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# Patterns of growth and changing quality of work in Europe

Sem Vandekerckhove  
HIVA-K.U.Leuven

Monique Ramioul  
HIVA-K.U.Leuven

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This report constitutes **Deliverable 3.3**, one of three reports to make up Deliverable 3, “Final report: Comparative analyses of employment expansion and of job characteristics in selected business functions”, for Workpackage 2 of the WALQING Project, SSH-CT-2009-244597.



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Sem Vandekerckhove, HIVA-K.U.Leuven

Monique Ramioul, HIVA-K.U.Leuven

Leuven, May 2011

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## 1 Introduction

At the 2000 European Council summit in Lisbon, employment targets for 2010 were set, not only on job growth and employment rates but also with respect to the characteristics of this growth. It was proposed that member states' employment policies should promote a knowledge intensive economy by innovation and learning and expand the European social model at the same time, hence the slogan 'More and better jobs'. Shortly after, in 2001, a monitoring scheme for the development of this social model was provided through the Laeken indicators. By 2010 it was clear that the Lisbon process had met with limited success, resulting in new goal being formulated in the so called Europe 2020 Strategy, picking up more or less the same goals, this time aiming for 'smart, sustainable and inclusive growth'. In the Europe 2020 strategy, the wish is expressed for more people to work, but also, explicitly, they are urged to work more and up to a higher age. Sustainable growth is to be understood in environmental terms, while inclusive growth focuses on vulnerable groups. While politics aims for a further expansion of paid work, not much is said about the quality of existing or future jobs, and there is concern that the quality of work is dropping off political agendas. Is this perceived shift of attention a legitimate fear?

The debate is troubled by an everlasting discussion on what is meant by good – or better – quality of work. It is not the aim of this study to give a conclusive answer to this question. Muñoz de Bustillo et al. (2009) provide a thorough review of approaches on job quality and point to the complexities. They consider the options for the development of an EU-wide composite index, but at the same time they point to the necessity of a set of indicators before even considering the challenges and drawbacks of composing an index. While the merits of such an approach would be great, researchers are most often only capable of focusing on a limited amount of indicators available in the data that are part of the complex concept of quality of work.

Rather than completing the quality of work puzzle, our interest goes to the impact of employment growth on the quality of work, since the 'more and better jobs' adage begs the question whether it is really to be expected that economic growth is to the advantage of all newcomers? As a matter of fact, few theories are optimistic about the link between economic growth and quality of work (well-known exceptions being Bell (1976) and Fourastié (1958)). Improvement was not foreseen in Adam Smith's view on the division of labour, stating that workers would be nothing but simple links in a complex production chain, ultimately losing the habit to think (Smith, 1976). Marx, in turn, described how a worker becomes estranged from his labour when it is no longer his property, as well as alienated when his labour is sold, notably for a price which is just enough to keep him alive (Marx, 1978). Both classic theories were echoed in the methods of Taylorism and in Braverman's view on the degradation of work (Braverman, 1975). It is the reflection of a pessimist view on progress, driven by rationality and exploitation, ending up in an 'iron cage', a world deprived of all sensations (Weber, 1976). This line of thinking may seem contradictory to the promises of European policy and old-fashioned in an ideological



sense, but in the eyes of the public, the future is to be feared, and more so for the have-nots (Dubet, 2006; Ester, Roman, & Vinken, 2003).

The statement of Marx that the more wealth a worker produces, the poorer he becomes, comes close to a later contribution by Baumol (1967) on the macroeconomics of unbalanced growth. Following his reasoning, rising productivity in industrial sectors leads to a shift of employment towards services. However, these services (e.g. nursing) do not have parallel productivity increases, hence the unbalanced growth. As a consequence, services become ever more expensive, putting downward pressure on costs and working conditions. While thus the shift towards fully fledged post-industrial economies in Europe is largely made, its implications are largely controversial. Is there an overall improvement of cleaner, knowledge-intensive service jobs (Bell, 1976), or are cost and competitive pressures driving down the quality of work? Recent investigations into low-wage and service work express some disillusionment with the promises of overall improvement of work in the service or knowledge society (Bolton & Houlihan, 2009) and express the need for political investment into institutions safeguarding the quality of work (Bosch, 2009).

Recently the origins of job quality dispersion received more attention from different perspectives. There is the (classical) description of a dual labour market, with good working conditions for the primary segment and worse for the secondary segment. The former often find themselves in the protected core of the company (Gallie, 2007a, p. 12; Lindbeck & Snower, 2002). One of the characteristics of the latter, in contrast, is job insecurity, which has become a major factor in the growing precariousness of work since employers, functioning in a competitive environment, impose more flexibility (Paugam & Zhou, 2007, p. 180). This has in some countries led to a shift of responsibility over job security from the employer to the state, a dynamic called 'flexisecurity' (Van Putten, Struyven, Vandenbrande, & Hendrickx, 2010; Wilthagen & Tros, 2003). Another cause of increasing precariousness brought forward is skill biased technological change. In an influential article, Autor, Levy & Murnane (2003) explore the effects of technological progress on the demand for routine and non-routine cognitive and manual workers. Considering a period of almost four decades, they find that the first effects of 'computerisation' were at the sector level. Later, occupational differences appeared, replacing both cognitive and manual routine labour with IT. As computers become cheaper, they will increasingly take over tasks that can be automatised. This implies that some white-collar workers, such as office clerks, while having had a high status in the past, face skills becoming obsolete. Together with the shift in employment composition, Autor et al. find a growing demand for high-skilled workers.

Skill biased technological change thus favours non-routine labour with high skill demands, skewing, when the demand is met, the income distribution to the left and leaving an empty space in the middle of the distribution. However, the shifts to a service economy, partly stimulated by this growing new upper class, also pushes up the number of jobs in the lower region of the income distribution. Goos and Manning (2007) find evidence for such a polarisation scenario in the UK. Remarkably, the growth for low-skilled service work does not come with an increase in pay levels. Supply surplus and a decline of unionisation (uncommon in service sectors) may explain this evolution, which is also interpreted as

having an impact on quality of work. In a later study the same polarisation pattern was also found for 16 European Union member states (Goos, Manning, & Salomons, 2009). However, the analysis in this case was based on an unbalanced set of 21 occupations in three categories, therefore inducing the conclusions by design. In fact, using the same data but with a quintile approach, Fernández-Macías (2010) does not find one homogeneous pattern of growth. If anything, the main trend appears to be one of upgrading rather than polarisation. However there is a vast diversity within Europe that should be acknowledged.

Therefore a comparative look is appropriate, shedding a light on the evolution of job quality from an international point of view. In this context, there is a divide between, on the one hand, convergence theories focusing on structural change of whole sectors and economies across national boundaries, possibly pushed forward by the existence of supranational institutions, and, on the other hand, divergence theories. The latter approach, emphasising the path-dependency of country-specific regimes and sets of institutions, is found in the literature on varieties of capitalism (Coates, 2000, 2005; P. A. Hall & Soskice, 2001; Whitley, 1999), which has been linked to quality of work for 'employment regimes' of seven EU member states by Gallie (2007a). This issue drew a lot of attention in the recent period of accelerating globalisation. Indeed, the division of labour is not limited by the fence of a factory and the sectors that shape the economy are no longer enclosed by the borders of a country. Independent from these structures (companies, sectors, countries), a process of activities termed a value chain exists *sui generis*, turning basic input factors into end products or services. The links of this chain are broader than mere occupations: Porter (1985) suggests the concept of loosely defined 'business functions', a set of activities lining up in the value chain or supporting other activities. Today's economic and political logic expanded this process across countries, resulting in the so called 'global value chain' (Huws et al., 2009; Sturgeon & Gereffi, 2009). This story has two sides: one leading to a heated political debate, inspired by fear, not only of a loss of jobs as a result of offshoring, but also of a downward levelling of working conditions due to international competition. Another view, supported by European economic policy, emphasises the opportunities in the context of globalisation, when a strategy of innovation and specialisation ultimately results in more welfare and a better quality of work.

## 2 A variety of patterns

There are very useful sources to trace the evolution of the economy at the sector level. Shifts in employment are observable and have an impact on aggregate levels of job quality. However, the common understanding of the impact of economic trends is about what is happening with occupations as we know them. The European studies in this respect have thus far not been entirely satisfying. A first problem is the lack of data. Because surveys are best studied at the level they were developed for, large scale surveys can only give reliable information at the European level or within Europe at either the sector or the country level. At lower levels, such as industries or occupations within countries, we do not have much coherent, comparable data. Researchers therefore have been creative in finding ways to overcome this problem. Goos & Manning (2007) for example turn the dependent variable into the basic unit of analysis: how do quantiles of a quality of work item evolve through time? But are quantiles in different countries comparable, or is it possible to impose the intervals found in one country to other countries? Applying a similar methodology, Fernández-Macías (2010) uses the in-depth data of the European Union Labour Force Survey (EU-LFS) and connects this with data on the quality of work. However, linking the occupations from one source to another source providing information on wages (such as the Structure of Earnings Survey of the EU-SILC), tears down the level of detail again.

In this paper, we want to make optimal use of the potential of the EU-LFS database to address the issues of job quality and employment growth at the occupational and sectoral levels. It is important to refrain from generalisations. As outlined, Fernández-Macías illustrated the multitude of different scenarios in the different EU Member States. Yet sector differences weren't fully dealt with. We learn from this that we are likely to find multiple patterns, over sectors and over countries, and choose a design to combine multiple levels. Avoiding generalisation also means turning back to the primary question: how is labour quality affected by the change in the structure of employment? We know by now how compositional effects change average job quality, still within-job evolutions remain a black box. The theories discussed, however, precisely have an impact on this level.

Finally, we have argued elsewhere for the detection of the patterns through an occupational clustering following the business function approach (Vandekerckhove/Ramioul 2011). Is it realistic to assume steady levels of quality of work of occupations, even in the short run, and explain changes in quality of work only through shifts in the composition of the labour force? Moreover, if there is a change in quality of work of an occupation or business function, in what way is this related to changes in employment levels? The line of thinking in the paper at hand is that effects of structure do not necessarily have to be one-on-one. For instance, a decline or improvement in job quality for service workers may be caused by structural changes in the composition of a sector apart from the number of service workers, e.g. more or less management, implying a change in the hierarchical structure, reflecting a fiercer competitive context or causing

productivity increases through synergy. In this paper, we aim to disentangle these structural changes in several steps. First, we need to find out which sectors are structurally growing in Europe. Second, we look for business functions within these sectors. Third, we plot the growth of these business functions and the patterns that appear in order to uncover diversity within Europe. Fourth, we do the same for quality of work. Finally, we compare both patterns to see if there is a correlation between changing structures and changing quality of work. In the next section, methodological issues will be addressed with regard to the proceeding of this analysis.

