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Varieties of service economies in Europe

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Varieties of Service Economies in Europe

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Abstract

This paper identifies the varieties and dynamics of service economies in Europe, analysing the role of knowledge base and innovative efforts and their evolution across time and countries. Results based on aggregated macroeconomic data indicate that there is no convergence trend towards a single service economy model. Moreover, different service economies models can be associated with institutional and welfare state diversity. When analysing a comprehensive set of indicators at a disaggregated level a more detailed pattern of service economies emerges. The structural composition of countries plays a prominent role, while heterogeneity is driven by uneven knowledge bases and innovative efforts.

Keywords: services, social models, innovation, knowledge, Europe.
JEL: L80, O31, C38

1. Introduction

Since the Lisbon summit, services have been clearly integrated in the EU policy agenda in order to meet the challenging objective of transforming Europe into the most competitive and dynamic knowledge-based economy. In the years 2000–2003, the consideration of services in the policy arena was related to the shift of the Lisbon strategy towards EU competitiveness and to the new efforts for creating a real internal market for services. In the past, these objectives were more or less neglected in the European integration process, despite attempts to institutionalize the free provision of services and the right of establishment, which were included in the Treaty and in many other directives developed between the 1960s and the 1990s. As a result of the Lisbon strategy, a new approach for an effective and real internal market for services was launched: the new framework Directive was drafted in 2004 and, in that year, the DG Internal Market was renamed DG Internal Market and Services. The Commission's Services Directive was finally approved in 2006, and member states are currently

implementing it. Today, the implementation of the Service Directive is a challenging process leading to new economic gains (Copenhagen Economics, 2005; Kox and Lejour, 2006; Visintin and Rubalcaba, 2011).

Additionally, services have gradually been included in other EU policies aimed at supporting competitiveness and economic performance of enterprises. In this context, a particular role was given to business-related services and to services of general economic interest (European Commission, 2003A and 2003B). Since then, tertiary activities were progressively included in the innovation policy agenda (European Commission, 2004A and 2004B). In 2004, for the first time, DG-Regio also included 'services to enterprise' in the new *Guidelines for Structural Funds 2007–2013*, under the innovation promotion area. Moreover, between 2006 and 2010 linkages between manufacturing and service sectors were pointed out in some relevant documents, such as the Commission mid-term review of industrial policy in 2007, and opinions of the European Economic and Social Committee in 2006 and 2008 (European Economic and Social Committee, 2006). During these years, services also became more prominent in EU programmes through the use of a bottom-up approach. Service companies and service projects started to appear in Research or ICT-related programmes, even if these were not directly connected to them. Since 2007, EU programmes have become much more service-oriented, and services are much more integrated into many EU policies (Rubalcaba and Gallego, 2009). The role of DG Enterprise in promoting services' innovation has been outstanding since the end of 2006, when promoting strategies and actions in this field, such as the platform on knowledge intensive services.

The growing importance of services within the EU policy agenda is related to the increasing role of these activities in the sectoral economic structure. Services account for more than 70% of European value added and employment. Even within manufacturing industries they represent a major part of jobs. The dominance of these activities at macro, meso and micro levels leads to the inclusion of services in any competitiveness programme. In order to accomplish the ambitious targets of the Lisbon Agenda a call for strengthening the knowledge society and an innovative Europe has been already made (Howarth, 2007; Sapir et al., 2003; Kok, 2004; Gros, 2005; Aho Report, 2006; Pisani-Ferry and Sapir, 2006). Now, knowledge and innovation continue to be one of the main objectives of the 'smart growth' Europe 2020 Strategy (European Commission, 2010) for the next decade due to the paradigm shift that EU intends to achieve in terms of institutional, technological and organisational changes. From this, it

becomes clear that a full understanding of the diversity of the service economies related to the role played by knowledge and innovation has to be considered as an important prerequisite for achieving policy goals.

In this context, this paper aims at identifying the varieties of service economies and the dynamic role played by knowledge and innovation in Europe. It is organized as follows. First, a literature review of the varieties of institutional, social and economic models existing across the EU is presented and the research hypotheses are set. After explaining the technique followed in order to detect similarities and dissimilarities in EU services economies, two complementary empirical approaches are developed. In the first place, a clustering of the EU service economy is developed on the basis of macro-aggregated indicators, such as public, private and mixed services' participation in employment and recent growth. Since this macro-picture can only be meaningfully interpreted by a better understanding of the sectoral specificities, in a second step a multivariate data analysis is applied to a comprehensive set of indicators at the disaggregated level. These indicators reflect different dimensions of service economies, such as: structural composition; knowledge base and innovative efforts; internationalisation; and competition restrictions. By accounting for sectoral specifics, this paper provides a more precise picture of the configuration and dynamics of service economies, which should be taken into account when designing service innovation policies at European or national level. However, a complete analysis of policy implications lies outside the scope of this research.

2. Varieties of models across Europe

The notion of a single European model has to be considered as unrealistic since institutional, social and economic diversity is one of the most prominent characteristics of the European Union. Several conceptual approaches have been used to capture national disparities. Institutional models of political economy or 'varieties of capitalism' (VoC) have been identified by Hall and Soskice (2001) from the different types of relationships and coordinating mechanisms among multiple actors, such as the State, society, firms and the market (Allen, 2004). Two polar ways of institutional organization of production have been recognised: *liberal market economies* and *coordinated market economies.* The former is mainly focused on short-term individual economic gains and is coordinated by market-driven mechanisms, while the latter is centred on long-term and cooperative-type efforts, together with non-market coordinating mechanisms which can be assumed by corporatist arrangements (as in Germany, the Netherlands,

Belgium and, to some extent, Austria), the state (France and Italy) or political parties such as social democracy (Scandinavia) (Blanke and Hoffmann, 2008).

Other approaches have recognised 'varieties of social models' on the basis of the configuration of the welfare state system. In the 1990s, they were characterized as *liberal*, *conservative* or *social democratic* (Esping-Andersen, 1990), while more recent studies (Sapir, 2006) have defined four social models: *Nordic*, *Anglo-Saxon*, *Continental* and *Mediterranean*.[1] They differ mainly on the level and scope of social expenditure, fiscal intervention, strength of the labour unions and the type of protection against labour market risks. The Nordic model shows the highest levels of social protection expenditure, as well as universal welfare provision and can be considered the most efficient and equitable.[2] In contrast, the Mediterranean grouping that relies on large social spending on old-age security and strong employment protection delivers neither efficiency nor equity. The Anglo-Saxon model, driven mainly by social assistance of the last resort, can be considered efficient but not equitable, while the opposite occurs in the Continental system.

