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Authors : Henk Kox and Luis Rubalcaba (University of Alcala, Madrid)

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Business services and the changing structure of European economic growth

Abstract:

A pervasive trend that characterised the past two decades of European economic growth is that the share in the economy of commercial services, and particularly business services, grows monotonically, and this mainly to the expensive of the manufacturing sector. The structural shift reflects a changing and increasingly complex social division of labour between economic sectors. The fabric of inter-industry relations is being woven in a new way due to the growing specialisation in knowledge services, the exploitation of scale economies for human capital, lowered costs of outsourcing in-house services, and the growing encapsulation of manufacturing products in a 'service jacket'. Business services, which inter alia includes the software industry and other knowledge-intensive business services (KIBS), play a key role in many of these processes.

We argue that in recent decades business services contributed heavily to European economic growth, in terms of employment, productivity and innovation. A direct growth contribution stems from the business-services sector's own remarkably fast growth, while an indirect growth contribution was caused by the positive knowledge and productivity spill-overs from business services to other industries. The spill-overs come in three forms: from original innovations, from speeding up knowledge diffusion, and from the reduction of human capital indivisibilities at firm level. The external supply of knowledge and skill inputs exploits positive external scale economies and reduces reduces the role of internal (firm-level) scale (dis)economies associated with these inputs. The relatively low productivity growth that characterises some business-services sectors may be a drag on the sector's direct contribution to overall economic growth. The paper argues that there is no reason to expect a "Baumol disease" effect as long as the productivity and growth spill-overs from KIBS to other economic sectors are large enough.

Finally, the paper concludes by pinpointing some policy 'handles' that could be instrumental in boosting the future contibution of business services to overall European economic growth.

JEL Classification**:** E32, L2, L8, L16, O3, O4, O52

Contact: H.L.M.Kox@CPB.NL, phone : +31.70.338.3413, fax: +31.70.338.3350,

CPB Netherlands Bureau for Economic Policy Analysis, The Hague, Netherlands, www.cpb.nl

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1 Introduction

This paper analyses the position of business services in European economic growth, puting emphasis on two aspects: (a) what has caused the fast growth of the European business-services industry, and (b) how has the business-services industry contributed to overall economic growth?

The European economy is in a process of structural change. Two major trends characterised the period of the past two decades. One is that the share of manufacturing in the economy is shrinking. The other trend is that services, and particularly business services, account for a monotonically increasing share of the European economy. Both structural shifts are linked to each other in several ways. We argue that one of the drivers of change is the exploitation of scale economies for human capital and –linked with that– the growing specialisation in knowledge services. Other relevant drivers are the growing tertiarisation of all production processes (including manufacturing) and the lowered costs of outsourcing in-house services functions. The business services industry plays a key role in such structural change, a role that has remained under-explored in the literature sofar.

The paper is divided in four parts. The first one deals with conceptual issues, offering an analytic definition of business services. The second section surveys the literature that explains the very strong growth of business-services industry in recent decades, confronting some popular views with a number of stylised facts. The theory contending that the growth of business services industry is just an optical illusion caused by outsourcing of other industries may be true for some low-skilled services functions, but for the rest this theory fits uneasy with some of the empirics. We propose an alternative explanation according to which the growth of business services represents a qualitatively new stage in the structure of production, driven by scale economies with regard to knowledge and skill inputs. Firm-level diseconomies with regard to such inputs are reduced by having them delivered externally, thus exploiting external scale economies. The third section covers the contribution by the business-services industry to overall economic growth through spillovers in the form of knowledge dissemination, original innovations and productivity effects in other parts of the economy. In the fourth and final section we address some market failure issues where policy intervention could perhaps boosting the future contibution of business services to overall European economic growth.

1.1 A positive definition of business services

The container concept *business services* covers a broad spectrum of services that are mainly traded in business-to-business transactions. These intermediary services range from software development to temporary-labour agencies, from equipment rental to legal consultancy, and from translation services to the management of complex engineering projects.

From Adam Smith's times onwards, services have been defined by what they are *not* – no goods, non-material, intangible, no agriculture, no manufacturing.[1] Hill, in a seminal article (1977), did away with this negative approach towards services. In '*On goods and services*' he emphasised a difference between goods and services. Goods are physical objects that can be appropriated and therefore are transferable between economic units. However, a service provided by an economic unit, represents "*a change to the condition of*" a person or goods belonging to another economic unit. The service is defined as a positive result.[2]

Business services are predominantly delivered to companies, other production organisations and government agencies. Hence, viewed from the angle of their destination, business services are primarily intermediate inputs; they can complement or substitute existing in-house service functions of client firms.[3] Often the business service is co-produced interactively with the client. Building on Hill's definition of services we define BS by their role for clients:

> *Business services is a set service activities that - through their use as intermediary inputs - affect the quality and efficiency of the production activities, by complementing or substituting the in-house service functions.*

The definition implies that business-services firms supply activities that in many cases could also have been produced in-house by the client. Service elements are pervasive in all production processes. Functional services like planning, design, monitoring, customer contacts and evaluation are close to the very heart of almost *any* production process. Also, there are lots of auxiliary services in most firms, like cleaning, human resources management, personnel recruitment, training, security, maintenance, facility management and catering. All these functional services can be provided by employees on a firm's own payroll, or they can be bought from outside providers. In the latter case, we speak of business services as an independent industry.

Figure 1.1 presents an operational taxonomy of business services based on the aforementioned definition. Business services are distinct from network-intensive services that in most cases can be produced in-house only at the expense large scale diseconomies. Figure 1.1 distinguishes between knowledge-intensive business services (KIBS) and operational business services, based on the average degree of human-capital intensity of the labour force.

Statistical classification problems for business services are larger than average for the commercial services sector. The fact that most business services in the EU nowadays are classified in the residual category *Other Business Services* (NACE 74) exemplifies the relatively short history of business

[1] For brief history of the concept see Rubalcaba and Kox (2007: Introduction), and also Schettkat and Yocarini (2003).

[2] See also Martini (1990), Rubalcaba (1999) and Gadrey et al. (1998) for positive definitions of services.

[3] Even though some business services – such as notary or architectural services – supply part of their production to individual consumers

Figure 1.1 Defining business services as part of producer services

<table>
<tr><td rowspan="4">Producer

Services</td><td rowspan="3">Business-

related

services</td><td rowspan="2">Business services</td><td>Knowledge intensive-business services (K.I.B.S.)</td><td>* Software and computer services
* Strategy and management consultancy
* Auditing, accountancy, tax and legal advise
* Marketing services, opinion polling
* Technical services, engineering
* Personnel training, headhunting</td></tr>
<tr><td>Operational business services</td><td>* Security services
* Equipment renting
* Facility management, cleaning
* Administration, bookkeeping
* Temporary labour recruitment
* Other operational services (e.g. catering, translation, call centres)</td></tr>
<tr><td>Network-intensive services</td><td colspan="2">* Wholesale, export, import services
* Transport and logistics
* Banking, insurance, stock exchange
* Telecommunication, couriers, cable services
* Energy services</td></tr>
<tr><td colspan="3">Consumer services partly used by enterprises like business travel, company health services, social insurance services</td></tr>
</table>

services as an independent economic sector. The functional industry classifications (NACE, ISIC) do not start from a positive definition of business services. They use a negative statistical approach based on classification as residual: *what is not in ..., not elsewhere classified*.[4] The relative newness of the sector, the continuously evolving product differentiation, and also the lack of interest shown by statistical authorities have made for a multiple and opaque classifications.

For brevity reasons and to avoid endless repetition in the rest of this paper, we will henceforth use the abbreviation 'BS' for business services and 'BS industry' or 'BS sector' for the business-services industry.

[4] The NACE category *Other Business Services* is subdivided in sectors. The last 3-digit sector (NACE 748) again uses a negative residual criterion: 'Other business servicess, not elsewhere classified'. Hence, this is a residual category within a residual taxonomic category. Nonetheless, it employs millions of employees in the European Union.

2 The growth of European business services

The most direct contribution of the BS sector to economic growth comes from its own dynamism and expansion. BS industry appears to be an 'early mover' over the business cycle (cf Rubalca and Kox 2007: Ch.1), but we will disregard the cyclical aspects here. After proving some key data on the growth of the Europen BS industry we concentrate on the explanations for the structural business-services growth.

2.1 The magnitude of BS growth

The BS sector has experienced a remarkably strong growth process in the past two decades, in terms of both employment and value added. As shown in Table 2.1, business services nowadays count as one of the largest economic sectors in the European economy, larger than such sectors as transport, communication, hotels and restaurants taken together. With a 4.2 per cent annualised growth rate of value-added between 1979 and 2003, BS was the most dynamic sector after telecommunications. In terms of employment, the growth of business services (4.4 per cent) far outstripped the growth of all other sectors.

Table 2.1 Key data on the growth of business services, European Union (EU15), 2003

Sector	Value added			Employment		
	billion euro [a]	% relative shares	Growth rates [b] 1979/03	Thousands	% relative shares	Growth rates [b] 1979/03
Business services	1,067	11.2%	4.2	19,460	11.4	4.4
- Renting of equipment	90	0.9	5.0	563	0.3	3.4
- Computer and related activities	183	1.9	6.6	2,450	1.4	6.1
- Research and development	37	0.4	2.4	632	0.4	1.8
- Legal, technical, advertising	472	4.9	3.8	7,037	4.1	3.8
- Other business activities, nec	286	3.0	3.9	8,778	5.1	4.8
For comparison						
All sectors	9,540	100.0%	2.2%	171,167	100%	0.6%
- Manufacturing	2,516	26.4%	2.2%	42,055	24.6%	-1.0%
- Distributive trades	937	9.8%	2.3%	25,943	15.2%	0.9%
- Transport	455	4.8%	2.4%	7,191	4.2%	0.5%
- Financial services	576	6.0%	2.5%	5,392	3.2%	1.3%

Notes: [a] Current prices. [b] Annual exponential growth rates. Value added at constant prices 1995. Sources: data OECD National Accounts data (STAN), and data compiled by Groningen Growth and Development Centre GGDC (cf. O'Mahony and Van Ark, 2003).

Table 2.2 shows some differences between EU countries.[5] Countries with consistent high growth rates are Austria, Ireland, Luxemburg and Spain, while France, Belgium and Denmark are witnessed relatively low growth rates for value added and employment. Interestingly, the EU15 countries and the USA had similar employment growth rates in business services over this long period, but the average value-added growth in the USA was higher. This differences implies that productivity growth in the EU business-services sector was weaker than in the USA.

Table 2.2 The growth rate and the share of business services value added and employment. Selected countries, 1979-2003

Country	Relative shares in total economy, 2003 [a)]		Annual growth rates,1979-2003 [b)]	
	Value added	Employment	Value added	Employment
EU15	11.2	11.4	4.2	4.4
Austria	9.2	9.4	5.7	5.3
Belgium	-	14.2	3.8	3.5
Denmark	7.8	9.7	4.1	3.1
Finland	7.2	8.5	4.8	5.2
France	13.3	13.7	2.9	3.5
Germany	12.3	11.4	4.4	5.1
Greece	3.4	6.4	3.5	4.5
Ireland	14.3	7.8	5.2	6.0
Italy	11.7	10.5	4.4	6.3
Luxembourg	7.6	15.6	8.6	7.5
Netherlands	11.2	14.2	4.5	4.3
Portugal	6.5	6.6	3.6	6.6
Spain	7.1	7.4	5.3	5.4
Sweden	10.3	9.8	4.3	4.2
UK	13.5	13.7	4.6	3.2
PM: USA	11.0	11.8	4.6	4.3

Notes: [a)] Current prices. [b)] Annual exponential growth rates. Value added at constant prices 1995. Sources: data OECD National Accounts data (STAN), extended and compiled by GGDC, see Table 2.1.

Summarising the empirical evidence, over the past decades employment in business services grew faster than in the total European economy and also faster than in the rest of the European services sector. The countries of northern and central Europe display stronger employment growth in business services than those in southern Europe. In absolute terms, job creation in the BS sector in all countries represented a major shift in market-sector employment. The growth difference between business services and the rest of the economy was smaller for value added than for employment.

[5] Apart from possible statistical biases, the country results may also reflect different market situations and sectoral specialisations.

2.2 Causes of structural growth

The spectacular growth performance of the BS industry may have several causes, some of which are shared more broadly by a larger group of services sectors. Literature surveys yield a panoply of explanatory factors for the relative expansion of services industries. The explanations operate at different levels of analysis (micro, meso, macro). Several factors can operate at the same time, though at different levels of analysis. Most explanations can be brought under one of the following three headings. The first group relates to shifts in the structure of final demand (Engel's 'law', changing institutions and social preferences). A second group concentrates on shifts in the inter-industry division of labour (technology, organisation). Finally, another group of explanations focuses on the shifts caused by diverging productivity growth rates of individual industries.[6]

Business services are foremostly intermediary inputs, so that changes in final demand tend to be of only secondary or indirect importance. This paper zooms in on the second group of explanations, in particular the division of labour between industries. In this area, we compare two dominant explanations for structural growth of business services. The first theory, defended *inter alia* by Rajan (1987) and Lewis (1988), states that the BS growth is an optical illusion. They state that existing service activities and jobs in other industries are simply replaced by similar activities in BS industry.[7] The second theory defends that structural growth of business services is a new development phase in the social division of labour. It builds on Adam Smith's classic view that specialisation and scale effects form the very heart of economic progress.[8] We subsequently deal with both explanations.

If the entire growth of BS industry would be based on a simple shift of existing in-house services jobs from other sectors to BS firms then we could indeed speak of a purely administrative shift: a "changing of nameplates". It is inherent in our definition of business services (section 1) that many services supplied by BS firms *could* also have been produced *internally* by firms in other industries. On average about 40 per cent of all persons employed in manufacturing work in occupations that are more or less (business)service-related.[9] Table 2.3 sketches a range of intra-company service functions that may or may not be up for outsourcing to BS firms.

The proposition that the growth of business services merely represents only an administrative change can be analysed in the same way as an analogue problem in international trade theory. Viner (1950)

[6] Fuchs (1968), Rubalcaba (1999), Aiginger (2001), Kox (2001), Schettkat and Yocarini (2003), Miles (2007) and Gregory et al. (2007) present comprehensive literature surveys on the growth factors.

[7] Rajan (1987) and Lewis (1988) find empirically that business-services growth is due to employment substitution inside the companies as a result of subcontracting the required services outside the company. The characteristics and significance of their statistical results have, however, been called into question by Perry (1992).

[8] The theory has been developed further by *inter alia* Stigler (1951), Edwards and Starr (1987) and Francois (1990).

[9] The following count as services-related occupations are: legislators, senior officials and managers, professionals and associate professionals, clerks, service workers and shop and market sales workers, as well as drivers, sales and services elementary occupations and transport workers (Wölfl 2004).

investigated whether economic integration between countries leads to additional trade (trade creation) or whether it represents a re-channelling of trade patterns (trade diversion).[10] Following Viner's distinction, we can distinguish two types of BS growth:

- *Displacement growth* (trade diversion) occurs when services hitherto produced in-house by other industries are outsourced to BS firms, without a change in the nature of the services.
- *Trade creation* occurs when BS firms provide products to client firms that are different (higher quality, more specialised) from the in-house services that the client firms produced in-house beforehand, or that are even completely new.

