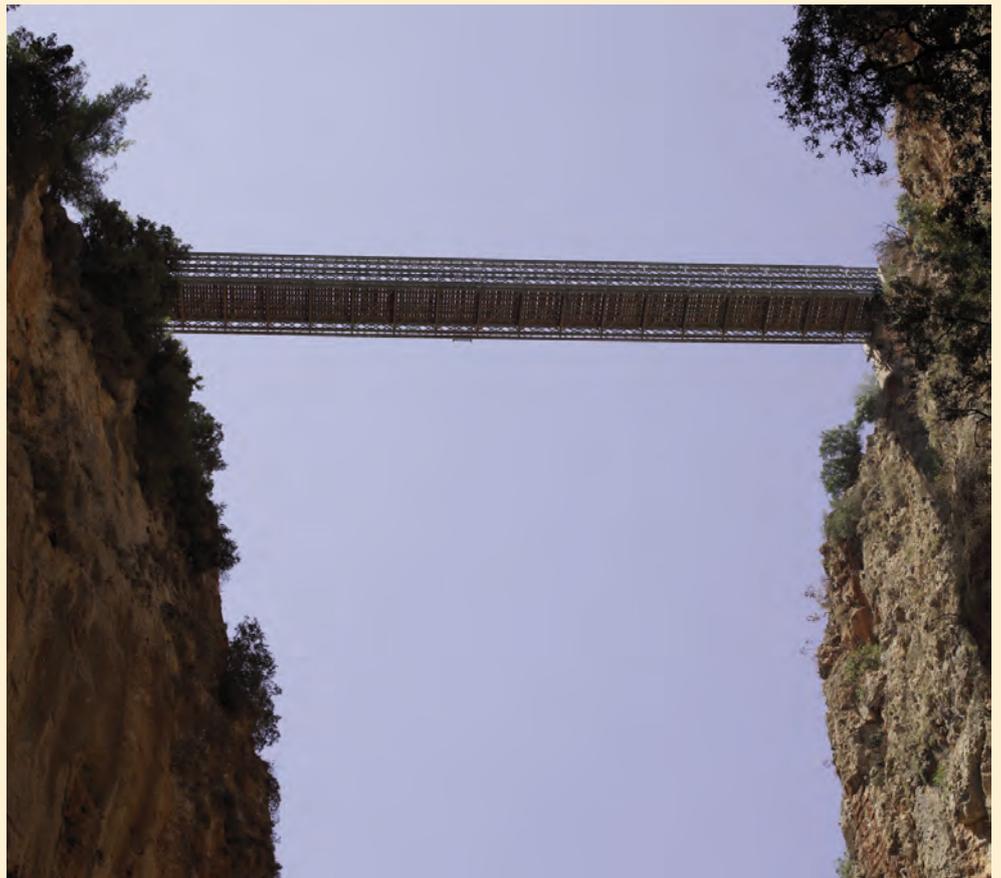




Eurofound

# Employment polarisation and job quality in the crisis



European Jobs Monitor 2013

# Employment polarisation and job quality in the crisis: European Jobs Monitor 2013

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**Research project:** European Jobs Monitor

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Eurofound

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## European Jobs Monitor 2013

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## Country groups and codes

### Country codes

The order of countries follows the EU protocol based on the alphabetical order of the geographical names of countries in the original language.

<b>BE</b>	Belgium	<b>FR</b>	France	<b>AT</b>	Austria
<b>BG</b>	Bulgaria	<b>IT</b>	Italy	<b>PL</b>	Poland
<b>CZ</b>	Czech Republic	<b>CY</b>	Cyprus	<b>PT</b>	Portugal
<b>DK</b>	Denmark	<b>LV</b>	Latvia	<b>RO</b>	Romania
<b>DE</b>	Germany	<b>LT</b>	Lithuania	<b>SI</b>	Slovenia
<b>EE</b>	Estonia	<b>LU</b>	Luxembourg	<b>SK</b>	Slovakia
<b>IE</b>	Ireland	<b>HU</b>	Hungary	<b>FI</b>	Finland
<b>EL</b>	Greece	<b>MT</b>	Malta	<b>SE</b>	Sweden
<b>ES</b>	Spain	<b>NL</b>	Netherlands	<b>UK</b>	United Kingdom

### Country groups

<b>EU15</b>	15 EU Member States prior to enlargement in 2004
<b>EU27</b>	Current 27 EU Member States
<b>EU23</b>	27 EU Member States except for Bulgaria, Malta, Poland and Romania

# Executive summary

## Introduction

European labour markets added nearly 30 million new jobs in a golden age of employment creation prior to the onset of the Great Recession in 2008. The markets have subsequently shed five million jobs and unemployment – rising rapidly once again – is at its highest since the late 1990s. This second annual European Jobs Monitor report looks in detail at recent shifts in employment at Member State and European level. The analysis covers three distinct periods:

- the pre-recession employment expansion (1995–2007);
- the Great Recession (2008–2010);
- the stalled recovery (2011–2012).

A ‘jobs-based’ approach is applied to describe employment shifts quantitatively (how many jobs were created or destroyed) and qualitatively (what kinds of jobs).

## Policy context

The EU’s Europe 2020 strategy for smart, sustainable and inclusive growth includes a commitment to fostering high levels of employment and productivity. This implies a renewed focus on the goals of the earlier Lisbon Agenda – ‘more and better jobs’. More jobs are needed to address the problem of lengthening unemployment queues which are approaching levels in some Member States that pose a real threat to social peace as well as sustainable economic growth. But Europe also needs better, more productive jobs if it is to succeed once again in increasing living standards for its citizens in an expanding, integrated global economy.

The European Commission’s 2012 Communication, ‘Towards a job-rich recovery’, identifies some sectors in which employment growth is considered most likely – health services, information and communication technologies, personal and household services – as well as the promising if hard-to-define category of ‘green jobs’. The jobs-based approach adopted in this report provides up-to-date data about employment levels and job quality in both growing and declining sectors and occupations.

The approach involves characterising a job as a given occupation in a given sector using standardised international classifications (ISCO for occupation and NACE for sector) and then describing the employment shifts in each Member State as well as in the EU as a whole. Ranking the jobs according to wage levels, level of educational attainment or a broader multidimensional index of job quality adds a qualitative dimension to the analysis.

The jobs-based approach was pioneered in the 1990s in the United States by Nobel laureate, Joseph Stiglitz, and refined thereafter by Erik Olin Wright and Rachel Dwyer. The particular question that this earlier American work addressed – was job growth being achieved at the expense of job quality? – has become more nuanced over time. The jobs-based approach has in particular been used to assess the extent to which the employment structures of developed economies are polarising, leading to ‘shrinking’ or ‘disappearing’ mid-paid jobs, or upgrading (growth in high-skilled, high-paid jobs) in line with the predictions of ‘skill-biased technical change’.

## Key findings

- The destruction of employment across Europe during the recession led to polarisation in terms of the wage structure. A large proportion of the jobs destroyed were in mid-paid manufacturing and construction occupations. Although in the previous period (1995–2007) there was also some degree of polarisation, it was much less pronounced. It was also offset by a significantly larger structural upgrading.
- The crisis not only accentuated polarisation in most countries, it also reduced considerably the amount of diversity across Europe in the patterns of structural change. Whereas throughout the expansion there were different patterns associated with European institutional families (polarisation in continental Europe, upgrading in northern countries and expansions in mid-paid jobs in the south), during the crisis most countries experienced some type of polarisation.
- During 2011–2012, employment shifts were less polarising, with greater growth in higher-paid jobs, less pronounced declines in mid-paid jobs and relatively greater declines in low-paid jobs. In particular, employment patterns in countries with more resilient labour markets showed more pronounced upgrading, while those in countries experiencing persistent employment declines continued to polarise.
- The process of job polarisation was mostly restricted to the wage structure, even during the recession. When classifying the jobs according to their average level of educational attainment or non-pecuniary job quality attributes, the process of structural change since 1995 has been one of mostly upgrading in nearly all EU countries. This is because the jobs responsible for the decline of the middle wage quintiles tend to occupy lower positions when characterised by their average level of educational attainment or non-pecuniary job quality than when they are characterised by their wages (male-dominated jobs in manufacturing and construction).
- Higher-paid jobs were much more resilient during the crisis, continuing to grow (albeit marginally) even during the peak periods of the Great Recession. During the first two years of the recession, the expansion of higher-paid jobs was mostly sustained by knowledge-intensive services in the public sector (principally health and education). Between 2011 and 2012, the focus shifted to knowledge-intensive services in the private sector, which added over 400,000 new jobs to the top quintile of the wage distribution in this period across the EU.
- The recession intensified the catch-up process of women in the labour market, both in terms of employment numbers and access to the higher layers of the employment structure. Women have increased their employment share, particularly in ‘mid-paid’ and ‘good’ jobs (those in the higher quintiles). In part, this has been because women are overrepresented in certain growing sectors such as health and underrepresented in declining sectors such as construction. But it also reflects higher levels of educational attainment by women at a time when qualifications are an even more important requisite for access to better quality jobs.

# Introduction: Labour market context

This report describes recent structural shifts in employment in European labour markets before, during and after the 2008–2010 recession. A jobs-based methodology is used to identify how net employment shifts at Member State and aggregate European Union (EU) level have been distributed across jobs in different quintiles of the wage distribution. Criteria for ranking jobs other than wages are also used. The two alternative job rankings are based on the average educational attainment level of job holders and a multidimensional measure of job quality derived from Eurofound's own European Working Conditions Survey (EWCS).

There were five million fewer people in paid employment in the EU27 in the second quarter of 2010 (2010 Q2) compared with the second quarter of 2008 (2008 Q2) as a result of the economic crisis – the most severe employment decline in over a generation. The following year (2010 Q2 to 2011 Q2) featured a tentative recovery with one million new jobs being added as labour markets began to revive, partly as a consequence of stimulus measures introduced in the aftermath of the financial crisis. Unemployment levels in the EU27 steadied at around 10%.

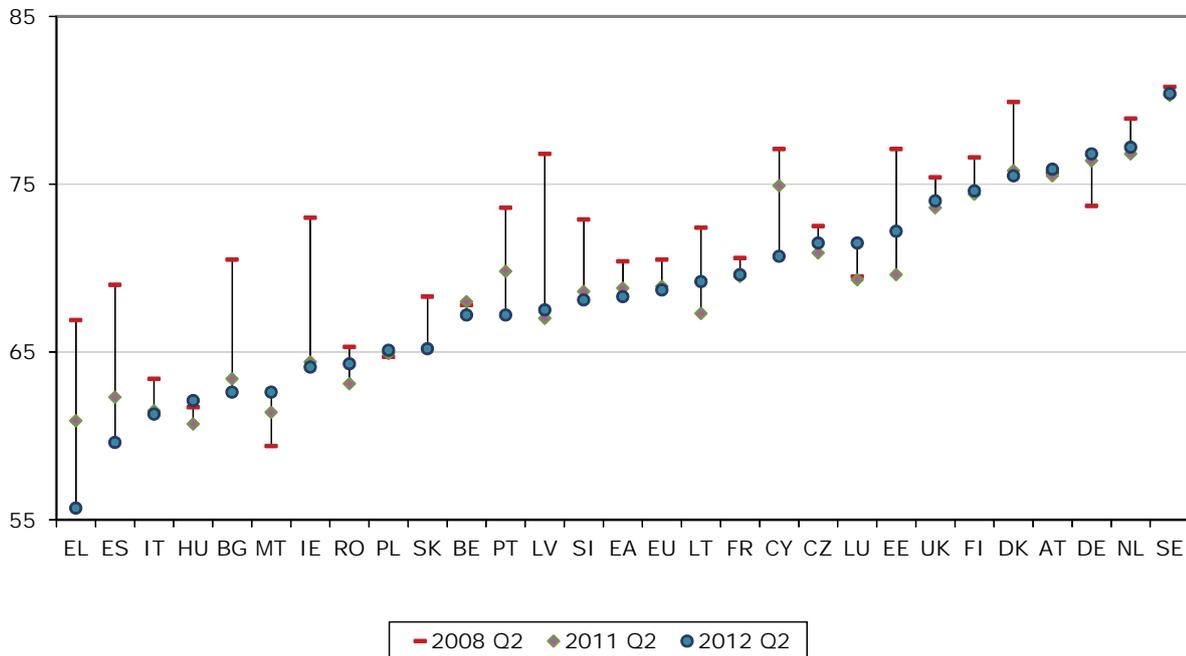
However, the most recent period has seen a reversion to net employment decline as fiscal policy shifted from stimulus to austerity and as the ongoing euro zone crisis cast a pall on prospects of a coordinated recovery. There were around 750,000 fewer people in employment in the EU27 in 2012 Q2 compared with 2011 Q2. In a labour market of some 220 million people, this may not seem unduly negative but should be seen in context. Between 1998 and 2007, EU labour markets tended to add on average around two million new jobs every year. Including inevitable growth, the crisis may have cost as many as 15 million jobs in the EU and there are now over 25 million unemployed in Europe.

Equally worrying is the fact that unemployment is currently increasing at rates not dissimilar to those recorded at the outset of the crisis. At the time of writing (November 2012), the euro zone of 17 EU Member States had again fallen into recession according to one common metric, that is, two consecutive quarters of declining output. Unemployment in the euro zone increased by a full percentage point in the year to September 2012 (that is, from 9.6% to 10.6%). By comparison, unemployment rates in the United States (US) during the same period declined from 9% to 7.8%.

There remains a large variation in national labour market performances within the EU27. Overall employment declines are attributable in a large part to developments in some particular euro zone countries where the combination of financial sector and sovereign debt problems has led to stagnant output (for example, Ireland, Portugal and Spain) or sharply declining output (for example, Greece) and negative labour market dynamics. Some countries – variously referred to as 'creditor' or 'core' in different narratives of the euro zone crisis – have fared reasonably well. Of the larger Member States, Germany has emerged stronger adding nearly one million jobs since the onset of the Great Recession (2008–2010). In Spain, however, over five million people are now unemployed and employment levels have declined by three million in the last four years.

The Europe 2020 programme has an overarching employment objective of a 75% employment rate among those aged 20–64 years. As highlighted in Figure 1, the recession and its aftermath have set back progress towards this target. The overall EU employment rate declined from 70.5% in 2008 Q2 to 68.7% in 2012 Q2.

Figure 1: Employment rates in the EU27 (age 20–64 years) 2008 Q2 to 2012 Q2 (%)



Note: EA = euro area covering 17 countries.  
 Source: EU LFS (authors' calculations)

Sharp falls in employment rates were recorded in the period from 2011 Q2 to 2012 Q2 in Cyprus, Greece, Portugal and Spain (all in the euro zone). Some of those countries that suffered most early in the recession (the Baltic states) have staged the beginnings of a recovery or have at least slowed the rate of decline (as also have Bulgaria and Ireland). The most striking aspect of Figure 1, however, is the very large dispersion of current employment rates in the EU from over 80% in Sweden to a little over 55% in Greece.

The impact of the recession and its aftermath has also varied widely in terms of its effects on different categories of workers. During the early stage of the crisis (2008–2009), younger male workers, those with lower levels of educational attainment and in temporary contracts were most affected. Those in higher-skilled occupations – especially experienced, older workers – were largely spared. In addition, predominantly state-funded sectors, especially health, tended to fare much better in employment terms than private services though the main area of job destruction was the manufacturing and construction sectors.

A major revision of the International Standard Classification of Occupations (ISCO) in the EU Labour Force Survey (EU LFS) in 2011 makes it impossible to track the precise evolution of occupation-by-sector shares of employment from 2010 to date (see Annex 1). Table 1 features the most recent year of EU-LFS data (2011 Q2 to 2012 Q2). These data confirm the persistence of some longer-term trends:

- relative decline of blue-collar compared with white-collar employment;
- resilient demand for high-skill white-collar employment across the sectors;
- relative increase in service sector employment compared with manufacturing.

Table 1: *Employment shifts by major sector/occupational categories, EU27 (% change, 2011 Q2 to 2012 Q2)*

Sector / Occupation	White-collar		Blue-collar		All occupations
	High skill	Low skill	High skill	Low skill	
Manufacturing	0.7	0.3	-2.4	-2.3	-1.3
Construction	2.3	0.1	-3.0	-9.3	-2.9
Retail	0.0	-0.1	-1.0	-0.5	-0.3
Other private services	2.0	1.0	-2.4	-2.1	0.3
Public services including health and education	1.6	0.4	-3.9	-4.4	0.1
<b>All sectors</b>	<b>1.5</b>	<b>0.5</b>	<b>-1.8</b>	<b>-2.5</b>	<b>-0.3</b>

Note: Primary sector omitted. The colours represent a scale from dark green (most growth) to dark red (least growth).

Source: *EU LFS (authors' calculations)*

Table 1 also reveals some significant differences between the period 2011–2012 and developments during the 2008–2010 recession.

- Predominantly state-funded service sectors, notably health and education, were bastions of employment growth during the recession but this is no longer the case. Austerity-led public spending cuts have led to a stalling of employment growth in the public services. Private sector service employment has increased only very modestly to compensate.
- The manufacturing and construction sectors have continued to shed employment but with a lower intensity, especially in manufacturing, compared with the recession when both sectors shed an average of 5% of employment per year.
- Employment loss has been relatively greater in low-skill blue-collar jobs; during the recession, high-skill blue-collar jobs were more at risk.

European labour markets are of course changing not just because of the crisis but also due to underlying long-term trends which relate more to developments in technology, international trade and labour market institutions. The ‘jobs approach’ adopted in this report offers a useful way of summarising the impacts of these structural vectors of change on the distribution of employment. The approach could also help to identify the relative weight of influence of different contributing factors to observed patterns of employment polarisation or upgrading.

The jobs approach was pioneered originally in the US during the 1990s (CEA, 1996; Wright and Dwyer, 2002) and applied to European labour markets in the following decade (Eurofound, 2008, 2011a; Goos et al, 2009; Fernández-Macías et al, 2012). Its principal advantage is that it brings together the qualitative and quantitative dimensions of employment shifts. This allows it to link existing empirical data explicitly to strategic policy commitments, for example, to the Lisbon Agenda’s commitment to create ‘more and better jobs’ and related follow-up commitments in Europe 2020. Using different proxies of job quality, principally average wage in a job, the jobs approach permits a tentative answer to:

- whether employment creation was skewed to better jobs during the pre-recession employment expansion (broadly yes);
- where job loss was concentrated during the recession (mainly in mid-paid or low–mid-paid jobs);
- whether the more polarising patterns of employment shift observed during the recession persisted after the recession (again broadly yes).

Job polarisation reflects some fundamental shifts in labour demand in developed economies which relate to long-term trends in labour market institutions on the one hand and technological innovation and international trade on the other.

Institutional factors tend to work in particular by influencing the demand for and supply of low-paid employment. Active labour market policy as well as fiscal policy (for example, working tax credits for low-paid workers in the UK) facilitate and in some cases subsidise low-paid employment. Social welfare regimes also influence labour costs and labour supply especially of low-paid jobs, while immigration policy can impact directly on labour supply, mainly for lower-paid jobs but increasingly also for higher-paid jobs. The EU Blue Card, for example, targets high-skilled workers to address specific labour market bottlenecks.

In attempts to explain recent job polarisation in the US, minimum wages and declining union coverage have also been invoked as potential contributing factors. Both serve to compress earnings distributions which theoretically limits job creation in low-paid jobs, but according to Autor (2010), neither plays an important role: ‘a key argument against the minimum wage as a primary causal factor is that the timing of the explanation does not fit the central facts’. Low-paid employment in the US declined even as the US federal minimum wage remained pegged at the same nominal level (and decreasing real value) throughout the 1980s. The adoption of minimum wage policies in an increasing number of European countries in the past two decades could, however, provide the basis for an interesting further test of this hypothesis.

According to some of the most influential research in this area, technology and trade are the most important determinants of job polarisation (Autor et al, 2006; Goos et al, 2009). These are to an important extent linked. Changes in information and communication technologies (ICT) have facilitated the extensive ‘subcontracting’ of manufacturing capacity from developed to developing countries such as China and India. Manufacturing now accounts for 16% of total employment in the EU15 (down from over 21% in 1995) and as little as 12% in the US where the process of de-industrialisation has advanced furthest. Most of this contraction in manufacturing employment has been in mid-paid jobs. Similarly, levels of employment in certain types of routine, repetitive administrative or clerical job – also predominantly mid-paid – have tended to decline as new generations of office technology replaces human operators. Insurance claims or payroll processing are increasingly computer-based rather than labour-intensive functions.

Meanwhile, employment creation has tended to be skewed towards higher-paying, higher-skilled service sector jobs such as business consultants and medical professionals). The theory of ‘skill-biased technical change’ (SBTC) has been the main explanatory narrative describing shifts in demand for workers of different skill levels (Violante, 2008). As technology advances, greater demand is created for those jobs and functions that can use and benefit most from the power of computers and ICT networks, and these jobs tend to be high-skilled. The corollary is that there is less demand for the jobs/functions/roles that are effectively replaced or displaced by technology.

In its simplest incarnation, the theory of SBTC predicts a linear shift in employment demand favouring those with higher skills and penalising those with lower skills and qualifications. As shown in this study, this theoretical prediction is consistent with the data from some Member States in certain recent periods. It is also consistent with what can be observed across countries over many decades; that is, strongest relative growth in high-skilled, high-paid jobs or upgrading in the employment structure.

Nonetheless, the hypothesis has proven deficient in one important respect. It has failed to account for the fact that in relative terms there has also been significant employment growth in lower-skilled service jobs in a number of EU countries and in the EU as a whole (that is, looking at aggregate EU employment figures). The fastest growing job in absolute terms in the EU in recent years has been that of personal care assistants working in residential care.

One possible explanation is that growing wage and income inequality – itself caused in part by shifting patterns of employment favouring higher-skilled workers – ends up generating demand for such lower-level service sector jobs. The lucky few profiting from increased demand (and higher wages) at the top of the wage distribution have the excess income that permits high levels of discretionary spending, boosting employment in such services.

A related explanation is based on a refinement of the skill-biased technical change (SBTC) hypothesis. The so-called ‘task-biased technological change’ (TBTC) hypothesis argues that it is not the skill content as such that impacts on shifts in labour demand but the nature of job tasks. Specifically, the jobs at risk of relative decline are those comprising tasks that are routine and easy to codify. This allows them to be replaced by machinery, computers or cheaper labour overseas. This theory goes further than the standard theory of SBTC in predicting actual labour market developments in the middle and bottom segments of the wage distribution in recent years. It accounts for declining manufacturing employment and declining routine administrative work in services. It also predicts growth, not decline, in certain basic-skilled service sector jobs – though only those that are non-codifiable in nature. There is as yet no way of programming machines or computers to carry out the various, non-routine and interactive functions of a personal care assistant, a hairdresser or a waiter in a restaurant. It is not possible to offshore a haircut or automate the job of a cocktail waitress. These lower-paid, low-skill but non-routine service sector jobs have been growing in recent years and the TBTC hypothesis provides a compelling explanation why this is the case; that is, they are relatively resistant to the encroachments of technological change.

### **Jobs approach: methodology**

The approach in this report is not to focus on the grand aggregates of the International Labour Organization’s (ILO) statistical definitions of the labour force but on how the structure of jobs in Europe has changed before, during and after the 2008–2009 recession.

The unit of analysis is the ‘job’. Increasingly, EU employment policy is phrased in terms of jobs. ‘More and better jobs’ was the headline phrase of the Lisbon Agenda and the slogan ‘New skills for new jobs’ is central to its successor, Europe 2020. Phrasing employment policy analysis in terms of jobs can also serve to bring matters closer to the concerns of European workers.

A ‘job’ is defined in this report as an occupation in a sector. This is an intuitively attractive definition and corresponds to what people think of when describing their job, for example, a secretary in a hospital, a salesperson in a car showroom or a researcher in the chemical industry. This definition is also very useful for both theoretical and empirical reasons. The two concepts of occupation and sector correspond to the two fundamental dimensions of structural change. The sector gives a description of what type of economic value is being created and the structure of occupations gives some indication of how this value is being created. Empirically, the definition conveniently corresponds to established classifications of occupation (ISCO) and sector (NACE).

The jobs approach requires not only the definition of a job in an intuitive, conceptually coherent and empirically practical way but also some analytically useful means of evaluating or classifying those jobs. The originator of the jobs approach, Joseph Stiglitz, used wages for classifying jobs according to their quality.

The analysis that follows in sections 1 and 2 also uses a wage-based measure for classifying jobs. In section 3, the narrative is enriched using alternative job classifications based on skill level (based on the average level of educational attainment of job holders) and on a broad, multidimensional indicator of job quality.

### Methodological note: the ‘jobs-based’ approach

The main, simplified steps of the approach are as follows.

#### Step 1

Using the standard international occupation (ISCO-88 up to 2010, ISCO-08 from 2011 onwards) and sector (NACE rev. 1.1 up to 2007, NACE rev. 2.0 from 2008 onwards) classifications at two-digit level, we created a matrix with the same basic format as Table 1 but at a much more detailed level of disaggregation. With the most recent versions of the occupational and sectoral classifications, this amounted to generating a matrix with 88 different sectors on the horizontal axis and 53 occupational groups on the vertical axis. This generated a matrix of 4,664 ‘job’ cells. In practice some of the possible combinations of occupation/sector do not exist (there are unlikely to be many precision craft workers in insurance companies, for example) but the country total of job cells varied between 902 in Cyprus and 2,720 in Germany. Earlier versions of the occupational and sectoral classifications (ISCO-88 and NACE rev. 1.1) contained fewer categories at two-digit level and the number of cells in the employment matrices for each country were correspondingly smaller, though with on average around 1,000 employment-containing cells in each country they still represented a very detailed breakdown of employment (Eurofound, 2008a, 2011a, Fernández-Macías et al, 2012).

#### Step 2

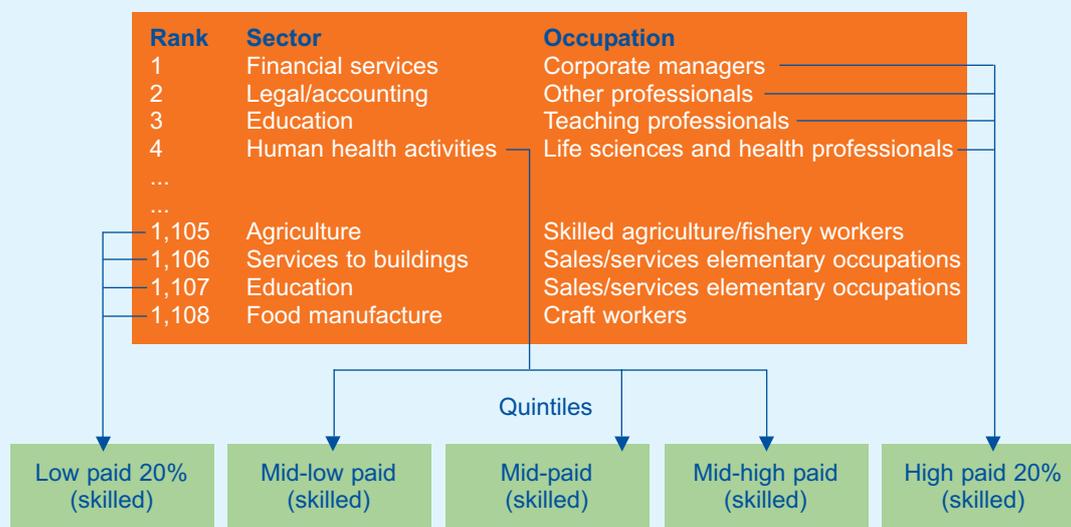
We ranked the jobs in each country based on mean hourly wage. Wage rankings were calculated based on different data sources for each period with varying levels of data quality and coverage (for more details, see Annex 1). The most recent country–job wage rankings were based on combining data from the EU LFS annual data file for 2011 and summary data from the Structure of Earnings Survey for 2010. These sources allowed us to create country–job–wage rankings for 26 Member States for the period 2011–2012. For the remaining country (Sweden), we applied an EU job wage ranking based on data from the other Member States.

#### Step 3

We allocated jobs to quintiles in each country based on our job–wage ranking for that country. The best-paid jobs were assigned to quintile 5 and the lowest-paid jobs to quintile 1. Each quintile in each country represented 20% of employment in the starting period. Hereafter, the job-to-quintile assignments remain fixed for each country for a given period. We then shifted our focus to the EU LFS employment data, where our interest lay in the shift in the stock of employment at quintile level in each country over a given period. The periods covered in this report are 2011–2012 in section 1; 1995–2010 in section 2 and 1995–2012 (Q2) in section 3.

Figure 2 illustrates in simplified format these three steps using some of the large employing top-paid and bottom-paid jobs at EU level as examples. Note that while the jobs are correctly assigned in terms of EU quintile, the individual job–wage ranks (that is, 1–4, 1,105–1,108) are for illustrative purposes only.

Figure 2: Job rankings and quintile assignments carried out for each country



#### Step 4

We then simply summed the net employment change between the starting and concluding period (in terms of persons employed) for each quintile in each country to establish whether net job growth had been concentrated in the top, middle or bottom of the employment structure. This generated a series of charts similar to Figure 3.

