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Productivity Performance of the Service Sectors in European Union Countries

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Abstract

Economic development has resulted in structural transformation towards economies based on services, which has raised some concerns about the limited opportunities for sustaining productivity growth. The aim of this paper is to examine total factor productivity (TFP) growth in the service sector in comparison with total industries and the manufacturing sector, as well as within the service sector. The study is based on the data from the EU-KLEMS database (2017), and it covers the years 1995–2015. It refers to EU countries, making it possible to carry out a comparative analysis between countries, in particular between the 'old' and 'new' member states. The study demonstrates that productivity growth in services was significantly lower than in manufacturing, but compared with total industries, the disparity was not significant. Productivity growth was usually higher in the 'new' EU countries than in the 'old' ones, except for information and communications services, which, on the whole, were the main driving force behind the productivity growth in services.

Keywords: productivity, TFP, services, EU

JEL: O14, O47

Introduction

Each economy has a three-sector structure that undergoes transformations along with its economic development. The agricultural sector dominates in the first stage of economic development, the industrial sector dominates in the second stage, and the service sector dominates in the third stage. The process of sectoral transformation that can be observed since the second half of the 20th century can be characterized by the growth of the service sector. This has drawn much attention not only due to qualitative changes reflected in the growing share of the service sector in output and employment but also due to its dynamics in favor of the service sector. The growing importance of the service sector has also raised some concerns within the economic environment, because according to the three-sector model, technological progress and the resulting productivity growth in the service sector is low, compared to industry and even agriculture (Fourastie 1954), which limits the possibilities of productivity growth in economies based on services (Baumol 1967; Baumol et al. 1985, 1989). Moreover, there is a threat of the cost disease, defined as a relative increase in service prices as a result of growing wages in service industries (which do not experience productivity growth) in response to growing wages in other industries (experiencing productivity growth). This, in turn, could reduce the demand for services and economic growth, as well.

One should note, however, that in the light of this model, the growing consumer demand for services, along with their growing income, is the main driving force behind the structural transformation towards the development of the service economy. Moreover, due to the fact that consumer services consist mainly of traditional services with limited possibilities for productivity improvement, this threat seems to be justified. A significant disadvantage of this model is that it does not take into account the producers' demand for services, which also increases with technical progress and economic development. Increased interest in the role of producer services[1] has been visible only since the 1980s (a review of the literature in this field can be found in Wyszkowska-Kuna 2016). Producer services also consist of diversified activities; among them one can mention traditional services (i.e., labor-intensive services, which use new technologies to a small extent, generally low-paid, with poor social status, e.g., cleaning, security, catering), as well as those related to new technologies and knowledge (Wyszkowska-Kuna 2016). The second category can be characterized by higher possibilities for efficiency growth and the growing use by different industries along with the structural transformation towards economies based on knowledge and innovation. What is also worth mentioning is that these services contribute to higher productivity performance in other industries using them (Wyszkowska-Kuna 2016), which removes the threat of the stagnation of overall productivity growth in the economy. Some new

1 'Producer services', including financial services, insurance, real estate and business services, are a sub-category of intermediate services that also comprise 'distributive services', i.e.,: transport and storage, communications, retail and wholesale services (Browning and Singelman 1978).

opportunities for productivity growth in services also resulted from the development of ICTs that have been widely introduced into industries such as banking, communications, telecommunications, transport, insurance, education, science, and healthcare (Szukalski 2001; Skórska 2012; Wyszkowska-Kuna 2016). Finally, one should note that the creation of the EU KLEMS and WIOD databases has made it possible to study the productivity performance of services in developed countries, including EU countries, as well as to work on more complete and comparable data between countries.

The study tries to answer the question of whether the opportunities for productivity growth in services have increased along with the information and communications technology (ICT) revolution, the growing role of the knowledge-intensive business services (KIBS) sector, and the improved availability of relevant data for service industries. The study is based on data derived from the EU KLEMS database (2017) and it refers to nineteen EU countries for which it is possible to calculate TFP growth (because of the lack of data on capital input for Belgium, Ireland, Portugal, Bulgaria, Latvia, Croatia, Cyprus, Malta, and Romania, these countries are excluded from the study). The analyzed period covers the years 1995–2015, and it is divided into three sub-periods: 1995–2007 (the pre-crisis period), 2008–2010 (the crisis period), and 2011–2015 (the post-crisis period). In the case of some countries, this period is shorter because of the lack of data. To compare the results for the 'old' and 'new' EU member states, weighted averages for EU–12 and EU–6/7[2] are calculated.