Castells and Aoyama (1994: 20) claim that: 'a post-manufacturing employment structure has indeed emerged over the last quarter of the twentieth century but there is a great deal of variation in the structures of various countries.' Since the process of structural change has not been homogeneous between services categories nor EU economies, a diversity of models has been recognised on the basis of the sectoral composition of national economic structure (Aoyama and Castells, 2002; Daniels et al., 2010). In this sense, the 'varieties of service economies' have been recently identified in the literature. Based on three main criteria, such as the employment structure of the service sector, job quality and skill levels in services, as well as the relative importance of market and non-market services, Gadrey (2007) identified two polar models of the service economy, the *Anglo-Saxon* and the *Nordic* model, while other countries are to be located in intermediate positions.[3] In a more recent study, Gadrey (2009) applies the same criteria to a larger set of 17 OECD developed countries and recognised four service models or 'worlds': *liberal*; *Nordic*; *European Continental;* and *familialist*.[4] Different national conventions on equality, solidarity, gender and family may underlie this diversity of worlds in developed service economies. Burger and Stare (2010) have analysed gaps in private and public employment shares, relative to EU15, and stressed that there are more varied service models in the enlarged Europe.[5] This paper contributes to the literature by analysing varieties of services economies in Europe and the dynamic role played by knowledge and innovation, with the view that these

activities may be crucial for achieving the 2020 objectives for growth and welfare. First, this diversity will be analysed on the basis of aggregated indicators in order to tackle the following hypotheses:

- *There is a variety of service economies models across Europe*. It is questionable why countries should be striving to achieve the same service economy model. There has been a general sectoral shift towards tertiary activities, involving all European economies, since improvements in GDP per capita are associated with a larger share of services in the economy from the side of final consumption (Maddison, 1980; OECD, 2005) and intermediate demand (Savona and Lorentz, 2009). It has to be recognised, however, that the patterns and interactions between institutions, technology, employment, occupations, skills and public sector intervention that operate at macro, meso and micro levels of analysis, may determine service economy diversity (Castells and Aoyama, 1994; Aoyama and Castells, 2002; Gadrey, 2007, 2009; Daniels et alt., 2010, Burger and Stare, 2010).

- *The grouping of EU services economies may reproduce, to some extent, the varieties of institutional and social models*. The different conceptual approaches previously analysed are most likely closely connected. As Hall and Soskice (2001: 50-51) note, it appears to be a correspondence between 'the types of political economies and the types of welfare state.' In fact, liberal market economies are generally accompanied by liberal social-policy regimes, which lend support to fluid labour markets mainly composed of an unspecific skilled labour force. At the same time, social policy regimes that accompany coordinated market economies are aligned to the corporate strategies found in such economies. Moreover, as Blanke and Hoffmann (2008) stated, the central social issue, addressed by welfare state models, is associated to a certain extent on the predominant type of institutional model: poverty (UK), the worker question (Germany), population and family (France/Italy) and equality (Scandinavian countries). In the same way, the distinctive features of the service economies models should back up the institutional organization of production, as well as the social policy regimes.

In a second stage of the analysis, the paper accounts for sectoral specificities in order to achieve a comprehensive understanding of the macro-picture. In this way, it seeks to provide some insights into the following hypotheses:

- *Knowledge and innovation may shape the role that services play in the EU economies.* Knowledge-intensive service activities are closely related to the innovation

capacity of an economy and are key for the competitiveness of the services economy (Windrum and Tomlinson, 1999; European Commission, 2004C). Some authors have claimed that 'there needs to be a shift in the focus from services to information processing as the dominant activity in today´s advanced economies' (Aoyama and Castells, 2002: 156). However, the development of the information society has not followed a homogeneous pattern across member states (Gómez-Barroso et al., 2008). Therefore, given the current importance of service innovation and innovation in services (Gallouj and Djellal, 2010), it is likely that the diversity of the knowledge base and innovation in services may also play a role in the mapping of the EU service economies.

- *The service economies models may not be unchanging in time.* In particular, the focus on the dynamics triggered by innovation processes demands to include a Neo-Schumpeterian dimension (Hanusch and Pyka, 2007). Each cluster may have its own dynamic in terms of sectoral structural composition, knowledge and innovative efforts, internationalization and competition restrictions. Evolution matters and changes should be observed in these models across European economies.

In the following section, methodological issues concerning the cluster technique used in the empirical analysis are discussed.

3. Detecting Similarities and Dissimilarities in European Service Economies: Cluster Analysis

In order to work out the similarities and dissimilarities among European service economies cluster analysis techniques are applied to the data (e.g. Jobson, 1992). The general rationale behind this analytical tool is to test a sample for the degree of structural commonalities between the units of analysis. Its outcome is a categorization of the analysed units so that the coherence of each group (or cluster), as well as the heterogeneity across different clusters, is maximized. To determine the coherence of a certain cluster and to calculate the existing diversity of different clusters, distance values between the units of analysis need to be determined on the basis of the characteristics of each entity. From the various methods to calculate distances between the entities, the squared Euclidean distance measure is applied. That is because this is a frequently applied distance measure of metric data. Furthermore, it accounts more strongly for differences between entities than does the linear Euclidean distance. Hence, the distance between two countries, *i* and *j,* can be calculated as follows:

$$d(i,j) = \sum_{k=1}^{m} (a_{ik} - a_{jk})^2$$

Here, a_{ik} represents the parameter value of characteristic *k=1,…,m* for country *i=1,…,n*. Thus, the entire quantitative data matrix is $\mathrm{A} = (a_{ik})_{m \times n}$. The determination of distances between entities is a crucial, but at the same time preliminary, step in the entire cluster analysis. It needs to be completed by the application of a classification algorithm. Depending on the quality of the underlying data and on the research target, various classification procedures exist. The data is characterized by a relatively small number of units of analysis and, at the same time, by a relatively large number of variables and by a cardinal data level. Given these specifics of the underlying data and the country sample, a hierarchical, two-step cluster method (which rests upon the average-linkage principle of cluster membership) is applied to the sample.

The determination of the inter-cluster diversity between two classes *K* and *L*, $v(K,L)$, can thus be described formally as follows:

$v(K,L) = \frac{1}{|K| \cdot |L|} \sum_{\substack{i \in K \\ j \in L}} d(i,j)$, with both distinctive classes *K* and *L* (i.e. *K≠L*) belonging to the entire classification **K**. At first, an agglomerative classification method is utilized since it is not intended to impose a given, pre-determined classification of countries ***ex ante***. This method starts with a single-country cluster and entails a step-wise concentration of countries according to their degree of structural similarities. Given that it is intended to attach all countries in the sample to a certain cluster, and that cases in which a certain country belongs to several clusters shall be ruled out, the selected clustering method yields an exhaustive as well as a disjunctive classification. A classification is exhaustive if $\bigcup_{K \in \mathrm{K}} K = N$, with N being the total amount of analysed objects. A disjunctive partition meets the condition that $K, L \in \mathrm{K}, K \neq L$, so that $K \cap L = \phi$. In the following section, we additionally perform a K-means clustering. This method assigns each of the *N* objects analysed to one of the *K* clusters fixed ***a priori*** (K<N), minimizing the within-cluster variance and maximizing the between-cluster variance.