### 3 Methodology

#### 3.1 Balanced absolute and relative trends (BART)

In this paper we rely heavily on an innovative technique for measuring change, developed elsewhere (Vandekerckhove et al. 2010). In order to compare sector growth scales. It is a balanced scale for absolute and relative trend figures. Working with sector employment sizes relative to the national employment (share  $s_{it}$  for sector  $i$  at time  $t$ ), the BART scale is actually a weighted average of the absolute change in employment ( $s_{it} - s_{it-1}$ , expressed in percentage points) and the relative change in employment  $\frac{s_{it}}{s_{it-1}}$ , transformed in order to have the same dimension as absolute growth [-1;1]. The weights are the share in the base year  $s_{it-1}$  for relative growth and 1 minus this share for absolute growth. The formula is given below:

$BART_{it} = s_{it-1} \cdot RG_{it} + 1 - s_{it-1} \cdot (s_{it} - s_{it-1})$ , with

$$RG_{it} = \frac{\epsilon^{-1} - \exp\left(-\frac{s_{it}}{s_{it-1}}\right)}{1 - \epsilon^{-1}}, \text{ if } \frac{s_{it}}{s_{it-1}} \leq 1$$

$$RG_{it} = \frac{\epsilon^{-1} - \exp\left(-\frac{s_{it}}{s_{it-1}}\right)}{\epsilon^{-1}}, \text{ if } \frac{s_{it}}{s_{it-1}} > 1$$

As a result, the BART scale is always between -1 and 1. The technique can be applied to any evolution of percentage scores without a change but is most recommended in the case of declining marginal figures, such as the evolution of shares which are by definition correlated. The reason for averaging and weighting absolute and relative growth then is that, otherwise, changes for small figures will be more dramatic than the same absolute change in higher percentages. For example: a company with one hundred employees, one of which is a woman, hiring another woman will increase the share of women by 100% while a company of the same size with 50 women would only have a growth of 2%. This mode of calculation is of course correct but it is not informative about the change that is happening. Studying employment growth, we are not solely interested in minor sectors gaining ground nor do we speak of a revolution when large sectors, e.g. administration or education, face an increase or decrease of their share in national employment with a much higher percentage difference. The BART scale finds a way in-between, capturing the concept of 'structural growth'.

## 3.2 Data source and variables

The data used comes from the EU Labour Force Survey (EU-LFS). It is the most reliable source for EU wide employment statistics, including data for all member states and candidate member states. There are three ways to obtain EU-LFS data from Eurostat: online interactive tables, customs tables and microdata. Microdata restricts ISCO and NACE to 1-digit level for privacy reasons, so we opt for custom tables with aggregated counts, including fewer variables, but at a higher level of detail (ISCO 3-digit, NACE 2-digit). The main drawback here is that data are weighted and sometimes hidden because of deemed inaccuracy or a threat for privacy.

We chose the period 2000-2007 for several reasons. First, base and final year are peak moments in terms of employment and GDP. We can therefore compare the structure of the economy in both years as if business trend effects were controlled for. As a result, the fact that construction is known to be most sensitive to an upward swing of the economy is not as problematic as it generally is, as argued by Fernández-Macías (2010) citing Tschetter and Lukasiewicz (1983). Nevertheless, the groundless construction boom in Ireland and the Iberian Peninsula, driven by low interest rates (Kösters et al., 2010, p. 351), might be reflected in the data and disturbing the image. However, the period is found in between, and not during, major perturbations, such as the financial crisis of late 2008 and the first stage of convergence of the post-socialist economies in the 1990s. Second, in 2000 the Lisbon summit was held, which was of quintessential importance to the European employment policy. Moreover, at the European institutional level, we see an advancing integration of the EU with the accession of twelve Central and Eastern European member states between 2004 and 2007. Third, it is much harder to cover as many countries before 2000 since candidate member states only gradually signed in for the EU-LFS. Fourth, this is a period in which technological progress accelerated. For instance, the proportion of citizens in the EU-15 having used the internet in the previous 3 months rose from 41% to 62% in five years (2002- 2007).<sup>1</sup>

## 3.3 Quality of work measurement

In conventional schemes of quality of work, three areas are distinguished: work quality (work organisation), employment quality (wages and payment system, security and flexibility) and empowerment quality (skills and development, collective representation and voice) (Holman & McClelland, 2011). As noted earlier, the variables in the EU-LFS are insufficient to construct a composite index of quality of work. In fact, the variables that best fitted the quality of work framework were:

- Concerning the contract: permanency of the contract and full-time or part-time employment, wish to work more hours
- Concerning work-life balance: contractual and actual hours worked, working at home

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<sup>1</sup> Source: 'Computers and the Internet in households and enterprises', EUROSTAT, [http://epp.eurostat.ec.europa.eu/cache/ITY\\_SDDS/EN/isoc\\_ci\\_esms.htm](http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/EN/isoc_ci_esms.htm), own calculations

- Concerning irregular working schedules: shift work, evening work, Saturday work, Sunday work, working at night
- On job satisfaction: looking for another job
- On remuneration: income deciles

The question on job satisfaction is rather an outcome than a separate dimension of quality of work, and therefore often used as an overall measure, assuming it reflects the quality of work. Evidently, job satisfaction is just as well influenced by personality traits, and depending on reference groups. For instance, in times of crisis, an employee could feel lucky to have a job, ignoring negative characteristics that would otherwise bother him.

In much the same way, wages are often used as an approximation of job quality in general (Fernández-Macías & Hurley, 2008; Goos & Manning, 2007), although this is contested (Gallie, 2007a, p. 6). Despite the individual trade-off between amenities and salary, there is no correlation between wages and quality of work at the population level that could be explained by compensating wage differentials (Akerlof, Rose, Yellen, Ball, & R. E. Hall, 1988). Because of the correlation of wages with human capital, some authors use skill level as a measure of quality of work (Tåhlin, 2007), while still others use wages as a measure for skills levels (Green, 2006). All of this contradicts with the finding that there is a rather weak correlation between income level and job satisfaction. Many explanations can be thought of, but essentially it proves that neither job satisfaction nor wages or skill level can tell anything about variables other than themselves.

Because income deciles in the EU-LFS are poorly measured and because the job satisfaction variable suffers from many missing and hidden values, the most appropriate variable to analyze further is the permanency of the contract. Other contract variables, such as full-time or part-time employment, depend too much on country traditions; moreover, countries (as well as sectors) have different understandings of the number of working hours in a full-time job. Irregular working schedules then are very much dependent on the sector, with some sectors working around the clock or at typical leisure moments. In contrast, permanency of the contract has a consistent impact on the quality of work, providing security and ease to the employee. It is correlated to other aspects of quality of work (Gallie, 2007a, p. 8), but more than that, it interacts with their impact, as an employee having a temporary contract has a weakened position within the company and on the labour market and is therefore more prone to the negative effects of bad aspects quality of work (Paugam & Zhou, 2007, p. 181).

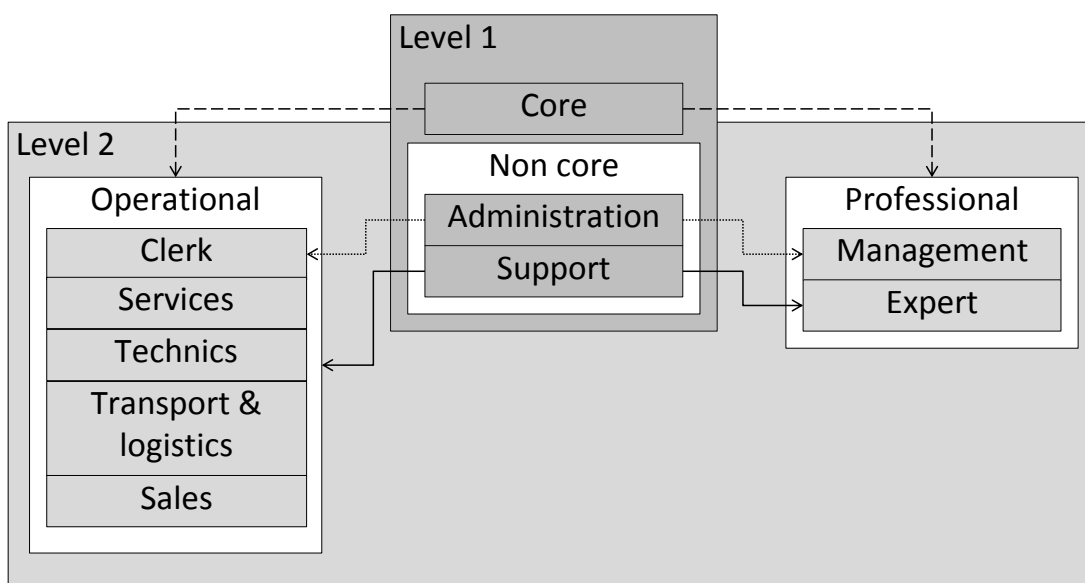
### 3.4 Business functions

The unit of analysis is the business function, which we discussed in a previous contribution (Vandekerckhove & Ramioul, 2011): In its simplest form it can be seen as a cluster of occupations within a sector. Based on previous conceptualisations (Brown, 2008; Dekocker & Wynants, 2009; Geurts, Coppin, & Ramioul, 2007; Huws et al., 2009; Porter, 1985), we distinguish business functions by their position and nature. The first level, the position, refers to the fact that functions can be either core to a sector or not. Generally, the core function is defined as the organisation's main characteristic activity,

which gives the company a competitive advantage (Kotler, Robben, & Geuens, 2004, p. 61), which is not necessarily the function where most added value is created. Non-core positions can be found in administration or other support functions. The second level, the nature, describes the content of the function in broad categories. Here we group professional functions on the one hand (managers, experts), and on the other hand operational functions (clerks, technical work, service work, sales and transport & logistics). Obviously, clerks and managers will generally have a position in administration, the exception being, for instance, management consultants.

The business function codings for the sectors studied in this paper can be found in the appendix. The interpretation of the categories at the second level is the following: managers have the authority in an organisation, they are always found in the first one-digit ISCO group. Experts are a very diverse group of professionals that would be interesting to dissect, but since the nature is highly determined by the sector and even company, we take all expert occupations together. They are mainly found in the second and partly in the third one-digit ISCO group and have high qualifications. Clerks are the operational workers in administration, they are found in the fourth one-digit ISCO group. Sales are all occupations where goods or services are sold by workers with lower qualifications: cashiers, teller, sales personnel, etc. Transport and logistics refers to drivers, pilots, lifting truck drivers, etc. Transport clerks are included in this group, but this does cause some noise, as some transport clerks themselves are mobile (on the road), while others have merely administrative office jobs. Technical work is manual production work in the field of constructing, and repairing infrastructure or goods. Service work or 'services', in contrast, is mostly oriented towards people (such as nursing or catering), or aimed at maintaining and protecting infrastructure (cleaning, security).

Figure 1: Applied two level business function typology



### 3.5 Cluster analysis

Theoretical views on welfare states (Esping-Andersen, 1990) and institutional theory (P. A. Hall & Soskice, 2001; Soskice, 1999) are commonly referred to in comparative social research of any kind. However, the possibilities to extend these typologies beyond their original domain is often problematic, as noted by Huws (2010) or at least unequivocal in its interpretation (Gallie, 2007b; Paugam & Zhou, 2007). An alternative, reverse approach is to cluster units directly by the dependent variables. Cluster analysis defines groups by their proximity in a space with as many dimensions as there are variables. In our case, the units are countries and the variables are BART scores on structural employment growth for each business function detected. We opted for Ward's linkage, which results in a balanced cluster solution. It is less sensitive to so called 'chaining', which is adding units to the same cluster one by one. On the other hand, it is more sensitive to outliers in the data due to the fact that it adds units, which provokes minimal increases within group variance. Also, as with all cluster options, it cannot handle units with missing variables. First of all, we cannot assume missing values in the data are random: they are caused by a smaller number of cases in some countries as a direct effect of the structure of the sector. Second, replacing missing values would result in outliers, and this has to be prevented as much as possible. Therefore, we installed a few criteria:

1. The data at the level of 2-digit NACE and 3-digit ISCO should cover at least 80% of all employment of a sector in a country. Let us recall that the business function classification was made for at least 90% of employment in 2007, but some more missing data is apparent in 2000. Countries that do not meet this criterion will likely have more missing values on the growth variables and will not be taken into consideration.
2. If a country has less than one third of the maximum number of business functions found in a sector in Europe, we would have to replace too many missing values or loose the case during the procedure. It is therefore skipped in advance.
3. The previous rule is important since, as a last criterion, we exclude business functions for which fewer than half of the remaining countries have valid numbers.

