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Productivity in European private and public services: A growth accounting approach

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PRODUCTIVITY IN EUROPEAN PRIVATE AND PUBLIC SERVICES: A GROWTH ACCOUNTING APPROACH

ABSTRACT

One of the most outstanding debates in the international economic circles is the one on productivity and related issues. Low productivity growth in most advanced countries has historically been related to structural changes and, more precisely, to the performance and weight of service industries (both in terms of labour and value added). The aim of the paper is, first, to describe the behaviour of productivity in service industries and the factors shaping it. Secondly, to apply growth accounting techniques to analyze the contribution of the different service activities to economic growth and the contribution of several factors to their productivity growth. The focus is the European case (as the work belongs to a broader European Commission project – ServPPIN), both old and new member states, although the United States is referenced too. The database has been elaborated using Groningen Growth and Development Centre (GGDC) databases and EUKLEMS database. The time range of the research is from 1979 onwards.

KEYWORDS: Productivity, Services, Growth accounting, Europe

RESUMEN:

Uno de los temas más interesantes dentro del ámbito económico internacional en los últimos años ha sido el de la productividad porque, como dijo el Premio Nobel P. Krugman, la productividad a largo plazo lo es todo. Por otra parte, el bajo crecimiento de la productividad en algunas economías avanzadas se ha relacionado históricamente con algunos cambios estructurales y, más concretamente, con el crecimiento y predominancia del sector servicios en la estructura económica de dichas economías. El objetivo de este documento de trabajo es, en primer lugar, describir el comportamiento de la productividad en el sector servicios, tanto a nivel agregado como en los diferentes subsectores y ramas de actividad de los que se compone este heterogéneo sector. Y, en segundo lugar, aplicar técnicas de contabilidad del crecimiento para analizar la contribución de las actividades de servicios al crecimiento económico y de la productividad del trabajo. El trabajo, perteneciente a un proyecto financiado por la Comisión Europea dentro del VII Programa Marco, analiza principalmente los países de la Unión Europea, aunque Estados Unidos se tomará como referencia en muchos casos. La base de datos se ha elaborado utilizando las fuentes de la Conference Board y EUKLEMS y el horizonte temporal del análisis cubre desde el año 1980 hasta la actualidad..

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1. INTRODUCTION

European economies are advanced economies, and this is why they are also services economies. In developed countries, the service sector has evolved continually over the past thirty years, modifying the structure of employment and the composition of value added. Nowadays, services companies generate about 70 per cent of value added and employment in the most developed countries. Despite the recent advances, services are still inadequately studied by researchers, underestimated by politicians and insufficiently exploited by many entrepreneurs. The traditional perception of services as unproductive still persists in the common mind of the present society. Even today, in the centre of a society characterized by knowledge, information and intangibles, many still consider services as secondary activities to economic growth. This idea is inherited from a materialist concept which, literally speaking, ostentatiously conflicts with the current reality.

One of the most outstanding debates in recent years around the service sector, especially in the European economies, has been the one on productivity issues. On the one hand, it is due to the increasing paper, both in quantitative and strategic terms, which these industries play in European countries. Secondly, on the base in the conventional theories related to the unproductive nature that display the service sector, whose historical base appeared at the end of the 60s with the well-known '*cost disease*' introduced by W. Baumol. This injurious myth set on the productivity of services has lead to many economists to affirm that the tertiarization processes in advanced countries restrains the productivity growth of their overall economies (**Box 1** deepens more in the relationships between productivity and service sector), worsening their long run growth and the life standards of their population.

Box 1.

Relationships between productivity and service sector

The question of why services grow has been the object of many explanatory hypotheses and theories throughout economic literature. Although a sole factor cannot answer that previous question, two hypotheses on the growth of the service sector prevail over the rest. Firstly, its differential of productivity related to other economic sectors. And, secondly, its greater income elasticity. Taking into account the aim of this paper, we will focus in the first one: that one directly related to the productivity.

Although the issues on the relationship between productivity and the growth of services come from the 40s, it was not up to two decades after they obtained his maximum apogee through the seminal works of W. Baumol. Its well-known 'cost disease' explains the unbalanced growth of services from the reallocation of productive factors – mainly labour force – towards these activities, generally less productive than other sectors of activity. Services, which have often difficulties to incorporate technology advances and to replace labour by capital, consider labour force as an end issue in itself and present greater price and income elasticities. Nevertheless, services tend to adopt those wages from the most productive sectors, playing the role of activities 'in stagnation' in these models on unbalanced growth.

This assumption is, as it has been introduced before, controversial, although certain legitimacy cannot either be denied. It is certain that labour productivity in services grow at lower rates than in other economic sectors. However, two objections rise to this assessment. Firstly, we can speak about vital problems in measuring productivity within services and the estimation of some attributes that characterize services provision and increase the quality of the service. Secondly, it is clear that there are growing interrelationships between productivity gains in services and other industries – such as manufacturing. In this sense, the upward externalization of some service activities has spread part of the efficiency of these service industries out the rest of the economy.

Additionally, the majority of empirical studies in recent years¹ have concluded that some service industries, such as transports and communications, financial intermediation or some dynamic and technological business and professional services, have contributed to the productivity growth of the western countries from the mid 90s. This evidence which clearly resists the conventional thesis on the

¹ See, among others, Bosworth and Triplett (2007) and Triplett and Bosworth (2004) for the United States; Crespi *et al.* (2006) for the United Kingdom; McLachlan *et al.* (2002) for Australia; or O'Mahony and van Ark (2003) and Maroto and Rubalcaba (2008) for the European Union.

unproductive nature of services has lead to the academic community to look for new theoretical approaches and inputs on the relationships between productivity and services. These new waves, more kindly with respect to the tertiary sector, consider issues as diverse as the inherent quality of the services, the innovation and knowledge, some measurement difficulties, or the indirect and positive effects that some service activities induce in the productivity growth of other economic industries through the externalization or outsourcing processes.

Scheme 1 summarizes the main contributions that specialized literature has left on the relationship between services and productivity, from the early *marginalist* approaches and the establishment of the classical theories on the stagnation of the productivity in services, to those most novel and present waves². The conclusion of this conceptual, theoretical and empirical argumentation it has been a change, or at least one clarification, of the conventional hypotheses. Thus, the current vision is more positive and for the service sector, at least concerning some countries and some sectors of activity.

Following these ideas, the aim of this paper is showing the more current empirical evidence on the productivity in the service sector and their heterogeneous industries of the European countries. To reach this objective, we will use the EU KLEMS database. The research hypothesis is that the service sector is not unproductive per se, but a clear duality appears within it, where some dynamic branches coexist with some others which, due to their labour intensive nature and organization, hardly can secure a high productivity growth. After this brief introduction, section 2 describes the state of the productivity in the service sector in the European Union, as well as its evolution from the beginning of the 80s. Later, section 3 deepens in the behaviour of the different service industries. Finally, the fourth section displays empirical evidence of the heterogeneity within services analyzing the sectoral and factorial contributions to the productivity and economic growth during the last twenty-five years in Europe.

² A more extensive and detailed analysis of the theoretical issues related to the productivity in the service sector can be obtained in the literature review realised for the **ServPPIN project**, financed by the European Commission (Maroto, 2009a), and summarized in other communication presented at this **RESER** meeting (Maroto, 2009b).

SCHEME 1.
Relationships between services and productivity. Main theoretical approaches

Historical age	Cited authors	Theoretical views	Summary
First half of the 20 th century	Fisher, A.G.B.; Kuznets, R.; Clark, C.; Fuchs, V.; Wolfe, M.	First appearance of services in the studies on long run economic growth	First approaches on the relationship between services and productivity
	J. Fourastié	Low relative productivity of services as explanation of growth of the sector → First approach to the relationship between productivity and services (1949)	
From end-60s to the 90s	W. Baumol and others (Blackman, Wolff, Bowen)	Services' cost disease and its explanations	'Boom' on productivity and services: services as guilty of low overall productivity → Conventional theories
From the 90s	L. Foster and others (Haltiwanger, Krizan)	Effects of the reallocation of resources towards services on the productivity growth	
	Bernard, A. and Jones, C.; Raymond, J.L.	Effects of the low relative productivity growth within services on the overall productivity growth	
	Baumol, W.; Triplett, J. ; Bosworth, B.	Services dualism or heterogeneity: Dynamic services versus labour intensive ones	Revisions and new theoretical inputs → Services as themselves are not unproductive, but it depends on the analyzed branch or subsector and other issues to be taken into account
	Gadrey, J. ; Gallouj, F.	Role of innovation and knowledge on the productivity growth within some services	
	N. Oulton ; Schreyer, P.	Service'quality' and theories on hedonic prices	
	Wolff, E.N. ; Raa, T.; Fixler, D.; Siegel, D.; Rubalcaba, L.	Indirect indicators and estimations (Baumol's thesis could only be observed in the final demand services → Outsourcing and indirect productivity)	
	Pilat, D. ; Kox, H.; De Bandt, J.	Role of other elements independent from the labour factor , such as the nature of the service, the substitution relationships or the market segmentation	
	Van Ark, B. ; O'Mahony, M. ; Piatkowski, M., Stiroh, K. ; Jorgenson, D.	Role of ITCs and the Information Society in the dynamism of some service subsectors	
Griliches, Z. ; Wölfl, A.; Hartwig, J.; Inklaar, R.; Timmer, M.; Ahmad, N.	Measurement and definition issues and possible infraestimation of services productivity		

Source: Own elaboration

2. PRODUCTIVITY IN THE SERVICES SECTOR IN THE EUROPEAN UNION, 1980-2005

The aim of this section, as it was mentioned in the introduction, is to analyze the current state of the productivity in the European services, as well as its evolution from 1980 onwards. **EU KLEMS**³ database (2008 march release) has been used. This source provides estimations on economic growth, productivity (both labour and multifactor), labour force and capital accumulation at sectoral level for the member states of the European Union, Japan and the United States from 1970 onwards. We have chosen this statistical source due to the wide sectoral breakdown that provides for the service sector (as it will be seen with more detail in the following section), as well as to the long time span covered and the comparability among countries that their estimations allow.