4. Varieties of the European service economies: The aggregated picture

As a first approximation for identifying different service economies models the cluster analysis is carried out for 26 countries[6] on the basis of macro-aggregated indicators, such as private, public and mixed employment shares in 2005, and their annual growth

during the decade 1995–2005. In this way, we consider a wider set of economies than previous studies and three theoretical situations of services provision.[7]

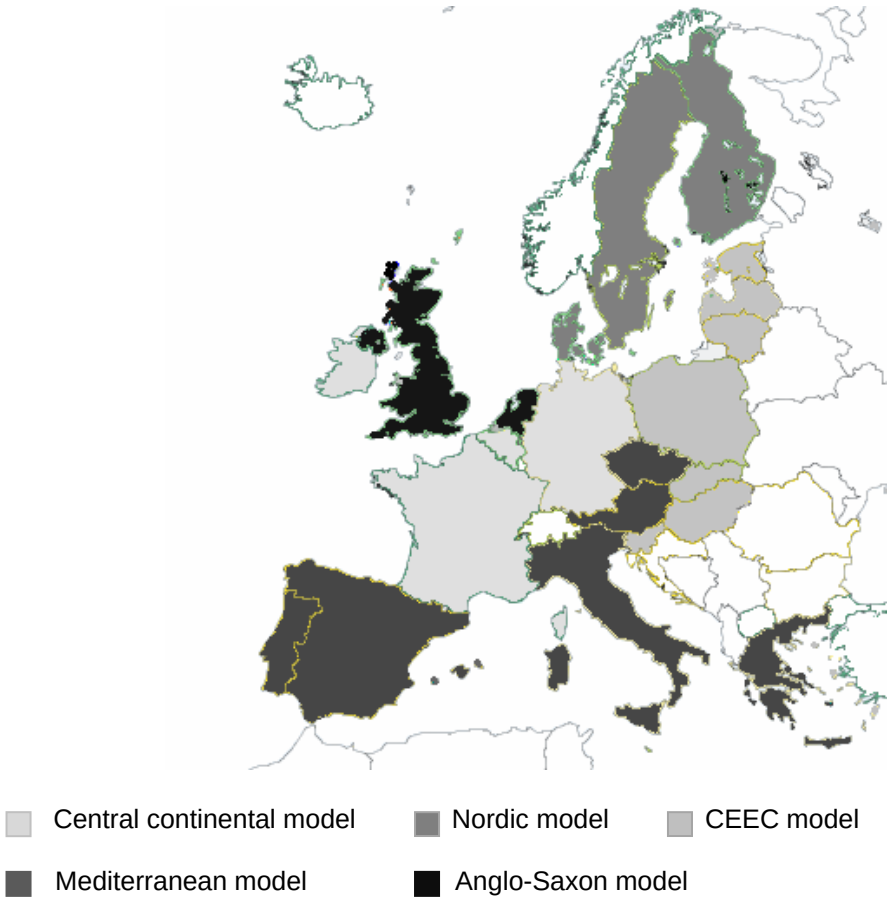
The results show a clustering around six service economies models (Figure 1). Therefore, the varieties of service economies emerge just on the basis of the interactions and patterns of aggregated sectoral composition of employment. The grouping is not given by the hazard nor produces illogical clusters. Indeed, it is closely related to geographical or socio-economic proximities, which lead us to label the groups as *Mediterranean* (Italy, Spain, Greece, Portugal, Austria and Czech Republic), *Continental* (Belgium, France, Germany and Ireland), *Anglo-Saxon* (The Netherlands, Australia, United Kingdom and the United States), *Nordic* (Denmark, Sweden and Finland), *CEEC* (Central and Eastern European Countries, including Estonia, Latvia, Hungary, Slovakia, Lithuania, Poland and Slovenia) and *Oriental* (Japan and Korea). The analysis confirms that the varieties of EU service economies increase when considering new member states, as Stare and Burger (2010) stressed. Also, economies such as Japan and Korea build a differentiated cluster which has to be expected due to cultural, socio-economic and geographical proximity. This result, however, is opposed to Gradey's (2009) findings which positioned the Japanese economy next to Mediterranean countries.

The K-means clustering confirms the previous results, except for Slovakia, that is grouped together with the Mediterranean model. This is not surprising considering the strong political and economic links and the geographical proximity of Slovakia with the Czech Republic, which was initially grouped within this model.

The main orientation of the typology of service economies identified is tied with the characteristics of the coordinating mechanisms of the prevailing institutional framework, as well as to the welfare state profiles. The Anglo-Saxon service economies combine the strongest private orientation with a progressively increasing role of mixed services (Table 1). This sectoral employment composition is, to some extent, in accordance with the market-driven capitalism and liberal social policy regime that characterize the countries belonging to this group. By contrast, in market-coordinated economies a different service orientation prevails, even though the growth of private activities emerges as the main general trend. Nordic economies show a clear mixed services economy orientation. Indeed, the predominance of non-market services employment is aligned with social democratic economies that feature the highest levels of social

protection expenditures and universal welfare provision. On the contrary, public services are relatively more relevant in Continental and Mediterranean models in which conservative welfare state regimes appear to prevail. As an additional feature, the Mediterranean cluster shows the lowest average share of mixed services in employment.

Figure 1. EU service economies based on aggregated indicators



Source: Based on EU KLEMS Database.

It is interesting to note that the contrast between Anglo-Saxon and Nordic types of services economies also emerged in Gadrey (2009), who used a simplified criterion based on market and non-market services. According to our typology, the varieties of service economies increase in the enlarged EU. In fact, the CEEC appears as a separate group that shows the lowest share of private services in total employment, despite having the highest annual growth rate during the last decade. Also, public and mixed services are comparatively important. In new member states, public administration played a central role owing to the increased requirements for

administrative support to the accession process, and to institutional changes launched by market oriented reforms (Stare, 2007).