The few missing values left after imposing these criteria will be replaced by zero. As they represent absent business functions in both years, there was no change in their share of the sector and we should therefore assume zero growth.

Cluster analysis is an explorative and non-inferential method. The clusters suggested depend on the number of clusters one wishes to obtain. This can be arbitrarily chosen, depending on distances bridged when merging clusters, or based on 'stopping rules'. Stopping rules are preferable since they try to optimise the number of clusters by comparing, for instance, the growth of within and between group variance when adding groups. We use the Calinski-Harabasz rule, as suggested by Milligan & Cooper (1985). Still, this is not conclusive, for two reasons. First, it is possible to find multiple solutions. For clarity, we choose the optimum linked to the smallest number of groups. For the same reason, we also do not consider solutions with more than seven or less than three clusters. If, within this range, there is no optimum, the number of groups is chosen which



has the largest positive difference of the F-test statistic in comparison with a cluster solution with one group less.

## 4 Analysis

### 4.1 Selection of sectors

Our first exercise is to determine which sectors had structurally growing employment between 2000 and 2007. As outlined in the previous section, the period was chosen in order to make a peak-to-peak comparison of business trend moments, assuming the structure of an economy is best represented by employment figures in times of maximum employment.

We calculate the BART scores for each country separately. Figure 2 maps mean scores of economic sectors on the Y-axis and the standard deviation around the mean, as a measure for variation within the EU, at the X-axis. As growth and decline of shares are complementary, the sectors are spread equally on both sides of the zero line on the Y-axis. We are interested in sectors that have gained ground, so even though there is some growth between both peak moments (e.g. higher employment in 2007 than in 2000 in most countries), we only look at sectors that have a growing share in this period. It should be noted that this opens up the possibility that a sector which has grown in absolute terms (more employees) is considered structurally declining, because its growth is inferior to that in other sectors.

From the graph we can see that trends above the zero line are sharper and the variation between countries is larger than below the line. This is illustrated by the larger number of sectors to the right of the mean line on the Y-axis. One sector in the lower right part did not fit in the graph: agriculture, which was until recently a dominant sector in many of the newly acceded countries but is now superseded by other sectors and involving less labour due to capital intensification.

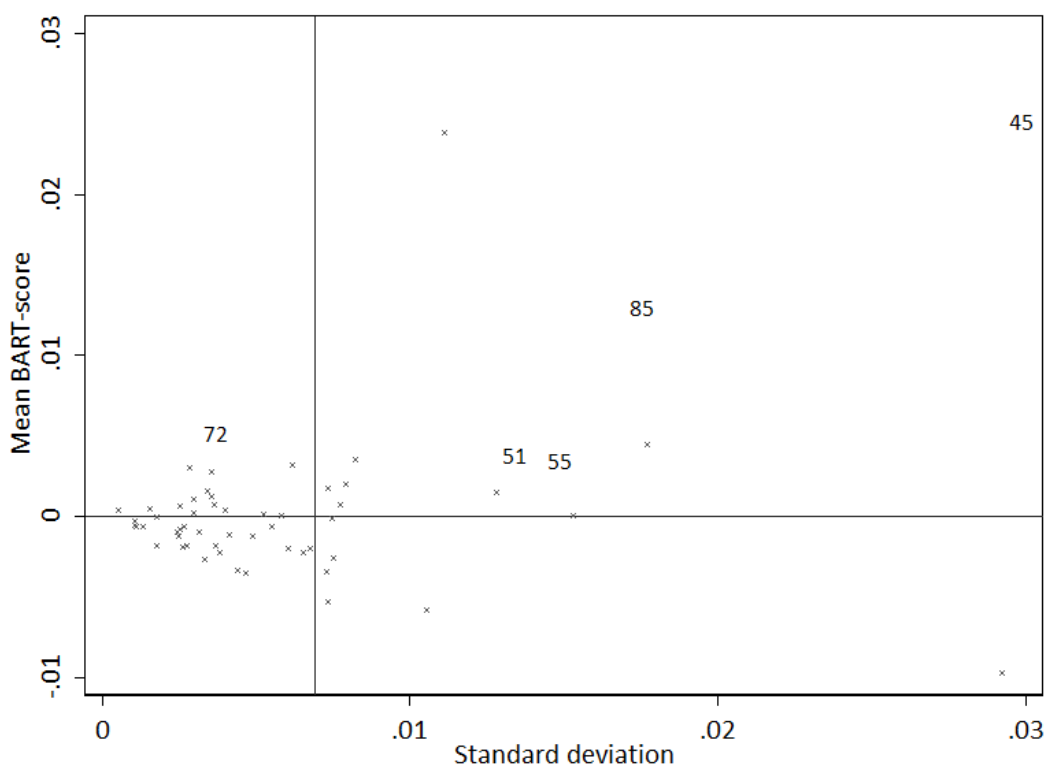
Overall, within the time range considered, most sectors have quite stable shares. The five sectors with the strongest structural growth are construction (45), business activities (NACE 74), health & social work (58), computer & related activities (72) and education (80). Since 'other business activities' as a sector is very heterogeneous, including consultancy companies, call centres and photographers, and education is a quasi-public sector, we further analysed construction, health & social work and IT.<sup>2</sup> Also added to these three sectors are retail (ranked sixth) and hotels & restaurants (ranked eighth), typical service sectors with low qualification requirements. These sectors are, on average, structurally growing sectors in Europe, but with the exception of IT, they do show strong dispersion over Europe. There is therefore often a different meaning to 'new and growing jobs' in the different member states. The substantial variation over countries (horizontal

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<sup>2</sup> The qualitative analysis of the WALQING project draws on these findings and includes, for further empirical investigation: Hotels & restaurants (HORECA), Construction, Health care, Waste and Cleaning.

spread), and the limited variation around the zeroline (vertical spread), are a warning to avoid generalising statements and a short-run focus on sector shifts in employment.

Figure 2: Average BART scores by sector in the EU-27 + Norway (excluding Poland)



Note: NACE rev. 1.1 codes used as labels for sectors analyzed in this paper.

## 4.2 Patterns of job growth

In this section we analyse, guided by cluster analysis, which countries have similar patterns regarding the employment growth of the business functions for a specific sector. Growth of business functions is calculated by using the BART score, which is appropriate for structural changes since a growing share of one function comes at the cost of a relative decrease in employment in another function. In order to better understand the patterns and the differences between them, we have synthesised the clusters by formulating hypotheses that can explain or at least describe the observed pattern. Some of these patterns can be brought back to the theories discussed, others originated from the observations in the data. For instance, if employment growth in a sector demonstrates a proportional rise of both administrative functions, this will be called a process of 'bureaucratisation'. 'Professionalisation' then implies a growth of management and expert functions and 'specialisation' would be a term to describe an increase of employment in core functions: we have labelled patterns as 'basic specialisation' when this concerns a single core function, and 'generalised specialisation' when more core functions have seen an expansion. We will use the term 'refocusing' when the evolution of a core function is contra-intuitive for the sector, signalling changes in the content of jobs, e.g. when technical jobs growth in retail while the core sales functions decrease. Evolutions of

support functions finally point in the direction of either 'horizontal integration' (insourcing, expansion of activities) or 'horizontal disintegration' (outsourcing, offshoring, ...).

#### 4.2.1 Construction

A cluster analysis for construction using the methodology outlined earlier results in seven clusters. Some of these clusters can be considered outliers within the EU: this is the case for Belgium and Estonia. Belgium is a case that combines bureaucratisation (growth of management and clerks) and professionalisation, while Estonia shows a tremendous decline in transport & logistics, possibly pointing in the direction of outsourcing in the transport sector or offshoring. The third cluster is similar to the Belgian case of bureaucratisation, but without professionalisation.

The fifth cluster has the largest number of countries, showing a rise in experts (e.g. architects), but proportionally less bureaucratisation. A growing demand for construction activities, supplied by a stable number of companies, may be the cause of this trend. Spain and Ireland, for example, belong to this cluster. Nevertheless, the figures are not extreme.

The sixth cluster has a very simple pattern, with a rise in core technical functions only. We call this basic specialisation because of the proportional growth of core operational functions, leading to a more streamlined, rationalised organisation model. The seventh cluster features the same trend, but in a very pronounced manner, and the second cluster may be close to this group of 'simple' patterns, as the growth of management includes the self-employed, who are numerous in this sector.

**Table 1: Patterns of growth in construction**

	Countries	Growth	Decline	Pattern
1	Belgium	Management Clerks Core experts	Core technicians	Bureaucratisation Professionalisation
2	Finland Lithuania	Management	Core experts Core technicians Support transport & logistics	Basic specialisation
3	Cyprus Denmark Romania	Management Clerks	Core experts Core technicians	Bureaucratisation
4	Estonia	Clerks Core experts Support sales	Support transport & logistics (pronounced)	Horizontal disintegration
5	Spain France Greece Hungary Ireland Netherlands Sweden UK	Core experts Support functions (moderate)	Management (moderate) Clerks (moderate)	Less bureaucratisation
6	Italy Latvia Norway Slovenia	Core technicians	Core experts Support transport & logistics Management Clerks	Basic specialisation
7	Bulgaria Slovakia	Core technicians (pronounced)	Core experts (pronounced) Management Clerks	Basic specialisation (pronounced)

### 4.2.2 Retail

In retail, the clustering procedure results in six clusters, the first of which is the largest, with one interesting finding: the growth of support technical functions. This is a pattern that is found across all clusters: retail activities broaden in scope and now include many kinds of processing and maintenance activities. Within support technical work, therefore, many operational functions that are identical to the functions at the core of other sectors will be found. This may suggest that the retail sector faces a trend of horizontal integration of adjacent activities from the value chain or is extending its range of activities by innovation.

The second cluster adds an expansion of logistics, which is easily understood, but also a decline in administration and, remarkably in this sector, less employment growth in sales. This decline in sales is even more pronounced in the third cluster, consisting only of Italy. Several explanations may be behind the figures. For example, there is possibly a compositional shift towards more business-to-business activities where expert-level brokers are involved. Another explanation is a rationalisation trend through, for example, self-scanning, internet sales or increased productivity. Common to these hypotheses is a refocusing of activities (with a decreasing core). Exactly the opposite refocusing trend is found in the fourth to sixth cluster, which all have more sales but fewer clerks. The main differences between the last three clusters are the growth in core experts in the sixth cluster (Denmark), in comparison with a decline in the fourth and fifth cluster.