The paper is organized as follows. Section 2 reviews the related studies. Section 3 describes the methodology and the data source. Section 4 presents and discusses the empirical results. Section 5 concludes.

Literature review

Since the 1990s, the number of papers on productivity growth in services has increased, but they generally proved that productivity improvement in services is harder to be achieved than in goods-producing industries (Baumol 1967, 2002; Mairesse & Kremp 1993; Licht & Moch 1999; Ark et al. 1999; Triplett & Bosworth 2001, 2003; Wolff 2002; Grönroos & Ojasalo 2004; Baláž 2004; Sahay 2005; Djellal & Gallouj 2008; Savona & Steinmueller 2013; Biege et al. 2013; Grassano & Savona 2014; Growiec et al. 2014).

While discussing the subject literature, studies indicating the problems with productivity measurement in services should be mentioned. Productivity measurement concepts have been deeply rooted in the context of mass manufacturing. They are based on contrasting input and output. Measuring service input and output raises new challenges due to the peculiarities of services, such as intangibility, heterogeneity, inseparability, and perishability. The customer is always a part of the service, and hence,

2 In case of the two first periods, the study refers to six of the 'new' member states due to the lack of data for Hungary.

customer actions need to be considered on the input side. Consequently, quantifying customer co-operation is necessary (Blois 1985; Grönroos 1990). Furthermore, service readiness, which is the major prerequisite of service delivery, also needs to be incorporated into measuring productivity. Finally, the problem of how to include quality in the analysis of the productivity of service operations arises (Vuorinen et al. 1998; Sahay 2005).

There are even more challenges if we intend to incorporate innovativeness and knowledge intensity of services into an adequate productivity measurement. Traditional productivity measurement concepts, as well as service-oriented concepts, will privilege less innovative products and services due to their steady-state of production and delivery. Hence, controlling merely by operating figures derived from existing productivity measurement concepts will mislead entrepreneurial decisions. The same statement can be made for knowledge-intensity, as one of the major input factors of productivity is employee, customer and third party knowledge, which is hard to quantify in existing productivity measurement concepts (Biege et al. 2013).

Finally, Hershey and Blanchard (1980) warn that problems can result from concentrating on increased productivity defined as output. They suggest the effectiveness of the firm is a better productivity measurement, with effectiveness individualized by an organizational decision as to goals and objectives. This is similar to a value-added measurement schema. The value-added concept provides an index for monitoring the effectiveness of the effort put in by the employees in achieving market position (Vrat et al. 1998). In line with such an approach, in the present study, TFP is calculated based on value-added.

Due to the above-mentioned problems, there is a high probability that the productivity changes in services will be underestimated. On the other hand, with the improvement of measurement methods, more adequate results for productivity growth in service industries can be expected. As we can find out from the study by Triplet and Bosworth (2003) in the U.S.A., the post–1973 productivity slowdown was greater in the tertiary sector than in manufacturing, while during the mid–1990s, service industries on average did about as well as the rest of the economy, both in their average rate of labor productivity growth and in their post–1995 acceleration. They concluded that perhaps the services industries were never sick, it was just that the measuring thermometer was wrong. The recently developed databases (EU KLEMS and WIOD) have created some new opportunities to verify this hypothesis. One should note, however, that the problems with measuring service output are also mentioned in the methodological explanations to these new databases (O'Mahony & Timmer 2009). They are still visible in areas such as financial or business services, real estate activities,[3] and in particular, in public services (such as public administration, health care, education, etc.), where there are no market prices that are necessary to aggregate the output/value-added coming from different divisions. Finally, the risk of lower reliability of data on service industries than

3 Data for the division Real estate should be interpreted with caution, because the majority of output in this area constitutes rent assigned to the owners of rented apartments.

on manufacturing industries should be mentioned. This is due to the fact that when constructing these databases, a variety of additional data sources were used, which are generally less numerous and often more incomplete in the case of service industries.