One of the most controversial subjects in the recent years has been the productivity gap between the European countries and the United States, especially from the mid 90s. Some empirical studies have underlined the interest to explain this phenomenon from a sectoral point of view, trying to answer to some questions that an aggregate analysis might not cover. Data on aggregate productivity – both in terms of employed people or hours worked – can hide important differences on the respective levels and growth rates within the different economic sectors and particular branches. We will focus on emphasizing those sectoral differences, taking as reference the six great economic sectors: agriculture, mining, manufacturing, energy, construction, and service sector. Additionally, since the attention of this paper is services, we will differentiate between private and public services⁴. Later, in the following section it will be deepened into the service sector, analyzing the productivity patterns within its great subsectors and branches of activity.

Data on labour productivity in the European Union show a wide rank of variation at sectoral level, although only the most important sectors will be analyzed. Thus, the productive structure of the economies plays a

³ The **EU KLEMS Growth and Productivity Accounts** are the result of a research project, financed by the European Commission, to analyze the productivity in the European Union at sectoral level. Data and main results are available in <http://www.euklems.net>. For a brief methodological description, as well as to a summary of the main results, see Timmer et al. (2007)

⁴ Concretely, throughout this paper we will refer as '**market services**' to those wholesale and retail trade activities (Nace 50-52), hotels and restaurants (55), transport (60-63), communications (64), finance (65-67), real state (70) business services (71-74), other communitarian, social and personal services (90-93) and private household services (95). On the opposite side, '**public services**' contain Public Administration and defense (75), education (80), and health and social work (85).

key role in the productivity patterns of them. **Table 1** presents the main indicators of labour and hourly productivity at sectoral level for the EU 15 (old member states), the EU 10 (new member states) and the EU 25. Both levels at year 2005 (last available data) and growth rates from 1980⁵ are displayed.

In 2005, the level in the labour productivity in the EU 15 was up to 48674 Euros per employed people and 30.1 Euros per hour worked. In the EU 25 the productivity levels are slightly lower (46518 Euros per employee and 28.1 Euros per hour worked), as levels within the EU 10 (30543 and 16.3) are notably below than the EU 15 average ones. Therefore, the European productivity levels are below than the ones at the United States⁶, accounting around 6-9 percentage points less in the EU 15 case and 12-13 less in the EU 25 case. Notably remarkable are the differences between the EU 10 and the United States, surpassing the 40 percentage points in terms of productivity per employee and 60 percentage points in terms of hourly productivity (see **Table 2**).

In the European service sector, the productivity level was up to 47757 Euros per employee and 30.4 Euros per hour worked (since the total hours worked in the service sector is slightly above than the one at aggregate level, notably in the new member states). These numbers suppose that the tertiary sector in Europe slightly displays productivity levels around the one in the overall economy for the EU 15 case (as productivity levels accounts for the 98-101% of the overall productivity level, according to the both estimations used) and for the EU 25 cases (101-104%), but notably above the overall level for the Eastern countries (124-128%). However, although productivity levels within services rise above than the ones within some economic sectors, such agriculture or construction, independently from the way we measure the labour productivity, they stand clearly below the levels within the rest of economic activities, especially manufacturing, mining and energy. Distinguishing between private and public services, it is observed that the labour productivity is noticeably higher in the first group.

On the other hand, as it can be observed in Table 2, productivity levels within European services are approximately close to those within the United States (with the exception of the EU 10 countries), especially by the behaviour of some private services. Therefore, productivity gap between Europe and the United States in terms of productivity is less important in the service sector than in other sectors, such as agriculture or manufacturing, since the differences are not significant within the tertiary sector.

⁵ For the new member states (and consequently for the EU25) data are only available from 1995.

⁶ Overall productivity levels in the United States were 53371 Euros per employee and 31.9 Euros per hour worked in 2005. In the service sector, productivity levels were respectively 48475 Euros and 25.9 Euros.

TABLE 1.
Productivity levels in the European Union-15, 1980-2005

	LABOUR PRODUCTIVITY			HOURLY PRODUCTIVITY		
	Level 2005	Index (related to total economy)	Annual average growth rate 1980-2005*	Level 2005	Index (related to total economy)	Annual average growth rate 1980-2005
European Union 15 (old member states)						
Total economy	48674	100,0	1,84	30,11	100,0	2,50
Agriculture	23465	48,2	7,30	11,82	39,3	8,19
Mining	131812	270,8	6,47	75,96	252,3	7,16
Manufacturing	58306	119,8	3,81	35,51	117,9	4,51
Energy	221641	455,4	6,28	138,75	460,8	7,14
Construction	37115	76,3	0,79	20,57	68,3	0,97
Services	47757	98,1	0,97	30,37	100,9	1,49
Private services	53426	109,8	1,22	32,73	108,7	1,79
Public services	36086	74,1	0,31	24,94	82,8	0,76
European Union 10 (new member states)						
Total economy	30543	100,0	3,87	16,33	100,0	4,17
Agriculture	7778	25,5	4,35	3,72	22,8	4,63
Mining	27668	90,6	4,52	16,06	98,4	4,51
Manufacturing	23964	78,5	9,75	12,84	78,6	9,87
Energy	52487	171,8	3,58	28,94	177,2	3,90
Construction	27943	91,5	2,42	14,15	86,6	2,50
Services	37875	124,0	2,47	20,84	127,6	2,80
Private services	37432	122,6	2,36	19,64	120,3	2,91
Public services	38765	126,9	2,72	23,50	143,9	2,76
European Union 25						
Total economy	46518	100,0	1,36	28,15	100,0	1,79
Agriculture	18725	40,3	3,09	9,26	32,9	3,43
Mining	89147	191,6	2,86	51,54	183,1	2,83
Manufacturing	50825	109,3	2,86	30,21	107,3	3,30
Energy	168557	362,4	5,34	101,30	359,8	6,04
Construction	37983	81,7	0,30	20,80	73,9	0,38
Services	47112	101,3	0,90	29,43	104,5	1,28
Private services	50609	108,8	1,02	30,44	108,1	1,50
Public services	39877	85,7	0,48	27,09	96,2	0,73

* 1995-2005 for the EU 10 and EU 25.

Source: Own elaboration. Data EUKLEMS (2009)

TABLE 2.
Productivity levels in the European Union, 2005 European Union versus United States

