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Sectoral explanations of employment in Europe: the role of services

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Abstract

This paper investigates the determinants of the service sector employment share in the EU-15, for the aggregate service sector, four sub-sectors and twelve service sector branches. Recently, both Europe and the US have experienced an increase in the share of service-related jobs in total employment. Although converging in all European countries, a significant gap in the share of service jobs in Europe relative to the US persists. Understanding the main factors behind this gap is key to achieving higher employment levels in Europe. This paper focuses on the role of barriers in the EU-15 which may have hindered its ability to absorb labour supply and therefore to adjust efficiently to the sectoral reallocation of labour. We find that a crucial role in this process has been played by the institutional framework affecting flexibility in the labour market and by the mismatch between workers' skills and job vacancies.

JEL Classification: E24, J21, J23, J24, L80

Keywords: Services, sectoral adjustment, employment share, Europe, US, institutions in the labour and product market.

1. Introduction

Over recent decades most advanced economies have experienced a substantial change in their occupational structure, namely a transition from an industry-dominated to a services-dominated employment structure. The workforce employed in services continued to grow in developed economies during the second half of the 1980s and the 1990s; by the beginning of 2000 in several OECD countries about three quarters of employees were working in services[1]. Furthermore, job creation nowadays takes place almost exclusively in this sector.

Both Europe and the US have experienced a secular increase in the share of service-related jobs in total employment, as well as a reduction in the number of jobs in industry and agriculture. Furthermore, those European countries experiencing the lowest performance in service employment over the period 1970-1997 - such as Spain and Italy - are also the countries suffering the largest increases in total unemployment (Lopez-Garcia, 2003). While convergence of the service employment share towards the US level has been recorded in all the European countries, significant differentials still persist. Understanding the main factors driving the gap relative to the US and across EU countries is one of the focal concerns of policy makers and a key point in achieving higher employment levels in Europe.

The literature on the poor employment performance in Europe over the last decade – both in absolute terms and in comparison with the US – has mainly focused on the role played by labour market institutions and their interactions with macroeconomic shocks (see, for instance, Blanchard and Wolfers 2000). This line of research puts little – if any – emphasis on the sectoral dimension. This aspect is increasingly believed to be crucial**,** and yet no commonly agreed explanation of the mechanisms behind employment in services has been provided so far. Whilst building on previous (theoretical and empirical) work on the topic - thereby taking into account the main determinants suggested in the literature to date – this paper investigates additional hypotheses which to the best of our knowledge have not previously received attention. Alongside a "core" of variables whose impact on the employment share in services is confirmed to be significant and fairly stable over time (namely per-capita income, the productivity differential between services and manufacturing, and the real public consumption), the impact of other potentially relevant factors is also tested. More specifically, the presence of adjustment barriers associated with the shift from manufacturing to services may have hindered the ongoing process of sectoral reallocation of the workforce. In this context, a crucial role may have been played, on the one hand, by the institutional framework affecting labour and product

[1] see OECD (2000).

market flexibility and, on the other hand, by the mismatch between workers' skills and job vacancies reflecting the adaptability of the workforce to the sectoral change.

The remainder of the paper is organised as follows. The next section presents the main stylised facts on service employment in the US and in the EU-15 countries (excluding Ireland and Luxembourg). The determinants of the increase in the service sector employment share as suggested in the literature to date are reviewed in section 3. The results of our econometric model - estimated for the aggregate service sector, for four sub-sectors and twelve branches - are then presented (section 4), followed by the investigation of the determinants of the US-Europe gap in the employment share (Section 5). Some policy considerations conclude.

2. International trends in the service sector employment share: some facts

The percentage of workers employed in the service sector steadily increased over the last three decades both in Europe and the US (Fig. 1). This rising trend - in absolute terms and relative to industry and agriculture - is shared by all the European Union countries, with the US systematically recording the highest share of service sector employment (Table 1)[2].

In all the countries considered, job creation increasingly occurs in the service sector, and in 2001 the level of the employment share in services was more than double that recorded in industry and agriculture. Despite Europe experiencing a long period of growth in its service employment share relative to the US, full convergence has not yet been achieved. The gap relative to the US service sector employment share is lower than the EU average for Belgium, Denmark, France, Luxembourg, the Netherlands, Sweden and the UK, and is higher for Greece, Spain, Italy, Austria, Portugal, Finland and Germany (table 2) [3].

A breakdown of the service sector into a finer classification further highlights the differences in service employment shares between European countries and the US. According to revision 3 of the International Standard Industrial Classification[4] (ISIC), total service employment is divided into four

[2]This increase in the share of the workforce employed in services may in part be due to the practice of manufacturing industries to increasingly outsource their service activities. In this case, since National Accounts define firms according to their main product, the higher share of employment in services would emerge merely as the result of the reallocation of activities. On the importance of taking into account changes in firms' organization, particularly the practice of contracting out, see for instance Elfring (1989). According to Greenhalgh and Gregory (2001), Russo and Schettkat (1999, 2001) and Petit (1986), outsourcing from manufacturing has in fact increased; however, they find that this effect is not sufficient to explain the trend towards service sector employment, as well as the difference in the share of service sector employment between the US and Europe. That also seems to be confirmed by the upward trend in the share of "white collar" jobs (OECD, 2000).

[3] Data on service employment rate in Europe show an even higher negative gap relative to the US, due to the strong increase in the US employment to working age population ratio.

[4] see Annex 1.

main sub-sectors: wholesale, retail trade, restaurants and hotels; transport, storage and communication; finance, insurance, real estate and business services; community, social and personal services. Although not exactly overlapping, the ISIC classification broadly corresponds to the grouping in four service activities - namely personal, distributive, producer and social services – proposed in Singelmann (1978) and Elfring (1988). Table 3 and 4 show that:

- In Europe and in the US - around 30% of service employment takes place in wholesale and retail trade, restaurants and hotels (Table 3) and that, relative to the US, all the EU countries show a negative employment share gap over the whole period 1970-2001 (Table 4). A further breakdown (Table 8) shows this negative gap to be entirely due to wholesale and retail trade. The hotels and restaurants sub-sector exhibits a positive employment share gap versus the US, which is relatively high for Austria, Spain and Greece.
- Transport, storage and communication - accounting for around 10% of service sector employment in Europe and the US - displays a small but positive employment share gap with the US in all countries except Portugal, which is mainly accounted for by the branch transport and storage (Tables 5 and 8).
- Finance, insurance, real estate and business services employ around 20% of the total service sector; three countries in this sub-sector (UK, the Netherlands and Luxembourg) seem to have recently performed better than the US (Table 6). On the other end of the spectrum, Austria, Spain, Finland, Greece and Portugal present a large negative employment share gap relative to the US, which is well above the -2% recorded on average in the EU; Belgium, Germany, Denmark, Italy and Sweden display a more modest gap. The negative gaps tend to be somewhat more substantial in real estate, renting and business activities (Table 8).
- Finally, the remaining 40% of service sector employees for the US and UK are found in community, social and personal services. A number of countries, notably Germany and Italy, show a negative employment share gap relative to the US, which tends to narrow over time. Belgium, Denmark, Finland, France and Sweden have reversed the sign of their differential and at the end of the 1990s experienced a large positive employment gap relative to the US (Table 7). These negative gaps are largely driven by the public administration and health and social work branches (Table 8).

3. The determinants of employment in services: an overview of the literature

The first literature on the sectoral distribution of employment dates back to the works of Fisher (1935) and Clark (1940). Clark (1940) qualifies the movement of labour from agriculture to manufacturing, and from manufacturing to commerce and services, as "the most important concomitant of economic progress". More specifically, growth in the service sector is mainly explained as the result of shifting income elasticities of demand, in the process later known as the 'hierarchy of needs' (Appelbaum and Schettkat 2001). As economies grow richer, tastes switch away from the basic needs of food and shelter towards non material goods, including services. In other words, the increasing service employment share recorded in post-industrial economies could be the result of rising per capita income levels[5].

In 1967, Baumol identified the key theoretical foundation for the expansion of service sector employment - the slower productivity growth in services compared to manufacturing[6]. According to what became later known as "Baumol's disease", the expansion of the employment share in services relative to industry is the direct consequence of services' lower productivity performance. The theory argues that as a result of this productivity differential, if the relative level of output in industry and services is maintained, an ever increasing proportion of the labour force must be channelled into service activities. The existence of this effect leads to the "paradox" of the service sector[7]. The model of Baumol (1967) has remained one of the principle theories on service sector employment[8]. An interesting extension to this work is provided by Oulton (2003), where also the supply of intermediate

[5] Supporters of the income effect have compared the output of richer and poorer countries, finding a positive relationship between wealth and the share of services in GDP. However, it has been argued that this effect disappears if one allows for the higher relative prices of services in richer economies – and that 'real' service sector shares may not bear relation to a country's level of prosperity. Along this line, a number of studies find that the share of services in real output remained constant as per capital income rises. See, for instance Summers (1985), Baumol, Blackman and Wolff (1989) for the US 1947-1976, Ramaswamy and Rowthorn (1997) for the US, Japan and Europe as a whole 1960-1994.

[6] The nature of several service activities, which cannot be automated and have to go through set standardised processes (e.g a doctor's diagnosis, a live orchestral performance), is behind the relatively stagnant productivity growth in the service sector. According to Baumol (2001), while some services (e.g. postal delivery times, rubbish collection) may have benefited from technological advances and many in particular from computerisation (particularly in the financial industries), he argues that so far, these productivity gains had been modest, whilst in other services no significant sources of productivity gains can be identified (e.g care of the elderly).

[7] Baumol (1967) argues that as technical progress in the industrial sector increases, wages will rise; if wage increases at the same or similar rates across sectors, labour cost per unit will remain constant (or even decrease) for manufacturing goods, but will exponentially rise in the lower productivity service sector, thereby leading to strong increases in service sector prices (the only possibility to halt this mechanism is to isolate the labour markets of each sector and freeze wage increases in services – arguably unrealistic). The paradox lies in the fact that despite the increasing relative cost/prices of services, the demand for services persists. Baumol (2001) links this to the fact that some services simply cannot be produced more cheaply; that some are provided by the government so that price increases are not observed first hand by the consumer; and that people consider some services critical for their well-being.

[8] Baumol (2001) identifies the strong existence of the cost disease for a number of service areas (e.g health care, education, legal services, police protection, restaurant services, car repairs) over the period 1960 to 1993 in the US, Japan, Canada, France, Germany and the UK, although to varying degrees.

service goods is considered. Oulton (2003) finds that a shift of primary inputs such as labour or raw materials from industry to intermediate service production increases the economy's productivity rate as long as the service sector has some positive productivity growth, however small[9].

Further explanations for the increase in service sector employment may be found in the empirical literature. Fuchs (1980) concludes that a significant proportion of the increase in service sector employment is due to the increased labour market participation of women, the effect being driven by both income and especially substitution effects of the choice between home and market work. Erdem and Glyn (2001) find that - in both the US and Europe - since 1973 female labour supply, rather than capital accumulation, was most important for service employment. A few papers also consider factors such as the role of international trade and outsourcing on service sector employment growth, but the evidence gathered to date is inconclusive.

In consideration of the reasons for the relatively slow service employment growth in Europe, the above contributions would suggest that productivity differences between the industrial and service sector have not been as great in Europe as in the US or - alternatively - that the expansion in female labour supply has not been so strong. These may in fact be part of the story. However, there may be other influences playing a more important role in the European context, and which may help to explain the observed differences in service sector shares across countries at similar stages of development. For example, any discussion of the determinants of employment within the European context needs to consider the role played by the institutional setting. A number of studies of European labour markets have identified a significant effect of labour market institutions - such as the generosity of the unemployment benefit systems, the employment protection legislation (EPL), the degree of unionisation, the level of taxation - on aggregate unemployment[10]. Bertola (2001) argues that institutional constraints – such as high non-employment benefits, legal minimum wages, centrally negotiated employment contracts, high tax wedges - may prevent the creation of low-wage jobs[11]. Others have found a positive effect of the interaction between labour market institutions and economic

[9] Russo and Schettkat (2001) find evidence of a significant increase in final demand, an increase in the demand for services from the manufacturing industry and an increase in the demand of intermediate services in the production of services as explanations for employment growth in the US and Europe.

