European Foundation for the Improvement of Living and Working Conditions

Shifts in the job structure in Europe during the Great Recession

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Executive summary

Introduction

Europe, in common with most of the developed world, continues to deal with the consequences of the Great Recession of 2008–2009. The repercussions have been especially severe in the labour market. There were five million fewer people in paid employment in the EU27 in the second quarter of 2010 than in the second quarter of 2008. This report describes the impact of the recession on the structure of employment in terms of occupations and sectors in the EU27, both at the aggregate and national level. It does so from a quantitative perspective (identifying shifts in employment levels) and from a qualitative perspective (showing how shifts in employment levels were distributed across the wage spectrum). This is the first report published as part of Eurofound's European Jobs Monitor. A follow-up report in late 2011 will continue the analysis to mid-2011 as labour-market recovery becomes (hopefully) more firmly anchored.

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 emphasis on the goals of the earlier Lisbon Strategy goals of 'more and better jobs'. More jobs are needed to remedy the sharp increase in unemployment that has accompanied the financial crisis. Employment growth is also necessary if Europe is to make progress towards its target of a 75% employment rate by 2020 for those aged between 20 and 64 years. (In 2010, the employment rate for this group was 68.6%.) Moreover, better-quality jobs (in terms of training, knowledge content and employment conditions) are needed if Europe is to improve its productivity levels – the key to meeting the competitive challenges of an increasingly multipolar world and thus to maintaining and improving living conditions.

In retrospect, Europe enjoyed something of a jobs miracle from the late 1990s until the onset of the recession in 2008. Over 20 million new jobs were created in little over a decade: this was more in both absolute and relative terms than were created in the US. Though the employment targets of the Lisbon Strategy were not met, significant progress was made in raising employment levels and combating unemployment. On the other hand, similar concerns to those previously voiced in the US were raised regarding the quality of the jobs being created. The perception was that many new jobs were low-paid and dead-end service jobs, and not enough were created in more knowledge-intensive and potentially productivity-enhancing activities. Was job growth being achieved at the expense of job quality?

Earlier work by Eurofound applied a simple method of analysis – first developed by Joseph Stiglitz – in order to provide an empirically sound answer to this question. By breaking down employment into individual 'jobs' (understood as a specific occupation in a specific sector – for example, a nurse in the health sector or a shop assistant in the retail sector) and by ranking jobs in terms of hourly wage (as a proxy of job quality), it can be seen whether job growth or decline was concentrated in 'good', 'middling' or 'low-paid' jobs. This analysis looked at developments in the labour market in 23 Member States between 1995 and 2006.

- Its main conclusion was that employment growth was skewed towards relatively higher-paid jobs.
- It also found that employment growth had been weakest in the middle of the wage distribution, linked to the long-term decline in manufacturing employment. Growth in the lowest-paid jobs was somewhat greater.

- Though patterns varied at national level, the aggregate EU data offered some partial support for patterns of a 'shrinking middle' previously identified in American and British labour markets.

Key findings

The current report – *Shifts in the job structure in Europe during the Great Recession* – uses European Labour Force Survey data to analyse whether the pattern of asymmetrically polarised employment change, identified in Eurofound's earlier work, persisted during a period of intense job destruction (between the second quarter of 2008 and the second quarter of 2010).

- Though clearly different in terms of employment outcomes, there was a similar pattern to that of the preceding decade in terms of the distribution of employment shifts across the wage structure at aggregate EU level. The recession appears to have accelerated previous trends.
- Sharp losses in low-medium and medium-paying jobs, especially in construction and manufacturing, accentuated the polarisation of the employment structure.
- Even in a period of intense job destruction, employment still grew in top-paying jobs. As in the preceding decade, job growth in the top wage quintile (the top 20% of the wage spectrum) was mainly due to an increase in jobs in so-called 'knowledge-intensive services' (KIS). These include both public services (mainly in education and health) and private services (business services). During the recession, the relative importance of public services for job growth in the top quintile increased.
- At Member State level, three main patterns of employment shift were observed during the recession: upgrading (job growth being skewed to the top of the wage distribution), polarisation (growth in employment at the lower and upper ends of the wage spectrum, but contraction in the middle) and downgrading (job destruction being greater in higher-paid jobs while lower-paid employment either grew or suffered only relatively small declines).
- Women fared better on the labour market than did men during the recession, both in qualitative and quantitative terms. During the crisis, four 'male' jobs were lost for every one 'female' job. The few sources of – generally high quality – employment growth were in predominantly female-employing jobs in health and education.
- The employment levels of older workers remained surprisingly high during the crisis; however, those of core age workers (those aged between 30 and 49 years) and – especially – younger workers were severely affected. During the recession there was a significant increase in employment among those aged between 50 and 64 years of 1.7 million new jobs. This employment growth took place across the wage spectrum, but was skewed towards top-paying jobs. For younger workers (those aged under 30 years), jobs were lost across the wage spectrum.
- There was a mixed picture in terms of employment status. There were marked losses in temporary jobs in the early phase of the recession; however, the greater part of employment growth from 2009 onwards took place in temporary jobs, though this growth has tended to be in lower-paying jobs. Part-time work has expanded across the wage spectrum, with gains more or less equally distributed between men and women. New male part-time employment has been created primarily in lower-paying jobs in agriculture, and food and beverages, while over two-thirds of the growth in female part-time employment was in higher-paying jobs in education, health and professional services.

Introduction

The empirical background to the Lisbon goal of more and better jobs was often phrased in terms of the dismal job creation performance of Europe compared to the United States. In the first half of the 1990s, the average annual rate of job growth in the United States was 1%, while in Europe during this period the rate declined (by 0.65%).[1] Even though the gap in job growth narrowed in the second half of the 1990s (1.67% for the US and 0.92% for the EU), the 'Great American Job Machine' highlighted unrealised European potential. Concerns were raised, however, as to the quality of the jobs being created in the US. Joseph Stiglitz, then economic advisor to President Clinton, introduced a jobs-based methodology to classify jobs created during the 1990s. The conclusion drawn was that – broadly speaking – most of the jobs created were of relatively high quality (using wages as a proxy). Wright and Dwyer (2003), taking a more nuanced approach (but still using the basic jobs methodology), found that the distribution of employment growth in the United States in the 1990s had indeed been skewed towards higher-paid jobs; however, there had also been significant growth at the bottom and a 'hollowing out' of the middle. This was taken as evidence of polarisation and was in sharp contrast to the employment growth of the 1960s.[2]

Between the turn of the millennium and the advent of the current economic crisis, job growth was higher in the EU27, and significantly so in the EU15, than in the US. In an attempt to classify the jobs created in this 'golden age' of European job creation, Eurofound's Jobs Project traced structural change between 1995 and 2006 in terms of median wages in jobs in 23 Member States. This was the first application of this jobs-based methodology to EU labour markets. The report found varying patterns across EU Member States – the two most common being a pattern of polarisation and another of upgrading (jobs growth being skewed to the top of the wage distribution). The aggregate pattern for the EU was one of upgrading with some limited evidence of polarisation (Fernández-Macías and Hurley, 2008).

In the US there are only relatively minor data issues attached to the use of the country's labour force survey (its Current Population Survey) for both employment data (by sector and occupation) and median wage. However, the situation is more challenging in Europe. The European Labour Force Survey (EU LFS) does provide good aggregate employment growth data, but there are some issues of compatibility of the implementation of sector codes (NACE rev. 2.0)[3] and particularly occupation codes (ISCO-88)[4] in various Member States. Moreover, in the previous Jobs Project study, wages were compiled using both the European Structure of Earnings Survey and the European Survey of Income and Living Conditions (EU-SILC), as well as its predecessor, the European Community Household Panel survey.[5]

The Jobs Project could be updated to 2007 using the original wage-ranking data (Fernández-Macías, 2010); however, further updating was not possible due to a major revision of the NACE sector classification in 2008, which was not easily mappable to the previous classification. The fact that wage data is now incorporated in the EU LFS is a huge improvement upon having to use sources external to the EU LFS. The problem now is that – currently – wage data is not available for all

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1 Data from the EU-KLEMS dataset.

2 The jobs methodology has been prominent in the polarisation research debate and Goos and Manning have founded evidence of polarised employment growth first in the UK (Goos and Manning, 2007) and more recently in the EU15 (Goos and Manning, 2009). Note, however, that there are important differences between the methodology used by these authors and both the cited US research and Eurofound work. Other similar approaches can be found in OECD (2001) and OECD (2003).

3 Statistical classification of economic activities in the European Community (*Nomenclature statistique des activités économiques dans la Communauté européenne*, NACE)

4 International Standard Classification of Occupation (ISCO)

5 For the sources used and exact means of constructing median wages for jobs in these 23 Member States, see Stehrer, Ward and Fernández-Macías (2008).

