Determinants of TFP growth: A close look at industries driving the EU–US TFP gap

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A B S T R A C T

This paper explores the determinants of the EU–US TFP growth gap using EU KLEMS. As found in previous analyses, TFP growth appears to be driven by catching-up phenomena associated with the gradual adoption of new technologies. TFP growth is also significantly driven by developments at the “technological frontier”, especially since the mid-1990s. Industries with higher R&D expenditures and higher adoption rates for ICT-intensive technologies appear to exhibit higher TFP growth rates, whilst human capital has mostly a significant effect across countries. Regarding determinants in industries relevant for the different TFP performance of the EU versus the US, ICT-producing industries appear to benefit from R&D in terms of stronger spillovers from TFP gains at the frontier, network utilities are strongly affected by product market regulations, whilst the retail and wholesale trade industry is significantly influenced by consumption dynamics which permit a better exploitation of scale economies.

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1. Introduction

Total factor productivity (TFP) is the main driver of growth in most mature economies, and understanding the determinants of TFP growth is essential in devising policies that help to enhance growth prospects. Most existing analyses aimed at analysing the determinants of TFP growth take either an aggregate perspective or make use of the overall available industry sample in panel data analysis. However, there is growing agreement that the bulk of TFP growth could be concentrated in a relatively narrow set of industries. This consideration appears especially relevant for the debate on the gap between the EU and the US in terms of productivity growth.

According to the prevailing view, the EU–US TFP growth gap is structural in nature, with the implication being that in the absence of a substantial policy turnaround, the EU could be condemned to a long period of relatively low TFP growth (e.g., Sapir et al., 2003; van Ark et al., 2003). This pessimistic assessment reflects the fact that the EU’s current institutions and policy frameworks underpin its comparative advantage in medium-technology manufacturing industries, where the room for further substantial TFP growth appears limited.1 Conversely, some observers consider the EU–US productivity gap as being, at least partly, due to measurement problems and mostly temporary, in light of the lagged effects from the labour, capital and product market reforms progressively introduced in the EU since the early 1990s (e.g., Blanchard, 2004).

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fers strongly across sectors and is actually concentrated in a handful of industries. Whilst the US advantage is highly concentrated in industries producing information and communication technology goods (ICT) and in a number of market services, notably retail trade services and business services, the EU exhibits stronger TFP growth in network utilities, notably telecommunications.

Since TFP determinants are likely to differ substantially across industries, this paper aims at identifying the TFP growth drivers in those industries that are key in explaining the divergent TFP performance of the EU relative to the US.

The analysis makes use of the EU KLEMS\(^2\) database, an industry-level database funded by the European Commission and constructed by a consortium of European academic and government research institutes co-ordinated by the National Institute of Economic and Social Research (NIESR) in the UK and the Groningen Growth and Development Centre (GGDC) in the Netherlands. The database contains high-quality measures of factor inputs and has been conceived with the explicit purpose of carrying out growth analyses. In particular, it makes data available on different types of capital and, skills-differentiated, categories of labour. Compared with previous similar analyses using the EU KLEMS database (Inklaar et al., 2008), our sectoral focus is broader since it does not restrict itself to private services but also includes manufacturing. In addition, there is also an attempt to explore the role of a larger set of potential TFP determinants: human capital, R&D, ICT capital, product and factor market regulations, macroeconomic developments, and industry-level indicators of changes in firm demography.

The paper adopts a “neo-Schumpeterian” growth approach (e.g., Aghion and Howitt, 2006) to analyse TFP determinants: TFP growth depends on the rate of innovation and on the rate at which “state-of-the-art” technologies are adopted/diffused throughout the wider economy. Countries that are close to the technology frontier mainly grow via the introduction of new technologies, whilst the “follower” grouping of countries derive the growth mainly grow via the introduction of new technologies, whilst an “across the board” increase in R&D and ICT does not significantly affect TFP growth. Regarding industry-specific determinants, ICT-producing industries appear to benefit from R&D in terms of stronger spillovers from TFP gains at the frontier; network utilities are strongly affected by improvements associated with reduced product market regulations; whilst the retail industry is significantly influenced by consumption dynamics which permit a better exploitation of scale economies.

The remainder of the paper is organised as follows. Section 2 describes the data and provides a descriptive analysis of TFP growth patterns in the EU and the US. Section 3 presents the conceptual background and an overview of existing empirical work on TFP determinants at the industry level. Section 4 presents the results from the econometric analysis. Section 5 summarises the results and discusses policy implications.

2. Data and stylised facts

The following analysis uses the EU KLEMS database, released in 2007 and constructed by a consortium of EU academic and government research institutes (see O’Mahony and Timmer, 2009). The purpose of EU KLEMS is to analyse growth at the industry-level in advanced economies over recent decades. The value added of EU KLEMS is the improved quality and availability of information on the various inputs used in production. Gross output is decomposed into the contributions of intermediate inputs (i.e. energy, materials and services) as well as

\(^2\) K for capital, L for labour, E for energy, M for materials, S for services.
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