ERICSSON

MEASURING THE IMPACT OF BROADBAND ON INCOME

A study on the socioeconomic effects of broadband speed on household income

As the Networked Society continues to grow, broadband is increasingly becoming a major factor in spurring economic growth. ICT investments have allowed countries worldwide to expand their broadband access and upgrade their existing broadband speeds. Although there has been significant research into the national impacts, there is little evidence on the effect faster broadband is having on individuals. A new study has been conducted investigating the socioeconomic effects of broadband speed on household income. By comparing certain countries with varying economic characteristics, it asks whether simply having access to broadband is enough to make an impact, or whether faster broadband is the way to significantly increase income.

This report reveals the results of the new study, entitled "Socioeconomic Effects of Broadband Speed: a Microeconomic Investigation," and reveals the impact of broadband upgrades on household income.

This microeconomic study analyzed data from several Organization for Economic Co-operation and Development (OECD) countries, as well as Brazil, India and China (BIC), investigating the similarities and differences between them. It measured the impact of broadband speed on household income by analyzing whether leveraging the benefits of faster broadband can improve competitiveness in the labor market.

Key findings

> The benefits from broadband are nonlinear and stepwise, with a minimum level required that is likely to rise over time

> Broadband access affects development:

- In OECD countries, gaining 4 Mbps of broadband increases household income by USD 2,100 per year after
- In BIC countries, introducing a 0.5 Mbps broadband connection increases household income by USD 800 per year

> Broadband speed upgrades affect development:

- In OECD countries, upgrading from 0.5 Mbps to 4 Mbps increases income by around USD 322 per month
- In BIC countries, upgrading from 0.5 to 4 Mbps increases income by USD 46 per month

Previous research

In 2011 Ericsson, in co-operation with Arthur D. Little and Chalmers University of Technology, conducted a macroeconomic study on the national impact of broadband investments titled "Socioeconomic Effects of Broadband Speed: a Macroeconomic Investigation." The study was the first piece of research in an ongoing project into the effects of broadband speed. Results showed that increasing broadband speed will have varied effects on Gross Domestic Product (GDP). The second study in the project is outlined in this report, and provides a detailed analysis on the effects of broadband on household income.

In collaboration with:

CHALMERS Arthur D Little

Data collection and analysis

There are several key sources for this study, of which survey data from Ericsson ConsumerLab forms the major part. The investigation into the impact of broadband access and speed is extracted from Ericsson ConsumerLab's web-based survey conducted in 2010, with 22,000 respondents from 14 OECD and BRIC countries. Figure 1 shows the countries used in the study and the variables that were considered.

The approach employed in this study builds on a proven method of investigating the impact of a "treatment," – in this case broadband speed – on household income using statistical regression analysis.

Other relevant factors affecting household income levels were also taken into account, e.g. education, skills and socioeconomic variables. This study introduces other variables concerning additional ICT skills possessed by individuals, including usage patterns for fixed and mobile internet.

Figure 1: Countries used in the microeconomic study

Countries included in the microeconomic investigation

8 OECD countries

UK
France
Germany
Italy
Spain
Sweden
Japan
USA

3 BIC countries

Brazil
India
China

Variables investigated

Source

Ericsson ConsumerLab

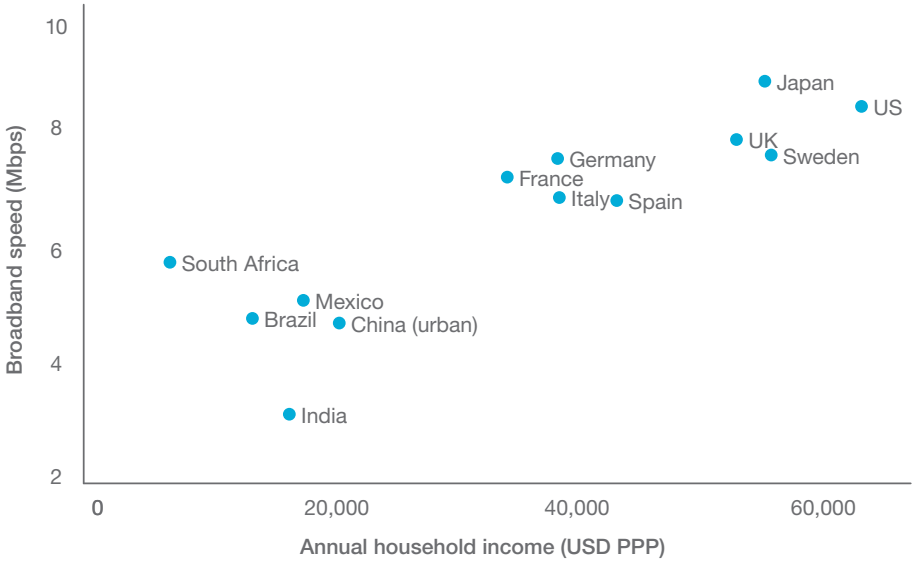
Data

- Household income
- Perceived broadband speed
- Level of education
- Type of education
- Gender
- Age
- Geographical area
- Marital status
- Household size