[10] See, for example, Nickell (1997), Elmeskov et al. (1998), Nickell and Nunziata (2000), Nunziata (2002).

[11] These institutions have been found to truncate the lower end of the low wage job distribution in countries with high labour productivity and wage dispersion (e.g. Spain, Italy, Germany), and particularly to reduce female labour participation. Furthermore, Bertola (2001) argues that contractual arrangements tend to prevent wages adjusting to local labour market conditions – resulting in low incentives for regional mobility.

shocks on the European unemployment rate[12]; a survey of a number of the key hypotheses and developments in this field is provided in Bertola (2001).

This literature may be relevant for explaining the slower growth of services in Europe relative to the US if it is the case that the institutional design in Europe has somehow prevented the setting up of new businesses and the flow of jobs to the service sector. According to Rogerson (2003) "the key to understanding the deterioration of employment rates in Europe relative to the US is the failure of Europe to move workers into the service sector". Consistent with this reading is the work by Erdem and Glyn (2001) where it is shown that after 1973, inactivity in Europe rose much more than in the US for men and fell much less for women – accounting for two thirds of the relatively slow employment growth in Europe. They argue that service sector employment acted like a "sponge" – persistently expanding more where labour supply had been plentiful. This implies that where labour supply within Europe was inhibited through institutional rigidity, then relatively limited growth in service sector employment may also have resulted.

4. The econometric analysis

4.1 The model

In order to study the impact of macroeconomic and institutional factors on the service sector's employment share we estimate a simple panel data model for an unbalanced sample of 13 EU countries[13], over the period from 1970 to 2003 (depending on the specification). We consider the following pooled regression model:

$$y_{it}=c+\beta x_{it}+u_{it} \qquad i=1\ldots N \qquad t=1\ldots T_i \tag{1}$$

$$u_{it}=\alpha_i+\varepsilon_{it} \tag{2}$$

where ε_{it} is assumed to be normally distributed and such that

$E(\varepsilon_{it})=E(\alpha_i)=0$

$E(\varepsilon^2_{it})=\sigma^2 \qquad E(\alpha^2_{it})=\sigma^2_{\alpha} \qquad E(\alpha_i\varepsilon_{jt})=0 \qquad \forall\, i, j, t$

$E(\varepsilon_{it}\varepsilon_{js})=0 \qquad if\ t\neq s\ or\ i\neq j$

$E(\alpha_i\alpha_j)=0 \qquad if\ i\neq j.$

[12] See, for instance, Blanchard and Wolfers (2000), Belot and van Ours (2000, 2001).

[13] EU-15 excluded Ireland and Luxembourg.

N is the number of countries (up to 13 countries) and T_i is the sample length in country i. The left hand side variable y_{it} is the $((T_1+...+T_N)\ x\ 1)$ vector of employment shares, while x_{it} is the $((T_1+...+T_N)\ x\ K)$ matrix of macroeconomic and institutional determinants. Furthermore, the fixed effect α_i is assumed to be randomly distributed across the cross-sectional units, as confirmed by the results of the Hausman's (1978) test.

The model was first estimated by Feasible Generalized Least Square (FGLS)[14]. However, the diagnostic statistics on residuals confirmed the presence of autocorrelation[15]. We therefore estimated a second specification in which autocorrelation in the error term is allowed. In particular, it is assumed that:

$$\varepsilon_{it}=\rho\varepsilon_{it-1}+\eta_{it} \qquad (3)$$

where $|\rho|<1$ and η_{it} is independent and normally distributed with

$E(\eta_{it})=0$

and

$E(\eta^2_{it})=\sigma^2$.

The model is estimated using the GLS estimator proposed by Baltagi and Wu (1999).

4.2. Results

Previous empirical studies have focused on the possible role played by a number of variables in determining service sector employment, for the aggregate, as well as - in the attempt to draw a comprehensive picture - its sub sectors. In particular, based on the analysis of a sample of OECD countries from 1984 to 1998 in four service sub-sectors, OECD (2000) finds that the employment share in services is mainly affected by per-capita income, the size of the welfare state and by female participation. The same study identifies a significant role of some labour market institutions, namely the strictness of employment protection legislation and the degree of centralisation of wage bargaining. Estimation is carried out by selecting a core model, which includes only a limited number of determinants, and by gradually adding other potentially relevant determinants. This same approach - i.e. selecting a basic model and then testing the significance of additional determinants - is followed in Messina (2004), where the focus is a sample of 27 OECD countries from 1970 to 1998 (five-years

[14] A drawback of the random effect model is that it assumes no correlation between the country specific effect α_i and the explanatory variables x_{it}. To overcome the problem, Mundlak (1978) proposed another estimation method within the random effect model framework. To assess how strict the orthogonality condition is, we also estimate the random effect model in the Mundlak version; the results do not change significantly.

[15] Some of the variables used in the analysis have a clear trend over time; we do investigate on its nature, i.e. stochastic or deterministic. Usual tests do not reject the hypothesis of stationary residuals, hence the consistency of our estimates.

averages). As in OECD (2000), Messina finds a positive impact of per-capita income and the size of the public sector on service employment, together with the productivity gap between services and manufacturing, the rate of investment, the degree of urbanisation, and the administrative burden on the creation of new firms. In contrast to OECD (2000), Messina finds that female participation does not play a significant role in service sector employment. The same applies to the employment protection legislation; however, other indicators of labour market institutions – notably, the degree of unionisation and of wage setting coordination – are found significant.

While building on these previous econometric studies, we extend the analysis in three directions. First, the panel estimation is here carried out for both the total service sector and its breakdown up to the second digit of the ISIC classification; this amounts to a total of four sub-sectors and twelve branches. While on the one hand testing the significance of regressors in specific service sub-sectors may blur the broad picture, on the other hand the likely determinants of the employment share are hardly significant when tested at the aggregate level. The reason for this lies in the high degree of heterogeneity characterising the set of economic activities grouped under the general heading of the service sector. Because of this heterogeneity some factors may only affect one specific sub-sector, or alternatively - when several activities are involved – may affect different branches differently and/or in such a way that their impact tend to cancel out for the aggregate. Second, we analyse a broader set of determinants. Third, an analysis of the factors driving the gap between the European and the US employment share is carried out. The results are presented in Tables 9 to 13[16].

4.2.1. The basic model

Following the same logic of the empirical contributions discussed above, we identify a core set of variables whose impact on employment in services results significant and stable across specifications. This includes GDP per capita and the gap in productivity between manufacturing and services; furthermore, we include an additional term in order to capture short-run fluctuations which may be an important component of employment share dynamics. When controlling for this cyclical effect, the strong positive correlation between the employment share and per capita income is confirmed across all specifications, for both the total and the main service sub-sectors. Our results also confirm that a decrease in productivity in services relative to manufacturing is associated with a higher service

[16] The causal relation between the dependent variable and its determinants is not always obvious; it should therefore be interpreted with caution. For a description of variables and data sources, see Annex 2. For the full set of results, see Annex 3.

employment share[17]; however, interestingly this effect seems to be smaller in magnitude than our indicator of total output.

In order to explain the differences in service employment shares across countries at similar income levels and productivity growth rates, the role of other, potentially relevant, determinants is also analysed. First, in many EU countries a large contribution to service employment growth comes from social services, which are largely provided or subsidized by the government. Along this line, our specification includes real government consumption as a measure of exogenous internal demand. Results for both total services and the majority of sub-sectors support the hypothesis that public sector demand has a positive and significant impact on employment growth in the service sector. The explanatory power of this variable is relatively strong in community, social and personal services, in post and telecommunications, and in the real estate, renting and business activities[18].

4.2.2. The impact of labour and product market institutions

As a further step, we focus on the possible role played by institutions in labour and product markets.

We first test the hypothesis that a number of labour market institutions such as union activity and employment protection legislation affect the service sector employment share. Two different dimensions of union activity – namely the degree of wage centralisation and union density – are analysed. The first is intended to capture the level at which wage bargaining takes place. Some literature argues that highly centralised unions may be more concerned about issues of national inflation and competitiveness, which may result in restrained wage changes. Highly decentralised wage bargaining may also result in more restrained wage changes with wages more closely linked to labour productivity, or concerns over firm competitiveness, playing a stronger role in wage decisions. On the contrary, whereas centralised unions may not be able to capture sector specific rents, unions at a sectoral level may be more successful in translating monopoly rents and productivity increases into wages. This suggests the hump shape relationship between union centralisation and wages described in Calmfors and Driffil (1988). The increased magnitude of wage changes may have negative implications for the rate of employment. We therefore include a centralisation squared term in our analysis to test the concavity of the effect of the degree of centralisation of wage bargaining on the

[17] Following Baumol (1967), the differential in productivities has two opposite effects. On the one hand, for a given output mix a slower productivity in services relative to manufacturing increases the service employment share due to the differential in labour requirement. On the other hand, slower productivity in the service sector increases relative service sector prices, thereby inducing consumers to substitute services with goods. This last effect would be reflected by an increase in the demand for workers in manufacturing relative to services.

[18] In order to account for possible decreasing returns to public spending, we estimated the model including a squared term. The hypothesis of a significant inverse u-shaped impact of government consumption is rejected for most of service activities.

service sector employment share. Results on the centralisation variable and its square reveal a significantly U-shaped relationship between the level of national wage bargaining and the total services employment share suggesting that employment in services is highest in fully centralised or decentralised systems. At a lower level of aggregation, this variable is significant for ISIC 65-74 (finance, insurance, real estate and business activities) and for ISIC 50-55 (wholesale and retail trade, restaurants and hotels).

The second of our labour market indicators captures the degree of union density. The idea behind this is that the greater the degree of union density, the higher the proportion of national employment that may be affected by wage bargaining decisions, and hence potentially the stronger the impact on service sector employment[19]. Our results generally show a negative effect of the rate of national union density on the service sector employment share, which is strongly significant for total services. Results by sub-sector show this variable to be less important in a number of branches. A relatively strong negative effect of union density is found for finance and insurance, in wholesale and trade, and hotels and restaurants. This result, particularly for branches such as hotels and restaurants, supports Gordon (1997)'s suggestion that wage compression introduced by unions in Europe has cut back jobs in the lower end of the skill distribution within European service sectors.

Two variables capturing the degree of national employment protection legislation (EPL) are also included in our analysis, the first measuring the degree of EPL for regular contracts and the second for temporary contracts. Relatively strict legislation may in fact hinder the reallocation of employment and thus have a significant impact on the development of the service sector employment share. Under strict employment protection legislation, dismissals are costly, and employers fill vacancies only with well matched employees. This has the effect of reducing hires in cyclical upturns. Firms will also tend to reduce fires during downturns in the presence of high dismissal costs. Hence, employment protection regulation tends to reduce inflows into unemployment, reducing short-term unemployment, but by reducing hires, also increases long-term unemployment and sets insufficient incentives for employment adjustment in response to cyclical and structural changes. Our results suggest that relatively strict national EPL on regular contracts has a significantly negative effect on service sector employment in finance, insurance, real estate and business activities, and in education, while less important seems to be the impact of EPL on temporary contracts.