Table 2: Patterns of growth in retail

	Countries	Growth	Decline	Pattern
1	Austria Spain Greece Slovakia	Support technicians	Core sales Management	Horizontal integration Refocusing
2	Bulgaria Portugal	Core experts (pronounced) Core transport & logistics Support technicians	Management Clerks Core sales	Less bureaucratisation Horizontal integration Refocusing
3	Italy	Management (pronounced) Core technicians	Core sales (pronounced)	Refocusing
4	Belgium Romania Sweden	Support technicians (pronounced) Core sales	Clerks (pronounced) Core experts Core transport & logistics	Horizontal integration Refocusing
5	Malta	Core sales Core transport & logistics Support technicians	Management Clerks Core experts (pronounced)	Less bureaucratisation Horizontal integration Refocusing
6	Denmark	Management Core experts (pronounced) Core sales Support technicians	Clerks (pronounced) Core transport & logistics (pronounced)	Horizontal integration Professionalisation Refocusing

### 4.2.3 Hotels & restaurants

In hotels & restaurants, six clusters appear. Four of them are mere outliers: Cluster 1 (Austria) bureaucratises, Cluster 2 (Italy) may point in the direction of self-employment or small companies and Cluster 6 (Romania) adds a pronounced decline of clerks to the

picture. The same decline of administration is found in Cluster 4 (Germany), where core services are on the rise, pointing to more employees in a stable number of companies.

Two clusters include the majority of countries with growth in hotels & restaurants. The third cluster is characterised by a growing proportion of core sales and services and less management, much like in the German case. In contrast, the fifth cluster shows a rise in management and fewer jobs in services, as has been expected to reflect a shift to smaller scale enterprises.

**Table 3: Patterns of growth in hotels & restaurants**

	Countries	Growth	Decline	Pattern
1	Austria	Management (pronounced) Clerks	Core services (pronounced)	Bureaucratisation
2	Italy	Management (pronounced) Core sales	Clerks Core services (pronounced)	Basic specialisation
3	Belgium Spain Greece Sweden Slovenia Slovakia	Core sales Core services	Management	Generalised specialisation
4	Germany	Core services (pronounced)	Management Clerks	Less bureaucratisation Basic specialisation
5	Bulgaria Czech Republic Denmark Hungary Netherlands Portugal UK	Management	Core services	Basic specialisation
6	Romania	Management Core sales	Clerks (pronounced) Core services	Basic specialisation

#### 4.2.4 IT

There are six clusters of patterns of growth in IT. The largest cluster is the third, with the odd combination of more management and fewer clerks. For now, the observation is more important than the explanation, but some thoughts can be expressed. For example, a general rise in skills combined with rising skill demands due to the technical complexity of work may elevate clerks to the professional level. Also, some tasks may have been taken up by other functions, become less intensive through computerisation, or may have been outsourced or offshored. For the local organisation this represents a small-scale shift or basic specialisation. The fourth cluster (Romania) has the same characteristics, but more pronounced. A common pattern in the other clusters is the growth of support sales, pointing to a more commercial, consumer-oriented structure of the sector. This is clear in the first and second cluster, where core functions that were former support functions in other sectors, are now on the decline – a sign of maturing. On the other hand, in the fifth and sixth cluster, this specialisation (growing core functions) is still apparent.

Table 4: Patterns of growth in IT

	Countries	Growth	Decline	Pattern
1	Austria Hungary	Management (pronounced) Clerks Support sales	Core experts (pronounced) Core technicians	Bureaucratisation Commercialisation Horizontal integration
2	Belgium Netherlands Norway	Support sales	Management Core experts	Less professionalisation Commercialisation
3	Germany Spain Finland Sweden UK	Management	Clerks	Basic specialisation
4	Romania	Management (pronounced)	Clerks (pronounced)	Basic specialisation
5	Czech Republic France	Core experts Core technicians	Management (pronounced) Clerks (pronounced)	Less bureaucratisation Basic specialisation
6	Italy	Management Core experts (pronounced) Core sales	Clerks (pronounced) Core technicians	Professionalisation Commercialisation

#### 4.2.5 Health & social work

Health & social work only has a small number of patterns, which are almost exact opposites. In the first and third cluster, core services grow and core experts are relatively diminishing. In the second cluster the reverse is true. In all three clusters, there is a rise in management.

Table 5: Patterns of growth in health &amp; social work

	Countries	Growth	Decline	Pattern
1	Austria Czech Republic Hungary Ireland Italy UK	Core services (pronounced) Management	Core experts	Basic specialisation
2	Belgium Cyprus Germany Denmark Spain France Greece Luxemburg Netherlands Norway Portugal Romania Slovenia	Management (moderate) Core experts (moderate)	Core services	Professionalisation
3	Finland	Core services (pronounced) Management	Core experts (pronounced) Clerks Support technicians	Basic specialisation

### 4.3 Changing quality of work: temporary contracts

In the next step of our analysis, we performed a similar analysis but looked at the evolution of temporary work as our selected key indicator for the quality of work. In this case, change is measured as a percentage difference between 2007 and 2000. Although we have argued that permanency of the contract is a good indicator of quality of work, in the sense that it is linked to and interacts with other aspects of job quality, it is by no means a reflection of the overall quality of work. Still, temporary contracts provoke insecurity, imply a demand for company-driven flexibility and will thus generally lower the quality of work.

Again, hypotheses will be linked to the observed patterns found over the countries which showed a structural growth in the sector. It should be said, however, that there were no clear discriminating functions when retroactively predicting clusters through discriminant analysis. This means that in many or most cases, the patterns will largely overlap. It is nevertheless interesting to look at the differences that do appear or the differences in size, and it certainly does not mean there has been no change in the quality of work.

We will find a 'specific' and 'generalised' growth in precarious work when temporary contracts become more frequent for one or more functions. Conversely, a decline in temporary contracts is interpreted as work becoming less precarious. Whenever operational functions show an increasing proportion of temporary contracts while this indicator of quality of work is improving for professional functions, there is 'polarisation'. We will use the term 'skill biased change in precariousness' when the polarisation particularly hits clerks, based on the idea that it is routine non-manual work that comes under pressure, at least in terms of employment security.

#### 4.3.1 Construction

The patterns of change in the proportion of temporary contracts cluster into six groups. There is one outlier, Spain, where almost every business function has an increasing number of temporary contracts, except for support sales. We might refer to this as an example of generalised increase of precarious work. The two dominant patterns, though, are found in the first and fifth cluster. The first cluster is relatively stable in terms of quality of work, with a slight worsening of the contracts for core experts and improvement for support services and managers. The fifth is more polarised, with better conditions for managers, experts and sales personnel and worse for other operational functions. The sixth cluster can be seen as a more pronounced version of the fifth.

The second and third cluster have some similarity too, with more temporary contracts for operational technical and logistics functions, and less for managers and support services as a common characteristic.

Table 6: Changing quality of work in construction: temporary contracts (2007-2000)

	Countries	More temporary contracts	Less temporary contracts	Pattern
1	Belgium Bulgaria Cyprus Estonia Lithuania Latvia	Core experts	Management Support services	Specific precarious work Specific improvement
2	Denmark Hungary Norway Romania	Core technicians (pronounced) Support transport & logistics	Management (pronounced) Support services Support sales	Polarisation Specific improvement
3	France Greece	Clerks Core technicians (pronounced) Support transport & logistics (pronounced)	Management (pronounced) Support services (pronounced)	Skill biased change in precariousness Polarisation
4	Spain	Management Clerks (pronounced) Core experts (pronounced) Core technicians (pronounced) Support services (pronounced) Support transport & logistics (pronounced)	Support sales (pronounced)	Generalised precarious work
5	Ireland Italy Netherlands Sweden Slovakia UK	Clerks Core technicians Support services (pronounced) Support transport & logistics	Management Core experts Support sales (pronounced)	Skill biased change in precariousness Polarisation
6	Finland Slovenia	Clerks (pronounced) Core technicians (pronounced) Support services (pronounced) Support transport & logistics	Management Core experts Support sales	Skill biased change in precariousness Polarisation

#### 4.3.2 Retail

In retail, three clusters are retrieved. In all three, clerks have weaker contracts and managers more jobs security, fitting the idea of skill biased change in precariousness. The first and third cluster reward core sales and support services with more permanent contracts, contrary to the second cluster, which is therefore more polarising.



Table 7: Changing quality of work in retail: temporary contracts (2007-2000)

	Countries	More temporary contracts	Less temporary contracts	Pattern
1	Austria Denmark Spain Greece Italy	Clerks (pronounced) Core transport & logistics	Management Core experts Core sales Support services	Skill biased change in precariousness Specific improvement
2	Belgium Portugal Sweden	Clerks Core sales (pronounced) Support services (pronounced)	Management Core experts	Skill biased change in precariousness Polarisation
3	Bulgaria Malta Romania	Clerks Core experts Core transport & logistics	Management (pronounced) Core sales Support services	Skill biased change in precariousness
	Slovakia	No data	No data	

#### 4.3.3 Hotels & restaurants

In hotels & restaurants, again a three cluster solution is obtained and skill biased change in precariousness is consistently present in administration. In the first cluster, an improvement in working conditions for support transport & logistics and more temporary contracts for support technicians are visible, and the reverse is found in the second cluster. Restructuring effects are the most likely cause of such a mixed finding. In contrast with the first two clusters, the third (the Netherlands) shows a brighter picture for core services and most other functions, showing a clear improvement pattern.

Table 8: Changing quality of work in hotels & restaurants: temporary contracts (2007-2000)

	Countries	More temporary contracts	Less temporary contracts	Pattern
1	Bulgaria Hungary Portugal Sweden	Clerks (pronounced) Core services Core sales Support technicians	Management (pronounced) Support transport & logistics (pronounced)	Skill biased change in precariousness Specific precarious work Specific improvement
2	Czech Rep. Greece Italy Slovenia Slovakia UK	Clerks Core services (pronounced) Support transport & logistics (pronounced)	Management (pronounced) Core sales Support technicians	Skill biased change in precariousness Specific precarious work Specific improvement
3	Netherlands	Clerks (pronounced)	Management (pronounced) Core services (pronounced) Core sales Support technicians (pronounced) Support transport & logistics (pronounced)	Skill biased change in precariousness Generalised improvement
	Austria Belgium Germany Denmark Spain Romania	No data	No data	

#### 4.3.4 IT

In IT, the picture is, at first sight, very diverse, as the cluster analysis returns five groups with small cell counts. The first cluster is indeed quite atypical, with more insecure contracts for managers, core experts and core technicians. It seems that there is a generalised demand for flexibility, hitting the main business functions. Sales, on the other hand, is valued higher than before in terms of jobs security, which is also the case in Clusters 2 (Spain) and 3 (Norway). In the other clusters, however, we consistently find the impact of skill differences on working conditions in administration, even more pronounced in Clusters 3, 4 and 5 because of the improving contracts for core experts and increasing job insecurity for operational functions. These clusters are therefore considered cases of polarisation.