Table 1. Cluster means (in %)

	Cluster 1 Mediterranean	Cluster 2 CEEC	Cluster 3 Continental	Cluster 4 Anglo-Saxon	Cluster 5 Oriental	Cluster 6 Nordic	EU25
Private services share	33,4	27,5	37,0	43,0	40,5	32,5	36,4
Private services AGR	1,7	1,9	1,1	0,6	0,8	1,2	1,3
Public services share	6,6	6,4	7,7	6,1	3,2	6,3	6,7
Public services AGR	-0,2	1,6	-0,7	-0,4	0,1	-1,4	-0,7
Mixed services share	20,5	24,1	26,9	28,4	22,8	34,3	24,9
Mixed services AGR	0,2	0,2	0,8	0,8	3,1	0,4	0,4
Cases	7	6	4	4	2	3	

Note: Share refers to the participation in total employment in the year 2005. AGR means annual growth rate during 1995–2005. Cluster 1 includes: Italy, Spain, Greece, Portugal, Austria, Czech Republic and Slovakia. Cluster 2 includes: Estonia, Latvia, Hungary, Lithuania, Poland and Slovenia. Cluster 3 includes: Belgium, France, Germany and Ireland. Cluster 4 includes: the Netherlands, Australia, United Kingdom and the United States. Cluster 5 includes: Japan and Korea. Cluster 6 includes: Denmark, Sweden and Finland.
Source: Based on EU KLEMS Database.

In general, the dominant trend is towards an increased participation of private services in total employment. The other side of the coin is that public services shares in employment show a diminishing tendency in all clusters analysed, except for the CEEC group and, to a lesser extent, the Oriental nations. On the other hand, those groups of countries strongly orientated to private services (Anglo-Saxon, Oriental) show a growing presence of mixed services in employment.

To achieve a better understanding of the rationale behind the services-lead clustering a more detailed and comprehensive exercise is proposed in the next section, based on sectoral-specific indicators related to different dimensions of service economies.

5. Varieties of EU service economies: The sectoral perspective

The major objective of this section is to develop a mapping of the service economies in Europe, accounting for sectoral specifics over time. In this way, we will be able to examine the role knowledge and innovation play within the diversity of service economy models, as well as to study its dynamic pattern.

a) Empirical setting: Data and analytical method

To meet this target and thus to be able to take a holistic or system-level perspective, our analysis is grounded in a comprehensive set of indicators, reflecting different dimensions of the service economies in Europe. We follow a similar approach to the one Balzat and Pyka (2006) applied for mapping national innovation systems in OECD economies. The variables included in the analysis originate from the EUKLEMS Database, Eurostat, OECD and World Trade Organization.[8] In order to capture the pattern dynamics of the European service industries, three time steps have been considered: 1995, 2000 and 2005. Owing to data availability twelve countries are included in the study.[9]

In the empirical analysis, our country sample is broken down into several dimensions or building blocks reflecting the main features that characterize services activities at national level. These are labelled *structural composition*, *knowledge base and innovative efforts*, *internationalisation* and *competition restrictions.* Each of these four central dimensions will now be briefly explained.

The configuration of the EU service economies is captured by the *structural composition* dimension which contains variables related to employment, gross value added and productivity growth for 33 service subcategories. When available, information related to firms is also included, although in this case the level of disaggregation of data reduces significantly.

The *knowledge base and innovative efforts* dimension contains several variables aimed at evaluating innovation potential and performance in service activities across nations. Several studies have demonstrated that services may be at least as innovative as other economic sectors (Miles, 1999, 2005; Howells and Tether, 2004; Rubalcaba and Gallego, 2007; Gallouj and Djellal, 2010), although old myths have been persistently upheld, that tertiary activities have difficulties in incorporating innovations and technology. R&D expenditure is a classic indicator of the innovative potential of a country. In our analysis, we take into account service investment in R&D on the macroeconomic level by taking into account expenditures, distribution across industries and intensity using value added.[10] However, the strength of a country's innovation system depends on many more aspects than just investment in R&D-related activities. Thus, further variables are included in this dimension for estimating the current and future outcomes of national innovation systems. To approximate the present inventiveness of a service economy, ICT patent data and human resources in science

and technology (S&T) in services are mainly utilized. The future inventiveness of a country is evaluated by indicators of the national education systems, by structural variables of the national workforce engaged in knowledge intensive activities (KIS) and knowledge intensive business activities (KIBS), as well as by data on the share of training enterprises across industries.

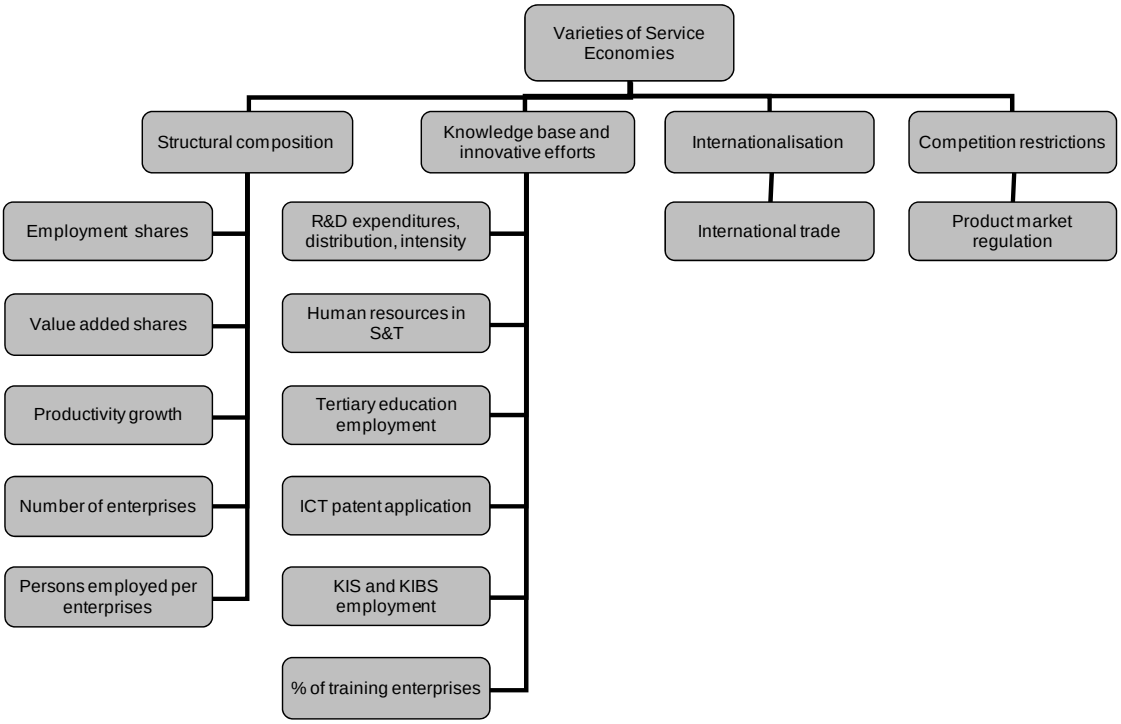
The *internationalization* dimension measures the degree of openness of services activities in the twelve economies under scrutiny. In this study we have considered information on market share of available services categories in total trade and market share of services exports in world exports.[11] In a certain way, they reflect the expansion of global sourcing which has established a new pace in the international provision of services (van Welsum and Vickery, 2005). It is worth highlighting that statistics regarding international trade of services only include a restrictive part of the real transactions from the estimates of the balance of payments, among other limitations.