Moving to product market institutions, following Paloma Lopez-Garcia (2003) the presence of start-up costs (in particular, administrative burdens on the creation of new companies) may increase the cost of

[19] A better measure would be union coverage, which would take into account both union membership and non-members covered by union bargaining arrangements. Unfortunately comparable time series measures of union coverage for all of the countries in our panel dataset are not available. For countries with a low membership rate, but high coverage rate (e.g France) our measure may therefore underestimate the effect of the union bargaining presence on the service sector employment share.

entering the market (especially by small/medium sized enterprises) and hinder services' growth in Europe vis-à-vis the US, thereby creating bottlenecks in the process of shifting the sectoral composition of production from manufacturing to services. The empirical work produced on the macroeconomic impact of product market regulations makes an extensive use of the OECD aggregate indicators produced by Nicoletti et al. (2000), while more limited is the information available at the sectoral level. Although extensive and, in practice, a unique source of information about regulatory framework, the OECD indicators present some limitations and the results of the econometric analysis may become questionable when their impact on specific sectors is tested. This applies in particular to the product market indicators. We find that the OECD indicator of product market regulation (which includes both the administrative burdens on start-ups and the regulatory and administrative opacity) is never significant[20] in our estimates except for ISIC 60-63 (transport and storage). In this case results should be interpreted with some caution, since this indicator covers only the retail distribution, transportation and telecommunications activities, and is only available for two years.

4.2.3. Skill mismatch

Finally, one may argue that a reason for Europe's inability to absorb workers released from agriculture and industry could be the degree of mismatch between labour supply and job vacancies associated with the growing role of services. Over recent decades, there has been a change in the composition of the workforce – by qualification and skill level - associated with the change in the sectoral composition of production. The introduction among the explanatory variables of the vacancies to unemployment ratio as an indicator of tightness of the labour market, as well as a complementary indicator of educational attainment[21], aims to test the hypothesis of a lack in the flexibility of labour supply in Europe, in particular in its ability to match the skills of the workforce with the skill requirements of the service sector in response to a sectoral shift. Consistently with the characteristics of the workforce employed in the different sub-sectors, the first mismatch indicator (in the tables called "vacancies") has a significant impact on the aggregate employment share. Furthermore, the skill level of the labour force – here proxied by the average years of schooling – has a positive and significant impact on the total employment share, particularly in producer services. On the other hand, consistent with its nature of generating mainly low-skilled and low-paid jobs, neither the mismatch nor the educational attainment indicators seem to play a role in affecting the employment share in the personal services sector.

[20] That is in fact the case in OECD (2000).

[21] An economy with a relatively large endowment of skilled human capital might be expected to employment a relatively high share of its workers in the service sector.

5. An investigation of the service employment share gap in Europe vis-à-vis the US

Understanding the main factors driving the gap in service sector employment between Europe and the US is one of the focal concerns of policy makers in achieving higher employment levels in Europe. This section therefore turns to this gap for a closer consideration of whether macroeconomic determinants (such as productivity gaps, cyclical variation and differing levels of government spending) or the role of other factors (such as those related to the institutional framework), might have played a stronger part in explaining the differential service employment share.

We base this analysis on the following equation

$$Y_{US_t} - Y_{EUR_{it}} = \alpha + \eta(X_{US_t} - X_{EUR\,it}) + \gamma_{it} \qquad t=1\ldots T_i \quad i=1\ldots N \qquad (4)$$

with $\gamma_{it}=v_i+r_{it}$ and $r_{it}=\delta r_{it-1}+\sigma_{it}$

The model is again estimated using the GLS estimator proposed by Baltagi and Wu (1999). N denotes the number of countries and T_i is the sample length in country i. The left hand side variable $Y_{US_t} - Y_{EUR\,it}$ is a $((T_1+\ldots+T_N)\ x\ 1)$ vector of the difference in the employment share between the US and each of our European countries. The left hand side variable $(X_{US_t} - X_{EUR\,it})$ is a $((T_1+\ldots+T_N)\ x\ K)$ matrix of the difference in the same macroeconomic and institutional determinants - as considered in model (1) above -between the US and each European country.

We test the significance of the same alternative specifications presented in section 4, for the aggregate service sector and the four main sub sectors, with the exclusions of the specifications including the degree of centralisation of wage bargaining and the vacancy to unemployment ratio, due to the unavailability of comparable data for the US[22].

Tables 14 to 16 present the results of this investigation. The first notable finding is the significant and stable contribution of a number of our core set of variables to the US-Europe service sector employment share gap. The differential in GDP per capita and the differential in government consumption both contribute strongly and positively to the positive US-Europe employment share gap in the aggregate service sector and three of the main sub-sectors, and negatively and significantly to the negative US-Europe employment share gap in transport and storage sub-sector. This result highlights the importance of economic growth for job creation. It supports the hypothesis that the increase in per capita income and public consumption levels in Europe relative to the US over the recent decade have positively contributed towards decreasing the employment share gap in the aggregate service sector between the two continents.

[22] The Checchi and Visser (2002) index of union centralisation is not available for the US. The most comprehensive information available on vacancies for the US is the "Index of help wanted advertising in newspapers" constructed by the conference board. However, this is an index based on the total vacancies, rather than unfilled vacancies, and is therefore not sufficiently comparable to the vacancy information available for Europe.

The US-Europe gap in productivity between manufacturing and services is also found to be a significant determinant of the employment share gap, although less important in terms of its magnitude than per capita income or government consumption differentials. It negatively contributes to the positive employment share gap in the aggregate service sector, and in the social and personal services sub sector. This result indicates that the falling relative productivity in the aggregate service sector in Europe versus the US in recent years should have also contributed to the closing gap between US and European service sector employment shares.

There is also some evidence that the institutional framework in Europe has an important role to play in the expansion of service sector employment in Europe relative to the US. Tables 15 and 16 show that US-Europe skill differentials significantly affect the employment share gap in two sub sectors - transport, storage and communications (a negative effect on the negative gap) and finance, real estate and communications (a positive effect on the positive gap). A wider differential between the US and Europe in the degree of union density significantly influences the US-European employment gap in three service sector sub-sectors, higher average union density in Europe increasing the US employment share advantage in wholesale and retail trade and decreasing the European employment share advantage in transport, storage and communications. The positive effect of the differential in the degree of union density on the US-Europe employment share in Community, social and personal services may be being driven by a higher rate of union density in the US than in Europe in this sector. There is also some significant evidence of strict EPL on either regular or temporary contracts reinforcing the positive US-Europe employment share gap, both within the aggregate service sector and across three out of four of the sub-sectors. Finally, the lower level of barriers to business start-up is found to increase the positive US-European employment share gap in most sectors, although this effect is never significant.

These results suggest that structural policies to increase the human capital content of the workforce and to reduce rigidities in the labour market are supportive of job creation and increased employment in the services sector. Accordingly, policies implemented in these areas in the EU over the last decade in the context of the European Employment Strategy will have contributed to the catch up of the European employment share with the US. However significant gaps between the US and Europe in a number of these structural factors persist. Work by, for example, the OECD (2004a) highlights the dramatically lower levels of employment protection legislation and unionisation in the US relative to Europe. Studies such as OECD (2004b) show that whilst some European countries such as the UK and Sweden hold amongst the highest first university-level degree completion rate of OECD countries, and many countries have seen a rise in the average education levels of their citizens over the past decade, low educational attainment levels remain a particular concern in Greece, Ireland, Italy, Portugal and Spain. Our analysis confirms the importance of addressing these remaining institutional and skill

differentials to close the US-Europe service sector employment share gap, and more generally, to increase overall employment levels in Europe.

6. Conclusions

Over recent decades most advanced economies have experienced a substantial change in their occupational structure, namely a transition from an industry-dominated to a service-dominated employment structure. While convergence of the service employment share towards the US level has been recorded in all the European countries, significant differentials still persist. Understanding the main factors driving the gap relative to the US and across EU countries is one of the focal concerns of policy makers and key to achieving higher employment levels in Europe.

This paper first investigates the determinants of the service sector employment share for 15 European countries, for the aggregate service sector, four sub sectors and twelve service sector branches. Results show that, when controlling for the cycle, the strong positive correlation between the employment share and per capita income is confirmed across all specifications, for both total services and single sub-sectors. Our results also confirm that a decrease in productivity in services relative to manufacturing is associated with a higher employment service share; however, interestingly this effect seems to be smaller in magnitude than our indicator for final demand.

Alongside this "core" of variables we test the impact of other potentially relevant factors. An important role in service sector employment results to be played, on the one hand, by the institutional framework affecting the degree of flexibility in the labour market and, on the other hand, by the mismatch between workers' skills and job vacancies affecting the adaptability of the workforce to the structural change. A number of other labour market institutions such as union activity and employment protection legislation are found to have a significant affect on the size of the service sector employment share. Results on centralisation of wage bargaining show a significant U-shaped relationship between the level of national wage bargaining and the total service employment share. We find a significant impact of the vacancies to unemployment ratio to the aggregate employment share. Furthermore, the skill level of the labour force – here proxied by the average years of schooling – has also a significant impact on the service employment share, particularly in producer services. Neither the mismatch nor the educational attainment indicators seem to play a role in affecting the employment share in the personal services sector. Finally, we do not find evidence supporting the hypothesis that start-up costs play a role in explaining Europe's service employment, although to some extent our analysis is constrained by data availability.

The paper then moves to a consideration of the determinants of the US-Europe employment share gap. Results show that relative developments over the last decade in per capita income, public consumption

and productivity have been important determinants of the gap between European and US employment shares in the aggregate service sector. There is also some evidence that the institutional framework in Europe has an important role to play in this process. Three main institutional sources of the gap are identified – the human capital content of the workforce (as measures by educational attainment), union density and EPL on regular contracts. Our analysis suggests that further progress in structural reform, to address these remaining institutional and skill differentials, are needed to increase overall employment levels in Europe.

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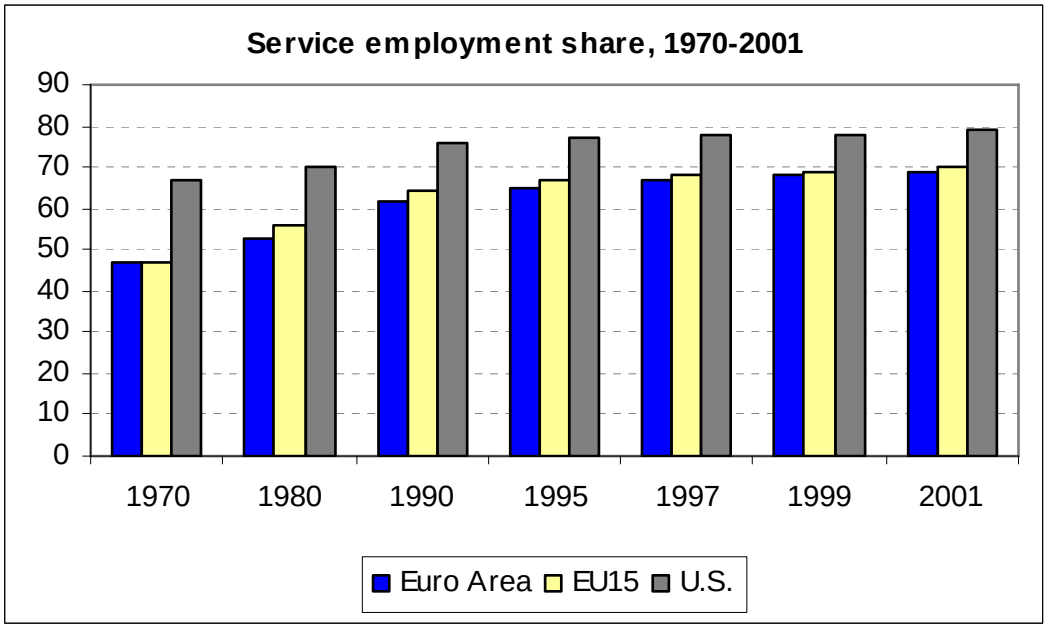
Charts and Tables

