



Briefing Note: Calculating The Economic Impact Of Universal Gigabit Broadband

Summary

A conservative estimate of the impact of universal gigabit broadband is that it would grow the economy by around 0.7 percent of GDP by 2025, the equivalent of an extra £217 per person a year. The main channel through which faster broadband increases growth is by enabling new business models, making it hard to reliably quantify future impacts. We therefore also present scenarios where the impact ranges from 0.2 – 1.2 percent a year.

The Economic Impact Of Universal Gigabit Broadband

We can decompose the impact of universal gigabit broadband into two elements:

- Increasing the average speed of broadband in the UK to gigabit
- Implementing an, in effect, universal service obligation (USO) for gigabit broadband

In this note we're mostly focusing on the former effect – the impact of increasing average speeds across the UK – as this is where the strongest evidence base exists, and where it seems clearest that improving connectivity would like have an impact on productivity. According to [Ofcom data](#), 98 percent of premises in the UK already have access to a download speed of 10 Mbps, suggesting that in practice we already have near universal basic broadband.

Given the scope of this briefing, we have focused only on the gross impact of gigabit internet. Our estimates do not take account of the costs to build any new required infrastructure.

Calculating The Productivity Impact Of Increasing Broadband Speeds

In principle, you would expect faster broadband speeds to have two effects on productivity and economic growth:

- **Saving time.** Reducing the time it takes for consumers and workers to get tasks done or download and watch content. In practice, however, broadband speeds are already fast enough that gigabit is unlikely to be a significant change for normal web browsing or email.
- **Enabling innovation.** Making possible entirely new types of business models or products. For example, many people believe that the rollout of faster internet will enable new types of media, Internet of Things (IoT), augmented reality (AR) and virtual reality (VR) applications.

There are broadly two types of method to estimate the potential economic impact of broadband:

- Bottom up studies, such as [Frontier \(2017\)](#), which attempt to quantify the potential use cases for faster internet speeds, and what their impact on economic output is likely to be.
- Top down regressions, such as [Koutroumpis \(2018\)](#), which try to econometrically separate out the impact of broadband from the other assumed drivers of growth. In this note, we have mostly focused on this kind of study.

A challenge with cross-country regressions is finding a reliable instrument to distinguish between causation and correlation. Even if faster internet had no impact on growth, it would not be surprising for wealthier countries to choose to invest more in it for consumption reasons, leading the two to be highly correlated in the data. In response, researchers have applied multiple strategies to attempt to overcome this challenge:

Endogeneity problem

Author(s)	Main variable(s)	Methods to cope with the endogeneity problem/comments
Röller and Waverman (2001)	telecommunication infrastructure	Jointly estimated supply and demand with production equation (estimated with GMM)
Lehr et al. (2005)	broadband availability/ broadband penetration	Matching control groups and treatment groups by estimating the average treatment effect
Crandall et al. (2007)	broadband infrastructure	Only use OLS for simplicity, however, the authors stated that more complex methods failed to provide any significant difference from OLS
Koutroumpis (2009)	broadband infrastructure	A simultaneous approach by the jointly estimated supply and demand with a production equation (using GMM and 3SLS)
Czernich et al. (2011)	broadband introduction/ broadband penetration	Instrumental variable (IV) approach using the cable TV and voice telephone penetration rate as instruments
Thompson Jr. and Garbacz (2011)	Fixed and mobile broadband lines per household	Estimating the predicted value for fixed broadband and mobile broadband using two-stage panel data regression (2SLS)
Rohman and Bohlin (2012)	broadband speed	Two-stage panel data regression (2SLS) approach using broadband penetration, broadband price and telecom revenue to estimate broadband speed

Source: [Kongaut, Rohman and Bohlin Presentation \(2014\)](#)

What Has Existing Research Found?

Despite these research challenges, most researchers find plausible magnitudes for the impact of broadband on growth. [Bohlin and Rohman \(2012\)](#), for example, find that doubling average broadband speed increases growth by 0.3 percent compared to the base year.

However, there are good reasons that we might expect diminishing returns from a small country increasing broadband speeds significantly more quickly than other advanced economies. The main channel we might expect to see an impact from is faster innovation – but it is harder to make your business model work if your product cannot scale across the U.S. or EU. [Koutroumpis \(2018\)](#), finds that in 2016 there was little economic benefit to increasing speeds beyond a threshold of around 9.8 Mbps – compared to a global average connection, according to [Akamai](#), of around 6.4 Mbps.

Over time, however, you might expect this threshold to increase as average broadband speeds increase internationally. In the last year alone, [data from Ookla](#) suggests that global fixed broadband speeds for download have increased by 34 percent. If we assume the same growth rate continues to 2025, average global broadband speeds would increase to 430 Mbps.

In his study, [Koutroumpis \(2018\)](#) notes that the threshold had increased from 3 Mbps in 2011 to 6.7 Mbps in 2014 and then 9.8 in 2016 Mbps. If we extend that growth rate for the threshold forward to



2025, we obtain a threshold of 85 Mbps. By contrast, if we assume the threshold remains constant as a ratio of global broadband speeds, you would expect a threshold of around 280 Mbps.

Scenarios For The UK

Based on the above, we suggest three plausible scenarios for the impact of universal gigabit broadband in the UK:

- An **optimistic scenario** in which UK GDP increases in line with the cross-country findings of [Bohlin and Rohman \(2012\)](#). According to [Ofcom](#), average home broadband speeds in the UK were 54.2 Mbps in the UK, suggesting that achieving universal gigabit broadband (1,000 Mbps) would represent just over four doublings – or a total growth impact of 1.2 percent of GDP by 2025.
- A **central scenario** in which we cap the growth benefits of universal gigabit broadband at 280 Mbps to take account of potential diminishing returns. This suggests a total growth impact of universal broadband of 0.7 percent of GDP by 2025.
- A **pessimistic scenario** in which we cap the growth benefits of universal gigabit broadband at 85 Mbps to take account of potential diminishing returns. This suggests a total growth impact of universal broadband of 0.2 percent of GDP by 2025.

Internet Association

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