27 Member States. The approach taken in this report is to use the national data for the 13 available countries to generate a common EU ranking for the remaining Member States.[6] In addition, a ranking of jobs based on the years of schooling for the average job-holder is also presented (see Annex 5).

The massive job growth of recent times in both the US and Europe now seems as though in a distant past. Between 2007 and 2009, average annual jobs growth in Europe was -0.6% (-2.0% in the US). While the original purpose of the Jobs Project methodology was to study the changes in the structure of jobs over a longer time period, it is of course very interesting to examine the shifts since the advent of the Great Recession in 2008. Perhaps of most interest is to set the developments in the last two years against the backdrop of the previous twenty. For example, has the change in the job structure in Europe during the Great Recession diverged from the experiences of the recent decades or is it more an acceleration of previously observed structural trends? As we will see in this report, broadly speaking, it turns out to be the latter.

We believe that this report will show the value of the jobs approach in analysing the changing structure of employment in the two turbulent years of the Great Recession. Not least, the possibility to provide a qualitative dimension to net jobs change in a large EU-wide dataset – with short publication lags – is extremely useful for policymakers. It may be particularly useful in the next few years. In some countries the employment adjustment to the recession has not yet run its course and it would be foolish to discount further macroeconomic shocks. Moreover, it is often when growth and employment first rebound that the strategic investment decisions of companies taken in the depths of the recession manifest themselves as regards their impact on the employment structure. This includes the consequences of decisions related to mergers and acquisitions, offshoring and outsourcing. It is thus highly uncertain what type of jobs the recovery in the private sector will provide. Moreover, this report shows the vital role that the public sector has had in holding up the level of well-paid jobs. It is likely, at least in some Member States, that this will not continue for long.

Chapter 1 presents a broad empirical picture of employment in Europe between the second quarter of 2008 and the second quarter of 2010. Chapter 2 explains the jobs methodology. The main body of the report is contained in Chapter 3, where – apart from the aggregate picture on the changing structure of jobs – a more detailed presentation breaks down changes in the job structure by economic activity (sector), worker characteristics and employment status. Chapter 4 draws some conclusions.

[6] For similar reasons of data availability, Goos, Manning and Salomons (2009) used wage data from one Member State – the UK – and applied it to 16 Member States. In defence of such an operation, rankings of jobs tend to be rather similar from country to country: for instance, in all countries medical doctors tend to be paid higher than office clerks who in turn tend to be paid higher than retail shop assistants. The pragmatic rationale is that comparable data is only available for a subset of Member States. The 13 countries for which we used EU LFS or national data to generate job-wage rankings and quintile assignments were Belgium, Denmark, Estonia, France, Greece, Hungary, Italy, Lithuania, Latvia, Luxembourg, Poland, Portugal and the UK.

Employment in recession

1

There were five million fewer people in employment in the EU27 in the second quarter of 2010 than in the second quarter of 2008 as a result of the economic crisis, the most severe in over a generation. This report describes the impact that this employment decline has had on the structure of employment in the EU27.

Europe, in common with most of the developed world, suffered a severe recession during 2008–2009. This was a direct consequence of a financial crisis whose causes are now agreed to be various and linked. They include: deregulated global capital markets; credit and savings gluts as well as global trade imbalances; excessive financial engineering; irresponsible banking; and inadequate bank supervision (Krugman, 2008; Stiglitz, 2010). Recessions have negative impacts on labour markets: they reduce demand for labour and increase unemployment. Recessions borne of financial crises tend to be especially severe. Reinhart and Rogoff (2009), for example, estimate that unemployment typically increases 7% after such recessions and the downtrend lasts on average four years. Active policy intervention has had a role in tempering the labour market impacts of the crisis to date. (Such intervention takes the form of stimulus packages to sustain demand and labour market measures such as strengthened short-time and work-sharing schemes.) However, a resumption of normal trend growth is still some way off, while employment growth remains anaemic and inadequate to the task of absorbing younger labour market entrants as well as many who lost their jobs at the peak of the crisis. Even without taking historical precedents as our reference, it is clear that eventual recovery will take many years.

The impacts of the recession have varied considerably among Member States. Employment began to decline as early as the third quarter of 2007 in some Member States (Hungary, Ireland, Lithuania, Romania and Spain) and as late as the final quarter of 2008 in others (Cyprus, the Czech Republic, Germany, the Netherlands and Poland; see Table 1). There were as many as 12 consecutive quarters of employment decline in Lithuania and as few as two or three in the case of Austria, Cyprus and Luxembourg. Broadly speaking, those countries where employment levels dipped earliest were also those with the largest peak-to-trough declines suffered over the most extended period.

Some countries emerged comparatively unaffected – Belgium, for example, where employment levels have barely declined, but also many of the larger Member States, including France, Germany, Poland and the UK. Short-time working schemes were a significant contributing factor to labour market resilience in Germany and Belgium in particular but also in many other Member States. By contrast, others have experienced wrenching increases in unemployment – such as the Baltic States, Ireland and Spain. Peak-to-trough declines in employment were over 15% in each of the Baltic States and over 10% in Ireland, Bulgaria and Spain. As of the third quarter of 2010, the most recent quarter for which data are available, employment had not yet troughed in four Member States (Greece, the Netherlands, Portugal and Slovenia, though the decline in employment in each of these countries has been comparatively mild).

The impact has also differed in terms of its effects on different categories of worker. Younger male workers, those with lower educational levels or in temporary contracts have been most affected. The crisis has largely spared, thus far, those in higher-skilled occupations, especially experienced, older workers. However, an exception to this general trend has been the decline in employment levels of corporate and general managers (ISCO 12 and 13).

Table 1: Employment change during crisis, by country

	2007				2008				2009				2010			Change in employment levels		Average annual employment growth, 1998–2007*
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Peak to trough	Q2 2008 to Q2 2010	
Latvia																-19.2	-16.2	1.4
Estonia																-16.7	-15.2	0.7
Lithuania																-15.0	-13.0	0.4
Ireland																-14.5	-12.0	4.7
Bulgaria																-11.6	-8.6	1.9
Spain																-10.4	-9.6	5.3
Slovakia																-7.7	-3.9	0.8
Finland																-7.3	-3.6	1.5
Denmark																-6.4	-4.9	0.4
Romania																-6.1	0.4	-1.3
Hungary																-5.9	-2.3	0.8
Slovenia																-5.9	-2.5	1.0
Sweden																-5.5	-1.6	1.6
Portugal																-5.0	-4.7	0.6
Luxembourg																-4.4	4.7	2.2
Czech Republic																-4.2	-2.6	0.2
EU27																-4.1	-2.3	1.2
Greece																-4.1	-3.4	1.4
Italy																-3.5	-2.4	1.5
Netherlands																-3.1	-1.0	1.5
UK																-3.0	-2.4	0.8
Austria																-2.7	-0.9	1.1
Poland																-2.6	1.9	0.1
Germany																-2.5	0.3	0.8
Cyprus																-2.3	0.8	4.3
France																-2.1	-0.7	1.7
Malta																-1.7	2.6	1.3
Belgium																-0.3	0.5	1.5

Note: Shaded quarters indicate the period between peak and trough employment levels during the recession. *Figures are from 1999 for Cyprus, and from 1998 for Malta, Bulgaria and EU27. Data not seasonally adjusted.
Source: EU LFS (for ages 15–64 only)

As Table 2 demonstrates, employment levels in the predominantly state-funded sector – public administration, education and health services – actually increased for white-collar workers while employment declines were relatively muted in private services (with the exception of the retail sector). On the other hand, the employment levels of both high- and low-skilled blue-collar workers, especially in construction and manufacturing, suffered most during the recession. The bursting of property bubbles (and their associated construction booms) was responsible for much of the damage in the Baltic, Irish and Spanish labour markets. In every sector except the primary sector – which accounts for a little over 5% of total employment – employment fell by more or rose by less for

lower-skilled workers than for those with higher skills levels and for blue-collar workers than for their white-collar counterparts.

Table 2: Changes in employment level, by major combined sector and occupation groupings, Q2 2008 to Q2 2010, EU27 (%)

Sector/occupation	White collar		Blue collar		All
	High skill	Low skill	High skill	Low skill	
Primary sector	-7.7	-2.6	-0.9	2.9	-0.7
Construction	-3.6	-10.5	-11.2	-16.4	-10.7
Manufacturing	-6.9	-7.8	-10.1	-14.0	-10.2
Retail	-2.7	-3.4	-5.8	-6.3	-3.7
Other private services	1.6	-0.8	-2.0	-0.9	0.1
Public services and utilities	4.3	3.0	-3.7	-0.6	3.1
All	0.9	-1.0	-7.3	-6.0	-2.3

Note: **Occupational breakdown**: white-collar high-skilled workers comprise ISCO codes 1–3 (legislators, managers, (associate) professionals); white-collar low-skilled workers comprise ISCO codes 4–5 (clerks, service workers); blue-collar high-skilled workers comprise ISCO codes 6–7 (skilled agricultural and craft workers); blue-collar low-skilled workers comprise ISCO codes 8–9 (plant operators, elementary occupations).
Source: EU LFS (authors' calculations)

The recession has therefore accentuated the long-run shift in employment away from the primary sector (agriculture, fishing and extractive industries) and manufacturing activities towards service activities. Services accounted for 69% of EU27 civilian employment in 2008 and 71% in 2010. The shift has also been markedly skills-biased, sparing in large part – at least in the period covered by this analysis – higher-skilled, white-collar workers.