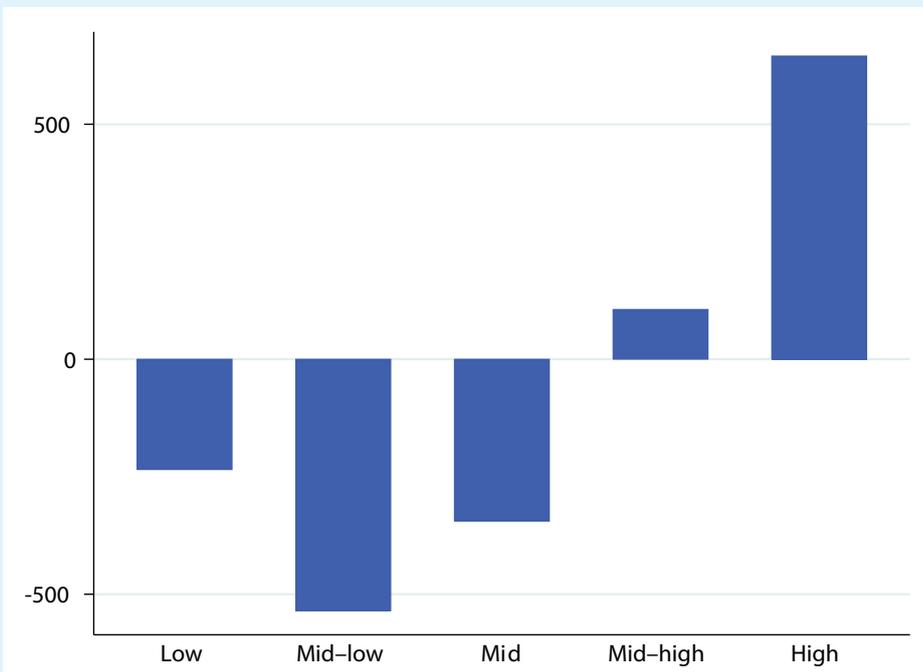
Except where otherwise indicated, all charts in the report describe net employment change by quintile for the indicated country or for the EU as a whole. The EU aggregate charts are based on applying a common EU job ranking.

The resulting quintile charts give a simple, graphical representation of the extent of employment change in a given period as well as an indication of how that change has been distributed across jobs of different pay levels. For example, Figure 3 illustrates employment change for the EU27 from 2011 Q2 to 2012 Q2 using job–wage quintiles. The figure should be read from leftmost bar cluster (lowest-paid jobs) to rightmost (highest-paid jobs). Net employment change is represented on the vertical axis; the fact that most of the bars are below the zero line confirms that this was a period of net job losses especially in mid-paid jobs and that employment grew only in the highest-paid jobs.

This method offers further possibilities to break up these net employment changes by gender, employment/professional status, working time category (full-time, part-time) and so on which we exploit later in the report.

For a more extensive description of the data-processing involved in the jobs approach, see Annex 1. Further background documentation includes Eurofound (2008b) as well as the extensive annex material of Eurofound (2008a) and Eurofound (2011a).

Figure 3: Net employment change in the EU27, by job–wage quintile, 2011 Q2 to 2012 Q2 (thousands)



Source: EU LFS (authors' calculations), ESES 2010 (see Annex 1 for more details)

# Employment developments by wage distribution 1

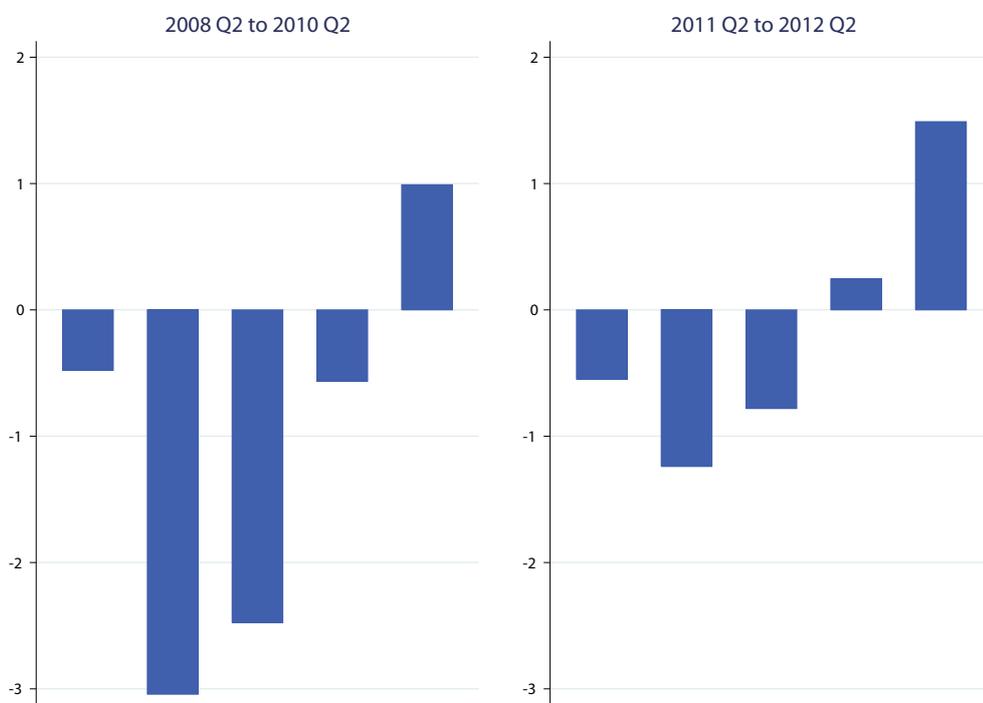
This section uses the ‘jobs approach’ to describe employment developments during the most recent 12 months for which data are available; that is, 2011 Q2 to 2012 Q2. First, the analysis looks at overall EU27 trends and then describes the varying patterns of change in individual Member States. Thereafter, employment change is broken up into its components in terms of major sectoral aggregations, worker characteristics (gender, age and so on) and employment status. The objective is to:

- show how the broad outlines of employment change identified in the quintile charts intersect with other dimensions of labour market development (increasing female participation, shifts in employment by sector of activity, changes in employment status);
- see whether and how these relationships have changed over the period in question.

The 12 months between 2011 Q2 and 2012 Q2 were a period of renewed employment decline in the EU with a net loss of some 600,000 jobs. As was the case during the recession, this net loss was concentrated in mid-paid and mid–low-paid jobs and corresponds to the ongoing weakness in construction and manufacturing sectors already noted and discussed in more detail below. Both these sectors tend to have a concentration of employment in the mid–low quintiles of the wage distribution.

Figure 4 compares the employment change between 2008 Q2 to 2010 Q2 and 2011 Q2 to 2012 Q2.

Figure 4: *Employment change in EU27, by wage quintile, 2008 Q2–2012 Q2 (% per year)*



Note: Here quintile charts are shown based on quarterly EU LFS data for the two periods in the interests of consistency. Later, in section 2, the analysis is based on annual data. The differences are marginal; that is, there are small differences in employment shifts in the bottom and top two quintiles.

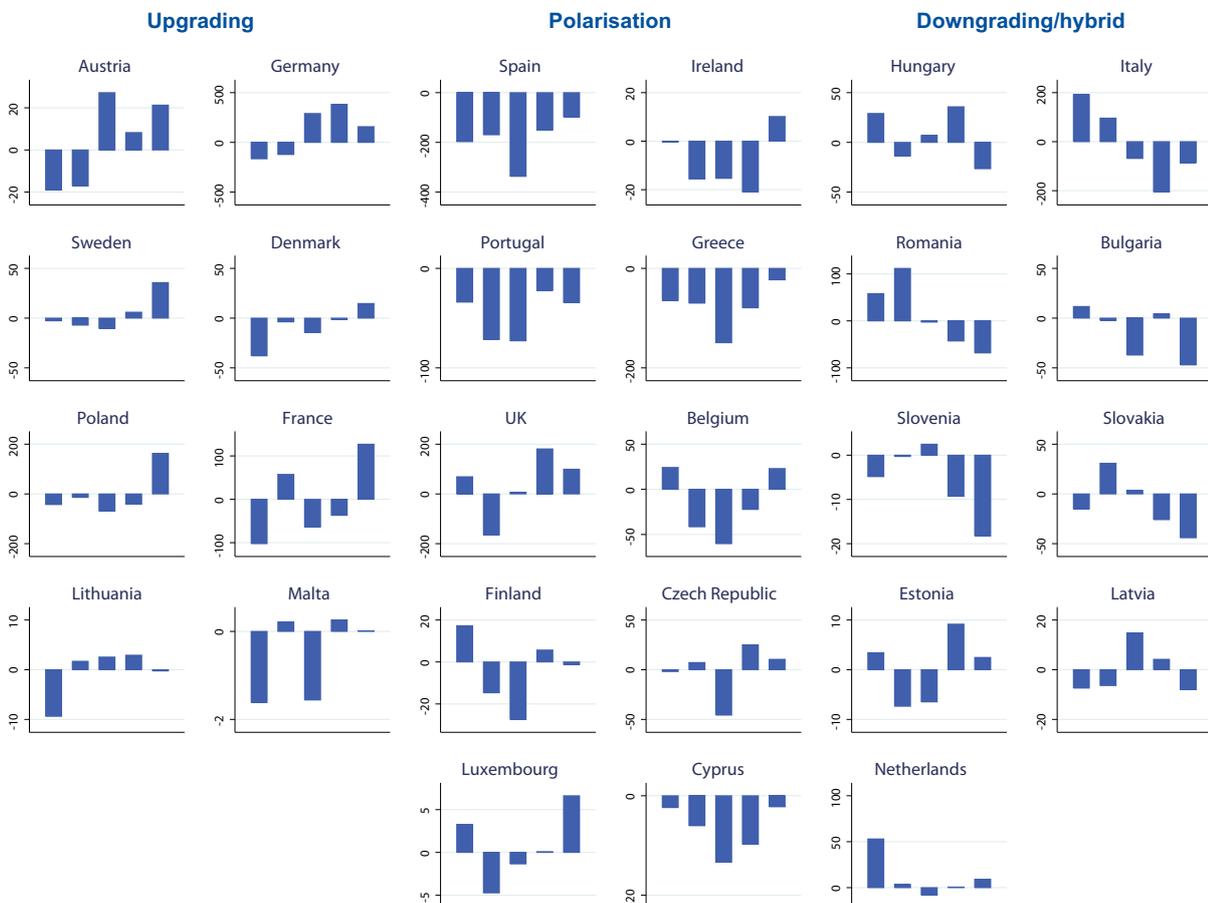
Source: *EU LFS (authors' calculations), ESES 2010 (see Annex 1 for more details)*

In many ways, little changed in the distribution of employment losses across quintiles during and after the peak recession period covered in the left-hand panel in Figure 4 (2008 Q2 to 2010 Q2). The main features – employment growth in the top quintile, relatively greatest decline in the middle and lower-middle quintiles, and more modest decline in the bottom quintile – remain the same in the right-hand panel covering the most recent 12 months of data (2011 Q2 to 2012 Q2) as a hesitant recovery stalled and employment began to decline again. However, the more pronounced destruction of mid-paid jobs observed during the recession has abated. Both the top two quintiles exhibit net growth from 2011 Q2 to 2012 Q2, with a significantly stronger employment growth rate in the top quintile compared with during the recession. The employment decline in the bottom quintile is somewhat greater than before and much more comparable in scale to what is happening in the mid and mid-low quintiles than during the peak recession period. Overall, the most recent pattern can be described as ‘upgrading with some degree of polarisation’. The cumulative outcome of these changes is nonetheless one of polarisation as job losses have concentrated in the ‘disappearing middle’ of the wage distribution.

Figure 5 presents the net employment change between 2011 Q2 and 2012 Q2 by wage quintile for all Member States grouped according to the three main categories of employment shifts, that is, ‘upgrading’, ‘polarisation’ and ‘downgrading/hybrid’. The last category includes Estonia and Latvia, two less easily classified ‘hybrid’ countries.

In previous analyses (Eurofound, 2008b, 2011a), the two most common patterns observed at national level were upgrading and polarising employment shifts with many countries showing some hybrid combination of both. Over the shorter period of the recession (Eurofound, 2011a), some countries exhibited signs of downgrading, that is, greater growth of lower-paid jobs and a decline in top-paid jobs.

Figure 5: Employment change by wage quintile and country, 2011 Q2 to 2012 Q2 (thousands)



Source: EU LFS (authors' calculations), ESES 2010 (see Annex 1 for more details)

The largest aggregate EU employment shift took place in the top quintile where over 600,000 new jobs were created. Growth in these top-paid jobs was attributable in large part to those countries with clearly upgrading patterns – Austria, Denmark, France, Germany, Poland and Sweden. The polarisation category is the largest and groups together 10 Member States. Some, like Belgium or Spain, have very clearly polarising patterns while others like the Czech Republic or Ireland demonstrate polarisation with some upgrading (Figure 5).

Member States such as Hungary and Italy continued to show a more downgrading structure with destruction of top-quintile employment. A similar pattern had been previously observed in these countries during the recession. Over longer time periods, however, downgrading was quite uncommon as demonstrated by the 1998–2007 data presented in section 2.

With only one year’s data, it is not possible to draw all but very tentative conclusions. However, the cluster of national labour markets most negatively affected by the debt crisis tended to be polarising while more resilient labour market performance tended to go hand in hand with employment upgrading such as the upgrading employment shifts in Austria, Germany and Sweden during 2008–2010 and 2011–2012.

### Manufacturing and construction

The two broad sector categories that suffered the brunt of the recession’s labour market impact were construction and manufacturing. Between 2008 and 2010 over 10% of pre-crisis employment was destroyed in both sectors.

Despite construction being a more cyclical sector in nature, it has continued to record sharp employment losses even as the economy returned to growth after 2010. Sector employment levels declined a further 3% between 2011 Q2 and 2012 Q2. The unwinding of previous excesses generated by construction booms in specific Member States (notably Spain) has yet to play out nearly five years after the first signs of a collapse in the property market. Structural employment decline in manufacturing accelerated during the recession but has resumed something like its more long-term rhythm. The sector shed 1.3% of employment between 2011 Q2 and 2012 Q2.

The concentration of net employment decline in middle- and lower-ranked jobs continues to relate primarily if not exclusively to employment declines in these two sectors (Figure 6). Within both manufacturing and construction, however, there has been a restoration of employment favouring white-collar (especially high-skill) occupations. This is reflected in a small top quintile employment growth, notably in manufacturing.

Figure 6: *Employment change by wage quintile and sector, EU27, 2011 Q2 to 2012 Q2 (thousands)*



Source: *EU LFS (authors’ calculations), ESES 2010 (see Annex 1 for more details)*

The countries in which top quintile manufacturing employment growth was relatively strongest were Austria, the Czech Republic and Germany. In Germany, three out of the top six categories of top-paid jobs demonstrating growth were science/engineering professions in hi-tech or heavy manufacturing sectors (machinery, automobile and fabricated metals). The growth of good quality manufacturing jobs in these countries was balanced by a decline in mid- and low-paid manufacturing jobs, although the net outcome across quintiles was positive. Meanwhile, manufacturing in Belgium, France, Portugal and Spain suffered employment losses across the spectrum but with a concentration in mid-paid jobs. Manufacturing employment losses in Italy were concentrated in better-paid jobs in the top three quintiles.

## Service sectors

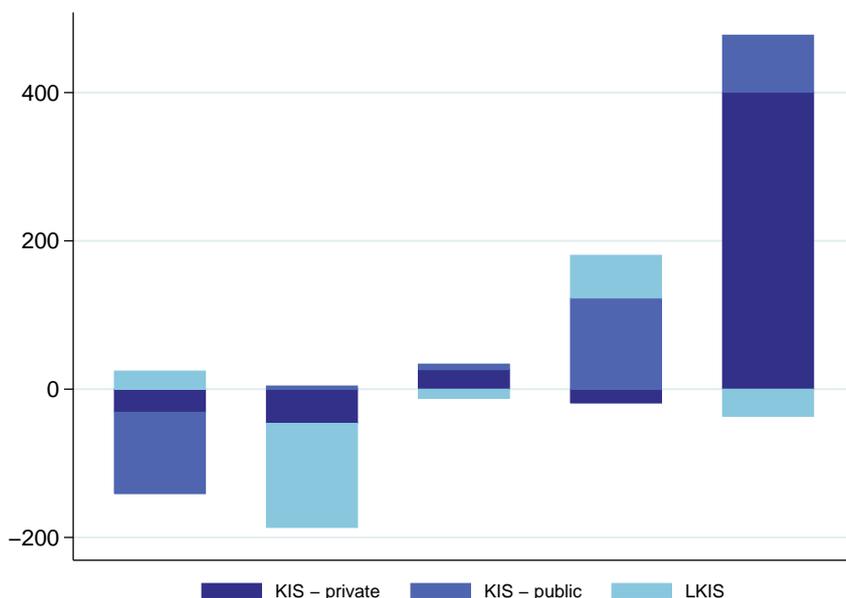
Over 70% of the working population in the EU is employed in the services sector. This share continues to grow as employment in the primary and manufacturing sectors continues its structural decline. During the recession, one notable development was the resilience of employment in predominantly public services such as health and education. Health sector employment in the EU actually grew at a faster rate between 2008 and 2010 than during the pre-recession economic expansion. EU27 employment levels increased in the sector by 5% over the two years. Predominantly private services suffered employment declines in all but the top quintile during the same period.

This changed abruptly as the respective roles of public and private services as sources of employment growth reversed during 2011–2012. Private knowledge-intensive services accounted for the majority of top quintile employment growth (Figure 7). By some margin, the biggest growing top quintile job was that of an ICT professional in computer programming, consultancy or related activities. This added over 100,000 net new jobs over the period from 2011 Q2 to 2012 Q2.

Meanwhile, public knowledge-intensive services made a more modest positive contribution across the top two quintiles (Figure 7). This is unsurprising given the significant retrenchment in public spending as policy – in both more and less fiscally challenged Member States – shifted from emergency stimulus to austerity. Belgium and France were exceptional in continuing to have superior employment growth in public knowledge-intensive services than in private knowledge-intensive services, in particular in the top quintile.

While both public and private knowledge-intensive services showed net employment growth overall, low knowledge-intensive services suffered marginal declines (Figure 7). The significant fall in low–mid-paid jobs was largely attributable to the retail and wholesale sectors.

Figure 7: Employment change in (less) knowledge-intensive services by wage quintile, public and private sectors, EU27, 2011 Q2 to 2012 Q2 (thousands)



Notes: LKIS = low knowledge-intensive services including retail, accommodation and restaurants  
 KIS – private = private knowledge-intensive services – a broad range of activities including media, IT, consulting, advertising, financial, legal services and accounting  
 KIS – public = public knowledge-intensive services – health, education and public administration  
 Source: *EU LFS (authors' calculations), ESES 2010 (see Annex 1 for more details)*

## Patterns of employment change by worker characteristics

Below, recent employment change (from 2011 Q2 to 2012 Q2) is broken down by quintile and the following background variables:

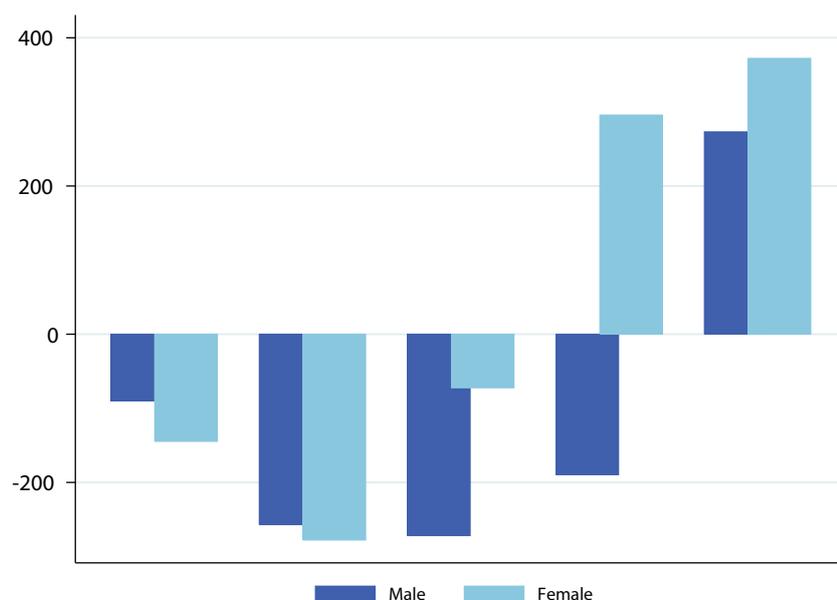
- gender;
- age;
- country of birth;
- various employment status dichotomies – full-time/part-time, self-employed/employee and fixed-term/permanent.

### Gender

The gender employment gap continued to close over the decade prior to the crisis with female employment growth greater in both relative and absolute terms than male employment growth up to 2007. At the time of writing, women accounted for nearly 46% of total employment in the EU27, an increase of over two percentage points since 2000. The recession accelerated this convergence due to the disproportionate impact of the crisis on male-employing sectors such as construction and manufacturing. Women also benefited from the robustness of public sector employment in health and education, two sectors in which women tend to be overrepresented.

Female employment continued to increase and male employment to decrease during 2011–2012 (Figure 8), but without the very sharp contrasts evident during the recession. Women continued to benefit from the lion’s share of employment growth in top-paid jobs while suffering employment declines mainly in the two lowest quintiles. In effect, employment shifts have tended to be upgrading for women but more polarising for men.

Figure 8: *Employment change by wage quintile and gender, EU27, 2011 Q2 to 2012 Q2 (thousands)*



Source: *EU LFS (authors’ calculations), ESES 2010 (see Annex 1 for more details)*

Despite only modest overall growth in employment in public knowledge-intensive services, health professionals in the health sector was the largest growing top quintile job for women over the past year and teaching professionals in education the largest growing mid–high-paid job. There was a net increase of over 50,000 new posts for female doctors and of nearly 80,000 for female teaching professionals. The same jobs recorded employment declines overall for men.

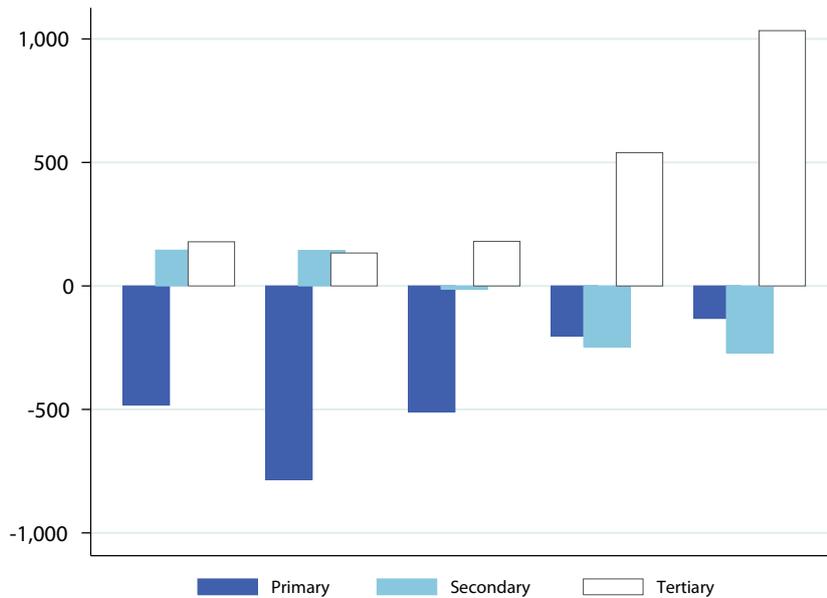
Significant top quintile gains for women were also recorded for two private sector jobs, that is, legal professionals, and business and administrative associate professionals in financial services. For men, by some margin the top growing top quintile job was that of an ICT professional. There were over 90,000 net new jobs added for this category from 2011 Q2 to 2012 Q2.

### Education

Sectoral and occupational employment shifts tend to go hand in hand with upgrading of the level of educational attainment. Growing sectors and occupations have higher skill requirements, declining sectors tend to have lower skill requirements. These vectors of change are reinforced by cohort shifts in the labour force where typically older workers with lower average educational attainment give way to younger workers with higher qualifications (though this last mechanism appears to have jammed since the onset of the crisis in 2008). In periods of net employment destruction, during 2008–2010 and 2011 Q2 to 2012 Q2, the axe fell in particular on less-qualified workers (Figure 9). Employment has declined sharply for those with basic education. Levels of employment of third-level graduates (undergraduates and postgraduates) have increased across all quintiles with a sharp skew towards higher-paid jobs. For those who had only completed secondary education, modest net growth was recorded only in the low-paid jobs.

However, only a very modest share of net growth in employment in the top two quintiles was accounted for by workers under 30 years old. This is the age cohort with the highest average level of qualification and the most recently acquired human capital. The net increase in 1.56 million tertiary-level jobs in the top two quintiles was distributed as follows: those aged under 30 years (<1%), 30–49 (59%), 50–64 (34%) and 65+ (6%).

Figure 9: *Employment change by wage quintile and level of education, EU27, 2011 Q2 to 2012 Q2 (thousands)*



Source: *EU LFS (authors' calculations), ESES 2010 (see Annex 1 for more details)*

### Foreign-born workers

The EU has had a positive annual net migration balance with the rest of the world since the early 1970s. Net migration to the EU is estimated to have declined sharply during the crisis, from 4.3 people in a thousand in 2003 to 1.8 people in a thousand in 2009,<sup>1</sup> but remains positive. There was a marginal growth (around 1%) in the employment of non-native workers during the crisis, mainly in low-paid jobs, while native-born workers bore the brunt of job losses (-2.7% between 2008 Q2 and 2010 Q2).

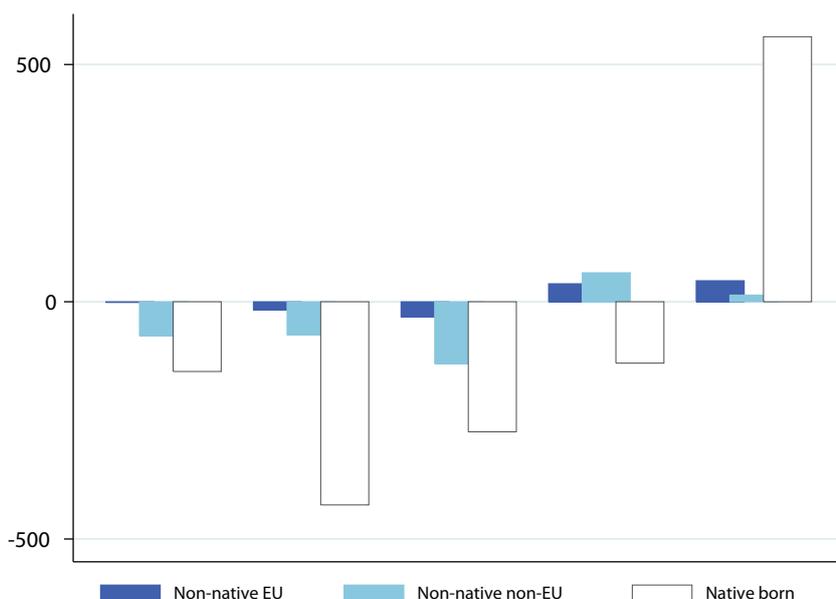
Despite greater legal obstacles to their paid employment, there were twice as many non-native non-EU workers in the EU as EU nationals working outside their country of birth (referred to as non-native EU workers) in 2012 Q2; that is, 12 million compared with just over six million.<sup>2</sup> However, the recession does appear to have prompted more native-born EU workers to take up work in another EU country. While numbers of non-native non-EU workers have declined marginally since 2008, those of non-native EU workers have increased (by some half a million since 2008, or 10%). However, the rate of increase slowed sharply in 2011–2012 as growth faltered.

<sup>1</sup> Eurostat statistics: Sustainable development – Demographic changes, available at [http://epp.eurostat.ec.europa.eu/statistics\\_explained/index.php/Sustainable\\_development\\_-\\_Demographic\\_changes](http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Sustainable_development_-_Demographic_changes)

<sup>2</sup> This is not the case in Germany, where all non-native non-EU workers are included in a large non-response category in the EU LFS. This category has increased by over 10% since 2008 and by nearly 200,000 alone in the year from 2011 Q2 to 2012 Q2.

Non-native non-EU workers, especially third-country nationals, are more likely to work in lower- than higher-quintile jobs. During 2011–2012, the decline in employment of third-country nationals was heaviest in mid-paid jobs (mainly in construction and manufacturing) with some countervailing gains in the top two quintiles (Figure 10). Net new employment of non-native EU workers occurred only in the top two quintiles, though some Member States continued to experience relatively strong growth in low-paid non-national employment (for example, Belgium and Italy).