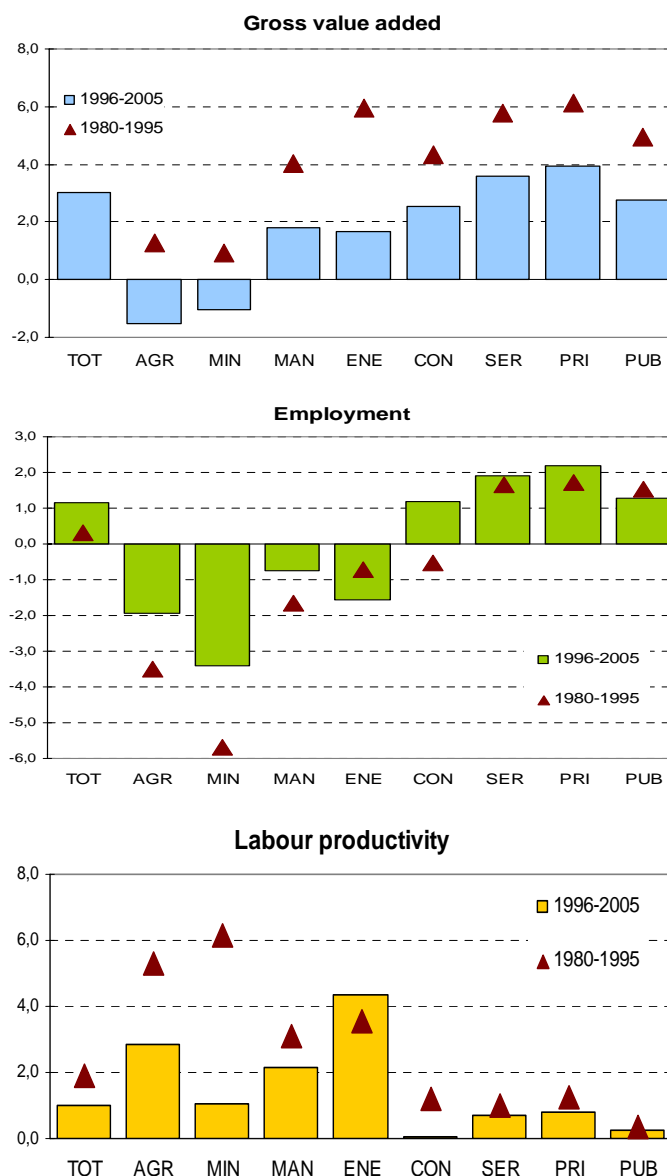
	LABOUR PRODUCTIVITY			HOURLY PRODUCTIVITY		
	EU-15	EU-10	EU-25	EU-15	EU-10	EU-25
Total economy	91,2	57,2	87,2	94,3	36,1	88,1
Agriculture	61,0	20,2	48,7	70,2	15,1	55,0
Mining	121,1	25,4	81,9	159,3	23,2	108,1
Manufacturing	57,9	23,8	50,5	67,7	12,3	57,6
Energy	89,6	21,2	68,2	102,4	15,4	74,8
Construction	121,4	91,4	124,3	133,3	73,3	134,8
Services	98,0	77,7	96,7	99,4	53,3	96,3
Private services	99,9	70,0	94,6	100,0	46,5	93,0
Public services	91,2	57,2	87,2	94,3	36,1	88,1

Source: Own elaboration. Data EUKLEMS (2009)

Nevertheless, the current state might hide some interesting changes during the last twenty-five years. The annual average growth rate of the overall productivity in the EU 15 has been up to 1.8% (2.5%) in terms of labour (hourly) productivity. Thus, it is observed that productivity growth is greater in terms of hours worked than in terms of employed people due to the lower number of hours worked in most European countries during the last decades (especially related to the United States). Secondly, this pattern is also observed within services, which has experienced an average growth rate up to 1.0% (1.5%) in terms of labour (hourly) productivity from 1980 to 2005. Additionally, data show that productivity growth rates in the EU 10 countries have been markedly higher than in the old EU member states during the period analyzed, especially from the mid 90s when productivity growth rates in the EU 15 slowed down.

The evolution of the sectoral productivities in the European economy from the beginning of the 80s onwards, briefly described in the Table 1, has its base on the growth patterns of its two main components: production and labour use. **Figure 1** presents these growth paths for the case of the gross value added (first graph of the figure), employment (second graph) y labour productivity (third graph). Relative figures in terms of hours worked and hourly productivity are very similar to the presented graphs. Two subperiods have been differentiated: until 1995 and from this year onwards. This cut-off year has been chosen based on the general consensus in the specialized literature that the productivity gap between European countries and the United States might have taken off this point.

FIGURE 1.
Growth in gross value added, employment and labour productivity.
Main economic sectors, UE-15, 1980-1995 versus 1996-2005



Source: Own elaboration. Data EUKLEMS (2009)

Data clearly confirm the change observed since 1995. Related to the growth of value added, an overall deceleration is registered, falling down from an annual average of 5% until 1995 to a 3% since then. This poorer behaviour of the European value added can be observed in every economic sector analyzed, especially in agriculture or mining where the growth rates since the mid 90s have been negative. Particularly, in the service sector the annual growth rate has fallen down from a 5.7% to a

3.6% between both subperiods. Therefore, the main conclusion that data show is that the European production has undergone an important deceleration, both from the aggregate and sectoral points of view, since mid 90s. Services follow the same trend. The opposite image is obtained when the graph related to overall employment is analyzed. Whereas it practically stayed inalterable during the 80s and the beginning of the 90s (reaching a growth rate of 0.3%), since 1995 it annually grew up to a 1.2%. Even this good behaviour is also observed in those economic sectors which net loss of employment during the last twenty-five years, such as agriculture, mining, manufacturing or energy. The service sector has also experienced a slight acceleration (from a 1.6% until 1995 to a 1.9% since then). This process of creation of tertiary jobs is observed only within the private services, as the growth rate in the public services has fallen since 1995.

These growth paths of the production and the employment observed in both upper graphs of Figure 1 is translated to the productivity graph. According to the deceleration of value added and the acceleration of employment in the European Union, a remarkable slowdown of the productivity growth is observed since the mid 90s, both in aggregate and sectoral levels. Only the energetic activities have shown greater productivity growth rates in the recent years than in the previous time period. In the service sector, for example, whereas the growth rate until 1995 was up to a 1% it fell down to a 0.7% in the last decade. Nevertheless, this slowdown in the productivity growth in European services since 1995 has not been as pronounced as in aggregate terms (where the productivity growth rate since then has been approximately the half than the one between 1980 and 1995).

3. HETEROGENEITY WITHIN THE SERVICE SECTOR: DYNAMIC INDUSTRIES VERSUS SERVICES IN STAGNATION

After the presentation of the current state and recent evolution of the labour productivity in the service sector as a whole of the European economy, this section will deepen into the tertiary activities. For this purpose, private services analyzed until this moment will break down into nine subsectors: wholesale and retail trade, hotels and restaurants, transport, communications, financial services, real estate, business services, other communitarian, social and personal services, and, finally, private households activities. Similarly, Public Administration and defence, education, and health and social work belong to public services. Whenever the database allows it these subsectors will be divided as well into their main activity branches (according to Nace codes to 2 digits).

Table 3 displays the main estimations of labour and hourly productivity for the different subsectors and economic branches belonging to the

service sector during the 1980-2005 period. In the previous section, it was shown that the productivity level in 2005 of private services in the EU 15 was 53426 Euros per employee (32.7 Euros per hour), whereas in public services the productivity level was notably lower (36086 Euros per employee and 24.9 Euros per hour). These numbers represent around ten percentage points above the aggregate tertiary levels for the private and around 20-25 percentage points below for the public services. On the opposite side, in the EU 10 (those Central and Eastern new member states) the productivity in private services stands significantly below the EU 15 levels, whereas in public services behaves better than in the Western European countries.

Within the private services, the most productive subsectors⁷ are communications (with an index of 311), finance (216) and transport (108), whereas the less productive ones are private household activities (22), hotels and restaurants (49), and other communitarian, personal and social services (73). If we disaggregate even more, the most dynamic tertiary activities are water and air transport, wholesale trade, financial and insurance services, renting activities and computer services. Public services, as we have demonstrated before, present productivity figures below than private ones. The most productive public services are those related to public administrations, near to the aggregate services levels; whereas the education are the less productive among public services.

In terms of evolution, the image previously shown for the levels in 2005 remain almost unchanged. Those services with the highest productivity levels are the ones experimenting quicker growth rates, and vice versa. Thus, private services show an annual growth rate between 1980 and 2005 of 1.2% (1.8%) in terms of employed people (hours worked). In particular, the branches that higher growth rates present in these years are communications, financial intermediation, wholesale trade and water transport. This growth is even more pronounced in the new EU member countries.

The growth in public services during this period was clearly below (0.3% and 0.8% respectively). Nevertheless, different and particular patterns stand when disaggregating our analysis. Some service industries, such as not market services (education, private households, other communitarian and personal services), real estate, business and insurance services and hotels and restaurants even experimented negative growth rates during these years. One remarkably fact is that in the EU 10 countries those non market services, such as education or other communitarian, personal and social activities, have not followed that negative trend, showing dynamic growth rates (although only considering the last ten years).

⁷ With the exception of real state activities which particular way of estimating their production (according almost only with the manpower in gross terms) is translated into huge labour productivity levels, as we can see in Table 3.