Data and methodology

In the present paper, the growth accounting framework is used to calculate changes in total factor productivity (TFP). The methodology of the decomposition of output or value-added volume growth was theoretically motivated by Jorgenson and Griliches (1967) and put in a more general input-output framework by Jorgenson et al. (1987). The advantage of this methodology is the ability to assess the contribution of all inputs to aggregate economic growth and changes in TFP. The starting point for the analysis is production possibility frontiers, where industry value-added (VA) is a function of capital and labor inputs and technology, which is indexed by time (*T*). Each industry (indexed by *j*) purchases a number of distinct capital and labor inputs to create its value-added. The production function is given by:

$$VA_j = f_j\left(L_j, K_j, T\right), \tag{1}$$

where: *VA* – is value-added; *L* – is an index of labor service flows; *K* – is an index of capital service flows.

Value-added is expressed in producer prices, and the costs – in purchaser prices. Under the assumptions of competitive factor markets, full input utilization, and constant returns to scale, the growth of value-added in the period between any two discrete points, say *t* and *t* –1, can be expressed as the cost-share weighted growth of inputs and technological change A^Y (Jorgenson et al. 1987, pp. 32–40; O'Mahony & Timmer 2009, p. 376):

$$\Delta lnVA_j = \overline{v}_j^L \Delta lnL_j + \overline{v}_j^K \Delta lnK_j + \Delta lnA_j^Y, \tag{2}$$

where v^i denotes the two period average share of input *i* in nominal output, defined as follows:

$$\overline{v}_j^L = \frac{1}{2}\left[\frac{P_{jt}^L L_{jt}}{P_{jt}^{VA} VA_{jt}} + \frac{P_{jt-1}^L L_{jt-1}}{P_{jt-1}^{VA} VA_{jt-1}}\right], \tag{3}$$

$$\overline{v}_j^K = \frac{1}{2}\left[\frac{P_{jt}^K K_{jt}}{P_{jt}^{VA} VA_{jt}} + \frac{P_{jt-1}^K K_{jt-1}}{P_{jt-1}^{VA} VA_{jt-1}}\right], \tag{4}$$

and: j = (1, 2, …, n), and $\overline{v}^L + \overline{v}^K = 1$.

Each element on the right side of equation (2) indicates the proportion of value-added growth accounted for by growth in capital services, labor services, and technical change. Technical change is measured by TFP.[4]

This method can be applied to the decomposition of value-added growth, not only in each industry but also with respect to total industries.

To assign VA volume growth in the EU countries (EU KLEMS 2017) to the contributions of labor input, capital input, and TFP, average annual growth rates of each input volume should first be calculated, and then they should be weighed by average shares of their costs in VA value.

Labor input is the number of hours worked by the people engaged (EU KLEMS 2017). The category "people engaged" is broader than the category "employees", because it includes, in addition to employees, self-employed workers (Timmer et al. 2007, p. 25).

Capital input is the value of real fixed capital assets in 2010 prices multiplied by the number of hours worked per person engaged (EU KLEMS 2017). The number of hours worked per person engaged is used as an indicator that shows the shift-factor, i.e., the degree to which capital assets are used in the analyzed period, depending on the economic situation.

Labor compensation is the compensation of all people engaged, while capital compensation (EU KLEMS 2017) is derived as gross value added minus labor compensation (O'Mahony & Timmer 2009, p. 380).

The data needed for the decomposition of VA volume growth are available in two databases, i.e., the EU KLEMS and the WIOD, both developed by the European Commission as a part of the EU 7th Framework Programme. In the present study, data from the EU KLEMS database are used due to the availability of data on capital investments for the analyzed period.

Empirical results

The TFP growth rates presented in this section are calculated for the whole service sector (services – S), as well as for individual service industries, i.e., wholesale and retail trade; the repair of motor vehicles and motorcycles (G); transportation and storage (H); accommodation and food service activities (I); information and communications (J), including publishing, audiovisual and broadcasting activities (J58–60), telecommunications (J61), and IT and other information services (J62–63); financial and insurance activities (K); real estate activities (L); professional, scientific, technical, administrative and support service activities (M–N); public administration and defence; compulsory social security (O); education (P); health and social work (Q); and arts, entertainment, recreation, and other service activities (R–S). The TFP growth rates for

4 Jorgenson et al. (1987) used the term "changes in productivity," whereas O'Mahony and Timmer (2009) used "multifactor productivity," but they both mean the same as "total factor productivity."

services are compared with the TFP growth rates for the following groups of industries: total industries (TOT); agriculture (A); mining and quarrying (B); manufacturing (C); and construction (F). The TFP growth rates are also calculated for two other groups of services, i.e., MS (market services) – excluding public services, i.e., without O, P, and Q; and KIBS – including J62–63 and M–N.[5] The data for MS are presented due to the above-mentioned problems with measuring service output in public services, whereas for KIBS, it is due to their growing importance in modern economies (Wyszkowska-Kuna 2016).