Figure 10: *Employment change by wage quintile and origin, EU27, 2011 Q2 to 2012 Q2 (thousands)*



Source: *EU LFS (authors' calculations), ESES 2010 (see Annex 1 for more details)*

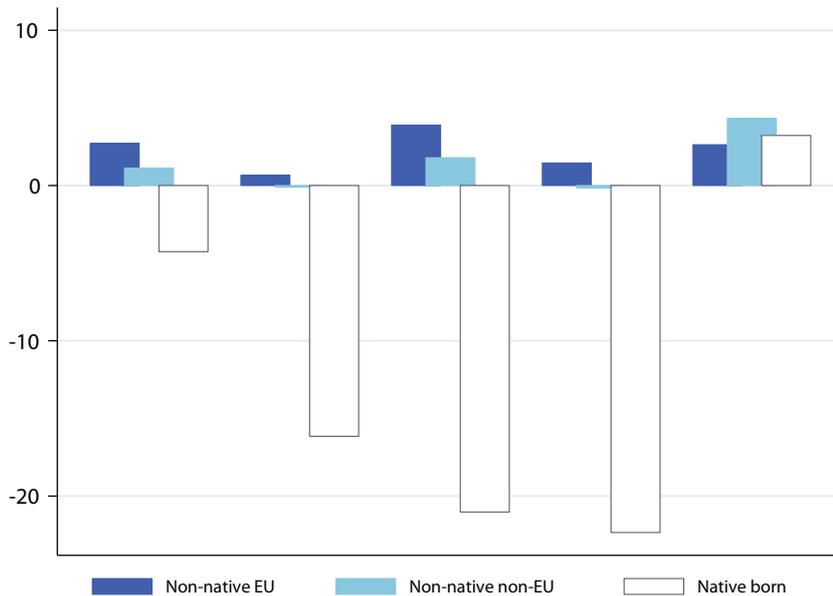
Taking the German non-response data on the country variable in the EU LFS as a proxy for foreign-born employment, non-nationals contributed in particular to growth in mid- and top-paid jobs. This category contributed about 40% of net overall employment growth between 2011 Q2 and 2012 Q2. That this growth was primarily in the top quintiles may reflect immigration policies favouring entry of skilled third-country nationals as well as intra-EU movements of higher-skilled workers.

Higher-quintile non-native employment grew in the EU between 2011 Q2 and 2012 Q2, particularly in Luxembourg and with impressive gains even in Ireland (Figure 11), another knowledge-intensive services economy albeit one in the eye of the euro zone storm.<sup>3</sup> Native-born employment levels have declined in Ireland by around 15% since 2008 as a result of emigration and increasing unemployment.<sup>4</sup>

<sup>3</sup> EU LFS data up to and including 2012 Q2 underestimate the foreign non-national population in Ireland. Fresh benchmark data from Irish Census 2011 led to an upward revision of 27% in the estimates of non-nationals in the population of working age in Ireland (CSO, 2012).

<sup>4</sup> A general caveat is that estimating levels and in particular changes in the non-native working population is fraught with difficulty for statistical reasons (inadequate coverage of non-natives in population sampling frames, higher non-response and possible episodes of mass regularisation of immigrant workers that are not always flagged in the data) and difficulties in covering the phenomenon (issues such as short-stay, return and circular migration).

Figure 11: *Employment change in Ireland, by wage quintile and origin, 2011 Q2 to 2012 Q2 (thousands)*



Source: *EU LFS (authors' calculations), ESES 2010 (see Annex 1 for more details)*

## Patterns of employment change by employment status

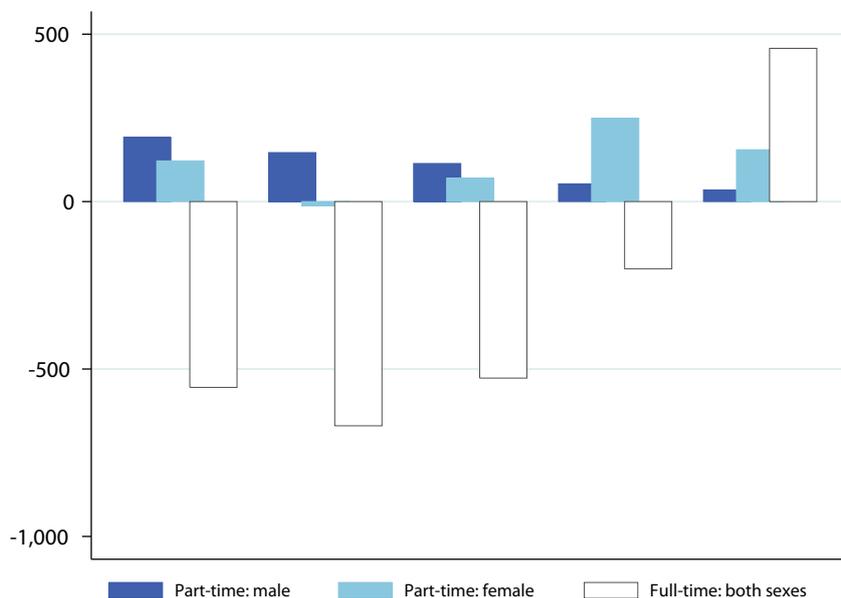
As labour markets tightened, the structural trend of destandardisation of the employment relationship tended to halt or even reverse in some countries in the period prior to the recession. The recession itself generated mixed outcomes. Part-time employment increased sharply and self-employment declined slightly, while temporary work suffered sharp declines early in the recession but accounted for the majority of positive employment growth after mid-2009.

The most recent data (2011 Q2 to 2012 Q2) show a large increase in part-time employment and more modest polarised growth in self-employment, but renewed weakness in temporary employment, especially in mid- and low-paid jobs. In the Netherlands, the 'national experiment' in part-time work has become more extensive and has been accompanied by strong growth in both self-employment and temporary work. Less than three million of the country's 8.4 million workers are now in permanent dependent full-time employment.

### Part-time work

Part-time employment grew in all five quintiles between 2011 Q2 and 2012 Q2, and now accounts for over 20% of EU27 employment. While somewhat stronger in the lowest quintile (which has the strongest concentration of part-time employment), part-time employment growth was evenly distributed across jobs at all levels of pay (Figure 12). Mid-paid jobs, which suffered strong contraction of full-time employment, generated growth of part-timers. Part-timers also took a disproportionate share of net new employment in the top two quintiles. Though the cross-sectional nature of the EU LFS data does not allow a definitive conclusion, some of this shift can be assumed to be transformation (temporary or otherwise) of full-time posts into part-time posts – a manifestation of working time flexibility to preserve employment.

Figure 12: Change in part-time and full-time employment, by wage quintile and gender, EU27, 2011 Q2 to 2012 Q2 (thousands)



Source: EU LFS (authors' calculations), ESES 2010 (see Annex 1 for more details)

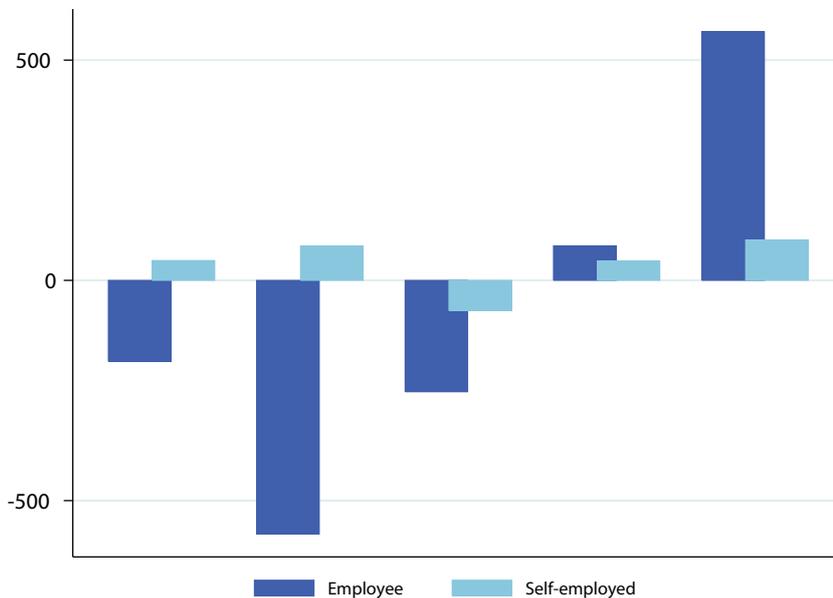
Those Member States in which part-time employment growth was most significant over the period 2011 Q2 to 2012 Q2 included Germany and Lithuania (in mid- and higher-paid jobs), the UK (polarised) as well as Italy and the Netherlands (concentrated in lower-paid jobs). Half of workers now work part time in the Netherlands.

Breaking down part-time employment growth by gender reveals an interesting pattern. Of the 750,000 new part-time jobs created between 2011 Q2 and 2012 Q2, nearly as many were held by men as were held by women despite part-time work being overwhelmingly carried out by women in the EU (more than 80% of part-time jobs are held by women). But whereas new male jobs were strongly skewed towards the lower quintiles with a concentration in construction and hotels/accommodation in particular, new female part-time jobs were much more likely to be in the top two quintiles with over half the gains recorded in health and education – both traditionally sectors that pay well.

### Self-employment

There was also a rise, though more modest, in levels of self-employment during 2011–2012. The self-employed are a heterogeneous population with a high share of agricultural workers in lower quintiles and self-employed professionals in top quintiles, with owner/managers in retail and so on spread across the wage distribution. Recent EU growth in self-employment has tended to reflect this polarised distribution (Figure 13).

Figure 13: *Employment change, by wage quintile and employment status, EU27, 2011 Q2 to 2012 Q2 (thousands)*



Source: *EU LFS (authors' calculations), ESES 2010 (see Annex 1 for more details)*

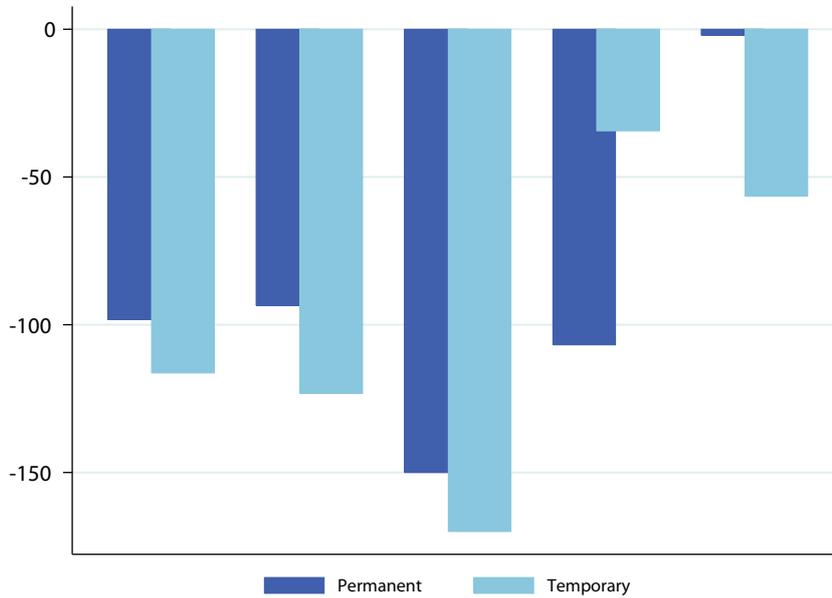
Self-employed job losses in the period were greatest in mid-paid jobs in manufacturing. Gains in mid–low-paid jobs were attributable mainly to agriculture, where the recession and its aftermath appear to have stalled the long-run decline in employment. Health and ‘professional, scientific and technical activities’ accounted for the bulk of top quintile employment gains, which were exclusively among sole traders, that is, self-employed without employees.

### Fixed-term

Fixed-term or temporary employment is the one form of atypical work to have contracted in the EU during 2011–2012, shedding half a million mid- and low-paid jobs. As was the case during the 2008–2009 recession, these losses were more or less wholly attributable to developments in one country, Spain, where employment losses for fixed-term workers continue to be greater than those for permanent workers (Figure 14). Greece and Portugal displayed similar patterns with relatively heavy losses in mid- and low-paid jobs.

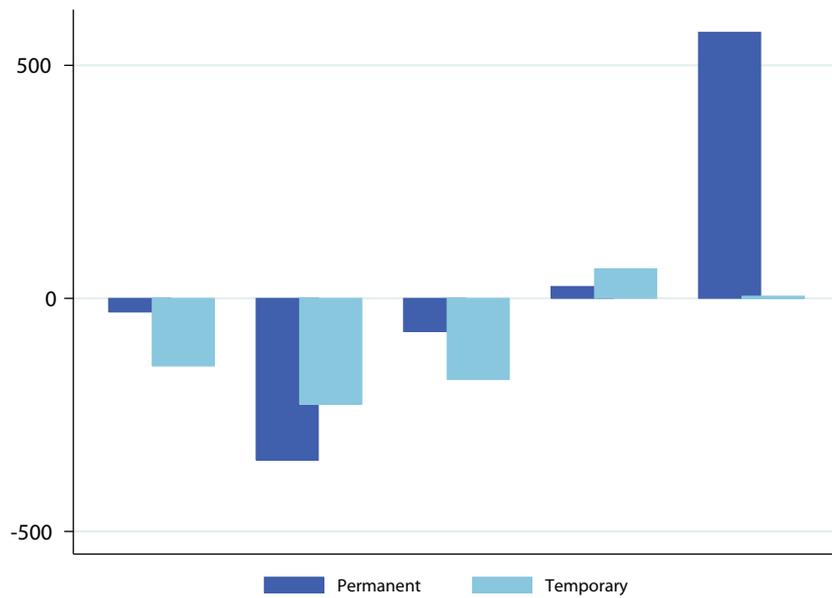
Increasing fixed-term employment was observed in Italy (across the quintiles), Poland (in the top and bottom quintiles) and the Netherlands (across all quintiles but with a skew to lower-paid jobs). All net EU employment growth in the top quintile came in permanent jobs (Figure 15).

Figure 14: Employment change in Spain, by wage quintile and employment status, 2011 Q2 to 2012 Q2 (thousands)



Source: EU LFS (authors' calculations), ESES 2010 (see Annex 1 for more details)

Figure 15: Employment change by wage quintile and employment status, EU27, 2011 Q2 to 2012 Q2 (thousands)



Source: EU LFS (authors' calculations), ESES 2010 (see Annex 1 for more details)

## Conclusions

- Employment levels in the EU27 declined by around 700,000 jobs between 2011 Q2 and 2012 Q2. The bulk of net employment losses were in mid-paid and low–mid-paid jobs, especially in construction and manufacturing.
- Although the overall pattern continued to be one of polarisation, the softening of the recession in 2011–2012 seems to have moderated the trough in the middle and accentuated the expansion of high-paid jobs, making the pattern more similar to the pre-recession upgrading trend. The return to recession induced by austerity is likely to re-emphasise polarisation in the near future.
- At country level, however, the most common pattern was one of polarisation. Member States with large current fiscal imbalances or debt-restructuring programmes in particular featured in this group. Countries with more resilient labour markets tended to have more upgrading patterns with employment growth concentrated in better-paid jobs.
- Although service sector employment continued to grow there was a rapid slowdown in net employment creation in the predominantly public-funded sectors (health, education and public administration). Private rather than public knowledge-intensive services were the source of most new, high-paid employment. The job of ICT professional in computer programming/consultancy, for example, was responsible for the largest expansion of high-paid jobs (over 90,000).
- Top quintile growth is consistent with a shift in employment favouring high-skill, white-collar employment within and across sectors.
- Continuing recent trends, female employment fared better in both qualitative and quantitative terms. Women account for a large share of recent employment growth in the top quintiles and men for a greater share of employment decline in mid-paid jobs.
- All net employment gains in mid–high-paid jobs were accounted for by third-level graduates.
- There has been strong growth in atypical forms of employment, notably part-time work but also self-employment. This has been polarised growth. In the case of part-time work, net employment growth in low-paid services was mainly male and that in high-paid services mainly female.
- There was a modest increase in intra-EU mobility, concentrated in well-paying jobs.

# Shifts in job structure before and during 2 the Great Recession

Do labour markets in advanced market economies tend towards polarisation? Are jobs in the middle of the wage/job quality distribution facing a structural process of relative decline with respect to those at the top and bottom? This argument has become almost commonplace in social sciences over the past decade and is slowly reaching into the policy debate as well.

The most well-known explanation of such an alleged job polarisation process is the theory of routine-biased technical change (Acemoglu and Autor, 2010), which attributes it to the IT revolution. Programmable machines are good at performing many types of routine tasks that were previously performed by unskilled and semiskilled industrial and service workers, who typically occupy the middle layers of employment – hence their polarising impact. The other main explanation for job polarisation found in the literature relates to globalisation (Oldenski, 2012). The mid-layer occupations tend to be also the easiest and most profitable to offshore, not only in industry but also increasingly in the service sector<sup>5</sup> (for example, the offshoring of back office tasks to India or call centres to South America).

The strongest evidence for such a process of polarisation comes from the US. A paper published by Wright and Dwyer in 2003 showed that the patterns of structural change in periods of employment expansion changed from a clear, outright upgrading in the 1960s to a very significant polarisation in the late 1990s. Several later papers confirmed such trends (Acemoglu and Autor, 2010; Autor, 2010; Autor et al, 2006).

Goos and Manning (2007) found a similar pattern of polarisation in the UK in the 1990s, although slightly more skewed towards the top of the income distribution (the middle grew the slowest, but the top grew much faster than the bottom). In a later paper they argued that the same process of polarisation had affected nearly all European economies in the employment expansion of the 1990s (Goos et al, 2009).

A previous Eurofound study (2008a) contested such evidence, arguing that there was a considerable diversity in the patterns of change of the employment structures across Europe over the last expansion – see also Fernández-Macías (2012) and contributions to *Transformations of the employment structure in the EU and USA, 1995–2007* (Fernández-Macías et al, 2012). The data not only showed diversity but a diversity that was clearly linked to European regions that share broadly similar institutional frameworks. This suggested that the institutional framework had something to do with the patterns of structural change in employment.<sup>6</sup> The interpretation was that, although it is certainly possible that technology and globalisation have a similarly polarising effect on employment demand everywhere, some features of the institutional system such as minimum wages or collective bargaining also affect the demand for different types of jobs and hence the observed diversity.

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<sup>5</sup> Technology and globalisation are also strongly linked. For instance, recent advances in electronic communications facilitate the impersonal delivery of services previously delivered face-to-face, hence facilitating their offshoring (see Blinder, 2007).

<sup>6</sup> See also Oesch and Rodriguez Menes, 2011 for a similar argument.

At least some of the clearest cases of polarisation in Europe seemed to be linked to a particular process of institutional transformation, the destandardisation of employment regulation that affected mostly continental European countries in the late 1990s and early 2000s<sup>7</sup> (Ebbinghaus and Eichhorst, 2006; Barbieri, 2007; Zdrojewski et al, 2009). Such institutional differences could explain why, despite facing similar underlying processes of technical change and globalisation, Nordic countries showed an unambiguously upgrading process of structural change, continental European countries suffered job polarisation and southern European economies underwent a centripetal process that is the very opposite to the idea of polarisation.<sup>8</sup>

However, these results concern a very specific period of recent European economic history, one which may look quite extraordinary in hindsight if some recent predictions about future growth trends are correct (Gordon, 2012). In the period 1995–2007, just after completion of the single market and during the start-up of the euro zone, overall employment in the EU grew by more than 1% a year on average, adding nearly 30 million jobs in total over the period across the EU27 Member States. It may be that such extraordinary economic conditions distorted the trends in structural change in some countries, allowing them to soften or to avoid the polarisation that would have otherwise occurred. For instance, the construction boom in some countries had a centripetal effect on structural employment change because construction jobs tend to be in the middle of the wage distribution. However, it is evident that developments in construction are the most cyclical of all sectors and indeed most of the employment expansion in construction was rolled back in the first two years of the crisis. In addition, the good economic conditions of the expansionary period may have allowed some structurally declining jobs to muddle through, only to be massively destroyed in the subsequent recession.

In other words, are the patterns of structural employment change different in expansions and recessions? Do economic crises produce job polarisation? The questions are not only important for understanding the employment impact of economic crises, but also to qualify the general understanding of structural change in employment in advanced market economies.<sup>9</sup> If economic crises do trigger a significant and pervasive process of job polarisation, it could be argued that the original conclusions drawn in this study were premature since they concerned only the good side of the economic cycle. In the long run, considering both the expansion and the contraction periods, it may be that there is a consistent trend towards polarisation, even if in the expansion period there is a diversity that seemingly falsifies the pervasive polarisation hypothesis.<sup>10</sup>

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<sup>7</sup> An earlier wave of destandardisation in the 1980s and early 1990s had affected mostly southern European countries such as Spain. Here the analysis only looks at what happened after 1995 and so this earlier destandardisation is omitted from the results. Although Spain has the second largest share of non-standard employment in Europe (after the Netherlands), this share actually decreased throughout the period studied here (that is, the destandardisation took place in the previous decade). On the contrary, the sharpest expansions of non-standard employment in the EU15 between 1995 and 2007 took place in Austria, Belgium, Germany and the Netherlands, precisely the countries where there was the clearest pattern of polarisation (together with France, which is a special case).

<sup>8</sup> This centralising process was often linked to the construction boom and was reversed in the subsequent bust.

<sup>9</sup> Wright and Dwyer (2003) argued that periods of economic expansion have a bigger impact on structural change in job quality and hence focused their analysis on them. The first publication in this Eurofound project (Eurofound, 2008a) also assumed that expansions are more important periods for structural change, something that this report qualifies to some extent.

<sup>10</sup> Some have recently argued that this is the case. For instance, Jaimovich and Siu (2012) claimed that job polarisation is not a gradual process (that is, it is not a regular incremental development throughout the business cycle) but that it only (or mostly) takes place during downturns.

The first evaluation of the impact of the recession on European employment structures found more polarisation than in the previous pre-recession economic expansion (Eurofound, 2011b). This section expands that early analysis of the recession by:

- using a better and more detailed dataset covering the four quarters of the EU LFS between 2008 and 2010, the full first period of the recession;
- systematically comparing the recession and the previous expansion;
- trying to identify to what extent the recession changed the patterns of structural change in employment.

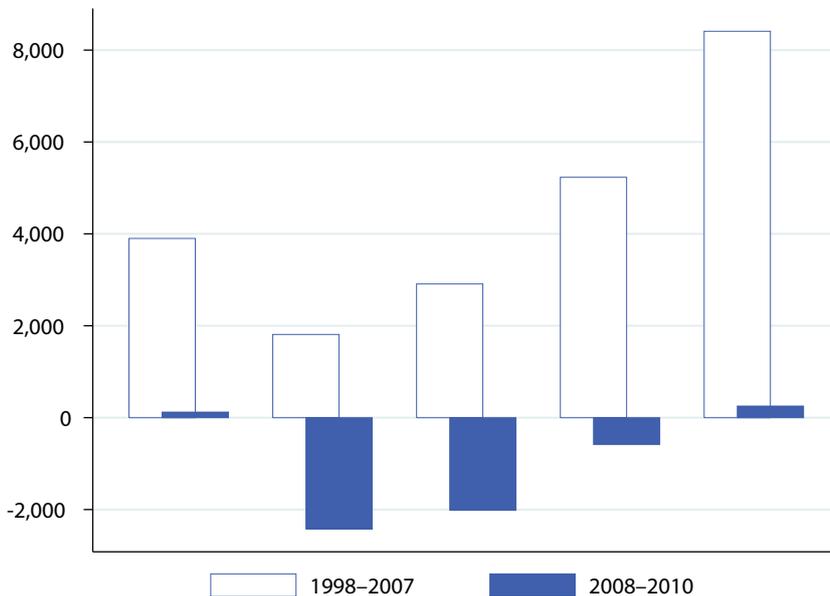
## Overall patterns of structural change in European employment

Figure 16 shows the change in the structure of employment during the 1998–2007 expansion and the 2008–2010 recession for the whole of the EU. It was necessary to study the two periods separately because of the break in NACE classification of employment by sector in the EU LFS between 2007 and 2008. Although the break is unfortunate, the fact that it coincides with the change in the cycle makes the comparison of the two periods still meaningful.

The figure allows for comparison of the patterns of structural change in employment over the expansion and the recession years. For instance, the number of lowest-paid jobs grew by nearly four million workers throughout Europe between 1998 and 2007, whereas they hardly grew at all between 2008 and 2010; the other extreme of the wage distribution shows that the top quintile grew by more than eight million workers between 1998 and 2007 in the 23 countries covered by the dataset and again hardly grew at all in the first two years of the crisis. Although the patterns of structural change are obviously different in the direction of change (between 1995 and 2007 all quintiles expanded in net terms, whereas between 2008 and 2010 only the highest and lowest quintiles grew marginally and the rest shed a significant amount of jobs), they are overall quite similar.

Between 1998 and 2007, the pattern is one of slightly polarised upgrading (with a much larger relative expansion at the two top quintiles and a slightly bigger expansion in the lowest compared with the second and third quintiles), while between 2008 and 2010 the pattern is one of a slightly upgrading polarisation (with the top and bottom quintiles growing by a similarly marginal amount and the three middle quintiles destroying a significant amount of jobs in net terms, with some downward bias). In other words, in both periods there was upgrading and polarisation, but while the emphasis in the expansion period was on upgrading, it clearly shifted to polarisation during the crisis.

Figure 16: Absolute change in employment by wage quintile, EU, 1998–2010 (thousands)

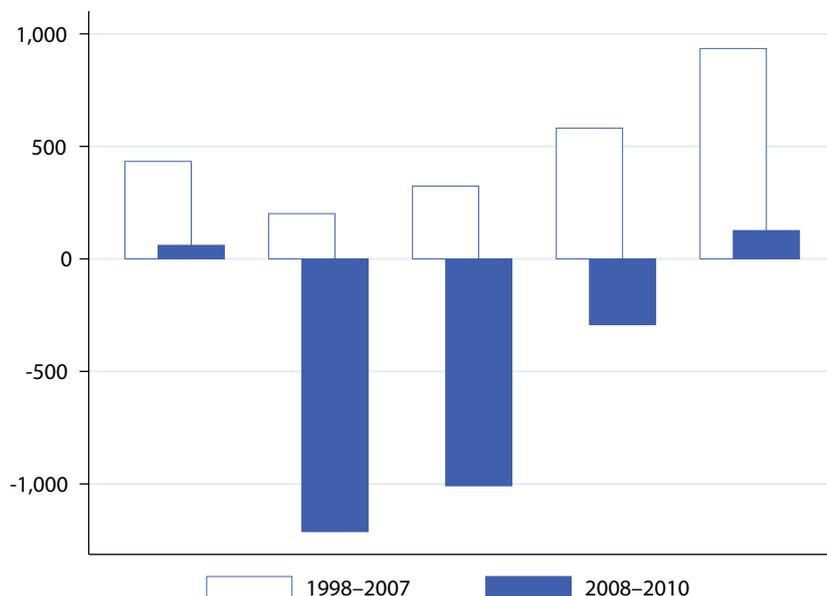


Notes: 23 Member States (no data for Bulgaria, Malta, Poland and Romania)

The white bars represent structural employment change during the expansion (1998–2007) and the blue bars represent structural employment change during the subsequent recession (2008–2010). Each pair of bars represents the absolute growth (in thousands) of a particular job quality quintile (that is, the first bar represents growth in the 20% employment in jobs with lower wages, and so on). Source: *EU LFS (authors' calculations), ESES 2002, ECHP, EU-SILC 2005, national accounts (see Annex 1 for more details)*

In terms of overall EU patterns, the crisis seems to have intensified the degree of polarisation. But because Figure 16 shows the figures in absolute terms and the two periods under consideration have different lengths, it can actually conceal the intensity of polarisation during the recession. A more informative picture of the trend before and after the crisis is shown in Figure 17, which represents an annual average of absolute net change in employment across the different quintiles over the two periods. The intensity of job destruction during the crisis was obviously much stronger than the intensity of job creation in the pre-recession years, but what is more important for this analysis is that the degree of structural change (differences in the relative growth of the five quintiles) was also much more intense during the crisis.

Figure 17: Annual average change in absolute employment by wage quintile, EU, 1998–2010 (thousands)



Notes: 23 Member States (no data for Bulgaria, Malta, Poland and Romania)

The white bars represent structural employment change during the expansion (1998–2007) and the blue bars represent structural employment change during the subsequent recession (2008–2010).