TABLE 3.
Productivity in service industries in the European Union, 1980-2005

	EU 15 (Old Member States)						EU 10 (New Member States)					
	Labour productivity			Hourly productivity			Labour productivity			Hourly productivity		
	Level 2005	80-05 growth	Index 2005	Level 2005	80-05 growth	Index 2005	Level 2005	95-05 growth	Index 2005	Level 2005	95-05 growth	Index 2005
SERVICES	47757	1,0	100,0	30,4	1,5	100,0	37875	2,5	100,0	20,8	2,8	100,0
PRIVATE SERVICES	53426	1,2	111,9	32,7	1,8	107,8	37432	2,4	98,8	19,6	2,9	94,2
Wholesale and retail trade	37246	1,8	78,0	22,6	2,6	74,5	23386	5,0	61,7	11,9	5,8	57,3
50	39351	1,3	82,4	22,2	1,9	73,2	25400	0,9	67,1	12,8	1,2	61,4
51	58857	2,4	123,2	33,4	3,1	110,0	28671	8,0	75,7	14,9	8,7	71,4
52	26034	1,6	54,5	16,8	2,4	55,2	19766	4,0	52,2	10,0	4,9	48,1
Hotels and restaurants	23229	-1,0	48,6	13,6	-0,5	44,8	9287	-1,8	24,5	4,8	-1,1	23,2
Transports	51412	3,0	107,7	27,5	3,6	90,7	31374	2,8	82,8	16,2	3,0	77,7
60	45256	3,8	94,8	25,0	4,4	82,4	27917	4,7	73,7	14,4	5,0	69,1
61	185410	12,6	388,2	90,5	13,8	298,0	32375	0,6	85,5	17,0	0,8	81,6
62	78235	0,3	163,8	48,0	0,8	158,0	36562	-2,5	96,5	18,6	-2,3	89,1
63	48240	1,5	101,0	24,2	2,1	79,7	44448	-1,7	117,4	23,1	-1,6	110,8
Communications	148420	12,0	310,8	96,2	13,2	316,9	31917	16,3	84,3	17,4	17,3	83,5
Finance	103044	2,2	215,8	64,0	2,7	210,7	82731	10,5	218,4	45,7	10,3	219,3
65	142204	5,4*	297,8	89,7	5,6*	295,5	92026	10,4	243,0	51,2	10,2	245,8
66	61068	-1,9*	127,9	37,7	-1,6*	124,3	73771	18,5	194,8	40,6	18,2	194,8
67	48049	2,0*	100,6	28,8	2,5*	94,7	51293	2,2	135,4	27,6	2,4	132,3
Real estate	455283	-0,2	953,3	284,5	0,2	936,9	288240	-1,0	761,0	157,4	-0,6	755,1
Business services	45790	-0,3	95,9	28,0	-0,1	92,3	27407	-0,4	72,4	14,6	0,2	70,0
71	222681	2,9	466,3	131,1	3,3	431,9	87338	4,5	230,6	47,7	5,0	228,7
72	57233	-0,4	119,8	32,7	-0,3	107,8	42818	6,0	113,1	22,0	6,8	105,8
73	50049	0,5	104,8	30,4	0,9	100,1	21695	-1,9	57,3	10,7	-2,7	51,2
741	48862	-0,7*	102,3	29,7	-0,4*	97,9	32919	-1,2	86,9	17,7	-0,5	84,8
749	29105	-1,0*	60,9	18,4	-1,0*	60,5	16619	-1,0	43,9	8,9	-0,2	42,9
Other private services	34899	-0,4	73,1	22,4	-0,1	73,9	28392	0,9	75,0	15,8	1,3	76,0
Private household services	10141	-0,6	21,2	8,1	-0,6	26,8	63881	-4,2	168,7	37,6	-4,8	180,6
PUBLIC SERVICES	36086	0,3	75,6	24,9	0,8	82,1	38765	2,7	102,4	23,5	2,8	112,8
Public Administration	45264	1,0	94,8	28,7	1,5	94,6	44282	2,6	116,9	24,6	2,4	118,2
Education	31890	-0,0	66,8	24,3	0,2	80,1	39843	2,5	105,2	27,7	2,5	132,9
Health and social work	32672	0,1	68,4	22,5	0,6	74,1	31010	2,5	81,9	17,6	2,7	84,7

* 1995-2005

Source: Own elaboration. Data EUKLEMS (2009)

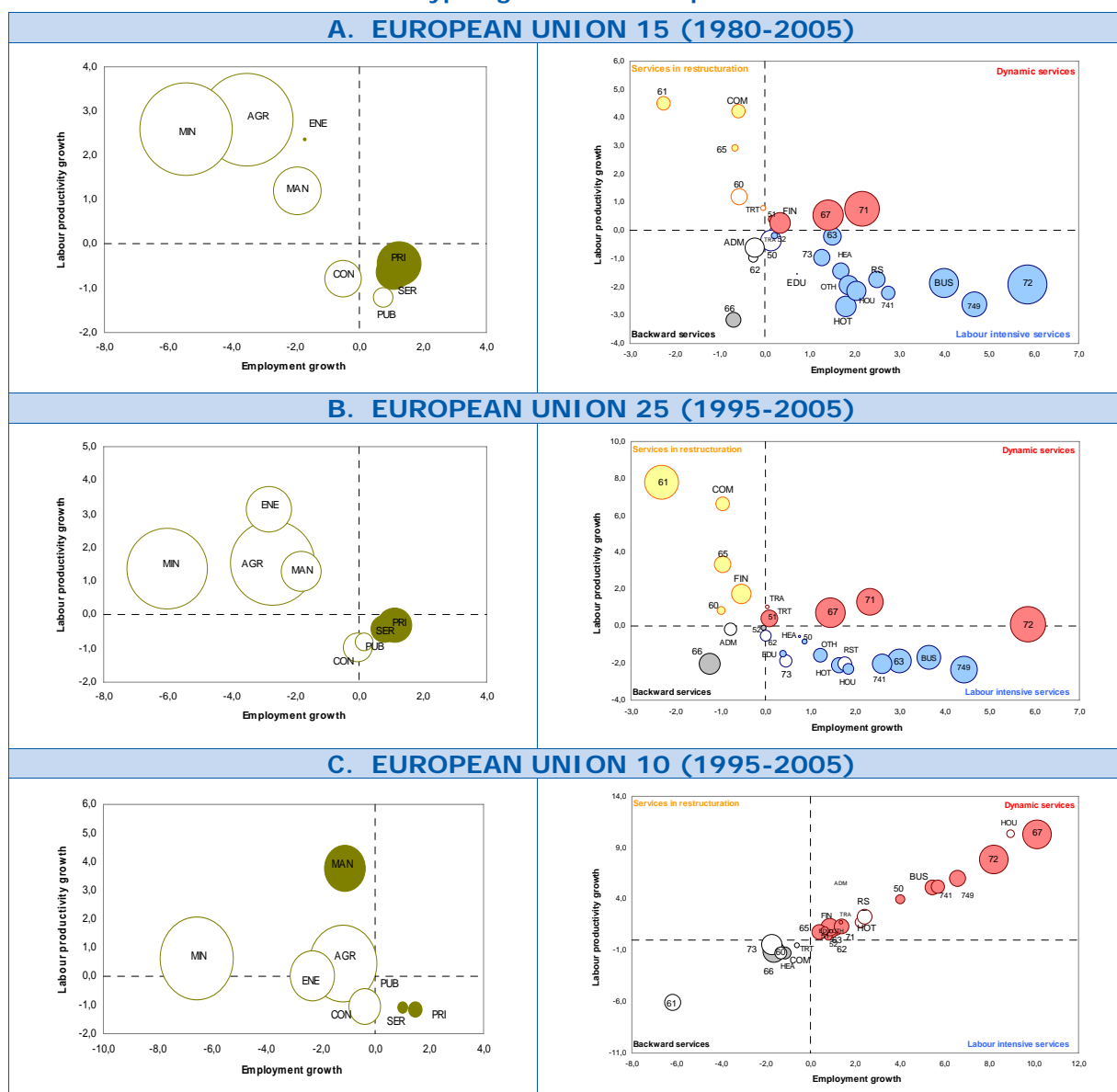
Another way to analyze the evolution of the productivity, jointly with the one of its two main components (production and employment) is the one introduced by Camagni and Capellin in 1985⁸. These authors represent in the X axis the relative growth of each activity in terms of employment (related to the national overall average growth rate) and the relative growth in terms of labour productivity in the Y axis. Finally, the size of the pointer shows the relative growth in terms of production. According to this methodology, economic sectors will be able to be distinguished in four typologies: dynamic (higher growth both in employment and productivity), backward (lower growth both in employment and productivity), labour intensive (lower growth in productivity due to a stronger process of labour use), and sectors in reconstruction (higher growth in productivity principally due to a process of jobs destruction). **Figure 2** shows the results of this methodological approach for the main economic sectors (at the left side graphs) and the tertiary activities (at the right side ones) for the EU 15 (Panel A), the UE 25 (Panel B) and the EU 10 (Panel C) during the available time period.

Previous figures show that no extreme behaviours are observed in the European economies. There are neither dynamic nor backward sectors during the years analyzed. More concretely, agriculture, manufacturing mining and energy display high productivity growths because they have undergone strong processes of jobs destructions (they might be characterized as sectors in reconstruction since the 80s). On the other hand, the service sector and construction behave oppositely, since their employment has grown above the overall average, impelling lower growths in their productivity.

Nevertheless, if we analyze the tertiary activities more deeply they appear those extreme patterns as we might expect. Thus, air transport (62), insurance (66) and public administration (ADM) have been backward services in the EU 15 countries since 1980. In the opposite side, wholesale trade (51), finance (FIN), auxiliary financial activities (67), and equipment and machinery renting (71) have been dynamic services during these years. Most of the rest of services might be characterized as labour intensive activities, such as services as a whole sector. Finally, some other branches, such as transport (TRT), inland and water transport (60-61), financial intermediation (65), and communications (COM) have experienced high productivity growth rates originated by remarkable decreases in their employment use. Extreme behaviours are clearer when shorter time spans are used and in the case of the new EU member states, as Figure 2.c displays. In these countries, only dynamic and backward services stand from 1995 to 2005.