Table 2.3 Internal service functions and externally delivered producer services

Major service functions in enterprises	Corresponding external producer services
1. Strategy and new markets	Management consultancy, Market research
2. Information management (IT services and infrastructure)	Computer services, Consultancy on information technologies, Telecommunication services
3. Design functions	Research and development, Industrial Design
4. Personnel	Selection and provision of personnel, Professional training
5. Production and technical function	Engineering and technical services. Tests and quality control. Maintenance service and repair of equipment
6. Marketing	Advertising, Direct marketing, Public relations, Organising Fairs and exhibitions
7. Purchases and sales	Distributive trades (incl. after sales services), Client relations
8. Facility management services	Security services, Building maintenance, Cleaning services, Catering, Environmental / waste disposal, Energy and water
9. Administration and accounting	Accounting and auditing, Legal services, Tax advise
10. Financial resources	Banking, Insurance, Renting and leasing
11. Transport and logistics	Logistics, Transport services, Express couriers, Real Estate

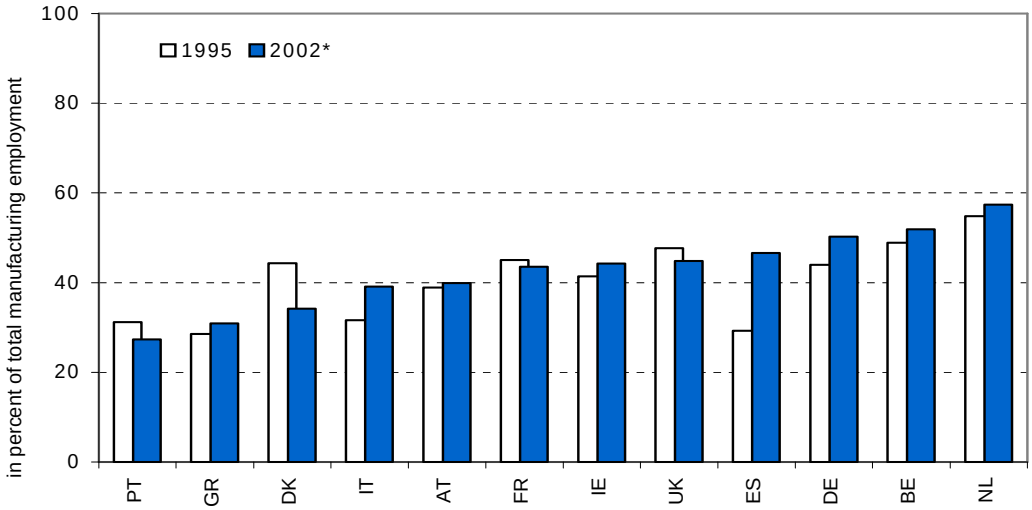
It is an empirical question which of both growth-types accounts for most of the recent growth of business services. Given the heterogeneity of firms and their in-house services this in fact requires a broad survey-based research method using firm-level microdata. To our knowledge such a study does not yet exist. We therefore turn to second-best research methods based on sector-level data.

[10] Cf. also Meade (1955).

2.2.1 Is replacement growth the best explanation?

A first test is whether the share of services jobs in manufacturing has diminished over time. Figure 2.1 shows that since 1995 it has indeed declined in the UK, Denmark and France. However, it has increased in all the other EU countries, especially in Spain, Italy and Germany. These data therefore do not confirm the existence of an overall trend towards a lower share of service-related jobs in manufacturing. The test is not conclusive, because the employment structure in manufacturing may be subject to other tendencies that affect the number of services jobs. For example, an increasing number of manufacturing products are nowadays sold "encapsulated in a service jacket" (Howells 2002).[11] This in itself could cause a persistent increase in the number of service jobs in manufacturing.

Figure 2.1 Share of employment in service-related occupations in the manufacturing sector (as % of total employment of manufacturing, 1995 and 2002)



Note: Services-related occupations cover ISCO classes 100-500, 830, 910, 933. Data for Germany are from 2001. Data source: EU Labour Force Survey 1995, 2002 (figure reproduced from Pilat and Wölfl , 2005).

Since the late 1980s, many empirical studies applied some form of input-output analysis to analyse growth factors for services sectors, often at a rather high aggregation level and mostly for one specific country.[12] Most of the intermediate deliveries from business services appear to

[11] For instance, producers of photocopying machines now sell *x* months of problem-free photocopying instead of only the hardware, just as producers of airplane engines sell *y* hours of problem-free flying. This means an increase of manufacturing jobs into downstream production stages (sales, consulting, maintenance, insurance, leasing).

[12] Cf. the empirical growth studies on producer and business services by Beyers and Lindahl (1996), Kutscher (1988), Tschetter (1987), Fontaine (1988), Oosterhaven and Hoen (1998), Klodt et al. (1997), Peneder et al. (2000), Wölfl (2004), Perry (1990), De Bandt (1995, 1999), Kox (2001), Pilat and Wölfl (2005), Coe (2000), Savona and Lorentz (2006).

go to manufacturing, the BS industry itself, and the public sector (e.g. Ecorys 2004). A test to establish the growth sources of the BS sector can be based on input-output analysis. A rough approximation method is the following. Assume a simple input-output system with three sectors: *business services industry* B, *other market industries* M and the *non-market sectors* Q. The input-output system is:

$$x = R\ y \tag{1}$$

in which x is a vector of gross production, R is the Leontief inverse matrix (3 x 3 dimension) of intermediate deliveries, and y is a vector of final demand. The growth of gross production between period 1 and period 0 is given by:

$$\Delta x = x_1 - x_o = R_1 y_1 - R_o y_o = \Delta R\ y_o + R_o \Delta y + \Delta R\ \Delta y \tag{2}$$

The change in final demand can be expressed in terms of the final demand in period *0* and a row vector (f) that gives growth perunages of total final demand per sector, so that:

$$\Delta x = \Delta R\ y_o + R_o\ f\ y_o + \Delta R\ f\ y_o \tag{3}$$

The base year shares of final demand are used as weights for the growth rates. The framework can be applied straightforwardly for tracing the causes of the structural growth-rate difference between the B sector and the M sector:

$$\dot{x}_B - \dot{x}_M = \frac{\Delta x_B}{x_{Bo}} - \frac{\Delta x_M}{x_{Mo}} \tag{4}$$

After filling in all elements from the full input-output system, the structural growth rate difference between the B sector and the M sector can be decomposed like in equation (3):

$$\begin{aligned}\dot{x}_B - \dot{x}_M = {} & \dot{y}_B\ y_{Bo}\left[\frac{r_{BBo} + \Delta r_{BB}}{x_{Bo}} - \frac{r_{MBo} + \Delta x_{MB}}{x_{Mo}}\right] + y_{B0}\left[\frac{\Delta r_{BB}}{x_{Bo}} - \frac{\Delta r_{MB}}{x_{Mo}}\right] \\ & + \dot{y}_M\ y_{Mo}\left[\frac{r_{BMo} + \Delta r_{BM}}{x_{Bo}} - \frac{r_{MMo} + \Delta x_{MM}}{x_{Mo}}\right] + y_{Mo}\left[\frac{\Delta r_{BM}}{x_{Bo}} - \frac{\Delta r_{MM}}{x_{Mo}}\right] \\ & + \dot{y}_Q\ y_{Qo}\left[\frac{r_{BQo} + \Delta r_{BQ}}{x_{Bo}} - \frac{r_{MQo} + \Delta x_{MQ}}{x_{Mo}}\right] + y_{Qo}\left[\frac{\Delta r_{BQo}}{x_{Bo}} - \frac{\Delta r_{MQo}}{x_{Mo}}\right]\end{aligned} \tag{5}$$

Using this decomposition we may break down the sources of structural BS growth. Specifically, it may give the relevance and relative importance of the following growth sources:

a) final demand in BS grows faster than in both other sectors if $\dot{y}_B > (\dot{y}_M, \dot{y}_Q)$.
b) BS benefits more than other market industries from privatisation (public procurement) in the public sector if $\Delta r_{BQ} > \Delta r_{MQ}$.

c) the BS sector increases its share in total intermediary deliveries of *Other market Industries* if $[\Delta r_{BM} - \Delta r_{MM}]y_{Mo} > 0$.[13]

d) Controlling for the aforementioned effects, BS growth would be replacement growth if the absolute fall in value added of *Other Industries* is about equal to the growth of intermediary BS deliveries to *Other Industries*.

If replacement growth would indeed be the dominant reason for the growth of business services then we should find that the last two conditions (*c*,*d*) are satisfied. Moreover, the importance of growth source *c* for *Business Services* must be larger than that of the growth sources *a* and *b* together.

The aforementioned growth decomposition analysis has not yet been applied to the structural growth of European business services for the period starting in 1990 due to data comparability problems.[14] Savona and Lorentz (2006) apply growth decomposition for 13 sectors in four countries. On the basis of their results, Figure 2.6 shows that in each of the countries the BS sector registered a higher growth rate of intermediate demand than two benchmark sectors. The graph shows that intermediate demand was relatively strong for business services in the 1980s and early 1990. This indicates – in terms of the aforementioned growth factors – that factor *c* indeed has been relatively important for BS. In the last time period, the role of intermediate demand is getting more in line with the two benchmark sectors (smaller growth-rate difference). Savona and Lorentz find that most of the growth in business services came from intermediate demand (factor *c*), but we do not know to whether this arose from new services products or from replaced services. Savona and Lorentz also find that a substantial part of BS growth came from final demand (factor *a*). The latter finding is clearly at odds with the replacement hypothesis. The same holds for the empirical result that BS industry itself has become the most intensive user of BS inputs (e.g. ECORYS 2004). This can hardly be reconciled with the proposition that the growth of business services is mostly due to displacement growth. The available evidence suggests that displacement growth can at best explain a limited part of BS growth.

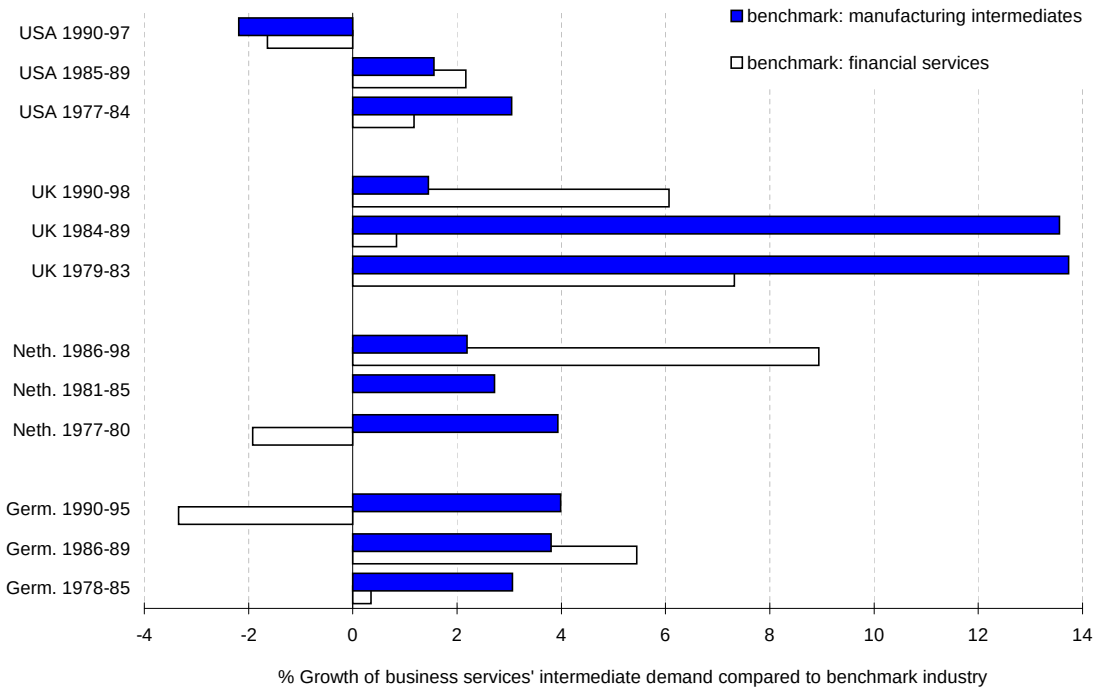
Ruyssen (1990) in a study for the European Commission found that the role of BS subcontracting is seldom just a transfer of employment between sectors. It often involves a new division of work between the client company and the service-providing company. Several studies indicate that a shift has taken place from pure replacement outsourcing to service-upgrading, particularly with regard to the human-capital content of the services product.[15]

[13] This finding could indicate replacement growth if it goes along with an at least equivalent shrinking of value added in the M sector. E.g. when the M sector outsources in-house services to the B sector predominantly for reasons of (labour) cost-saving.

[14] Amounts must be expressed in constant prices and correction is necessary for that part of growth that is due to growth in final output of *Other Industries.* The test can be done for most EU countries as soon as comparable input-output tables in constant prices for the 1990s are available. A large ongoing EU project, EUKLEMS (http://www.euklems.net/), in CPB which among many national statistical and research institutes co-operate, may yield these results in some years.

[15] E.g. Peneder et al. (2000), Beyers and Lindahl (1996), De Bandt (1995; 1999); Coe (2000); Kox (2002; 2001).

Figure 2.6 Growth rate difference of the share of intermediate demand in total output: business services compared to manufacturing industries and financial services. (Germany, UK, Netherlands and USA, data for three sub-periods) [a)]



Note: a) For manufacturing we used two sub-sectors (machinery industry and electrical-equipment industry) that both have substantial intermediate deliveries. Source: calculated from data in Savona and Lorentz (2006).

2.2.2 BS growth and structural change

The development of business services as an industry forms a step in the process of labour division. Many studies conclude that the output increase in (business) services has to more to do with overall changes in the productive system than with just a redistribution of activities between manufacturing sector and the services sector. Specialised knowledge-intensive business functions that in the past were regarded as core competences of firms –and therefore not subject to outsourcing– are increasingly outsourced to specialised outside firms, or are continued in close co-operation with the latter.[16] In the past 15 years, more knowledge-intensive business functions have become eligible to outsourcing. A very important enabling factor was the ICT revolution that substantially lowered the information and communication costs between geographically dispersed business processes. This made it much easier to outsource and co-ordinate knowledge intensive parts of in-house service

[16] Examples are customer relations, marketing, management information systems, quality control, logistic management, R&D functions, recruitment of top management, project management, invoicing, administrative organisation, human resource management, professional training, engineering, computer services and legal affairs.

activities. The BS sector has benefited from this process of structural change in a double way. Firstly, the ICT revolution partly came from within the BS industry (software development and IT services). And secondly because the surge in outsourcing created new business opportunities for other branches in business services. The complexity of inter-sectoral and intra-sectoral division of labour also has an international dimension through the rise of 'offshoring'. Particularly since the turn of the century we witness a steep growth of international outsourcing of knowledge-intensive services for cost reasons (Grossman and Rossi-Hansberg 2006; Baldwin 2006; Van Welsum and Vickery 2006). It gives rises to new international trade flows in knowledge-intensive business services, or shortly: *KIBS* (Lesher and Nordås 2006; Markusen and Strand 2007). To the extent that there are large scale economies involved in co-ordinating the internationally dispersed knowledge-service activities we would expect that the process goes along with an increase in the ratio between intra-company and arm's length trade in services. The specialisation by some knowledge-based firms is such that even the size of most national markets is not even large enough for them. Sometimes, routinised elements within knowledge services are further split up so that parts of the process can be done in less-developed countries, benefiting from the wage-rate differences.

The increasingly complex social division of labour with regard to knowledge services allows several types of product and process innovations, more knowledge specialisation, and better use of specialised inputs. Scale bottlenecks with regarding knowledge-intensive specialisations at the firm level become less relevant, as outsourcing makes it possible to benefit from external scale advantages in these areas. A popular way of obtaining the most from advanced business-related services is the combination of both in-house and external services. The expertise and specialist knowledge of external KIBS firms can better be absorbed and optimised if the outsourcing firm also employs highly skilled people.[17]

These structural changes give an impetus to aggregate economic growth with repercussions that go beyond the BS sector. This can be illustrated on the basis of macro-economic production functions. A macro-economic production function is a specific national production constellation, i.e. a particular relation between sectors that together form the national economy. Alternatively, we may also view this as a particular way in which the social division of labour in the economy is organised. Figure 2.7 plots two macro-economic production functions with on the vertical axis the total value added of all industries, and on the horizontal axis the aggregated production inputs (like labour) used to produce this value added.[18]

Initially, the relation between industries and sectors is reflected in macro-economic production function 1. It represents all the production possibilities that are within reach by a certain state of

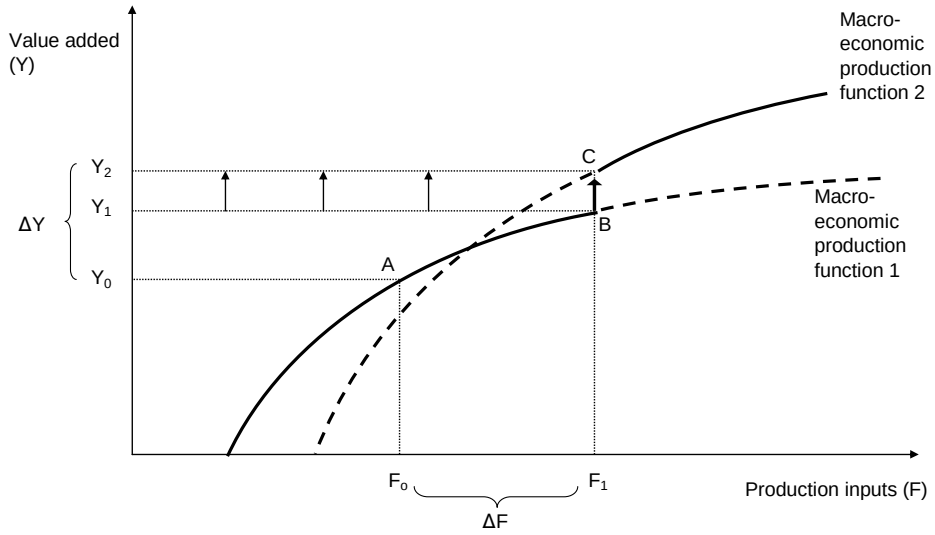
[17] For further evidence, see Baker (2007), Camacho and Rodriguez (2007) and Crespi (2007).