In important respects, the 2008–2009 recession is not over. Firstly, labour market impacts of recessions tend to lag output. The EU unemployment rate is still over 9.5% and has not yet begun to move downwards. Secondly, the severity of the downturn prompted large public stimulus packages, which served to protect employment in the short term. Their withdrawal or winding down is likely to impact in particular on public-sector employment, already the focus of retrenchment in many Member States. This also applies to sections of the financial services industry, which have been the main recipients of state aid to date. Finally, the fact that negotiated and incentivised working time flexibility also played a large part in dampening employment losses during the downturn is likely to have created a buffer that may depress new job creation in the recovery.

Technically, recession in the EU began in the second quarter of 2008 and ended in the third quarter of 2009 after five quarters of consecutive negative growth. The quarterly peak-to-trough period of employment decline in the EU27 was from Q3 2008 to Q1 2010, during which employment in the EU shrank by over nine million (a reduction of over 4% of the total). In this report we opt for the two-year timeframe (the second quarter of 2008 to the second quarter of 2010) for our analysis, as it covers the period from before the collapse of the Lehman Brothers bank in September 2008 (seen by many as the trigger for the global crisis) to just after the stabilisation of EU27 unemployment rates at around 9.5% (where they remain). There are other justifications for opting for this timeframe. Employment declines in recession typically lag output declines by two to three quarters, which justifies extending our period to beyond that of quarter-on-quarter output declines. Also, since we focus on changes in employment levels (which are not seasonally adjusted), it makes sense to select the same quarter in our two target years to minimise seasonal effects.

2 The jobs approach

This report focuses on how the Great Recession has changed the structure of jobs in Europe. Increasingly, EU employment policy is phrased in the concrete concept of a job. 'More and better jobs' was the headline phrase of the Lisbon agenda; 'new skills and jobs' is central to its successor, the Europe 2020 strategy. Phrasing employment policy analysis in terms of jobs can also bring matters closer to the concerns of European workers.

A job is defined here as an occupation in a sector. This is an intuitively attractive definition and corresponds to what people think of when describing their job – a secretary in a hospital, a salesman in a car showroom or a scientist 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 standard classifications of occupation (ISCO-88) and sector (NACE rev. 2.0), both well established in both Eurostat and throughout Europe.

However, the jobs approach requires not only the definition of a job in an intuitive, conceptually coherent and empirically practical way but also an analytically useful way of evaluating or classifying these jobs. The originator of the jobs approach, Joseph Stiglitz, used the median wage for this. Wage as purely a measure of monetary compensation is of course a useful classification of jobs in itself. Research in the US, however, has interpreted wages as a proxy for quality of work – see Levy and Murnane (1992), Ilg and Haugen (2000) and Wright and Dwyer (2003).

Apart from the intrinsic monetary value of the wage, the principal reasons for adopting wage as a means of ranking jobs are twofold. First, wage income is both more measurable and generally more widely measured than many other individual dimensions of job quality.[7] Other dimensions of job quality – such as cognitive richness of work or work autonomy – are less easy to model or measure and are addressed less often and less systematically in surveys. Secondly, on the assumption that the wage of a job is likely to correlate with other unobserved or less easy-to-observe dimensions of work, earnings are a 'sufficient salient aspect of job quality' (Wright and Dwyer, 2003) to be used as a proxy even if the concept itself is multidimensional.

Recent European research on job or work quality has acknowledged the importance of the wage dimension. According to Leschke and Watt (2008b, p. 6), 'wages are arguably the most important field in regard to job quality'. This is not just attributable to the value of purchasing power of a high wage. Wages are strongly related to other payments such as pensions and social security benefits. Moreover, the status of a job in society is strongly related to wage, as are a number of other non-pecuniary job characteristics such as autonomy, cognitive richness and job security. The use of wage as a proxy of quality does not imply an exclusive regard for the monetary aspects of a job, but reflects the fact that wage levels are correlated with other non-monetary aspects of job quality.

Research published in the European Commission's annual *Employment in Europe* report (European Commission, 2008) based on work by Davoine et al. (2008b) bears out the significance of wage in measures of overall job quality. In a principal components analysis of job quality dimensions using different European data sources, the authors identify wages as the dimension with the highest loading (0.9) on a factor that they interpret as 'socioeconomic security and good working

[7] However, the lack of availability of comprehensive wage data for EU Member States does make the task of establishing national job-wage rankings more difficult than in the US (see Annex 2).

conditions'. Other job quality dimensions with a high loading on this factor include job satisfaction, the perception of being well paid for work done, participation in training etc. (European Commission, 2008),[8] all factors that are correlates of job quality in the literature.

However, it should be underlined that even if wages are probably the best single proxy of job quality, it is likely that some important dimensions of job quality are not captured. While the compensating wage differential idea of Adam Smith is hardly a major determinant of wages, it certainly has some role to play and it is likely that some unattractive features of some jobs are compensated for by high wages. This may be the case, for example, for jobs that could be dangerous, stressful or entail high levels of effort.

It is important to emphasise the potential to expand the jobs-based approach. With a stable frame of jobs defined by NACE and ISCO, other sources of data that use these codes can be used to evaluate or classify jobs. Indeed, in this report, we also present a ranking of jobs according to the estimated average number of years of schooling of the job-holders (see Annex 5). This can be interpreted as a measure of the skill content of the job and is based on the Eurostat Labour Force Survey (EU LFS) variable *'hatlevel'*, which captures the highest level of educational attainment of individual respondents. A more multidimensional job ranking based on a synthetic indicator of non-pecuniary job quality has also been elaborated (Fernández-Macías, Hurley and Storrie, 2011). This uses data from Eurofound's European Working Conditions Survey of 2005 and takes advantage of the fact that this survey has a richer coverage of quality of work dimensions than the EU LFS.

The text box explains the basic steps of the jobs methodology.

Methodological note: the 'jobs-based' approach

The key (simplified) steps of the approach are as follows.

1. Using the standard international occupation (ISCO-88) and sectoral (NACE rev. 2.0) classifications at two-digit level, we create a matrix with the same basic format as Table 2 but at a much more detailed level of disaggregation, counting 88 different sectors on the horizontal axis and 27 occupational groups on the vertical axis. This generates a matrix of 2,376 '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 varies from 1,639 in Italy to 413 in Luxembourg.[9]

2. We rank the jobs in each country based on mean hourly wage.

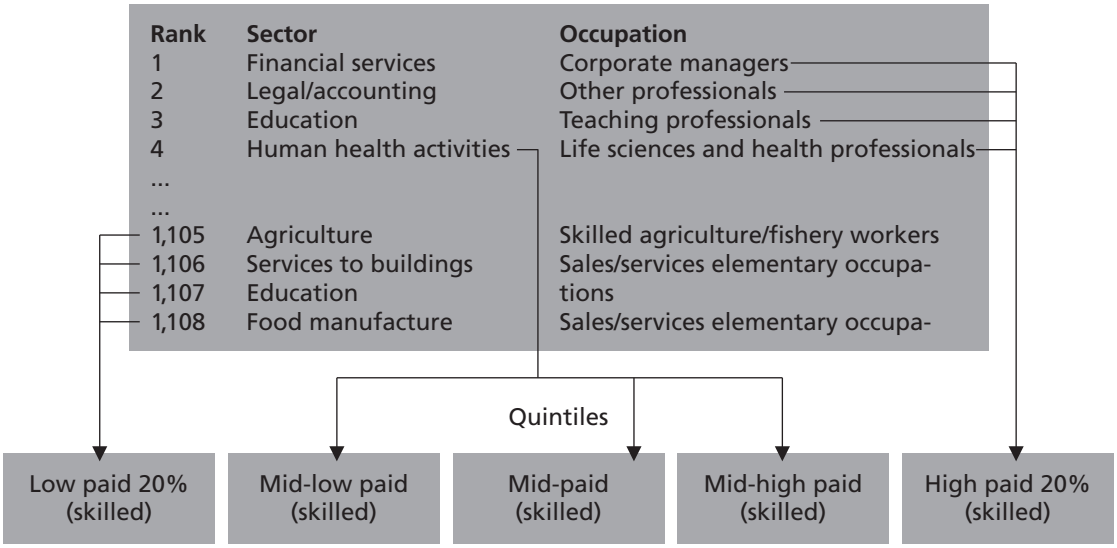
[8] Incidentally, this analysis by the European Commission also relates job quality and macro labour market outcomes, noting that a 'higher score [on the socioeconomic security/good working conditions factor] tends to be associated with better labour market outcomes (e.g. higher employment rates and lower youth unemployment ratios) as well as favourable outcomes in terms of productivity levels'.