Source: *EU LFS (authors' calculations), ESES 2002, ECHP, EU-SILC 2005, national accounts (see Annex 1 for more details)*

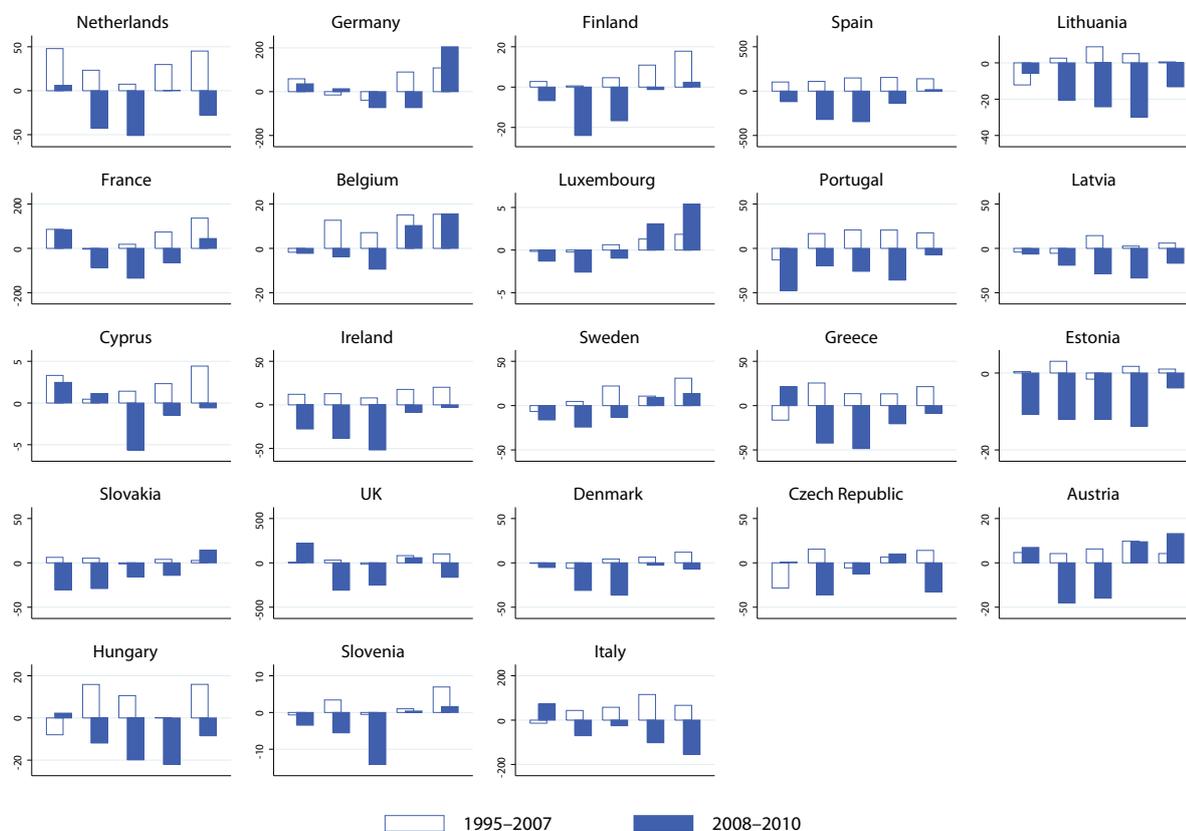
However, the country-specific results are more interesting than the EU figures. After all there is still no European labour market as such, but many distinct labour markets within the EU Member States. Figure 18 shows the country-specific patterns of structural change in employment, comparing the annual average change in the quintiles before and after the outbreak of the crisis in the same way as discussed for the whole EU in Figure 17.

The country charts are arranged as in the original Eurofound analysis of the expansion period (see Eurofound, 2008a), grouping countries with similar patterns of change between 1995 and 2007.

- The first column has five countries that experienced more or less clear polarisation processes.
- The second column has five countries in which there was polarisation but also a significant process of upgrading (as in the overall EU figures between 1998 and 2007 discussed above).
- The third column has five countries characterised by unambiguous upgrading, with no sign of polarisation.
- The fourth column has four countries with a centripetal, growth-in-the-middle development.
- The final fifth column has four countries that experienced a less clear, somewhat centripetal development.

Because the countries are ordered in Figure 18 according to their patterns of structural change during the expansion, the grouping may not be as relevant for the recession period. However, retention of this grouping allows for a more explicit comparison of the patterns before and after the crisis.

Figure 18: Annual average change in absolute employment by wage quintile and country, 1995–2010 (thousands)



Notes: 23 Member States (no data for Bulgaria, Malta, Poland and Romania)

The white bars represent structural employment change during the expansion (1995–2007), except for 1996–2007 in the Netherlands and Slovenia; 1997–2007 in Estonia, Finland, Hungary and Sweden; 1998–2007 in the Czech Republic, Latvia, Lithuania and Slovakia; 1999–2007 in Cyprus.

The blue bars represent structural employment change during the subsequent recession (2008–2010).

Source: *EU LFS (authors' calculations), ESES 2002, ECHP, EU-SILC 2005, national accounts (see Annex 1 for more details)*

As seen for the EU results, the intensity of structural change in the various Member States was much bigger in the recession than in the expansionary period (that is, the blue bars are bigger than the white bars, and in most cases more unequal). As the literature on economic cycles shows (see, for example, Pérez, 1983), crises are periods of more intense structural change than expansions (even if the expansion is as extraordinary as the one between 1995 and 2007 in some European countries, as shown by the figures for Ireland or Spain for instance).

What is most important for the purpose of this study is that the amount of diversity in the patterns of structural change was clearly reduced by the recession. Most countries would now fit into the category of polarisation, even most of those that did not experience polarisation in the previous period. The countries originally classified as polarising have simply intensified such a pattern of structural change during the crisis. Denmark and Finland have shifted from a clear and strong upgrading to a rather abrupt polarisation. Greece and Spain changed from a more or less centripetal development to a very intense polarisation, as did Austria, Latvia and Lithuania. The only countries that did not experience some type of polarisation during the crisis were:

- Slovakia, which experienced a very intense process of destructive upgrading, with most job destruction in the bottom and some job creation at the top;

- Italy, with a unique downgrading process, in which most employment destruction took place at the top of the employment structure;
- Luxembourg, with a clear upgrading pattern;
- Portugal, with job destruction concentrated in the first and fourth quintiles;
- Sweden, with still intense upgrading, albeit some job destruction.

This more or less pervasive polarisation observed in the recession is the result of a widespread intense destruction of mid-paid jobs. Top-paid jobs were quite resilient in the countries with a more intense employment destruction or even contributed positively in the (few) countries where the recession was milder (the clearest cases being Austria, Belgium and Germany), and jobs at the bottom of the employment structure either decreased less markedly than the middle or even expanded significantly in a few cases (such as France, Greece or the UK). During the expansion, the top of the employment structure behaved similarly in most countries (expanding rapidly), whereas most differences across countries took place in the bottom and to a lesser extent in the middle quintiles. In the period of crisis, it is the middle that looks very similar everywhere (with intense job destruction) and most differences across countries are to be found in the top and bottom of the wage structure, though in general the diversity is smaller.

There was also much less association between regional country groups and patterns of structural change during the crisis than during the previous expansion. During the crisis, there were cases of polarisation in all country clusters and the few exceptions are equally scattered across European regions.

So if the previous association suggested that some features of the institutional framework affected the patterns of structural change, the current picture seems to question that idea or at least suggest that institutions matter less in recessions. One possible explanation would be that polarisation is, after all, the long-term underlying trend. It can be delayed or disguised by institutional factors in a period of expansion but it will eventually return with a vengeance at the end of the cycle.

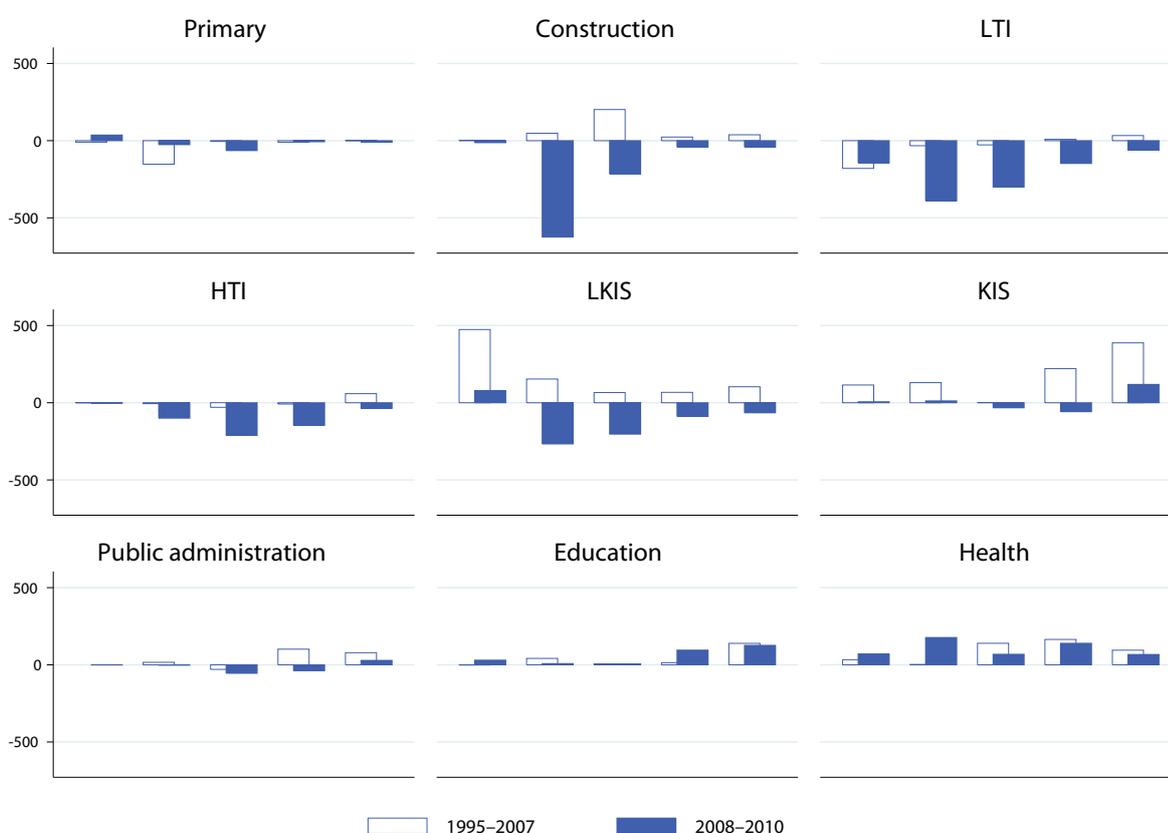
There are plausible reasons why the institutional framework may be less effective in recessions than in expansions. For instance, unions are weaker when unemployment is higher and may have less capacity to alter the patterns of job creation through collective bargaining (Kelly, 1998). But it may also be that the institutional framework changes more rapidly in the context of deep crises, in ways that facilitate (or at least not impede) polarisation. Indeed, in the current crisis some EU countries are under massive pressure to deregulate their labour markets, pressure that comes directly from EU institutions (that is, conditions for bailouts) or indirectly through financial markets (that is, credit downgrades and difficulties in financing public deficits). As argued previously (Eurofound, 2008a), labour market deregulation tends to facilitate the expansion of low-paid jobs and hence is associated with the pattern of job polarisation.

### **Drivers of change: sectoral dynamics and destandardisation**

Previous analysis of the transformation of European employment structures in the expansion explored the drivers of change by breaking them down in terms of broad sectors as well as by type of contract (Eurofound, 2008a). The widespread expansion of the top two quintiles was mostly related to a generalised growth of jobs in knowledge-intensive services, both private and public sector, which tended to occupy rather high positions in terms of wages and skill levels. Wherever there was an expansion of the bottom quintiles, it was usually linked to less knowledge-intensive services (personal services) and to the expansion of non-standard employment contracts. Finally, the developments in the middle quintiles of the wage distribution were often associated with construction (they grew when construction expanded) and to the (stagnant) behaviour of industry.

Figure 19 shows the annual average change in 23 EU Member States as a whole broken down by nine broad sectors, comparing the figures before and after the crisis. The white bars show the 1995–2007 trends mentioned above, while the blue bars show how things changed during the recession. The sector where the scale of structural change was most dramatic was construction where the recession destroyed a significant number of jobs in the second and third quintiles, and thus contributed strongly to the polarisation pattern. Since in the previous period it contributed significantly to the expansion of the middle quintiles, it is obvious that the contribution of this sector to polarisation is strongly cyclical. It reduced the amount of polarisation in the expansion years by expanding the middle layers of employment and intensified polarisation in the recession years by destroying many of the jobs created in the previous period.<sup>11</sup> But precisely because of this reversible cyclical nature, it can be argued that this sector did not contribute to long-term polarisation.

Figure 19: Average annual change in absolute employment by wage quintile and sector, EU, 1998–2010 (thousands)



Notes: 23 Member States (no data for Bulgaria, Malta, Poland and Romania)

The white bars represent structural employment change during the expansion (1995–2007) and the blue bars represent structural employment change during the subsequent recession (2008–2010).

HTI = high-tech industries; LTI = low-tech industries

KIS = knowledge-intensive services; LKIS = low knowledge-intensive services;

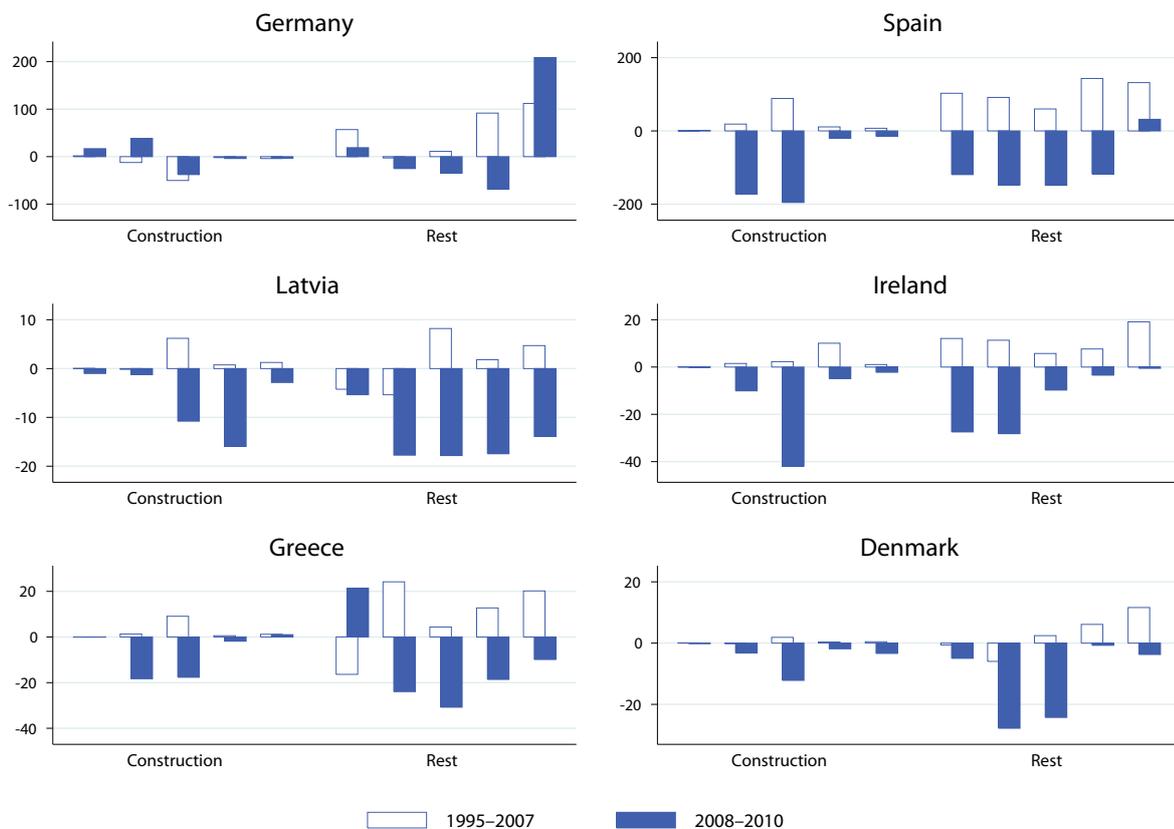
Source: *EU LFS (authors' calculations), ESES 2002, ECHP, EU-SILC 2005, national accounts (see Annex 1 for more details)*

<sup>11</sup> The contribution of the construction sector to job destruction in the recession is not the exact mirror image of its contribution to job growth in the expansion years because the largest contributor was the second rather than the third quintile. This is to some extent an artefact resulting from the break in the series due to the change of sector classification in the EU LFS in 2008; before 2008 the biggest occupation in construction was classified as a third-quintile job whereas it was placed in the second quintile after 2008. However, the fall in the relative position of construction in the wage ranking may also reflect something real. If the massive push of labour demand in construction may have inflated its relative wage in the previous period, its collapse after the crisis may have deflated it considerably and lead to its shift downwards in the employment structure.

Figure 20 shows the annual average contribution of construction to structural employment change in six countries, selected as presenting the most significant patterns or for illustrative reasons. In this case, the overall pattern for each country is broken down into two separate charts: one for the construction sector and one for all the other sectors of the economy.

In this presentation, the contribution of the construction sector can be put into proper context. For instance, in those countries such as Ireland or Spain that experienced the biggest construction boom in the expansion years, the amount of job destruction in this sector when the recession hit was nearly as big as in all the other sectors together (even though the construction sector never accounted for more than 13% of overall employment even at its highest point). Southern European countries (except Italy) and the Baltic states experienced an intensified version of the cyclical contribution of construction to structural change discussed earlier for the EU; that is, depolarising in the expansion years (by expanding the middle quintile) and polarising heavily in the recession. However, the construction sector in Denmark and Germany seems to have a longer-term polarising effect. In Germany, mid-paid jobs were destroyed in the construction sector throughout the two sides of the business cycle (expansion and recession). Nevertheless, unlike the rest of Europe, it created some jobs in the lower two quintiles during the recession. In Denmark, there was a significant destruction of mid-paid jobs in the construction sector in the recession period that did not follow a similar creation of jobs in this sector in the previous years and hence also suggests a longer-term effect. In most other countries, the construction sector did not have a significant impact in one way or another.

Figure 20: Average annual change in employment by wage quintile in the construction sector, 1995–2010 (thousands)



Notes: Absolute change

23 Member States (no data for Bulgaria, Malta, Poland and Romania)

The white bars represent structural employment change during the expansion (1995–2007), except for 1998–2007 in Latvia, and the blue bars represent structural employment change during the subsequent recession (2008–2010).

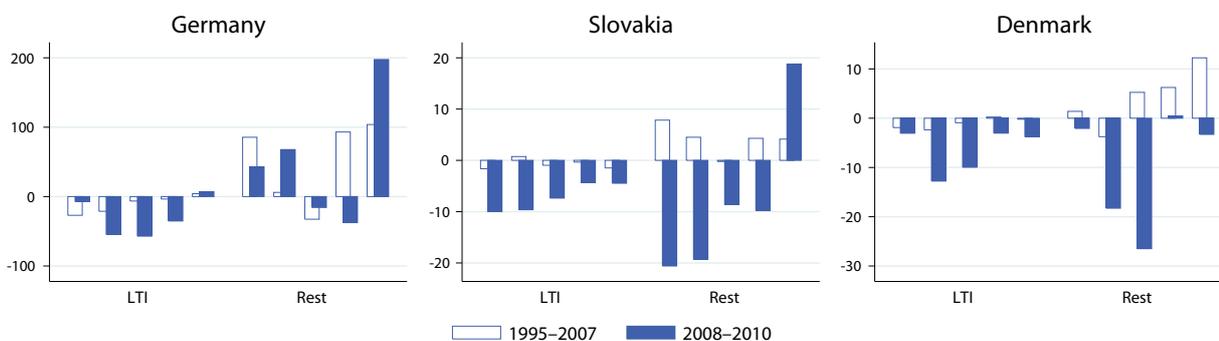
Source: EU LFS (authors' calculations), ESES 2002, ECHP, EU-SILC 2005, national accounts (see Annex 1 for more details)

The other very large contributor to job destruction during the recession was the industrial sector, which is split in Figure 19 into two subsectors based on a classification by the Organisation for Economic Co-operation and Development (OECD) according to the technological intensity of the production process (Hatzichronoglou, 1997). High-tech and low-tech industries both destroyed a significant amount of employment in the recession period; this destruction was concentrated in the mid- and mid-low quintiles, hence contributing strongly to polarisation. In this case, however, this development was not compensating for a previous expansion in the expansion years but followed a nearly flat contribution of these sectors to the previous long expansion of employment across Europe.

What this means is that, unlike the construction sector, the industrial sector did have a long-term polarising impact. This process was not gradual but resulted from an asymmetric development across the phases of the business cycle similar to the one found by Jaimovich and Siu (2012). In the expansion, the industrial sector remained stagnant in absolute terms, thus contributing to polarisation only indirectly (since other sectors did expand). In the contraction, it very rapidly destroyed a significant number of mid-paid jobs which will probably not be recovered – if the analysis extrapolates from previous trends.

The specific country patterns for low-tech and high-tech industries shown respectively in Figures 21 and 22 indicate that there are not many differences across European countries with regard to these subsectors. Low-tech industries had a significant negative polarising impact everywhere – even in Germany, where there was overall employment growth. The only exceptions were Slovakia (shown in Figure 21), Italy and Portugal (both not shown) where the negative impact of this subsector was concentrated in the lowest quintiles and thus contributed to upgrading rather than polarisation. The impact of the high-tech industries was also negative and polarising in most countries, though there were some upgrading patterns with even some job creation in the top quintile such as the one shown in Figure 22 for Germany (and also for Austria, not shown).

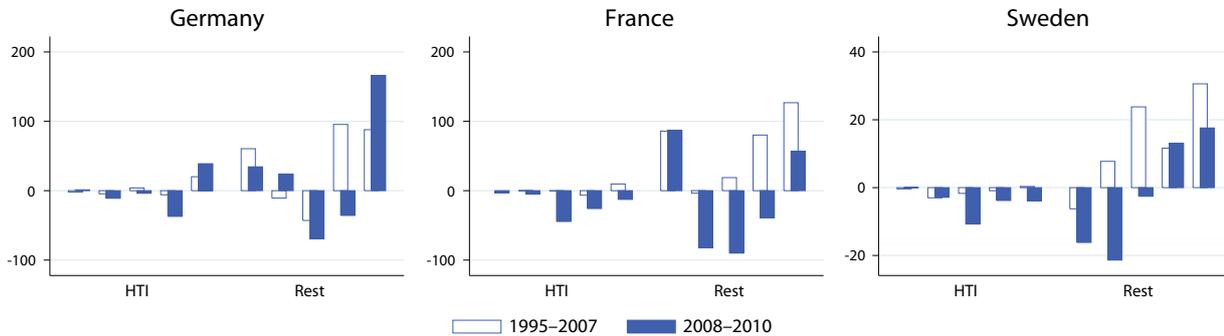
Figure 21: Average annual change in low-tech industries, by wage quintile and country, 1995–2010 (thousands)



Note: The white bars represent structural employment change during the expansion (1995–2007), except for 1998–2007 in Slovakia, and the blue bars represent structural employment change during the subsequent recession (2008–2010). LTI = low-tech industries.

Source: EU LFS (authors' calculations), ESES 2002, ECHP, EU-SILC 2005, national accounts (see Annex 1 for more details)

Figure 22: Average annual change in high-tech industries, by wage quintile and country, 1995–2010 (thousands)



Note: The white bars represent structural employment change during the expansion (1995–2007), except for 1997–2007 in Sweden. The blue bars represent structural employment change during the subsequent recession (2008–2010).

HTI = high-tech industries.

Source: *EU LFS (authors' calculations), ESES 2002, ECHP, EU-SILC 2005, national accounts (see Annex 1 for more details)*

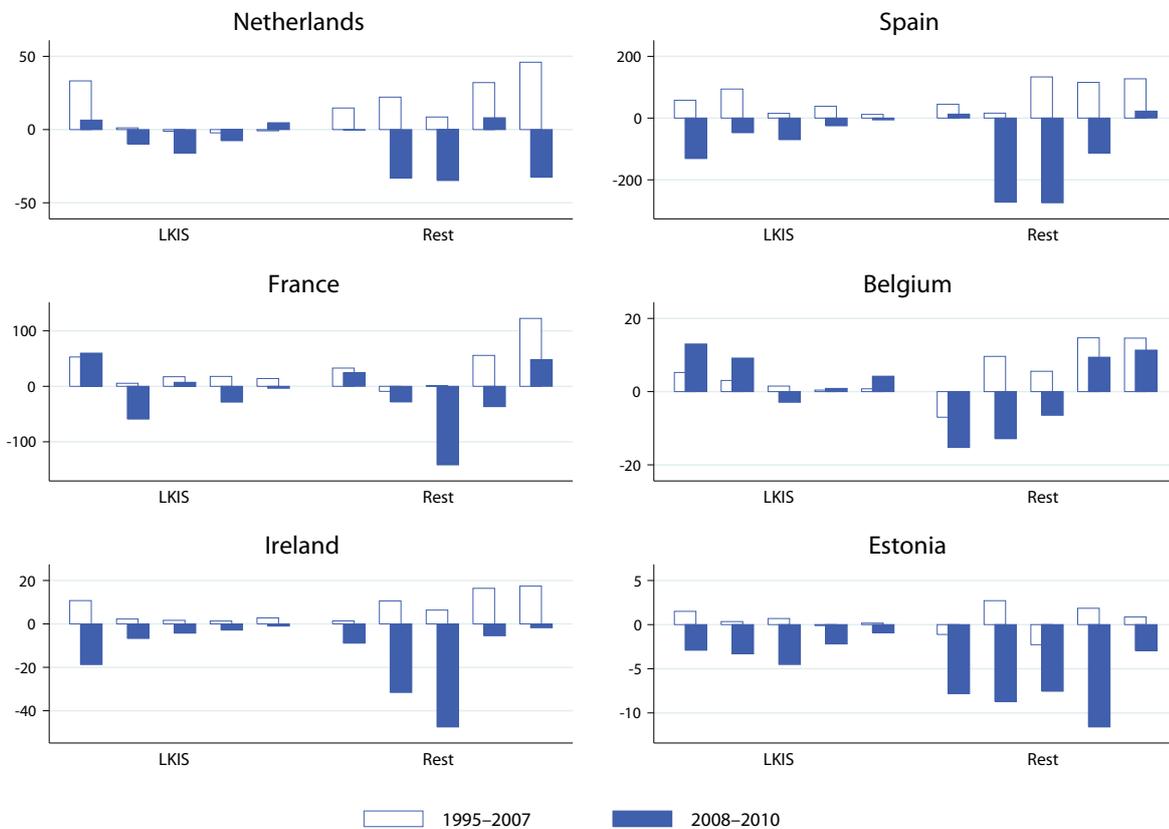
Low knowledge-intensity services also made a negative contribution in net terms to structural change during the recession. In this case, the destruction of employment came after a rather intense period of job creation in the expansion years and so this subsector also showed clear cyclical behaviour. Compared with construction, however, the positive and negative contributions of the opposite phases of the business cycle were less symmetrical. Whereas personal services generated mostly low-paid jobs in the expansion (that is, an expansion of the lowest quintile), they destroyed mostly mid-paid and mid-low-paid jobs during the recession.<sup>12</sup> Thus less knowledge-intensive services contributed to polarisation in both sides of the business cycle though in different ways – in the pre-recession years, by boosting (only) the creation of low-paid jobs and in the recession years by destroying mid-paid jobs. The routine-biased technical change hypothesis could fit this development. As in manufacturing, mid-paid routine service jobs are stagnant in upswings and destroyed in large numbers in recessions. In this service subsector, however, there are also many non-routine jobs which expanded massively in numbers in some countries in the pre-recession years, and were not destroyed in the recession years, and which tend to occupy the very bottom of the wage distribution.

Figure 23 shows the contribution made in six countries by low knowledge-intensive services to structural employment change before and after the crisis. This subsector displays more variability than most others across countries. Some countries do fit the picture painted earlier for the whole EU, that is, boosting 'bad' jobs<sup>13</sup> in the expansion and destroying 'mid-paid' jobs in the period of recession (see Estonia or the Netherlands in the figure). In other countries, the behaviour of this sector was more consistently inverted with the recession, similar to the construction sector; that is, the creation of bad jobs in the expansion and destruction of bad jobs in the recession – a purely cyclical phenomenon with less long-term effects (this seems the case of the Netherlands and Spain, as shown in the figure). In other countries such as Belgium, this sector behaved similarly in the expansion and recession years (creating lots of bad jobs), despite the rather big destruction of bad and mid-paid jobs in the other sectors. Yet in other countries such as Germany this sector contributed hardly anything during the crisis, remaining nearly stagnant (although its small contribution was of a polarising nature but this is not shown here).

<sup>12</sup> In this case, this difference does not seem to result from a difference in the ranking (quintile) position of some particular jobs before and after the change in the NACE classification.

<sup>13</sup> In this report, 'bad jobs' simply mean jobs in the lower quintiles.

Figure 23: Average annual change in less knowledge-intensive services, by wage quintile and country, 1995–2010 (thousands)



Notes: Absolute change

The white bars represent structural employment change during the expansion (1995–2007), except for 1996–2007 in the Netherlands and 1997–2007 in Estonia. The blue bars represent structural employment change during the subsequent recession (2008–2010).

LKIS = low knowledge-intensive services

Source: EU LFS (authors' calculations), ESES 2002, ECHP, EU-SILC 2005, national accounts (see Annex 1 for more details)

Was there any positive contribution to employment during the recession? Knowledge-intensive services, both in the private and public sectors, contributed positively to employment even during the recession and with a clear upward bias. In this sense, they continued their pre-recession trend, confirming that their upgrading contribution is a long-term development. Although private sector knowledge-intensive services had a positive contribution to the expansion of the top quintile (see Figure 19), the biggest positive contribution during the crisis came from the typically public sector knowledge-intensive service subsectors of education (with a very strong upward bias) and health (with a positive contribution to all quintiles, but particularly the second and fourth).

