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**WHY IS PRODUCTIVITY GROWTH IN EUROPE STILL SLOW?
ON THE ROLE OF ICT AND INNOVATION IN MARKET
SERVICES**

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Abstract: This paper examines the slow trend in productivity growth in the European Union in an international comparative perspective, focusing on the role of market services. Using new industry-level data, we find that the share of market services in GDP and employment in Europe has slowly converged to the US, but productivity growth remains considerably slower. This suggests that Baumol's "cost disease" hypothesis is still alive in Europe. Based on conventional growth accounting, we show that lower ICT investment goes some way in explaining the labour productivity growth differential between Europe and the US. However, we argue that the effects of ICT can be much bigger in the long run due to the effects of complementary intangible investments and innovation. Econometric analysis indicates that the long-run effects of ICT can be up to twice as large as the short-run effects. So far Europe has missed out on these dynamic effects of ICT as well due to the low ICT investment levels. Finally, we show that there is a large and increasing variation in market services productivity levels across European countries. This suggests that the slow growth of services productivity growth in Europe is due to structural impediments in product and factor markets which hold back growth in these industries to systematically lower rates than in the US. However, an optimal policy mix to support productivity growth should not only be focused on the regulatory framework as technology and educational policies and macro-economic management play an important role as well.

1. Introduction

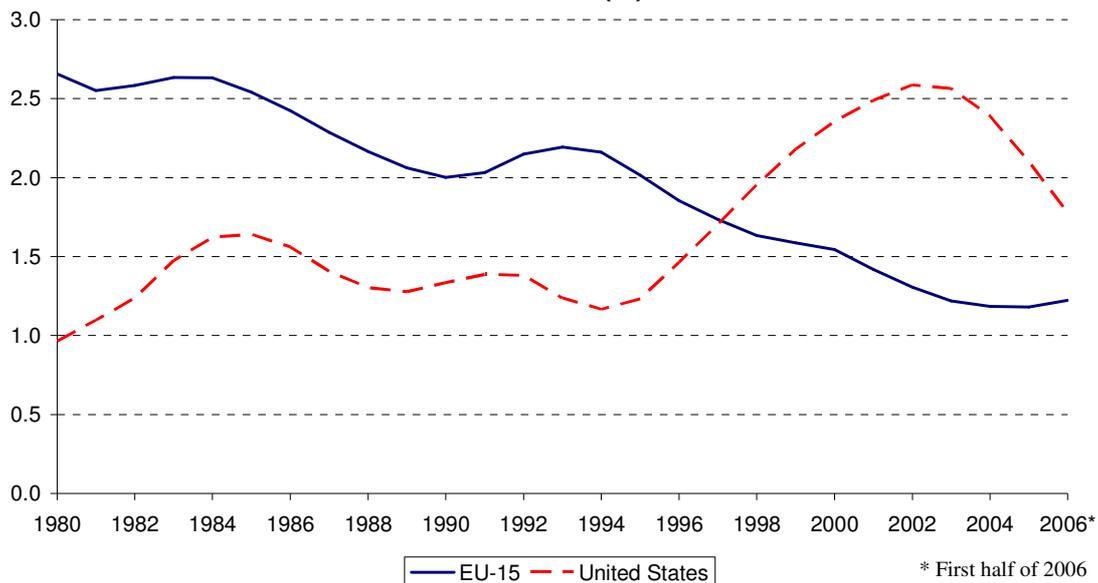
During the second half of the 1990s the comparative growth performance of Europe vis-à-vis the United States has undergone a marked change. For the first time since World War II labour productivity growth in most countries that are now part of the European Union (EU) has fallen behind the US for a considerable length of time. Whereas average annual labour productivity growth in the US accelerated from 1.2 percent during the period 1987-1995 to 2.3 percent during 1995-2005, EU productivity growth declined from 2.1 to 1.4 percent.¹ The macro GDP estimates of both the European countries and the US have been revised over the years, reducing the growth differential somewhat in particular for the period 1995-2000 (1.7 in the EU-15 vs. 2.2 percent in the US), but the growth differential for 2000-2005 remains quite large (1.1 percent in the EU-15 vs. 2.5 percent in the US). The labour productivity estimates for the US indicate a slowdown since 2004 whereas the figures for the EU-15 suggest a recent small improvement in productivity growth. It is too early, however, particularly in the case of Europe to argue that these recent numbers indicate an improvement in the structural trend of productivity growth (**Figure 1**). Moreover labour productivity growth in the US is still more than 0.5 percentage points higher than in Europe, despite their different position in the business cycle.

The acceleration in US output and productivity growth in the mid 1990s has been extensively discussed in the literature. A consensus has emerged that faster growth can be traced at least in part to the effects of the information and communication technology (ICT) revolution (Oliner and Sichel 2000, 2002; Jorgenson, Ho and Stiroh, 2005; Corrado et al., 2006). This revolution is characterized by a surge in ICT investment, productivity effects from ICT-producing industries and a more productive use of ICT across the economy. In addition, the relatively flexible labour and product markets in US will have

¹ Throughout the paper, the European Union refers to the EU-15, which are the member states prior to 1 May 2004, or to the EU-11, which are the EU-15 excluding Greece, Ireland, Luxembourg, and Portugal. The latter countries had to be excluded from all the calculations on capital and TFP in this paper, because appropriate data for the purpose of this are still missing. In 2005, the EU-11 made up 94% of GDP in the EU-15 and 86% of GDP in the EU-25.

supported the ICT revolution. A flexible labour market has supported the substitution of low-skilled for high-skilled labour and the restructuring of the economy towards comparative advantages in knowledge-intensive industries. Flexible product markets have opened up new opportunities for productive applications of ICT mainly in service industries and service-related activities in manufacturing. In addition, flexible markets have supported the creativity of firms and entrepreneurs in developing new products and services and new distribution channels for these products and services. Some dissenters argue, however, that the innovation impact of ICT has been short-lived and already lost steam since 2004 (Gordon, 2006).

