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## Economic growth in the New Economy: evidence from advanced economies

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### Abstract

Firstly, by surveying recent research, this paper confirms that both the production and use of ICT have been the factors behind the improved economic performance of the United States in the 1990s. However, the evidence for the New Economy is much weaker outside the United States. Secondly, the paper applies growth accounting to estimate the impacts in Finland. It is shown that the contribution to output growth from ICT use has increased from 0.3 percentage points in the early 1990s to 0.7 points in the late 1990s. In addition, the fast growth of multi-factor productivity in the ICT-producing industries has had an even larger impact. But, unlike in the US, there has been no acceleration in the trend rate of labour productivity. © 2002 Elsevier Science B.V. All rights reserved.

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### 1. Introduction

The popular view is that information and communication technology (ICT) will change the world by boosting productivity and economic growth. But while ICT has many visible effects on the modern economy—the growth in electronic commerce and in Internet use for example—its impact on productivity and economic growth has been surprisingly difficult to detect. Although investment in

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ICT has exploded since the mid-1970s, aggregate productivity growth remained sluggish until the mid-1990s in the United States which is the world's leader in both the production and use of ICT. Therefore, many policy-makers and economists have taken the strong performance of the US economy in the late 1990s as most welcome evidence for the view that the large investments in ICT have finally started to pay off. It is generally believed that the United States has become a 'New Economy' in which business firms have learnt to take advantage of both the ICT revolution and the globalization of business activities in ways which improve productivity. Indeed, the growth rate of labour productivity has doubled in the late 1990s.

The defining characteristics of the ICT revolution are the fast improvement in the quality of ICT equipment and software, and the concomitant sharp decline in their quality adjusted prices. For example, in the United States the price of computer investment declined 18% per year in 1960–1995 and 28% per year in 1995–1998 (Jorgenson and Stiroh, 2000). Profit maximizing firms respond to the change in relative prices by substituting ICT equipment and software for other capital equipment and structures. A larger portion of investment will be in assets with relatively high marginal products, and the aggregate capital service flow increases. This increase in capital intensity raises labour productivity in the ICT using industries. The standard argument for the fact that it has taken so long for the productivity impact to show up in the productivity statistics is that firms have not yet invested enough in ICT (see, for example, Oliner and Sichel, 2000). Even if information and communication technology investments earn hefty returns, the share of nominal income accruing to computers has been rather small until recently.

Besides improving productivity in the ICT-using industries, the rapid technological advance should also raise productivity in the ICT-producing industries and, consequently, should contribute to productivity at the aggregate level as well. Consequently, the mechanisms underlying the structural transformation of the industrial economy into a 'new', ICT-based economy are easy to understand by applying the basic principles of economic theory. The problems lie on the empirical side.

Growth accounting is the standard technique for assessing the impacts of both the use and production of different types of assets including ICT. The method is briefly reviewed in the next section. Sections 3 and 4 take stock of the productivity debate by reviewing recent research on the impacts of both the use and production of ICT in the United States and other advanced countries. Section 5 contains the findings of our own application to explaining economic growth in Finland. This country is of special interest because it is one of the leading producers of ICT in Europe and is sometimes regarded as a model country in ICT consumption as well. It is well-known that Finland ranks among the top countries in the world in terms of the number of Internet hosts and mobile phones per capita.

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