[18] Figure 2.7 assumes that diminishing returns to scale are dominant in the production function.

technology and by a given social division of labour between sectors. By using production inputs F_o it yields value-added level Y_o. By increasing the amount of production inputs to F_1 value added grows to Y_1 as output shifts upwards from A to B along production function 1.

Now suppose that a technological breakthrough such as the ICT revolution, makes a new arrangement of the relations between economic sectors possible, allowing for further division of labour, more outsourcing possibilities and more use of specialised service inputs. In Figure 2.7, the new social division of labour is represented by macro-economic production function 2. Note that at input size F_o, it is not yet profitable to switch to production function 2; it takes more scale-size (amount of inputs) to bring the efficiency benefits into reach.[19] Structural change occurs when the production system switches from production function 1 to production function 2, with a 'jump' from point B to point C. With a given increase in factor inputs (ΔF), a higher level of economic growth (namely ΔY) becomes possible, thus attaining production level Y_2.

Figure 2.7 Structural change and macro-economic growth potential



If there is indeed a positive relation between economic size and the role of the BS sector in the inter-industry division of labour, we would expect to find a relatively larger BS sector in the larger and more developed countries. In Figure 2.8 we plot a correlation between GDP per capita and the employment share of the BS sector. The average values for the EU25 are used as the reference point (index =100).

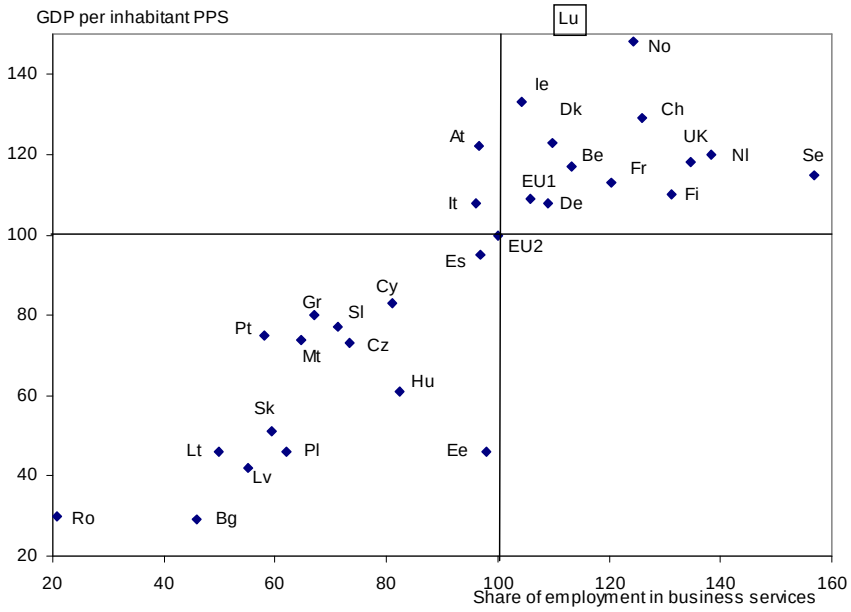
We indeed find the expected pattern, even within the Europe. EU member states with a low income per capita all have a less developed BS sector, while in none of the richer countries we find a low share of BS jobs. Countries like Portugal, Lithuania, Latvia or Slovakia are below 60 per cent of

[19] E.g. Edwards and Starr (1987).

the EU25 average. Luxemburg is an outlier. The correlation coefficient is 0.75 for the whole set of 30 countries presented here. It increases to 0.85 if Luxemburg is excluded from the sample. The results imply no direction of causation, but we may infer that the development of the BS sector is associated with a process of structural change in the economy as average income goes up.

There is a second interesting finding on the basis of this empirical analysis. The four quadrants of the graph are derived from the EU25 average for both variables. If we confine us to the country sample in the upper right quadrant of Figure 2.8, it appears that there is no longer a significant correlation between GDP per capita and the employment share of the BS sector. This suggests the existence of some threshold level in the relation between both variables. The correlation does not say anything about the direction of causality with regard to this threshold level.[20]

Figure 2.8 Correlation between GDP per capita and the share of business services in total employment in Europe, 2000



Note: EU1 is the average for the EU15 countries and EU2 is the average for EU25. Data: Eurostat national account data for GDP, PPS (standardised PPP-purchasing power parity)

Input-output analysis provides further indications that the growth of the BS sector indeed reflects an increasingly complex social division of labour between industries, and even within industries. Total intermediate demand for business services is for an important share absorbed within the BS sector itself (cf. Table 2.4). This pattern would be difficult to explain if the growth of the BS sector was

[20] Either there is a level of BS employment beyond which income growth per capita depends on other factors, or there is a level of income per capita beyond which economic wealth may be derived as well from BS as from other economic sectors.

purely replacement growth. If the size differences between the sectors are taken into account, the BS sector is the most intensive user of BS inputs.[21] The vertical fragmentation and specialisation process in the production chain translates itself into growing 'roundaboutedness' of production, i.e. a higher transaction density in the trajectory between primary inputs and the final good. The term 'roundaboutedness' is derived from the neo-Austrian capital theory where it is regarded as a measure of capital intensity (Hicks 1973).[22] In our case it points more particularly to increasing human-capital intensity with KIBS firms providing the intangible assets (know-how, software, organisational skills, R&D capabilities etc.) that drive additional value creation in client firms.[23] The growth of business services since the 1990s reflects a different way of organising social production, allowing a better spread of the advantages of knowledge specialisation, more external scale economies, and a higher-level growth path. The key position of the business services industry in this process must go along with high forward-linkage intensity: a one-unit increase in final demand in the economy will necessitate BS industry to supply a more-than-average increase of intermediates to accommodate the economy-wide demand. Lesher and Nordås (2006) indeed find evidence for this in OECD countries.

Table 2.4 Intermediate demand for BS inputs: ranking of the main destination sectors, selected countries, period 1994-1998

Country	Rank of business services as destination sector	Five most important destination sectors of intermediate BS inputs, ranked by importance [a)]	Share (%) of Business Services in intermediate demand
UK	1	BS - MFG - PUB - FIN - THC	26.1
Netherlands	1	BS - MFG - THC - PUB - FIN	24.9
France	2	MFG - BS - PUB - FIN - CON	24.2
Germany	2	MFG - BS - PUB - REA - THC	17.1
Italy	3	MFG - THC - BS - PUB - FIN	14.2
Spain	3	MFG - PUB - BS - THC - CON	13.6
Denmark	5	CON - THC - PUB - MFG - BS	12.9
Finland	4	MFG - PUB - THC - BS - REA	8.1
Greece	8	MFG - THC - PUB - CON - TRA	3.1
PM: USA	2	THC - BS - PUB - MFG - FIN	17.7

Note: a) The sector codes are: MFG: manufacturing; BS: business services; FIN: financial services; PUB: public sector; THC: trade, hotels and catering; TRA: transport and storage; CON: construction; REA: real estate. Source: The country data are based on the most recent IO table available in the OECD database over the period 1994-1998. OECD input-output tables; ECORYS-NEI (2004).

[21] This is calculated by dividing a sector's share in total intermediate demand for business services by the sector's share in total industrial output.

[22] For this interpretation, see *inter alia* Grubel and Walker (1991); Grubel (1995) and Burda and Dluhosch (2000).

[23] From an accounting point of view, expenditures on software and R&D are increasingly registered as investments rather than as current expenditures, due to their contribution to future benefits (cf. Zambon 2003).

From the mid-1990s onwards the process of domestic outsourcing has gradually changed. Even specialist and close-to-management service activities - that thus far were considered to be the core company domains - became eligible for outsourcing. Typically, these were non-routine jobs. Knowledge-intensive services with high skill inputs gained strongly in this most recent outsourcing wave (cf. Miles 2007). Outsourcing of knowledge-intensive services went along with product innovation and product differentiation, generating demand for specialised services products. Sub-sectors that mostly produce client-specific business services have gained most since the mid-1990s. The professional specialisation and the quality of knowledge inputs of knowledge-intensive business services firms became a dominant reason for outsourcing in this stage (Kox 2002).

We may summarise the evidence so far. Leaving international outsourcing (offshoring) apart, the available evidence suggests that *trade creation* is probably more important than *displacement growth* (trade diversion) for explaining the domestic structural growth of business services. Business services play a key role in the growing complexity and "knowledge roundaboutedness" of the social division of labour.

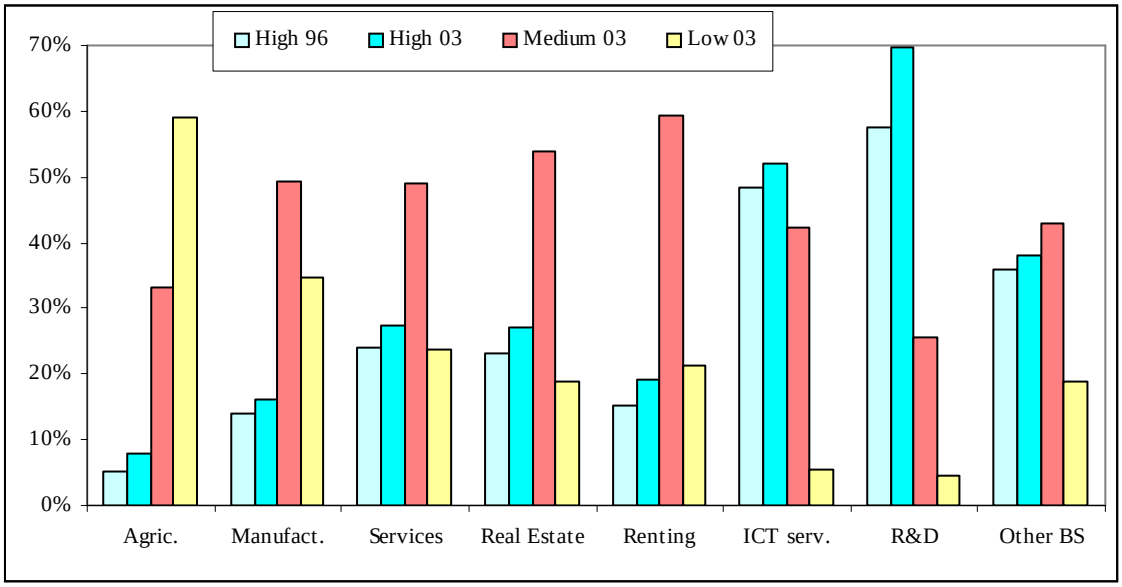
2.3 Human-capital characteristics of BS employment growth

The increasing role of knowledge-intensive BS can be traced back in the human-capital composition of the labour force in the European BS industry. Figure 2.9 shows that the sector has a very strong orientation towards higher education, much more than most other industrial or service sectors. In manufacturing and total services, the education profile is dominated by the intermediate educational level, while there are more workers with low education levels, particularly in manufacturing.

The business services sector consists of equipment renting, ICT services, contract R&D and *Other Business Services*. In computer services and R&D services, the share of highly educated people is impressive, especially in R&D services. It is also high in *Other Business Services* despite the fact that this aggregate includes sub-sectors like cleaning or security services, which employ many low-skilled workers.*Other Business Services* represents most of the business services employment. In equipment renting and real estate the educational profiles are similar to the total services average. In order to add a time dimension, Figure 2.9 also pictures the employment share of highly educated workers in 1996. In all economic sectors, the share of highly educated persons increased between 1996 and 2003. This also holds for the BS sectors, even though BS already had a high education profile in 1996.

A further indication of the high educational profile in business services can be derived from the percentage of BS enterprises that provides their workers with any type of training. It may reflect the extent to which workers are prepared to adapt to new requirements and manage to deal with

Figure 2.9 **Education attainment levels in business services compared to other economic activities, EU15, 1996 and 2003**



Data: calculated on the basis of data from European Labour Force Surveys.

increasing organisational and work complexity. Data for 2000 from the European Labour Force Survey indicate that in all EU15 countries, business services invests more in providing *continuous vocational training* (CVT) to their workers than the average for the total economy. Moreover, it also appears that the average costs of CVT courses are much higher in business services than in the rest of the economy. This may reflect a higher level of specialisation and knowledge input in these courses.[24]

Summing up, BS jobs on average have a high profile of educational attainment levels and the relatively strong importance of professional training in the sector.[25] These finding supports the earlier evidence on the role of BS industry in the inter-sectoral division of labour, especially in view of its knowledge role.

2.4 "Offshoring" tendencies and BS replacement growth

Most outsourced services in the early 1980s were either low- or medium-skilled (cleaning, catering, internal and external transport, building maintenance). From the mid-1980s until the late 1990s, many

[24] We found strong differences among European countries in terms of the percentage of business services firms that use CVT training for their employees. For example, the percentage of Spanish and Portuguese enterprises spending resources on training is less than 50% of their Dutch or Danish counterparts. In the countries where the percentage of enterprises providing courses is highest (Denmark, Ireland and Netherlands), also the training costs per course are highest.

[25] We found only one other remarkable employment characteristic of BS compared to most other European sectors appeared to be the high incidence of self-employment, especially in professional and knowledge-intensive business services. This is further analysed in Kox, Van Leeuwen and Van der Wiel (2007)

standardised in-house services became subject to outsourcing, including security services, training of personnel, administration, storage, technical testing, computer services and recruitment. Especially wage costs and scale effects derived from standardisation played a dominant role in this stage of outsourcing. If replacement growth took place, it was probably most relevant in this period. Before the turn of the century, almost all authors took for granted that outsourcing of in-house services from manufacturing and other industries came to the benefit of *domestic* BS industry.[26]

ICT developments have since then lowered communication and co-ordination costs to such an extent that international outsourcing of in-house services tasks has become more than an exotic exception. Due to this development a new range of standardised in-house services can be sourced from low-wage countries, including knowledge-intensive jobs of a standardised nature (cf. Van Welsum *et al.* 2005, 2006). Offshoring of standardised services tasks to low-wage countries could weaken the market position of domestic firms that produce standardised business services.[27] If anything, the offshoring tendency will therefore make the displacement-growth hypothesis less relevant for explaining the structural growth of *domestic* business services in Europe.

At a national scale this process goes along with a change in the composition of the total labour force. Figure 2.10 illustrates the shift away from routinised jobs that is taking place in the total labour force of the USA. As more routinised manual jobs and standardised knowledge-intensive jobs are sourced from low-wage countries this reduces the scope for future replacement growth by the domestic BS industry smaller. An increasing part of the remaining jobs will be characterised by non-routinised services tasks.[28]

Offshoring of routinised manual and cognitive BS jobs could in a way be regarded as a form of prolonged replacement growth, although now in an international context. To the extent that offshoring is done intra-company by BS firms, it may give rise to something new, namely vertical (i.e. input-sourcing related) foreign direct investment in BS industry. Vertical direct investment till now used to be something that is important in mining and manufacturing, but unimportant in services.

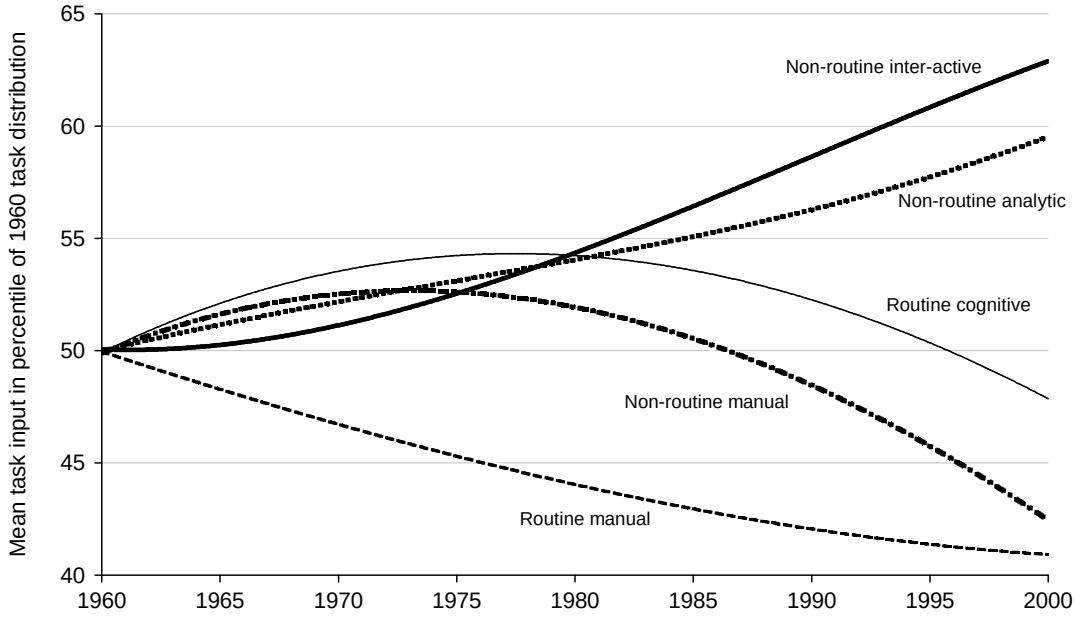
However, the offshoring process is getting increasingly differentiated. In the software sector, for example, India's computer-services exports are no longer restricted to routinised offshored software jobs. Indian BS firms are actively involved in the management of complex automatisation processes of European and US clients (e.g. Marsh 2007). Even in this area we can no longer speak of pure replacement growth.