⁸ Recently used in some papers on sectoral and services productivity, such as Maroto and Cuadrado (2007 and 2009).

FIGURE 2.
Sectoral typologies in the European Union



Note: 50 = Commercial and motor vehicle repair; 51 = Wholesale (except motor vehicles) and repair; 52 = Retailing (except motor vehicles) and repair; HOT = hotels and restaurants; 60 = Land Transport; 61 = Water Transport; 62 = Air Transport; 63 = Auxiliary Transport Activities; COM = Communications; 65 = Financial Services (except insurance and pensions); 66 = Insurance; 67 = Auxiliary Financial Activities; RST = Real Estate; 71 = Equipment and Machinery Renting; 72 = Computer Services; 73 = R&D; 741-3 = Legal, technical and Publishing Services; 749 = Other Business Services; ADM = Public Administration and Defence; EDU = Education; HEA = Health Care; OTH = Other Social, Personal and Community Services; and HOU = Private Households Services.

Source: Own elaboration. Data EUKLEMS (2009)

TABLE 4.

Production, employment and labour productivity in service industries in the EU 15, 1980-2005

	Annual average growth rate (%)					Weight (employment)	Weight (hours)	Contribution to the PL growth ¹	Contribution to the PH growth ¹
	GVA	Employment	Hours worked	Labour productivity (LP)	Hourly productivity (HP)				
TOTAL ECONOMY	4,2	0,6	0,2	1,5	2,0	100,0	100,0	1,5	2,0
SERVICES	4,9	1,8	1,3	0,9	1,3	64,7	62,7	0,6	0,8
PRIVATE SERVICES	5,3	1,9	1,5	1,1	1,6	42,8	42,5	0,5	0,6
Wholesale and retail trade	4,1	0,8	0,4	1,5	2,0	15,0	15,4	0,2	0,3
Hotels and restaurants	5,7	2,5	1,8	-1,2	-0,6	4,0	4,4	-0,0	-0,0
Transports	4,2	0,6	0,3	2,3	2,6	4,2	4,8	0,1	0,1
Communications	4,9	0,1	-0,2	5,8	6,1	1,6	1,5	0,1	0,1
Finance	5,7	1,0	0,7	1,8	2,1	3,0	3,0	0,1	0,1
Real estate	5,2	3,2	2,7	-0,2	0,2	0,8	0,8	0,0	0,0
Business services	7,3	4,7	4,4	-0,3	-0,1	8,1	8,0	-0,0	-0,0
Other private services	5,5	2,5	2,2	-0,4	-0,1	4,0	3,8	-0,0	0,0
Private household services	5,6	2,7	2,8	-0,6	-0,7	2,0	1,5	-0,0	-0,0
PUBLIC SERVICES	4,1	1,4	1,1	0,6	1,0	21,9	20,2	0,1	0,2
Public Administration and defense	3,1	0,4	0,1	0,9	1,3	7,3	7,0	0,1	0,1
Education	4,3	1,4	1,1	0,0	0,2	6,3	4,9	0,0	0,0
Health and social work	5,2	2,3	1,8	0,1	0,6	8,3	7,4	0,0	0,1

¹ The contribution of each activity to the growth in labour productivity (hourly) has been calculated multiplying the growth of labour productivity (hourly) in each activity by the weight over the total employment (hours worked) of each sector.

Source: Own elaboration. Data EUKLEMS (2009)

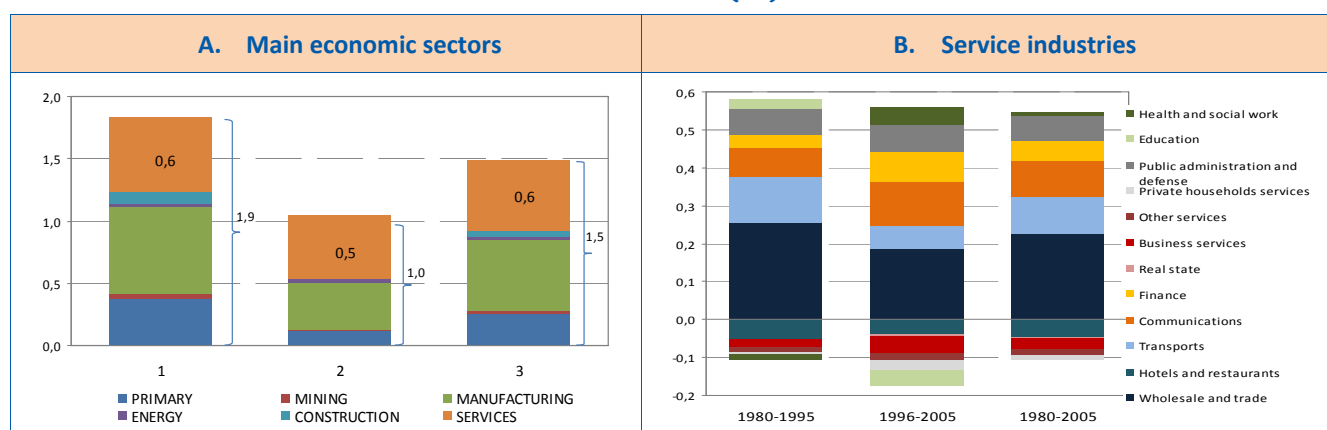
Table 4 displays the growth of the value added, employment and labour productivity during the 1980-2005 period in the EU 15⁹. Additionally, sectoral contributions to the productivity growth are also presented. Data demonstrate that the growth of gross value added was significantly high, especially during the 80s (see Tables A.1 and A.2 in the Annexe). Concretely, the annual growth rate was up to 4%. Employment in European economies (both in terms of employed people and hours worked) experienced lower growth rates during these years (0.6% and

⁹ For country results see van Ark et al. (2007).

0.2%). Obviously, this success in terms of production growth jointly with the relatively weak creation of employment has originated a productivity growth during these twenty-five years, despite the evident deceleration since the mid 90s. Labour productivity has reached an annual growth rate of 1.5%, whereas the rate in hourly productivity has been even more pronounced (2.0%).

According to the sectoral estimations for the contributions to productivity growth in the Table 4, **Figure 3** shows that more than 60% of the overall productivity growth was accounted by non tertiary sectors, mainly those in reconstruction such as agriculture (17%) and manufacturing (37%). Service sector represents approximately the 40% of the overall productivity growth from 1980 onwards. Additionally, the service contribution has notably grown since the mid 90s (surpassing the 50% since 1995).

FIGURE 3.
Sectoral contribution to the productivity growth in the European Union, 1980-2005 (%)

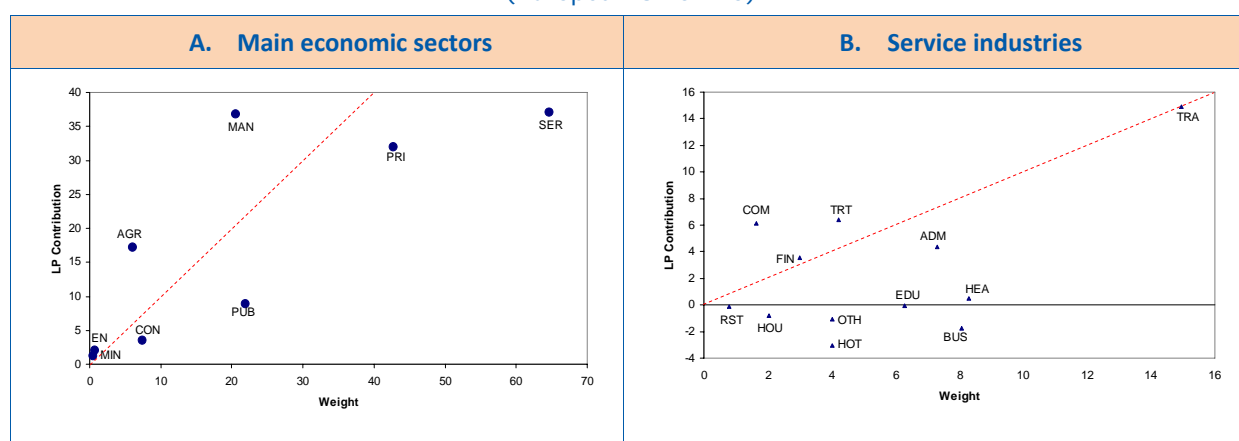


Source: Own elaboration. Data EUKLEMS (2009)

Private services have accounted one third of the overall labour productivity growth in the European Union since 1980 (approximately the 75-80% of the contribution of the service sector as a whole). Public services added other 10% to the overall labour productivity growth during these years (20-25% of the aggregate tertiary contribution). Deepening into the service sector, those industries which contribute more to the overall productivity growth have been the wholesale and retail trade (around the 15%), transports and communications (6% each), public administrations and defence (5%), and financial services (4%). On the opposite hand, hotels and restaurants, business services, private household activities and the other communitarian, social and personal services not only do not contribute to the overall productivity growth but their contribution since 1980 has been smoothly negative.