Global investigation into the impact of broadband speed

Figure 2 places the countries in relation to their household income and broadband speed. It shows that four countries benefit from levels of both: the US, Japan, the UK and Sweden. All BIC countries, together with Mexico and South Africa, are to the bottom left of the figure, showing that both speed and income levels are still not as mature in these countries.[1] This leads to the hypothesis that a higher broadband speed contributes to a higher income level.

Figure 2: The relationship between broadband speed and household income



[1] Further analysis in this study was conducted comparing OECD and BIC countries. Even though Mexico and South Africa are OECD member countries, the structure of their economies is different to the rest of the OECD countries in this study, and they have been removed from the sample. Russia only yielded a total sample of 19,000 households, so due to the poor data quality available, was also removed from the country investigation.

Allowing access improves development

The importance of broadband development can be investigated in terms of both access and speed. Access refers to the user's connectivity to broadband, whereas speed concerns the capacity subscribed to by the user.

When comparing OECD and BIC countries, there appears to be different thresholds at which broadband access has a positive impact on household income. Figure 3 illustrates that the minimum effective speed is at least 2 Mbps for OECD countries.

The greatest expected increase in income is when households go from having no broadband to 4 Mbps, gaining around USD 2,100 per household per year. This is equivalent to USD 182 per month.

For BIC countries, the threshold level already seems to be at, or below, 0.5 Mbps. An additional annual household income of around USD 800 is expected to be gained by introducing a 0.5 Mbps broadband connection in BIC countries. This is equivalent to nearly USD 70 per household per month.

Figure 3: Estimated difference in income based on access to broadband, per speed

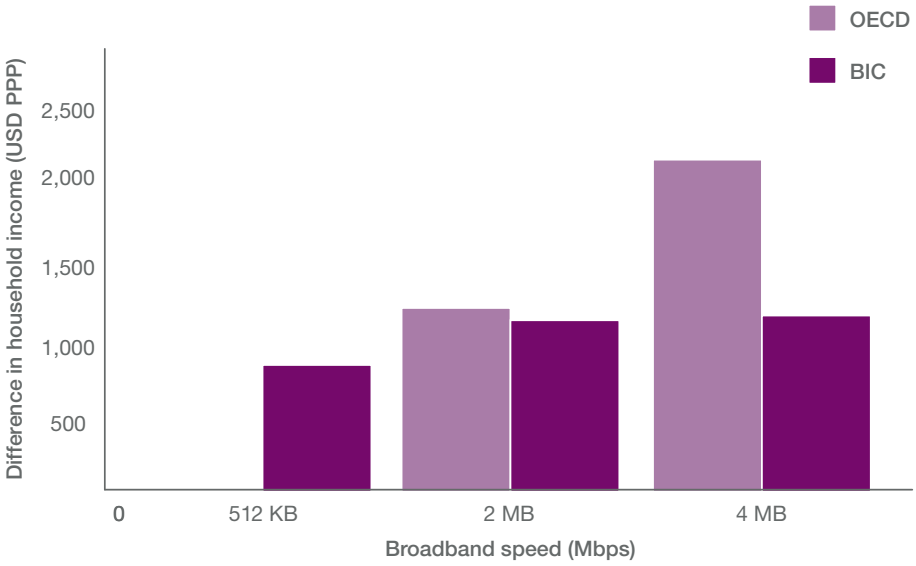
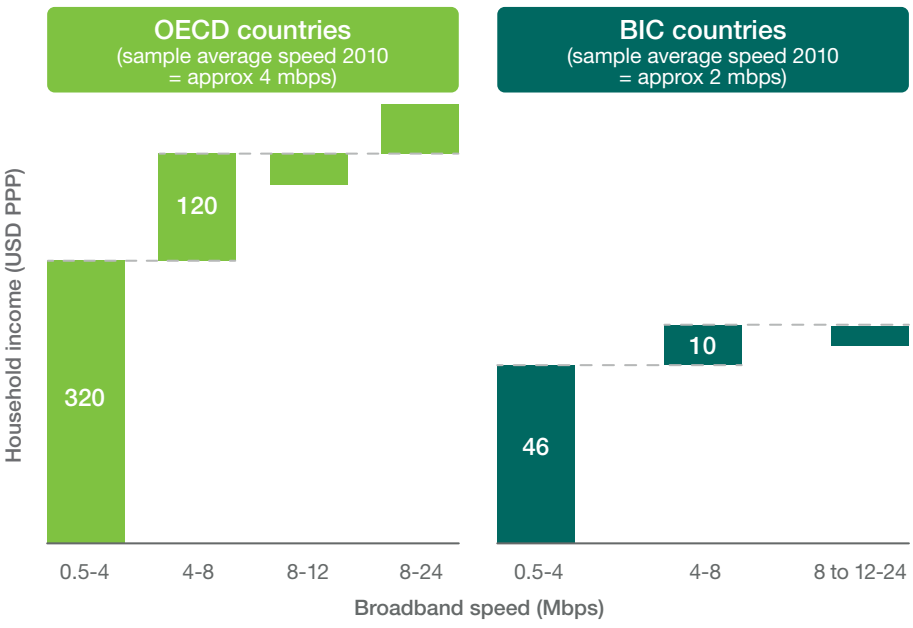