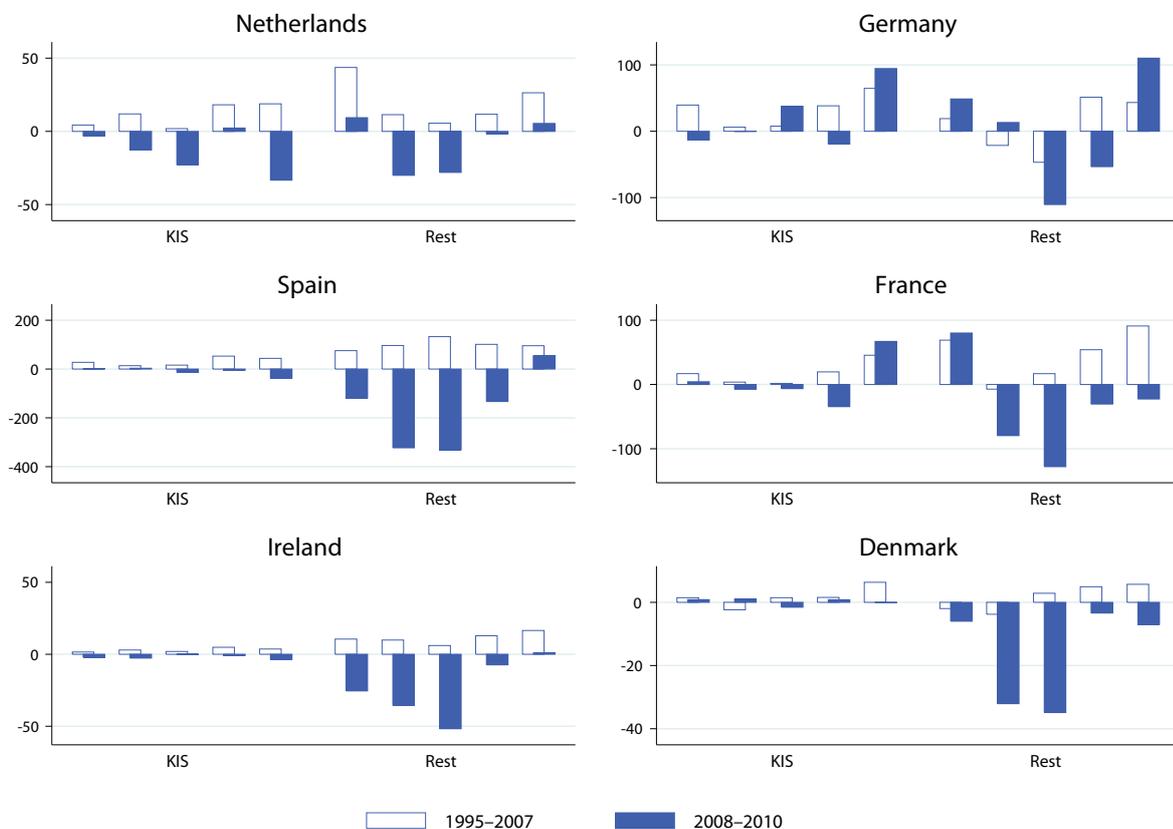
While all these developments seem consistent for both the periods included in Figure 19, the expansion of (public) education and health was brought to an end or even reversed immediately after the period shown by the shift of economic policy towards austerity that took place across most of Europe between 2010 and 2011 (see Chapter 1). Long-term trends in public sector employment depend more on political choice than on technological developments and it certainly seems that the current political climate in Europe is not likely to favour any further expansion of public sector employment for some time (indeed further cuts seem more likely). According to the results presented here, that would lead to a considerable reduction in the capacity of European economies to generate 'good' jobs,<sup>14</sup> since public sector employment

<sup>14</sup> In this report, 'good jobs' simply mean jobs in the higher quintiles.

in education and health in particular accounted for a significant proportion of the jobs created in the top two quintiles in both the 1995–2007 expansion and the 2008–2010 recession.

Figure 24 shows six country charts for private sector knowledge-intensive services. There is also some variation in this subsector, though not as important as in low knowledge-intensive services. In some countries such as France or Germany, this sector contributed positively to upgrading, adding many jobs to the top quintiles. In other countries such as Denmark, Ireland or Spain, it remained stagnant during the crisis in contrast with a large destruction of jobs in the other sectors of the economy. A clear outlier is the Netherlands, where this sector contributed strongly to structural employment downgrading through the destruction of a large number of jobs in the top quintile.

Figure 24: Average annual change in (private sector) knowledge-intensive services, by wage quintile and country, 1995–2010 (thousands)



Notes: Absolute change

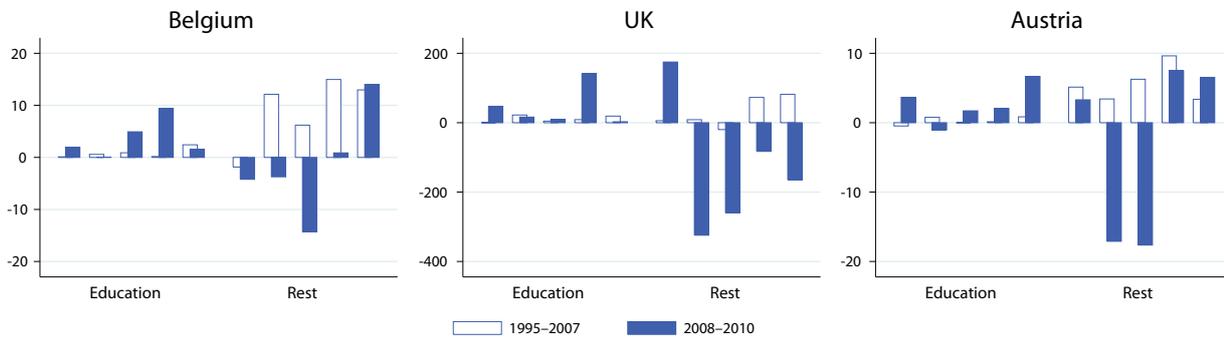
The white bars represent structural employment change during the expansion (1995–2007), except for 1996–2007 in the Netherlands, and the blue bars represent structural employment change during the subsequent recession (2008–2010).

KIS = knowledge-intensive services

Source: EU LFS (authors' calculations), ESES 2002, ECHP, EU-SILC 2005, national accounts (see Annex 1 for more details)

For education and health, the overall EU patterns conceal important differences between countries. The expansion of the education sector during the crisis is to a significant extent accounted for by a single country, the UK (shown in Figure 25), although this sector also expanded significantly in Austria, Belgium, Germany and Spain. In most of these countries, the contribution of the education sector was concentrated in the top two quintiles (Figure 25). In most other countries, the contribution of this sector was marginal and in some cases even slightly negative (for instance, in France and Italy; not shown).

Figure 25: Average annual change in education sector, by wage quintile and country, 1995–2010 (thousands)

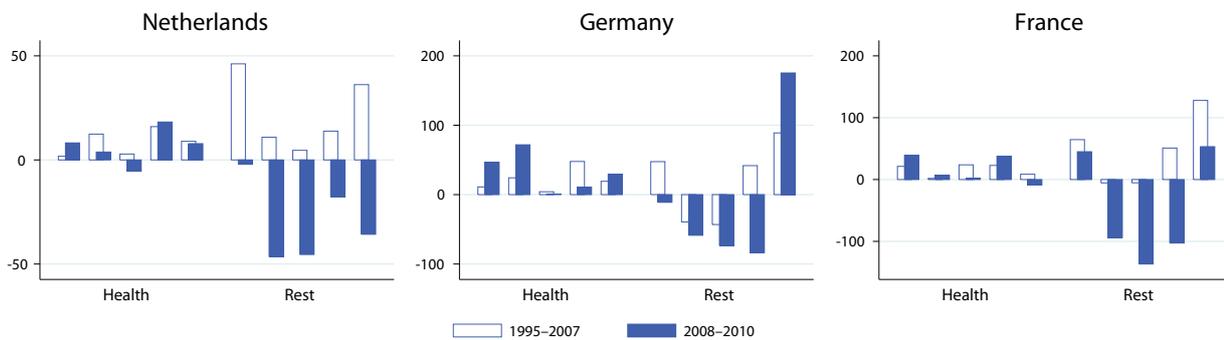


Note: The white bars represent structural employment change during the expansion (1995–2007) and the blue bars represent structural employment change during the subsequent recession (2008–2010).

Source: *EU LFS (authors' calculations), ESES 2002, ECHP, EU-SILC 2005, national accounts (see Annex 1 for more details)*

The health sector made a positive contribution in nearly all cases and one which was sizeable in Austria, Belgium, France, Germany, the Netherlands and the UK (Figure 26). However, this contribution was of a rather different nature in different countries. While it contributed strongly to upgrading in Belgium and the Netherlands, it had a polarising impact in Austria, France and Germany, and a surprisingly downgrading impact in the UK (most new jobs in the health sector in the UK were located in the lowest wage quintile; not shown here).

Figure 26: Average annual change in the health sector, by wage quintile and country, 1995–2010 (thousands)

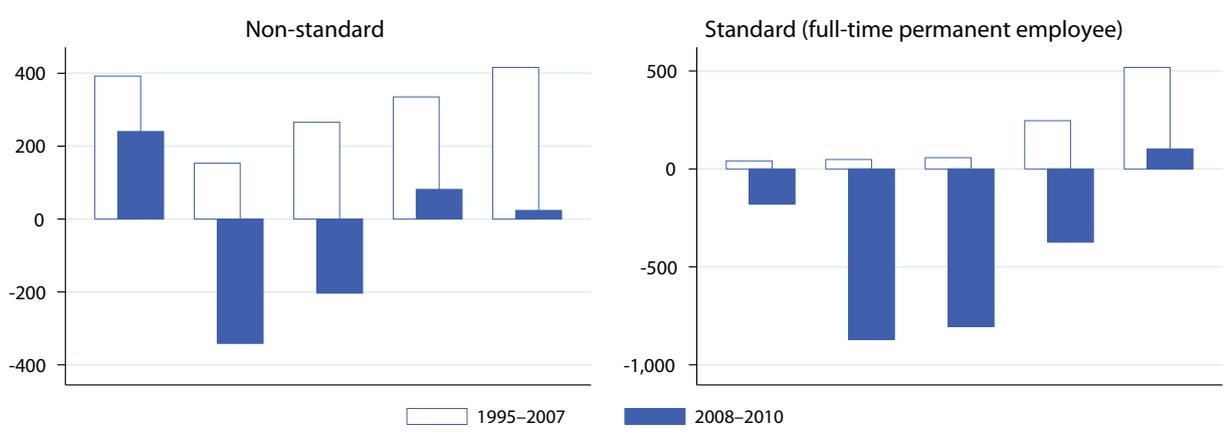


Note: The white bars represent structural employment change during the expansion (1995–2007), except for 1996–2007 in the Netherlands, and the blue bars represent structural employment change during the subsequent recession (2008–2010).

Source: *EU LFS (authors' calculations), ESES 2002, ECHP, EU-SILC 2005, national accounts (see Annex 1 for more details)*

Eurofound's previous report on the patterns of structural employment change during the 1995–2007 expansion argued that one of the drivers of polarisation (in those countries where there was polarisation) was a destandardisation of the employment contract (Eurofound, 2008a). That is, in those countries where there was an expansion of bad jobs, these bad jobs were mostly non-standard (part-time, temporary contracts or self-employment), whereas the widespread expansion of good jobs was in most cases strongly biased towards standard employment. Although such patterns were mostly country-specific, the EU figures shown in the white bars of Figure 27 serve as an illustration of such a process of polarising destandardisation. The blue bars superimposed on the white bars show that this process of destandardisation continued during the crisis (though within a general context of employment contraction) and that the polarised pattern of job growth in the case of non-standard employment was maintained or even slightly intensified.

Figure 27: Average annual change in employment, by wage quintile and type of employment, EU, 1998–2010 (thousands)



Notes: 23 Member States (no data for Bulgaria, Malta, Poland and Romania)

The white bars represent structural employment change during the expansion (1998–2007), and the blue bars represent structural employment change during the subsequent recession (2008–2010).

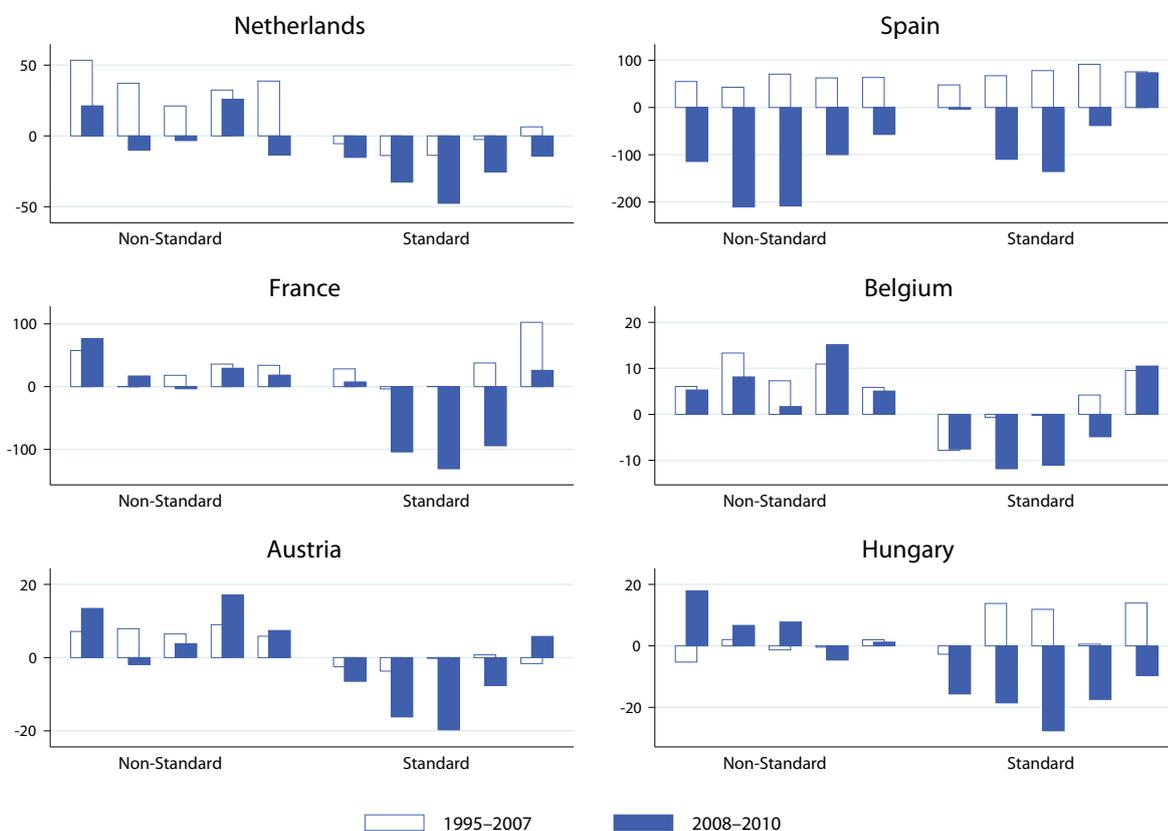
Source: EU LFS (authors' calculations), ESES 2002, ECHP, EU-SILC 2005, national accounts (see Annex 1 for more details)

But the really striking aspect of Figure 27 is the big change in the contribution of standard employment to the patterns of structural change. If in the expansion years the growth of standard employment had a strongly upgrading impact on the patterns of structural change, in the recession the very large reduction of standard employment was intensely polarising. Most of the mid-paid jobs destroyed in the crisis had standard contracts, and most of the standard employment destroyed was in the second and third quintiles. In other words, whereas only non-standard jobs contributed to polarisation in the expansion, in the recession both standard and non-standard showed a polarising pattern – indeed the contribution to polarisation of standard employment was far greater. This still suggests that polarisation and destandardisation are linked phenomena in the European context, but that the nature of such a link seems to change in the up and down phases of the business cycle.

Figure 28 shows the contribution to the patterns of structural change of non-standard employment for six significant countries. In this case, the overall trends are very similar across Europe. During recession, there was in most cases a net destruction of standard employment, with a deep polarising impact. In some cases, there was a small creation of standard jobs in the very top quintile, although not enough to compensate for the negative developments in other quintiles (see Austria, Belgium and Spain in Figure 28; a similar pattern can be observed in Germany and Sweden, but it is not shown here). Also in most cases, if there was any job creation in the recession, it was concentrated in non-standard employment, which grew in most cases despite the crisis and in most cases with a polarising impact as well (see Austria, Belgium and the Netherlands), or with a structural downgrading effect (see France and Hungary). The exceptions to this overall pattern were:

- Spain, where the destruction of non-standard employment was much bigger than that of standard employment;
- Italy (not shown here), where the destruction of both standard and non-standard employment was concentrated in the highest quintiles.

Figure 28: Average annual change in employment, by wage quintile, type of employment relation and country, 1995–2010 (thousands)



Notes: Absolute change

The white bars represent structural employment change during the expansion (1995–2007), except for 1996–2007 in the Netherlands and 1997–2007 in Hungary. The blue bars represent structural employment change during the subsequent recession (2008–2010).

Source: *EU LFS (authors' calculations), ESES 2002, ECHP, EU-SILC 2005, national accounts (see Annex 1 for more details)*

## Conclusions: Job polarisation in Europe across the business cycle

The patterns of structural change in employment across the EU were asymmetric in the up and down phases of the last business cycle. In the expansion years, the routine occupations in industry and services that occupy the middle positions in the employment structure remained stagnant, while the ‘good’ jobs (mostly, knowledge-intensive public and private services) grew everywhere and the ‘bad’ service jobs grew wherever labour market institutions allowed them to grow. In the recession years, the top and bottom quintiles of the wage distribution remained stagnant or grew only marginally, whereas routine service and industrial jobs hollowed out the middle employment structure by being massively destroyed. The construction sector had a peculiar impact in those EU countries that experienced a construction boom–bust cycle in this period, depolarising in the upswing and strongly polarising in the downswing, and thus intensifying the patterns of the rest of the economy.

In explaining the patterns of recent structural change in employment across advanced market economies, two alternative approaches have dominated recent research. One emphasises the similarities and argues that routine-biased technological change is polarising employment structures everywhere. The other emphasises the diversity and argues that differences in labour market institutions lead to different patterns of structural change.

Eurofound's previous analysis of labour market developments across Europe between 1995 and 2007 provided strong support for the argument of diversity and indirect support for the importance of labour market institutions in determining structural employment change (Eurofound, 2008a). However, the analysis of the subsequent crisis presented in this report clearly fits the universalist argument better and therefore provides an important qualification to the earlier conclusions drawn. If both phases of the period are considered (expansion and recession), the hypothesis that there is a fundamental underlying trend towards job polarisation in advanced capitalist economies seems more appealing.

However, there are still important problems with this hypothesis that need to be addressed by further research. First, the hypothesis still has to explain the existence of variability, even if it is limited to periods of economic expansion. Although looking at both sides of the business cycle qualifies the extent of variability, it is by no means eliminated from the picture and it cannot be ignored. Second, the increased homogeneity in the recession can plausibly be itself the result of a coordinated process of institutional transformation. Although the outcome is the same (a pervasive polarisation), the interpretation is radically different if it results from universal impersonal technological forces or from a political process of institutional change. Finally, it is simply too early to tell. Such a sweeping generalisation about the long-term trends of structural change in employment requires the analysis of longer time periods.

# Enriching the European Jobs Monitor: 3 A multidimensional indicator of job quality

It may be difficult to define precisely what job quality is but most people would agree that it is not just about wages. Yet in most of the previous publications for this project (Eurofound, 2008a, 2011a), as well as in most other publications with a similar methodology (Wright and Dwyer, 2003; Goos et al, 2008), the classification of jobs by their quality is primarily done on the basis of the average wage level of workers. The justification for this has always been to a large extent pragmatic (the lack of comparable sources with the required level of detail), although wages are arguably among the most salient aspects of job quality, as well as a good proxy because of their high correlation with other (and more difficult to measure) aspects of job quality (Leschke and Watt, 2008). However, any approach based solely on wages remains partial and hence would benefit from the addition of a secondary measure with a wider coverage of job quality. This is done in this chapter. In two previous publications (Fernández-Macías, 2010; Hurley et al, 2012), the analysis used a similar approach to enrich the European Jobs Monitor (EJM) data. In this report, an updated version of the job quality model and a richer data source are used. The methodology and index presented in this report will form part of the EJM dataset from now on.

This chapter looks first at the construction of the new non-pecuniary job quality index (NPI) for the EJM. This is followed by a comparison of the three indices used for classifying jobs in the EJM (wages, education and non-pecuniary job quality). The final section revisits the evolution of job quality over the last two decades in Europe, taking advantage of the richer view presented by the three indices.

## Construction of the NPI

The data used to construct the NPI come entirely from the fifth European Working Conditions Survey (EWCS) carried out by Eurofound in 2010 (Eurofound, 2012a). The EWCS is the only European data source that provides a comparable and detailed picture of job quality, updated every five years. The methodological principles and theoretical model followed for the construction of such an index draw on two main sources:

- *Trends in job quality in Europe* (Eurofound, 2012b);
- *Measuring more than money: The social economics of job quality* (Muñoz de Bustillo et al, 2011).

Both these sources also use EWCS data.

## Concepts and principles behind the NPI

The concept of job quality refers to the potential impact of the characteristics of jobs on the well-being of workers. A job quality index is a cardinal measure of such a concept. Since job quality is a complex and multidimensional concept that has no obvious direct manifestation, it necessarily involves a complex process of conceptualisation, measurement and aggregation of different indicators at different levels.

Each decision in this process requires making some assumptions, which are always debatable because of the complex and strongly normative nature of the concept itself. This problem cannot be solved as such, but it can be confronted in two main ways:

- by drawing on the existing accumulated knowledge on the impact of jobs on workers' well-being;
- by being transparent about the assumptions made in constructing the index (Muñoz de Bustillo et al, 2011).

The general principles behind the construction of the index are summarised below.

The index is based on objective rather than subjective indicators. Although all information is based on workers' own assessment of their situation (the EWCS is a workers' survey), this analysis only uses items that refer to factual information. In particular, the study avoids using any type of job satisfaction question. The reason behind this decision is that satisfaction or more generally subjective indicators reflect not only the characteristics of work but also the workers' psychological characteristics such as their expectations.

The index is focused on characteristics rather than outcomes. Again this is because here the aim is for the measure to reflect the characteristics of jobs themselves rather than those of the people holding them. Most of the outcomes depend on the characteristics of workers as much as on those of their jobs. For instance, rather than including a measure of the impact of work on the health of workers (which also depends on their initial health condition), the analysis includes a measure of the risks and hazards to which they are exposed.

The index is constructed at the individual level and then averaged at the job level in order to assign such scores to the EJM dataset.

The selection of the attributes to be measured and the overall structure of the model used are based on the available literature on job quality, in particular Eurofound (2012b) and Muñoz de Bustillo et al (2011). Whenever the analysis departs from these sources, the reason is stated.

For the construction of the index, 38 individual variables from the EWCS were selected. All variables were normalised to a 0–1 scale, assigning the values with a substantive rather than statistical logic, with 0 being the worst possible outcome and 1 the best. In some cases, this normalisation is straightforward, for instance, when using variables with a pseudo-time scale (being all the time exposed to a negative risk factor would be coded as 0, and never as 1, with the values in between proportional to the stated proportion of time exposed). In others, it requires some assumption or simple common sense; having autonomy over the pace of work (other things being equal) is good and thus receives a value of 1, to be averaged with the level of autonomy in other areas of work. In all cases, there has been an effort to follow a logic that can be justified by the existing literature on job quality and which is consistent with Eurofound (2012b) and Muñoz de Bustillo et al (2011).

### **Structure of the model: components and weighting**

The overall structure of the model is shown in Table 2. There are four main dimensions of job quality:

1. Intrinsic job quality;
2. Employment quality;
3. Workplace risks;
4. Working time and work–life balance.

Table 2: *Structure of the NPI*

<p><b>1. Intrinsic quality of work (25%)</b></p> <p>a) Skills (8.3%; ISCO q49d, q49e, q49f)</p> <p>b) Autonomy (8.3%; q25a, q50b, q50c, q49b)</p> <p>c) Social support (8.3%; q51a, q51b)</p> <p><b>2. Employment quality (25%)</b></p> <p>a) Contractual stability (12.5%; q7, q12, q77a,)</p> <p>b) Development opportunities (12.5%; q61a, q77c)</p> <p><b>3. Workplace risks (25%)</b></p> <p>a) Physical risks (*20%; q23a–i, q24a, q24b, q24c, q24e)</p> <p>b) Psychosocial risks (*5%; q71b)</p> <p><b>4. Working time and work–life balance (25%)</b></p> <p>a) Duration (6.25%; q18)</p> <p>b) Scheduling (6.25%; q32, q33, q34, q35)</p> <p>c) Flexibility (6.25%; q39, q40)</p> <p>d) Intensity (6.25%; q45a, q45b)</p> <p><i>*Approximately (different aggregation procedure)</i></p>
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Note: The percentages show the weighting given to the various components of the dimension. The numbers refer to fifth EWCS variables.

The second and fourth dimensions are almost identical to the components ‘prospects’ and ‘working time quality’ of Eurofound (2012b) and to the dimensions ‘employment quality’ and ‘work–life balance’ of Muñoz de Bustillo et al (2011). The dimensions ‘intrinsic job quality’ and ‘workplace risks’ are included within a single component in the model described in Eurofound (2012b), which is also called ‘intrinsic job quality’, but following Muñoz de Bustillo et al (2011) it is preferred here to consider them as separate dimensions (this is justified later).

No component of wages has been included as in the previous studies by Eurofound (2012b) and Muñoz de Bustillo et al (2011). There is already a relative indicator of wages in the EJM and so it would be redundant to include such a component in this index (the goal is to compare the results using the two alternative approaches). The omission of that important component is what gives this multidimensional index its name, that is, non-pecuniary job quality index.

The first dimension of the index, intrinsic job quality, has three main components:

- skills;
- autonomy;
- social support.

In this dimension, the analysis departs slightly from both Eurofound (2012b) and Muñoz de Bustillo et al (2011). As already mentioned, Eurofound (2012b) includes risks and intensity within ‘intrinsic job quality’. Here it is considered that these are distinct issues both in the social sciences tradition (the study of workplace risks is associated with work epidemiology and health and safety studies, whereas intrinsic job quality falls mainly within the field of sociology of work and labour process studies) and conceptually (intrinsic job quality refers to the contents of work and the nature of

the labour process; risks refer to attributes of the work environment that can affect workers; and intensity or pace is an attribute of the timing of work). Muñoz de Bustillo et al (2011) include a 'subjective' subcomponent that violates the principle of keeping the index objective. In the approach taken here, this dimension can be understood as a measure of the richness of work as creative human activity, which is what skills, autonomy and social support are all about.

The second dimension of job quality is employment quality, which refers to the characteristics of the contractual relation binding the worker and their employer (or customers in the case of the self-employed). Following both Eurofound (2012b) and Muñoz de Bustillo et al (2011), this dimension is split in two components – one measuring the degree of contractual stability of the worker and the other the prospects that the job provides for the further development of the employee.

The third dimension is workplace risks. Although the dimension and its base indicators are roughly the same as in both Eurofound (2012b) and Muñoz de Bustillo et al (2011), the method of aggregation used in this study is different. The problem with aggregating these indicators of risks is that a simple arithmetic average (as used for aggregating other dimensions of the index) produces misleading results. The indicators used measure how often workers are exposed to 13 different work hazards such as high temperatures, fumes or radiation. It is highly unlikely that someone would be exposed all the time to all hazards, which would be the theoretical maximum value if the indicator was based on a simple average. But if the worker is exposed to a single risk, if exposure is frequent it can have a considerable negative effect on the quality of work.

The approach taken by Eurofound (2012b) is in practice identical to a simple arithmetic average of the level of exposure since it assigns a value of 1–6 to the level of exposure of each individual and then sums them (so that for an individual to get the worst value they would have to be exposed to all risk factors all the time). Muñoz de Bustillo et al (2011) simply assign to each worker the most negative value of all risk indicators, assuming that it is the level of exposure to the risk to which the worker is most exposed that determines their job quality. Both approaches yield very different results for the same levels of exposure – generally low in the case of Eurofound (2012b) and in many cases quite high in the case of Muñoz de Bustillo et al (2011).

This analysis opts for an intermediate, albeit more complicated, approach in which the mean value of the dimension 'risks' is determined by the exposure to physical risks. This is calculated as the average of two different values:

- the maximum level of exposure to any risk;
- the average level of exposure to the six risks to which the worker is most exposed.

This means that, if someone is exposed all of the time to chemical agents but never exposed to any other risk, they would receive a value of 0.41 (0 being the worst outcome and 1 the best), whereas the simple arithmetic average would give a value of 0.91 (that is, a very positive outcome) and the maximum value approach would assign a value of 0 (the most negative value). The psychosocial component of the risks dimension is only based on a single dichotomous variable holding a value of 1 if the worker is subject to bullying and harassment at work. If the worker is not, their overall value of risks is equal to their value of physical risks. If the worker is bullied at work, their value for physical risks is divided by two (that is, being bullied lowers the risks score of the job by half, where a lower score implies poorer job quality).