As data analyzed until this moment has been suggesting, productivity growth in the European services has been closely related to the evolution of employment and labour utilization (with only a few exceptions to this rule). Thus, the highest growth rates in productivity during recent years have matched in those industries characterized by strong processes of labour destruction, capitalization practices and technological investment, whereas the poorest paths has located into surroundings of labour intensive areas. Nevertheless, there are certain tertiary branches that break this relationship between labour use and productivity. They display dynamic behaviours despite having obtained good figures in terms of employment creation.

FIGURE 4.
Employment and productivity contribution in the service industries in the European Union, 1980-2005
 (European Union 15)



Note: 50 = Commercial and motor vehicle repair; 51 = Wholesale (except motor vehicles); 52 = Retailing (except motor vehicles) and repair; HOT = hotels and restaurants; 60 = Land Transport; 61 = Water Transport; 62 = Air Transport; 63 = Auxiliary Transport Activities; COM = Communications; 65 = Financial Services (except insurance and pensions); 66 = Insurance; 67 = Auxiliary Financial Activities; RST = Real Estate; 71 = Equipment and Machinery Renting; 72 = Computer Services; 73 = R&D; 741-3 = Legal, technical and Publishing Services; 749 = Other Business Services; ADM = Public Administration and Defence; EDU = Education; HEA = Health Care; OTH = Other Social, Personal and Community Services; and HOU = Private Households Services.

Source: Own elaboration. Data EUKLEMS (2009)

In order to contrast this fact, **Figure 4** shows annual average contributions to the employment and labour productivity in the European Union between 1980 and 2005. The red line indicates those locations where the contribution to overall productivity growth approximately corresponds to their contribution or weight in total employment. Industries over the line contribute more to productivity growth than employment and vice versa. Considering the main economic sectors (Panel A), only construction and the service sector (both private and public activities) stand below the line. However, there are some tertiary industries with higher contributions to productivity than they supposed

via employment (see Panel B). Concretely, only some private services, such as communications, finance and transport, are located clearly above the red line, whereas wholesale and retail trade present approximately identical contributions to employment and productivity. The rest of private industries and all public services show high weights over total employment and hours worked in the European economies but their contributions to productivity growth are pretty small or even negative.

4. ECONOMIC GROWTH AND PRODUCTIVITY IN THE EUROPEAN UNION: FACTORIAL CONTRIBUTIONS AND MULTIFACTOR PRODUCTIVITY (1980-2005)

In the previous section, some evidences about productivity levels and growth patterns within service industries have been displayed. Additionally, it has been demonstrated that not all services behave negatively in terms of productivity, but there is a couple of dynamic activities in the period analyzed. Following these ideas, it would be interesting to deepen a little more in how those dynamic services grow. For this purpose, in the present section it will be analyzed the factorial contributions to economic and productivity growth in the European Union. Particularly, the contributions of each production factor (labour, capital and multifactor productivity – MFP) to the value added growth will be estimated. Moreover, labour and capital contributions will be decomposed, respectively, into hours and labour composition and technological and non technological capital contributions.

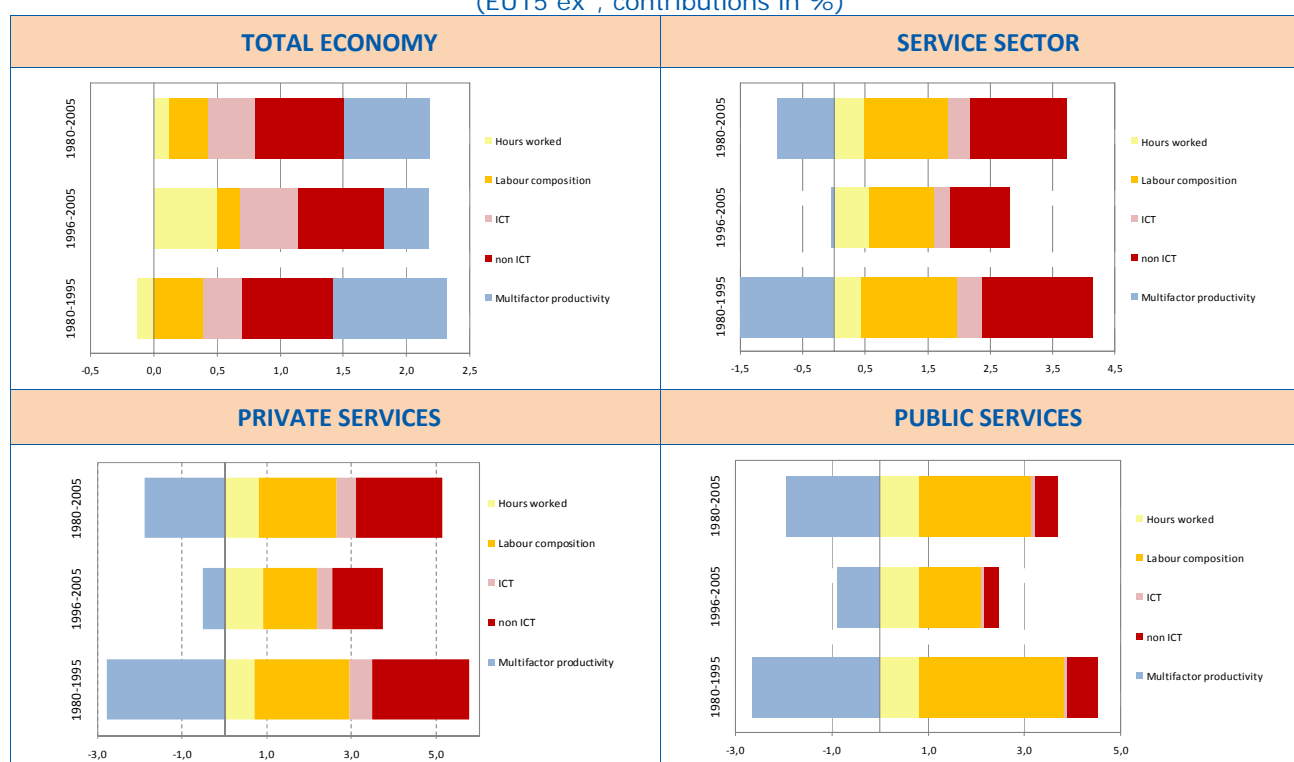
Figure 6 shows these factorial contributions to the gross value added in the European Union¹⁰. Four distinctions (whole economy, service sector, private and public services) have been made and graphs also distinguish between 1980-1995 and 1996-2005 subperiods. The growth of aggregate GVA between 1980 and 2005 in European countries (2.2%) have essentially been due to the capital contribution (50%), whereas labour has contributed a 20% and the other 30% has been originated by other sources (MFP). More concretely, most of capital and labour contributions arise from the non ICT capital and the labour composition. However, during latest years the labour contribution (especially that coming from the total number of hours worked) has grown while MFP lost weight in the production growth.

The factorial sharing out within the service sector notably differs from the aggregate case. The main factor in the tertiary GVA growth is the labour force (70%), especially the genre and age composition (50%). Secondly, capital contributes with other 65%, whereas MFP present a

¹⁰ Figures and percentages of these contributions are displayed in Tables A.3-5 in the Annexe

negative contribution in the period analyzed due to its worst behaviour during the 80s and the first half of 90s. Figures about private services approximately replicate those for services as a whole (see left bottom graph in Figure 5), although negative contribution of MFP is even higher in private services. High but negative contributions also appear in the case of public services, where the labour contribution (especially the quality and labour composition effects) accounts for almost all the growth within those activities.

FIGURE 5.
Factorial contributions to the economic growth in the European Union, 1980-2005 (EU15 ex¹, contributions in %)



¹ The 'EU 15 ex' country-cluster consists on Austria, Belgium, Denmark, Finland, France, Germany, Italy, Netherlands, Spain and the United Kingdom (only countries which EUKLEMS database allow to approximate growth accounting estimates).

Source: Own elaboration. Data EUKLEMS (2009)

Disaggregating into service branches, an evident heterogeneity or dichotomy arises. Net dynamic services live together labour intensive activities again. Figures 6 and 7 present those factorial contributions within private and public services respectively. Inside private sphere, **Figure 6** shows two clusters of industries. On the one hand, hotels and restaurants, business services and other private services, previously characterized as displaying below average productivity levels and growth rates. Three key aspects arise when the factorial contributions are analyzed within these industries. Firstly, MFP has a significant negative

contribution (see yellow areas). Secondly, they are characterized by a strong role of labour, essentially of the quantity or volume. And, finally, capital effects provide almost exclusively from non technological assets.