Competition is a key element for enhancing competitiveness by means of increases in economic global productivity (Nicoletti and Scarpetta, 2003), innovation and technological diffusion (Aghion et al., 2001). As a result, a proactive and effective competition policy is essential in order to achieve a high service performance in Europe. In order to capture the scope to which political and institutional framework promote or inhibit competition in services, a last dimension labelled *competition restrictions* is included in our analysis. The available OECD indicators of product market regulation are used for measuring this dimension.

With these four dimensions, the study aims to capture the configuration of services economies in a structured way, as well as central determinants of service activities on the national level. In Figure 2, a diagram of the dimensions considered is shown.

The specific targets of our study are to detect and then to analyse cross-national (dis-) similarities in the structure and performance of the different dimensions of services economies on the country level. The clustering method is applied from an *overall* and *partial* perspective. In the first case, the entire set of indicators previously described is subject to a hierarchical cluster analysis. In the second one, the above described clustering procedure is applied to every single dimension.

Figure 2. The sectoral specific dimensions considered in the analysis



b) Empirical findings

First, we perform a cluster analysis with all the available indicators in order to detect a general pattern of varying service patterns in the economies under investigation. As Table 2 shows, this overall pattern for the first year, 1995, displays three different groups which are to be distinguished from each other. The first group comprises the Eastern European candidates, the Czech Republic and Poland. On the one hand, the service structure of these economies are too different from the ones of the old membership countries, but, on the other hand, they are similar enough to be grouped in a distinguishable cluster. In these economies, several factors such as market-oriented reforms, institutional, technological and organizational changes, as well as statistical realignment of activities may explain the pattern followed by services activities in the last decade (Stare, 2007). As this result is maintained for the years 2000 and 2005, the differences to the other countries have to be considered as rather persistent. A similar result is detected for the Irish service economy. Over the three periods observed, the cluster algorithm allocates Ireland into a single cluster, stressing the different character of the service economy of the *Celtic Tiger,* which very likely can be traced back to the special role that outsourcing, ICT and the financial sector play there. In 1995, all other economies in our sample are allocated into one large cluster which means that, in 1995, the differences within this group of countries are not pronounced

enough to justify a more complex pattern in this overall analysis. This large cluster, however, is broken open for the years 2000 and 2005. In 2000, the two Mediterranean economies, Italy and Spain, constitute their own cluster and also a Scandinavian Cluster, encompassing Denmark, Finland and Sweden, emerges. These two clusters, therefore, show a strong geographical determination, indicating a particular organization of their service economies. The remaining service economies of France, Germany, the Netherlands and the United Kingdom, which were allocated into one distinguishing cluster in 1995, partly follow a geographical pattern (central European economies) and a size-dependent pattern, as with Germany, France and United Kingdom the larger European economies, can be found here. The size of the economies seem to dominate the service organization as the pattern observed in 2005 is similar to the one in 2000 with one exception: The Netherlands now are grouped into the cluster of the smaller Scandinavian economies.

Table 2. Composition of country clusters by dimensions

Dimensions and Countries												
Overall												
	CZ	**DK**	**ES**	**FI**	**FR**	**DE**	**IRE**	**IT**	**NL**	**PL**	**SW**	**UK**
1995	1	2	2	2	2	2	3	2	2	1	2	2
2000	1	2	3	2	4	4	5	3	4	1	2	4
2005	1	2	3	2	4	4	5	3	2	1	2	4
Structural composition												
1995	1	2	2	2	2	2	3	2	2	1	2	2
2000	1	2	3	2	4	4	5	3	4	1	2	4
2005	1	2	3	2	4	4	5	3	4	1	2	4
Knowledge base and innovative efforts												
1995	1	2	1	3	3	4	1	1	3	1	3	5
2000	1	2	1	2	3	3	1	1	2	1	2	3
2005	1	1	2	3	3	4	1	5	3	2	3	3
Internationalisation												
1995	1	2	3	1	4	4	1	3	5	6	1	4
2000	1	2	3	1	4	4	5	3	4	1	1	6
2005	1	2	4	3	4	4	5	4	3	1	3	6
Competition restrictions												
2000	1	2	3	2	4	2	4	3	2	1	2	5
2005	1	2	1	2	3	4	5	1	4	1	4	6

The fact that country size, in principle, seems to matter in the overall configuration of the EU services economies patterns is a surprising result, which impels us to

investigate the cluster patterns observed for each of the four specific dimensions we identified as important. This will allow us a better understanding of the variety of service models in Europe as well as the identification of dimensions which, more than others, shape the overall picture. The first dimension under investigation is the structural composition of European service economies.

The patterns detected for the varying structural compositions of our sample economies are strikingly similar to the overall pattern. From this follows that homogeneity within each cluster, and heterogeneity amongst the different clusters with respect to the structural composition, are dominant and follow the geographical pattern since 2000. The Eastern European model differs from the Central European model, which again differs from the Scandinavian and Mediterranean models. In contrast to the overall picture, the size effect in the year 2005, which moved the Dutch service economy into the cluster of Scandinavian countries, is not visible in the dimension of structural composition. The Dutch service economy remains in the cluster together with the largest countries in our sample: France, Germany and the United Kingdom. Therefore, it can be concluded that the country size effect, which seems to matter when considering the comprehensive set of indicators that shape the overall service economy pattern, is not relevant from the perspective of specific dimensions, such as structural composition. The Eastern European model is below the rest in terms of services participation in the economy and productivity. However, inland transport emerges as a comparatively relevant category, which may be related to the role played by infrastructure as a building block of socialist economies. In Mediterranean countries and Ireland, services account for quite similar shares of employment and value added (below 70%), although productivity appears to be somewhat higher in the Irish economy. Nevertheless, their services economies models are rather dissimilar since the latter is mainly oriented towards financial intermediation, while in Mediterranean countries public administration and also hotels and restaurant categories play the most prominent role. On the other hand, the Scandinavian and Continental models show the highest participation of services in employment and value added (surpassing 70%), as well as the top levels of productivity. While in the Nordic economies sectors such as health and education are the leading ones, in the cluster encompassing the Continental countries in our sample, business activities (in particular, professional and other business services) emerge as the most important.