Figure 1



Source: own calculations on *STAN database*

Tab.1 Employment shares, 1970-2001, main sectors

	70			80			90			95			97			99			01		
	A	*I*	*S*	*A*	*I*	*S*	*A*	*I*	*S*	*A*	*I*	*S*	*A*	*I*	*S*	*A*	*I*	*S*	*A*	*I*	*S*
Belgium	5	...	54	3	33	64	3	27	71	2	25	73	2	24	74	2	24	74	...	...	...
Germany	9	46	45	5	41	54	4	37	60	3	33	64	3	31	66	3	30	68	3	29	69
Greece	...	...	...	...	...	...	...	...	...	20	25	56	19	24	57	19	24	58	17	24	59
Spain	...	...	...	...	35	48	11	30	59	8	28	64	8	28	64	8	29	64	7	29	64
France	14	...	50	9	33	58	6	27	67	5	24	71	5	23	72	5	23	73	4	22	74
Italy	21	39	41	13	38	49	8	32	60	6	31	63	6	30	64	6	30	65	5	29	66
Luxembourg	...	...	...	...	0	...	3	31	66	2	28	71	2	26	72	2	24	74	1	23	76
Netherlands	6	36	58	5	29	66	4	24	71	4	22	74	4	21	75	4	20	76	3	20	77
Austria	...	...	...	...	32	47	18	28	54	16	27	58	15	26	59	15	25	61	13	25	62
Portugal	...	...	...	...	36	43	16	34	51	12	31	57	12	31	58	12	31	58	...	...	...
Finland	22	34	45	14	34	53	9	30	61	8	27	65	7	28	65	7	28	66	6	28	66
Euro area	13	40	47	11	36	53	7	31	62	6	29	65	6	28	67	5	27	68	5	27	69
Denmark	11	35	54	8	28	64	6	26	69	5	25	71	4	24	72	4	24	73	3	23	74
Sweden	7	37	56	5	31	65	3	27	70	3	24	72	3	24	73	3	24	73	...	...	...
U.K.	...	...	...	2	35	63	2	28	70	2	24	75	2	23	75	2	22	76	2	21	78
EU-15	13	40	47	9	36	56	6	30	64	5	28	67	5	27	68	5	26	69	4	26	70
U.S.	4	29	67	3	27	70	3	22	76	3	20	77	3	20	78	3	20	78	2	19	79

A= Agriculture, I=Industry, S= Services. Source: own calculations on *STAN database*. Data for Germany cover Western Germany for the period 1970 to 1990. The weights used to generate the aggregate figures for the Euro area and the EU15 are each country's employment share in total employment; the weights change over time, taking missing data into account.

Tab.2: Gap in the service sector employment share, 1970-2001

	70	80	90	95	97	99	01
Belgium	-13	-6	-5	-4	-4	-4	...
Germany	-22	-16	-16	-13	-12	-10	-10
Greece	...	...	...	-21	-21	-20	-20
Spain	...	-22	-17	-13	-14	-14	-15
France	-17	-12	-9	-6	-6	-5	-5
Italy	-26	-21	-16	-14	-14	-13	-13
Luxembourg	...	...	-10	-6	-6	-4	-3
Netherlands	-9	-4	-5	-3	-3	-2	-2
Austria	...	-23	-22	-19	-19	-17	-17
Portugal	...	-27	-25	-20	-20	-20	...
Finland	-22	-17	-15	-12	-13	-12	-13
Euro area	-20	-17	-14	-12	-11	-10	-10
Denmark	-13	-6	-7	-6	-6	-5	-5
Sweden	-11	-5	-6	-5	-5	-5	...
U. K.	...	-7	-6	-2	-3	-2	-1
EU-15	-20	-14	-12	-10	-10	-9	-9

Each country – US. Source: our computation on *STAN database*.

Table 3: Percentage of employees in service sub-sectors (total=100)

	70	80	90	95	97	99	01
	Sub-sector 1: Wholesale and retail trade, restaurants and hotels						
EA weighted average	34	32	30	29	29	29	29
EU weighted average	34	32	30	29	29	29	29
U.S.	33	34	33	32	32	32	31
	Sub-sector 2: Transport, storage and communication						
EA weighted average	12	11	9	9	8	8	8
EU weighted average	12	11	9	8	8	8	8
U.S.	8	7	6	6	6	6	7
	Sub-sector 3: Finance, insurance, real estate and business services						
EA weighted average	13	14	17	18	19	20	21
EU weighted average	13	15	18	19	19	20	22
U.S.	12	15	19	19	20	21	21
	Sub-sector 4: Community, social and personal services						
EA weighted average	41	43	44	44	44	43	42
EU weighted average	42	43	43	44	43	43	41
U.S.	47	43	42	42	41	41	41

Source: our computation on *STAN database*.

Table 4: Service sector employment share gap, 1970-2001, Sub-sector 1: Wholesale and retail trade, restaurants and hotels

	70	80	90	95	97	99	01
Belgium	-5	-7	-8	-9	-9	-9	...
Germany	-5	-6	-6	-6	-5	-5	-5
Greece	...	...	...	-5	-4	-4	-3
Spain	...	-6	-5	-4	-4	-3	-3
France	-6	-8	-8	-8	-8	-8	-7
Italy	-7	-7	-6	-5	-5	-5	-4
Luxembourg	...	...	-4	-4	-5	-5	-6
Netherlands	-3	-6	-6	-5	-5	-4	-4
Austria	...	-6	-5	-5	-4	-4	-4
Portugal	...	-7	-6	-6	-5	-5	...
Finland	-6	-9	-9	-10	-10	-9	-9
EA weighted average	-6	-7	-6	-6	-6	-5	-5
Denmark	-3	-6	-7	-7	-6	-6	-6
Sweden	-6	-9	-10	-10	-9	-9	...
U. K.	...	-3	-3	-2	-2	-2	-2
EU weighted average	-6	-6	-6	-5	-5	-5	-4

Each country – US. Source: our computation on *STAN database*.

Table 5: Service sector employment share gap, 1970-2001, Sub-sector 2: Transport, storage and communication

	70	80	90	95	97	99	01
Belgium	1	3	2	2	2	2	...
Germany	0	1	1	1	0	0	0
Greece	...	...	...	2	2	2	2
Spain	...	1	1	1	1	1	1
France	0	1	1	1	1	1	1
Italy	-1	0	0	0	0	0	0
Luxembourg	...	...	3	2	2	3	3
Netherlands	0	1	1	1	0	1	1
Austria	...	1	1	1	1	1	1
Portugal	...	-1	-1	-2	-2	-2	...
Finland	1	2	3	3	3	2	2
EA weighted average	0	1	1	1	1	0	1
Denmark	1	2	2	2	2	2	2
Sweden	1	1	2	2	2	2	...
U. K.	...	1	1	1	1	1	1
EU weighted average	0	1	1	1	1	1	1

Each country – US. Source: our computation on *STAN database*.

Table 6: Service sector employment share gap, 1970-2001, Sub-sector 3: Finance, insurance, real estate and business services

	70	80	90	95	97	99	01
Belgium	-1	-2	-2	-1	-1	-1	...
Germany	-2	-3	-4	-3	-3	-2	-2
Greece	...	...	...	-8	-9	-9	-8
Spain	...	-5	-6	-6	-7	-7	-7
France	-1	0	-1	0	-1	-1	0
Italy	-4	-6	-5	-4	-4	-4	-4
Luxembourg	...	...	3	6	6	9	11
Netherlands	0	0	0	2	3	3	3
Austria	...	-5	-6	-6	-7	-7	-6
Portugal	...	-7	-9	-7	-7	-8	...
Finland	-4	-5	-5	-6	-6	-6	-6
EA weighted average	-2	-3	-4	-3	-3	-3	-3
Denmark	-1	-2	-3	-4	-4	-4	-3
Sweden	-3	-5	-5	-4	-5	-5	...
U. K.	...	0	1	2	2	2	3
EU weighted average	-2	-2	-3	-2	-2	-2	-2

Each country – US. Source: our computation on *STAN database*.

Table 7: Service sector employment share gap, 1970-2001: Sub-sector 4: Community, social and personal services

	70	80	90	95	97	99	01
Belgium	-8	0	3	3	4	5	...
Germany	-14	-8	-6	-5	-4	-3	-4
Greece	...	...	...	-11	-9	-9	-10
Spain	...	-12	-6	-4	-4	-4	-5
France	-10	-4	-1	1	2	3	1
Italy	-14	-9	-5	-4	-4	-4	-5
Luxembourg	...	...	-10	-10	-9	-10	-11
Netherlands	-6	1	1	0	-1	-1	-1
Austria	...	-13	-11	-10	-9	-8	-8
Portugal	...	-12	-9	-6	-6	-5	...
Finland	-13	-6	-3	1	1	1	0
EA weighted average	-12	-8	-4	-3	-3	-2	-3
Denmark	-10	0	2	2	3	3	2
Sweden	-3	7	7	8	8	8	...
U. K.	...	-6	-5	-4	-4	-3	-3
EU weighted average	-11	-7	-4	-3	-2	-2	-3

Each country – US. Source: our computation on *STAN database*.

Table 8: Service sector employment share gap in sub-sectors, further breakdown

	Sub-1		Sub-2		Sub-3		Sub-4			
	Wh-re	**ho-re**	**tr-st**	**po-te**	**fin-int**	**re**	**pa**	**he**	**oth**	**pr**
Belgium	-10	1	2	0	-1	-1	2	1	-1	2
Germany	-8	3	1	0	-1	-1	-5	0	0	1
Greece	-8	5	2	-1	-2	-6	-3	-5	-1	1
Spain	-8	5	1	-1	-2	-5	-3	-4	3	...
France	-9	2	1	0	-1	1	1	-1	3	...
Italy	-8	3	0	-1	-2	-2	-4	-4	0	4
Luxembourg	-9	3	...	...	8	3	-7	-4	-1	2
Netherlands	-6	2	1	0	-1	3	-6	2	-1	3
Austria	-8	5	2	-1	-1	-4	-5	-3	-1	-1
Portugal	-8	3	-1	-1	-2	-6	-3	-4	2	...
Finland	-11	2	2	0	-3	-3	-3	4	0	0
Euro Area	-8	3	1	0	-1	-1	-3	-1	1	3
Denmark	-8	2	1	0	-2	-1	-3	6	0	0
Sweden	-10	1	1	0	-2	...	…	...	...	...
U. K.	...	...	...	...	...	...	…	...	...	...
EU-15	-8	3	1	0	-1	-1	-3	-1	1	3

Each country – US. Note: wh-re = wholesale and retail trade, repair, ho-re = hotel and restaurants, tr-st = transport and storage, po-te = post and telecommunications, fin-int = financial intemediation, re = real estate activities, renting of machinery and equipment and other business activities, pa = public administration and defense, compulsory social service, he = health and social work, oth = other community, social and personal services, pr: private household with employed persons. Figures are for last year available. Source: our computation on *STAN database*.