[9] The UK data show strong evidence of 'classification shift' for certain similar sectors between 2008 (quarter 2) and 2010 (quarter 2). These tend to happen within NACE one-digit groupings. Our solution has been to reaggregate the two-digit sectors to one digit for the affected one-digit sectors – water supply etc. (E), construction (F), financial and insurance activities (K) – prior to ranking and assigning jobs to quintiles for the UK. This produced only minor differences in the UK chart.

3. We allocate jobs to quintiles in each country based on our job-wage ranking for that country. The best-paid jobs will be assigned to the fifth quintile, the lowest-paid to the first. Each quintile in each country should represent 20% of employment in the second quarter of 2008.[10] Hereafter, the job-to-quintile assignments remain fixed for each country and we shift our focus to the EU LFS quarterly employment data; here, what we are interested in is the shift in employment at quintile level in each country.

Figure 1 illustrates in simplified format the above three steps using some of the large employing top- and bottom-paid jobs at EU level as examples (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 1: Job rankings and quintile assignments carried out for each country

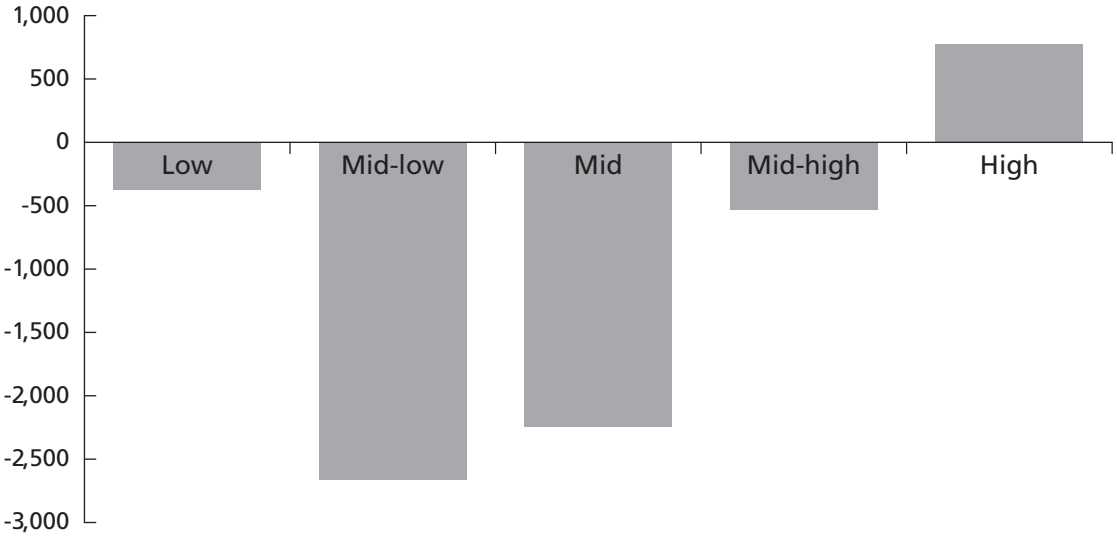


4. We then simply sum **net employment** change between the second quarter of 2008 and the second quarter of 2010 (in numbers of persons employed) for each quintile in each country to establish whether net job growth has been concentrated in the top, middle or bottom of the employment structure. This generates 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-wage ranking.

[10] Large, 'lumpy' jobs with a big share of employment can tend to make the quintile employment totals uneven in some countries. However, in only one country – Romania – does this lead to individual quintiles containing more than 22.5% or less than 17.5% of a country's employment. This should be borne in mind when looking at charts for Romania. The single most common job in the country – skilled agricultural workers in crop and animal production – alone accounted for 20% of employment in the second quarter of 2008 and this results in an outsized bottom quintile and undersized second quintile.

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 or skill levels. Figure 2, for example, illustrates employment change using job-wage quintiles for the EU27 as a whole during the crisis. The figure should be read from the leftmost bar (the lowest-paid jobs) to the rightmost (the 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 net job losses were extensive (a decline of employment of around 2.7 million low-to-medium quintile wage jobs) and that employment grew only in the highest-paid jobs.

Figure 2: Net employment change, second quarter 2008 to second quarter 2010, by wage quintile (thousands), EU27



Source: EU LFS (authors' calculations)

This method also offers further possibilities of breaking these net employment changes down by gender, employment/professional status, working-time category (full-time, part-time) etc. We do this later in this report.

For a more extensive description of the data-processing involved in the jobs approach, see Annex 3. Further background documentation includes Stehrer and Ward (2008) and Fernández-Macías and Hurley (2008) from the original Eurofound research project investigating employment change in the EU over the period 1995–2006.

The EU LFS is the source of all data in the rest of this report, both the changes in number of job holders and the wages and education variables used to rank jobs. Regarding the wage data, it should be noted that the wage variable we are using – incmon, from the EU LFS 2008 annual data – was voluntarily submitted to Eurostat by the national statistical institutes (NSIs) in the countries covered. Only subsequently (in 2009) did Eurostat receive a mandate to begin collecting wage data from the

NSIs as an obligatory variable in their annual data submissions. The 2009 annual data already contained wage data in decile format (incdecil) for 21 Member States. For this report, we have used EU LFS 2008 annual wage data ('incmon') for 12 countries; national sources contributed the data for Denmark. The job-wage ranking for the other Member States was constructed as a weighted average of the available data for these 13 countries. Annex 3 describes in detail how this was done.

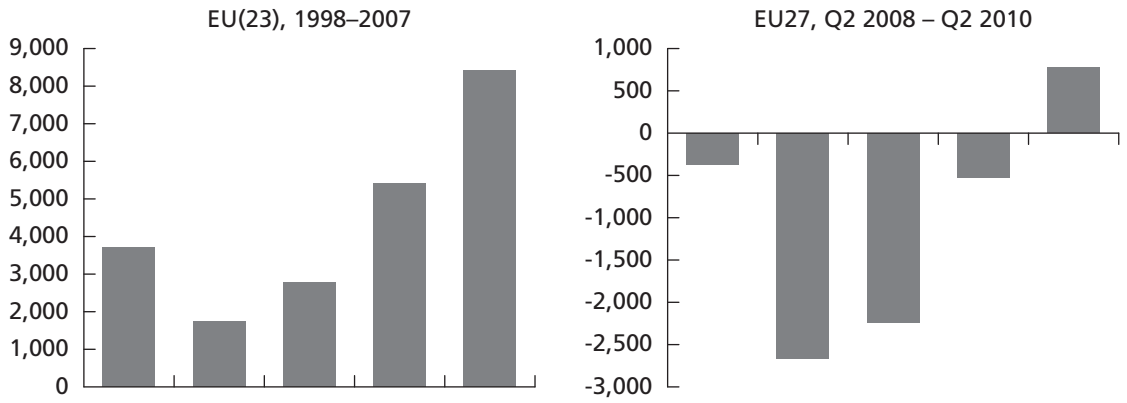
3 Changes in job structure during the recession

In this section, we use the 'jobs approach' to describe employment developments during the recession. We look first at overall trends in the EU27 and then describe the varying patterns of change in the individual Member States. Thereafter, we break down employment change into its components in terms of major sectoral aggregations, worker characteristics (gender, age etc.) and employment status. Our 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 – and to see how the recession has affected these relationships.

Aggregate development at EU and Member State level

Overall, decline in aggregate EU employment decline has been concentrated in middle- and lower-middle paying jobs (Figure 3, right pane).