Figure 1: Trend growth of labour productivity, EU-15 and US 1980-2004 (%)



Notes: Trend labour productivity growth estimated using Hodrick-Prescott filter
Source: Groningen Growth and Development Centre, Total Economy Database
(<http://www.ggdc.net/dseries/totecon.shtml>)

Unfortunately there is much less consensus on the causes of the productivity slowdown in Europe. At first sight many of the reasons are the same as those explaining the growth advantage for the US, such as a limited impact of technology and innovation and moderate structural reforms in labour and product markets.² From a policy perspective the urgency to deal with the causes of the problems is underlined by the Sapir report

² See Nicoletti and Scarpetta (2003), Blanchard (2004), Alesina and Zeira (2006) and Conway *et al.* (2006).

enhancing growth (Sapir, 2003) and in the mid-term review of the Lisbon agenda for reform in Europe by the Kok Commission (European Commission, 2004a). Indeed, the Kok report strongly argues for reforms to stimulate productivity growth in Europe, in particular in the light of demographic trends towards a working-age population.

This paper aims to contribute to the search for causes of the European productivity problem by drilling down from the macro-level to the industry level. In earlier work, we already identified the important role of market services in accounting for most of the growth differential between Europe and the United States (O'Mahony and van Ark, 2003; van Ark et al., 2003a and b; Inklaar et al, 2006; van Ark, 2006). However, due to a lack of adequate industry level data on output and different types of inputs, it was not possible until now to precisely assess the sources of growth and slowdown, and more specifically to identify the role of ICT investment. By exploiting a new growth accounts database, called EU KLEMS, with internationally comparable series on output, inputs and productivity by industry, this paper makes it possible for the first time to measure and analyze the relationship between inputs, output and productivity by industry for the European Union as a whole as well as for individual member states.

The paper proceeds as follows. In **Section 2**, we start our analysis from the Baumol's cost disease hypothesis. Evidence from the US suggests that this disease is largely cured (Triplett and Bosworth, 2004), but we find that European market services are still "sick" in this respect. While the GDP and employment share of market services in the economy has increased, productivity growth is still slow in most industries.

In **Section 3**, the role of ICT in growth in Europe and the US is investigated by means of a growth accounting decomposition. We show that the low levels of ICT capital deepening which were previously found for aggregate economies (Timmer and van Ark, 2005) are also found for market service industries. But lower levels of ICT investment in Europe explain only a minor part the entire productivity differential between the EU and the US.

In **Section 4**, we push the analysis a step further and hypothesize that the long-run effects of ICT can be much bigger than the short-run effects as measured in conventional growth accounting. The long-run effects of ICT might be closely related to the effects of unmeasured investments in organisational capital, such as organizational changes and staff training that are complementary to ICT. The hypothesis is tested by means of an econometric model using data for twelve countries and nine services industries for the period 1980-2004. We find that ICT investment makes a contribution to measured productivity and output growth in the short run that is consistent with normal returns to ICT. However, the contribution of ICT is strongly increasing over time, up to 80 percent larger over a 10-year horizon. This type of result was found earlier for firm level data in the US (Brynjolfsson and Hitt, 2003), but this is the first time it has been found at the industry level and in an international comparative perspective. It suggests that, given its lower levels of ICT investment, the full potential for the dynamic effects of ICT has still not been realised in Europe.

In **Section 5**, we concentrate on another source of slow productivity growth in Europe, namely through the inefficient allocation of factor resources across countries. Indications of static inefficiencies emerge from the large differences in relative levels of total factor productivity across European countries. These relative MFP levels are derived with a new set of industry-level purchasing power parities from the EU KLEMS database. We find a large spread of MFP levels across Europe of up to 40 percent, indicating substantial inefficiencies in the allocation of production factors across Europe. There is some evidence of convergence in productivity levels in market services across countries, but not everywhere. In particular, we find more convergence in countries with less regulated product markets, which is in line with the work by Nicoletti and Scarpetta (2003) and Conway *et al.* (2006).

However, in **Section 6**, we show that the complexity of the relationship between productivity, ICT, innovation and intangible capital, and reforms in labour and product markets is not easily captured in full by statistical analysis. We report on a detailed case study of the retail industry in the US and Europe carried out during 2004 and 2005

(McGuckin *et al.*, 2005). The retail case study illustrates the differences between short-term and long-run effects of ICT. It shows how land-use regulations and labour laws have reduced the incentives in Europe for investment in new technologies and experimentation with new organizational models.

In **Section 7** we conclude that the slow growth of services productivity growth in Europe is largely the result of a slow convergence towards an industrial structure with a greater share of service industries that make intensive use of ICT. This indicates that Baumol's disease might be on its way to be cured in Europe, provided that structural impediments in product and factor markets that hold back investment in ICT and perpetuate static inefficiencies are removed. However, we argue that an optimal policy mix should not be focused only on the regulatory framework, as technology and educational policies and macro-economic management play an important roles as well.