



The economic impact of telecommunications diffusion on UK productivity growth [☆]

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Abstract

This paper investigates the relationship between telecommunications infrastructure competition, investment and productivity. Using a novel methodology comprising of econometric modelling and input–output economics, the extent to which telecommunications has contributed to national and sectoral productivity performance is examined. The main findings from this paper suggest that most industries have benefited from the incorporation of advances of telecommunications technology, which might have, amongst other things, emanated from encouraging infrastructure investment, in their production processes.

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1. Introduction

Economists have long observed concomitant trends in growth rates of publicly owned infrastructure investment and productivity and these growth rates and measures of

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international competitiveness e.g. Aschauer (1989), De Long and Summers (1991, 1993). Furthermore, studies – see Jipp (1963), Hardy (1980), Cronin et al. (1991, 1993a) – have found that highly developed national economies are correlated with highly developed telecommunications infrastructure. However, no study in the UK has examined and measured the extent to which telecommunications and its diffusion have contributed to productivity performance at economy-wide and sectoral levels.

Employing an innovative analytical approach suggests that, from a historical basis, most industries have benefited from the incorporation of advances in telecommunications technology, which might have, amongst other things, emanated from encouraging infrastructure investment, in their production processes.

The structure of the paper is as follows: Section 2 provides a brief outline of the previous literature in this area. Section 3 describes the methodology undertaken in this study for measuring the impact of telecommunications infrastructure investment on national and sectoral productivity. Section 4 discusses the data used in the analysis. Section 5 provides an estimate of the relative impact of telecommunications infrastructure investment on national and sectoral productivity. Finally in Section 6, we conclude with a summary of the results and their public policy implications.

2. Previous related research

The relationship between telecommunications investment and economic development has been the topic of several studies.

Research by Norton (1992) showed that there was a strong positive relationship between telecommunications infrastructure investment and economic growth in 47 countries for the period 1957–1977 which seemed to suggest that if certain countries had higher stocks of telephones, growth rates could be increased significantly.

Greenstein and Spiller (1995) also investigated the impact of telecommunications infrastructure on economic activity. They focused, however, solely on the US market and specifically on two sectors: finance, insurance and real estate (FIRE); and manufacturing. Their main findings were that the level of modernisation of a telecommunications network has an economically important influence on the amount of ‘high tech collar’ activity in a region. This positive relationship was, further confirmed in a later study – see Greenstein and Spiller (1996).

Finally most recently – as far as I am aware – Röller and Waverman (2001), jointly estimated a micro-model for telecommunications investment with a macro production function, thus incorporating the feedback process between telecommunications and the aggregate economy. Using data from 21 OECD countries (UK inclusive), over a 20-year period, they found evidence of a significant positive causal link, especially when a critical mass of telecommunications infrastructure is present.

The results of these studies generally suggest that there is a strong positive relationship between telecommunications investment and economic activity. The focus has however been at the macroeconomic level i.e. country- or county-level usually consisting of a macroeconomic structural model (often with only one equation embodying some causal relation). Such methods, although valuable, are nonetheless subject to important limitations. The results are highly dependent on the variables utilised and the model specification.

The relationship between telecommunications investment and economic activity is far too complex to be captured by a single equation model with only one or a few independent

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