The values of the average annual TFP growth rates in the EU–12 and EU–6/7 presented in Graphs 1–2 show that productivity growth in the service sector was lower than in the total economy. In the EU–12 the disparity was not high, as the TFP growth rate in services accounted for about 75% of the TFP growth rate in total industries. One should note, however, that while taking into account only MS, the disparities were even smaller, because the TFP growth rate in MS was higher than in services, as well as higher than in total industries. The crisis period was an exception as, at the time, the negative growth rate of TFP in MS was twice as high as in services, and at a similar level as in total industries. In the EU–6/7 countries, the situation was slightly different. In the pre-crisis period, the TFP growth rate in MS was higher than in services and accounted for 82% (in services 75%) of the TFP growth rate in total industries. During the crisis period, productivity decreased both in services and MS (in MS to a larger extent), while in total industries, it was still on the increase. In the post-crisis period, a slight decline prevailed only in services, and the disparity slightly increased in comparison with the pre-crisis level.

A more significant gap is visible while comparing TFP changes in services and manufacturing. In the pre-crisis period, productivity in manufacturing increased much faster than in services: in the EU–12 countries, it was 4-times faster (in comparison with MS, 2.5-times), and in the EU–6, 3-times faster. In the EU–12 countries, there was a tendency to decrease this gap. As a result, in the post-crisis period, the TFP growth rate in services was 78% lower than in manufacturing (in the case of MS, only by 20%). In contrast, in the EU–6/7 countries, the tendency was the reverse, and as a result, the TFP growth rate in manufacturing became nearly six times higher than in MS (in comparison with services, the gap was even bigger).

The study of the TFP changes in the three subsequent periods shows the negative impact of the recent financial crisis on productivity in services – in the EU–12, the negative TFP growth rate in services occurred only in the crisis period, and in the last period, it nearly recovered to the pre-crisis level. In turn, in the EU–6/7, the decline of TFP persisted throughout both periods after the outbreak of the crisis, but with a downward trend (a positive growth rate of TFP returned only in MS). The situation was different

5 KIBS should only include the following divisions: legal and accounting activities; activities of head offices; management consultancy activities (M69–70); architectural and engineering activities; technical testing and analysis (M71); scientific research and development (M72); advertising and market research (M73), but the relevant data is available only for the whole category M–N.

in manufacturing, where a positive growth rate of TFP sustained throughout the entire period, although after the outbreak of the crisis, it was much lower than before the crisis. These results differ from the findings of the study by Ark and Jäger (2017), which show that productivity growth in manufacturing was particularly hard hit by the recent financial crisis. The difference probably derives from the fact that in the present study, the shift factor (described in section 3) was taken into account when calculating capital input. In the EU–6/7, the downward trend also persisted in the post-crisis period, but on the whole, the post-crisis growth rates were much below their pre-crisis levels in both groups, which is in line with the findings by Ark and Jäger (2017).

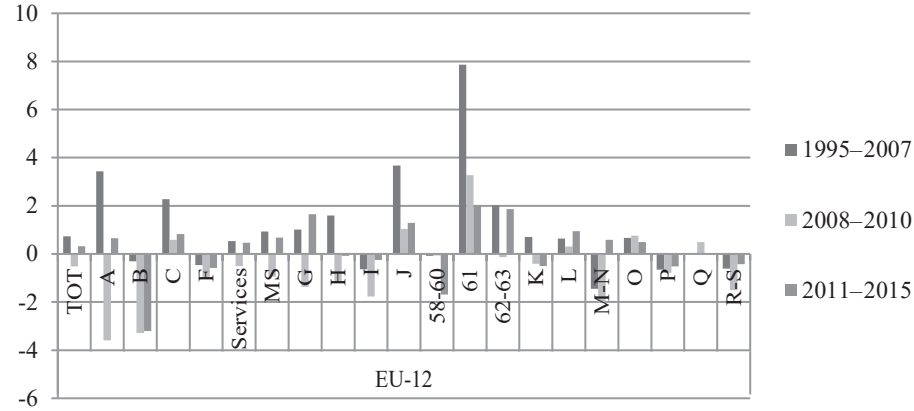

Figure 1. Average annual TFP growth rates in the EU–12 in the period 1995–2015 (in pp)
Source: own calculations based on data derived from EU KLEMS 2017.