[26] An exception was Feenstra and Hanson (1999) who also looked into the international dimensions of outsourcing.

[27] Recent trends towards the offshoring of some business services such as call centres and ICT services have led to fears in the US and Europe about the migration of jobs to low-wages countries like India. Some estimates say that more than two million jobs in the US and one million in Europe will move to developing countries (e.g. McCarthy 2002).

[28] The issue has many interesting aspects from an international trade perspective (cf. Grossman and Rossi-Hansberg 2006; Baldwin 2006), but these go beyond the scope of the present paper.

Figure 2.10 Trends in routine and non-routine task inputs in US labour force



Note: The picture is based on an analysis of the occupational structure, using census data and Current Population Survey data, using the mean 1960 task input structure as point of reference. Plotted variables depict the employment-weighted mean of each assigned percentile in the indicated year. Source: Autor, Levy and Murnane (2003).

2.5 Growth of European BS industry: conclusions

The BS sector has experienced a remarkably strong growth process in the past two decades, in terms of both employment and value added. Business services nowadays count as one of the largest economic sectors in the European economy, larger than such sectors as transport, communication, hotels and restaurants taken together. The sector's employment and value added account for, respectively, 11 per cent and 12 per cent of the total EU15 economy. Value-added growth during last two decades was higher than in any other sector except telecommunications. Regarding employment, the growth of business services far outstripped the growth of any other sector. For European countries we find a significant and strong positive correlation between the average income per capita and the share of business services in total employment. This correlation holds up to some threshold level of BS employment.

Traditionally, services were considered as relatively stable sectors, less sensitive to cyclical fluctuations than agriculture and manufacturing. They served as refuge sectors in case of economic crisis. Our analysis learns that the BS sector has a higher exposure to cyclical effects than most services sectors, but there are also some compensatory characteristics. Moreover, the business-cycle volatility may be different in various parts of the BS industry. The empirical analysis concludes that

the structural growth trend for the BS industry has until now dominated its relatively high cyclical volatility.

Two main explanations stand out for the structural growth in the business services industry. Partly, the growth may have been caused by outsourcing of existing in-house services jobs from other sectors to BS industry, especially in the 1980s and in the early 1990s. Sub-sectors that produce standardised business services contributed most to the growth process in this period. Since the mid-1990s, a shift has occurred. The growth of business services especially reflects a growing complexity and specialisation in the social division of labour between industries. In this stage, many knowledge-intensive and non-routine services tasks became eligible for outsourcing to independent services firms. However, this was seldom a simple substitution of pre-existing in-house services jobs. Professional specialisation and product innovation often also caused the nature of the service product to change. Since the mid-1990s, those sub-sectors that predominantly produce client-specific services products contributed most to the structural growth of business services industry.

The recent tendency to 'offshore' some standardised services tasks from suppliers in low-wage countries may weaken the market position of domestic firms that produce mainly standardised business services. As a consequence, the displacement-growth hypothesis will become even less relevant for explaining the present structural growth of business services in Europe. To the extent that intra-company offshoring by BS firms grows, it may improve overall cost competitiveness and labour productivity in European BS industry.

Business services jobs on average appear not have many special characteristics compared with other economic sectors. There are two major characteristics of BS which can -to a certain extent- be considered “special”. The first is the high incidence of self-employment, especially in professional and knowledge-intensive business services. The second is the high profile of educational attainment levels and the relatively strong importance of professional training in the sector. The importance of know-how in business services is epitomised by the large number of enterprises providing their staff with continuous vocational training courses, as well as the greater amount of resources used on such courses.

3 The contribution of business services to European economic growth

This section analyses the contributions of business services to aggregate economic growth in Europe. The growth of business services represents a qualitatively new stage in the social structure of production. A major characteristic of this structural change is that firm-level scale economies with regard to knowledge and skill inputs are reduced by external deliveries of such inputs, thereby exploiting external scale economies. It goes along with an increasingly complex social division of labour between economic sectors. The share of knowledge-intensive services in the intermediate inputs of the total economy has risen sharply in the last decade.

The business-services and communication sectors are in the focal point of the structural change. The direct growth contribution of business-services industry arises from its own employment and value-added growth. The indirect growth contribution stems from the positive spillovers that business services create for other industries. The spillovers relate to the sector's role in knowledge and technology dissemination to client industries, and to its role in removing scale indivisibilities with regard to knowledge inputs.

The structure of the section is the following. The first two sub-sections analyse, respectively, the direct and indirect growth contributions of business services. The relatively poor labour-productivity growth of business-services industry in combination with its expanded share in the total European economy has evoked discussion whether this sector contributes to a growth stagnation tendency. The third sub-section briefly deals with this so-called 'Baumol disease'. The fourth sub-section gives a brief survey of the empirical literature on the indirect growth contributions, and a final sub-section summarises the conclusions.

3.1 The direct growth contribution of business services

The strong expansion of the BS sector over the past decade contributes in itself to aggregate economic growth. We subsequently deal with the sector's contribution to growth in terms of employment, value added and labour productivity. Table 3.1 brings out that the sector has had a most prominent role in inter-sectoral employment shifts during the last two decades. The BS industry on its own accounted for more than half the EU's net employment growth between 1979 and 2003. This was more than the joint employment contribution of all other commercial services taken together.[29] It was even larger

[29] The absolute change in employment for financial services, transport, distributive trades, hotels and catering, communication together represented 46 per cent of the absolute change in European employment over the period 1979-2003. Agriculture and manufacturing made a negative contribution. Source: own calulations based on OECD STAN data and data from GGDC.

than employment growth in public services. Business services more than compensated the shrinking employment in manufacturing.

The largest annualised growth rate within the business services was registered by the sub-sector computer services. The latter started from a very small initial size in 1979, but nonetheless its employment growth accelerated to 6.6 per cent in the second half of the 1990s (OECD 2003b).[30] Over the entire period, knowledge-intensive business services (KIBS) and the rest of business services (non-KIBS) have grown at about the same pace, with the employment-growth contribution of 'non-KIBS' only being a little bit higher than the contribution of KIBS.[31]

Table 3.1 The contribution of business services to EU15 employment growth, 1979-2003

	Employment in 1000 persons, 1979	Employ-ment in 1000 persons, 2003	Average annualised sectoral growth rate (%)	Contribu-tion to aggregate growth (% point)	Contribution (%) to EU15 absolute employment change [a)]
Business services	**6 837**	**19 460**	**4.5**	**0.33**	**54.4**
- Equipment renting	250	563	3.4	0.01	1.4
- Computer services	571	2 450	6.3	0.05	8.1
- Contract R&D	411	632	1.8	0.01	1.0
- Professional services	2 846	7 037	3.8	0.11	18.1
- Other, n.e.c.	2 759	8 778	4.9	0.16	26.0
Total all sectors	**147 984**	**171 167**	**0.6**	**0.6**	**100.0**
- Manufacturing	53 381	42 055	-1.0	-0.30	-48.9
- Distributive trades	20 993	25 943	0.9	0.13	21.4
- Financial services	3 976	5 392	1.3	0.04	6.1
PM					
KIBS business services [b)]	3 828	10 119	4.1	0.17	27.1
Non-KIBS business services [c)]	3 009	9 341	4.8	0.17	27.3

Notes: a) Each industry's absolute change in employment as percentage of the total employment change in the entire economy. b) The group of knowledge-intensive business services (KIBS) is here taken to consist of 'Computer services', 'Contract R&D', and 'Legal, technical, accountancy, advertising'. c) Non-KIBS business services is here taken to consist of 'Equipment renting' and 'Other, n.e.c.' Sources: data are from OECD National Accounts data (STAN), extended with data from GGDC.

[30] Over the period 1995-2000, OECD-area employment in computer services grew by more than 3 million, equalling an annual growth rate of over 4.3%, more than three times that of overall market-sector employment (OECD 2003).

[31] The distinction between knowledge-intensive business services and other business services is not a sharp one. All sub-sectors in business services have elements of both. The demarcation line in Table 3.1 is based on average human-capital inputs and the average incidence of knowledge -intensive tasks.

Measured in constant prices, the value-added growth between 1979 and 2003 was stronger in business services than in any other economic sector of the European economy, except for communication services (cf. Table 3.2). Within business services, *computer services* registered the strongest growth performance, while the weakest growth occurred in *contract R&D*. The 'non-KIBS' part of business services grew slightly faster than the KIBS part.

The contribution of BS to the absolute change in total value added was much smaller than its contribution than in terms of employment growth. About one-eight of the overall EU15 change in value added was accounted for by business services. Two-thirds of this direct growth contribution stemmed from the KIBS, which is mainly explained from the fact that its 1979 share in value added was already larger than the 'non-KIBS' part.

Table 3.2 The contribution of business services to value-added growth, 1979-2003

	Value-added level in billion euros,[d)] 1979	Value -added level in billion euros,[d)] 2003	Average annualised sectoral growth rate (%) [e)]	Sector contribution to aggregate growth (% point)	Contribution (%) to EU15 absolute value-added change [a)]
Business services	**122.9**	**1067.4**	**4.2**	**0.28**	**12.7**
- Equipment renting	10.8	90.3	5.0	0.02	1.1
- Computer services	12.4	182.7	6.6	0.05	2.3
- Contract R&D	7.0	36.7	2.4	0.01	0.4
- Professional services	59.7	472.0	3.8	0.12	5.6
- Other, n.e.c.	33.0	285.7	3.9	0.08	3.4
Total all sectors	**2124.0**	**9540.1**	**2.2**	**2.2**	**100**
- Manufacturing	804.1	2515.9	2.2	0.51	23.1
- Distributive trades	218.5	936.6	2.3	0.22	9.7
- Financial services	103.7	576.4	2.5	0.14	6.4
PM					
KIBS business services [b)]	79.1	691.4	4.1	0.53	8.3
Non-KIBS business services [c)]	43.8	376.0	4.4	0.29	4.5

Notes: a) Each industry's absolute change in value added as percentage of the total value-added change in the entire economy. b) The group of knowledge-intensive business services (KIBS) is here taken to consist of 'Computer services', 'Contract R&D', and 'Legal, technical, accountancy, advertising'. c) Non-KIBS business services is here taken to consist of 'Equipment renting' and 'Other, n.e.c.' d) Current prices, for 1979 conversion to euro from ECU and other national currencies. e) Based on constant 1995 prices. Sources: data are from OECD National Accounts data (STAN), extended with data from GGDC.

The direct contribution of BS to the growth of aggregate productivity is implied by the two preceding tables.[32] Productivity growth is defined as the growth of real value added per employed person, expressed in constant prices of 1995. This definition counts persons, not hours worked; it could therefore underestimate the productivity growth if the share of part workers grows over time. In Table 3.3 we see that the direct contribution of business services to EU15 productivity change has been negative over the 1979-2003 period. The reason is that the employment in business services has grown faster than its value added did. The negative productivity contribution is entirely caused by the non-KIBS part of business services, and more particularly by the sub-sector '*Other, not elsewhere classified*'. This residual category includes *inter alia*, industrial cleaning, security services, call centres, packaging firms, and agencies for temporary labour. Branches like call centres and industrial cleaning tend to employ many part-time workers, and especially call centres form a relatively young activity. So, a growing share of part-timers could in this case lead to underestimation of real productivity growth (per hour worked).

Table 3.3 The contribution of business services to EU15 labour productivity growth, 1979-2003

	Producti-vity level in euros, curr. prices 1979*	Producti-vity level in euros, curr. prices 2003*	Labour productivity level 2003 based on constant 1995 prices [a)]	Average annualised growth rate in constant prices (%)	Sector share (%) in EU15 growth of aggregate in productivity [d)]
Business services	17 976	54 851	16777	– 0.3	– 0.023
of which:					
- Equipment renting	43 200	160 391	62450	1.6	0.012
- Computer services	21 716	74 571	23236	0.3	0.003
- Contract R&D	17 032	58 070	19611	0.6	0.002
- Professional services	20 977	67 074	20977	0.0	0.000
- Other, n.e.c.	11 961	32 547	9504	– 1.0	– 0.021
Average Total EU15 economy	14 353	55 736	20961	1.6	1.600
PM: KIBS [b)]	20 664	68 327	20664	0.0	0.000
Non-KIBS business services [c)]	14 556	40 253	13280	– 0.4	– 0.012

Notes: a) Using 1979 productivity levels as starting values and calculating on the base of the value-added growth rate in constant 1995 prices. b) The group of knowledge-intensive business services (KIBS) is here taken to consist of 'Computer services', 'Contract R&D', and 'Legal, technical, accountancy, advertising'. c) Non-KIBS business services is here taken to consist of 'Equipment renting' and 'Other, n.e.c.' d) Employment weighted. Sources: calculated on the basis of data in Tables 3.1 and 3.2.

[32] If H_{1979} is initial labour productivity in 1979, then H_{2003} is defined as: $H_{1979} \cdot (1+g_{VA})^{n} \cdot (1+g_{EMP})^{-n}$ where g_{VA} and g_{EMP} are, respectively, the growth perunages for value added and employment, and *n* is the number of years (24 in this case). Note that g_{VA} must be measured in constant prices, so that the resulting H_{2003} does not match the current-prices value added in Table 3.2.

The KIBS ─though representing more than half the BS employment─ also failed to make a positive direct contribution to EU15 productivity growth over the period 1979-2003. The positive exceptions in this category are *computer services* and *contract R&D*. The sub-sector aggregate that includes most professional services (*Legal, technical, accountancy, advertising*), and that accounts for about one-third of total BS employment, had on average a zero growth of real productivity.

Summing up, the own productivity performance by business services can at best be called very poor. The same holds for this sector's direct contribution to European productivity growth, a result that was also found by the European Central Bank (ECB Task Force 2006). It gives some reason for worry. Economic growth is mainly driven by two sources, namely productivity growth and increased labour inputs (participation). In the coming decades, population ageing effects will become palpable, and increased labour participation can no longer be relied upon as a major source of economic growth in the European Union (cf. EC 2002a). So, productivity growth will be left as the only major source of economic growth. The weak productivity performance by the BS industry - if carried on into the future - could become a drag on economic growth, this sector now forms a major sector in the European economy. Some have even raised the question whether the 'Baumol disease' (growth stagnation due to an increasing weight of low-productivity services sectors) is lurking behind the horizon.[33] We return to this discussion in section 3.4.

First, we want to qualify some of the aforementioned conclusions on productivity growth in business services. Productivity performance in business services differs by country and by sub-sector, so one must be careful with generalisations (cf. Pilat 2007; O'Mahony and Van Ark 2003; Wölfl 2003). Moreover, there is international agreement nowadays that measurement issues might affect the productivity record of business services more than in many other economic sectors.[34] The high degree of product differentiation makes it difficult to distinguish between price and volume components of value added growth (cf. Triplett and Bosworth 2004; Wölfl 2003; Rubalcaba 2006). This especially regards the KIBS, where the products are in many cases client-specific.

The theory on industry dynamics provides us with a reason for being careful about extrapolating the past productivity-growth performance of business services into the future. BS industry is relatively new, and some of its branches did not even exist 20 years ago. Many of its products, particularly knowledge-intensive products, are even newer. The theory on product life-cycles (Vernon 1966) states that products in an early stage of their development tend to be quite little standardised and

[33] Baumol (1967) inferred that the growth of labour-intensive service industries with few opportunities for labour saving might cause an overall stagnation of economic growth.