Table 9: Changing quality of work in IT: temporary contracts (2007-2000)

	Countries	More temporary contracts	Less temporary contracts	Pattern
1	Austria Germany	Management Core experts Core technicians (pronounced)	Support sales (pronounced)	Generalised precarious work Specific improvement
2	Spain	Clerks (pronounced) Core technicians (pronounced)	Core experts (pronounced) Support sales (pronounced)	Skill biased change in precariousness Specific improvement
3	Norway	Clerks (pronounced) Core technicians (pronounced)	Management (pronounced) Core experts Support sales (pronounced)	Skill biased change in precariousness Polarisation Specific improvement
4	Belgium Czech Rep. Hungary Italy UK	Clerks Support sales	Management Core experts Core technicians	Skill biased change in precariousness Specific improvement
5	Netherlands Sweden	Clerks (pronounced) Core technicians Support sales	Management Core experts (pronounced)	Skill biased change in precariousness Polarisation
	Finland France Romania	No data	No data	

#### 4.3.5 Health & social work

Health & social work has the most coherent pattern of changing quality of work. The first cluster contains almost all countries and seems idiosyncratic, unrelated to the common trends. Two countries form separate clusters: Cluster 2 (Finland), with a clear deterioration except for core functions, and Cluster 3 (France), where temporary contracts in administration are growing, to the advantage of managers, and operational support functions, other than services, are faced with more insecurity.

Table 10: Changing quality of work in health & social work: temporary contracts (2007-2000)

	Countries	More temporary contracts	Less temporary contracts	Pattern
1	Austria Belgium Cyprus Czech Rep. Germany Denmark Spain Greece Hungary Ireland Italy Luxemburg Netherlands Norway Portugal Slovenia UK	Clerks Core experts Support services	Core services Support transport & logistics	Specific precarious work Specific improvement
2	Finland	Management Clerks (pronounced) Support services (pronounced) Support transport & logistics (pronounced)	Core experts Core services	Generalised precarious work
3	France	Clerks (pronounced) Support technicians (pronounced) Support transport & logistics (pronounced)	Management (pronounced) Core services Support services (pronounced)	Skill biased change in precariousness
	Romania	No data	No data	

#### 4.4 Patterns of job growth and changing quality of work

In this last section, we will link the patterns of job growth with the clusters found based on changes in quality of work. Because of the data reduction and the stress on the importance of structures, there will mostly be more cells in the matrix crossing both pattern categories than units, so even small sample statistical tests are impossible. Emphasis will therefore be put on the interpretation of dominant combinations of the two patterns, which would provide evidence of a link of which the direction of the causality is not defined. Quality of work inducing shifts in employment, or the restructuring of a sector may provoke changing quality of work. Yet the first question is whether there is such a link, or, put otherwise, whether it is possible for different patterns of job growth to go together with patterns of better or worse quality of work. The countries in the matrix can in this sense serve as examples of good or bad practices.

##### 4.4.1 Construction

The business function/quality-of-work change matrix for construction shows one junction with a modal number of countries: the combination of less bureaucratisation and skill biased change in precariousness/polarisation. The best interpretation of this case is the

growing importance of core experts, who are on the rise proportionally in terms of employment and have secure labour contracts, thus causing one side of the polarisation. The relative shrinking of administrative functions that are divided in terms of quality of work causes the other, not necessarily because of their decreasing share in the sector.

Further, the matrix can be looked at from two perspectives: with either the employment growth or the quality of work as a starting point. From the business function perspective, it is interesting to see that the cluster with less bureaucratisation and a larger share of experts is twice found in clusters with skill biased change in precariousness, and in three clusters with polarisation. This is much in line with the interpretation of the modal combination discussed. From the perspective of the quality of work, the first cluster with limited change can be found in any changing business function pattern, except for less bureaucratisation. The second quality-of-work cluster is oddly distributed over more and less bureaucratizing countries and can be linked to a growing share of core experts in the third and sixth growth cluster only. Finally, the crowded pattern of skill biased change in precariousness and polarisation is more pronounced in the last three clusters, which have a declining share of managers. It seems therefore that fewer managers benefit from better working conditions.

**Table 11: Evolution of business function configurations and changing quality of work in construction**

<b>QOW</b> <b>BF</b>	1 Specific precarious work Specific improvement	2 Polarisation Specific improvement	3 Skill biased change in precariousness Polarisation	4 Generalised precarious work	5 Skill biased change in precariousness Polarisation	6 Skill biased change in precariousness Polarisation
1 Bureaucratisation Professionalisation	Belgium					
2 Basic specialisation	Lithuania					
3 Bureaucratisation	Cyprus	Denmark Romania				
4 Horizontal disintegration	Estonia					
5 Less bureaucratisation		Hungary	France Greece	Spain	Netherlands Ireland Sweden UK	
6 Basic specialisation	Latvia	Norway			Italy	Slovenia
7 Basic specialisation	Bulgaria				Slovakia	

#### 4.4.2 Retail

For retail, a variety of (overlapping) patterns was found, but only the change of quality of work was univocally towards skill biased change in precarious work. Still, some specific functions saw an improvement of quality of work. Mainly core sales in the first cluster of both dimensions is an example of this. Overall, though, the main conclusion for this sector is that the changing content (refocusing of activities and horizontal integration) goes

together with more precarious work and that a refocusing towards commercialisation improves the working conditions of core sales staff.

**Table 12: Evolution of business function configurations and changing quality of work in retail**

QOW BF		1	2	3	9
		Skill biased change in precariousness Specific improvement	Skill biased change in precariousness Polarisation	Skill biased change in precariousness Specific precarious work Specific improvement	n.a.
1	Horizontal integration Refocusing	Austria Spain Greece			Slovakia
2	Less bureaucratisation Horizontal integration Refocusing		Portugal	Bulgaria	
3	Refocusing	Italy			
4	Horizontal integration Commercialisation		Belgium Sweden	Romania	
5	Less bureaucratisation Horizontal integration Refocusing			Malta	
6	Horizontal integration Professionalisation Refocusing	Denmark			

#### 4.4.3 Hotels & restaurants

For hotels & restaurants, we see two dominant shifts in employment: basic and generalised specialisation. Generalised specialisation is mainly found in the second quality-of-work cluster, which again is not very different from the first quality-of-work cluster, the main difference being a weakened position of core sales in the first cluster and strengthened contracts in the second and the reverse for support transport & logistics. Basic specialisation is distributed over the different quality-of-work groups.

From the view point of changing quality of work, the first cluster, with more employment insecurity for core sales, services and clerks, is found in the fifth growth cluster, with a growth in management and less core services. Basic specialisation seems to entail quite some growth in precarious work. The second large quality-of-work cluster, in which core sales, managers and support technical work fare well, is found in the third growth cluster as mentioned before, but equally in the group of basic specialisation. The effect is thus not inevitable, but again, clerks and core services face more temporary contracts.

**Table 13: Evolution of business function configurations and changing quality of work in hotels & restaurants**

QOW BF		1	2	3	9
		Skill biased change in precariousness Specific precarious work Specific improvement	Skill biased change in precariousness Specific precarious work Specific improvement	Skill biased change in precariousness Generalised improvement	n.a.
1	Bureaucratisation				Austria
2	Basic specialisation		Italy		
3	Generalised specialisation	Sweden	Greece Slovenia Slovakia		Belgium Spain
4	Less bureaucratisation Basic specialisation				Germany
5	Basic specialisation	Bulgaria Hungary Portugal	Czech Rep. UK	Netherlands	Denmark
6	Basic specialisation				Romania

#### 4.4.4 IT

In IT, there is not a single combination of patterns with more than one country, so the picture seems very scattered. There is one dominant pattern in employment growth (Row 3), with a mere shift towards management and away from clerks. Only in the UK and Sweden, this is paired with more permanent contracts for managers, while clerks have worse job security in all cases.

The dominant pattern from the point of view of quality of work (Column 4), a clear case of polarisation based on skills, is found in each type of growth pattern. It seems therefore reflecting general trends rather than effects caused by the changing structure of the sector.

**Table 14: Evolution of business function configurations and changing quality of work in IT**

QoW BF		1	2	3	4	5	9
		Generalised precarious work Specific improvement	Skill biased change in precariousness Specific improvement	Skill biased change in precariousness Polarisation Specific improvement	Skill biased change in precariousness Specific improvement	Skill biased change in precariousness Polarisation	n.a.
1	Bureaucratisation Commercialisation Horizontal integration	Austria			Hungary		
2	Less professionalisation Commercialisation			Norway	Belgium	Netherlands	
3	Basic specialisation	Germany	Spain		UK	Sweden	Finland
4	Basic specialisation						Romania
5	Less bureaucratisation Basic specialisation				Czech Rep.		France
6	Professionalisation Commercialisation				Italy		

#### 4.4.5 Health & social work

The last sector, health & social work, has a much smaller matrix. One trend is dominating, and it is rather limited: some more temporary contracts for clerks, core experts and support services, while core services and support transport & logistics get more permanent contracts. This pattern of quality of work is spread over the first growth cluster with fewer core experts, and the second, with more core experts. There are two exceptional cases. One is France, which shows a strong trend towards skill biased change in precariousness, but favours core and support services, while there is no movement in any of these functions except core services. If caused by a changing structure of the market, it is not a one-on-one relationship. The second being Finland, where core functions have more job security in contrast to administrative functions, in a context of basic specialisation: a movement towards management, core-services organisations.

**Table 15: Evolution of business function configurations and changing quality of work in health & social work**

QOW BF		1	2	3	9
		Specific precarious work Specific improvement	Generalised precarious work Specific improvement	Skill biased change in precariousness	n.a.
1	Basic specialisation	Austria Czech Rep. Hungary Ireland Italy UK			
2	Professionalisation	Belgium Cyprus Germany Denmark Spain Greece Luxemburg Netherlands Norway Portugal Slovenia		France	Romania
3	Basic specialisation		Finland		

## 5 Conclusion

The European Union has lofty ambitions regarding employment growth: to become a knowledge intensive economy with more *and* better jobs. But labour demand curves rarely slope positively, not for wages and maybe not for other characteristics of work. Critical academics have drawn dualistic images of the evolution of job quality and its importance for life quality is so important that quality of work concerns and worries all.

We aimed to assess the link between job growth and quality of work from an occupational point of view. This is complementary to many studies that have already mapped

compositional shifts in the structure of the economy, influencing the average quality of work by changes in sector employment. We developed a method to measure the average structural change of the economies in the EU member states but did not find tremendous shifts in a seven year time span. Still, some dispersed trends appear from the sector point of view. We selected five sectors (construction, retail, hotels & restaurants, IT and health & social work) that make up the top of the ranking of average sector growth in Europe. As envisioned by the EU policies' objectives, IT is universally growing. However, the employment growth in other sectors is more geographically spread. This is a first remark for the existing takes on labour market evolutions in Europe which are often generalising, partly due to the dominance of the few big member states in European statistics.

Next, we looked at the movement within these growing sectors, making use of the business function typology. We believe this offers a way of discovering effects of company restructuring on the labour market since a changing composition of sectors mirrors a changing division of labour both within and between companies. These configurations, at the sector level within countries, again tend to be different and develop differently across member states. This is fully understandable from the theoretical perspectives: competition, globalisation, technological and organisational change interact with sector and countries specificities and lead to a variety of patterns of growth. As a consequence, we expect a variety of ways in which these changing structures translate into changing quality of work.

The data used for the research was the EU-Labour Force Survey, a very large and detailed survey that is almost unique in its sort. Unfortunately, its use has not yet been stretched to the limits. Distilling occupational information with the business function framework resulted in a number of pattern dimensions found in the sectors: bureaucratisation, specialisation, horizontal integration and refocusing. We have described these patterns for all five selected sectors, but the main finding is that the vast variety of patterns does not fit conventional institutional theory.