Table 9: The determinants of the employment share in Europe: Total Services, panel regression

Total Services (ISIC 50-99)	core	I	II	III	IV	V	VI	VII
Constant	2,889	3,055	2,823	2,96	2,728	3,263	3,207	2,883
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
GDP per capita	0,434	0,387	0,426	0,435	0,464	0,363	0,372	0,435
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Cycle	-0,027	-0,019	-0,027	-0,028	-0,027	-0,022	-0,023	-0,027
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Productivity gap	-0,106	-0,12	-0,107	-0,109	-0,105	-0,098	-0,097	-0,106
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Government Consumption	0,144	0,164	0,141	0,149	0,187	0,088	0,09	0,144
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]	[0.001]	[0.000]
Vacancies		-0,005						
		[0.048]						
Education			0,016					
			[0.262]					
Union Density				-0,021				
				[0.038]				
Centralisation					-0,042			
					[0.062]			
Centralisation^2					0,006			
					[0.075]			
EPL regular contracts						-0,007		
						[0.226]		
EPL temporary contracts							0,001	
							[0.661]	
Barriers								0,001
								[0.655]
Observations	334	181	334	319	256	218	218	334
Number of COUNTRIES	13	9	13	13	11	13	13	13
R2 Within	0,946	0,933	0,946	0,951	0,957	0,89	0,891	0,946
R2 Between	0,462	0,487	0,472	0,481	0,257	0,48	0,455	0,461
R2 Global	0,665	0,611	0,67	0,666	0,551	0,556	0,537	0,664

p values in parentheses

Table 10. The determinants of the employment share in Europe: Sub-sector 1, Wholesale and retail trade, restaurants and hotels, panel regression

	Wholesale and retail trade; restaurants and hotels (ISIC 50-55)			**Wholesale and retail trade; repairs** (ISIC 50-52)		**Hotels and restaurants** (ISIC 55)	
	core	**I**	**II**	**core**	**I**	**core**	**I**
Constant	2,579	2,79	2,674	2,507	2,655	1,882	2,213
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
GDP per capita	0,165	0,14	0,182	0,104	0,078	0,191	0,177
	[0.000]	[0.000]	[0.000]	[0.003]	[0.035]	[0.005]	[0.010]
Cycle	-0,004	-0,003	-0,007	0,002	0,005	-0,012	-0,013
	[0.210]	[0.497]	[0.095]	[0.568]	[0.240]	[0.094]	[0.079]
Productivity gap	-0,046	-0,045	-0,02	-0,048	-0,05	-0,257	-0,239
	[0.023]	[0.028]	[0.369]	[0.035]	[0.032]	[0.000]	[0.000]
Government Consumption	0,018	0,034	-0,031	0,022	0,054	0,016	0,002
	[0.634]	[0.389]	[0.498]	[0.612]	[0.247]	[0.825]	[0.984]
Union Density		-0,054			-0,045		-0,092
		[0.001]			[0.015]		[0.003]
Centralisation			-0,097				
			[0.038]				
(Centralisation)^2			0,016				
			[0.034]				
Observations	328	313	250	275	262	262	249
Countries	13	13	11	12	12	12	12
R2 Within	0,453	0,481	0,405	0,246	0,265	0,795	0,793
R2 Between	0,098	0,006	0,048	0,001	0,112	0,11	0,048
R2 Global	0,038	0,118	0,047	0,043	0,114	0,027	0,153

p-values in parentheses

Table 11. The determinants of the employment share in Europe: Sub-sector 2, Transport, storage and communication, panel regression

	Transport and storage and communications (ISIC 60-64)	**Transport and storage** (ISIC 60-63)			**Post and telecommunications** (ISIC 64)	
	core	**core**	**I**	**II**	**core**	**I**
Constant	2,27	2,484	3,17	2,549	-0,818	-0,876
	[0.000]	[0.000]	[0.000]	[0.000]	[0.009]	[0.005]
GDP per capita	-0,055	-0,097	-0,219	-0,115	0,177	0,209
	[0.035]	[0.010]	[0.000]	[0.003]	[0.007]	[0.002]
Cycle	0,001	-0,003	0,012	-0,002	0,007	0,004
	[0.696]	[0.528]	[0.070]	[0.611]	[0.423]	[0.616]
Productivity gap	-0,116	-0,085	-0,188	-0,086	-0,207	-0,195
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Government Consumption	0,071	-0,088	-0,022	-0,082	0,558	0,577
	[0.089]	[0.086]	[0.744]	[0.105]	[0.000]	[0.000]
Vacancies			-0,009			
			[0.084]			
Barriers				-0,011		
				[0.071]		
Observations	328	221	118	221	221	217
Number of COUNTRIES	13	11	7	11	11	11
R2 Within	0,356	0,181	0,458	0,164	0,536	0,518
R2 Between	0,358	0,096	0,232	0,178	0,678	0,669
R2 Global	0,117	0,037	0,242	0,091	0,616	0,598

p values in parentheses

Table 12. The determinants of the employment share in Europe: Sub-sector 3, Finance, insurance, real estate and business services, panel regression

	Finance, insurance, real estate and business services (ISIC 65-74)						**Financial Intermediation** (ISIC 65-67)		**Real Estate Activities** (ISIC 70)	**Renting of M&EQ and other business activities** (ISIC 71-74)	
	core	**I**	**II**	**III**	**IV**	**V**	**core**	**I**	**core**	**core**	**I**
Constant	0,474	-0,363	1,132	0,159	1,786	1,494	0,635	2,305	2,292	-0,97	-0,91
	[0.143]	0,336	[0.001]	[0.646]	[0.000]	[0.000]	[0.072]	[0.000]	[0.000]	[0.043]	[0.049]
GDP per capita	0,947	0,877	0,886	1,014	0,771	0,815	0,231	-0,24	-0,327	1,486	1,542
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.002]	[0.002]	[0.000]	[0.000]	[0.000]
Cycle	-0,05	-0,049	-0,049	-0,052	-0,036	-0,038	-0,016	0,009	-0,005	-0,063	-0,07
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.054]	[0.304]	[0.661]	[0.000]	[0.000]
Productivity gap	-0,282	-0,278	-0,322	-0,238	-0,367	-0,365	-0,115	-0,074	-0,777	-0,314	-0,31
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]	[0.000]	[0.000]	[0.000]
Government Consumption	0,099	0,062	0,142	0,136	0,007	0,022	0,051	-0,059	0,622	-0,079	-0,084
	[0.142]	[0.350]	[0.034]	[0.035]	[0.936]	[0.796]	[0.585]	[0.549]	[0.000]	[0.385]	[0.402]
Education		0,171									
		[0.000]									
Union Density			-0,115								-0,065
			[0.000]								[0.079]
Centralisation				-0,131							
				[0.028]							
(Centralisation)^2				0,02							
				[0.037]							
EPL regular contracts					-0,038						
					[0.042]						
EPL temporary contracts						0,004		-0,012			
						[0.520]		[0.067]			
Observations	341	341	326	263	218	218	260	189	192	192	184
Countries	13	13	13	11	13	13	12	12	10	10	10
R2 Within	0,943	0,944	0,955	0,949	0,875	0,877	0,315	0,233	0,884	0,972	0,973
R2 Between	0,334	0,347	0,441	0,132	0,386	0,336	0,347	0,165	0,066	0,355	0,436
R2 Global	0,598	0,605	0,648	0,461	0,493	0,456	0,268	0,035	0,003	0,523	0,589

p-values in brackets

Table 13. The determinants of the employment share in Europe: Sub-sector 4, Community, social and personal services. Panel regression

	Community social and personal services (ISIC 75-99)			**Public admin. and defence; compulsory social security** (ISIC 75)	**Education** (ISIC 80)				**Health and social work** (ISIC 85)	**Other community, social and personal services** (ISIC 90-93)		**Private households with employed persons** (ISIC 95)		
	core	**I**	**II**	**core**	**core**	**I**	**II**	**III**	**core**	**core**	**I**	**core**	**I**	**III**
Constant	2,233	2,244	2,191	2,36	1,31	2,164	1,769	1,307	0,75	1,611	2,142	3,888	5,951	1,55
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.030]	[0.000]	[0.000]	[0.017]	[0.001]	[0.397]
GDP per capita	0,327	0,34	0,337	-0,133	0,24	0,041	0,118	0,264	0,429	0,35	0,297	-0,126	-0,281	0,462
	[0.000]	[0.000]	[0.000]	[0.016]	[0.000]	[0.571]	[0.098]	[0.000]	[0.000]	[0.000]	[0.000]	[0.673]	[0.370]	[0.123]
Cycle	-0,028	-0,029	-0,028	-0,005	-0,028	-0,017	-0,021	-0,028	-0,035	-0,035	-0,036	-0,043	-0,036	-0,034
	[0.000]	[0.000]	[0.000]	[0.423]	[0.000]	[0.008]	[0.001]	[0.000]	[0.000]	[0.000]	[0.000]	[0.067]	[0.153]	[0.145]
Productivity gap	-0,222	-0,223	-0,222	-0,334	-0,299	-0,304	-0,298	-0,3	-0,297	-0,305	-0,318	-0,335	-0,349	-0,365
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.002]	[0.001]	[0.001]
Government Consumption	0,372	0,377	0,37	0,528	0,374	0,342	0,339	0,398	0,45	0,081	0,055	-0,598	-0,514	-0,201
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.269]	[0.502]	[0.041]	[0.105]	[0.521]
Union Density											-0,067		-0,478	
											[0.032]		[0.022]	
EPL regular contracts						-0,043								-0,282
						[0.002]								[0.062]
EPL temporary contracts							0,009							
							[0.069]							
Barriers			0,009											
			[0.070]											
Observations	334	327	334	233	233	172	172	227	233	233	222	166	159	117
Countries	13	13	13	11	11	11	11	11	11	11	11	8	8	8
R2 Within	0,883	0,893	0,885	0,689	0,784	0,632	0,6	0,801	0,874	0,905	0,896	0,356	0,462	0,521
R2 Between	0,611	0,607	0,612	0,145	0,29	0,551	0,414	0,316	0,715	0,029	0,05	0	0,132	0,019
R2 Global	0,68	0,68	0,681	0,24	0,508	0,543	0,426	0,539	0,569	0,118	0,306	0,001	0,17	0,008

p-values in brackets

Table 14. The determinants of the US-Europe employment share gap. Total services, panel regression

	Total Services (ISIC 50-99)					
	core	**I**	**II**	**III**	**IV**	**V**
Constant	0,196	0,196	0,189	0,143	0,163	0,196
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
GDP per Capita	0,128	0,129	0,142	0,135	0,15	0,124
	[0.022]	[0.021]	[0.012]	[0.014]	[0.008]	[0.028]
Cycle	-0,004	-0,004	-0,005	-0,002	-0,002	-0,004
	[0.176]	[0.177]	[0.069]	[0.458]	[0.440]	[0.215]
Productivity Gap	-0,04	-0,04	-0,045	-0,022	-0,017	-0,04
	[0.013]	[0.014]	[0.007]	[0.231]	[0.352]	[0.013]
Government Consumption	0,214	0,214	0,206	0,194	0,199	0,215
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Education		0,0001				
		[0.993]				
Union Density			0,001			
			[0.926]			
EPL regular contracts				-0,012		
				[0.056]		
EPL temporary contracts					-0,002	
					[0.376]	
Barriers						-0,005
						[0.306]
Observations	284	284	270	203	203	284
Countries	13	13	13	13	13	13
R2 Within	0,635	0,635	0,596	0,74	0,739	0,638
R2 Between	0,589	0,589	0,566	0,63	0,562	0,595
R2 Global	0,571	0,571	0,536	0,607	0,54	0,578

p values in parentheses

Table 15. The determinants of the US-Europe employment share gap, ISIC 50-55 and 60-64, panel regression