The patterns to be detected for the dimension knowledge base and innovative efforts in services, however, differ strongly. From this follows that the remaining heterogeneity

within the clusters found so far is caused by differences in the knowledge bases. Furthermore, these differences are not strong enough to justify different cluster allocations within the overall pattern. Concerning the knowledge base dimension we find in 1995, three single country clusters (Denmark, Germany and UK), one cluster comprising four old member countries (Finland, France, the Netherlands and Sweden), and one cluster with the new members from Eastern Europe (Czech Republic and Poland), the Mediterranean economies (Spain and Italy) and Ireland. While this cluster is repeated in 2000, a certain dynamic for the other clusters is to be observed: Denmark, Finland, Sweden and the Netherlands are forming one cluster, now encompassing the northern countries in our sample. France, Germany and the United Kingdom constitute the third cluster, encompassing the large European economies. This pattern changes again in the year 2005, and therefore allows the conclusion to state a significant dynamic within the knowledge dimension. Now, Germany and Italy constitute single country cluster solutions. In the German economy, knowledge base and innovative efforts appear as mainly oriented towards manufacturing activities. In Italy, this dimension is mainly oriented towards knowledge-intensive market services (such as transport, real estate and renting). The Spanish service economy goes together with Poland into one cluster in which knowledge base in services is relatively weak and mostly oriented to less knowledge-intensive activities (distributive trades, hotels and restaurants and travel agencies). Another cluster is comprised by the Czech Republic, Denmark and Ireland. In this group, R&D intensity of the service sector appears considerably high, indicating an innovative potential in this kind of activities, mainly in knowledge-intensive financial services. Finally, Finland, France, the Netherlands, Sweden and the United Kingdom form together the largest cluster, encompassing five service economies in 2005, characterized by a relatively strong knowledge and innovation base in services, in particular, in knowledge-intensive high-technology activities.

The dimension internationalisation again is characterized by a higher stability over the period between 1995 and 2005. The particular patterns which are detected, however, also differ, at least partly, from the overall pattern, which allows for the conclusion that internationalisation of service economies is not completely determined by the structural compositions of the service industries. Over this ten-year period, the Danish service economy shows strong differences in the internationalisation pattern, which leads to a single country cluster solution. In this economy, transportation services have played a central role and have accounted for an important and growing share of total trade. The Czech Republic, Finland and Sweden constituted one cluster over 1995, which is

enlarged by Poland in 2000. However, this group splits up in 2005, following to some extent a geographical pattern. Eastern European countries, in which the internationalization of 'other commercial services' shows a decreasing trend, differ from Nordic economies, including the Netherlands, in which these activities show a growing pattern. Ireland integrated the former cluster in 1995, but in subsequent years constituted a distinctive group. In the last years, this country has often been mentioned in the off-shoring debate (Rubalcaba and van Welsum, 2007). Indeed, data shows an impressive growth in services trade shares in 2000 and 2005, mainly in the category comprising financial activities and business services. Continental countries (France and Germany) and Mediterranean economies (Spain and Italy) formed separate clusters in 1995 and 2000, but joined together into one group in 2005. The similarities in the pattern of services internationalization may be found in the central and growing role played by travel and 'other commercial services'. The United Kingdom, previously grouped together with France and Germany, is allocated in a single cluster solution for the more recent years 2000 and 2005. This is likely caused by the strongest base of British service economy in world exports, mainly in 'other commercial services'.

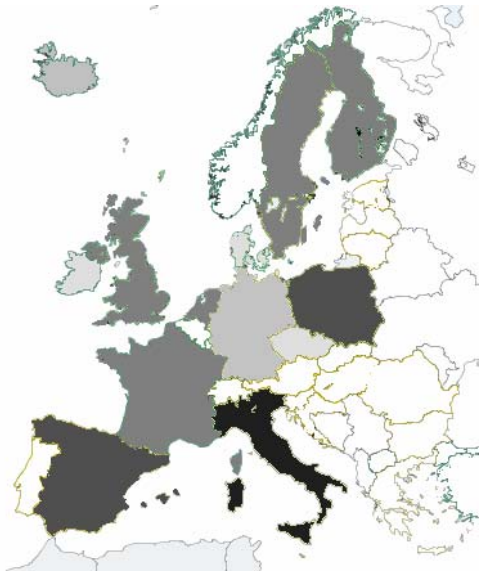
For the competition restrictions, dimension data is only available for the analysis of the years 2000 and 2005. The patterns detected here are rather irregular. Therefore, this dimension is not entirely repeated in the overall picture, indicating a moderate influence only. It is noticeable that the Mediterranean cluster is repeated in 2000, and enlarged by the two Eastern European service economies in our sample in 2005. In this group, product market regulation indices are relatively high in almost all sectors considered, indicating strong competition restrictions, especially in the area of professional services. In 2005, the cluster originally built by France and Ireland is split up into separate single groups. The French economy strongly restricts competition in retail distribution, road and telecom, while Ireland does so mainly in airlines and railways. The Anglo-Saxon tradition for the United Kingdom leads to a single country cluster in both years, which is characterized by comparatively lower levels of competition restrictions, except for postal services. In fact, it is the only country of the sample that has not reduced market regulation indices in this sector between 2000 and 2005. The cluster initially formed by Denmark, Finland, Germany, The Netherlands and Sweden is broken up in 2005, and the last three economies constitute a separate group. Both clusters show relatively low levels of market regulation. However, Denmark and Finland are less restraining in professional services and road transport, while Germany, The Netherlands and Sweden appear to promote competition in air transport more.

From the overall sectoral perspective, the configuration of European service economies models seems to follow a socio-economic and geographical pattern. A size-dependent pattern is somewhat detected, but the partial analysis of the different dimensions included in the analysis shows that it is not relevant. Among the different dimensions of the service economies, the structural composition is the most prominent one in shaping the varieties of EU sectoral models. Dissimilarities, across time between the models identified, arise mainly in knowledge base and innovative efforts. Meanwhile, the patterns detected in terms of services internationalization and competition restrictions are rather irregular.

Figure 3. Varieties of service economies in Europe, 2005

Structural composition

Knowledge base & innovative efforts



Internationalisation

Competitive restrictions

6. Conclusions

Services have progressively been included in EU policy agenda in accordance with their growing importance within the sectoral structure of economies. Gradually, they are being considered as key actors for enhancing competitiveness at macro, meso and micro levels. Within this framework, understanding the similarities and dissimilarities of EU services economies across the enlarged EU is crucial for effective policy shaping.

The configuration of the service economy is not homogeneous across European countries. If services provision is classified into private, public and mixed categories, the variety across Europe is the rule. Several clusters of countries can be outlined from an aggregated perspective, depending on the relative shares these services have in total employment and their annual growth rate during the last decade. Within Europe, five service economy models emerge: Anglo-Saxon, Nordic, Continental, Mediterranean and Central Eastern European. The main orientation of the varieties of service economies identified is closely connected to the diversity of social models, as well as to differences in the institutional organization of production. Moreover, the main trend across clusters, during the last decade, is towards an increased participation of private services in total employment. On the other hand, no conclusive evidence is found regarding the catching-up process of mixed and public services.