The same exercise for changing quality of work turned out differently. We shed some light on the permanency of employment contracts, an important aspect of employment security. Here, the patterns of changing quality of work were more similar. There is consistent skill biased change in precariousness in administration in all sectors and some more polarisation in construction for many countries. The functions that step in for specific improvement depend on both countries and sector. The position of sales is a good example of this, improving or declining in quality of work in almost all sectors in about an equal number of countries. The same 'split in half' situation affects core technicians in IT and core experts in construction. The findings show good and bad practices in the field of quality of work and provide evidence that changes in the quality of work are also present at the functional level. In other words: from a longitudinal point of view, notwithstanding the short-run time range, the same jobs had either more or less temporary contracts, and therefore the sense of job security changed.

In a last section, we constructed matrices combining the dimensions of growth and quality of work. Despite careful consideration of the methodology and interpretation of the



patterns, no strong relations between changes in the structure of the selected sectors and changes in employment security at the functional level were found. It seems that many more factors come into play other than the structure. For an understanding of the evolution of the quality of work, these other factors (tradition, competition, demographics, education, etc.) should be considered. Nevertheless, it has been a premise that this context has an impact on the structure of sectors, and the fact that different patterns of growth exist despite a strong general pressure on the quality of work, may open up possibilities for change and improvement. Learning from international experience will be a key element for this, and the exploration provided here can be used as a reference for tackling the challenge to make new jobs better.

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## 7 Appendix

### 7.1 Business functions

#### 7.1.1 Construction

Table 16: Business functions in construction

Business function	Occupation
Administration clerks	343 Administrative associate professionals 410 Office clerks <sup>3</sup> 411 Secretaries and keyboard-operating clerks 412 Numerical clerks 419 Other office clerks
Administration management	121 Directors and chief executives 122 Production and operations managers 123 Other specialist managers 130 Managers of small enterprises 131 Managers of small enterprises 241 Business professionals 244 Social science and related professionals
Core experts	214 Architects, engineers and related professionals 311 Physical and engineering science technicians;
Core technicians	611 Market gardeners and crop growers 712 Building frame and related trades workers 713 Building finishers and related trades workers 714 Painters, building structure cleaners and related trades workers 721 Metal moulders, welders, sheet-metal workers, structural-metal preparers, and related trades workers 722 Blacksmiths, tool-makers and related trades workers 723 Machinery mechanics and fitters 724 Electrical and electronic equipment mechanics and fitters 742 Wood treaters, cabinet-makers and related trades workers 828 Assemblers 833 Agricultural and other mobile plant operators 931 Mining and construction labourers 932 Manufacturing labourers
Support sales	341 Finance and sales associate professionals;
Support service operational	913 Domestic and related helpers, cleaners and launderers 914 Building caretakers, window and related cleaners 915 Messengers, porters, doorkeepers and related workers
Support transport & logistics	413 Material-recording and transport clerks 832 Motor vehicle drivers 933 Transport labourers and freight handlers

<sup>3</sup> ISCO-codes ending with 0 point to a 2-digit coding

## 7.1.2 Retail

Table 17: Business functions in retail

Business function	Occupation
Administration clerks	343 Administrative associate professionals 410 Office clerks 411 Secretaries and keyboard-operating clerks 412 Numerical clerks 414 Library, mail and related clerks 419 Other office clerks 421 Cashiers, tellers and related clerks 422 Client information clerks
Administration management	110 Legislators and senior officials 121 Directors and chief executives 122 Production and operations managers 123 Other specialist managers 130 Managers of small enterprises 131 Managers of small enterprises
Core sales	520 Models, salespersons and demonstrators 522 Shop, stall and market salespersons and demonstrators 911 Street vendors and related workers
Core experts	211 Physicists, chemists and related professionals 213 Computing professionals 214 Architects, engineers and related professionals 222 Health professionals (except nursing) 241 Business professionals 244 Social science and related professionals 245 Writers and creative or performing artists 311 Physical and engineering science technicians 312 Computer associate professionals 341 Finance and sales associate professionals 342 Business services agents and trade brokers
Support experts	315 Safety and quality inspectors
Support services	512 Housekeeping and restaurant services workers 913 Domestic and related helpers, cleaners and launderers 915 Messengers, porters, doorkeepers and related workers 916 Garbage collectors and related labourers
Support technicians	611 Market gardeners and crop growers 613 Crop and animal producers 712 Building frame and related trades workers 713 Building finishers and related trades workers 721 Metal moulders, welders, sheet-metal workers, structural-metal preparers, and related trades workers 722 Blacksmiths, tool-makers and related trades workers 723 Machinery mechanics and fitters 724 Electrical and electronic equipment mechanics and fitters 740 Other craft and related trades workers 741 Food processing and related trades workers 742 Wood treaters, cabinet-makers and related trades workers 812 Metal-processing plant operators 826 Textile-, fur- and leather-products machine operators 827 Food and related products machine operators 829 Other machine operators not elsewhere classified 921 Agricultural, fishery and related labourers 931 Mining and construction labourers 932 Manufacturing labourers
Core transport & logistics	413 Material-recording and transport clerks 832 Motor vehicle drivers 833 Agricultural and other mobile plant operators 933 Transport labourers and freight handlers

## 7.1.3 Hotels &amp; restaurants

Table 18: Business functions in hotels &amp; restaurants

Business function	Occupation (3--digit ISCO)
Administration clerks	343 Administrative associate professionals 412 Numerical clerks 419 Other office clerks
Administration management	121 Directors and chief executives 122 Production and operations managers 123 Other specialist managers 131 Managers of small enterprises 241 Business professionals 244 Social science and related professionals 341 Finance and sales associate professionals
Core sales	422 Client information clerks 522 Shop, stall and market salespersons and demonstrators
Core services	347 Artistic, entertainment and sports associate professionals 512 Housekeeping and restaurant services workers 513 Personal care and related workers 514 Other personal services workers 741 Food processing and related trades workers 911 Street vendors and related workers 913 Domestic and related helpers, cleaners and launderers 914 Building caretakers, window and related cleaners 915 Messengers, porters, doorkeepers and related workers
Core experts	342 Business services agents and trade brokers 346 Social work associate professionals
Support sales	421 Cashiers, tellers and related clerks, service operational 516 Protective services workers,
Support technical	712 Building frame and related trades workers 713 Building finishers and related trades workers 723 Machinery mechanics and fitters 724 Electrical and electronic equipment mechanics and fitters 931 Mining and construction labourers
Support transport & logistics	413 Material-recording and transport clerks 832 Motor vehicle drivers

## 7.1.4 IT

Table 19: Business functions in IT

Business function	Occupation (3-digit ISCO)	
Administration clerks	343	Administrative associate professionals
	412	Numerical clerks
	419	Other office clerks
Administration management	121	Directors and chief executives
	122	Production and operations managers
	123	Other specialist managers
	131	Managers of small enterprises
	241	Business professionals
	244	Social science and related professionals
	341	Finance and sales associate professionals
Core sales	422	Client information clerks
	522	Shop, stall and market salespersons and demonstrators
Core services	347	Artistic, entertainment and sports associate professionals
	512	Housekeeping and restaurant services workers
	513	Personal care and related workers
	514	Other personal services workers
	741	Food processing and related trades workers
	911	Street vendors and related workers
	913	Domestic and related helpers, cleaners and launderers
	914	Building caretakers, window and related cleaners
	915	Messengers, porters, doorkeepers and related workers
Core experts	342	Business services agents and trade brokers
	346	Social work associate professionals
Support sales	421	Cashiers, tellers and related clerks, service operational
	516	Protective services workers,
Support technical	712	Building frame and related trades workers
	713	Building finishers and related trades workers
	723	Machinery mechanics and fitters
	724	Electrical and electronic equipment mechanics and fitters
	931	Mining and construction labourers
Support transport & logistics	413	Material-recording and transport clerks
	832	Motor vehicle drivers



## 7.1.5 Health &amp; social work

Table 20: Business functions in health &amp; social work

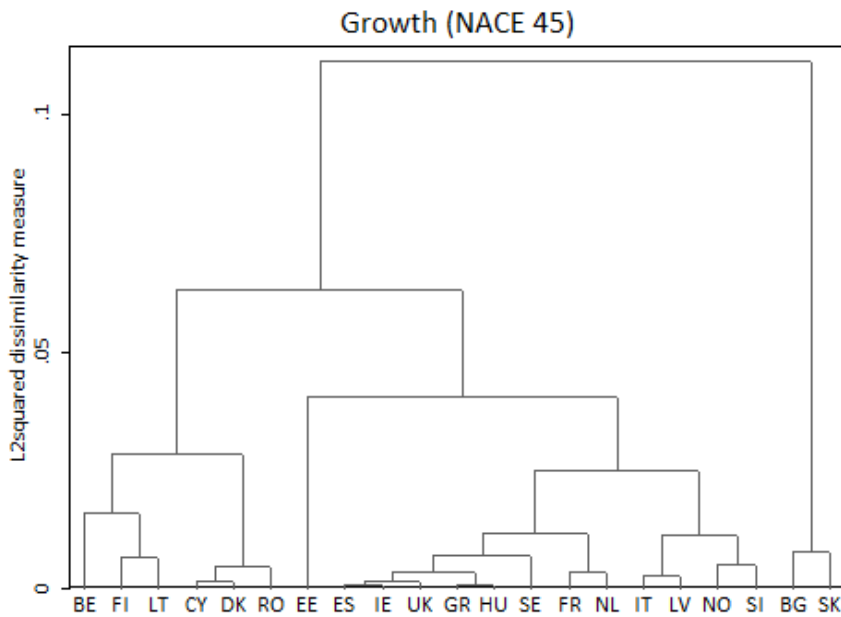
Business function	Occupation
Administration clerks	343 Administrative associate professionals 410 Office clerks 411 Secretaries and keyboard-operating clerks 412 Numerical clerks 419 Other office clerks
Administration management	120 Corporate managers 121 Directors and chief executives 122 Production and operations managers 123 Other specialist managers 131 Managers of small enterprises 241 Business professionals 244 Social science and related professionals
Core experts	213 Computing professionals 214 Architects, engineers and related professionals 243 Archivists, librarians and related information professionals 245 Writers and creative or performing artists 311 Physical and engineering science technicians 312 Computer associate professionals 347 Artistic, entertainment and sports associate professionals
Core technicians	724 Electrical and electronic equipment mechanics and fitters 800 Plant and machine operators and assemblers 932 Manufacturing labourers
Support sales	341 Finance and sales associate professionals 342 Business services agents and trade brokers 522 Shop, stall and market salespersons and demonstrators