Figure 3: Changes in EU employment levels by wage quintile, 1998–2007 and Q2 2008–Q2 2010q (thousands)



Note: The two charts in Figure 3 are broadly comparable in terms of the method used to generate them, but the 1998–2007 chart is based on the original EU Jobs Project's job-wage rankings, which relied on various EU data sources (2000–2002, see Stehrer and Ward, 2008 for details) using the older NACE classification (rev. 1.1) and for only 23 Member States. Bulgaria, Poland, Malta and Romania were not included due to unavailability of data. The second chart, for the EU27 for the 2008–2010 period, is based on two sources – 2008 EU LFS annual data for the ranking (see Annex 2 for detail), and Q2 2008 to Q2 2010 quarterly EU LFS data for the employment shifts – and uses the NACE rev. 2.0 classification.
Source: EU LFS (authors' calculations), Fernández-Macías (2010)

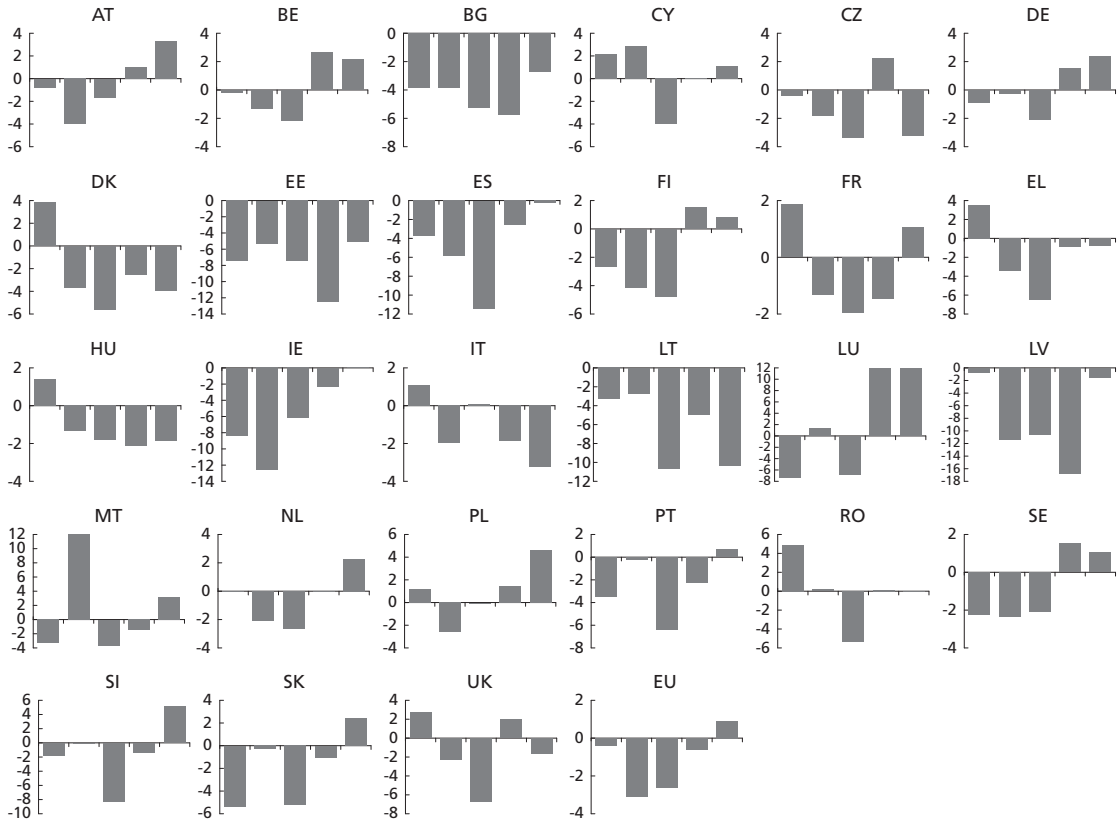
Despite the recession, jobs in the top quintile actually increased by around 1% per annum using the wage-based measure and around 2% per annum using the education-based measure (see Annex 5). These findings are comparable to earlier results (Fernández-Macías and Hurley, 2008) covering the period 1995 to 2006 (subsequently updated to 2007), which showed employment growth firmly skewed to higher-paid jobs. Higher-paid and skilled jobs were much more resilient to the effects of the recession than lower-paid and – especially – lower-skilled jobs. They were also the main beneficiaries of employment growth during the long preceding period of European employment expansion.

Employment change during the crisis in the EU27 as a whole can be characterised as polarised, with some element of upgrading. This compares with the aggregate picture from the earlier period. It clearly demonstrated an upgrading of employment: growth in employment in the top two quintiles accounted for over two-thirds of overall employment growth, but with some degree of polarisation (in that growth was lowest in the middle and somewhat higher in low-paid jobs). Thus the recession has negatively impacted employment in two ways: by destroying (low-to-) medium-paid jobs and by stemming the net creation of new higher-paid employment, which had been the hallmark of the long pre-crisis expansion.

Figure 3 also makes clear that the recession has 'hollowed out' the labour market by disproportionately affecting those jobs in the middle of the wage distribution. This is a common finding of previous analyses in both the US and UK that used a similar methodology and applied job-wage or occupation-wage rankings (Wright and Dwyer, 2003; Goos and Manning, 2007). Employment trends are relatively positive in jobs at the top and bottom and relatively negative in the middle, giving rise to an overall polarisation of the labour market as the 'middle disappears'. It is interesting that these trends, previously observed during growth periods, should also be evident during a severe downturn.

Figure 4 presents net employment change between the second quarter of 2008 and the second quarter of 2010 by wage quintile for all Member States and for the EU27 as a whole. In virtually all country charts, employment-losing quintiles outnumber employment-gaining ones, though those countries where the recession impacted less severely (such as Germany, Poland and the Benelux countries) tended to have countervailing growth, especially in the highest-paid jobs. The chart illustrates the large variation in the size of the impact of the recession on employment by country. The six countries that recorded peak-to-trough employment declines of 10% and more each have a concentration of job loss in low-skilled but medium-paid jobs.

Figure 4: Annual employment change by wage quintile, Q2 2008 to Q2 2010 (%)



Note: Quintiles based on national wage rankings for BE, DK, EE, FR, EL, HU, IT, LT, LU, LV, PL, PT, UK and common EU wage ranking for all other Member States.
Source: EU LFS (authors' calculations)

These declines are attributable in large part to the plight of construction jobs in those countries where preceding construction booms collapsed from 2007 onwards. The construction-led volatility of the Irish and Spanish labour markets in particular has been remarkable. Both countries experienced comparably frenetic employment growth in the decade preceding the crisis (Table 1). The Irish labour market almost doubled in size between 1992 and 2007, while Spain accounted for over one in three net new jobs in the EU15 between 1995 and 2006 (Fernández-Macías and Hurley, 2008, p. 14). Much of the growth was in an overheated construction sector. The collapse has been even more dramatic than what preceded it. Spain alone shed one million construction jobs between the beginning of 2008 and 2010. Employment in the construction sector fell between 40% and 60% in the countries in the top row of Figure 4 in just two years. The bursting of national property bubbles has had repercussions well beyond the labour market but it was also the single most important factor behind declining employment in those countries where the recession struck hardest.

When Eurofound carried out its original jobs-based analysis of EU LFS data covering the earlier period 1995–2006, three main patterns of employment growth were identified at national level: polarised growth, upgrading, and growth in the middle (as well as two further hybrid or mixed categories). Labelling different national growth patterns in this way makes sense over an 11-year

period as the change can – in large part – be considered structural. The short timeframe of the current analysis – two years – and the fact that it is self-evidently an exceptional period of job destruction may make a repetition of the same exercise somewhat artificial. Nonetheless, with this caveat (and others),[11] it is interesting to see the extent to which the patterns identified earlier still apply. Our definition of employment polarisation is adjusted to reflect changed circumstances: it refers to any country where job destruction has been especially concentrated in medium-paid jobs. Table 3 summarises the pre- and post-crisis patterns of employment growth.

Table 3: Patterns of employment change at national level – comparison of pre- and post-crisis periods

Pattern of employment change	1995–2006	2008–2010
Polarisation	Cyprus, France, Hungary, Netherlands, Slovakia	Bulgaria, Cyprus, Spain, France, Greece, Ireland, Latvia, Portugal, Slovenia, UK
Hybrid polarisation/upgrading	Austria, Belgium, Germany, Slovenia, UK	Austria, Belgium, Finland, Netherlands, Poland
Upgrading	Denmark, Finland, Ireland, Luxembourg, Portugal	Germany, Luxembourg, Sweden, Slovakia
Hybrid upgrading/growing middle	Czech Republic, Spain, Italy, Sweden	Romania
Growth in middle	Estonia, Greece, Lithuania, Latvia	
Downgrading		Denmark, Czech Republic, Hungary, Italy, Lithuania
Not classified		Estonia, Malta

Source: EU LFS (authors' calculations), Fernández-Macías and Hurley (2008)

The first thing we observe is that the list of countries with polarising employment change has lengthened. Two of the original countries – Cyprus and France – have been joined by eight new Member States. The list is influenced in particular by employment declines in the construction sector, which tend to concentrate in middle-paying jobs. This is clearly the reason why Ireland, Spain, the UK and two of the Baltic States appear under the 'Polarised' heading in 2008-2010 but not beforehand. Indeed, the fast-growing employment in the construction sector in 1995–2006 (Fernández-Macías and Hurley, 2008, p. 25) served to disguise polarisation in the overall employment structure for the earlier period in some countries. By contrast, its sharp decline in the post-crisis period has accentuated any underlying polarisation.