	Wholesale & retail trade; restaurants & hotels (ISIC 50-55)						Transport & storage & communications (ISIC 60-64)					
	core	**I**	**II**	**III**	**IV**	**V**	**core**	**I**	**II**	**III**	**IV**	**V**
Constant	0,26	0,256	0,221	0,321	0,322	0,263	-0,1	-0,092	-0,067	-0,219	-0,175	-0,098
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.075]	[0.093]	[0.258]	[0.000]	[0.004]	[0.082]
GDP per Capita	0,172	0,168	0,155	-0,002	0,017	0,149	-0,265	-0,215	-0,23	-0,042	-0,108	-0,257
	[0.038]	[0.044]	[0.064]	[0.984]	[0.833]	[0.069]	[0.016]	[0.046]	[0.038]	[0.714]	[0.337]	[0.019]
Cycle	0,001	0,002	0,004	0,015	0,015	0,002	0,006	0,003	0,004	-0,011	-0,009	0,005
	[0.767]	[0.697]	[0.422]	[0.004]	[0.005]	[0.581]	[0.323]	[0.659]	[0.489]	[0.075]	[0.155]	[0.372]
Productivity Gap	-0,04	-0,039	-0,043	-0,101	-0,09	-0,04	0,042	0,04	0,052	0,12	0,11	0,043
	[0.135]	[0.136]	[0.108]	[0.004]	[0.010]	[0.129]	[0.194]	[0.221]	[0.108]	[0.002]	[0.005]	[0.191]
Government Consumption	0,126	0,127	0,153	0,2	0,194	0,123	-0,091	-0,091	-0,13	-0,205	-0,197	-0,09
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.020]	[0.020]	[0.001]	[0.000]	[0.000]	[0.020]
Education		0,002						-0,007				
		[0.582]						[0.048]				
Union Density			-0,062						0,066			
			[0.000]						[0.004]			
EPL regular contracts				-0,011						0,002		
				[0.331]						[0.863]		
EPL temporary contracts					-0,006						0,009	
					[0.087]						[0.026]	
Barriers						-0,014						0,013
						[0.122]						[0.216]
Observations	284	284	270	203	203	284	284	284	270	203	203	284
Countries	13	13	13	13	13	13	13	13	13	13	13	13
R2 Within	0,467	0,474	0,419	0,611	0,611	0,468	0,261	0,277	0,251	0,522	0,567	0,276
R2 Between	0,238	0,234	0,062	0,363	0,369	0,206	0,24	0,318	0,098	0,179	0,181	0,244
R2 Global	0,077	0,077	0,002	0,108	0,104	0,055	0,329	0,386	0,107	0,1	0,143	0,328

p values in parentheses

Table 16. The determinants of the US-Europe employment share gap, ISIC 65-74 and 75-99, panel regression

	Finance, insurance, real estate and business services (ISIC 65-74)						Community social & personal services (ISIC 75-99)					
	core	**I**	**II**	**III**	**IV**	**V**	**core**	**I**	**II**	**III**	**IV**	**V**
Constant	0,3	0,254	0,243	0,21	0,31	0,297	0,151	0,162	0,179	0,052	0,058	0,151
	[0.001]	[0.004]	[0.004]	[0.034]	[0.001]	[0.001]	[0.002]	[0.001]	[0.001]	[0.279]	[0.201]	[0.002]
GDP per Capita	0,283	0,238	0,324	0,178	0,281	0,261	0,251	0,262	0,276	0,276	0,287	0,251
	[0.106]	[0.170]	[0.059]	[0.352]	[0.143]	[0.136]	[0.015]	[0.012]	[0.008]	[0.002]	[0.001]	[0.015]
Cycle	0,008	0,013	0,009	0,031	0,029	0,009	-0,019	-0,02	-0,024	-0,024	-0,025	-0,019
	[0.370]	[0.162]	[0.329]	[0.004]	[0.008]	[0.295]	[0.001]	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]
Productivity Gap	-0,05	-0,045	-0,056	-0,079	-0,058	-0,05	-0,089	-0,09	-0,095	0,0001	0,002	-0,089
	[0.347]	[0.385]	[0.309]	[0.249]	[0.407]	[0.337]	[0.006]	[0.005]	[0.003]	[0.999]	[0.950]	[0.006]
Government Consumption	0,236	0,245	0,263	0,289	0,329	0,237	0,366	0,363	0,313	0,235	0,238	0,366
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Education		0,017						-0,004				
		[0.002]						[0.223]				
Union Density			-0,059						0,061			
			[0.110]						[0.006]			
EPL regular contracts				-0,061						-0,004		
				[0.010]						[0.668]		
EPL temporary contracts					-0,006						-0,001	
					[0.437]						[0.851]	
Barriers						-0,028						0,0001
						[0.104]						[0.994]
Observations	284	284	270	203	203	284	284	284	270	203	203	284
Countries	13	13	13	13	13	13	13	13	13	13	13	13
R2 Within	0,36	0,395	0,374	0,46	0,483	0,376	0,511	0,519	0,481	0,555	0,55	0,511
R2 Between	0,425	0,406	0,581	0,495	0,401	0,43	0,657	0,655	0,53	0,604	0,601	0,657
R2 Global	0,367	0,367	0,502	0,464	0,352	0,377	0,6	0,598	0,472	0,555	0,551	0,6

p values in parentheses

Annex 1: ISIC classification

Total Services (ISIC 50-99)

Sub-sector 1: Wholesale and retail trade, restaurants and hotels (ISIC 50-55)	
Wholesale and retail trade, repair	50-52
Hotels and restaurants	55
Sub-sector 2: Transport and storage and communication (ISIC 60-64)	
Transport and storage	60-63
Post and telecommunications	64
Sub-sector 3: Finance, insurance, real estate and business services (ISIC 65-74)	
Financial intermediation	65-67
Real estate activities	70
Renting of machinery and equipment and other business activities	71-74
Sub-sector 4: Community social and personal services (ISIC 75-99)	
Public administration and defence, compulsory social service	75
Education	80
Health and social work	85
Other community, social and personal services	90-93
Private household with employed persons	95

Annex 2: Definitions and data sources

1. **Service employment share**: ratio between total employment (number engaged in domestic production) in services and total employment (multiplied by 100, logarithm). Source: OECD, Structural Analysis (STAN) database.

2. **GDP per capita**: gross domestic product per head at constant prices and current PPPs (divided by 1000, logarithm). Source: OECD, National Account (NA)

3. **Cycle:** detrended GDP per capita (divided by 1000). Detrending procedure: Hodrick and Prescott. Source: authors' computation on OECD, NA database.

4. **Productivity Gap:** logarithm of the ratio (multiplied by 100) of productivity in services to productivity in manufacturing (both index numbers, base=1995). Productivities are computed as real value added over number of employees. Source: authors' computation on OECD, STAN database.

5. **Government Consumption**: real public consumption expenditure, percentage of real GDP (multiplied by 100, logarithm). Source: authors' computation on OECD, NA database.

6. **Vacancies**: unfilled vacancies to unemployment ratio (multiplied by 100, logarithm). Source: OECD, Main Economic Indicators; AMECO.

7. **Education**: logarithm of average years of schooling (multiplied by 100). Source: Barro and Lee (2000). Data available at the web address: http//www.cid.harvard.edu/ciddata/ciddata.html

8. **Union Density**: logarithm of union density (percentage). Union density is computed as the ratio of number of members to number of employees. Source: OECD

9. **Centralisation:** logarithm of the index of centralization/co-ordination of wage negotiations (multiplied by 100). Source: Checchi and Visser (2002)

10. **EPL (regular)**: employment protection legislation on regular contracts index. Two values available for the years 1989 and 1998. We assume constant the first value from 1970 to 1989 and the second value from 1990 to 2001. Source: OECD

11. **EPL (temporary)**: employment protection legislation on temporary contracts index. Two values available for the years 1989 and 1998. We assume constant the first value from 1970 to 1989 and the second value from 1990 to 2001. Source: OECD

12. **Barriers**: barriers to entrepreneurship. It includes: administrative burdens on startups; regulatory and administrative opacity; barriers to competition. Only year 1998 and 2003 available. Source: Conway, Janod, Nicoletti (2005)

Annex 3: Full set of results on the determinants of the employment share in Europe

Wholesale and retail trade, restaurants and hotels (ISIC 50-55)

	core	I	II	III	IV	V	VI	VII
Constant	2.579	2.483	2.541	2.79	2.674	2.464	2.45	2.582
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
GDP per capita	0.165	0.181	0.161	0.14	0.182	0.182	0.179	0.165
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Cycle	-0.004	0.006	-0.004	-0.003	-0.007	-0.001	-0.001	-0.004
	[0.210]	[0.310]	[0.220]	[0.497]	[0.095]	[0.755]	[0.801]	[0.211]
Productivity gap	-0.046	-0.073	-0.046	-0.045	-0.02	-0.051	-0.05	-0.046
	[0.023]	[0.022]	[0.023]	[0.028]	[0.369]	[0.059]	[0.066]	[0.023]
Government Consumption	0.018	0.076	0.016	0.034	-0.031	0.048	0.053	0.017
	[0.634]	[0.139]	[0.668]	[0.389]	[0.498]	[0.295]	[0.238]	[0.640]
Vacancy		-0.006						
		[0.171]						
Education			0.008					
			[0.728]					
Union Density				-0.054				
				[0.001]				
Centralisation					-0.097			
					[0.038]			
Centralisation^2					0.016			
					[0.034]			
EPL regular contracts						-0.002		
						[0.802]		
EPL temporary contracts							-0.003	
							[0.457]	
Barriers								-0.001
								[0.920]
Observations	328	168	328	313	250	210	210	328
Number of COUNTRIES	13	9	13	13	11	13	13	13
R2 Within	0.453	0.63	0.453	0.481	0.405	0.539	0.54	0.453
R2 Between	0.098	0.153	0.092	0.006	0.048	0.194	0.202	0.097
R2 Global	0.038	0.001	0.037	0.118	0.047	0.028	0.029	0.039

p values in parentheses

Wholesale and retail trade, repair (ISIC 50-52)

	core	I	II	III	IV	V	VI	VII
Constant	2.507	2.374	2.576	2.655	2.472	2.262	2.289	2.498
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
GDP per capita	0.104	0.09	0.111	0.078	0.137	0.113	0.107	0.107
	[0.003]	[0.047]	[0.003]	[0.035]	[0.002]	[0.002]	[0.004]	[0.003]
Cycle	0.002	0.011	0.002	0.005	0	0.005	0.005	0.002
	[0.568]	[0.047]	[0.597]	[0.240]	[0.973]	[0.214]	[0.183]	[0.577]
Productivity gap	-0.048	-0.047	-0.048	-0.05	-0.01	-0.045	-0.044	-0.048
	[0.035]	[0.147]	[0.033]	[0.032]	[0.694]	[0.087]	[0.089]	[0.034]
Government Consumption	0.022	0.077	0.024	0.054	-0.011	0.085	0.086	0.021
	[0.612]	[0.169]	[0.582]	[0.247]	[0.840]	[0.067]	[0.065]	[0.621]
Vacancy		-0.005						
		[0.205]						
Education			-0.014					
			[0.617]					
Union Density				-0.045				
				[0.015]				
Centralisation					-0.099			
					[0.105]			
Centralisation^2					0.016			
					[0.111]			
EPL regular contracts						0.003		
						[0.774]		
EPL temporary contracts							-0.001	
							[0.695]	
Barriers								0.002
								[0.687]
Observations	275	162	275	262	203	199	199	275
Number of COUNTRIES	12	8	12	12	10	12	12	12
R2 Within	0.246	0.4	0.248	0.265	0.246	0.288	0.287	0.248
R2 Between	0.001	0.051	0.002	0.112	0.001	0.047	0.047	0.001
R2 Global	0.043	0.007	0.051	0.114	0.026	0.007	0.007	0.042

p values in parentheses

Hotel and restaurants (ISIC 55)

	core	I	II	III	IV	V	VI	VII
Constant	1.882	2.203	1.783	2.213	2.431	2.558	2.543	1.887
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
GDP per capita	0.191	0.127	0.179	0.177	0.163	0.157	0.157	0.19
	[0.005]	[0.196]	[0.015]	[0.010]	[0.047]	[0.099]	[0.078]	[0.006]
Cycle	-0.012	-0.003	-0.011	-0.013	-0.018	-0.01	-0.01	-0.012
	[0.094]	[0.804]	[0.108]	[0.079]	[0.024]	[0.272]	[0.279]	[0.095]
Productivity gap	-0.257	-0.31	-0.258	-0.239	-0.25	-0.27	-0.269	-0.257
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Government Consumption	0.016	0.051	0.014	0.002	-0.15	-0.154	-0.145	0.017
	[0.825]	[0.644]	[0.851]	[0.984]	[0.097]	[0.107]	[0.129]	[0.823]
Vacancies		0.002						
		[0.825]						
Education			0.022					
			[0.643]					
Union Density				-0.092				
				[0.003]				
Centralisation					-0.057			
					[0.617]			
Centralisation^2					0.012			
					[0.531]			
EPL regular contracts						0.004		
						[0.844]		
EPL temporary contracts							-0.001	
							[0.846]	
Barriers								-0.002
								[0.861]
Observations	262	149	262	249	190	191	191	262
Number of COUNTRIES	12	8	12	12	10	12	12	12
R2 Within	0.795	0.831	0.795	0.793	0.777	0.757	0.761	0.796
R2 Between	0.11	0.213	0.104	0.048	0.016	0.061	0.021	0.109
R2 Global	0.027	0.006	0.024	0.153	0.115	0.096	0.072	0.027

