 10 percentage point lead over the closest follower
Average measured downstream bandwidth (2014)	1st	
% of fixed broadband connections with downstream connections above 10Mbit/s (2014)	3rd	87% of broadband connections in the UK have access to downstream speeds above 10Mbit/s, only lagging behind Spain (91%) and France (93%)
Competitive intensity of broadband market (2014)	1st	The UK's mix of four strong operators – BT Retail, Liberty Global, Sky and TalkTalk – makes the market more competitive than the other EU5 countries
Take-up of superfast broadband as percentage of available connections (2014)	1st	High take up is due in part to BT Retail's early decision to strongly promote superfast broadband, creating pressure for other operators to do likewise.
Take-up of superfast broadband as percentage of premises (2014)	1st	The UK has had higher take-up, as superfast broadband became available earlier than in the rest of EU5
Fixed broadband penetration	1st	
Price of fixed broadband connection	2nd	
Non-incumbent's share of broadband revenue	1st	The combined market share of non-incumbent operators was higher in the UK than in other countries
Non-incumbents' share of broadband connections	1st	BT's share hovered around 30% from 2009 to 2014, while the remaining EU5 incumbent operators had shares of above 40% in 2014
Percentage of broadband lines provided on LLU	2nd	France has the highest percentage of broadband lines using LLU
Non-incumbent's share of narrowband revenue	1st	BT is the only incumbent with less than 50%
Non-incumbent's share of narrowband connections	1st	BT is the only incumbent with less than 50%
Incumbent's share of retail revenue from narrowband access and calls	1st	BT is the only incumbent with lower than 50%
Price of narrowband channel	3rd	

Benchmark	UK position among EU5	Comments
Price of MPF services	2nd	
Price of SMPF service	1st	
Price of wholesale line rental	3rd	

Figure A.2: Summary of the expected position of superfast broadband, standard broadband and narrowband in the UK compared with EU5 benchmark countries, year-end 2020 [Source: Analysys Mason, 2015]

Benchmark	UK position in 2020 among EU5	Movement in UK's position relative to 2014	Comments
Superfast coverage – nationwide, all networks	1st	→	
Superfast coverage – nationwide, incumbent operator's networks	1st	→	By 2020, we expect BT to remain the leader among incumbent operators in EU5
Take-up of superfast broadband as percentage of premises	1st	→	Take-up is impacted by the affordability of superfast broadband, and UK consumers will likely take advantage of increasingly accessible and affordable plans
Take-up of superfast broadband as percentage of available connections	1st	→	
Fixed broadband penetration	1st	→	
Price of fixed broadband connection	1st	↑	Prices in the UK are forecast to drop below those in France from 2018 onwards
Price of narrowband connection	5th	↓	While prices are forecast to remain flat in the UK, in France they will fall further in 2019

Annex B Exchange rate

The Sterling exchange rates used in this study are shown in Figure B.1. 2014 rates were used for past and future years.

Figure B.1: Exchange rates used in this report [Source: Analysys Mason, 2015]

Country	Europe (EUR to GBP)	USA (USD to GBP)	Japan (JPY to GBP)	South Korea (KRW to GBP)
2014	0.8059	0.6067	0.0062	0.0006