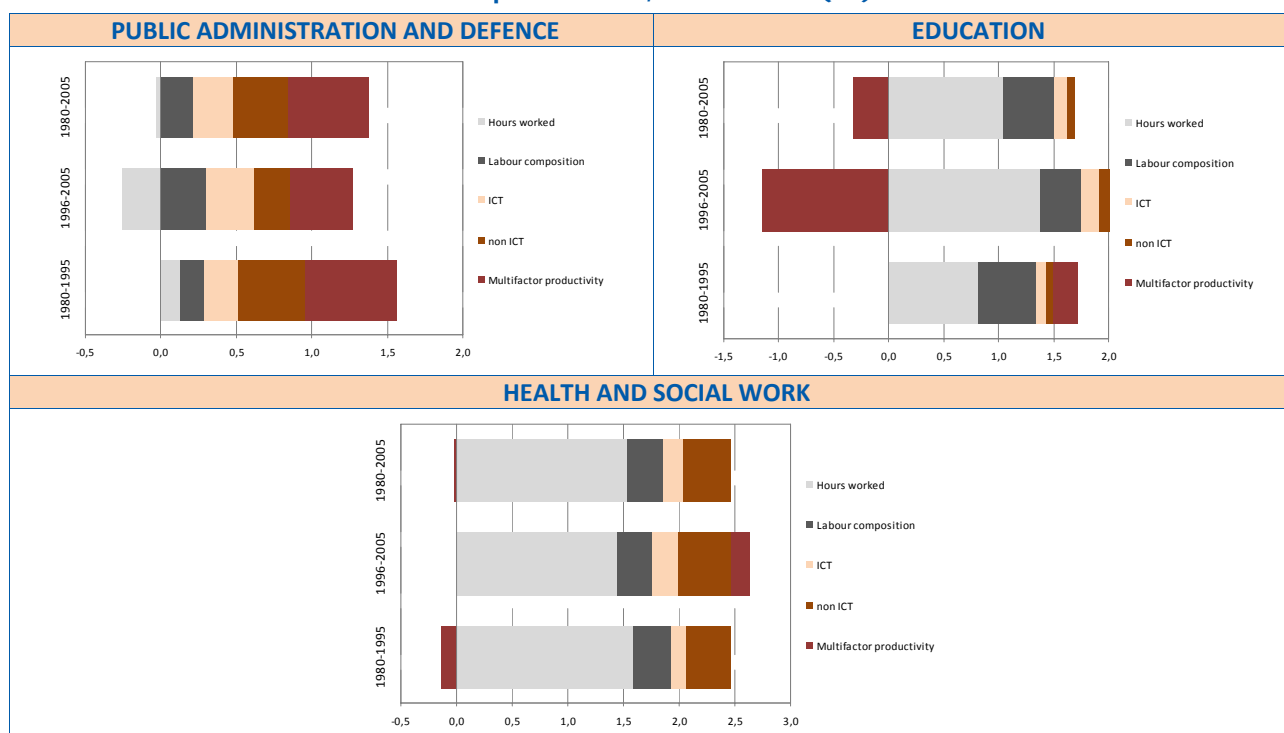
FIGURE 6.
Factorial contributions to the economic growth in private services in the European Union, 1980-2005 (%)



Source: Own elaboration. Data EUKLEMS (2009)

On the opposite side, there appears a cluster which includes private services such as communications, transport, wholesale and trade, and financial activities. They present the reverse characteristics than the previous set of services. Remember that these services have displayed high growth rates of labour productivity during recent decades and, as well, their contribution to overall productivity growth has been quite significant. Additionally, according to evidence shown in Figure 6, their growths of MFP are the leading contribution to the growth of value added (especially since the mid 90s). The second remarkable fact is the contribution of technological capital in this kind of services (see light blue areas), significantly over the contribution of other types of capital.

FIGURE 7.
Factorial contributions to the economic growth in public services in the European Union, 1980-2005 (%)



Source: Own elaboration. Data EUKLEMS (2009)

To conclude this section, **Figure 7** presents the factorial contributions within public services. In this case, it is not possible speaking about generalized public issues, since each industry including into this group behave different landlords. Regarding to MFP contributions, public administrations have undergone positive growth rates during the whole period analyzed. Inside health and social services it contributes positively since 1995 although in the previous period the behaviour was the opposite. And the MFP in educational activities has experienced negative growth rates. Another generalized attribute in the production growth of these activities is the leading role of the level of employment.

They are clearly labour intensive services, where the relationship between provision of service and employment volume is directly evident. Finally, regarding to capital (notably less important than labour within every public services), most of its contribution provides from non technological investments. Finally, although the contribution of the level of employment

5. FINAL REMARKS AND CONCLUSIONS

Productivity is, probably, one of the topics more extended among the economists, even also by whom they are not. Inside the discuss about productivity, the role of the service sector plays a key role. Both in theoretical, applied and politic fields. Additionally, its influence is incessantly growing up because a service sector in stagnation or unproductive might be the source of a slowing down of the economy as a whole, as the result of the growing quantitative and strategic weight of services in the economic net.

From the beginning of the 21st century, the famous 'cost disease', introduced by Baumol at the end of the 60s, has been criticized and reviewed by many papers and works. These new approaches are based in issues such as the vertical relationships or outsourcing processes, the role of the ICTs, the issues related to the definition and measurement of productivity in some service industries, or the multidimensional and multi-output nature of the majority of services. Lack of data and information could be also included inside the conceptual problems that take with itself the analysis of the production and the productivity within the service sector.

Since the mid 90s, there have grown a debate about the negative patterns of European productivity, contrasting to the better figures shown by the United States. One of the reasons used to explain this fact is the sectoral structure of our growth path. Our analysis of the behaviour of the productivity within the service sector, as a whole, supports to the traditional or conventional theories, emphasizing its relatively low growth. Nevertheless, when disaggregating our focus it raises that significant within-sector differences exist, moving towards these new modern and current waves of thinking less against services. Our conclusion is that services are not unproductive *ex ante*. On one hand, it is undeniable that the level and the growth of the productivity within the service sector is generally below than the overall results and those experienced in other economic sectors, such as manufacturing or agriculture. Yet, very noteworthy differences by service industries are observed.

Many services are showing growth rates comparable, or even above, than those registered by the more dynamic manufacturing industries. Additionally, some of these service industries, such as communications,

transports, certain business and professional services, or financial intermediation, show relatively high productivity growths even creating employment simultaneously. Moreover, these activities are characterized to display considerable capitalization processes and prominent multifactor productivity contributions.

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ANNEXE

TABLE A.1.
Production, employment and labour productivity in service industries in the EU 15, 1980-1995

	Annual average growth rate (%)					Weight (employment)	Weight (hours)	Contribution to the PL growth ¹	Contribution to the PH growth ¹
	GVA	Employment	Hours worked	Labour productivity (LP)	Hourly productivity (HP)				
TOTAL ECONOMY	5,1	0,3	-0,2	1,9	2,4	100,0	100,0	1,9	2,4
SERVICES	5,8	1,7	1,2	1,0	1,4	61,4	59,5	0,6	0,8
PRIVATE SERVICES	6,1	1,7	1,3	1,2	1,6	40,1	40,0	0,4	0,6
Wholesale and retail trade	4,9	0,7	0,2	1,7	2,2	14,8	15,4	0,3	0,3
Hotels and restaurants	6,5	2,3	1,7	-1,4	-0,8	3,7	4,0	-0,1	-0,0
Transports	3,9	0,1	-0,1	2,9	3,1	4,2	4,8	0,1	0,2
Communications	5,3	-0,1	-0,4	4,5	4,8	1,7	1,6	0,1	0,1
Finance	6,2	1,4	1,0	1,2	1,5	3,0	2,9	0,0	0,0
Real estate	7,2	3,4	2,9	0,1	0,6	0,7	0,7	0,0	0,0
Business services	8,1	4,7	4,4	-0,3	0,0	6,4	6,3	-0,0	0,0
Other private services	6,5	2,6	2,4	-0,4	-0,1	3,7	3,5	-0,0	0,0
Private household services	6,8	2,6	3,0	-0,4	-0,7	1,9	1,3	-0,0	-0,0
PUBLIC SERVICES	4,9	1,5	1,1	0,8	1,3	21,3	19,5	0,2	0,2
Public Administration and defense	3,7	0,7	0,3	0,9	1,3	7,5	7,2	0,1	0,1
Education	5,0	1,3	0,9	0,4	0,8	6,1	4,7	0,1	0,1
Health and social work	6,6	2,5	1,9	-0,2	0,5	7,6	6,9	-0,0	0,0

Source: Own elaboration. Data EUKLEMS (2009)

TABLE A.2.
Production, employment and labour productivity in service industries in the EU 15, 1996-2005