The number of countries in the upgrading and hybrid polarisation/upgrading categories remained roughly the same over the two periods. In these countries, employment destruction was concentrated in lower-paid jobs while better-paid jobs experienced growth. In the recession, this was decisively the case in 'pure' upgrading countries such as Luxembourg, Germany and Sweden, while hybrid polarisation/upgrading countries such as Austria and Belgium feature significant job loss in medium-paid jobs, little change in lowest-paid jobs and growth at the top.

It is important to bear in mind that a country's employment structure can be categorised as 'upgrading' even as it experiences comparatively high levels of job loss. Thus, Slovakia, for example,

[11] Four Member States were not covered in the earlier period due to unavailability of data (Bulgaria, Malta, Poland and Romania). Also, the quintile assignments were based on national wage data for all 23 Member States for the 1995–2006 analysis. This is our preferred method. In this report, in order to cover employment developments in all 27 Member States, we use a national ranking for 13 Member States and a common European job-wage ranking for those 14 countries where adequate wage data were not available (see Annex 2 for details).

added employment in the top quintile but lost even more in the bottom three quintiles and is hence classed as 'upgrading'. Poland, on the other hand, is an example of hybrid polarisation/upgrading despite being amongst the Member States with the most resilient labour markets during the crisis and enjoying employment growth in our reference period.

A new label, 'downgrading', was necessary to cover the change of sign of employment change between the two periods. No countries experienced 'growth in the middle' during the crisis period but a number experienced an outright deterioration of employment structure according to our method. By this we mean that job destruction was greater in higher-paid jobs, while lower-paid employment either grew or suffered only relatively small declines. There was no equivalent of this pattern in the period 1995–2006, as only one of 23 countries recorded marginally greater job growth in the bottom quintile than in the top quintile (the Netherlands, the most obviously polarising country). For the recession period, the group covers – perhaps surprisingly – the Czech Republic, Denmark, Italy, Hungary and Lithuania.

As a list of the top employment-gaining and losing jobs indicates, there is no obvious common explanation for this development in these five countries. In Italy, the largest-growing job by some margin has been in low-paid household services (+150,000). Job decline in the top quintile in Italy is attributable in significant part to job losses in public administration and education. Italy is also the only Member State in which all of the 'higher' white-collar occupational grades (aggregated to one digit – officials/legislators, managers, professionals and associate professionals) experienced job declines. Cumulatively, these higher-level occupations accounted for just over 500,000 job losses – equivalent to net Italian employment loss over the two-year period. This is clearly quite a distinctive pattern compared with most other Member States, where employment losses were concentrated lower down the occupational and wage distribution. In terms of job growth at the lower end of the wage distribution, four of the five largest-growing jobs in Denmark were low-paid, first quintile jobs, including retail salespersons and restaurant service workers. Meanwhile, the biggest growth in Hungary was in lower-level public administration workers ('elementary occupations').

The picture, therefore, is disparate and it would be unwise to extrapolate structural trends given the short timeframe of the current analysis and possible erratic movements in the quarterly employment estimates at this level of detail. Nonetheless, certain countries exhibit a clear disimprovement of their employment structure during the recession. Overall, patterns of employment shift are even more varied across countries than those presented in the original analysis covering 1995–2006 (Fernández-Macías and Hurley, 2008).

Patterns of employment change during the recession: by activity

Manufacturing and construction

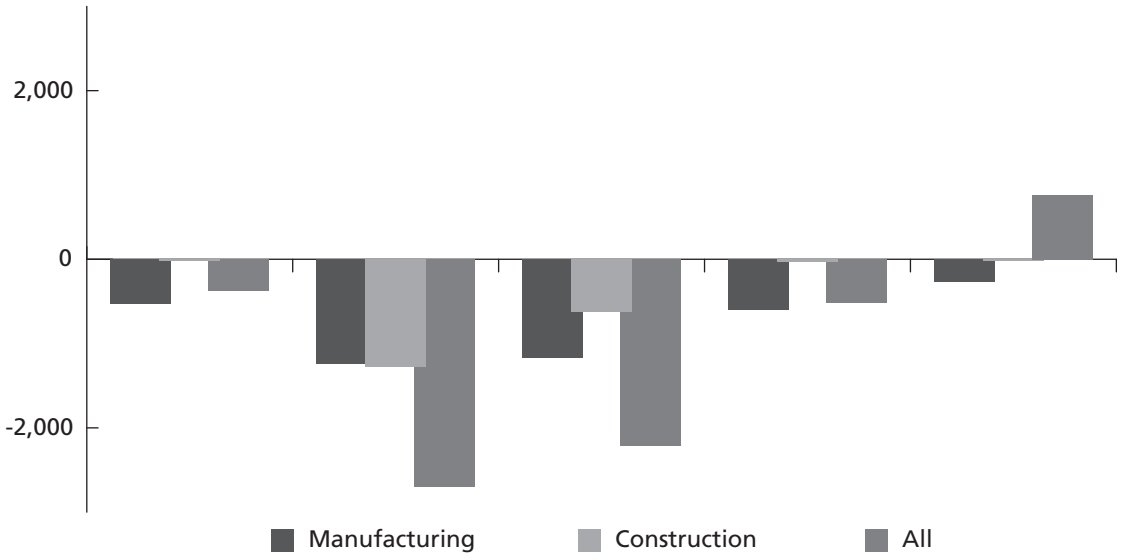
As already indicated, the two broad sector categories that have suffered the brunt of the recession's impact on the labour market have been construction and manufacturing. Between the second quarter of 2008 and the second quarter of 2010, over 10% of pre-crisis employment was destroyed in both sectors. If one were to exclude manufacturing and construction, employment levels in the EU actually increased over the course of the crisis.

Other than having broadly similar workforce demographics, construction and manufacturing are notably dissimilar in terms of their productive logic. Construction is the most cyclical of all sectors whereas manufacturing is the most 'structural': it involves substantial fixed capital investment and much longer time horizons to reap the benefit of these investments. On first principles, therefore, any decline in employment during a recession in manufacturing is more likely to be permanent, while in construction it is more likely to be temporary. There are many features of the Great Recession, however, that complicate this simple picture.

For one thing, boom–bust cycles in national construction sectors, and their comparative extremity during this recession, make it unlikely that construction-sector employment will recover all of the losses suffered any time soon. A large share of job losses in construction may well on this occasion be structural in nature. Meanwhile, manufacturing employment during the recession has followed quite distinct national patterns – large output declines accompanied by modest employment declines in some Member States (Germany, for instance) and the reverse in other countries (such as Spain). Firms have hoarded labour in some countries while in others they appear to have obeyed a contrary dictate – 'let no crisis go to waste' – and have taken advantage of the fact that job losses may be more justifiable or acceptable during a recession.[12]

The concentration of net employment decline in middle- and lower-ranked jobs relates primarily if not exclusively to employment declines in these two sectors (as does the shrinking gender employment gap). Job loss in the construction sector was heavily concentrated in medium-paid and medium-to-low-paid jobs, while the manufacturing sector destroyed employment across the wage distribution but most heavily in the same two quintiles (Figure 5). Such employment losses in manufacturing would have been even heavier had it not been for the existence of short-time working schemes in a majority of Member States as well as negotiated flexible working time agreements, which served to maintain employment – in particular during the peak crisis quarters of late 2008 and early 2009.

Figure 5: Job gain in manufacturing and construction by wage quintile, EU27, Q2 2008 to Q2 2010 (thousands)

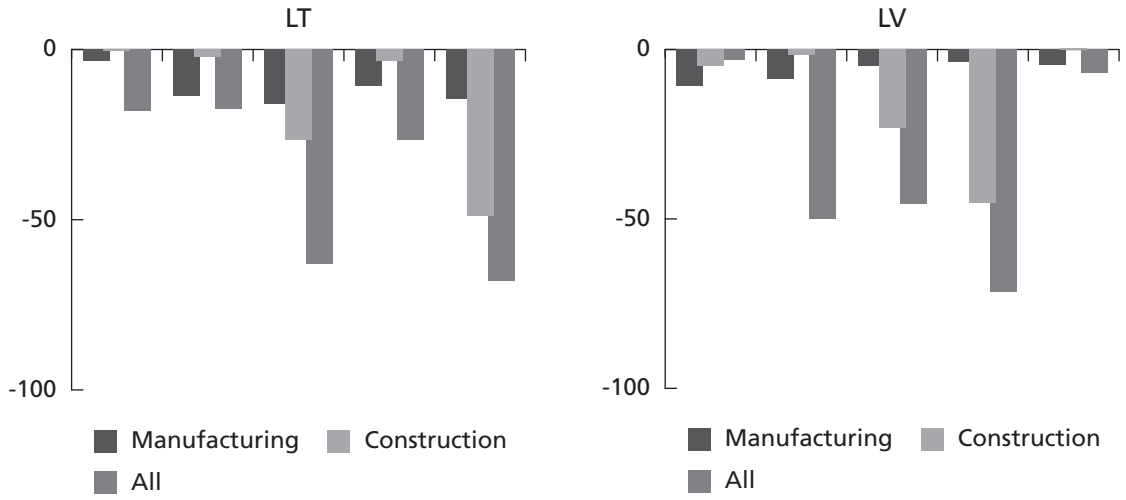


[12] The destruction of low-productive employment has seen Spanish productivity levels per person employed rise sharply and outstrip Germany, the UK and Finland, according to the most recent annual data (Eurostat data for 2009; search for the code 'tsieb030').