p values in parentheses

Transport, storage and communications (ISIC 60-64)

	core	I	II	III	IV	V	VI	VII
Constant	2.27	2.566	2.191	2.077	2.005	2.621	2.599	2.32
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
GDP per capita	-0.055	-0.148	-0.057	-0.037	-0.037	-0.102	-0.095	-0.064
	[0.035]	[0.000]	[0.054]	[0.179]	[0.215]	[0.008]	[0.012]	[0.017]
Cycle	0.001	0.01	0.002	-0.001	-0.002	0.003	0.002	0.002
	[0.696]	[0.081]	[0.686]	[0.741]	[0.612]	[0.541]	[0.643]	[0.658]
Productivity gap	-0.116	-0.148	-0.115	-0.1	-0.099	-0.108	-0.107	-0.119
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Government Consumption	0.071	0.113	0.072	0.06	0.126	-0.005	-0.014	0.073
	[0.089]	[0.060]	[0.089]	[0.164]	[0.008]	[0.932]	[0.799]	[0.079]
Vacancy		-0.002						
		[0.744]						
Education			0.011					
			[0.684]					
Union Density				0.027				
				[0.147]				
Centralisation					0.005			
					[0.914]			
Centralisation^2					-0.002			
					[0.802]			
EPL regular contracts						-0.005		
						[0.689]		
EPL temporary contracts							0.004	
							[0.373]	
Barriers								-0.009
								[0.130]
Observations	328	168	328	313	250	210	210	328
Number of COUNTRIES	13	9	13	13	11	13	13	13
R2 Within	0.356	0.545	0.355	0.31	0.23	0.431	0.442	0.362
R2 Between	0.358	0.352	0.258	0.032	0.003	0.335	0.376	0.329
R2 Global	0.117	0.215	0.073	0.003	0.001	0.147	0.196	0.114

p values in parentheses

Transport and Storage (ISIC 60-63)

	core	I	II	III	IV	V	VI	VII
Constant	2.484	3.17	2.359	2.501	2.593	2.828	2.786	2.549
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
GDP per capita	-0.097	-0.219	-0.115	-0.11	-0.116	-0.131	-0.132	-0.115
	[0.010]	[0.000]	[0.006]	[0.005]	[0.015]	[0.002]	[0.002]	[0.003]
Cycle	-0.003	0.012	-0.002	-0.001	-0.003	-0.003	-0.003	-0.002
	[0.528]	[0.070]	[0.616]	[0.856]	[0.627]	[0.558]	[0.583]	[0.611]
Productivity gap	-0.085	-0.188	-0.086	-0.083	-0.107	-0.094	-0.095	-0.086
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Government Consumption	-0.088	-0.022	-0.091	-0.063	-0.061	-0.143	-0.133	-0.082
	[0.086]	[0.744]	[0.074]	[0.265]	[0.340]	[0.014]	[0.024]	[0.105]
Vacancies		-0.009						
		[0.084]						
Education			0.029					
			[0.393]					
Union Density				-0.017				
				[0.452]				
Centralisation					-0.028			
					[0.731]			
Centralisation^2					0.004			
					[0.779]			
EPL regular contracts						-0.011		
						[0.415]		
EPL temporary contracts							-0.003	
							[0.514]	
Barriers								-0.011
								[0.071]
Observations	221	118	221	213	178	165	165	221
Number of COUNTRIES	11	7	11	11	10	11	11	11
R2 Within	0.181	0.458	0.175	0.184	0.18	0.29	0.252	0.164
R2 Between	0.096	0.232	0.177	0.044	0.001	0.074	0.086	0.178
R2 Global	0.037	0.242	0.088	0.002	0.003	0.033	0.048	0.091

p values in parentheses

Post and telecommunications (ISIC 64)

	core	I	II	III	IV	V	VI	VII
Constant	-0.818	-0.657	-0.896	-1.089	-1.032	-0.342	-0.55	-0.786
	[0.009]	[0.170]	[0.036]	[0.001]	[0.007]	[0.441]	[0.193]	[0.015]
GDP per capita	0.177	0.056	0.172	0.186	0.138	0.091	0.134	0.174
	[0.007]	[0.567]	[0.016]	[0.004]	[0.034]	[0.341]	[0.159]	[0.009]
Cycle	0.007	0.013	0.007	0.003	0.005	0.011	0.008	0.006
	[0.423]	[0.331]	[0.393]	[0.736]	[0.561]	[0.308]	[0.436]	[0.433]
Productivity gap	-0.207	-0.215	-0.208	-0.187	-0.183	-0.216	-0.209	-0.211
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Government Consumption	0.558	0.647	0.565	0.55	0.691	0.52	0.508	0.559
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Vacancies		0.006						
		[0.564]						
Education			0.011					
			[0.867]					
Union Density				0.049				
				[0.173]				
Centralisation					-0.13			
					[0.328]			
Centralisation^2					0.022			
					[0.315]			
EPL regular contracts						-0.02		
						[0.448]		
EPL temporary contracts							0.012	
							[0.194]	
Barriers								-0.005
								[0.664]
Observations	221	118	221	213	178	165	165	221
Number of COUNTRIES	11	7	11	11	10	11	11	11
R2 Within	0.536	0.406	0.537	0.536	0.55	0.536	0.53	0.535
R2 Between	0.678	0.656	0.683	0.701	0.571	0.71	0.692	0.678
R2 Global	0.616	0.643	0.622	0.627	0.582	0.648	0.618	0.616

p values in parentheses

Finance, insurance, real estate and business services (ISIC 65-74)

	core	I	II	III	IV	V	VI	VII
Constant	0.474	1.109	-0.363	1.132	0.159	1.786	1.494	0.492
	[0.143]	[0.013]	[0.336]	[0.001]	[0.646]	[0.000]	[0.000]	[0.130]
GDP per capita	0.947	0.857	0.877	0.886	1.014	0.771	0.815	0.942
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Cycle	-0.05	-0.03	-0.049	-0.049	-0.052	-0.036	-0.038	-0.05
	[0.000]	[0.002]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Productivity gap	-0.282	-0.358	-0.278	-0.322	-0.238	-0.367	-0.365	-0.282
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Government Consumption	0.099	0.11	0.062	0.142	0.136	0.007	0.022	0.099
	[0.142]	[0.259]	[0.350]	[0.034]	[0.035]	[0.936]	[0.796]	[0.139]
Vacancies		-0.011						
		[0.118]						
Education			0.171					
			[0.000]					
Union Density				-0.115				
				[0.000]				
Centralisation					-0.131			
					[0.028]			
Centralisation^2					0.02			
					[0.037]			
EPL regular contracts						-0.038		
						[0.042]		
EPL temporary contracts							0.004	
							[0.520]	
Barriers								-0.006
								[0.531]
Observations	341	181	341	326	263	218	218	341
Number of COUNTRIES	13	9	13	13	11	13	13	13
R2 Within	0.943	0.913	0.944	0.955	0.949	0.875	0.877	0.943
R2 Between	0.334	0.401	0.347	0.441	0.132	0.386	0.336	0.336
R2 Global	0.598	0.548	0.605	0.648	0.461	0.493	0.456	0.599

p values in parentheses

Financial intermediation (ISIC 65-67)

	core	I	II	III	IV	V	VI	VII
Constant	0.635	1.782	0.729	0.488	-0.07	2.101	2.305	0.505
	[0.072]	[0.000]	[0.099]	[0.194]	[0.889]	[0.000]	[0.000]	[0.154]
GDP per capita	0.231	-0.11	0.241	0.264	0.421	-0.182	-0.24	0.264
	[0.002]	[0.211]	[0.002]	[0.001]	[0.000]	[0.018]	[0.002]	[0.000]
Cycle	-0.016	0.009	-0.016	-0.019	-0.029	0.004	0.009	-0.017
	[0.054]	[0.483]	[0.051]	[0.025]	[0.003]	[0.604]	[0.304]	[0.040]
Productivity gap	-0.115	-0.077	-0.114	-0.114	-0.106	-0.072	-0.074	-0.113
	[0.000]	[0.001]	[0.000]	[0.000]	[0.000]	[0.001]	[0.001]	[0.000]
Government Consumption	0.051	-0.028	0.054	0.108	0.068	-0.08	-0.059	0.043
	[0.585]	[0.820]	[0.568]	[0.277]	[0.573]	[0.415]	[0.549]	[0.642]
Vacancies		-0.009						
		[0.283]						
Education			-0.02					
			[0.725]					
Union Density				-0.034				
				[0.401]				
Centralisation					0.059			
					[0.639]			
Centralisation^2					-0.011			
					[0.597]			
EPL regular contracts						0.019		
						[0.356]		
EPL temporary contracts							-0.012	
							[0.067]	
Barriers								0.027
								[0.025]
Observations	260	147	260	247	188	189	189	260
Number of COUNTRIES	12	8	12	12	10	12	12	12
R2 Within	0.315	0.17	0.32	0.364	0.513	0.229	0.233	0.342
R2 Between	0.347	0.042	0.37	0.45	0.191	0.138	0.165	0.359
R2 Global	0.268	0	0.278	0.358	0.251	0.034	0.035	0.283

p values in parentheses

Real estate activities (ISIC 70)

	core	I	II	III	IV	V	VI	VII
Constant	2.292	1.758	2.039	1.79	1.235	1.595	1.885	2.054
	[0.000]	[0.004]	[0.007]	[0.003]	[0.034]	[0.069]	[0.021]	[0.000]
GDP per capita	-0.327	-0.218	-0.273	-0.216	-0.077	-0.314	-0.353	-0.285
	[0.000]	[0.052]	[0.014]	[0.034]	[0.434]	[0.028]	[0.012]	[0.003]
Cycle	-0.005	-0.019	-0.003	-0.008	-0.006	-0.005	-0.006	-0.005
	[0.661]	[0.176]	[0.771]	[0.486]	[0.550]	[0.729]	[0.685]	[0.664]
Productivity gap	-0.777	-0.685	-0.76	-0.719	-0.634	-0.791	-0.803	-0.769
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Government Consumption	0.622	0.616	0.693	0.66	0.666	0.866	0.824	0.633
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Vacancies		0.002						
		[0.878]						
Education			-0.031					
			[0.749]					
Union Density				-0.063				
				[0.243]				
Centralisation					-0.129			
					[0.482]			
Centralisation^2					0.018			
					[0.539]			
EPL regular contracts						-0.01		
						[0.803]		
EPL temporary contracts							-0.004	
							[0.771]	
Barriers								0.021
								[0.200]
Observations	192	101	192	184	149	146	146	192
Number of COUNTRIES	10	6	10	10	9	10	10	10
R2 Within	0.884	0.854	0.879	0.884	0.87	0.79	0.801	0.887
R2 Between	0.066	0.576	0.008	0.002	0.641	0.038	0.015	0.033
R2 Global	0.003	0.407	0.019	0.027	0.46	0.07	0.045	0.008

p values in parentheses

Renting of machinery and equipment, and other business activities (ISIC 71-74)