	Annual average growth rate (%)					Weight (employment)	Weight (hours)	Contribution to the PL growth1	Contribution to the PH growth1
	GVA	Employment	Hours worked	Labour productivity (LP)	Hourly productivity (HP)				
TOTAL ECONOMY	3,0	1,2	0,8	1,0	1,4	100,0	100,0	1,0	1,4
SERVICES	3,6	1,9	1,5	0,7	1,1	70,0	67,8	0,5	0,7
PRIVATE SERVICES	3,9	2,2	1,8	1,1	1,5	47,1	46,6	0,5	0,5
Wholesale and retail trade	2,9	1,1	0,6	1,2	1,7	15,2	15,5	0,2	0,2
Hotels and restaurants	4,4	2,7	2,0	-0,8	-0,2	4,6	4,9	-0,0	-0,0
Transports	4,5	1,4	1,0	1,4	1,9	4,2	4,9	0,1	0,1
Communications	4,2	0,2	0,0	7,6	7,9	1,5	1,4	0,1	0,1
Finance	4,8	0,4	0,2	2,7	2,9	3,0	3,0	0,1	0,1
Real estate	2,3	2,8	2,4	-0,8	-0,3	1,0	0,9	-0,0	0,0
Business services	6,0	4,6	4,3	-0,4	-0,2	10,7	10,7	-0,0	-0,0
Other private services	4,1	2,4	2,0	-0,5	-0,1	4,6	4,4	-0,0	0,0
Private household services	3,8	2,8	2,5	-1,0	-0,7	2,3	1,8	-0,0	-0,0
PUBLIC SERVICES	2,7	1,3	1,1	0,4	0,6	22,8	21,2	0,0	0,2
Public Administration and defense	2,1	0,0	-0,2	1,0	1,2	7,0	6,7	0,1	0,1
Education	3,1	1,5	1,5	-0,7	-0,6	6,5	5,2	-0,1	-0,0
Health and social work	3,2	2,1	1,8	0,5	0,8	9,3	8,3	0,0	0,1

Source: Own elaboration. Data EUKLEMS (2009)

TABLE A.3
GVA growth and factorial contributions in the European Union, 1980-1995

(EU 15ex, annual average growth rate, between brackets the % over GVA growth)

	GVA	Labour	Hours	Labour composition	Capital	ICT	Non ICT	MFP
TOTAL ECONOMY	2.2	0,3 12	-0,1 -6	0,4 18	1,0 47	0,3 14	0,7 33	0,9 41
SERVICES	2.6	2,0 75	0,4 16	1,6 59	2,2 82	0,4 15	1,8 67	-1,6 -56
PRIVATE SERVICES	3.0	2,9 99	0,7 24	2,2 75	2,8 95	0,6 18	2,2 77	-2,7 -93
Wholesale and retail trade	2.4	0,3 14	0,1 5	0,2 9	0,8 33	0,3 12	0,5 21	1,3 53
Hotels and restaurants	0.9	1,9 210	1,6 182	0,3 28	0,4 43	0,1 8	0,3 35	-1,4 -153
Transport	3.0	0,2 7	-0,1 -2	0,3 9	0,8 26	0,3 10	0,5 16	2,0 67
Communications	4.4	0,0 -1	-0,2 -5	0,2 4	2,0 46	1,3 30	0,7 16	2,4 55
Finance	2.6	0,9 35	0,6 23	0,3 12	1,6 64	1,1 41	0,5 23	0,1 1
Real estate	3.5	0,3 9	0,2 6	0,1 3	2,0 58	0,1 2	1,9 56	1,2 34
Business services	4.4	3,5 79	2,9 67	0,6 12	2,5 56	0,8 19	1,7 37	-1,6 -36
Other communitarian, social and personal services	2.2	2,0 91	1,6 73	0,4 18	1,4 57	0,5 15	0,9 42	-1,2 -48
PUBLIC SERVICES	1.9	3,8 207	0,8 44	3,0 163	0,7 36	0,1 3	0,6 33	-2,6 -143
Public Administration and defence	1.6	0,3 18	0,1 8	0,2 10	0,7 43	0,2 14	0,5 29	0,6 39
Education	1.7	1,3 78	0,8 47	0,5 31	0,2 9	0,1 5	0,1 4	0,2 13
Health and social work	2.3	1,9 83	1,6 68	0,3 15	0,5 23	0,1 6	0,4 17	-0,1 -6

Source: Own elaboration. Data EUKLEMS (2009)

TABLE A.4.
GVA growth and factorial contributions in the European Union, 1996-2005

(EU15 ex, annual average growth rate, between brackets the % over GVA growth)

	GVA	Labour	Hours	Labour composition	Capital	ICT	Non ICT	MFP
TOTAL ECONOMY	2.2	0,7 32	0,5 23	0,2 9	1,1 52	0,4 20	0,7 32	0,4 16
SERVICES	2.6	1,6 61	0,6 21	1,0 40	1,1 41	0,3 10	0,8 31	-0,1 -2
PRIVATE SERVICES	3.0	2,2 72	0,9 30	1,3 42	1,4 45	0,4 12	1,0 33	-0,6 -17
Wholesale and retail trade	2.3	0,5 21	0,4 16	0,1 5	1,1 46	0,4 19	0,7 27	0,7 32
Hotels and restaurants	1.8	1,9 103	1,7 91	0,2 12	0,8 43	0,1 8	0,7 35	-0,9 -46
Transport	2.9	0,9 32	0,7 25	0,2 7	1,3 44	0,5 16	0,8 28	0,7 25
Communications	7.9	0,1 2	-0,1 -1	0,2 3	2,4 31	1,8 23	0,6 8	5,4 68
Finance	3.1	0,4 11	0,0 0	0,4 11	1,4 44	1,2 39	0,2 5	1,3 45
Real estate	2.0	0,2 10	0,2 8	0,0 2	1,9 95	0,2 4	1,9 91	-0,1 -5
Business services	4.1	3,1 75	2,8 68	0,3 7	2,6 62	1,3 31	1,3 31	-1,6 -37
Other communitarian, social and personal services	1.9	1,4 72	1,4 72	0,0 0	1,2 63	0,4 23	0,8 40	-0,7 -35
PUBLIC SERVICES	1.6	2,1 136	0,8 53	1,3 83	0,3 21	0,1 3	0,2 18	-0,8 -57
Public Administration and defence	1.0	0,1 5	-0,3 -25	0,4 30	0,5 54	0,3 31	0,2 23	0,4 41
Education	0.8	1,8 207	1,4 163	0,4 44	0,3 30	0,2 19	0,1 11	-1,3 -137
Health and social work	2.6	1,8 67	1,4 55	0,4 12	0,7 27	0,2 9	0,5 18	0,1 6

Source: Own elaboration. Data EUKLEMS (2009)

TABLE A.5
GVA growth and factorial contributions in the European Union, 1980-2005

(EU 15ex, annual average growth rate, between brackets the % over GVA growth)

	GVA	Labour	Hours	Labour composition	Capital	ICT	Non ICT	MFP
TOTAL ECONOMY	2.2	0,4 20	0,1 6	0,3 14	1,1 49	0,4 17	0,7 32	0,7 31
SERVICES	2.6	1,8 69	0,5 18	1,3 51	1,7 65	0,3 13	1,4 52	-0,1 -35
PRIVATE SERVICES	3.0	2,6 88	0,8 27	1,8 61	2,2 75	0,5 16	1,7 59	-1,8 -62
Wholesale and retail trade	2.4	0,4 17	0,2 9	0,2 8	0,9 38	0,4 14	0,5 24	1,1 45
Hotels and restaurants	1.3	1,9 148	1,7 130	0,2 18	0,5 43	0,1 8	0,4 35	-1,1 -91
Transport	2.9	0,5 17	0,3 9	0,2 8	1,0 33	0,4 12	0,6 21	1,4 50
Communications	5.8	0,0 0	-0,2 -3	0,2 3	2,2 38	1,5 26	0,7 12	3,6 62
Finance	2.8	0,7 25	0,4 14	0,3 11	1,5 55	1,1 40	0,4 15	0,6 20
Real estate	2.9	0,3 9	0,2 7	0,1 2	2,0 68	0,1 3	1,9 65	0,6 23
Business services	4.3	3,3 78	2,9 68	0,4 10	2,5 59	1,0 24	1,5 35	-1,5 -36
Other communitarian, social and personal services	2.1	1,8 84	1,5 72	0,3 12	1,2 59	0,3 18	0,9 41	-0,9 -43
PUBLIC SERVICES	1.7	3,1 181	0,8 47	2,3 134	0,5 31	0,1 4	0,4 27	-1,9 -112
Public Administration and defence	1.3	0,2 14	0,0 -2	0,2 16	0,6 46	0,2 19	0,4 27	0,5 40
Education	1.4	1,5 110	1,0 76	0,4 34	0,2 14	0,1 9	0,1 5	-0,3 -24
Health and social work	2.4	1,9 76	1,5 63	0,3 13	0,6 25	0,2 7	0,4 18	-0,1 -1

Source: Own elaboration. Data EUKLEMS (2009)

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