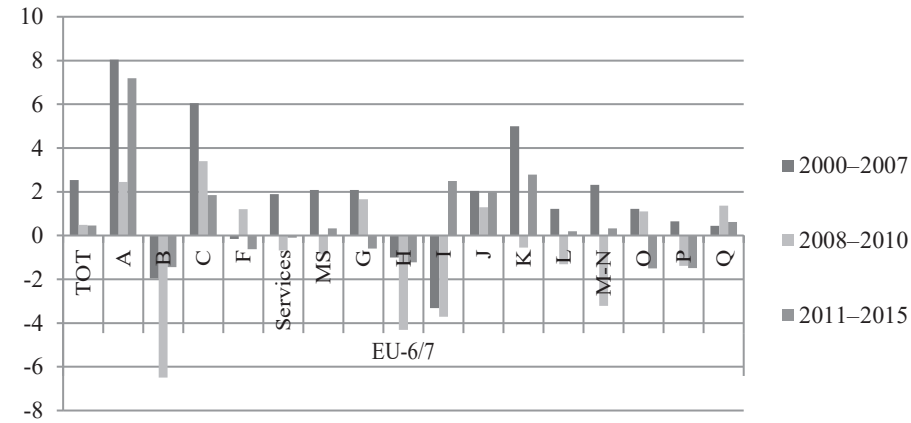

Figure 2. Average annual TFP growth rates in the EU–6/7 in the period 2000–2015 (in pp)
Source: own calculations based on data derived from EU KLEMS 2017.

A strong tendency to increase productivity was visible in agriculture. In the EU–6/7 countries, the agricultural sector recorded the largest increase in productivity, which

sustained throughout the entire period. In the EU–12 countries, agriculture also recorded the strongest increase in productivity, but only in the pre-crisis period, while during the crisis it suffered from the highest decline of productivity. The mining sector recorded a significant drop in productivity throughout the whole analyzed period, and a downward trend also prevailed in construction (except for the crisis period in the EU–6/7 countries).

Generally, higher productivity growth rates could be observed in the EU–6/7 rather than the EU–12 countries, which is in line with the process of the less developed EU countries catching up with the more developed ones, and the resulting higher growth rates of output/value added and productivity in the less developed EU countries.

Within the service sector, information and communications services (J) deserve particular attention, as they experienced impressive productivity growth throughout the whole analyzed period, although with a downward trend. This means a continuation of productivity growth in this area since the 1980s (Maroto-Sanches and Cuadrado-Roura 2011). What is more, in the EU–12 countries, the productivity growth in this section was higher than in manufacturing (in the EU–6/7, such a situation took place only in the last period), as well as higher than in the earlier period (not covered by the present study). The EU–12 countries recorded a higher productivity growth rate in this field than the EU–6/7, but there was a tendency to decrease this disparity. In the case of the EU–12 countries, the data are available for individual divisions within section J, which shows that, division 61 was the main driving force behind the productivity growth in this area – the TFP growth in this division reached the highest value in the whole economy, and it persisted even during the crisis period. Divisions 62–63 also recorded relatively high productivity growth, although they did not avoid a slight decline during the crisis period. The general trend of productivity growth is also visible in the following sections: Q, O, G, and L, while downward trends prevailed in sections I, H, P, J58–60, and R–S. When compared with the results of previous studies in this field (Breitenfellner and Hildebrandt 2006; Maroto-Sanches and Cuadrado-Roura 2011), one can notice that productivity was still on the increase in distributive services (G). The situation was the reverse in transportation and storage (H), as a positive TFP growth rate was sustained only in the EU–12 during the pre-crisis period, whereas it declined significantly in the EU–6/7. One should also note that real estate services (L) managed to sustain productivity growth in the periods covered by the present study, but it was much lower than labor productivity growth in the years 1983–2003, particularly with respect to the 'old' EU countries. In the case of other sections, productivity growth was intertwined with its decline. In the EU–6/7, financial services (K) deserve attention as they recorded the highest productivity growth within the whole service sector (except for the crisis period). In turn, in the EU–12, a slight increase in this field is visible only in the pre-crisis period, whereas in the years 1983–2003, productivity growth in the EU–12 was among the highest.

