ESRI Research Bulletin

When broadband becomes available in an area, who takes it up and how quickly does it spread?

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When broadband becomes available in an area, how quickly does it spread and who takes it up?[1]

Seán Lyons[2]

Introduction

The quality of broadband has varied across the country since these services were first introduced. Each generation of broadband service tends to be made available first in places where it is least costly to deploy, typically densely populated areas, and only later across the rest of the country. This pattern is illustrated for basic broadband in this animation.[3]

When broadband is first made available in an area, some households adopt it immediately. Others wait for a while, a third group never subscribes. One reason for this variation in choices is that different households value broadband services differently; some might see many uses for broadband given their circumstances, others few. Second, households may be influenced by the popularity of broadband among their neighbours and local businesses, e.g. through availability of information about services, social influence, availability of local content or other channels. Economists call these factors "local network effects". In areas where these effects are strong, adoption of service is likely to accelerate as increasing local use of broadband increases its value for users, before reaching saturation when all users who are likely to subscribe have done so.

This paper uses data from Ireland to examine how quickly basic broadband spread in small areas after it was offered and what household characteristics were associated with more or less likelihood of using broadband.

Data and Methods

Addressing these questions required data on who adopted broadband, their household characteristics and the local availability of broadband services over time. Two main sources were used. The 2006 Census of Population in Ireland reported detailed small area population statistics on the number of households with and without broadband services and on socioeconomic indicators such as

[1] Lyons, S., 2014, Timing and determinants of local residential broadband adoption: evidence from Ireland, *Empirical Economics* 47, 1341-1363. This research was supported by the ESRI Programme of Research in Communications, which in turn received funding from DCENR and ComReg. http://dx.doi.org/10.1007/s00181-013-0790-6

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[3] http://link.springer.com/content/esm/art:10.1007/s00181-013-0790-6/file/MediaObjects/181_2013_790_MOESM1_ESM.avi

the local patterns of educational attainment, age profile, employment status and sector, type of accommodation, PC ownership, etc. For this study, the Census information was matched to data on geographical availability of fixed line basic broadband service in Ireland from 2001 to 2006.

Econometric models were used to identify how broadband adoption in a given area was affected by the amount of time since broadband was made available, allowing for the area's socioeconomic characteristics (e.g. better off areas use broadband more). The analysis also allowed for reverse-causation: the possibility that areas where people were particularly keen on broadband received service earliest.

RESULTS

As expected, it took time for households in an area to take up broadband after it was offered. It took just over three years for newly-served areas to catch up with the national average broadband penetration rate, with about half of the catching-up taking place in the first year. Table 1 below summarises the direction of some of the key socioeconomic effects observed for both demand and supply of broadband.

Knowing more about these patterns is useful for telecoms operators extending broadband service to new areas, because the speed of adoption affects their expected revenues from subscriptions. Policymakers can benefit from such information too, because there are government programmes aimed at increasing the availability of broadband in less well served areas and raising broadband adoption across the population. It is easier to design such programmes if one knows how quickly and fully broadband will be adopted when it is offered.

TABLE 1 **Selected factors associated with area-level residential broadband demand and supply in Ireland (+ means there was a positive association between the characteristic and broadband demand or supply, – is a negative association, n.s. means not statistically significant)**

Socioeconomic makeup of area	Demand	Supply
Average distance to local telephone exchange (proxy for lower quality of service)	–	–
County average disposable income	+	+
PC ownership share	+	n.s.
Share in higher occupational/social class categories	+	+
% living in a house rather a flat or bedsit	+	n.s.
Commercial sector employment share	+	+
Share with higher level of education	–	–
Share of population aged 45-64 compared to 25-44	+	+
Proxy for density of households	not included	+

Source: Lyons, S., 2014, Timing and determinants of local residential broadband adoption: evidence from Ireland, *Empirical Economics* 47, Table 6.