[34] In the BS sector, the measurement of productivity can be even more important than for other services sectors due, among other reasons, to the fact that prices are much less standardised and "registerable" in statistical terms. Wölfl point out three different problem areas with regard to the measurement of services productivity: in the selection of inputs (labour mostly), in the selection and definition of outputs (at constant prices and quality), and finally, in the method of aggregation over sectors.

highly differentiated, but many of these products become more standardised over time. In the beginning, price elasticity for the output of individual firms may be quite low. Production methods still have a learning-by-doing character, and producers have a large degree of freedom in changing their inputs. Once demand for a product expands, a certain degree of standardisation (commonly accepted product standards) takes place.[35] Efforts at product differentiation do not come to an end, since competitors try to avoid the full brunt of price competition. Moreover, more product variety may arise due to specialisation. Over time, concern about production costs gets more important and uncertainties diminish about how the product should best and cheapest be produced. Once standardisation occurs in the product market, the price elasticity of demand for the output of individual firms increases. Firms that wish to survive, must give full attention to cost efficiency. When this happens, the productivity record in business services can be expected to improve.

3.2 The indirect growth contribution of business services

Thus far we focussed on the growth of BS industry itself and how that contributes to economic growth in Europe. Two important characteristics of the sector are that its products are used as intermediate inputs, and that these inputs are often knowledge-intensive. Both affect the further role of business services in overall economic growth.

There is reason to assume that individual firms in business services are not always able (or willing) to charge the full value of their inputs to clients. An important economic explanation for this is that knowledge products are non-rival in their use. It means, that once the knowledge product has been created it is difficult for BS firms to prevent it from being used subsequently by the client in new applications, or from being copied by other firms. It is difficult to fully appropriate the rents of new knowledge products.[36] In BS markets dominated by few large companies price-umbrella effects may occur, necessitating SME companies to charge limited fees due their reputation lag with respect to large firms. Both factors may imply that the value added of the BS sector underestimates the sector's contribution to overall economic growth.[37] A comprehensive picture of the growth contribution by BS industry therefore also requires that such knowledge 'externalities' or spillovers are somehow taken into account. Griliches (1979) made a distinction between knowledge spillovers and rent spillovers. Real knowledge spillovers do not necessarily imply economic transactions between industries. Rent spillovers relate to quality improvements in intermediate inputs that are not matched by price increases. Under-pricing of products in the case of rent spillovers is the result of the market structure

[35] It is worth noting in this context that the European Commission (DG Enterprise) is actively promoting the development of more standardised product formats for some business services.

[36] From the results of the European *Community Innovation Survey* over 1999-2001 it appears that innovating BS firms ─compared to manufacturing firms─ make relatively more intense use of 'secrecy', 'design complexity' and 'lead-time advantage on competitors' to prevent copying of their innovations, and relatively less use of copyrights and trademarks (EC 2004).

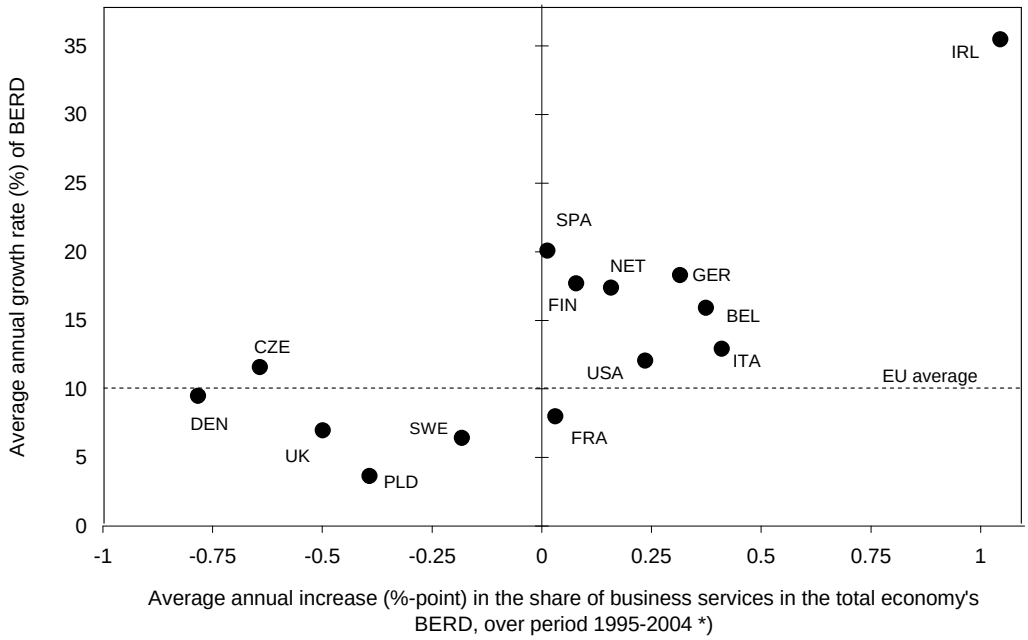
[37] And, for that matter, it also means that the economic-growth contributions from other sectors are over-estimated on the basis of the latter's value-added figures.

for the knowledge products, and not necessarily a matter of flawed statistical measuring.[38] Spillovers generated by business services firms are generally rent spillovers.

Knowledge-intensive BS firms have an important role in national innovation systems. They contribute in three ways to modern knowledge infrastructure, through *original innovations*, through *knowledge diffusion*, and through their role in *surpassing human capital indivisibilities*. We subsequently discuss these three forms of indirect growth impacts.

Original innovations. The BS industry has a key role in the development of original innovations. Firms in the software, engineering and contract research sub-sectors actively contribute to technological innovations. Other sub-sectors like accountancy, consultancy and marketing are more active in the development of non-technological innovations. This sector's role in original innovations can be shown using the business expenditures on R&D (shortly: BERD) as an indicator. Figure 3.1 shows on the vertical axis that the annual growth of these expenditures over the period 1995-2004 has been very strong in most EU countries, and in several cases also higher than in the USA.

Figure 3.1 Growth of R&D expenditure by BS industry, and its changing share in the national R&D expenditures, period 1995-2004 *)



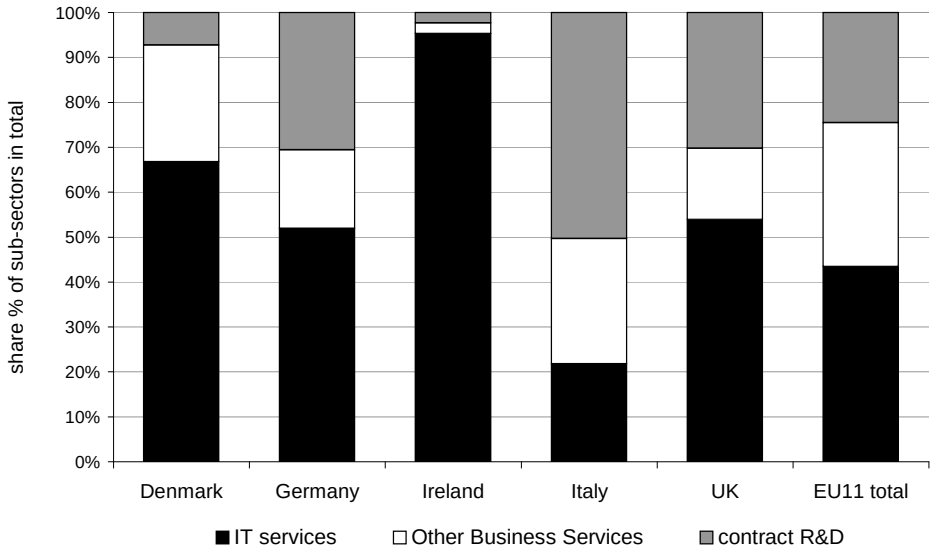
Note: *) The share of business services is corrected for its increased share in the total economy. Business expenditures on R&D (BERD) are measured in PPP dollars. Source: own calculations, using data from OECD ANBERD (2006) and STAN databases.

[38] Spillovers would still exist if we knew all prices charged by individual business-services firms.

The horizontal axis of Figure 3.1 gives the annual change in the share of BS in the total economy's BERD during the period 1995-2004. We corrected for the fact that the business- services sector itself has become a bigger part of the total economy. The figure therefore also allows the conclusion that the BS sector in most of the EU15 countries became more R&D-intensive than the rest of the economy did.[39] The Europe-wide *Community Innovation Survey* show that the share of innovating firms in business services – or more precisely: in computer services, engineering, architecture Computer activities, contract R&D, consultancy and technical testing – is higher than in manufacturing industry (EC 2004; Pain and Jaumotte 2005).

Figure 3.2 shows that there are substantial intra-EU differences in the R&D share of different sub-sectors. *Computer services* and *Contract research* account for a major part of the R&D expenditures in business services. Most European patent registrations in services also originate from these sub-sectors (European Commission 2003a; Blind *et al*. 2003). In 2000, some 16 per cent of all innovating BS firms in the EU applied at least for one patent, only slightly less than the equivalent figure for manufacturing. In five countries (Sweden, Denmark, Germany, Spain and Portugal), the percentage of innovating firms with patents was higher in business services than in manufacturing (EC 2004).

Figure 3.2 Share of sub-sectors in R&D expenditure in BS industry, 2004



Data source: OECD ANBERD (2006).

[39] This did not hold for the United Kingdom, Sweden and Denmark, where the R&D expenditures of the business-services sector increased less than the share of the sector in the total economy. The same also holds for the Czech Republic and Poland who joined the Union in 2004.

Firms in Other Business Services are active innovators in non-technological areas such as organisational development, firm strategy, human resources management, public relations or marketing. (Boden and Miles 2000; Rubalcaba 1999). The innovations in these sub-sectors are often of a non-technological kind, and they do not go along with formal R&D expenditure. Many of their original innovations are developed and adapted for client firms on a case-by-case basis.

Knowledge diffusion. With regard to many business competences, BS providers lead their client firms towards the relevant efficiency frontier by spreading 'best practice' information. This is in itself an important indirect contribution to economic growth. A consistent finding from the EU *Community Innovation Survey* is that BS firms tend to rank before universities as a source of external information for innovating companies. This pattern was found *inter alia* in Finland (Leiponen 2001), Netherlands (Kox 2004) and the United Kingdom (Hughes and Wood 1999). Many BS providers are in the unique position of being able to look into the 'knowledge kitchen' of client firms. They observe localised, tacit knowledge solutions in client firms. But since their horizon is wider, they can more easily conceptualise such solutions and select 'best practice' solutions to more common business problems. Such 'best practice' information is subsequently introduced as input when BS firms serve new clients. It has been demonstrated empirically that BS firms also play a role in international knowledge dissemination. Drejer (1999) established that knowledge intensive services have played a central role as a knowledge source for Danish firms in manufacturing as well as services. Guerrieri *et al*. (2005) have shown that international trade in BS between countries could explain bilateral knowledge spillovers as measured by patent citations. Apart from the overall contribution of BS industry to knowledge spillovers, we should in particular point to the role of computer-related services (part of BS sector). Many BS firms actively contribute to ICT-related innovations and introduce innovations that make the use of ICT more effective.

Surpassing human capital indivisibilities. A further indirect growth contribution of business services relates to the production potential of small and medium-sized enterprises (SME). It is well-documented in the literature that firm-specific economies of scale play a role with regard to human capital inputs like knowledge specialisations and skills development (e.g. Edwards and Starr 1987; Francois 1990; Grubel 1995). Before the rise of the BS sector, say before 1980, a certain firm size was required to have access to particular specialist knowledge and skill. The expertise of some professionals in branches like law, science, engineering, public relations, logistics, marketing or security is sometimes so specialised that even the largest manufacturing companies do not need these specialisms on a full-time basis, let alone the small firms. The setup costs for departments that sustain such specialists are simply too high. These scale indivisibilities prevented SME firms from access to such production inputs. The growth of the BS availability since the 1980s has drastically widened the potential input-mix choices of SME firms, thereby reducing the importance of firm-specific scale

economies in the area of human capital resources. Even small firms nowadays have access to specialist knowledge and specialist skills that once were the exclusive domain of universities and large firms. Professionals of specialised BS firms now cater to clients throughout a region, country or worldwide. Their services are now accessible to small firms in more localised markets or local governments, thus widening their production and efficiency potential.

Summing up, we have good reasons to assume that the poor productivity performance of BS industry will at least to some extent be compensated by the indirect growth contributions originating from this industry. Of particular importance are three forms of spill-over effects –in the form of original innovations, knowledge diffusion, and the reduction of human capital indivisibilities at firm level– that have a positive impact on productivity in other industries.

3.3 Is the 'Baumol disease' looming?

Since the BS sector did grow so fast in the preceding two decades, its own poor productivity performance may ─ at first sight ─ have had a downward impact on aggregate productivity growth. This has led some observers to conclude that the growth of this sector contributes to growth stagnation, the so-called Baumol disease. The unbalanced-growth model developed by Baumol (1967) and Baumol *et al*. (1989). The latter analysed how an expanding low-productivity services sector may bring down the growth rate of the entire economy, a pattern that is nowadays known as "Baumol disease". The services sector in his growth model has only a limited potential for labour-saving and productivity growth. Moreover, it is characterised by a relatively price-inelastic demand, while its wages follow those of the most productive sector. In this economy, an increasing share of labour will be employed by the services sector. The imminent 'disease' is that the growth rate of the economy falls, while the relative price of services rises.

Some of these 'unbalanced-growth' characteristics also seem present in the growth of the BS sector, in particular its vigorous employment growth and its poor productivity record, while also the Baumol assumptions on wage growth and the relative price inelasticity might at least partially apply.[40]

Even apart from the likelihood that productivity growth of the BS sector may be downward-biased because of measurement problems, there are several further reasons why growth of the BS industry does not necessarily contribute to stagnation of macro-economic growth. Firstly, the Baumol model

[40] Some evidence for this is presented in Kox (2004), where it is also shown that measurement errors with regard to business-services output are unlikely to not affect the measured productivity growth for the economy as a whole. If real value added created by the business sector is systematically underestimated, this implies that the value added of other sectors that use business services as intermediate inputs must be over-estimated. Measurement errors with regard to business-services output do only affect the macro-economic productivity for the small part of business-services output that is destined for final demand (consumption, export, investment).

focuses on consumer services, whereas business services are intermediate inputs for other industries. Several studies have demonstrated that even low-productive intermediate industries may increase macro-economic productivity growth if the intermediate inputs replace primary labour inputs in the client industries and if the BS industry itself has a positive productivity growth rate (Fixler and Siegel 1999; Oulton 2001; Baumol 2007).[41] An important but implicit assumption in Oulton's model is that competition in the markets for BS products is such that all labour productivity gains (no matter how small) are passed on to its clients. This precondition may not be fulfilled. The ECB has found for the euro area that gross profit margins and mark- ups in the BS sector exceeded the mark-up in total economy and manufacturing. They infer that this might indicate lower competitive pressures in business services relative to the rest of the economy (ECB Task Force 2006). Weak competition and market opacity in business services may thus hamper the positive effects of the BS sector on aggregate productivity. Secondly, in contrast to the service sector in the Baumol model, the BS industry might have an unexhausted potential for labour-saving and productivity improvements (Kox 2002; 2004). Thirdly, as shown in the preceding section, the BS industry indirectly raises the productivity of other industries by the knowledge spillovers that we dealt with in the preceding section.

In Figure 2.8 we found a strong and positive correlation between the employment share of business services and GDP per capita. Francois and Reinert (1995) using a cross-country sample also find that countries with a higher share of producer services in intermediate inputs of manufacturing had a significantly higher income (GDP) per capita. Also in the future, the weak productivity growth of the BS sector does not necessarily have a negative effect on European economic growth provided that the positive productivity and innovation spillovers to other industries are strong enough, and provided also that competition and market transparency in business services are such that productivity gains are passed on to client industries.

3.4 Measuring the contribution of business services to economic growth

If the BS sector is indeed the source of positive spill-over effects for other sectors, this must show up empirically. We surveyed a number of empirical studies that – though they use different methods and investigate different countries and periods – have in common that they try to assess the quantitative impacts of BS use on aggregate productivity and economic growth. Table 3.4 gives a nutshell survey of empirical findings on spillovers from an important sub-sector of business services, namely computer-related services. The table does not claim to be comprehensive, but it is illustrative for standard findings in this area.[42] Most spill-over studies focus specifically on the contributions of R&D

[41] This is exactly what has happened, for cost-saving reasons, in the outsourcing movement that swept across all market industries throughout the 1980s and 1990s. Privatisation of government services had the same effect.

[42] Not included are studies by Hempel (2002), Collechia (2001), Müller and Zenker (2000), which all deal with similar research questions, though sometimes on a regional rather than national level.

and information technology. Crespi (2007) finds highly significant effects from the use of IT in labour productivity.