Table 1. Average annual TFP growth rates in the EU–12 in the period 1995–2015 (in pp)

Country	AUT			DNK			FIN		
Time	95–07	08–10	11–15	95–07	08–10	11–15	95–07	08–10	11–15
TOT	1.2	–0.3	0.6	0.4	0.6	0.8	2.4	–1.6	–0.7
C	2.6	–2.4	0.7	1.3	1.4	3.1	6.4	–4.5	–0.6
S	0.6	0.8	0.3	0.2	0.4	0.8	0.8	–1.2	–0.6
MS	0.6	0.3	0.3	0.2	1.0	0.5	1.3	–1.5	–0.5
J	2.1	–1.7	–0.7	5.4	3.3	6.6	6.1	3.7	4.1
58–60	3.0	–5.3	–0.3	1.9	–0.7	6.1	2.0	–1.4	–2.8
61	1.2	–1.1	–1.9	10.7	3.7	12.8	11.7	12.7	7.3
62–63	2.3	–1.5	–0.9	5.2	6.1	2.9	2.8	0.1	3.3
M–N	–0.4	0.4	0.0	–2.6	–2.3	2.2	0.1	–3.2	–0.5
KIBS	–0.1	0.2	0.1	–1.9	–0.6	2.3	0.6	–2.7	1.1
Country	FRA			GER			GBR		
TOT	0.8	–0.6	0.6	1.3	–0.6	0.5	0.9	–0.1	–0.3
C	2.9	1.9	1.1	3.1	1.1	0.5	2.3	1.8	–0.1
S	0.6	–0.6	0.7	0.9	–1.1	0.6	0.9	0.3	0.2
MS	2.0	–1.0	0.3	1.3	–2.0	0.8	1.1	0.6	0.7
J	2.7	–1.7	1.0	4.8	1.5	2.5	5.7	2.8	0.4
58–60	1.2	–1.4	–1.0	0.6	1.7	–1.5	2.3	–1.7	1.6
61	7.0	–2.0	3.6	9.2	8.1	4.7	10.8	2.6	–3.3
62–63	0.1	–1.9	0.7	3.8	–1.0	3.9	3.6	4.5	1.3
M–N	–1.3	–1.9	–0.4	–2.6	–3.8	0.7	1.7	0.2	2.2
KIBS	–1.1	–1.9	–0.2	–2.0	–3.5	1.5	2.2	1.0	2.1
Country	GRC			ITA			LUX		
TOT	1.1	–1.8	–0.8	0.0	–0.9	0.3	0.6	–0.7	0.1
C	1.0	–4.6	1.1	0.5	0.2	1.0	1.4	–3.8	8.5
S	0.8	–2.4	–0.8	–0.1	–0.8	0.1	0.5	–0.6	–0.3
MS	0.4	–4.5	1.7	–0.2	–0.8	0.2	0.5	0.1	–0.5
J	3.7	–4.5	–6.2	2.5	1.7	–1.3	1.5	6.7	0.3
58–60	–2.4	–4.6	–12.9	–0.9	0.4	–7.0	–6.5	2.0	7.6
61	7.4	–8.9	–4.4	5.9	3.0	–2.2	5.3	11.2	–9.2
62–63	–10.1	–0.3	–5.6	0.4	0.1	1.5	–	–	–
M–N	–3.8	–13.9	–6.6	–2.7	–1.9	–0.7	–4.4	–4.7	0.1
KIBS	–4.0	–13.2	–6.5	–2.3	–1.6	–0.3	–	–	–
Country	NLD			ESP			SWE		
TOT	0.8	–0.6	0.7	–1.2	0.2	0.6	1.1	–1.4	0.1
C	2.8	–1.3	0.6	0.0	–0.6	3.0	4.0	1.3	–1.1
S	0.7	–0.2	0.8	–0.4	0.2	0.7	0.4	–1.4	1.2
MS	1.0	–0.9	0.9	–0.6	–0.7	1.1	1.1	–2.5	2.2
J	5.2	0.4	1.9	–1.4	1.8	3.6	3.1	2.2	2.5
58–60	0.8	–1.7	–1.4	–7.2	5.0	–3.8	0.8	–3.9	1.2
61	10.5	2.0	0.8	1.5	4.0	7.6	7.3	8.4	4.8
62–63	2.4	–0.8	3.3	2.1	–3.9	1.4	0.4	1.1	0.8
M–N	–0.7	–1.2	1.0	–4.6	–0.8	1.3	0.6	–0.8	1.8
KIBS	–0.3	–1.1	1.5	–3.8	–1.0	1.3	0.6	–0.4	1.8

GBR – 1997–2007 and 2011–2014; GRC, ITA, SWE – 2011–2014; NLD – 2000–2007
Source: own calculations based on data derived from EU KLEMS 2017.

