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# PRODUCTIVITY IS HIGHER AMONG SOME SERVICE FIRMS WHEN BROADBAND BECOMES AVAILABLE, BUT NOT ALL

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# Productivity is higher among some service firms when broadband becomes available, but not all<sup>1</sup>

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## INTRODUCTION

Using internet services over broadband connections may help some firms become more productive, generating more output from a given amount of labour and capital equipment. However, there is mixed evidence internationally about how large this benefit has been in practice and which types of firms are most likely to improve their productivity by using these technologies. In this research we examine the effects of broadband availability on the productivity of service sector firms.

Some previous studies using region- or country-level data have reported large productivity effects of broadband on services, but it is hard for this type of study to prove that broadband is making firms more productive. For example, their results might partly be explained by factors that both make firms more productive and more likely to use broadband, rather than a causal link from one to the other. Studies using data on firms have tended to find little evidence that there are broadband-based gains from this source.<sup>2</sup> Our research tries to unpack the service sector to see whether there are identifiable groups of firms that register significant productivity gains after broadband becomes available to them.

Knowing more about how large and focused these benefits are should help policymakers predict the likely effects of programmes to bring high-speed broadband to less well-served areas.

## DATA AND METHODS

We use official representative data sources to capture firms' productivity, characteristics, locations and local broadband availability. Information on service

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<sup>1</sup> This Bulletin summarises the findings from Haller, S.A. and Lyons, S., 2018, Effects of broadband availability on total factor productivity in service sector firms: Evidence from Ireland, *Telecommunications Policy*, in press. <https://doi.org/10.1016/j.telpol.2018.09.005>. This research was supported by the ESRI's Programme of Research in Communications, which is funded by the Commission for Communication Regulation and the Department of Communications, Climate Action and Environment.

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<sup>2</sup> Indeed, previous research in Ireland found no significant effects of broadband on productivity of manufacturing sector firms: Haller, S.A. and Lyons, S., 2015, Broadband adoption and firm productivity: evidence from Irish manufacturing firms, *Telecommunications Policy* 39, 1-13.

sector firms comes from Ireland's Annual Services Inquiry, collected by Central Statistics Office (CSO) over the period 2006–2012. This source includes data on each firm's sales, value of inputs, nationality of ownership and participation in trade. On average over the sample period there are about 11,000 firms per year, and we include only firms with a single location (i.e. not those with multiple premises, for which it would be ambiguous when broadband became available).

Each firm's geographical location (mapped into 10 km grid squares) comes from the CSO's Business Register. Data on where and when basic broadband service was first made available was provided by Ireland's fixed line incumbent operator, Eir.

Having linked up these data, we use statistical methods to test whether broadband availability is associated with higher productivity among firms, taking into account firm characteristics and time effects. The models are estimated across all firms to see if there is a generalised effect of broadband and then on sub-sectors of firms, allowing for the possibility that some sectors experienced stronger benefits than others.

## RESULTS

We find significant gains from broadband availability in two services sectors: Information & Communication services and Administrative & Support Service Activities. The effects measured for these two sectors are large, equivalent to about a third of the typical variation in productivity among the firms. While most other sectors show smaller positive associations between broadband and firms' productivity levels, none of these effects are statistically significant, and we also find no significant effect looking across all service sector firms taken together. These results are consistent with those of other recent research that suggests the benefits of broadband for productivity depend heavily upon sectoral and firm characteristics rather than representing a generalised effect.

Overall, it seems that the benefits of broadband to particular local areas may vary substantially depending upon the sectoral mix of local firms and the availability of related inputs such as highly educated labour and appropriate management.<sup>3</sup>

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<sup>3</sup> Recent research on firm location decisions in Ireland has emphasised this point as well: McCoy, D., S. Lyons, E. Morgenroth, D. Palcic and L. Allen, 2018, The impact of local infrastructure on new business establishments, *Journal of Regional Science* 58, 509-534.

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