The studies in Table 3.4 focus in particular on the effects of computer-related or ICT services. With the exception of the Nordhaus study, all the surveyed studies investigate EU countries. Though the empirical evidence is incomplete and fragmentary, we may conclude that positive spill-over effects from the computer (IT) services sub-sector have been quite strong. Other studies show positive spill-over effects from BS inputs without differentiating their sub-sector origin. A number of important results are shown in Table 3.6.

Table 3.4 Survey of empirical studies with regard to the impact of computer-related services inputs on aggregate productivity change and growth

Study and main approach	Country, coverage	Productivity or spillover indicator	Main findings
Pilat & Lee (2001) Decomposition aggregate labour productivity growth by industry contributions	5 EU countries (DK, NL, FINL, IT, GERM), 1989-99	Aggregate labour productivity growth	Computer services contributed positively in Denmark, Germany and Italy, but negatively in Netherlands and Finland.
Nordhaus (2002) Decomposition of productivity growth (measured from income side value-added data)	USA, 1975-2000	Aggregate productivity growth	Software industry contributed 0.1% to the 1.6% productivity growth acceleration after 1995.
Crespi (2007) : Cobb-Douglas-like production function, measures of IT use and proxies indicators of innovation and labour.	EU, 9 countries (GERM, F, UK, IT, SP, FL, DK), 1995-2000	Aggregate labour productivity	Highly significant fixed effects from IT use, R&D intensity and labour costs.
Van Leeuwen & Van der Wiel (2003) Growth accounting and production function model, including ICT spillovers and innovation indicators	Netherlands, market services, 1994-1998	TFP growth, labour prod. growth	Contribution of ICT spillovers to productivity growth was very strong, and even more so in innovating firms

The studies for the BS sector (Table 3.5) as a whole have met with more mixed results than those for IT services.[43] The Ecorys-NEI (2004) study, commissioned by the EU, finds statistically significant

[43] We have only presented by studies that focus on spillover effects. Other studies like those by Windrum and Tomlinson (1999) focus on explaining production or productivity levels, using industry production functions with industry-level inputs of knowledge-intensive services (for Germany, Japan, the Netherlands, and the UK, 1970-1990). They find that input of knowledge-intensive services has a significant positive impact on gross output and productivity level of industries in all four countries.

Table 3.5 Survey of empirical studies with regard to the impact of Total Business Services (TBS) inputs on aggregate productivity change and growth

Study and main approach	Country, coverage	Productivity or spillover indicator	Main findings
Ecorys-NEI (2004) Cross-section production function, compares estimated coefficient for the TBS contribution to aggregate output with the actual BS cost share in intermediate inputs	7 EU countries + Australia, Canada, Japan, Norway, 1994-1998	Difference between actual cost share and estimated production contribution	(a) For France, Germany, Canada, for the EU total, and for the pooled regression: estimated contribution is 1.5 to 2.5 the actual cost share. (b) coefficient for TBS is not significant in regressions for other individual countries.
Antonelli (1999) Calculate production elasticities for TBS use in production functions for a large range of industries (cross- section and time series)	4 EU countries (IT, FRA, GERM, UK), 1988-1990	Value added impact of TBS use	Effect of TBS use on value added of client industries: a 1% increase in BS inputs caused value added to increase by on average 2.6 to 4.2%
Greenhalgh & Gregory (2000) Growth decomposition in input-output framework: tracing key sectors that generate cost savings and product improvements	UK, 1979-1990	Labour productivity growth, R&D spillovers	TBS industry key sector for productivity growth during 1980s, causing large labour saving in other industries. TBS also important player in the forward transmission of rising product quality
Katsoulacos & Tsounis (2000) Correlation between TFP residuals of industry production functions and BS use, 75 industries	Greece, 1980-1988	TFP, TFP growth	Strong correlation between TBS use and TFP levels and TFP growth of industries
Camacho and Rodriguez (2007) Production function with KIS and KIBS as inputs. Separately: innovation diffusion by KIS/ KIBS through product-embodied R&D.	DK, GERM, SP, NL, UK, 1995-1998	Production, productivity and product embodied R&D diffused by KIS	Positive and significant impacts of KIS on production and productivity. In this second case, no clear results for the UK and Spain. Concerning diffusion on innovation, uneven results by country and sector were identified, but positive impacts dominate.
Pilat & Lee (2001) Decomposition aggregate labour productivity growth by industry contributions	5 EU countries (DK, NL, FIN, IT, GERM), 1989-99	Aggregate labour productivity growth	Inputs of non-IT Business Services inputs contributed negatively except in Denmark (period 1995-1999) [a)]

Note: a) Contributions by other BS sub-sectors were positive in Finland and Germany during 1989-1994.

indications for the existence of positive spillovers in the EU as a whole, in France and in Germany. For the other five individual EU countries, no significantly positive effects could be established. Pilat and Lee (2001) found indications for negative impacts of non-IT business services on aggregate productivity. That effect may be caused by the poor productivity performance of the BS sector itself. The studies by Antonelli, by Greenhalgh and Gregory, by Katsoulacos and Tsounis mostly cover the period 1980-1990, and they all found indications of the existence of positive spillover effects. Camacho and Rodriguez (2007) find positive and significant impacts of the use of knowledge-intensive services on production and productivity of client sectors. In the second part of their study they find no significant impacts for the UK and Spain, compared to some other EU countries. Besides, they estimate impacts on innovation diffusion through product embodied R&D: positive impacts of KIBS use prevail, but impacts differ by country and sector.

Taking these results together, we might tentatively conclude that the growth of business services during the 1980s caused overall positive productivity spillovers. The available positive evidence for the existence of technology and knowledge spillovers seems to imply that BS firms during the 1980s were unable or unwilling to charge prices that reflect the full contribution of their services to value creation in client industries. The empirical results for the mid-1990s onwards are more mixed. This can be partly explained by the different methodologies used, country selection and uneven shares of operative low-productive services with respect to KIS within the total BS aggregate. IT and computer services have had an overall positive impact on aggregate productivity and growth, but for other business services, the empirical results do not allow this conclusion for all EU countries. Taken as a whole, the available empirical evidence indicates that the contribution of the BS sector to aggregate economic growth may be positive, and that ─ at least during important parts of the preceding two decades ─ the BS sector has created positive spillover effects for other industries.

3.5 The contribution by BS industry to European growth: conclusions

The growth of business services represents a qualitatively new stage in the social structure of production. A major characteristic of this structural change is that firm-level scale economies with regard to knowledge and skill inputs are reduced by external deliveries of such inputs.

The sector has had a most prominent role in inter-sectoral employment shifts during the last two decades. The BS industry on its own accounted for more than half the EU's net employment growth over the entire period. The direct contribution of BS to the absolute change in total value added was much smaller than its contribution than in terms of employment growth. A consequence was that the productivity growth in BS industry during last decades can at best be called poor. The poor productivity performance of BS industry is at least to some extent compensated by the indirect growth

contributions originating from this industry. Of particular importance are three forms of spillover effects –in the form of original innovations, knowledge diffusion, and the reduction of human capital indivisibilities at firm level– that have a positive impact on productivity in other industries.

The empirical studies surveyed in this paper indicate that positive spillover effects from the computer (IT) services sub-sector have been quite strong. The studies for the BS sector as a whole have met with more mixed results. The growth of business services during the 1980s caused overall positive productivity spillovers. The available positive evidence on technology and knowledge spillovers seems to imply that BS firms during the 1980s were unable or unwilling to charge prices that reflect the full contribution of their services to value creation in client industries. The empirical results for the mid-1990s onwards are more mixed. IT and computer services persistently have an overall positive impact on aggregate productivity and growth, but for other business services, the empirical results do not allow this conclusion for all EU countries.

The weak productivity performance by the BS industry - if carried on into the future - could be potentially become a drag on economic growth. Since the BS sector has become a major sector in the European economy, this is some reason for concern. Some have even raised the question whether the 'Baumol disease' (growth stagnation due to an increasing weight of low-productivity services sectors) is lurking behind the horizon. We argue that this is not yet a big economic threat because of the sector's positive productivity and innovation spillovers to other industries. However, improvement of market transparency and competition in business services may be needed, on the one hand, to ensure that productivity gains are passed as much as possible, on to clients industries, and, on the other hand, to provide more room for the BS sector's own efficiency.

4 Policy issues related to the future role of business services in the European economy

The growth of business services since 1990 absorbed about half of European employment growth. Apart from that, the BS industry has had impacts on aggregate productivity and innovation. In the movement towards a more competitive Europe the role of business services in economic growth needs particular attention. The evidence from the USA about its use of business services suggests that there is additional room for growth. The contributions of the BS industry to innovation, to scale economies in respect of human capital and knowledge, to efficiency spillovers and their impacts on productivity growth have all served to strengthen a more productive and competitive EU economy. Most of the quantitative empirical evidence on these contributions points to very positive results.

Since these facts all touch upon the EU's Lisbon goals, the BS sector is an interesting enough domain for policy makers. But is there a real need for policy intervention at EU level? Most of the recent

developments in the BS sector have been driven by markets and private initiatives. The free development of an industry does not automatically generate the best possible welfare outcomes. There may be 'banknotes left on the sidewalk', which the BS sector itself is unable to pick up. Targeted, stimulating action can in some cases seize welfare opportunities that otherwise would have remained underdeveloped. Welfare theory suggests that policy intervention is only called for if markets do not work properly. Moreover, if policy intervention is called for, at what level should it take place? The subsidiarity principle indicates that EU policies are required when national market problems have a European dimension. These elements will be used to discuss whether EU policy intervention is required in the development of the BS sector. For a proper discussion, this section splits the issue into two questions, each of them calling for an answer:

- Are there market failures in connection with the expanding BS sector, and if so, are they such that the welfare outcomes could be improved upon by policy intervention?
- If indeed market failures exist, is there a need for EU-wide policies beyond what national governments do (or can do) to improve the market outcomes of national BS sectors? Put another way, do market failures in the BS sector have a European dimension?

4.1 Potential market failures in the BS sector

Welfare theory distinguishes several reasons why market failure may occur. Market failure exists when the private-market prices for business services would systematically differ from the marginal costs and benefits of these services for society as a whole. The achievement of socially optimal outcomes by the free development of BS markets can be disturbed by the three types of market failures, or combinations thereof:

- *Markets do not account for social externalities*, either positive or negative. Intervention may be required to suppress negative social externalities, or to sustain a sufficient provision of positive social externalities.
- Existence and abuse of *market power* results in socially undesirable outcomes. In markets with entry barriers, monopolist or strategic oligopolist behaviour by market parties results in sub-optimal allocation of resources or too high prices for consumers. This means that the private market prices for a substantial group of firms are systematically higher than marginal costs.
- *Information asymmetry* causes undesirable outcomes in markets for information-sensitive goods. Less-informed parties may systematically find themselves in a disadvantaged position, and — being aware of this risk — may also deliberately reduce their exposure to being deceived. This reduces total transaction volume below the level that would prevail without the information asymmetry problem.

The three groups of market failures will be dealt with one by one, although there are clear overlaps between some aspects.

Social externalities

External effects arise when transactions between suppliers and buyers of business services have welfare effects for other producers or consumers that are not taken into account by the transaction partners. External effects are not reflected in the costs and prices of the BS products. As a consequence, the market price for the delivered service is – from the social perspective – either too high or too low. We first mention some branch-specific externalities, and afterwards turn to more general externalities, positive and negative.

Intervention in markets for a number of knowledge-intensive BS products has long been based on the social externalities that go along with these services. Specific examples of such services and the social externalities involved are:

- accountancy: important for safeguarding of reliable financial information, which is essential for trust in capital markets and the financial system as a whole;
- legal services (lawyers, notaries): important for upholding the legitimacy of the constitutional state and the legal system;
- engineering: safeguarding the liability of technical systems;
- architects: special role in upholding the amenity value of the urban environment, and the quality and aesthetic value of housing and other buildings.

Prevention of charlatanism and concern for the independence, reliability and accountability of providers of these professional services, many of them under traditional self-regulation umbrellas, partly explain why policymakers hesitate to remove regulation barriers and 'red tape' with regard to multi-professional cooperation. This concern, real or exaggerated, also played a role in the recent debate on the EU services directive.

The growth of the BS industry has had several positive external effects outside the industry itself, particularly in the areas of innovation and productivity development. This is especially true if innovation is understood in the broad sense of the word and not only in the traditional sense of R&D carried out for certain products. Innovation of both processes and organisation proves to be very important in providing those innovative services that can lead to productivity gains.

The sector makes its own, direct contribution to technological innovation, particularly in software and engineering. It also contributes directly, through non-technological innovations, to labour productivity development in client industries. The availability of external business services makes it possible for small and medium-sized enterprises to surmount scale problems (and associated setup costs) for

knowledge inputs. Finally, the BS sector contributes to the diffusion of production-frontier knowledge among client firms, with regard to many competence areas of business development. Through the latter contribution, business services contribute to the general speed of technological and non-technological innovation in the European economy.

Many of these effects can be regarded as externalities, because the BS industry itself cannot appropriate all associated benefits for client industries. Intellectual property rights in the BS industry are underdeveloped. Clients, competitors and employees that leave the business services firm, often have few problems in applying the same idea for their own account and benefit. The positive external effects are increasingly acknowledged by national governments and international organisations. Recent policy documents mention business services as a crucial factor for enhancing the productivity and competitiveness of client industries.[44] Given these positive externalities, it can be taken for granted that economic welfare in the European economy is served by having a strong and innovative BS industry.

Under-provision of innovation-related positive externalities can occur for several reasons. Consider first the yield in terms of original innovations. Several BS branches in EU countries, mostly SME, spend only a small share of their turnover on innovation expenditure. Such expenditure is essential for the creation of original innovation by the BS industry. The incentive structure, institutional structures, bureaucratic procedures and fiscal climate for original innovations with an immaterial character deserve to be screened for this reason. Intellectual property rights for services products, such as brand names and copyrights, are underdeveloped in the EU. Many business services products, even though innovative, are difficult to patent. Under-provision of positive externalities in the area of knowledge diffusion may occur when the knowledge assets upon which diffusion must rest become obsolete. Constant maintenance and renewal of such human capital assets is necessary. The problem in this respect lies with the large majority of small BS firms. Many of them entered the markets in the second half of the 1990s. Entrepreneurs and their employees (if there are any) are often so engaged in daily business services that they do not have the opportunity to keep their knowledge up-to-date, and certainly not to acquire new knowledge and skills that go beyond their current activities. Projected into the future, this could lead to exhaustion of the knowledge base in important parts of the BS industry.

[44] According to the OECD: "*The provision of strategic business services is considered key to enhancing performance across the economy, in manufacturing and services alike. Increased efficiency in the provision of services will have positive spillover effects on both large and small firms*" (OECD,1999a, p.8). A similar judgement stems from the European Commission: "*The key importance of business services lies in their dynamic links and their contribution to the competitiveness of EU industry. An important element in EU competitiveness policy is to promote intangible investments (knowledge creation, quality, innovation, management, etc.). Business services are often required to supply key elements of such investments*" (European Commission 1998).

A major negative externality of business services development on general economic welfare derives from this industry's own sluggish productivity development. A stagnating productivity development in a large sector like the BS industry could become a drag on economic growth. Efficiency stagnation in intermediary industries has economy-wide effects, because most transactions in the final goods market are preceded by several intermediary transactions. Low efficiency in business services markets causes too high prices, passed on downstream throughout the entire economy. Exactly this argument is mentioned in a report to the EU Industry Council. The EU Commission stresses that "*a great number of the cost pressures on the industry are generated not only within manufacturing, but in the service sectors. These input services to manufacturing are in many cases not competitive in Europe. The resulting negative downstream externalities effectively reduce the competitiveness of Europe's manufacturing industry*". The report adds that "*the most important obstacle to enhanced competitiveness of business services is represented by national market access restrictions*" (EU Commission Services, 1997). Business services have become a strategic sector in advanced economies.[45] Since BS industry has become a major source of intermediary inputs for all sectors in the EU economy, a lack of competition and cost efficiency in BS industry has economy-wide repercussions. Improving overall competitiveness and efficiency of BS industry may therefore strengthen this industry's contribution to overall European economic growth. Policy actions towards BS industry are still at a embryonic step so far as for many of other service activities as well (Rubalcaba, 2007).

How do positive and negative externalities of BS growth add up? Present data do not allow a cost-benefit quantification. If we look only at the overall effect of BS growth on macro-economic labour productivity, there are two diverging effects. The positive effect runs through the impact on client industries. The negative effect comes from productivity stagnation in the BS industry itself. A double-edged policy would therefore seek to improve the productivity-growth of the BS industry itself, while at the same time grasping opportunities to foster the productive impact of this sector for its client industries.