As far as productivity changes in individual EU–12 countries are concerned (Table 1), Austria, Denmark, and the United Kingdom recorded productivity growth in services throughout the whole analyzed period, and these countries achieved the best results in this area. The TFP growth rates in services were generally lower than in manufacturing. The opposite situation took place only in the post-crisis period in the Netherlands and Germany, whereas in Austria and Spain (in the crisis period), as well as in Sweden and the United Kingdom (in the post-crisis period), the productivity growth in services was accompanied by its decline in manufacturing. In most countries, productivity decline occurred only during the crisis period, and more countries experienced a productivity decline in services than in manufacturing (8 and 6, respectively).

Table 2. Average annual TFP growth rates in the EU–7 in the period 1995–2015 (in pp)

Country	CZE			EST			LTU			HUN
Time	95–07	08–10	11–14	00–07	08–10	11–14	00–07	08–10	11–14	11–14
TOT	1.7	–1.1	1.1	1.8	0.5	0.9	4.5	–3.6	2	1.3
C	4.8	1.3	–0.4	0.7	3.9	3.5	5	0.9	4.4	0.3
S	0.6	–1	1.7	2.7	–1.2	0.4	2.8	–4	1.9	1
MS	0.7	–1.6	2.4	4.2	–0.5	1.1	2.9	–4.8	1.4	0.9
J	0.6	–0.6	1.7	–0.3	2.1	5.4	0.5	2.9	3.7	0.2
58–60	2.6	0.9	2.6	–	–	–	–	–	–	–
61	–1.3	–0.7	5.9	–	–	–	–	–	–	–
62–63	0.7	–3.7	–3.2	–	–	–	–	–	–	–
M–N	–0.8	–4.6	0.6	6.1	–2.0	–1.3	7.2	–11.4	0.8	–4.0
KIBS	–0.2	–4.1	0.1	–	–	–	–	–	–	–
Country	POL			SVK			SVN			–
Time	03–07	08–10	11–14	04–07	08–10	11–15	00–07	08–10	11–15	–
TOT	2.9	2.3	–0.3	5.3	–1	1.3	3.3	–2.2	0.5	–
C	8.4	5.3	2.2	8.4	6.5	5.9	5.3	–0.2	1.1	–
S	2.7	–0.2	–1.2	3.5	–1	0.3	1.5	–2.6	0.3	–
MS	3.1	0.02	–0.8	2.4	–2.2	1.2	2.1	–2.8	0.7	–
J	2.5	2.8	2.8	6.4	0.9	–0.3	3.6	–2.3	1.0	–
58–60	–	–	–	17.9	–2.2	–3.1	–	–	–	–
61	–	–	–	0.7	–6.5	–0.1	–	–	–	–
62–63	–	–	–	13.8	10.0	–4.8	–	–	–	–
M–N	2.5	–2.9	0.4	12.1	–3.3	–0.6	–2.4	–2.7	1.1	–
KIBS	–	–	–	12.4	–1.1	–1.3	–	–	–	–

Source: own calculations based on data derived from EU KLEMS 2017.

The EU–6/7 countries (Table 2) usually also suffered from productivity decline in services only during the crisis period. In the pre-crisis period (2000/03–2007) the highest TFP growth rates can be attributed to Slovakia, Lithuania, Estonia, and Poland, while in the post-crisis period – to Lithuania and the Czech Republic. During the crisis period, the highest productivity decline in services occurred in Lithuania,

while in Poland a downward trend persisted through the post-crisis period. In turn, productivity in manufacturing was on the increase throughout the whole analyzed period, and a slight decrease occurred only in the Czech Republic (in the post-crisis period) and in Slovenia (in the crisis period). On the whole, the TFP growth rates in services were much lower than in manufacturing, and there was no tendency to decrease these disparities.

If we take into account the TFP changes in MS, they were generally more considerable than in services.

In the case of section J, the periods of TFP growth clearly dominated, and in nine countries, the growing trend sustained throughout the whole analyzed period. Denmark and Finland recorded the highest TFP growth rates, as well as Poland among the EU–6/7 countries. TFP changes were generally smaller in the 'new' EU member states than in the 'old' ones. Austria and Greece were the only two countries where a downward trend continued over the last two periods.