## 7.2 Dendrograms

### 7.2.1 Construction

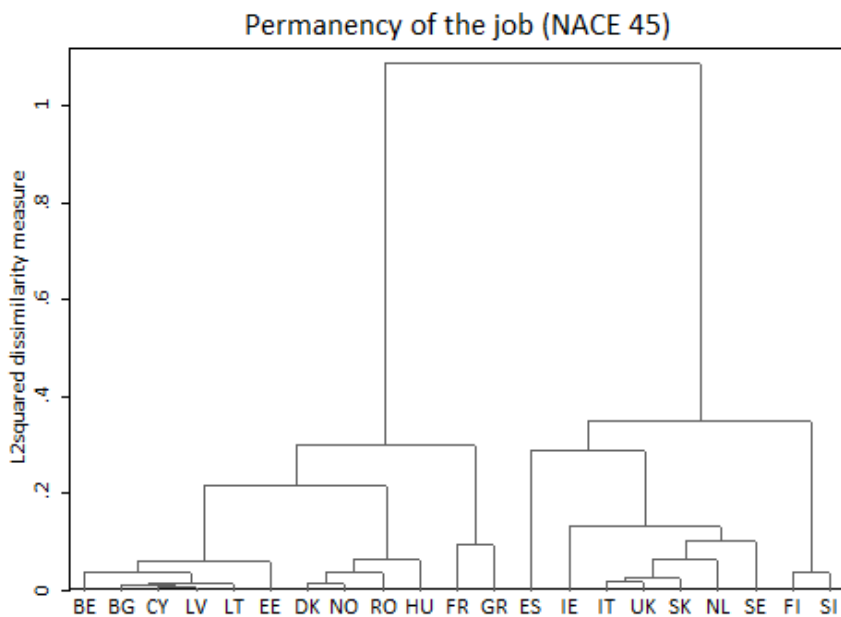
#### Business function growth

Figure 3: Dendrogram: business function growth in construction



#### Changing quality of work: temporary contracts

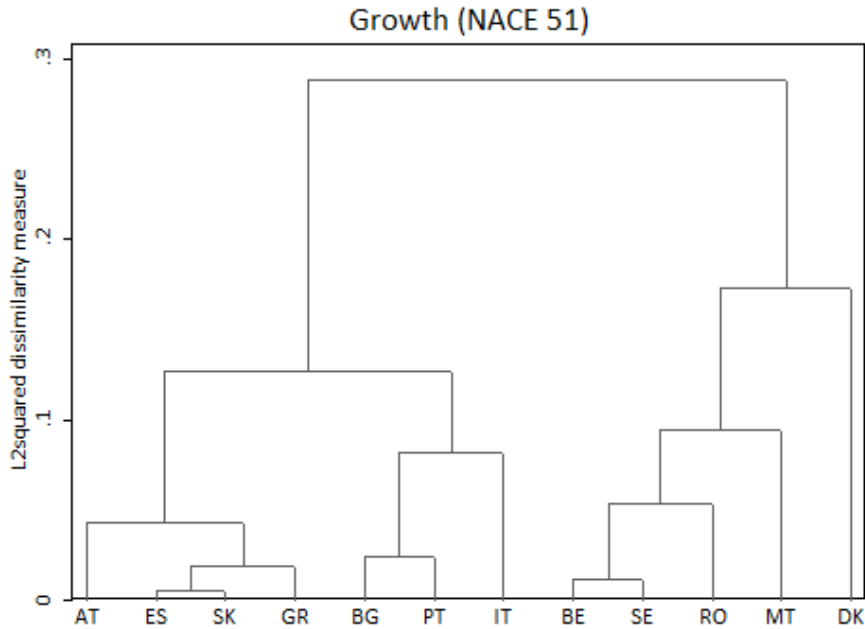
Figure 4: Dendrogram: changing quality of work (temporary contracts) in construction



7.2.2 Retail

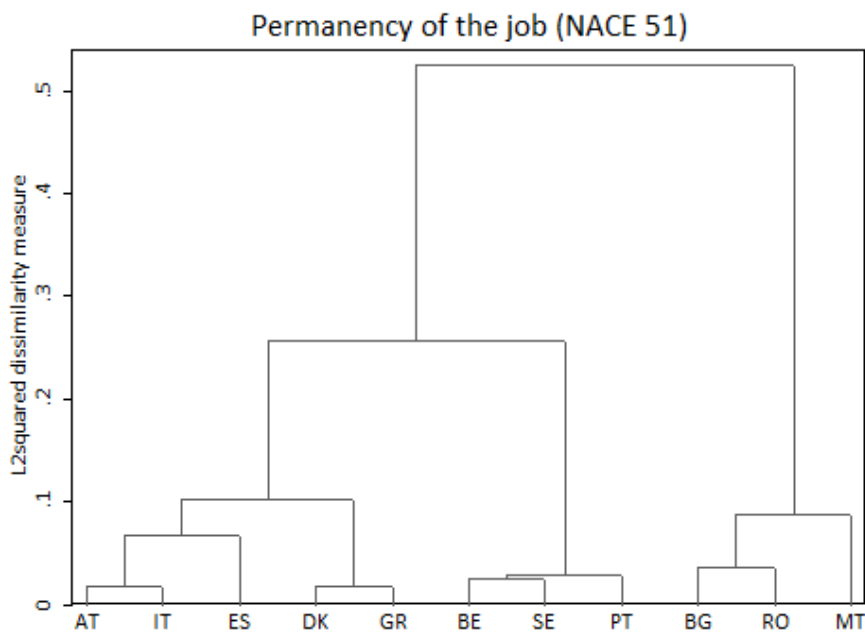
**Business function growth**

Figure 5: Dendrogram: business function growth in retail



**Changing quality of work: temporary contracts**

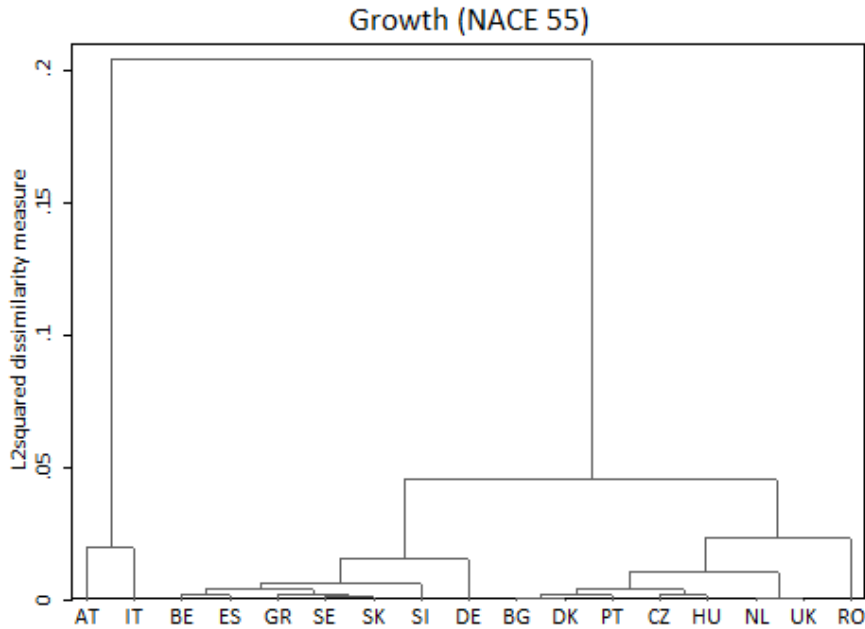
Figure 6: Dendrogram: changing quality of work (temporary contracts) in retail



7.2.3 Hotels & restaurants

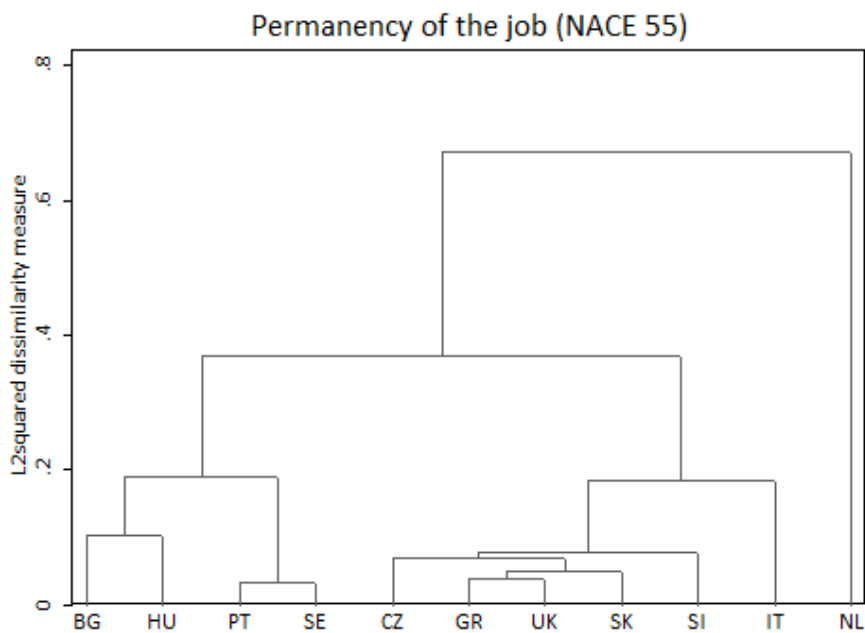
**Business function growth**

Figure 7: Dendrogram: business function growth in hotels & restaurants



**Changing quality of work: temporary contracts**

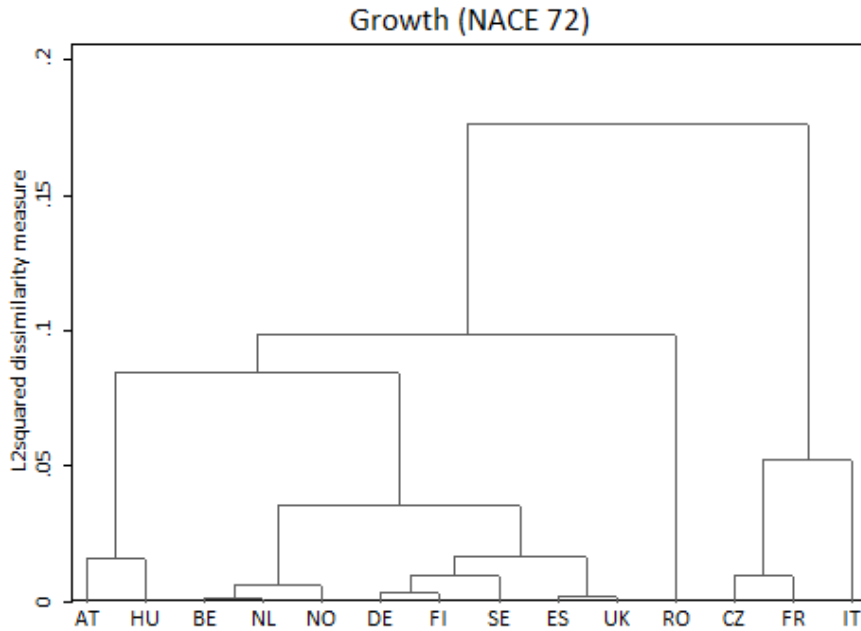
Figure 8: Dendrogram: changing quality of work (temporary contracts) in hotels & restaurants