The four jobs in which employment declined the most were all in the strongly cyclical construction sector (see Table A1 in Annex 1). Between them, construction sector jobs accounted for net job destruction of over 1.9 million jobs – over 35% of total net decline. These jobs tend to be medium or low-medium in terms of pay but low-ranked in terms of educational attainment.[13]

Even among white-collar workers, engineers/professionals and corporate managers in the construction sector were also among the jobs experiencing the largest employment declines. Employment fell most sharply in those Member States where the construction sector had grown, as a result of property/development booms, to account for between 11% and 13% of the workforce (compared with 8% in the EU as a whole) at the beginning of 2008. In Latvia and Lithuania, the fact that construction job losses were predominantly in the two top-paid quintiles is in itself an indication of boom-led wage inflation in the sector before the crisis (Figure 6). The same jobs appear more frequently in middle or lower quintiles in other countries. The pay premium for construction jobs in the Baltic countries is echoed in 2008 data from the EU survey on income and living conditions (EU-SILC, see Annex 4), where occupational rankings for ISCO 71 (extraction and building trade workers) in these Member States were also comparatively high.

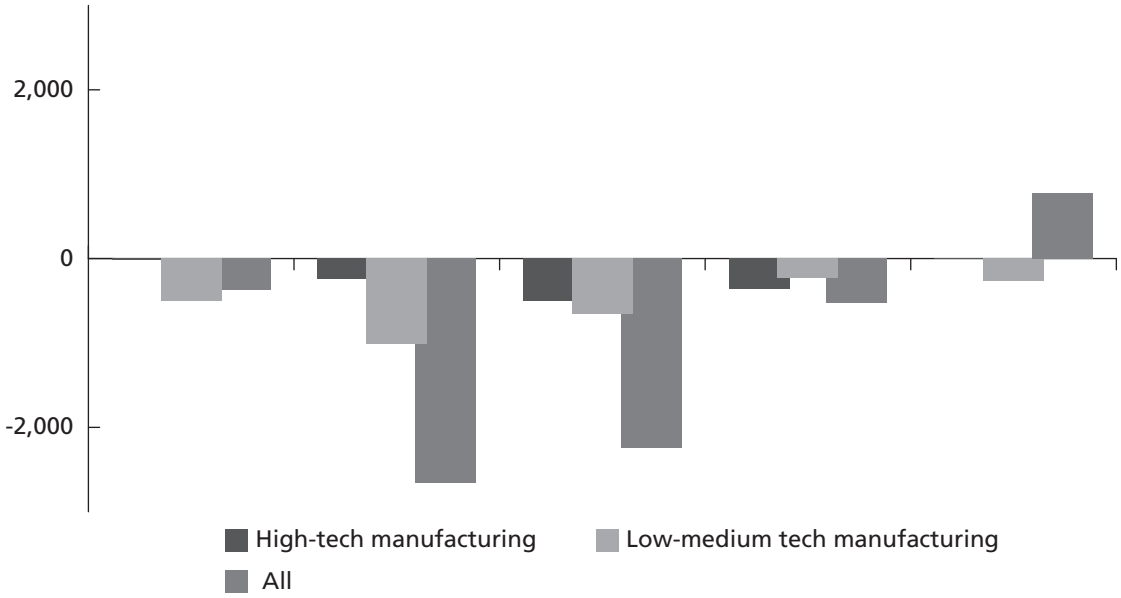
Figure 6: Job loss in manufacturing and construction in Lithuania and Latvia, by wage quintile Q2 2008 to Q2 2010 (thousands)



The fine-graded nature of the NACE classification in respect of manufacturing means that employment tends to be more dispersed across our jobs matrix and it is less easy to pick out single large jobs in which employment was destroyed, as we have done for construction. Nonetheless, manufacturing was the broad sectoral category that suffered the greatest employment decline in absolute terms between the second quarter of 2008 and the second quarter of 2010 (3.8 million jobs).

[13] However, the International Standard Classification of Education (ISCED) or years of completed full-time education are weaker proxies of skill levels in these types of job, which are more reliant on apprenticeship and on-the-job learning.

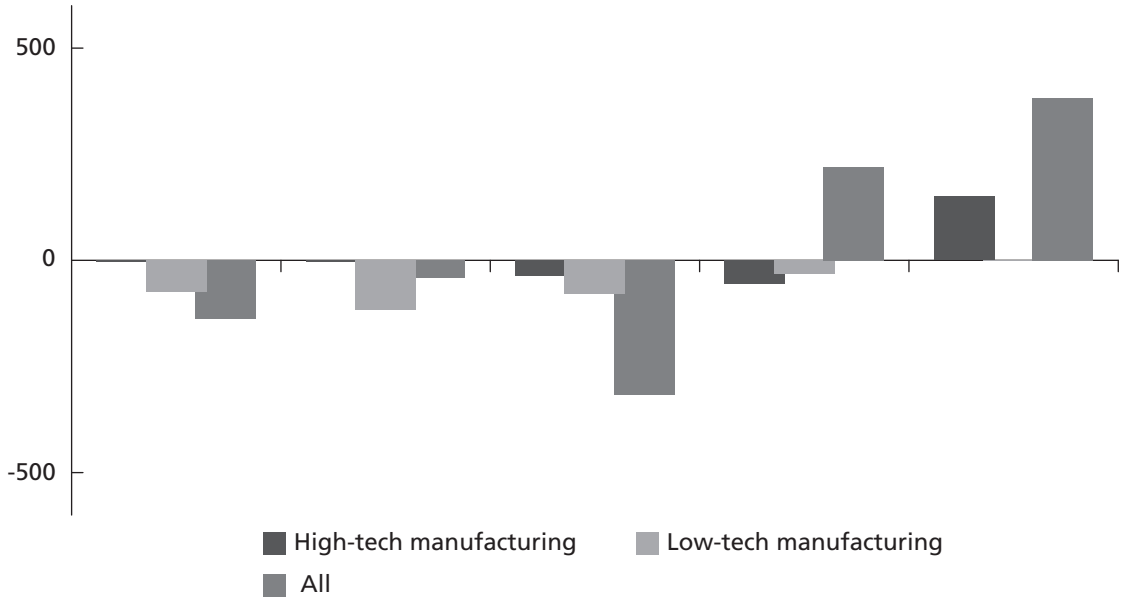
Figure 7: Job loss in high- and low-tech manufacturing by wage quintile, EU27, Q2 2008 to Q2 2010 (thousands)



As Figure 7 shows, the bulk of the losses were, predictably, in low-technology manufacturing (clothing/textiles, furniture and wood products etc.). These jobs were predominately in the low-wage quintiles. Bulgaria, Estonia and Hungary stand out in this regard. There was also quite significant job loss in the high-technology manufacturing sectors in jobs located in the middle-range job quintile.

This occurred in both the more and less developed European economies and was largely in the heavy capital-intensive sectors, such as fabricated metals and cars and machinery. These sectors account for much of the considerable high-technology net job loss in the middle quintiles (machine operators and other metal and machinery workers) in Sweden and the Czech Republic in particular and to a lesser extent in France, Slovenia and Slovakia.