Market failure resulting from market power and monopolistic competition. Product markets in the BS sector differ in their competitiveness. Table 4.1 provides some EU-wide data on market structures. Markets for standardised products are relatively transparent, characterised by limited product differentiation, and product prices are important competitive tools. Table 4.1 shows the market position of the leading firms (at EU level) in relation to the position of all other companies. The market hybridity factor measures the gap between the average leading firm and the average 'other' firm. A salient difference emerges between the branches with client-specific and standardised BS

[45] This has been recognised by the European Commission (1998, 2003). Studies by Arnold et al. (2005) and Rutherford et al. (2005) confirm that improved productivity in intermediary services may be a crucial factor for productivity growth in others sectors of the economy.

products. When judged by the relatively small combined market share of the leading firms, markets for client-specific products are far more fragmented. It would seem that firms in the standardised business services branches are better able to exploit some scale economies. In most branches for standardised services products, a small number of large and often international firms together account for a sizable market share, often in the range of 20 to 50 per cent of the market. This opens up the possibility for strategic and collusive behaviour by leading oligopolists. Since the markets for standardised products are reasonably transparent, competition-surveillance authorities will probably be able to deal relatively easily with collusive behaviour.

Table 4.1 Hybrid market structure in European business services industries, 1992

Business services branch	Number of firms (x1000)	Number of leading firms	Combined market share (%) leading firms [b]	all other firms	Market hybridity factor [a]
Standardised services					
Inspection and control	5.0	20	18	82	69
Temporary work agencies	7.6	6	35	65	682
Security services	5.0	7	62	38	1165
Cleaning services	40.0	200	35	65	108
Car hire	12.0	5	50	50	2400
Other equipment rental	72.0	47	20	80	383
Client-specific services					
Management consulting	8.0	20	8	92	35
Legal services	200.0	15	2	98	272
Accounting/auditing serv. [c]	150.0	6	10	90	2778
Industrial engineering	15.0	10	7	93	113
Computer services	16.0	10	9	91	158
Market research	1.5	10	..	..	..
Advertising	20.0	13	55	45	1880

Notes: a) The market hybridity factor is calculated as the average market share of large, leading firms divided by the average market share of the small firms. b) Market share is based on turnover value. c) Data did not allow differentiation between simple administration shops and more knowledge-intensive services like certified accountants. Sources: data compiled by Rubalcaba (1999: 46, 430) from EU, Panorama of the EU Industry and industry sources; Kox (2002: 39).

A different story holds for BS branches characterised by client-specific business services. The existence of concentrated market shares is not a widely present market failure problem here.[46] The leading firms often have smaller combined market shares than in the markets for standardised business services products. Rather, market failure stems from the fact that these product markets are non-transparent and segmented, with prices playing a smaller role in competition. Distinctive knowledge-based inputs have come to be the key element in the reputations and competitiveness of firms in these markets for client-specific services.[47] Market segmentation occurs by region and by reputation of the provider. A proliferation of different product varieties is offered in different regional markets. Monopolistic competition, sometimes approaching localised monopolies, makes up the dominant form of competition.[48] A widespread complaint among users of these client-specific services is that the buyers find the tariff structure of the providers not very transparent. Buyers of knowledge-intensive services often have little insight into the real quality of the service providers, certainly not before buying the service. The standard market-failure problem that prices diverge from marginal costs, must necessarily occur whenever demand is not perfectly price-elastic (Eaton and Lipsey 1989). Since demand for client-intensive BS products is not perfectly price-elastic, market failures must be omnipresent here. Switching-costs on the clients' side lower the price-elasticity of demand and contribute to the opacity of these markets.[49]

Policy attention seems required for the lack of market transparency, and the prevalence of imperfect competition in knowledge-intensive business services branches. Some years ago already, the European Commission called on Member States to take steps to promote transparency in the supply and demand sides of the BS market (European Commission, 1998, pp. 15-17) but these actions remained largely ineffective till the effects of the Lisbon strategy leaded to a new Communication on the competitiveness of business-related services and their contribution to economic growth (2003); at that time some actions related to services started to be promoted within the Commission actions[50].

Market failure due to information asymmetry. Many knowledge-intensive business services products can be considered as credence goods, i.e. before and perhaps even shortly after purchasing the service, the client firm may not be able to judge its quality adequately. This creates information

[46] An exception may be the market for certified accountancy services, in which the international market is characterised by a small number of very large firms. However, due to lack of data, Table 4.1 is unable to distinguish this sub-market from that of the much more standardised administration services.

[47] Distinctive assets are often intangible in nature (cf. Eustace 2000), and as such it is difficult to separate them from the organisational fabric of the company and its workers.

[48] Balkanisation is the label used in industrial organisation theory for the proliferation of product varieties. In a survey article, Eaton and Lipsey (1989, p. 760) note: "*Market failure is ubiquitous in [...] models with balkanisation and localised competition since in free-entry equilibrium the position of each product is very much like [..] a natural monopoly*".

[49] Client firms necessarily invest labour time and other resources in identifying, communicating and sometimes jointly solving specific business problems with the external business services provider.

[50] E.g. the promotion of self-related standards on BS quality, the integration of service innovation in the EU innovation and R&D policies or the actions related to regional promotion of competitive business services (within the Structural Founds); these policy actions begun at the same time the COM747(2003) on business-related services was drafted.

asymmetry. The market-based correction mechanism for this problem is the reputation premium. A client firm has to rely on information on the business services firm's past performance. Basically, a reputation is nothing other than the expectation that an economic agent will act in the same way as he did in the past. BS firms with a proven reputation for being able to supply a high-quality service product can earn a price premium. The premium is a reward for time-consistent behaviour by the business services provider. Building up a broad reputation for being able to supply high-quality services products is a lengthy and precarious process. Reputations in the BS industry form implicit market-entry barriers, causing market segmentation. The established reputations of incumbents form a barrier to entering the premium segments of their market, with the reputation-barrier sheltering them from competition by newcomers. Hence, the reputation mechanism forms a barrier in the competition process, preventing direct competition between established, large incumbents on the one hand and new entrants or SME firms with local reputations on the other. In a market with reputation-based segmentation, increased entry of new firms in the market does not necessarily mean that the total BS market becomes more competitive, nor that incumbents have a stronger incentive to reduce X-inefficiencies, and exploit any possible scale economies in order to gain cost-price advantages. For client firms, the reputation mechanism means that they often pay too high a price.[51]

The general conclusion from this section is that the development of the European BS industry goes along with several market failures ─ social externalities, market power, information asymmetry and market non-transparencies ─ that may result in socially undesirable outcomes. This means that there may be a case for policy intervention in BS markets. The next question is for which market failures policy-intervention should perhaps be left in the hand of national authorities, and which elements deserve to be taken up at EU level.

[51] The clients may also have higher switching costs than necessary. In the case of proven reliability by a familiar business services supplier, client firms may 'put all their eggs in one basket' by purchasing other services from the same supplier without the latter being the best or the cheapest supplier. The problem of market failure as a result of asymmetric information creates additional market-information costs, and hence stands in the way of the most cost-effective business solutions.

4.2 Scope for EU-wide policies in business services markets

A few simple rules may help in deciding which policy interventions in BS developments are most appropriately made at the national level, and which issues might more auspiciously be tackled at the European level. The following criteria may help in delineating the most efficient policy level for dealing with issues related to market failures in business services:

- Does the issue at hand form a clear issue provided for in the *acquis communautaire* of the European Union?[52]
- Do the market failures in BS development have a common European dimension?
- For all other aspects: is there a positive reason to deviate from the subsidiarity rule that leaves policy intervention in principle at the level of Member States?

Creating a common ground for national BS firms in the Internal Market is a policy area where market failures may have a clear European dimension. A particular European challenge relates to the role of market integration and the elimination of obstacles in the Internal market for services. This is apolitical challenge that would allow European business services to compete in better positions and take advantage of wider and less fragmented markets.

Table 4.2 indicatively presents some market-failure issues that most likely pertain to particular elements in the *acquis communautaire*. Indicatively, because in the new 25-member Union there is likely to be debate between EU Member States on any specific policy interference.

European BS markets are still dominated mainly by domestic competition, as is shown in Figure 4.1. The IT consultancy, equipment renting and personnel-recruitment branches are the most exposed to foreign competition, while those most sheltered from foreign competition are accountancy and tax consultancy. The international firms active in these branches operate in specific market segments, but the overwhelming majority of firms report that they have only domestic firms as competitors. Nonetheless, increasing the exposure of domestic firms to foreign competition would probably result in a number of beneficial effects: more pressure to improve labour productivity, more product and process innovation. These positive externalities will have a European dimension. Innovation policies

[52] During the process of the enlargement of the European Union, the *acquis* was divided into 31 chapters for the purpose of negotiation between the EU and the candidate countries. Some of the relevant "Chapters" are: Free movement of persons, Freedom to provide services, Free movement of capital, Company law, Competition policy, Taxation, Statistics, Social policy and employment, Industrial policy, Small and medium-sized enterprises, Science and research, Telecom and information technologies, Culture and audio-visual policy, Regional policy and coordination of structural instruments, Consumers and health protection, Cooperation in the field of Justice and Home Affairs.

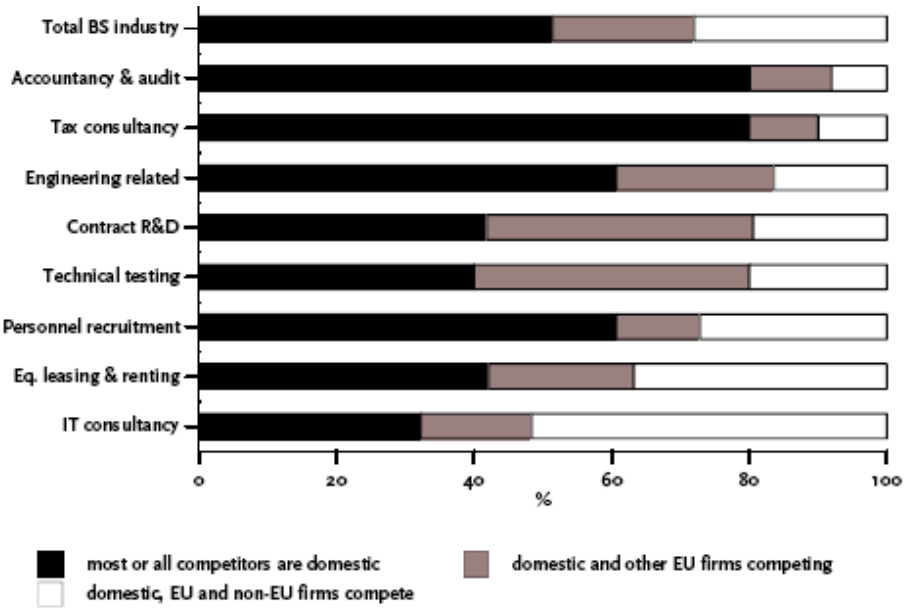
Table 4.2 Market failure issues in business services development and the acquis communautaire: indicative correspondence

Market failure type	Causative factor	Relevant elements of the acquis communautaire	Examples of relevant aspects
Information asymmetry	Non-transparency of markets for client-specific business services	Freedom to provide services Right of establishment	* Different national quality standards, intra-EU trade
		Competition policy	* Transparent price and tariff structure
		Consumers and health protection	* Quality guarantees law * Quality certification system * Reduce switching costs
Too few positive externalities	Market and system failures in innovation related policies	Science and research, enterprise innovation policy	* Orientation of tangible products and processes * Under-recognition of organisational innovation and other intangible elements
	Lack of intellectual property rights for BS products		* EU patent bureaucracy, innovation incentives
	Limited use of KIS	Small/medium sized enterprises	* Intensity of KIBS use
Too many negative externalities	Slow productivity growth of BS firms	Small/medium sized enterprises	* Permanent education SME firms * Administrative burdens SME * Preconditions for scale effects
		Education and training, Science and research, Industrial Policy	* Availability qualified personnel * Positive incentives for innovative start-ups
		Competition policy	* Abate market collusion * Transparent prices/tariffs
		Freedom to provide services	* Free movement firms EU * Opening up national markets
		Regional policy	* New regional policies oriented to innovation spillovers.
		Telecom and information technol.	* Communication infrastructure
	Employment in business services	Training and education	* Relevant skills and expertise for KIBS activities
		Regional policy, Social policy and employment	* Assist business services policies in new Member States

and the technology-transfer policies may have an unbeatable ally in business services. Business services produce innovative effects in companies and generate a change in the state of their

technological knowledge. However, at the same time, they are carriers of the most important technological advances in society. This makes them possible pivots in EU policies that seek to stimulate and disseminate innovations.

Figure 4.1 Exposure of domestic business services markets in the EU to international competition



Source: results of a European survey among BS firms. CSES (2001: 143).

Other policy areas that concern market failures with an EU-wide dimension include the protection of intellectual property rights and the creation of a system of innovation incentives for European BS firms. Though national preferences can play a role here, it is clearly in everyone's interest to prevent national systems from being set up according to a beggar-my-neighbour principle. The Kok Report (2004, 20) recognised the importance of business services, calling for sectoral policies: "business with a fast growth potential must be better supported" and for the role of knowledge-intensive services to be recognised among other key sectors.

The same holds for quality standards for BS firms: all EU Member States may gain by agreeing on the use of more mutual recognition and some harmonisation of national quality standards for BS firms. Foreign competition can be artificially suppressed by national regulations that offer shelter to domestic BS firms vis-à-vis foreign providers. Market regulations can operate as effective trade barriers, even if that was not the intention of the policy maker. In some knowledge-intensive business services, several market-affecting regulations are left that might function as effective non-tariff

barriers to imports and direct investment. In 1993, European industrial organisation specialists observed that service industries are highly affected by specific regulations, and that 'in many countries services are subject to more government interventions than most other activities' (Sapir, Buigues and Jacquemin, 1995). There has been some improvement since then, but the situation in the BS industry is still characterised by a relatively strong presence of market regulation by governments. The integration process of the Internal Market in an enlarged Europe may offer new opportunities to improve the qualifications and mobility of business service professionals. Ensuring competitive and transparent markets for business services is an issue that obviously has EU-wide elements, if only because part of competition policies must be based on European competition law.

For some other policy areas, such as promotion of BS employment, it is far from obvious that this is an area where European policies should prevail over national policy interventions. Since labour market conditions and industrial structure still differ considerably between EU countries, it might be more efficient if national policies have precedence over EU policies. Insofar as business services have constituted the most dynamic sector in job creation in recent years, an active job policy may be contributing to the acceleration of this market process in some countries. It might reduce current levels of unemployment. Jobs generated in the sector will in turn create indirect jobs through positive spillovers: more services and greater competition. Hence, there may be good reasons for national policies to enhance BS employment, e.g. by allowing more scope for part-time jobs, thus creating better conditions for women to take up jobs in BS firms. European policies in this area may be supportive to national policy efforts, but should not replace the latter.

A similar argument holds for removing rigidities in labour markets. The latter may disturb BS growth, because flexible working conditions appear to be a requirement for the growth of some business services branches. Flexibility encourages the appearance and expansion of advanced services, many of which develop with very little structure, part-time jobs and in conditions of high job rotation. If market rigidities are not removed, more BS jobs may migrate to low-wage countries. Given the specific national character of market failures in the relevant labour markets, national policies should – also here – have precedence over EU policies, except for those EU training programmes and similar already existing EU actions which could shape the needs of BS activities. The Kok Report (2004) calls, inter alia, for a re-examination of certain non-wage labour costs.

To sum up, an affirmative answer can be given to the question "Is there a need for EU-wide policies beyond what national governments do (or can do) to improve the market outcomes of national BS sectors?" There is certainly scope for EU-wide policies in this area, but dealing with market failures in BS development sometimes means that EU policies need to be formulated with a cooperative eye to Member States' national policies. This may pertain, for instance to quality standards, recognition of professional qualifications, and tax treatment of BS firms. Some policy issues, such as employment

policies for the BS industry, might perhaps more efficiently be left to the governments of EU Member States, although some Commission activities and policies could help to promote employment-related actions at regional and national level. In any case, there is no reason to exclude service-related policies in the existing EU policies, whether employment, innovation, internal market or competition they be. A need for shaping EU policies towards services, including business services, is still needed.

In conclusion, there is room for policy actions ─ at the national and the EU level ─ that boost and encourage the contribution of business services to economic growth. It is beyond the scope of this study to discuss in detail all the market failure items mentioned in Table 4.2. However several policy elements can be envisaged which will boost the role of business services in European economic growth. This may help to achieve some of the ambitious Lisbon goals with respect to employment, productivity and innovation.