When analysing a comprehensive set of indicators of services economies at disaggregated level, the models discussed in the first empirical exercise are only partially confirmed. The overall pattern detected is closely linked to socio-economic and geographical proximities. The country size effect, which may apparently play a role from this perspective, no longer prevails in the partial analysis of the building blocks of the services economies under study. The structural composition of countries emerges as the dimension which mainly shapes the varieties of EU services models, while knowledge base and innovative efforts in services show a relatively more dynamic and uneven pattern across the clusters identified.

The varieties of service economies in Europe impose several challenges to policymakers. First of all, since services represent a dimension of any economic activity and are particularly important for enhancing competitiveness and innovation, there is no reason for the exclusion of this sector from current public policies. Actually, there is a need to apply new services-oriented policy performance criteria within existing

community policies. In addition, it is important to develop policies that deal with the special characteristics of services innovation and R&D; regional localization of services; imperfect information between agents involved in the provision; qualifications, employment and entrepreneurship; and that cope with the remaining gaps in knowledge and statistics.

This paper has emphasized the heterogeneous behaviour of services across countries, but further research is needed to explore the situation in particular categories. Moreover, due to data availability limitations, the period of time considered in the analysis does not encompass important EU market opening initiatives developed after 2005 (revised Lisbon Strategy or Services Directive). Therefore, one challenging avenue of future research relates to the extension of the time span under study in order to examine how the consolidation of services market integration influences the configuration of service economies across the enlarged EU.

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Notes

[1] The *Nordic* includes Denmark, the Netherlands, Finland and Sweden; the *Anglo-Saxon* contains Ireland and the United Kingdom; the *Continental* comprises Austria, Belgium, France, Germany, Luxembourg, and *Mediterranean* includes Italy, Greece, Spain, and Portugal.

[2] According to Sapir (2006:378) a model may be considered efficient if it generates relatively high employment rates, and equitable if it keeps the risk of poverty relatively low.

[3] Portugal, Spain, Italy, Greece and Ireland are excluded from this analysis. The Anglo-Saxon model includes the United Kingdom, USA, Canada and Australia; the Nordic model comprises Sweden, Norway, Denmark and Finland.

[4] European Continental includes France, Germany, Belgium and the Netherlands, while familialist includes Italy, Portugal, Spain, Greece and Japan. Belgium and the Netherlands can be grouped together with the Nordic depending on the criteria used.

[5] In this study, private services are approximated with data for market services employment and public services with data for non-market services (community services) employment.

[6] Those countries with available information in EUKLEMS Database are included in the analysis: EU25 except for Luxembourg, Malta and Cyprus (which were removed from the analysis to avoid outliers' behavior), United States, Australia, Korea and Japan.

[7] Private services are approximated with data for distributive trades, hotels and restaurants, water transport, air transport, financial services, real estate, renting and business activities employment. Public services are estimated with data for public administration, defence and compulsory social security employment. Mixed services are approximated with data for employment in the following service sectors: education, health and social work, other community, social and personal services, post and telecommunications, inland transport.

[8] A complete list of all utilized data sources, variables and sectoral breakdown availability can be found in the Appendix.

[9] Czech Republic (CZ), Denmark (DK), Spain (ES), Finland (FI), France (FR), Germany (DE), Ireland (IRE), Italy (IT), The Netherlands (NL), Poland (PL), Sweden (SW) and the United Kingdom (UK).

[10] We do not consider data from the survey on service innovation (CIS) in order to avoid comparability problems. Like the Innovation Scoreboard, it provides limited information for some countries.

[11] Available services categories are: transportation services, travel and other commercial services, including communication, construction, insurance services, financial services, royalties and licence fees, other business services and personal, cultural and recreational services. Foreign direct investment in services has not been included owing to data constraints.

References

Aho Report (2006) 'Creating an Innovative Europe'. Report of the Independent Expert Group on R&D and Innovation appointed following the Hampton Court Summit and chaired by Mr. Esko Aho.

Aghion, P., Harris, C., Howitt, P. and Vickers, J. (2001) 'Competition, Imitation and Growth with Step-by-Step Innovation'., *Review of Economic Studies* 68 (3): 467–92.

Allen, M. (2004) 'The Varieties of Capitalism Paradigm: Not Enough Variety?', *Socio Economic Review* 2: 87-108.

Amable, B. and Petit, P. (2001) 'The Diversity of Social Systems of Innovation and Production during the 1990s'. CEPREMAP Working Paper Series, No. 0115.

Aoyama, Y. and Castells, M. (2002) 'An empirical assessment of the informational society: employment and occupational structures of G-7 countries', *International Labour Review* 141(1 – 2): 123-159.

Balzat, M. and Pyka, A. (2006) 'Mapping national innovation systems in OECD area', *International Journal of Technology and Globalisation* 2 (1/2): 158-176.

Blanke, T. and Hoffmann, J. (2008) 'Towards a European social model: preconditions, difficulties and prospects of a European social policy', *International Journal of Public Policy* 3 (½): 20-38.

Burger, A. and Stare, M. (2010) 'Public and private services transformation in CEECs', *The Service Industries Journal* 30 (4): 479-496.

Castells M. and Aoyama Y. (1994) 'Paths towards the informational society: employment structure in G-7 countries, 1920 – 1990', *International Labour Review*. 133 (1): 5-33.

Copenhagen Economics (2005) 'Economic Assessment of the Barriers to the Internal Market of Services'. Paper commissioned by the EC, January.

Daniels, P. Rubalcaba, L., Stare, M. Bryson, J. (2007) 'Transformation of the European Services Landscape: Convergence of Divergence?'. Paper presented at the XVII International RESER Conference, Tampere, 13 September.

Esping-Anderson, G. (1990) The Three Worlds of Welfare Capitalism. New Jersey: Princeton University Press.

European Commission (2003a) 'The competitiveness of business-related services and their contribution to the performance of European enterprises', COM(2003) 747 final, Brussels.

European Commission (2003b) 'Green paper on services of general interest', COM(2003) 270 final, Brussels.

European Commission (2004a) 'Innovate for a Competitive Europe: A new Action plan for innovation', 2.4.2004.

European Commission (2004b) 'European Innovation Scoreboard 2004 Comparative Analysis of Innovation Performance'. SEC (2004)1475

European Commission (2004c) 'Business-related services: a key driver of European competitiveness. An enhanced economic analysis'. Enterprise DG Working Paper.

European Commission (2010), 'Europe 2020: A strategy for smart, sustainable and inclusive growth', COM (2010) 2020, Brussels

European Economic and Social Committee (2006) 'Interactions between services and European manufacturing industries'.CCMI/035 Opinion of the European Economic and Social Committee, Consultative Commission on Industrial Change

Gadrey, J. (2007) 'National Economies and the Service Society: the Diversity of Models', in J. Bryson and P. Daniels (eds) *The Handbook of Service Industries.* Cheltenham: Edward Elgar.