Finally, the fourth dimension refers to working time and work–life balance. Although working time could be considered as part of the conditions of employment (being one of the key elements of the employment contract), it is so salient in the literature and has such important implications in terms of work–life balance that it is preferred to include it in a

separate dimension, as do both Eurofound (2012b) and Muñoz de Bustillo et al (2011). This dimension is shaped by four components, which refer to the four key aspects of working time at the job level:

- duration;
- scheduling;
- flexibility;
- intensity of work.

All four components receive the same weighting as do all subcomponents of the index unless otherwise stated.

The final aggregation of the four dimensions into a single index is done using a geometric rather than arithmetic average. A geometric method of aggregation has very interesting properties for the construction of a welfare index. It is also used as the method of final aggregation in Muñoz de Bustillo et al (2011) and was recently introduced in the well-known UN Human Development Index (Klugman et al, 2011).

The contribution of each dimension to the overall value of the index is concave rather than linear (that is, an increase from a low initial value contributes more to the index than the same increase from a high initial value<sup>15</sup>). It depends on the other dimensions as well, with a penalisation when the values in the four dimensions are very different. Therefore, the final index assumes decreasing returns in the attributes of job quality and imperfect substitutability among them, both of which are consistent with the existing literature (for a more detailed discussion, see Muñoz de Bustillo et al, 2011, pp. 155–191).

### The index at individual level

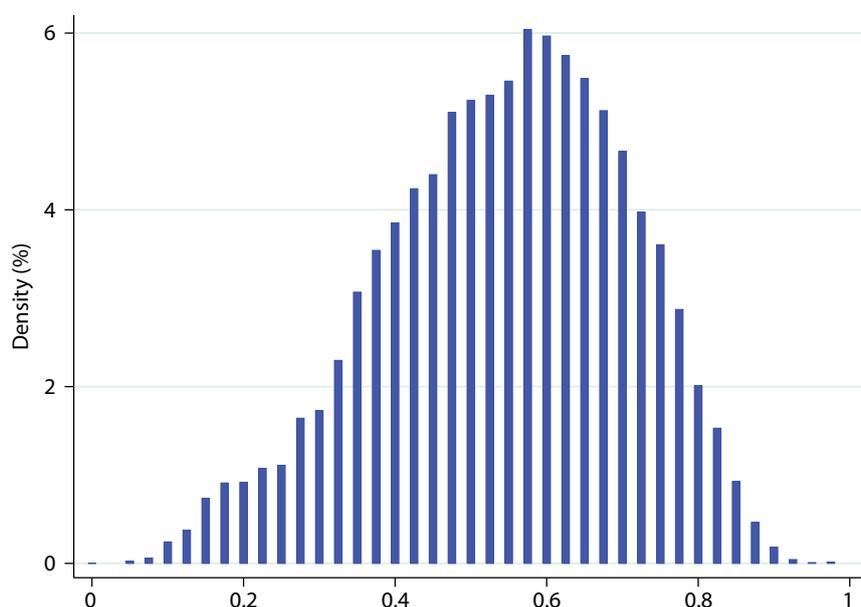
Figure 29 shows the distribution of the index at individual level for the EU27 using data from the fifth EWCS (Eurofound, 2012a). Table 3 lists some of the index's basic statistical descriptives; on a 0–100 scale, the mean of the NPI for the EU27 is 55.60, with a standard deviation of 16.22 and a coefficient of variation of 0.29. The distribution is approximately normal, although the concentration of cases around the mean is slightly less than a theoretical normal distribution (the value of kurtosis is marginally below 3) and it is somewhat skewed to the left (as shown in the small negative value of the skewness coefficient in Table 3). Although the distribution is clearly unimodal, there is some prominence around the value of 0.2 which results from the effect of some values very near or at zero in dimensions 2 and 3, as will be seen later.<sup>16</sup>

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<sup>15</sup> In a geometric index, the same relative – and not absolute – increase in any component has an identical effect on the index, irrespective of the initial value.

<sup>16</sup> Because the aggregation is multiplicative in geometrical averaging, very low values can have a very large impact on the final score. To avoid this, all values of 0 have been substituted with a theoretical minimum value of 0.01. The impact of these small values can be still observed in Figure 29.

Figure 29: Distribution of the NPI for EU27 countries



Source: EWCS 2010 (authors' calculations)

Table 3: Descriptive statistics across the four dimensions of the NPI

	NPI	Dimension 1 Intrinsic	Dimension 2 Employment	Dimension 3 Risks	Dimension 4 Working time
Mean	55.60	62.57	54.86	61.71	58.76
Standard deviation (SD)	16.22	20.84	22.18	30.11	16.25
Coefficient of variation (CV)	0.29	0.33	0.40	0.49	0.28
Kurtosis	2.63	2.56	2.63	1.76	2.93
Skewness	-0.32	-0.40	-0.18	-0.27	-0.11
p1	16.27	11.06	0.00	0.83	18.75
p5	26.58	24.89	14.58	11.25	31.25
p25	44.59	47.28	41.50	36.25	47.81
p50	56.96	63.94	54.00	65.42	59.38
p75	67.76	77.83	70.83	92.50	68.75
p95	80.25	94.44	89.58	100.00	85.00
p99	86.33	100.00	100.00	100.00	96.67
n	35,359	35,371	35,364	35,369	35,371

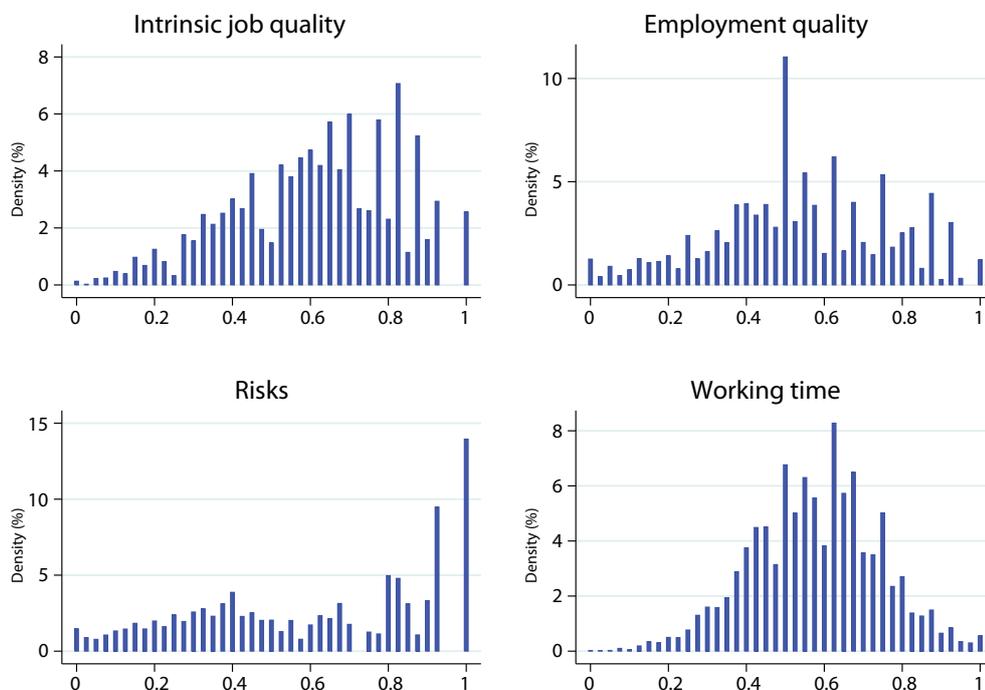
Source: EWCS 2010 (authors' calculations)

Figure 30 shows the distribution of the four dimensions behind the index. Because the analysis followed a substantive rather than statistical normalisation of the original variables, the empirical distribution differs considerably across dimensions. Intrinsic job quality has the highest average value (the highest median value is for risks) and employment quality has the lowest average value.

To some extent, the differences in the averages across dimensions should reflect real differences; hence the most positive attribute of European jobs would be their intrinsic content and the most negative their conditions of employment. But although such a result is in line with previous research, it should not be given too much importance since the actual scores of each dimension, taken individually, are subject to too many assumptions and data limitations. The main uses

of an index such as this one lie not in its absolute value but in its comparability across different types of jobs and employees, across times and societies.

Figure 30: *Distribution of the four dimensions of the NPI for the EU27*



Source: *EWCS 2010 (authors' calculations)*

The fourth dimension of the index (working time and work–life balance) is the most normally and continuously distributed (kurtosis of 2.93 and skewness of -0.11, Table 3).

The employment dimension is not too far from a normal distribution, but as can be seen in the histogram in Figure 30, it does not look at all like a continuous variable. This is because the dimension was constructed from a smaller number of EWCS variables (five). The histogram also shows that there is a small but significant proportion of cases with a value of 0 (or very near), which poses the problem for the aggregation mentioned earlier.

The dimension of intrinsic job quality is more continuous, although it is also slightly scattered, but it is much more skewed to the left.

The dimension of workplace risks has the most unorthodox distribution of all. It has a rather large proportion of cases with a value of 1 (or very close to 1), with the rest being somewhat evenly spread across the range of possible values. The histogram seems to suggest two different profiles:

- jobs with very low risks;
- jobs that face a considerable amount of risk.

This would seem to be justified according to the existing literature. Many service jobs have a very low risk profile, with just some minor musculoskeletal and psychosocial risks. However, traditional industrial, agricultural and construction jobs, as well as some particular occupations in services (such as nurses, or drivers) have a relatively high exposure to workplace risks.

### The index at job level

To link the results calculated at the individual level with the EJM dataset, the unit of analysis has to shift to the job level; that is, summary scores (weighted averages) of the index (and its four higher-level dimensions) are needed for each possible combination of occupation and sector. These scores were produced according to the following principles.

Due to the relatively small sample of the EWCS at country level, it is not reasonable to generate such scores separately for each EU country. Instead, a single set of scores were determined for the whole of the EU for each job, ignoring country differences.

Because the classifications of occupation and sector that are the basis for the definition of jobs have changed, three different sets of scores must be used for three different periods.

- For 1995–2007, the jobs are classified by NACE rev. 1.1 and ISCO-88.
- For 2008–2010, the jobs are classified by NACE rev. 2.0 and ISCO-88.
- For 2011–2012, the jobs are classified by NACE rev. 2.0 and ISCO-08.

This is unfortunate but there is no other solution, since the main source of the EJM data (EU LFS) does not include double coding or any other feature that would allow for a consistent reconstruction of a single time series. The main classification revisions were implemented as follows in the EU LFS: ISCO-88 to ISCO-08 in 2011, and NACE rev. 1.1 to NACE rev. 2.0 in 2008.

Even using the full EU27 sample, there are not enough people doing some jobs to make a valid estimation of job quality through the NPI. Some of the ISCO and NACE categories have therefore been merged for the estimation of the scores.<sup>17</sup>

The data used for computing the scores include all workers, even the self-employed. This type of employment contract only affects directly one component of dimension 2, all the other measures apply equally.

One way of evaluating the validity of the jobs-based approach for the study of job quality is to conduct a simple variance decomposition of the NPI, differentiating between the variance that exists within each job (cell in the matrix, occupations within sectors) and across them. If the jobs-based approach is relevant, the variation across jobs would be expected to be significant (if the jobs are different enough in terms of conditions of work and employment). Nonetheless, it is difficult to say how significant it should be since factors such as seniority rules, promotions or even individual preferences for specific job features will produce a significant amount of variation within jobs.

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<sup>17</sup> The number of categories in NACE rev. 2.0 fell from 88 to 63. There was no reduction in the number of categories in ISCO-88 and a reduction from 43 to 29 categories in ISCO-08. Without this merging, the quality of the estimates would be lower because many cells would be too small. However, its potential impact on the precision of the later analysis in the context of EJM is very limited. The reduction of categories is limited to the estimation of scores for small cells within the EWCS without affecting the classifications used in the EJM. Even with the reduction of categories, the level of detail of the jobs matrix is very large; 29 occupations within 63 sectors yield a potential 1,764 jobs in the matrix.

Table 4 shows a variance breakdown of the overall index and its four main components, using the combination of NACE rev. 2.0 and ISCO-88 for the 2008–2010 period of EJM data. The figures using other versions of the classification variables yield very similar results.

Table 4: *Variance decomposition of the NPI and its four dimensions*

	NPI	Dimension 1 Intrinsic	Dimension 2 Employment	Dimension 3 Risks	Dimension 4 Working time
<b>Total variance (sum of the squared values)</b>	865.04	1,431.81	1,610.55	2,978.55	856.84
<b>Explained by jobs</b>	311.99	543.96	330.63	863.47	134.14
<b>Residual</b>	553.05	887.85	1,279.94	2,115.08	731.70
<b>Adjusted <math>r^2</math></b>	<b>0.3525</b>	<b>0.3720</b>	<b>0.1951</b>	<b>0.28.8</b>	<b>0.1441</b>
<b><math>n</math></b>	32,952	32,961	32,956	32,958	32,960

Source: *EWCS 2010 (authors' calculations)*

The differences across jobs in the matrix account for more than a third of the total variance in the final scores for the EWCS sample ( $r^2 = 0.35$ , Table 4), a more than reasonable result. Jobs do differ significantly and systematically in terms of job quality, though there is still a significant amount of variation that cannot be explained by differences across jobs.

Beyond factors such as seniority or individual preferences, other factors are likely to produce some degree of within-job variation:

- the differences that may result from the pooling of data from 27 countries (which may differ significantly in terms of the attributes of jobs as well);
- the purely random noise or even systematic bias that inevitably enters any survey such as the EWCS.

All in all, the result is reassuring and confirms the pertinence of the jobs-based approach when discussing job quality.

The amount of variance accounted for by the different dimensions behind the index varies considerably.

It seems that the jobs-based approach is most significant for the dimension of intrinsic job quality (37.2% of variance explained, Table 4); the jobs-based approach is an empirical application of the concept of division of labour and so it makes sense that it is most strongly linked to this dimension which measures the nature and content of work.

The dimension of risks is also strongly related to differences across jobs (28.1% of variance explained, Table 4).

However, the dimensions of employment quality and working time are much less associated with differences across jobs since they explain less than 20% of their variation (19.5% and 14.4% respectively, Table 4). This is probably because the conditions of the employment contract are not linked so directly to the nature of work and the division of labour. Something similar could also be said about working time, scheduling and so on, which is more likely to be affected by workers' preferences, and is to some extent independent of the nature of job tasks.<sup>18</sup>

<sup>18</sup> The variance accounted for by country can be used as a point of reference to evaluate the relevance of the jobs-based approach. For the NPI as a whole, the cross-country variance accounts for 4.6% of total variance (nearly 10 times less than occupation and sector, 2.5% for the intrinsic job quality (15 times less), 3.6% for employment quality (6 times less), 2.7% for risks (10 times less) and 2.7% for working time (6 times less).

## Comparing the three approaches to job quality

With the addition of this new index, the EJM can now classify jobs using three different indices:

- wages;
- educational attainment;
- non-pecuniary job quality.

The construction of these three indices assumed that each measures the same thing (job quality) albeit from different perspectives. Job quality is a common, unobserved factor – important aspects of which each of the three proxy measures seeks to capture.

Measures of correlation are an obvious way to test this assumption. But should one expect high or low levels of correlation, positive or negative? To the extent that the three indices are different ways to measure the same underlying phenomenon (job quality) one could expect a high positive correlation between them. This would be consistent with segmentation theory (Peck, 1996), which argues that in real-life labour markets there are distinct types of jobs that accumulate positive or negative attributes (that is, ‘good’ jobs with high salaries, high educational requirements and good working conditions, and ‘bad’ jobs with the opposite features). However, given the extent to which workers have different preferences and employers have to compensate for unpleasant conditions with higher pay (as implied in the still canonical theory on job quality in mainstream economics, Adam Smith’s ‘compensating differentials’<sup>19</sup>), much more moderate correlations or in some cases even negative ones could be expected. This empirical question is far from settled in the social sciences literature and so it is interesting to see what the findings of this study show.

The correlation matrix shows a high level of positive correlation in the job rankings generated by the three main job quality indices (above 0.65 in each case, in bold in Table 5). Jobs that pay well do indeed tend to have higher proportions of well-qualified workers and better working conditions. The strongest relationship is between the education ranking and non-pecuniary job quality, with both these attributes having a weaker correlation with wages. This may reflect the fact that one of the dimensions of the non-pecuniary index (intrinsic job quality) measures the skill requirements of jobs, which is of course related to the skill profile of workers in the different jobs. However, it may also reflect the fact that workers with a higher level of educational attainment give greater priority to good working conditions than pay, and hence there are jobs with a high educational profile and good non-pecuniary conditions, but not such high pay.

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<sup>19</sup> For a detailed discussion, see Muñoz de Bustillo et al, 2011, pp. 31–45.

Table 5: Correlation matrix of job rankings, EU27

		Job rankings						
		Wage	Education	Non-pecuniary job quality	/Intrinsic	/Employment	/Risks	/Working time
Job rankings	Wage							
	Education	<b>0.77</b>						
	Non-pecuniary job quality	<b>0.66</b>	<b>0.85</b>					
	/Intrinsic	0.73	0.82	0.82				
	/Employment	0.74	0.75	0.74	0.69			
	/Risks	0.40	0.64	0.85	0.52	0.41		
	/Working time	0.06	0.37	0.56	0.31	0.18	0.53	

Notes: Pairwise correlations of job ranking by wage, education/skill and non-pecuniary job quality as well as its four dimensions. The correlations between wage–education, wage–job quality and education–job quality are shown in bold. The correlations in italics are those involving the subdimensions of non-pecuniary job quality.

Correlations weighted by employment (2011 Q2) in job cells (ISCO-08 two digits, NACE rev. 2.0 two digits).

The EU job–wage ranking is based on an employment-weighted average of 26 national job–wage rankings (all Member States except Sweden).

The EU job–education ranking is based on an employment-weighted average of 27 national job–education rankings.

Source: EWCS 2010, EU LFS (authors' calculations), ESES 2010 (see Annex 1 for more details)

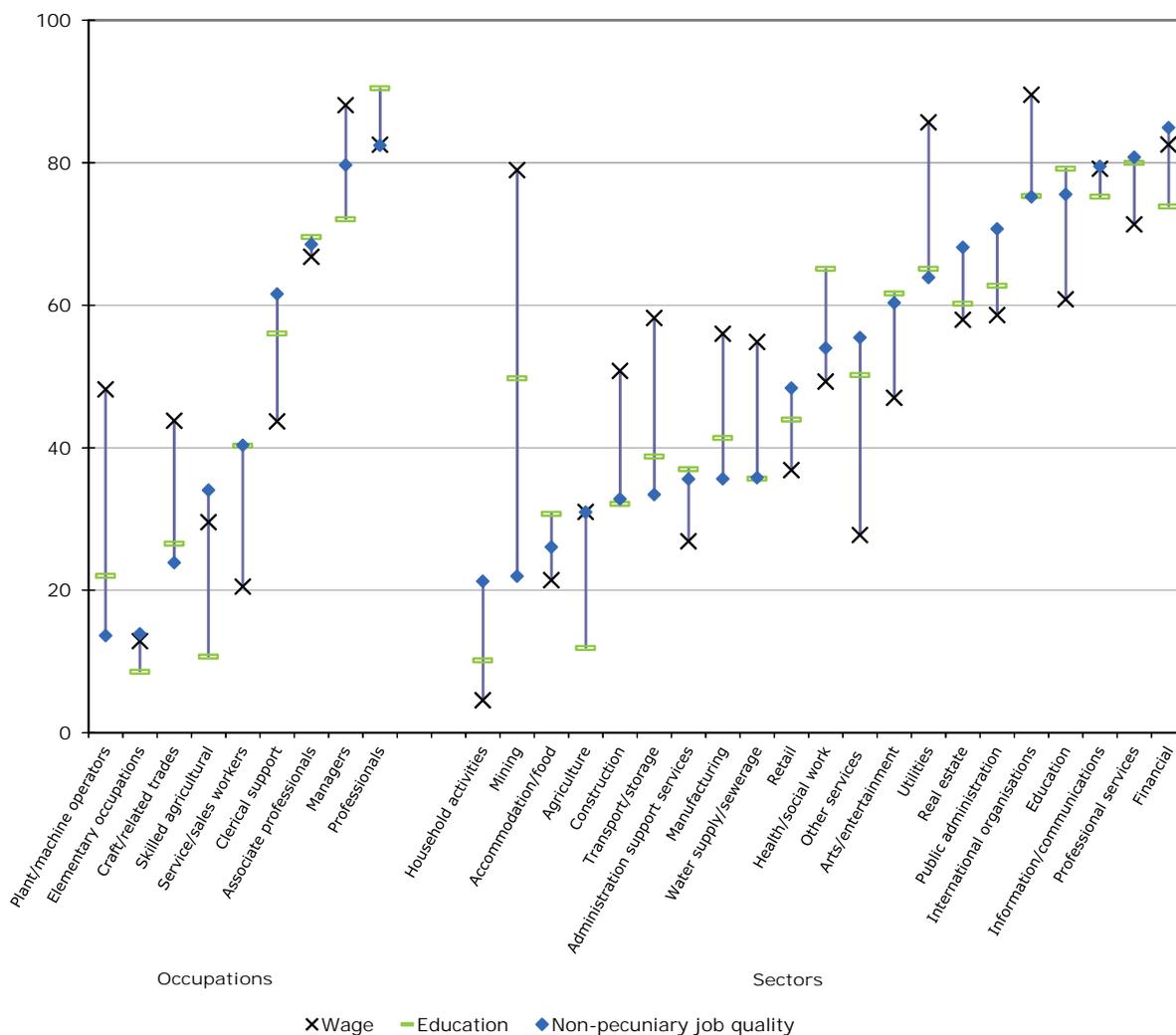
Table 5 also shows that there is more accumulation than compensation between the different job attributes. Good jobs tend to be consistently good across the three indices and bad jobs tend to be consistently bad. This could be taken as evidence against the theory of compensating differentials and in favour of the segmentation approach. However, that would be too simplistic because the theory of compensating differentials aimed to explain wage differentials for workers with similar levels of educational attainment and therefore it could be argued that it should be tested against within-job rather than across-job differentials.

There is a high degree of consistency between the three different approaches to job quality, a consistency that is even more remarkable if one were to consider that each of the attributes measures entirely different things, drawn from different data sources. Therefore, it can be stated with a high degree of confidence that there is such a thing as a distribution of job quality and that the three indices capture such an unobservable concept from three different but consistent perspectives.

Table 5 also includes the four main components or dimensions of the NPI, which allows for a deeper understanding of the correlations across the different aspects of job quality. Although all the correlations remain positive at this level, some of them are rather weak – especially between working time and both wage and education, and to a lesser extent between risks and wages. In the case of working time, this probably reflects the existence of many otherwise good jobs that have relatively long and unsocial working hours, as well as some otherwise bad jobs with good working time arrangements (see Eurofound, 2007). In this sense, the working time dimension of the NPI has a peculiar distribution that makes it less consistent with the others, because there are bad jobs in terms of working time both at the top and bottom of the job quality continuum (managers and waiters), as well as a relatively large proportion of good jobs in terms of working time at the bottom (many types of part-time workers with generally precarious conditions and low salaries).

Another way to evaluate the association between the three indices is to compare the average values for specific subgroups of the working population. Figure 31 presents the average scores of the three indices for all main occupations and sectors on a scale of 0–100. The reference value across all sectors or occupations is 50 and corresponds to a sector or occupation made up of jobs whose average employment-weighted value falls right in the middle of the wage, education or non-pecuniary job quality distribution. As already indicated by the correlation matrix (Table 5), non-pecuniary job quality and the educational profile of workers are closely associated as shown by the generally close coupling of their markets for most sectors and occupations in Figure 31 (blue diamond for non-pecuniary job quality and hollow green line for education).

Figure 31: Average (employment-weighted) wage, education and non-pecuniary job quality scores, by occupation and sector, EU27



Notes: Average index values 0–100. Average scores on the left-hand side are for all main occupations and those on the right-hand side for sectors.

Average scores are based on employment data and index values calculated from EU27 data for 2011 Q2. Index values are based on an employment-weighted average of the percentile values for a given job quality index for all jobs (ISCO two digits, NACE two digits) in a given broad occupation or broad sector.

Source: EWCS 2010, EU LFS (authors' calculations), ESES 2010 (see Annex 1 for more details)

While higher values for one index tend to coincide with higher values on the others, there are also clearly some sectors and occupations where wage values in particular diverge from those for education or non-pecuniary job quality. Blue-collar jobs (plant and machine operators, craft/related trades workers) tend to rank higher in terms of wages than in terms of educational attainment and non-pecuniary job quality. The concentration of this type of occupation in the construction and manufacturing sectors is evident from the similar relative rankings for these two sectors on the right-hand side of Figure 31.

However, the most striking divergence is for a sector, mining, which Adam Smith himself used as an example for his compensating differentials hypothesis. Other sectors where wage rankings are higher than job quality rankings include various utility sectors – transport/storage, gas/electricity supply ('utilities' in Figure 31), water supply/sewerage and international/extraterritorial organisations. But whether the wage premium that exists in those sectors and occupations

can be attributed to compensating differentials is debatable because those sectors and occupations also tend to be the ones with highest levels of union representation and collective bargaining across most of Europe. Other sectors and occupations with equally bad working conditions but traditionally lower levels of union coverage (such as elementary occupations, accommodation/food sector and retail sector) do not seem to enjoy the same compensation in terms of higher wages.

In some cases, the compensation seems to go in the opposite direction. White-collar, low-skilled occupations (clerical support or service/sales workers) fare worse in terms of wages than in non-pecuniary job attributes. This is also the case for some predominantly state-funded services (public administration and education), which may be able to attract highly educated workers despite providing only moderately high salaries because of their good non-pecuniary conditions.

The types of jobs most hit during the recession coincide to some extent with those that have higher wages than non-pecuniary job quality or education (Figure 31). In a context of economic hardship and decreased profitability, those jobs may be the most vulnerable. The relative and absolute decline of employment in those jobs is likely to make it very difficult to reintegrate the displaced workers, who often have lower than average levels of educational attainment and can only hope to find jobs in low-paid service sector employment – or in the current situation, remain unemployed.

An interesting aspect of the disparities between the wage scores and the other two scores is that they are strongly related to gender (Figure 32). The gender pay gap may have decreased in recent years but the labour market remains strongly segmented by gender, with less than 20% of the workforce in ‘mixed’ jobs with a similar proportion of men and women.<sup>20</sup> Male-dominated jobs tend to enjoy relatively higher wages as a result of longer-term historical developments linked to institutional power, high levels of union membership or coverage – possibly in addition in some cases to compensating differentials as already noted. However, these jobs were also the ones that suffered the greatest employment losses during and after the recession. Female-dominated jobs have lower scores in terms of wages than in terms of education, but with the partial exception of the retail sector, these were also the jobs in which employment was more resilient or even continued to grow during the recession.

Figure 32 presents the average score for the three indices of job quality by gender and full-time/part-time work status. The relationship between the wage ranking on the one hand and the education and job quality rankings on the other is almost a mirror image across the gender divide. Women are overrepresented in jobs with a high level of education and non-pecuniary job quality (both closely coupled). However, female workers tend to work in jobs that are relatively less well-paid.

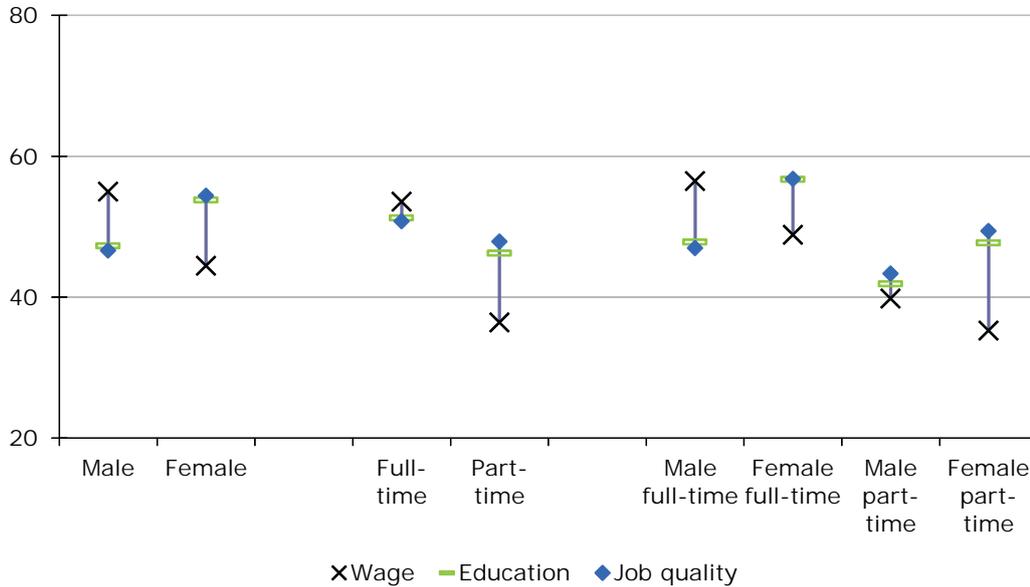
A possible confounding factor is the high prevalence of part-time work among female workers. For example, women accounted for over 80% of part-time workers in the EU27 from 2011 Q2 to 2012 Q2. But while part-time work does have a relatively low wage compared with full-time work,<sup>21</sup> the part-time wage ‘penalty’ applies equally to male and female part-timers, as can be seen in Figure 32. And as noted previously, one of the less heralded labour market developments since the onset of the recession in 2008 has been the growth of male part-time work.