References

Aiginger, K. (2001), "Speed of change and growth of manufacturing", in: M. Peneder et al., *Structural Change and Economic Growth*, WIFO, Vienna.

Antonelli, C., 1999. *The Micro Dynamics of Technological Change.* Routledge, London.

Arnold, J., B.S. Javorcik and A. Mattoo, 2006, *Does services liberalisation benefit manufacturing firms?* CEPR Discussion Paper 5902, Centre for Economic Policy Research, London.

Autor, D., F. Levy and R. Murnane, 2003, The skill content of recent technological change: an empirical exploration, *Quarterly Journal of Economics*, 118 (4), pp. 1279-1333

Baker (2007), The impact of business-services use on client industries: evidence from input-output data, in: L.Rubalcaba and H.Kox, eds., *Business services in European economic growth*, Palgrave MacMillan, forthcoming.

Baldwin, R. (2006), *Globalisation: the great unbundling(s)*, contributed paper to project Globalisation Challenges for Europe and Finland, Prime Minister's Office, Helsinki, 20 September 2006.

Baumol, W. (2007), On mechanisms underlying the growing share of service employment in the industrialized economies, in: M. Gregory et al., eds, *Services and employment: explaining the U.S.-European gap*, Princeton University Press (forthcoming), pp. 63-80.

Baumol, W. et al. (1989), *Productivity and American leadership. The long view*. MIT Press, London.

Baumol, W. (1967). "Macroeconomics of unbalanced growth: The anatomy of urban crisis". *American Economic Review* , June 1967 (57), 415-426.

Beyers, W.B. and D.P. Lindahl, 1996, Explaining the demand for producer services: is costdriven externalisation the major factor?, *Papers in Regional Science*, 75 (3), 351-74.

Blind, K., et al. (2003), *Patents in the Service Industries – Final Report*. Fraunhofer Institut für Systemtechnik und Innovationsforschung, Karlsruhe.

Boden, M., and I. Miles, eds., (2000), *Services and the Knowledge-Based Economy*. Continuum, London.

Burda, M. and B. Dluhosch (2000), *Cost competition, fragmentation and globalization*, CESifo Paper Nr. 393, Center for Economic Studies & IFO Institute for Economic Research, München.

Camacho, J.A. and M. Rodriguez (2007), Integration and Diffusion of KIS for Industry Performance, in: L.Rubalcaba and H.Kox, eds., *Business services in European economic growth*, Palgrave MacMillan, forthcoming.

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Coe, N.M., 2000, The externalisation of producer services debate: the UK computer services sector, *The Services Journal*, 20 (2), 64-81.

Clark, C. (1938), *Australian economic progress against a world background*, J. Fisher Lecture.

Collechia, A. (2001), *The impact of Information Communications Technology on output growth.* STI Working Paper. OECD, Paris

Crespi, F. (2007) IT services and productivity in European industries, in: L.Rubalcaba and H.Kox, eds., *Business services in European economic growth*, Palgrave MacMillan, forthcoming.

CSES (2001), *Barriers to trade in business services - Final report*, Report commissioned by the European Commission, Centre for Strategy & Evaluation Services / European Commission, Brussels.
De Bandt, J., 1999, The concept of labour and competence requirements in service economy, *The Services Journal*, 19 (1).
De Bandt, J., 1995, Indirect productivity of business services, through non-material investments, E. Felli et al. (eds), *The service sector: productivity and growth*, Physica Verlag, Heidelberg, 157-173.
Drejer, I. (1999), *Technological change and interindustrial linkages: introducing knowledge flows in input-output studies*, PhD dissertation, Aalborg University, Aalborg.
Eaton, B.C. and R.G. Lipsey, 1989, Product differentiation, in: R. Schmalensee and R. Willig (eds), *Handbook of industrial organization*, vol. I, North Holland, Amsterdam.
EC (2004), *Innovation in Europe - results for the EU, Iceland and Norway, data 1998-2001, 2004 edition*, European Commission / Eurostat.
EC (2003), '*The competitiveness of business-related services and their contribution to the performance of European enterprises'*. Communication from the Commission, COM(2003) 747. European Commission, Brussels.
EC (2003a), *Third European Report on Science and Technology Indicators - Towards a Knowledge-Based Economy*. European Commission, Luxembourg.
EC (2002a), *Europe's response to World Ageing: a contribution of the European Commission to the 2nd World Assembly on Ageing*, COM(2002) 143 FIN, Brussels.
EC (1998), *The contribution of business services to industrial performance: a common policy framework*, Communication from the Commission, COM(1998)534final, EU, Brussels.
European Commission Services (1997), *Industrial competitiveness and business services: report to the Industry Council*. Working Document IIIA.0/OGD(97)pw//bs/workpap.EU, Brussels.
ECB Task Force of the Monetary Policy Committee of the European System of Central Banks (2006), *Competition, productivity and prices in the euro area services sector*, Occasional Paper No. 46, ECB, Frankfurt.
ECORYS-NEI (2004), *Business Services: Contribution to Growth and Productivity in the European Union*, technical report prepared for the European Commission, Enterprise Directorate-General, Brussels
Edwards, B. and R. Starr (1987), A note on indivisibilities, specialisation and economies of scale, *American Economic Review*, 77 (1), pp. 192-194.
Eustace, C. (2000), *The intangible economy - impact and policy issues*, Report European High Level Expert Group on the Intangible Economy, European Commission, Brussels.
Feenstra, R.C. and G.H. Hanson, 1999, The impact of outsourcing and high-technology capital on wages: estimates for the United States, 1979-1990, *Quarterly Journal of Economics*, 114 (3), 907-940.
Fisher, A.G.B. (1939), Production, primary secondary, tertiary, in: *Economic Record*, vol.15 , June, 24-38.
Fixler, D. and Siegel, D. (1999), Outsourcing and productivity growth in services, *Structural Change and Economic Dynamics*, 10, 177-94
Francois, J. (1990), Producer services, scale and the division of labour, *Oxford Economic Papers*, 42, pp. 715-729.
Francois, J. and K. Reinert (1995), *The role of services in the structure of production and trade: stylised facts from a cross-country analysis*, CEPR Discussion Paper No. 1228, CEPR, London.
Fuchs, V. (1968), *The service economy*, Columbia University Press, New York.
Gadrey, J. and Gallouj, F. (1998) The provider-customer interface in Business and Professional Services. *The Services Industries Journal.* Vol. 18 (2), pp. 2-15.
Greenhalgh, C. and M. Gregory (2000), Labour productivity and product quality: their growth and inter-industry transmission in the UK 1979-90, in: Barrell, R., Mason, G., O'Mahoney, M., (Eds.), *Productivity, Innovation and Economic Performance*. Cambridge University Press, Cambridge.
Gregory, M., W. Salverda and R. Schettkat, eds. (2007), *Services and employment: explaining the U.S.-European gap*, Princeton University Press (forthcoming).
Griliches, Z. (1979), Issues in assessing the contribution of research and development to productivity growth. *Bell Journal of Economics*, 10, 92-116.
Grossman, G. and E. Rossi-Hansberg (2006), *The rise of offshoring: it's not wine and cloth anymore*, mimeo Princeton University, Lecture at Jackson Hole, August 25, 2006.
Grubel, H.G and M.A.Walker, 1991, The dominance of producers services in the US economy, *Banca Nazionale del Lavoro Quarterly Review*, vol. 1976, pp. 57-68.
Grubel, H.G., 1995, Producer services: their important role on growing economies, in: E. Felli et al. (eds), *The service sector: productivity and growth*, Physica Verlag, Heidelberg, pp. 11-41.
Guerrieri, P., B Maggi, V. Meliciani, and P.C. Padoan, 2005, *Technology diffusion, Services, and Endogenous Growth in Europe: Is the Lisbon Strategy Useful?*, IMF Working Paper WP/05/103, IMF Washington.
Hempell, T. (2002), *What's spurious, what's real? Measuring the productivity impacts of ICT at firm-level*. ZEW Discussion Paper 02-42. Center for European Economic Research, Mannheim.
Hicks, J. (1973), *Capital and time, a neo-Austrian theory*, Clarendon Press, Oxford.

Hill, T.D. (1977) “On goods and services”. *The Review of Income and Wealth*, vol. 4.
Hughes, A. and Wood, E. (1999), *Rethinking innovation comparisons between manufacturing and services: the experience of the CBR SME surveys in the UK*. Working paper, no. 140. ESRC Center for Business Research, Cambridge University, Cambridge.
Katsoulacos, Y., Tsounis, N., 2000. Knowledge-intensive business services and productivity growth: the Greek evidence, in: Boden, M., Miles, I. (Eds.), *Services and the Knowledge-Based Economy*. Continuum, London.
Klodt, H., R. Maurer and A. Schimmelpfennig, 1997, *Tertiarisierung in der deutsche Wirtschaft: Schwerpunkstudie zur Strukturberichterstattung fur den Bundesminister fur Wirtschaft*, Institut fur Weltwirtschaft, Kiel.
Kok, W. (2004) *Facing the challenge: The Lisbon strategy for growth and Employment. Report from the High Level Group chaired by Wim Kok.* November 2004. European Commission
Kox, H., G. van Leeuwen and H. van der Wiel (2007), Market structure, productivity and scale in European business services, in: L.Rubalcaba and H.Kox, eds., *Business services in European economic growth*, Palgrave MacMillan, forthcoming.
Kox, H. (2004), The contribution of business services to aggregate productivity growth, in G. Gelauff et al. (eds), *Fostering productivity growth – patterns, determinants and policy implications*, Contributions to Economic Analysis Series No. 263, Elsevier Science, Boston.
Kox, H., 2002, *Growth challenges for the Dutch business services industry: international comparison and policy issues*, De Swart / CPB (ISBN 90-5833-095-8), The Hague.
Kox, H., 2001, *Sources of structural growth in business services*. CPB Research memorandum No. 12, The Hague. (http://www.cpb.nl/eng/pub/cpbreeksen/memorandum/12/memo12.pdf)
Kutscher, R.E. (1988) Growth of services employment in the United States, in: Guile, B.R. and Quinn, J.B. (Eds.), *Technology in services: policies for growth, trade and employment*. National Academy Press, Washington DC.
Leiponen, A., (2001), *Knowledge Services in the Innovation System*. ETLA / SITRA, Helsinki.
Lesher, M. and H. Nordås (2006), *Business services, trade and costs*, TD/TC/WP(2006)32, OECD, Paris.
Leeuwen, G., van, and H. Van der Wiel (2003), *Do ICT spillovers matter? – Empirical evidence for the Netherlands*, CPB Discussion Paper 26, CPB, The Hague.
Lewis, J. (1988) Services post industrial transformation or flexible production, in: Marshall, J.N. (Ed.), *Services and uneven development*. Oxford University Press, Oxford.
Maddison, A., 2004, Macromeasurement Before and After Colin Clark, *Australian Economic History Review*, vol. 44(1), pp. 1-34.
Markusen, J. and B. Strand (2007), *Trade in business services in general equilibrium*, NBER Working Paper 12816, NBER, Washington.
Marsh, P. (2007), A new twist to India IT outsourcing, *Financial Times*, January 31st, p. 7.
Martini, M. (1990) *Implicazioni statistiche dell'analisi dei servizi resi alle imprese. Criteri di identificazione e classificazioni*. Internal Document of Eurostat, Luxembourg.
McCarthy, J.C., 2002, *3.3 million US service jobs go offshore*, Techstrategy Brief, Forrester Research Inc, Nov.2002.
Meade, J.E., 1955, *The theory of customs unions*, North Holland, Amsterdam.
Miles, I. (2007), Business Services and their Users: a literature review, in: L.Rubalcaba and H.Kox, eds., *Business services in European economic growth*, Palgrave MacMillan, forthcoming.
Müller, E. and R. Zenker (2000), *The contribution of knowledge-intensive business services to regional innovation capacities*. Fraunhofer Institute, Karlsruhe.
Nordhaus, W. (2002), Productivity growth and the new economy. *Brookings Papers on Economic Activity*, 2002(2). Brookings Institution, Washington.
O’Mahony, M and B. van Ark (2003), *EU productivity and competitiveness: an industry perspective. Can Europa resume the catching-up process?* European Commission, Brussels.
OECD (2003), *Science, Technology and Industry Scoreboard, 2003*, OECD Paris.
OECD (1999a), OECD (1999a) *Strategic business services*, OECD, Paris.
Oosterhaven, J. and A.R. Hoen, 1998, Preferences, technology, trade and real income changes in the European Union - an intercountry decomposition analysis for 1975-1985, *The Annals of Regional Science*, 32, 505-524.
Oulton, N. (2001), Must the growth rate decline? Baumol’s unbalanced growth revisited. *Oxford Economic Papers*, 53, 605-627
Pain, N. and F. Jaumotte (2005), *Innovation policies: innovation in the business sector - evidence on innovation determinants from the Community Innovation Survey*, ECO/CPE/WP1(2005)2/ANN4, OECD, Paris
Peneder, M., S. Kaniovski and B. Dachs, 2000, *External services, structural change and industrial performance*, Enterprise DG Working Paper, European Commission, Brussels.
Perry, M., 1992, Externalisation and the interpretation of business sector growth, *The Service Industries Journal*, 12 (1), pp. 1-17.
Perry, M. (1990) *Business services specialization and regional economic change*, Regional Studies, 24, 195-209.

Pilat (2007), Productivity in business services, in: L.Rubalcaba and H.Kox, eds., *Business services in European economic growth*, Palgrave MacMillan, forthcoming.
Pilat, D. and A. Wölfl (2005), *Measuring the interaction between manufacturing and services*, STI Working Paper 2005/5, OECD, Paris.
Pilat, D. and F. Lee (2001), *Productivity growth in ICT-producing and ICT-using industries: a source of growth differentials in the OECD?*, STI Working Papers, 2001/14. OECD, Paris
Rajan, A. (1987) *Services: the second industrial revolution?* Butterworths, London.
Rubalcaba, L. and H. Kox, eds. (2007), *Business services in European economic growth*, Palgrave MacMillan, forthcoming.
Rubalcaba, L. (2007), *The new service economy: challenges and policy implications for Europe*, Edward Elgar..
Rubalcaba, L. (1999), *Business services in European industry. Growth, employment and competitiveness*, European Commission, Brussels.
Sapir, A., P. Buigues and P.Jacquemin, eds. (1995). T*he coherence of European Policies on Trade Industry and Competition*, introduction Edward Elgar.
Savona, M. and A. Lorentz, 2006, *Demand and technology determinants of structural change and tertiarisation – an input-output structural decomposition analysis for four OECD countries*, BEPA Document de Travail 2006-01, Université Louis Pasteur, Strasbourg.
Schettkat, R. and L. Yocarini (2003), *The shift to services: a review of the literature*, IZA Discussion Paper no. 964, IZA, Bonn.
Stigler, G.J, 1951, The division of labor is limited by the extent of the market, *Journal of Political Economy*, 59.
Triplett, J. and B.Bosworth (2004), *Productivity in the U.S. Services Sector*, Brookings Institution, Washington.
Tschetter, J., 1987, Producer services: why are they growing so rapidly?, *Monthly Labor Review*, 110 (Dec.), 31-40.
Windrum, P. and M. Tomlinson (1999), Knowledge-intensive services and international competitiveness: a four country comparison, *Technology Analysis and Strategic Management*, 11 (3), pp.391-408.
Vernon, R. (1966), International investment and international trade in the product cycle, *Quarterly Journal of Economics*, vol. 80, 190-207.
Van Welsum, D. and G. Vickery (2006), "*The share of employment potentially affected by offshoring – an empirical investigation*," OECD Working Paper DSTI/ICCP/IE(2005)8, Paris.
Viner, J., 1950, *The custom unions issue*, Stevens and Son, London.
Van Welsum, D. and G. Vickery (2006), "*The share of employment potentially affected by offshoring – an empirical investigation*," OECD Working Party on the Information Economy Report DSTI/ICCP/IE(2005)8, Paris.
Van Welsum, D. and X. Reif (2005), "Potential Offshoring: Evidence from Selected OECD Countries," *Brookings Trade Forum* 2005, 165-194.
Wölfl, A., 2004. The interaction between manufacturing and services: some preliminary findings. DSTI Working Paper DSTI/EAS/IND/SWP/AH(2004)7. OECD, Paris.
Wölfl, A. (2003), *Productivity growth in service industries: an assessment of recent patterns and the role of measurement*, STI Working Paper 2003/7, OECD, Paris.
Zambon, S. et al., 2003, *Study on the measurement of intangible assets and associated reporting practices*, prepared for the European Commission (DG Enterprise), Ferrara/Melbourne/New York.