What seems surprising is the productivity decline in the KIBS sector in most EU–12 countries. What is more, the negative growth rates in this field were quite significant, and in some countries, they occurred throughout the whole analyzed period (France, Greece – the largest drop overall, and Italy). An exception is the United Kingdom, which experienced a constant and significant increase in productivity in the KIBS sector. In most cases, productivity drops in the KIBS sector resulted from the negative TFP growth rates in sections M–N, although in several countries during the crisis period productivity also declined in divisions 62–63. With respect to the EU–6/7 countries, the TFP growth rates for the KIBS sector were calculated only for the Czech Republic and Slovakia due to the lack of relevant data for divisions 62–63. In the Czech Republic, the situation was similar to that in the EU–12. In turn, Slovakia recorded a very high TFP growth rate in both KIBS fields, much higher than in other countries, but only in the pre-crisis period (in divisions 62–63, also in the crisis period). In section M–N, a downward trend prevailed in most countries.

Conclusions

The study carried out in the present paper shows that productivity growth in services was significantly lower than in manufacturing, but compared to total industries, the disparity was not significant (in the EU–12 in the post-crisis period, the TFP growth rate in services was even higher than in total industries).

While taking into account only market services, the TFP growth rates were usually higher than in total services, which confirms more significant problems with measuring productivity in the case of public services. The TFP growth rates were generally higher in the 'new' EU member states than in the 'old' ones, which is in line with the process of the less developed EU countries catching up with the more developed ones,

and the resulting higher growth rates of output/value added and productivity in the less developed EU countries.

Information and communications services were an exception, as the 'old' EU countries achieved better results in productivity growth in this field than the 'new' ones. Information and communications services appeared to be the only category where TFP increased for all three periods in both groups of countries. The TFP growth rates in this area were among the highest, but a downward trend can already be noticed.

The situation was the reverse in professional, scientific, technical, administrative, and support service activities. The problem with this section is that we cannot exclude less knowledge-intensive services (N77–82). On the other hand, the productivity decline in this field seems to be in line with Baumol's unbalanced growth model (2002), with R&D services included to study the effects of the stagnation of labor productivity in R&D on the long-turn GDP growth. R&D services are similar to KIBS, as they combine a 'progressive' input (input characterized by higher productivity than the average in the economy) and a 'stagnation' input (in the form of intellectual work) (Desmarchelier et al. 2013). As Baumol (2002, p. 153) noted: "The act of thinking is a crucial input for the research process, but there seems to be little reason to believe that we have become more proficient at this handcraft activity than Newton, Leibnitz or Huygens." Assuming that there is an economy-wide single wage rate and that it increases at the average productivity rate, progressive input costs will decrease, while the stagnant input costs will increase, making R&D and KIBS activities more and more expensive. Thus, one should note that while R&D and KIBS services contribute to productivity growth in other industries using them (Wyszkowska-Kuna 2016), they are less likely to experience productivity growth on their own.

The recent financial crisis negatively affected productivity growth in both services and manufacturing. The productivity decline usually occurred only during the crisis period, but on the whole, the TFP growth rates have not recovered to pre-crisis levels in most EU countries. In the 'new' member states, the services sector was more significantly hurt by the crisis than the manufacturing sector.

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Streszczenie

Produktywność sektora usług w krajach Unii Europejskiej

Rozwój gospodarczy przyczynił się do transformacji strukturalnej w kierunku gospodarek usługowych, co zrodziło obawy związane z możliwościami utrzymania wzrostu produktywności. Celem niniejszej pracy jest zbadanie wzrostu łącznej produktywności czynników produkcji (TFP) w sektorze usług w porównaniu z gospodarką ogółem i sektorem przetwórczym, jak również wewnątrz sektora usług. Badanie przeprowadzono w oparciu o dane pochodzące z bazy EU-KLEMS (2017) i obejmuje ono lata 1995–2015. Badaniem objęto kraje UE, co daje możliwość analizy porównawczej między krajami, a w szczególności między krajami 'starej' i 'nowej' UE. Z badania wynika, że wzrost produktywności w usługach był znaczenie niższy niż w przetwórstwie, ale w porównaniu z gospodarką ogółem różnica nie była już znacząca. Wyższy wzrost produktywności notowały kraje nowoprzyjęte do UE niż kraje starej UE, z wyjątkiem usług informatycznych i komunikacyjnych, które ogólnie były siłą napędową wzrostu produktywności w usługach.

Słowa kluczowe: produktywność, TFP, usługi, UE