Figure 4: Estimated increase in household income from broadband speed upgrades (per month, USD PPP)



Broadband upgrades lead to higher income

Figure 4 illustrates that for OECD countries, the greatest measured increase in income was for households that upgrade from 0.5 Mbps to 4 Mbps, at around USD 322 per household per month. On average, upgrading from 4 to 8 Mbps yielded USD 122 per household, per month. For BIC countries, upgrading from 0.5 Mbps to 4 Mbps is projected to yield USD 46 per month, per household.[2]

Source: Ericsson, Arthur D. Little and Chalmers University of Technology (2012)

Note: The income levels have been adjusted for sample bias by comparing sample income with actual pre-tax income. Boxes displayed without figuresindicate low statistical significance

[2] The income levels have been adjusted by comparing sample income with actual pre-tax income. The adjustment factor for OECD is 0.78 and 0.58 for BIC.

Why broadband speed increases household income

There are several reasons as to why households benefit from increased broadband speed. Firstly, gaining access to more advanced services, e.g. videoconferencing, enables more effective, productive ways of working. Increasing broadband speed also boosts personal productivity and teleworking and telecommuting allow for more flexible work arrangements.[3]

Secondly, several previous studies have shown that broadband enables people to become more informed, better educated, and enriched – ultimately leading to a faster career path.[4] However as ICT maturity increases, participants without broadband or with slow broadband at home will find it harder to stay competitive in the labor market – reducing their chances of finding a job and building capital. The level of broadband speed required to gain a competitive advantage in the labor market is likely to be raised over time. This labor market competition effect could explain why broadband thresholds seem to be progressing, as households would also have an incentive to compete with each other to gain better means to participate in the labor market.

Further investigation is needed concerning the relationship between broadband speed and services used. Simply having a very high speed connection is not enough, how it is used may be the key to gaining any benefit.

Advanced economies benefit most

The findings in this microeconomic study represent a unique investigation into the effect of broadband on household income in both OECD and BIC countries. The results are statistically significant and show that the impact of having better access to broadband and speed upgrades is positive.

In summary:

1. There is a minimum broadband access and speed level required in order to gain any benefit. This varies between economic regions
2. The benefits of broadband are nonlinear and stepwise
3. Households in advanced economies can achieve more from broadband upgrades

This study supports previous research which found that the most advanced countries will gain the greatest total benefit from broadband, and can quickly move toward highly innovative markets and improve labor productivity. Their ability to leverage higher broadband speeds is enabled by a richer service offering related to both work and private life, and a higher level of ICT maturity among enterprises and public institutions.

The results of this study into the impact of broadband speed on household income can act as a starting point in the discussion on the increasing effects of ICT investments. It will inform authorities and decision makers about how best to approach ICT investments, and those who can use them wisely will be able to innovate in this new ecosystem – whether it is on a national or local level.

[3] This has been shown in several previous studies such as Dutz, M., Orszag, J., & Willig, R. (2009), Lehr (2005) and Quiang (2009).

[4] Crandall, R. W., Jackson, C. L., & Singer, H. J. (2003).

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