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<sup>20</sup> According to the data here, less than 20% of the European workforce works in jobs (that is, occupations within sectors) where the proportions of women and men are between 40% and 60%. In other words, 80% of workers are in jobs in which one gender dominates by more than a factor of 3/2.

<sup>21</sup> This difference does not result from the simple fact that part-timers work fewer hours because the wage index was calculated on the basis of hourly wages or full-time equivalents.

Figure 32: Average (employment-weighted) wage, education and non-pecuniary job quality index value, by gender and employment type, EU27



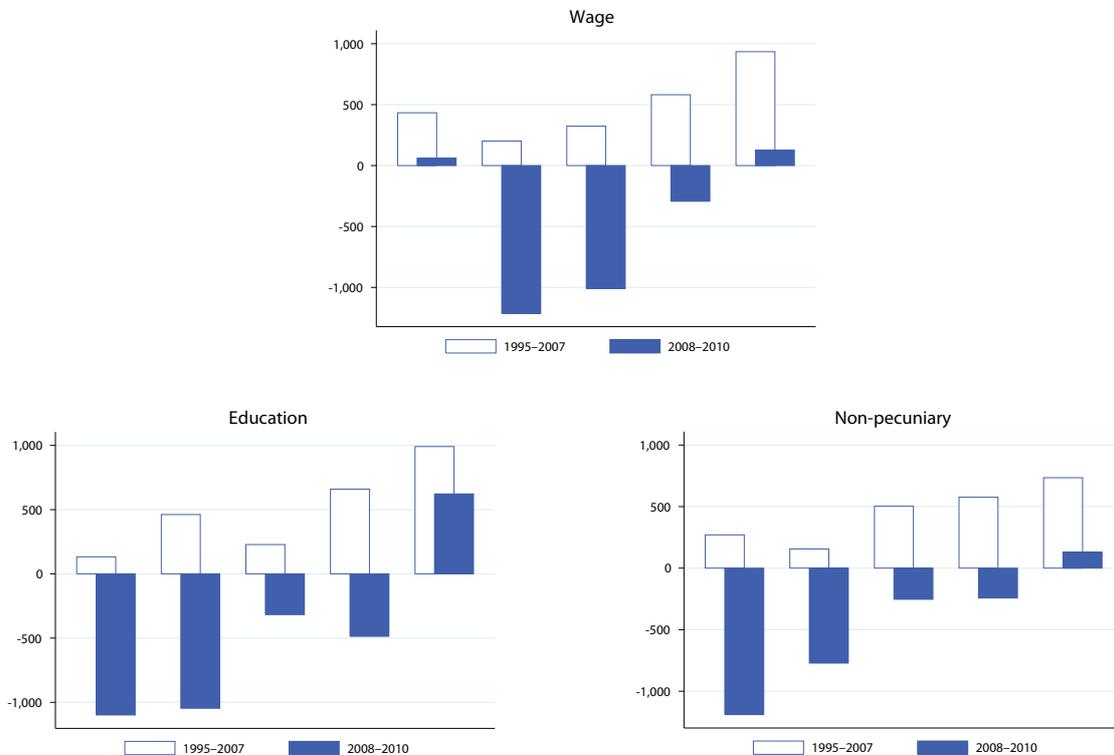
Notes: Average scores are based on employment data and index values calculated from EU27 data for 2011 Q2. Index values are based on an employment-weighted average of the percentile values for a given job quality index for all jobs (ISCO two digits, NACE two digits) in a given broad occupation or broad sector.

Source: EWCS 2010, EU LFS (authors' calculations), ESES 2010 (see Annex 1 for more details)

### Changes in job quality in Europe since the mid-1990s: a broader view

Using the three different indices for classifying jobs according to their quality, it is time to revisit the analysis of the changes in the structure of employment in Europe since the mid-1990s to see whether the identified trends are consistent independently of the job quality measure used. Figure 33 shows the overall change in employment by job quality quintiles according to wages, education and non-pecuniary job quality in the EU23 (that is, the EU27 without Bulgaria, Malta, Poland and Romania).

Figure 33: Average annual change in employment according to wage, education and non-pecuniary job attributes, by wage quintile, EU, 1995–2010 (thousands)



Notes: 23 Member States (no data for Bulgaria, Malta, Poland and Romania)  
 The white bars represent structural employment change during the expansion (1995–2007) and the blue bars represent structural employment change during the subsequent recession (2008–2010).  
 Source: EU LFS, EWCS (authors' calculations), ESES 2002, ECHP, EU-SILC 2005, national accounts (see Annex 1 for more details)

Figure 33 shows that the polarisation trend observed earlier is limited to changes in the wage structure. Both in terms of education and non-pecuniary job quality, the pattern throughout the whole period has instead been one of a clear and consistent process of occupational upgrading. This process continued during the crisis, with even more intensity.

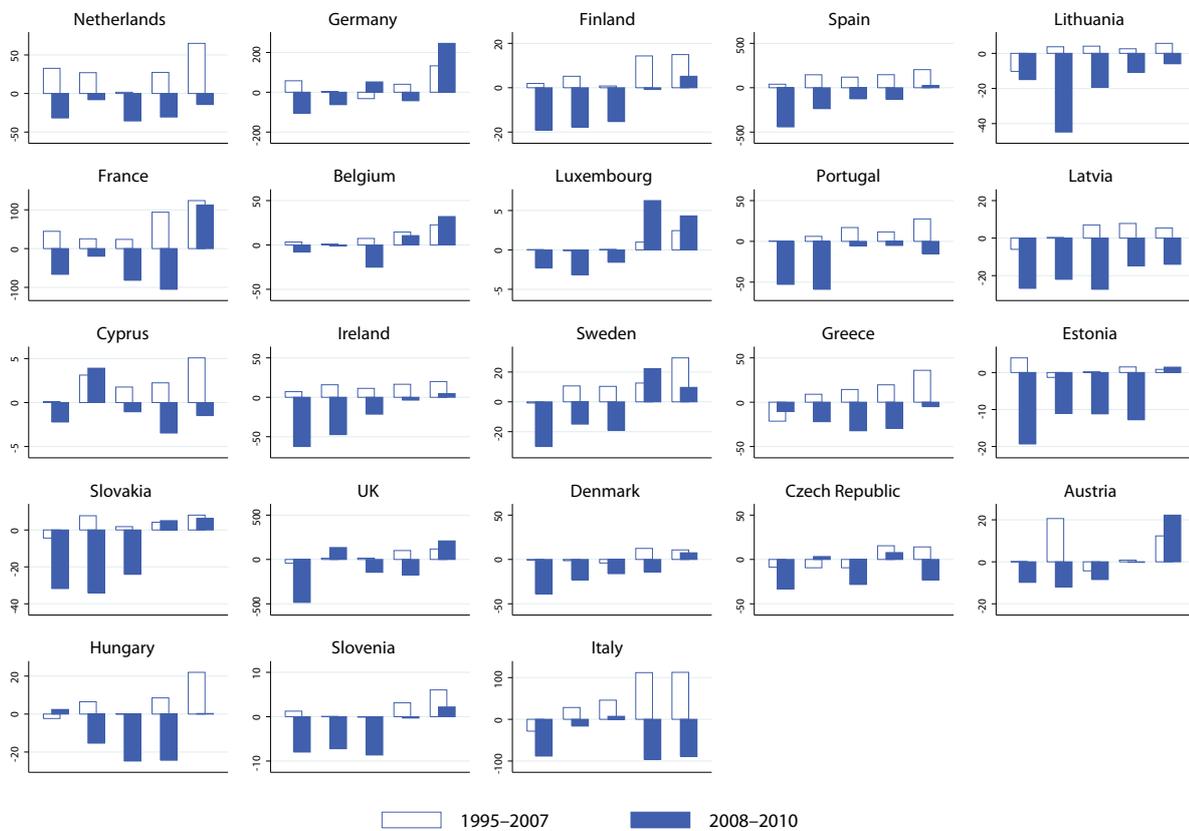
The reason for the discrepancy between the results using the three indices is that, as argued above, an important proportion of jobs in the middle of the wage distribution have a higher relative position in terms of wages than education or non-pecuniary job attributes. A large proportion of these jobs (those in manufacturing) remained stagnant in the 1995–2007 expansion and many were destroyed in the subsequent recession. Whereas such trends generated polarisation in terms of the wage structure, they depressed the bottom of the education and non-pecuniary job quality structure.

The large expansion of jobs in knowledge-intensive services, in both the public and private sectors, was the other major development throughout the period. This contributed strongly to the expansion of jobs at the top of the employment structure and was broadly similar for the three job quality indicators.

But because the EU figures are basically a weighted average of the trends at national level, they could be hiding important differences across countries. Figures 34 and 35 show the annual average change in the absolute employment figures for 23 EU countries, classifying jobs by education and non-pecuniary job quality, respectively. Figures 34 and 35 should be compared with Figure 18, which is based on the wage index.

Although there is still a considerable diversity across countries that makes it difficult to present an overall interpretation, it seems clear that for both education and non-pecuniary job quality there is much more upgrading and much less polarisation than when the jobs are ranked according to their wages. As in the case of the overall EU figures, the contrast is especially striking for the recession period. Whereas in the recession there was a nearly pervasive pattern of job polarisation in terms of wages, such a process was only observed in Belgium, Greece and Hungary (and perhaps less clearly in France and the Netherlands) when the jobs were classified by the average level of job holders' educational attainment level, and in Cyprus and perhaps the Netherlands when the jobs were classified by non-pecuniary job quality attributes.

Figure 34: Average annual change in employment according to education quintiles, by country, 1995–2010 (thousands)

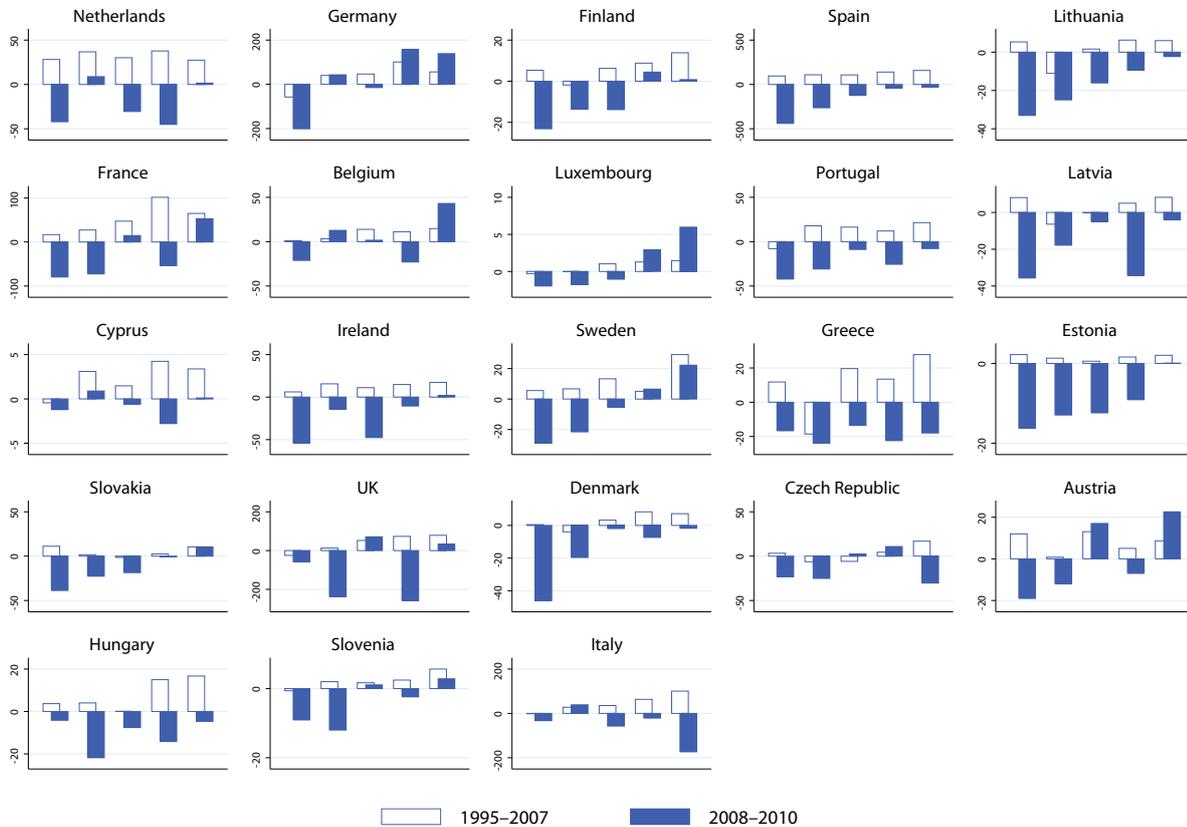


Notes: 23 Member States (no data for Bulgaria, Malta, Poland and Romania)

The white bars represent structural employment change during the expansion (1995–2007), except for 1996–2007 in the Netherlands and Slovenia; 1997–2007 in Estonia, Finland, Hungary and Sweden; 1998–2007 in the Czech Republic, Latvia, Lithuania and Slovakia; 1999–2007 in Cyprus. The blue bars represent structural employment change during the subsequent recession (2008–2010).

Source: *EU LFS* (authors' calculations)

Figure 35: Average annual change in employment according to non-pecuniary job quality quintiles, by country, 1995–2010 (thousands)



Notes: 23 Member States (no data for Bulgaria, Malta, Poland and Romania)

The white bars represent structural employment change during the expansion (1998–2007), except for 1996–2007 in the Netherlands and Slovenia; 1997–2007 in Estonia, Finland, Hungary and Sweden; 1998–2007 in the Czech Republic, Latvia, Lithuania and Slovakia; 1999–2007 in Cyprus. The blue bars represent structural employment change during the subsequent recession (2008–2010). Source: *EWCS 2010, EU LFS (authors' calculations)*

Figures 36–38 make this point clearer by presenting the same data differently. Each of the three figures represents the year-on-year change in the share of employment that can be classified as ‘bad’, ‘mid-paid’ or ‘good’ according to each of the three job quality indices. Instead of five equal-sized groups that make up the quintile, jobs are classified in three equal-sized groups at the beginning of each period of analysis. Apart from the number of job quality groups and the graphical presentation, the underlying methodology is identical.

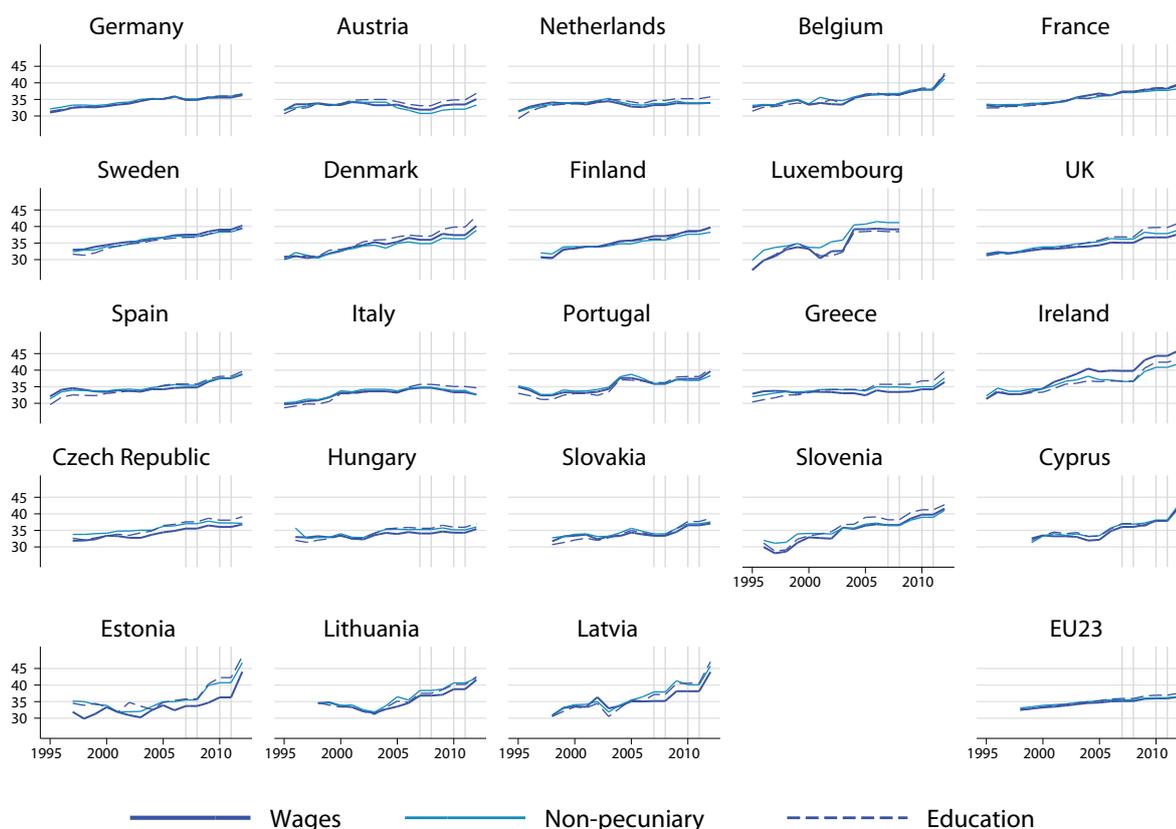
The year 2000 is set as the base year, in which each of the three groups is set to account for roughly one-third of overall employment. To simplify the analysis, the trend breaks that took place in 2008 and 2010 were removed by splicing the lines before and after the break (such adjustments are indicated by two vertical lines in each chart). Although such an adjustment is somewhat artificial (the classifications changed and so the underlying jobs are not defined equally, the shares of employment do not coincide entirely), it simplifies the analysis considerably and so is considered justifiable.

This presentation (that is, classifying jobs in three rather than in five groups) changes the visual aspect of the patterns of structural change considerably and casts them in a different light. Since Figures 36–38 show the annual relative change in the share of employment between the groups of jobs, they make it look more gradual than the absolute change over the whole period shown previously.

This type of representation tends to de-emphasise the polarisation story even when jobs are classified by wages. As shown by the EU23 chart in the bottom right-hand corner of the three figures, both low-paid and mid-paid jobs were subject to a consistent structural decline, with polarisation being just indicated by the slightly steeper decline of mid-paid jobs (especially clear after the crisis). The clearest contrast is between the impressively consistent expansion of the share of jobs classified as good, and the either stagnant or declining share of jobs in mid-paid and bad jobs. Most of the cases of polarisation were just the result of bad jobs declining slightly less rapidly than mid-paid jobs, even during the crisis.

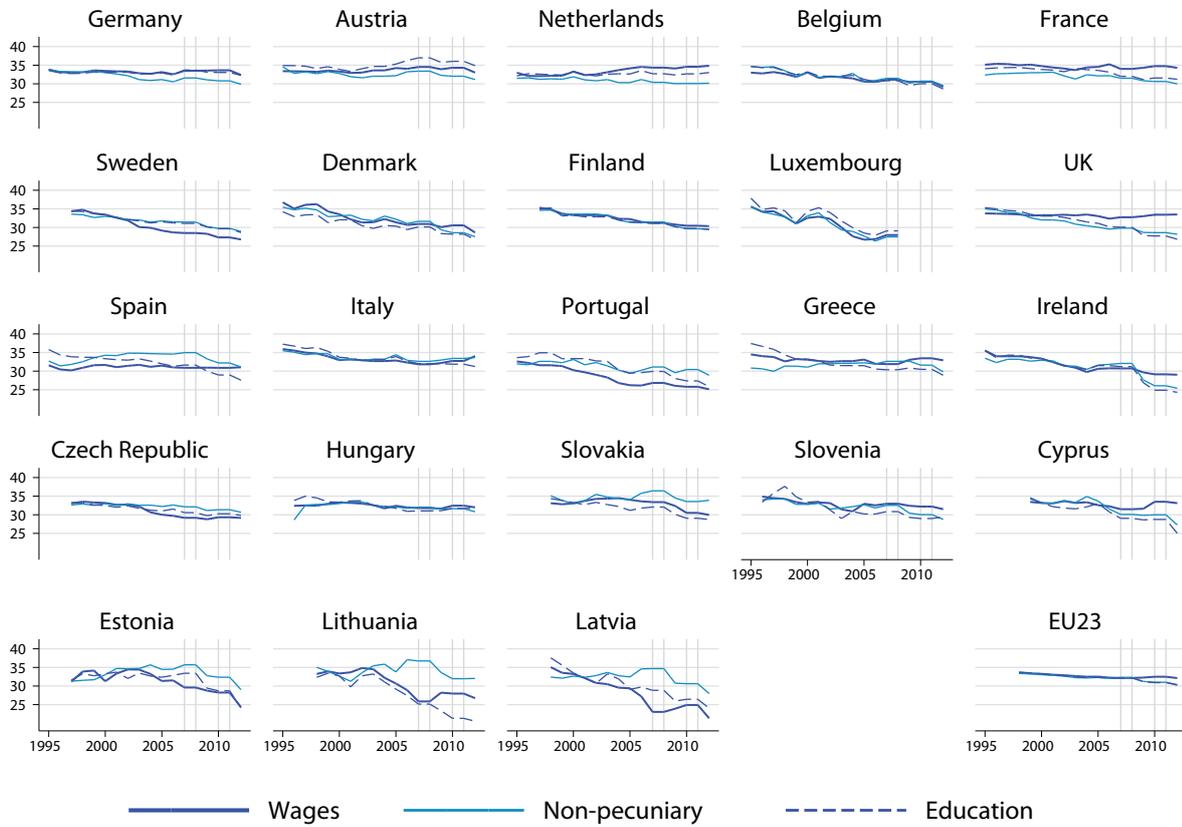
This type of presentation makes it easier to see whether the three indices of job quality yield a similar or different picture. In the case of good jobs, the three indices provide a remarkably similar picture: the three lines are nearly identical in most countries. But in the case of the mid-paid and bad jobs, there is much less consistency between the evolution of employment shares depending on whether they are defined according to wages, education or non-pecuniary job quality attributes, as shown by the decoupling of the three lines in the charts. In nearly all cases, the share of bad jobs decreases most when they are defined according to their average level of educational attainment or non-pecuniary attributes (with the exceptions of Portugal and Sweden, and to some extent Spain). And as already noted, mid-paid jobs decreased most significantly when defined according to their wages and remaining in most cases stagnant when defined according to the education of their workers or their non-pecuniary job quality.

Figure 36: Change in the share of good jobs according to wage, education and non-pecuniary job quality, by country, 1995–2012



Note: 23 Member States (no data for Bulgaria, Malta, Poland and Romania)  
 Source: EU LFS, EWCS (authors' calculations), ESES 2002, ECHP, EU-SILC 2005, national accounts (see Annex 1 for more details)

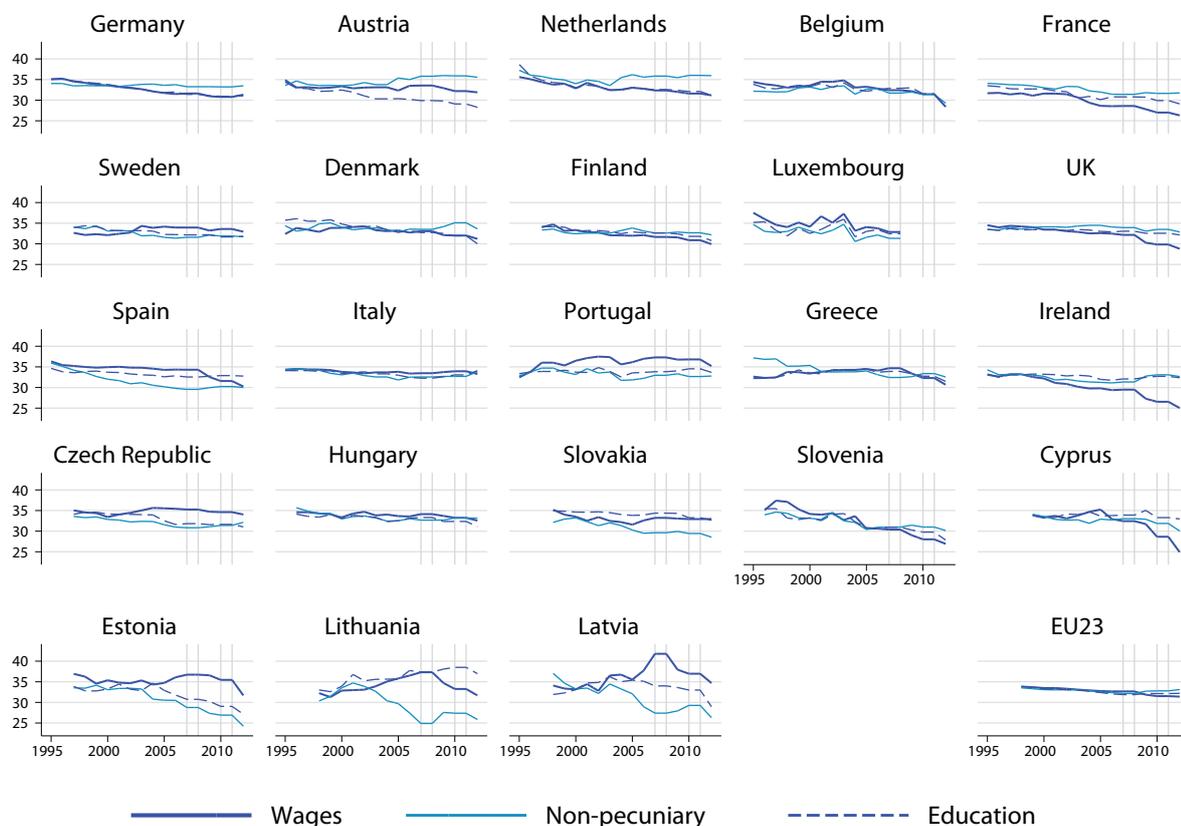
Figure 37: Change in the share of bad jobs according to wage, education and non-pecuniary job quality, by country, 1995–2012



Note: 23 Member States (no data for Bulgaria, Malta, Poland and Romania)

Source: *EU LFS*, *EWCS* (authors' calculations), *ESES 2002*, *ECHP*, *EU-SILC 2005*, national accounts (see Annex 1 for more details)

Figure 38: Change in the share of mid-paid jobs according to wage, education and non-pecuniary job quality, by country, 1995–2012



Note: 23 Member States (no data for Bulgaria, Malta, Poland and Romania)

Source: EU LFS, EWCS (authors' calculations), ESES 2002, ECHP, EU-SILC 2005, national accounts (see Annex 1 for more details)

## Conclusions

This chapter describes a new index to classify jobs in the European Jobs Monitor. In addition to the existing indices based on wages and the average level of educational attainment of workers in each job, a non-pecuniary job quality index has been compiled based on the aggregation of information about a wide range of job attributes that have been linked to workers' well-being in the specialised social sciences literature.

The identification and classification of jobs by their quality within the European Jobs Monitor is now therefore not based solely on a more or less sensible approximation, but on a relatively exhaustive coverage of job quality in both its pecuniary and non-pecuniary dimensions. This made it possible to re-evaluate the implications for job quality of structural change in European labour markets and revisit the topic from a broader perspective.

The main conclusion from this a re-evaluation is quite unequivocal: the process of job polarisation that affected some EU countries in the 1995–2007 expansion and most countries in the subsequent recession was mostly restricted to the wage structure. When the jobs are classified by their non-pecuniary job quality attributes or by the average level of educational attainment of workers, the process of structural change is in nearly all cases strongly upgrading – even, indeed, more intensely, during the recession.

The reason for this inconsistency is the different position that the jobs most affected by structural decline have in the three indices. Those jobs that decline in number tend to have a higher position in terms of wages than in terms of education or non-pecuniary job quality attributes (they tend to be mid-paid jobs for wages and bad jobs in terms of the other two indices). Thus, their decline contributes to polarisation of the wage structure but to upgrading of the educational or non-pecuniary job quality structures.

The subsequent exploration of the correlations and distribution of scores of the three indices for different categories of workers provided some interesting signs about the nature of the link between job quality and structural decline in employment. The correlations were very high, especially between education and non-pecuniary job quality, with wages having a slightly lower (but still high) correlation with the other two indices.

The jobs with a bigger discrepancy between the three indices were those in the manufacturing and construction sectors, where the position in terms of pay was significantly higher than in the other two indices.

The discrepancy between the three indices also seemed to have a strong gender bias. Whereas female-dominated jobs tended to have a better position in terms of both education and non-pecuniary job attributes, male-dominated jobs tended to enjoy a better position in terms of wages than education and non-pecuniary job quality. These male-dominated jobs were responsible for a significant part of the relative decline in mid-paid employment in the expansion and for most of its massive contraction in recent years.

So could the relative wage advantage of these jobs be partly responsible for their structural decline in terms of employment across Europe? If such a discrepancy affects profitability, for instance, investment and labour demand could be redirected to more profitable sectors, foster labour-saving technological change (which would link these results to the hypotheses of routine-biased technical change) or encourage the offshoring of production. Or are both phenomena (the better than expected wages of those jobs and their decline) linked to a third underlying mechanism such as the demise of Fordism and its socio-institutional (even gender) structure?