Gadrey, J. (2009) 'The four worlds of developed service economies: social inequalities make the difference'. SERVPPIN working paper available at: http://www.servppin.com/

Gallouj, F. and Djellal, F. (2010) *The Handbook of Innovation and Services: a multi-disciplinary perspective*. Cheltenham: Edward Elgar

Gómez-Barroso, J. L; Feijóo, C. and Karnitis, E. (2008) 'The European Policy for the Development of an Information Society: the Right Path?', *Journal of Common Market Studies* 46 (4): 787-825.

Gros, D. (2005) 'Prospects for the Lisbon Strategy How to Increase the Competitiveness of the European Economy?'. CEPS Working Document No. 224 (Brussels: Centre for Economic Policy Studies).

Hall, P.A.; Soskice, D. (2001) 'An Introduction to Varieties of Capitalism', in P.A. Hall, and D. Soskice (eds) *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*. Oxford: Oxford Univ. Press.

Hanusch, H. and Pyka, A. (2007) 'The Principles of Neo-Schumpeterian Economics', *Cambridge Journal of Economics* 31(2): 275-289.

Howarth, D. (2007) ‘Internal Policies: Reinforcing the New Lisbon Message of Competitiveness and Innovation’, *Journal of Common Market Studies* 45 (Annual Review): 89-106.

Howells, J. and Tether, B. (2004) ‘Innovation in services: issues at stake and trends’. INNO-Studies 2001: Lot 3 (ENTR-C/2001), The Community Innovation and SMEs Programme.

Jobson, J.D. (1992) *Applied Multivariate Data Analysis: Volume II: Categorical and Multivariate Methods*. New York, Berlin, Heidelberg: Springer.

Kok, W. (ed) (2004) ’Facing the challenge: The Lisbon strategy for growth and employment’. Report from the High Level Group chaired by Wim Kok, November.

Kox H., Lejour A. (2006) ‘The trade-inducted effects of the service directive and the country of origin principles’. CPB Documents, CPB Netherlands Bureau for Economic Policy Analysis.

Maddison, A. (1980) ‘Economic growth and structural change in the advanced countries’, in I. Leveson (ed) *Western economies in transition: structural change and adjustment policies in industrial countries.* Boulder: Westview Press.

Miles, I. (1999) ‘Foresight and services: closing the gap?’, *The Service Industries Journal* 19 (2): 1–27.

Nicoletti, G. and Scarpetta, S. (2003) ‘Regulation, productivity and growth’. World Bank Policy Research Working Paper, No. 2944.

OECD (2005) *Enhancing the Performance of the Services Sector*. Paris: OECD Publishing.

Pisani-Ferry, J. and Sapir, A. (2006) ’Last exit to Lisbon’. Bruegel policy brief No. 2006/02, March.

Rubalcaba, L. (2006) ’Which policy for innovation in services?’, *Science and Public Policy* 33(10): 745–756.

Rubalcaba, L. and Gallego, J. (2007) 'Shaping R&D and services innovation in Europe´, *International Journal of Service Technology and Management* 9 (3-4): 199-217.

Rubalcaba, L. and Gallego, S. (2009) 'Community Instruments and Programmes Supporting the Innovation of Services'. DG Enterprise and Industry, final version, 04_09_2009 (mimeo).

Sapir et al. (2003) 'An Agenda for a Growing Europe'. Report of an Independent High-Level Study Group established on the initiative of the President of the European Commission.

Sapir, A. (2006) 'Globalization and the Reform of European Social Models', *Journal of Common Market Studies* 44(2): 369-90.

Savona, M. and Lorenz (2009) 'Demand and Technology Contribution to Structural Change and Tertiarisation: An Input-Output Structural Decomposition Analysis', ServPPIN workig paper.

Stare, M. (2007) 'Service Development in Transition Economies: Achievements and Missing Links' in J. Bryson and P. Daniels (eds) *The Handbook of Service Industries.* Cheltenham: Edward Elgar.

Van Welsum, D. and Vickery, G. (2005) 'Potential offshoring of ICT-intensive using occupations'. Information Economy Working Paper, DSTI/ICCP/IE(2004)19/FINAL, Paris: OECD.

Visintin, S. and Rubalcaba, L. (2011), 'The European market for services: integration and policy implications', *International Journal of Services, Economics and Management*, Forthcoming.

Windrum, P. and Tomlinson, P. (1999) 'Knowledge-intensive services and international competitiveness: a four country comparison'. Paper provided by Maastricht: MERIT, Maastricht Economic Research Institute on Innovation and Technology, Research Memoranda Nº 023.

Appendix

Dimensions & Variables	Source	Data availability	Sectoral breakdown availability for services
Structural composition of the service economy by sectors			
Employment shares by sectors	EUKLEMS, March 2008 Release	1995-2000-2005	Includes 33 service sectors
Gross value added (at current prices) shares by sectors	EUKLEMS, March 2008 Release	1995-2000-2005	Includes 33 service sectors
Gross value added per hour worked, nominal data (€)	EUKLEMS, March 2008 Release	1995-2000-2005	Includes 33 service sectors.
Gross value added per hour worked, annual growth rate	EUKLEMS, March 2008 Release	1995-2005	Includes 33 service sectors.
Number of enterprises in service industries	EUROSTAT	2005	Includes 4 service sectors
Ratio persons employed / Number of enterprises	EUROSTAT	2005	Includes 4 service sectors
Knowledge base & innovative efforts			
R&D expenditure (Millions of current PPP dollars)	OECD Stan Database	1995-200-2004	Total services
Distribution of R&D expenditures across industries for the total economy (%)	OECD Stan Database	1995-2003	Total services
R&D intensity using value added (%)	OECD Stan Database	1995-2004	Total services
Human Resources in Science and Technology	EUROSTAT	2005	
Total ICT patent application to EPO (Per million of inhabitants)	EUROSTAT	1995-2000-2005	
Tertiary education employment in knowledge-intensive sectors (%)	EUROSTAT	2005	Includes total services and 8 knowledge intensive services categories
KIS share in employment	EUKLEMS, March 2008 Release	1995-2000-2005	KIS comprises NACE codes 61, 62, 64 to 67, 70 to 74, 80, 85 and 92
KIBS share in employment	EUKLEMS, March 2008 Release	1995-2000-2005	KIBS comprises NACE codes 72/73/'741t4
Training enterprises as % of all enterprises, by NACE	EUROSTAT	2005	Includes 13 service sub-sectors
Internationalisation			
Share of commercial services in total trade	WTO	1995-2000-2005	Travel, transportation, other commercial services
Share of commercial services exports in world commercial services exports	WTO	1995-2000-2005	Travel, transportation, other commercial services
Competition restrictions			
Product Market regulation in service markets	OECD	2003/ 2000-2005	Includes 7 services sectors

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