	core	I	II	III	IV	V	VI	VII
Constant	-0.97	-0.424	-1.332	-0.91	-1.286	-1.246	-1.211	-0.933
	[0.043]	[0.495]	[0.020]	[0.049]	[0.010]	[0.041]	[0.042]	[0.052]
GDP per capita	1.486	1.367	1.454	1.542	1.522	1.549	1.554	1.47
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Cycle	-0.063	-0.054	-0.062	-0.07	-0.067	-0.06	-0.06	-0.063
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Productivity gap	-0.314	-0.476	-0.311	-0.31	-0.309	-0.306	-0.302	-0.312
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Government Consumption	-0.079	0.085	-0.086	-0.084	-0.014	-0.077	-0.093	-0.07
	[0.385]	[0.489]	[0.342]	[0.402]	[0.886]	[0.488]	[0.406]	[0.441]
Vacancies		0.01						
		[0.295]						
Education			0.07					
			[0.247]					
Union Density				-0.065				
				[0.079]				
Centralisation					-0.051			
					[0.734]			
Centralisation^2					0.01			
					[0.664]			
EPL regular contracts						0.014		
						[0.562]		
EPL temporary contracts							0.006	
							[0.437]	
Barriers								-0.013
								[0.241]
Observations	192	101	192	184	149	146	146	192
Number of COUNTRIES	10	6	10	10	9	10	10	10
R2 Within	0.972	0.976	0.972	0.973	0.981	0.939	0.935	0.972
R2 Between	0.355	0.357	0.349	0.436	0.31	0.196	0.201	0.348
R2 Global	0.523	0.5	0.516	0.589	0.438	0.336	0.338	0.516

p values in parentheses

Community, social and personal services (ISIC 75-99)

	core	I	II	III	IV	V	VI	VII
Constant	2.233	2.303	2.262	2.047	1.862	2.746	2.704	2.191
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
GDP per capita	0.327	0.25	0.331	0.357	0.35	0.221	0.235	0.337
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Cycle	-0.028	-0.022	-0.028	-0.031	-0.024	-0.026	-0.027	-0.028
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Productivity gap	-0.222	-0.215	-0.221	-0.212	-0.233	-0.165	-0.168	-0.222
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Government Consumption	0.372	0.421	0.373	0.357	0.487	0.234	0.229	0.37
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Vacancies		-0.001						
		[0.774]						
Education			-0.007					
			[0.748]					
Union Density				0.028				
				[0.087]				
Centralisation					0.016			
					[0.692]			
Centralisation^2					-0.003			
					[0.680]			
EPL regular contracts						-0.007		
						[0.429]		
EPL temporary contracts							0.004	
							[0.090]	
Barriers								0.009
								[0.070]
Observations	334	181	334	319	256	218	218	334
Number of COUNTRIES	13	9	13	13	11	13	13	13
R2 Within	0.883	0.867	0.883	0.886	0.909	0.713	0.718	0.885
R2 Between	0.611	0.596	0.611	0.562	0.56	0.608	0.622	0.612
R2 Global	0.68	0.63	0.679	0.644	0.673	0.555	0.561	0.681

p values in parentheses

Public administration and defence, compulsory social service (ISIC 75)

	core	I	II	III	IV	V	VI	VII
Constant	2.36	2.024	2.456	2.247	1.64	2.524	2.44	2.272
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
GDP per capita	-0.133	-0.123	-0.122	-0.12	-0.109	-0.183	-0.162	-0.114
	[0.016]	[0.169]	[0.041]	[0.045]	[0.088]	[0.007]	[0.014]	[0.044]
Cycle	-0.005	0.007	-0.005	-0.006	0.001	-0.002	-0.003	-0.005
	[0.423]	[0.469]	[0.392]	[0.333]	[0.931]	[0.718]	[0.593]	[0.368]
Productivity gap	-0.334	-0.259	-0.333	-0.327	-0.368	-0.24	-0.239	-0.331
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Government Consumption	0.528	0.527	0.531	0.558	0.764	0.391	0.385	0.525
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Vacancies		-0.01						
		[0.186]						
Education			-0.021					
			[0.610]					
Union Density				-0.014				
				[0.630]				
Centralisation					0.07			
					[0.482]			
Centralisation^2					-0.011			
					[0.519]			
EPL regular contracts						-0.008		
						[0.589]		
EPL temporary contracts							0.004	
							[0.423]	
Barriers								0.014
								[0.097]
Observations	233	120	233	222	164	172	172	233
Number of COUNTRIES	11	7	11	11	9	11	11	11
R2 Within	0.689	0.606	0.687	0.724	0.811	0.416	0.415	0.704
R2 Between	0.145	0.093	0.146	0.178	0.09	0.157	0.162	0.169
R2 Global	0.24	0.125	0.242	0.301	0.212	0.166	0.177	0.266

p values in parentheses

Education (ISIC 80)

	core	I	II	III	IV	V	VI	VII
Constant	1.31	1.036	1.61	1.109	1.289	2.164	1.769	1.245
	[0.000]	[0.023]	[0.000]	[0.003]	[0.007]	[0.000]	[0.000]	[0.000]
GDP per capita	0.24	0.126	0.281	0.269	0.198	0.041	0.118	0.256
	[0.000]	[0.185]	[0.000]	[0.000]	[0.022]	[0.571]	[0.098]	[0.000]
Cycle	-0.028	-0.018	-0.029	-0.031	-0.023	-0.017	-0.021	-0.028
	[0.000]	[0.048]	[0.000]	[0.000]	[0.003]	[0.008]	[0.001]	[0.000]
Productivity gap	-0.299	-0.334	-0.294	-0.289	-0.308	-0.304	-0.298	-0.298
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Government Consumption	0.374	0.62	0.382	0.395	0.446	0.342	0.339	0.37
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Vacancies		0						
		[0.980]						
Education			-0.071					
			[0.090]					
Union Density				0.003				
				[0.926]				
Centralisation					-0.019			
					[0.855]			
Centralisation^2					0.004			
					[0.797]			
EPL regular contracts						-0.043		
						[0.002]		
EPL temporary contracts							0.009	
							[0.069]	
Barriers								0.012
								[0.158]
Observations	233	120	233	222	164	172	172	233
Number of COUNTRIES	11	7	11	11	9	11	11	11
R2 Within	0.784	0.798	0.784	0.794	0.826	0.632	0.6	0.791
R2 Between	0.29	0.372	0.302	0.312	0.323	0.551	0.414	0.308
R2 Global	0.508	0.553	0.527	0.519	0.488	0.543	0.426	0.53

p values in parentheses

Health and Social work (ISIC 85)

	core	I	II	III	IV	V	VI	VII
Constant	0.75	0.083	0.435	0.499	-0.605	0.87	0.822	0.692
	[0.030]	[0.857]	[0.287]	[0.187]	[0.175]	[0.029]	[0.028]	[0.047]
GDP per capita	0.429	0.548	0.406	0.47	0.569	0.409	0.413	0.443
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Cycle	-0.035	-0.04	-0.034	-0.037	-0.029	-0.041	-0.041	-0.036
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Productivity gap	-0.297	-0.189	-0.294	-0.286	-0.251	-0.182	-0.182	-0.297
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Government Consumption	0.45	0.408	0.444	0.457	0.611	0.261	0.272	0.447
	[0.000]	[0.001]	[0.000]	[0.000]	[0.000]	[0.003]	[0.003]	[0.000]
Vacancies		-0.009						
		[0.300]						
Education			0.059					
			[0.207]					
Union Density				0.015				
				[0.642]				
Centralisation					0.206			
					[0.055]			
Centralisation^2					-0.034			
					[0.056]			
EPL regular contracts						0		
						[0.998]		
EPL temporary contracts							-0.001	
							[0.923]	
Barriers								0.011
								[0.252]
Observations	233	120	233	222	164	172	172	233
Number of COUNTRIES	11	7	11	11	9	11	11	11
R2 Within	0.874	0.855	0.871	0.875	0.904	0.782	0.783	0.877
R2 Between	0.715	0.693	0.725	0.738	0.661	0.712	0.717	0.708
R2 Global	0.569	0.596	0.598	0.595	0.596	0.581	0.589	0.564

p values in parentheses

Other community, social and personal services (ISIC 90-93)

	core	I	II	III	IV	V	VI	VII
Constant	1.611	2.277	1.417	2.142	0.911	1.561	1.493	1.645
	[0.000]	[0.000]	[0.000]	[0.000]	[0.061]	[0.000]	[0.000]	[0.000]
GDP per capita	0.35	0.178	0.323	0.297	0.439	0.378	0.408	0.341
	[0.000]	[0.021]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Cycle	-0.035	-0.018	-0.034	-0.036	-0.042	-0.036	-0.037	-0.035
	[0.000]	[0.074]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Productivity gap	-0.305	-0.352	-0.308	-0.318	-0.279	-0.286	-0.283	-0.306
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Government Consumption	0.081	0.123	0.072	0.055	0.105	0.04	0.021	0.084
	[0.269]	[0.305]	[0.329]	[0.502]	[0.325]	[0.634]	[0.801]	[0.254]
Vacancies		-0.006						
		[0.486]						
Education			0.048					
			[0.285]					
Union Density				-0.067				
				[0.032]				
Centralisation					0.152			
					[0.206]			
Centralisation^2					-0.026			
					[0.183]			
EPL regular contracts						0.002		
						[0.923]		
EPL temporary contracts							0.008	
							[0.133]	
Barriers								-0.007
								[0.432]
Observations	233	120	233	222	164	172	172	233
Number of COUNTRIES	11	7	11	11	9	11	11	11
R2 Within	0.905	0.89	0.907	0.896	0.897	0.859	0.854	0.906
R2 Between	0.029	0.262	0.041	0.05	0.021	0.216	0.237	0.029
R2 Global	0.118	0.012	0.104	0.306	0.149	0.007	0.009	0.119

p values in parentheses

Private household with employed persons (ISIC 95)

	core	I	II	III	IV	V	VI	VII
Constant	3.888	3.762	4.535	5.951	8.301	1.55	0.239	4.209
	[0.017]	[0.216]	[0.021]	[0.001]	[0.000]	[0.397]	[0.892]	[0.011]
GDP per capita	-0.126	-0.312	-0.089	-0.281	-0.587	0.462	0.595	-0.197
	[0.673]	[0.513]	[0.771]	[0.370]	[0.138]	[0.123]	[0.058]	[0.522]
Cycle	-0.043	-0.012	-0.044	-0.036	-0.038	-0.034	-0.046	-0.04
	[0.067]	[0.805]	[0.063]	[0.153]	[0.220]	[0.145]	[0.045]	[0.089]
Productivity gap	-0.335	-0.508	-0.338	-0.349	-0.446	-0.365	-0.359	-0.349
	[0.002]	[0.013]	[0.002]	[0.001]	[0.001]	[0.001]	[0.002]	[0.001]
Government Consumption	-0.598	-0.163	-0.58	-0.514	-0.962	-0.201	-0.135	-0.588
	[0.041]	[0.808]	[0.049]	[0.105]	[0.027]	[0.521]	[0.668]	[0.045]
Vacancies		0.009						
		[0.819]						
Education			-0.118					
			[0.545]					
Union Density				-0.478				
				[0.022]				
Centralisation					-0.862			
					[0.095]			
Centralisation^2					0.135			
					[0.109]			
EPL regular contracts						-0.282		
						[0.062]		
EPL temporary contracts							0.008	
							[0.625]	
Barriers								-0.039
								[0.327]
Observations	166	78	166	159	129	117	117	166
Number of COUNTRIES	8	5	8	8	7	8	8	8
R2 Within	0.356	0.44	0.355	0.462	0.61	0.521	0.448	0.386
R2 Between	0	0.061	0.002	0.132	0.019	0.019	0.001	0.001
R2 Global	0.001	0.022	0.006	0.17	0.007	0.008	0.002	0

p values in parentheses