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## Annex 1: Construction of the wage and educational rankings

This annex provides details of how the new wage and education rankings for the EJM used in this report were constructed. It also explains why these new rankings were necessary and outlines some checks on the plausibility and correlations of the rankings. The construction of the third ranking (non-pecuniary job quality) is detailed in Chapter 3.

### Problem of the change in classifications

The jobs-based approach underlies the EJM studies on change in employment across occupations and sectors from the perspective of some specific job quality ordinal index. The process is as follows:

1. Split overall employment into jobs (occupations within sectors at the two-digit level of ISCO and NACE);
2. Rank and group these jobs according to some job quality indicator;
3. Plot the change in employment numbers across jobs against their quality.

The original JOBS project (Eurofound, 2008a; Fernández-Macías et al, 2012) used two fixed rankings to analyse structural change in employment in 23 EU countries between 1995 and 2007. One of those rankings was based on the average level of educational attainment of workers within each job, drawing on EU Labour Force Survey (EU LFS) data. The other ranking – the most important – was based on the average hourly pay of workers within each job and was constructed from different statistical sources combined at the job level. The underlying structure of this ranking was provided by the 2002 European Structure of Earnings Survey (ESES). To cover jobs not included in the ESES sample it was necessary to complement its data with data from the European Household Panel Survey (EHP) and the EU Survey on Income and Living Conditions (EU-SILC), as well as with data from national accounts to provide more detailed data on wages in the manufacturing sector. For more details see Eurofound, 2008b.

These two rankings provided a sound basis for analysing structural change in employment across the EU between 1995 and 2007. Unfortunately, the two variables used for classifying workers into jobs in the EJM were completely changed in the following period, meaning that not only did the trend analysis have to be discontinued but also that the previous rankings could not be used for any subsequent analysis.

From 2008 onwards, the classification of sectors in the EU LFS moved to using revision 2 of the NACE international standard and, from 2011 onwards, the classification of occupations in the EU LFS moved to the 08 version of the ISCO international standard. In both cases, the revisions were so substantial that there is no compatibility at all between the old and the new classification systems at any level of disaggregation. Hence there is no way to avoid the discontinuity.

For the EJM, this means that all trend analysis has to be broken down into three distinct periods:

- between 1995 and 2007;
- between 2008 and 2010;
- between 2011 and later.

Although the methodology in those three periods is identical and the results are strictly comparable, it is not possible to aggregate the three periods into a single trend line because the definition of what is a job (the basis of the whole analysis) is slightly different across them.

Therefore, two new sets of rankings are needed – one for the period between 2008 and 2010 and another for the period between 2011 and later.

For the new non-pecuniary job quality index, the three sets of rankings are easily constructed with the same survey because the fifth European Working Conditions Survey (EWCS) included the old and the new codes for both sector and occupation.

### Construction of the educational ranking

This ranking is the simplest to construct because the EU LFS includes all the necessary information. The basis of this ranking is the variable International Standard Classification of Education (ISCED) included in the EU LFS datasets. ISCED is an internationally comparable codification of national educational systems. It was originally designed by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in the 1970s and has been updated several times (UNESCO, 2006).

A highly aggregated version of ISCED is used which only distinguishes three broad levels of education:

- low (basic schooling or less, below ISCED 2);
- medium (upper secondary and post-secondary pre-tertiary, ISCED 3–4);
- high (tertiary, ISCED 5 and above).

For each country, the average educational level of all workers within each job was calculated, assigning an arbitrary value of 0 to low, 0.5 to medium and 1 to high educational level. These values were used to generate the educational ranking.

For the period 2008–2010, the average values are based on the pooled data from the EU LFS for those three years, with jobs being classified by NACE rev. 2.0 and ISCO-08. For the period 2011–2012, the average values are based on the 2011 EU LFS dataset.

Because the basis for the ranking is the average of just three values (0, 0.5 and 1), there are some jobs that have exactly the same value (for instance, professional jobs that only have workers with third-level education) and which cannot therefore be ordered unambiguously. To get round this problem, an EU-level average of the national averages was constructed, which was used as a secondary ranking variable. So if two jobs have the same value at the national level, they will be sorted according to their EU-level average, which is much less likely to be identical because it is based in a much larger sample.

### Construction of the wage ranking

As in previous analyses of EJM data, the construction of the wage ranking is more complicated (Eurofound, 2008b, 2011a). The main reason is that the EU LFS does not include a variable that measures wages as a continuous quantity which can be then divided by the number of hours worked to obtain an indicator of hourly labour compensation.

Up to 2009 the EU LFS did not include any information on wages at all, which forced previous EJM analyses to use external data for this purpose (Eurofound, 2008b).

From 2009, the EU LFS has included a variable that positions each worker on the distribution of wages for their country within a 10-point decile scale. This variable has two problems for the purpose of this analysis.

- It only provides a very crude approximation of the actual distribution of wages in each country, providing just 10 possible values instead of the full complexity of a continuous variable.
- It only allows the identification of the relative position of each worker within a 10-point scale, as it is impossible to know the monetary values corresponding to each position in such a scale.

Due to the latter problem, it is impossible to calculate even an approximate value of hourly wage, which is necessary to avoid getting a biased average at the job level according to the share of part-timers in the job.

Unfortunately, there is no EU-wide data source that allows the calculation of a reliable estimate of average hourly wages at the job level (two-digit occupation by two-digit sector level). The closest match is the ESES, which was last carried out in 2010. This includes a continuous variable of wages and another on working hours, and allows classifying workers by sector (NACE rev. 2.0) and occupation (ISCO-08). Unfortunately, this source does not cover the full economy, omitting the public sector and agriculture, as well as all companies with fewer than 10 employees. Another possible source is the EU LFS of 2008, which exceptionally collected a continuous variable on wages for 13 countries on a purely voluntary basis as part of the preparation for the collection of the income deciles variable in 2009. In this case, the problem is that it only covered a small selection of countries, the data were potentially less reliable because of their experimental nature and the source was only available for that particular year. The data actually formed the basis of the EJM 2011 report (Eurofound, 2011a), and as can be seen later, the rankings seem to be pretty reliable for the available countries.

Thus we had several different sources were available (two for each period: 2008–2010 and 2011–2012), but none totally fitted the purpose of this research. Therefore, it was necessary to develop a practical solution involving the aggregation of different sources at the job level.

For the period 2008–2010, the analysis used the continuous data on wages for 13 countries in the 2008 EU LFS and the income deciles for 26 countries (all EU Member States apart from Sweden) in the 2009 and 2010 EU LFS. The process of aggregation was as follows.

1. The average hourly wage for each job for the 13 countries available in the 2008 EU LFS was calculated and the jobs ranked by their scores. The rankings were then normalised to a 0–100 percentile scale. Each job was assigned the percentile position it occupied according to the ranking and a weighted EU average of the normalised ranking positions was generated. Finally the EU normalised average ranking was assigned to the 14 countries with no data and to the cells with missing values in the countries with data (to have scores covering the full dataset).

2. Using the income decile data from the 2009 and 2010 EU LFS, a second ranking of jobs by their wage was produced. In this case, the basis for the calculation was the values of individual workers within the 10-point wage decile scale (literally 1 to 10). To avoid the possible bias resulting from different shares of part-time workers across jobs, all workers with fewer than 32 usual weekly working hours were eliminated from the calculation, as well as all the cells with more than 50% part-time workers. Thus this secondary wage ranking is based on the average income decile position of full-time workers within jobs with mostly full-time workers. The same normalisation and EU-average interpolation as applied to the 2008 data were applied to these data.
3. The values of the two normalised rankings were averaged for each job within each country and the result was normalised again.

For the period 2011–2012, a very similar process was carried out but this time using the 2010 ESES data and the income deciles from the 2011 EU LFS. The ESES data were used to calculate average hourly wages per job within each country with which to generate a country-specific ranking (with interpolation of a weighted EU average ranking to fill the gaps). The EU LFS data were used to calculate the average income decile position for full-time workers within jobs with at least 50% of full-timers, applying the same EU average interpolation. Finally, the two normalised rankings were averaged and re-normalised.

The wage rankings for the two periods are therefore each based on two different sources:

- the income deciles variable from the EU LFS;
- the hourly wages information from the ESES (for the later period) or the EU LFS 2008 (for the earlier period).

Two different sources from each period were used purely because there was no single source adequate for the purpose of this study. A simple average at the job level of two different (each of them incomplete on its own) normalised job quality rankings should provide a much more reliable indicator, which can be used to rank the jobs and study their evolution over time.

### **Checks on the resulting rankings**

Notwithstanding this, it is necessary to do some checks with the resulting rankings to evaluate their plausibility and consistency. These checks not only include the wage and educational rankings considered above but also the multidimensional job quality ranking discussed in Chapter 3.

The most obvious check concerns the coverage of the different rankings in terms of jobs and workers. Since different sources are used with varying sample sizes, there could be some empty cells (that is, jobs with no known ranking position) for one of the three job quality measures.

Table A1 shows the number of jobs and workers in jobs for which there is no ranking at all, just one, two or the three rankings (and separately for the two periods). The three rankings provide a very exhaustive coverage of jobs; around 97% of overall employment is covered by the three rankings, with less than 1% of jobs with no ranking at all.

Table A1: Number of jobs and employment levels, by ranking, EU27, 2008–2010

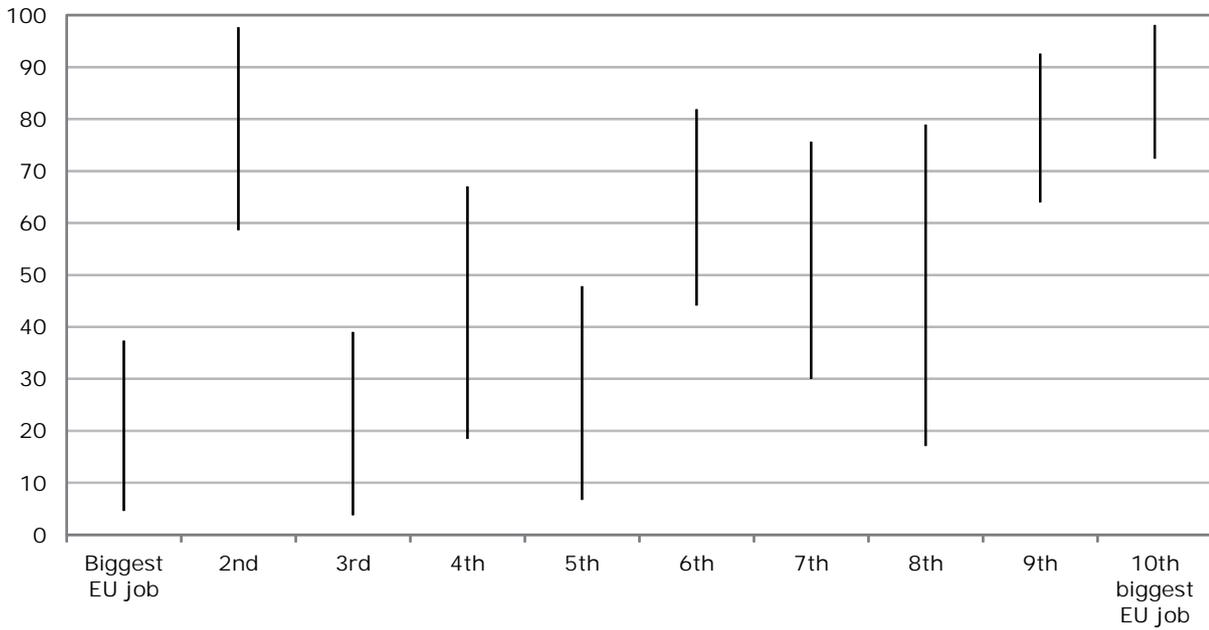
	No ranking		1 ranking		2 rankings		3 rankings		Total
	Jobs	Employment	Jobs	Employment	Jobs	Employment	Jobs	Employment	Jobs
AT	0	0.0%	16	0.0%	199	1.3%	1,155	98.7%	1,370
BE	1	0.0%	8	0.0%	188	1.2%	1,126	98.8%	1,323
BG	0	0.0%	38	0.1%	193	2.4%	1,081	97.4%	1,312
CY	0	0.0%	1	0.0%	42	0.6%	665	99.3%	708
CZ	5	0.0%	9	0.0%	205	1.3%	1,139	98.7%	1,358
DE	83	1.3%	224	0.2%	366	1.4%	1,248	97.2%	1,921
DK	24	0.1%	28	0.1%	259	1.4%	1,107	98.4%	1,418
EE	8	0.2%	1	0.0%	49	1.1%	714	98.7%	772
ES	0	0.0%	82	0.1%	269	0.9%	1,210	99.0%	1,561
FI	60	0.6%	27	0.1%	157	1.2%	1,017	98.2%	1,261
FR	28	0.5%	12	0.0%	360	2.8%	1,157	96.7%	1,557
EL	0	0.0%	4	0.0%	100	0.5%	1,010	99.5%	1,114
HU	0	0.0%	3	0.0%	209	1.7%	1,184	98.3%	1,396
IE	88	0.8%	27	0.1%	215	1.6%	1,135	97.6%	1,465
IT	0	0.0%	12	0.0%	373	1.4%	1,295	98.6%	1,680
LT	0	0.0%	6	0.0%	137	1.5%	973	98.5%	1,116
LU	37	2.6%	3	0.0%	60	1.1%	643	96.2%	743
LV	13	0.1%	8	0.1%	120	3.7%	872	96.1%	1,013
MT	1	0.0%	1	0.0%	70	1.6%	708	98.4%	780
NL	106	9.2%	75	1.2%	265	1.3%	1,181	88.3%	1,627
PL	12	0.1%	2	0.0%	168	1.0%	1,108	99.0%	1,290
PT	0	0.0%	5	0.0%	125	7.2%	1,017	92.8%	1,147
RO	2	0.0%	3	0.0%	164	1.2%	1,070	98.8%	1,239
SE	69	0.4%	43	0.1%	223	1.5%	1,136	98.0%	1,471
SI	69	1.0%	3	0.0%	106	1.1%	986	97.9%	1,164
SK	4	0.0%	8	0.0%	114	1.0%	942	98.9%	1,068
UK	54	0.7%	107	0.1%	359	1.8%	1,252	97.3%	1,772
<b>Total</b>	<b>664</b>	<b>0.8%</b>	<b>756</b>	<b>0.1%</b>	<b>5,095</b>	<b>1.7%</b>	<b>28,131</b>	<b>97.5%</b>	<b>34,646</b>

Source: EWCS 2010, EU LFS (authors' calculations)

The number of jobs covered in all rankings across countries ranges from 1,295 in Italy for the 2008–2010 period (1,757 in the following period, since the ISCO-08 classification is more detailed than its predecessor) to 643 in Luxembourg (822 in 2011), with most countries having three rankings for around 1,000 jobs (1,500 in the second period). Hence the coverage seems reasonably adequate, with the possible exception of the Netherlands where roughly 10% of employment is in jobs for which there is no ranking whatsoever. This is because in the Netherlands there is a (relatively) high percentage of missing values in the classifications of occupation and sector (much higher than elsewhere) in the EU LFS.

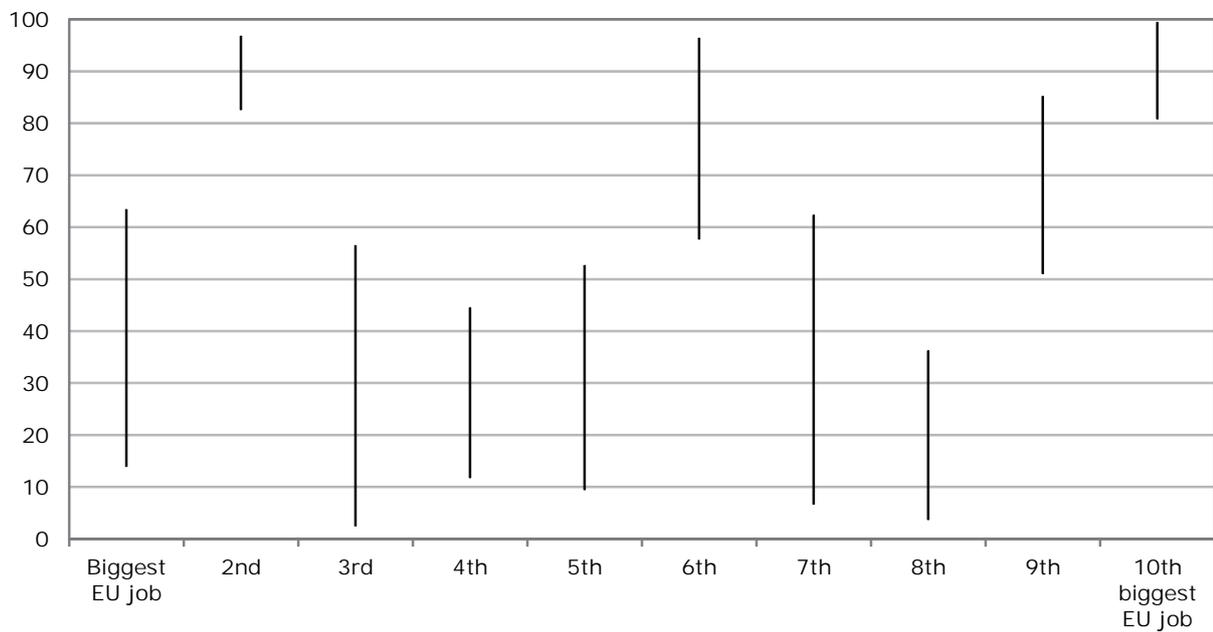
Figures A1 and A2 show the spread of the normalised ranking position (a percentile) for the 10 biggest jobs across all countries (job number 1 is sales workers in retail; job number 2 is teaching professionals in education and so on). These charts show that, although the positions of jobs across countries tend to be quite consistent (the values are relatively concentrated for most jobs around a range of 20–30 percentile points), there is a considerable amount of variation that can affect the relative positions of jobs in relation to each other and therefore potentially the outcomes when looking at employment growth across the job quality spectrum. However, the results again look reasonably within expectations.

Figure A1: Spread in the average country scores for the 10 bigger jobs, normalised wage rankings (2008–2010)



Source: EU LFS (authors' calculations)

Figure A2: Spread in the average country scores for the 10 bigger jobs, normalised educational rankings (2008–2010)



Source: EU LFS (authors' calculations)

## Annex 2: Differences between the non-pecuniary job quality index and Eurofound 2012 job quality indices

Chapter 3 of this report introduced a new index for the EJM, based on the aggregation at the job level of different work attributes that according to specialised literature have an impact on the well-being of workers. This new index, the ‘Non-pecuniary job quality index (NPI), was developed by drawing on two recent contributions to the debate on job quality in a European context (Muñoz de Bustillo et al, 2011 and Eurofound, 2012b). The text outlined the broad differences between these earlier contributions and the NPI. This annex provides a more technical look at the differences between the NPI and the Eurofound 2012 job quality indices, briefly presenting the differences in the actual scores by country, sector and occupation.

Both the NPI and Eurofound 2012 indices are composite indicators that aggregate information from a long list of variables from the European Working Conditions Survey (EWCS), using a complex nested structure that derives from a theoretical model (see Table 2 in Chapter 3). However, an important difference is that, while the NPI carries the aggregation to the highest level, hence producing a single index that summarises the whole model, the Eurofound 2012 model only aggregates information up to the level of four broad components of job quality. Therefore, while the NPI is a composite indicator as such, the Eurofound 2012 model constitutes a system of (four) composite indicators. The objective of the NPI in the context of the EJM made it necessary to carry out the aggregation to the final stage, so that the jobs in the matrix used in this study could be unambiguously ranked and assigned to quintiles, in order to compare the structural development in European labour markets according to this index, wages and education.

Nevertheless, the strength of composite indices is that they can be decomposed into their dimensions, components and indicators. At the level of the four dimensions of the NPI, its differences with the Eurofound 2012 model are generally small: beyond the few differences of substance explained in Chapter 3, they mostly derive from the technical requirements of the EJM. Most importantly, the NPI needs to maintain compatibility with the 2005 EWCS, because that source is needed for classifying jobs in the 1995–2007 period. That means that the analysis cannot use many variables introduced in the 2010 version of the EWCS, which are included in the Eurofound 2012 set of indicators.<sup>22</sup> Out of the 69 variables used in the Eurofound 2012 model, 38 are also included in the NPI. Of the 31 remaining variables, most of them could not be included to keep consistency with the previous EWCS in 2005, or they were already in the EJM (wages and education).

Table A2 provides details on the operational differences of both models, comparing the dimensions and components which are equivalent (but not necessarily occupying the same structure in both models, as explained in Chapter 3). The first index of Eurofound 2012, ‘hourly earnings’, is not included in the NPI because the EJM already has a separate wage index. The second component of Eurofound 2012, ‘prospects’, is nearly identical to the second component of the NPI, ‘employment quality’. The third component of Eurofound 2012, ‘intrinsic job quality’, differs in the structure, but not so much in the content, with the equivalent ‘intrinsic quality of work’ in the NPI. In Eurofound 2012, intrinsic job quality has four components: skills and discretion, good social environment, good physical environment and work intensity. The two earlier components are the basis for the NPI’s ‘intrinsic quality of work’, whereas the third one is basically the same as the NPI’s ‘risks’, and the fourth one is included in the NPI’s ‘working time and work–life balance’ (see Chapter 3 for a justification of these differences). The component ‘working time quality’ is nearly identical except for the inclusion of intensity in the NPI, and the inclusion of an extra variable in Eurofound 2012.

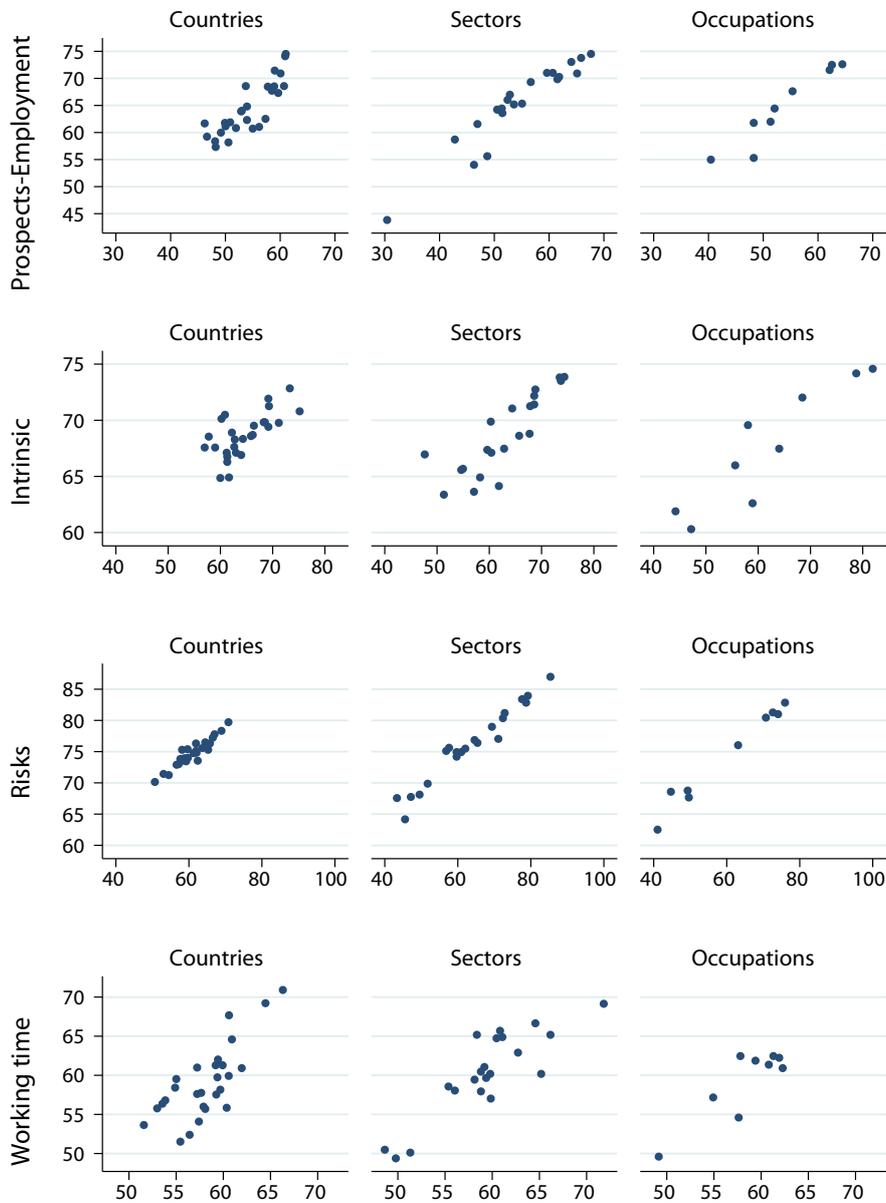
<sup>22</sup> Or dropped or changed in 2010, since the variables have to be in both sources.

Table A2: Differences between Eurofound 2012 indices and NPI

Eurofound 2012	NPI	Comments
<b>Hourly earnings</b>	<b>Intrinsic quality of work</b>	<b>Already existing in EJM (wage ranking)</b>
<b>Prospects</b>	<b>Employment quality</b>	<b>Identical except for Q12 in NPI</b>
Q77A, Q77C, Q6, Q7	Same	
Not included	Q12	
<b>Intrinsic job quality</b>	<b>Intrinsic quality of work</b>	<b>Different structure, similar but simpler content</b>
<b>Skills and discretion</b>	<b>Skills and autonomy</b>	<b>2 subindices in NPI</b>
Q61A, Q61C, Q49C	Not included	Minor changes
Q49E, Q49F	Same	
Q50A–C	Same	
Q51C, Q51E, Q51I, Q51O	Not included	New (C, I, O), modified (E)
Q24H	Not included	
Ef1_ISCED	Not included	Already existing in EJM (education ranking)
ISCO_08_2	Same	
<b>Good social environment</b>	<b>Social support</b>	<b>Similar but simpler content</b>
Q51A, Q51B	Same	
Q58A–E, Q77E, Q70A–C, Q71A,C	Not included	New (Q58A–E), modified (Q70A–C, Q71A,C) or additional dimension (Q77E)
Q71B	Same	Included in workplace risks (psychosocial risks)
<b>Good physical environment</b>	<b>Workplace risks</b>	<b>Different dimension in NPI, identical content</b>
Q23A–I, Q24A–E	Same	Same variables, different aggregation
<b>Work intensity</b>	<b>Intensity</b>	<b>Same component, but different dimension</b>
Q45A, Q45B	Same	
Q46A–E	Not included	
Q51G, Q51L, Q51P, Q24G	Not included	Minor differences in coding, or new
<b>Working time quality</b>	<b>Work–life balance</b>	<b>Identical except for intensity component</b>
Q18, Q32–35, Q39, Q40	Same	Identical variables and construction
Q43	Not included	New
Not included	Q45A,B	

But in practice, how much difference do these discrepancies make? Figure A3 shows the scores of the four components of the NPI against the equivalent indices of Eurofound 2012, for countries, sectors (NACE 2.0 at one-digit level) and occupations (ISCO-08 at one-digit level). First, it is quite clear that there is more discrepancy in the average country scores than in the scores at the sector and occupation level. This is because country is a less relevant determinant of non-pecuniary job quality than occupation and sector, therefore the differences are smaller (except partly in the case of working time) and the discrepancies are more likely to be affected by pure statistical noise. Second, the dimensions of ‘employment quality’ and ‘risks’ produce extremely similar results. The dimensions ‘intrinsic job quality’ and ‘working time’ show more discrepancies, but as previously mentioned, their different structure means that despite their conceptual similarity they do not measure exactly the same thing. Nevertheless, the general picture is one of a broad consistency, especially for sectors and occupations. Considering that the overall scores for sectors and occupations were used in this study for constructing the NPI (because of sample size issues, country-specific NPI scores could not be constructed), this is a reassuring outcome.

Figure A3: Differences in scores for components of NPI and Eurofound 2012, by countries, sectors and occupations



Note: Horizontal axes represent NPI scores, vertical axes represent Eurofound 2012 scores  
 Source: EWCS 2010 (authors' calculations)



*This report describes recent structural shifts in employment in European labour markets before, during and after the 2008–2009 recession. It finds that employment destruction across Europe in the recession was strongly polarising in terms of the wage structure, while there was less polarisation in 2010–2012. A jobs-based approach identifies how net employment shifts at Member State and EU level have been distributed across jobs in different quintiles of the wage distribution. Two alternative criteria for ranking jobs are based on the average education level of job holders and a multidimensional measure of job quality, the non-pecuniary job quality index. This new index, derived using data from the fifth European Working Conditions Survey, is based on the aggregation of information about a wide range of job attributes linked by social scientists to workers' well-being.*

The European Foundation for the Improvement of Living and Working Conditions (Eurofound) is a tripartite EU body, whose role is to provide key actors in social policymaking with findings, knowledge and advice drawn from comparative research. Eurofound was established in 1975 by Council Regulation EEC No 1365/75 of 26 May 1975.