7.2.4 IT

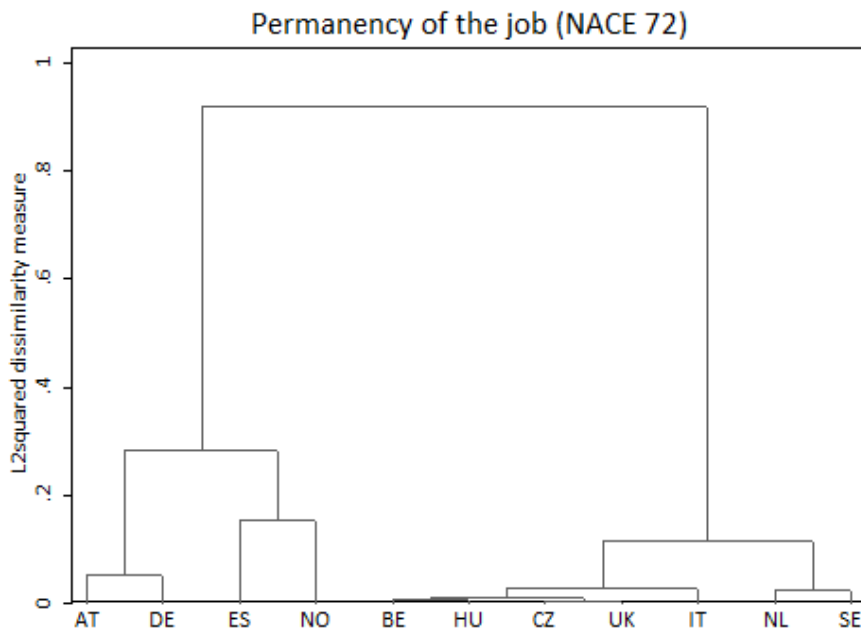
**Business function growth**

Figure 9: Dendrogram: business function growth in IT



**Changing quality of work: temporary contracts**

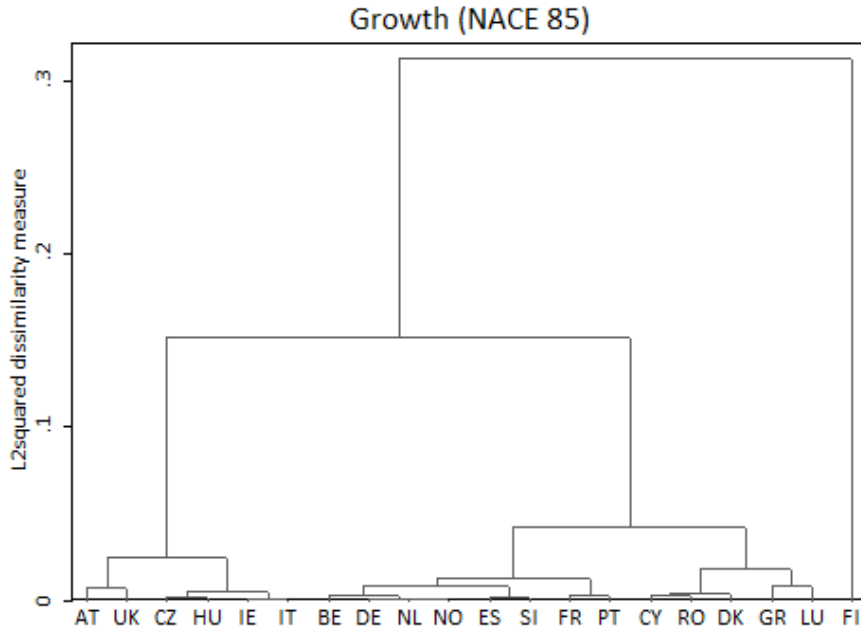
Figure 10: Dendrogram: changing quality of work (temporary contracts) in IT



7.2.5 Health & social work

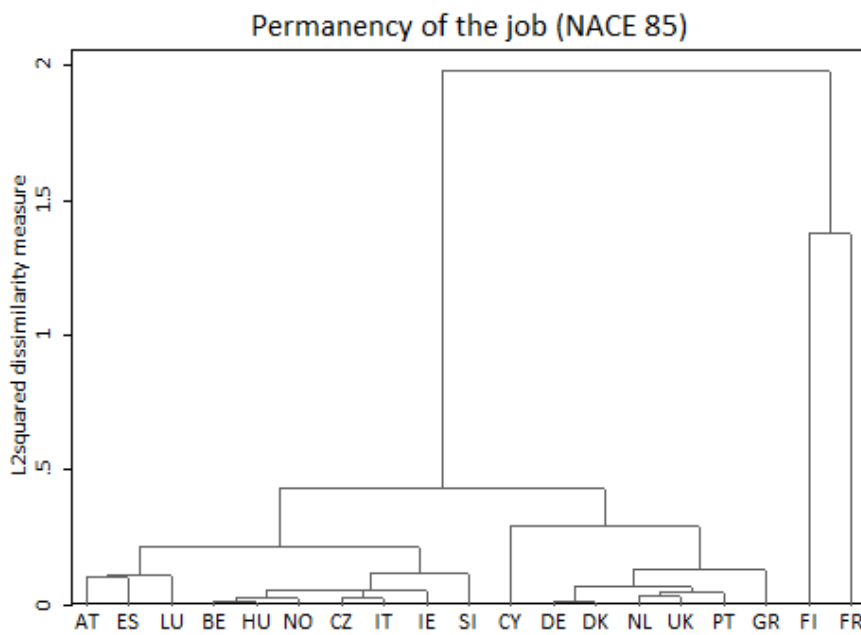
**Business function growth**

Figure 11: Dendrogram: business function growth in health & social work



**Changing quality of work: temporary contracts**

Figure 12: Dendrogram: changing quality of work (temporary contracts) in health & social work



## 7.3 Summaries of clusters

### 7.3.1 Construction

#### Business function growth

Table 21: Business function growth in construction: mean BART score

Cluster	Administration Management	Clerks	Core Experts	Technicians	Support Services	Sales	Transport & log.
1	6.38%	3.43%	6.11%	-8.51%	1.01%	-1.51%	-0.32%
2	8.16%	0.47%	-1.25%	-3.68%	0.75%	0.12%	-5.53%
3	2.12%	2.70%	-5.09%	-4.47%	0.45%	-0.06%	0.98%
4	-0.38%	3.52%	2.69%	0.16%	0.00%	1.36%	-14.14%
5	-0.64%	-0.52%	1.51%	-0.64%	0.05%	0.28%	0.38%
6	-0.44%	-1.17%	-2.24%	4.68%	-0.05%	0.25%	-1.57%
7	-1.27%	-1.88%	-6.80%	14.31%	-3.11%	-0.56%	-5.12%

#### Changing quality of work: temporary contracts

Table 22: Changing quality of work (temporary contracts) in construction: mean percentage difference

Cluster	Administration Management	Clerks	Core Experts	Technicians	Support Services	Sales	Transport & log.
1	-3.19%	-0.17%	0.80%	4.35%	-1.55%	-0.80%	-1.19%
2	-22.98%	0.67%	0.89%	8.13%	-2.35%	-6.64%	1.37%
3	-14.86%	1.38%	0.40%	14.26%	-16.05%	4.58%	23.26%
4	3.75%	13.74%	9.44%	17.10%	13.36%	-48.87%	26.16%
5	-3.43%	5.06%	-3.13%	7.41%	17.17%	-22.67%	1.35%
6	-20.83%	22.18%	-21.65%	8.75%	11.68%	-16.83%	4.65%

## 7.3.2 Retail

**Business function growth**

Table 23: Business function growth in retail: mean BART score

Cluster	Administration Management	Clerks	Core Experts	Sales	Transport & log.	Support Technicians	Services
1	-1.33%	0.72%	-0.08%	-3.13%	-0.81%	1.78%	0.08%
2	-5.15%	-5.20%	17.67%	-9.80%	1.32%	3.54%	-3.51%
3	10.50%	-2.17%	6.16%	-24.47%	0.45%	5.32%	-1.45%
4	-0.16%	-10.80%	-6.92%	4.74%	-5.82%	12.21%	0.93%
5	-6.02%	-2.07%	-24.43%	2.07%	7.73%	7.57%	0.00%
6	6.16%	-13.77%	10.92%	4.07%	-24.74%	9.74%	1.71%

**Changing quality of work: temporary contracts**

Table 24: Changing quality of work (temporary contracts) in retail: mean percentage difference

Cluster	Administration Management	Clerks	Core Experts	Sales	Transport & log.	Support Technicians
1	-2.65%	11.67%	-2.33%	-5.95%	5.69%	-1.86%
2	-1.39%	4.06%	-3.96%	11.21%	-0.08%	15.33%
3	-34.11%	1.44%	3.10%	-4.77%	7.30%	-2.46%



## 7.3.3 Hotels &amp; restaurants

**Business function growth**

Table 25: Business function growth in hotels &amp; restaurants: mean BART score

Cluster	Administration Management	Clerks	Services	Sales	Support Technicians	Sales	Transport & log.
1	12.30%	1.83%	-11.97%	0.00%	-0.42%	0.53%	0.07%
2	22.48%	-1.27%	-19.87%	4.84%	0.37%	0.00%	0.39%
3	-3.14%	-0.15%	1.34%	2.62%	-0.27%	0.10%	0.49%
4	-6.98%	-1.26%	9.45%	-0.58%	-0.46%	0.33%	-0.25%
5	1.41%	0.14%	-2.22%	0.09%	0.27%	0.04%	0.22%
6	6.50%	-10.02%	-3.07%	1.93%	0.00%	0.00%	0.00%

**Changing quality of work: temporary contracts**

Table 26: Changing quality of work (temporary contracts) in hotels &amp; restaurants: mean percentage difference

Cluster	Administration Management	Clerks	Services	Sales	Support Technicians	Sales
1	-9.46%	9.61%	5.19%	2.59%	2.67%	-10.50%
2	-12.04%	3.42%	16.74%	-7.61%	-7.97%	8.85%
3	-8.98%	23.92%	-13.51%	-3.33%	-19.65%	-48.45%

## 7.3.4 IT

**Business function growth**

Table 27: Business function growth in IT: mean BART score

Cluster	Administration Management	Clerks	Core Experts	Technicians	Support Sales
1	11.59%	3.57%	-13.59%	-1.35%	1.36%
2	-0.96%	0.21%	-1.20%	0.34%	1.24%
3	7.20%	-4.96%	-0.63%	0.11%	0.40%
4	18.09%	-20.93%	-7.26%	0.00%	0.00%
5	-8.56%	-9.88%	5.87%	1.72%	2.00%
6	5.41%	-16.47%	17.75%	-1.98%	1.95%

**Changing quality of work: temporary contracts**

Table 28: Changing quality of work (temporary contracts) in IT: mean percentage difference

Cluster	Administration Management	Clerks	Core Experts	Technicians	Support Sales
1	1.56%	-0.52%	2.63%	32.96%	-8.04%
2	0.00%	22.46%	-15.22%	53.89%	-41.26%
3	-16.41%	13.77%	-6.00%	22.44%	-30.21%
4	-2.59%	1.39%	-2.30%	-1.39%	1.88%
5	-1.72%	16.86%	-13.19%	5.13%	1.70%

## 7.3.5 Health &amp; social work

**Business function growth**

Table 29: Business function growth in health &amp; social work: mean BART score

Cluster	Administration Management	Clerks	Core Experts	Services	Support Technicians	Services	Transport & log.
1	1.91%	0.40%	-7.32%	9.07%	-0.30%	-0.22%	-0.25%
2	0.92%	-0.68%	0.81%	-1.71%	-0.24%	-0.59%	0.13%
3	1.59%	-2.27%	-24.96%	34.90%	-0.84%	0.26%	0.04%

**Changing quality of work: temporary contracts**

Table 30: Changing quality of work (temporary contracts) in health &amp; social work: mean percentage difference

Cluster	Administration Management	Clerks	Core Experts	Services	Support Technicians	Services	Transport & log.
1	0.31%	1.69%	4.60%	-1.45%	0.74%	4.38%	-5.83%
2	4.06%	12.97%	-5.99%	-2.35%	0.00%	19.36%	80.64%
3	-93.69%	8.98%	0.10%	-4.16%	9.33%	-9.33%	23.24%