Figure 8: Job loss/gain in high- and low-tech manufacturing by wage quintile, Germany, Q2 2008 to Q2 2010 (thousands)

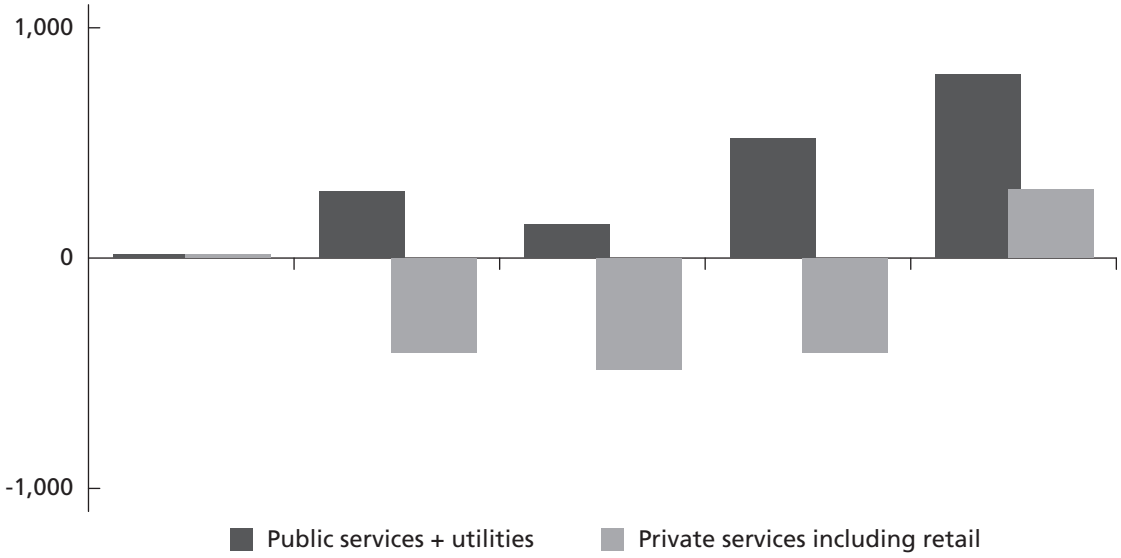


It is very striking that only very limited job loss in high-technology jobs in the middle is found in Germany (Figure 8). This is almost certainly due to the more extensive adjustment that took place in Germany than elswehere in the average hour, rather than head count. Indeed, Germany continued to distinguish itself as the major source of employment growth in high-technology manufacturing. Four of the top eight growing jobs in the highest quintile belonged to the occupational classification of physical, mathematical and engineering science professionals, in various sectors.

Services

Given that over 70% of the working population is employed in the services sector, it might be expected that services would have a sizeable influence on the evolution of our aggregate representation of employment change during the recession. This was certainly the case in the decade preceding the crisis when services accounted for virtually all growth at the top and the bottom of the job-wage distribution (Fernández-Macías and Hurley, 2008, p. 29). However, the recent slowdown in growth in employment in services means that the ongoing polarisation tendencies are, to a larger extent than before, accounted for by the collapse of middle-wage ranking jobs in manufacturing and construction.

Figure 9: Job loss/gain in services by wage quintile, EU27, Q2 2008 to Q2 2010 (thousands)

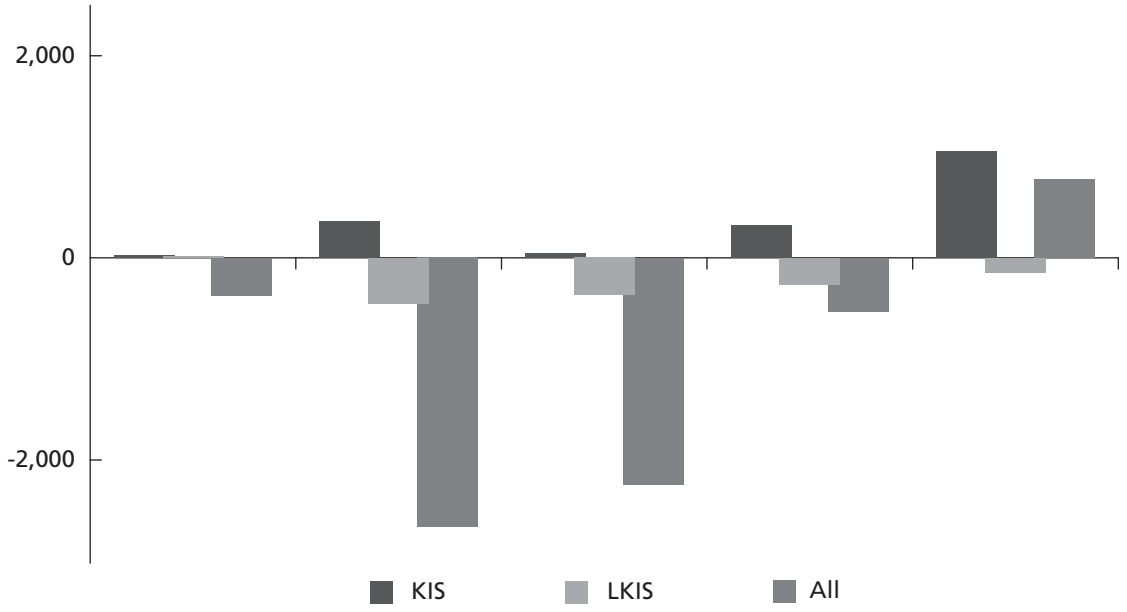


Similarly, the rapid decline in manufacturing and construction means that even if employment growth in services has declined appreciably, the proportion of employment accounted for by services jobs continues to increase. Even before the recession, the large, predominantly state-funded, education and health and care sectors were important sources of employment growth. Since the recession, these have been an even more significant contributor to job growth – not least in the top wage quintile. Even during the peak crisis quarters of the last quarter of 2008 and the first quarter of 2009, employment in education and health continued to grow and over the period Q2 2008 to Q2 2010, these sectors recorded net growth of approximately 3% and 5%, respectively. As Figure 9 illustrates,[14] employment in private-sector services declined markedly in middle-ranking jobs while it grew across the board in the predominantly state-funded sector and with a strong bias towards higher-paid jobs.

Another way of breaking down employment change in the services sector is in terms of the 'knowledge intensiveness' of the sectors in which the change is taking place (in line with the Eurostat distinction between 'knowledge intensive' and 'less knowledge intensive' services, see Annex 7).

[14] Figure 9 uses the same breakdown as Table 2 ('Private services including retail' = 'retail' plus 'other private services' (NACE rev. 2.0, G–N, R–U); 'Public services plus utilities' = 'health', 'education', 'public administration' and 'utilities' (NACE rev. 2.0, E–F, O–Q).

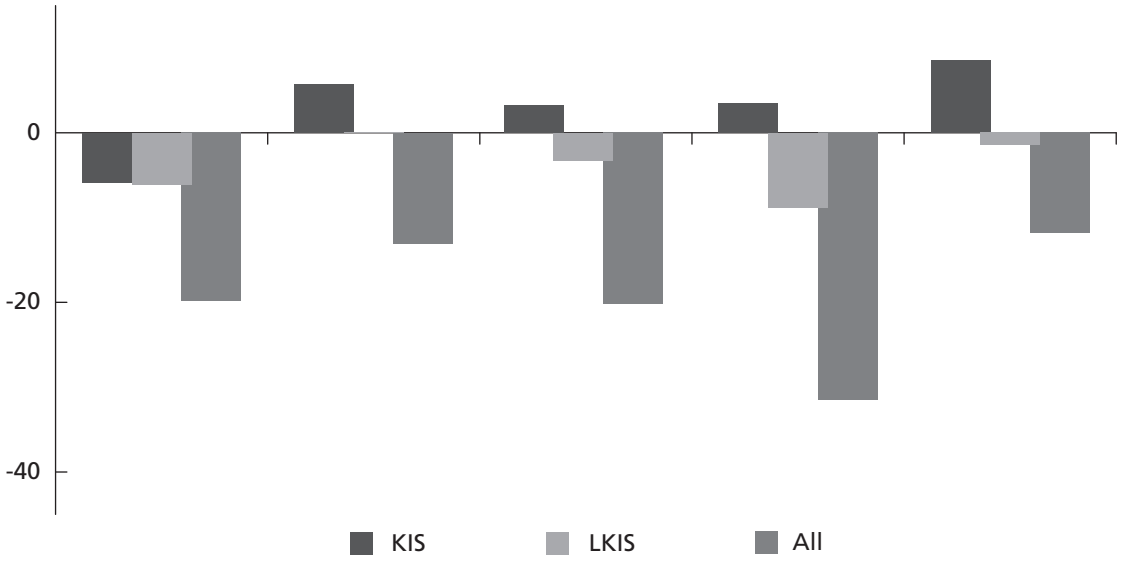
Figure 10: Job loss and gain in KIS and LKIS by wage quintile, EU27, Q2 2008 to Q2 2010, (thousands)



Aside from health and education professionals, a major contributor to the jobs growth in the top quintile of knowledge-intensive services (KIS) were science professionals in computer services, consultancy and other business services. Indeed, knowledge-intensive services have remained relatively unaffected during the crisis, enjoying employment growth across all quintiles (Figure 10). They alone account for the net growth in high- and medium-high-paid jobs in the EU27. Growth was also evident in lower-paid KIS jobs, primarily in residential care but also in smaller, expanding sectors such as gambling/betting, information services and head offices/corporate headquarters.

By contrast, less knowledge-intensive services (LKIS) suffered employment losses across the board (Figure 10). Retail was the sector that contributed most to declines – especially in the lower quintiles – while losses were also notable in postal services (in the second quintile, and in the concluding phase of deregulation in the EU), in warehousing (in the fourth quintile) and transport and personal services (in the fourth quintile). There was some countervailing LKIS employment growth in food and beverage services, but not enough to offset the losses elsewhere.

Figure 11: Job loss/gain in KIS and LKIS in Estonia by wage quintile, Q2 2008 to Q2 2010 (thousands)



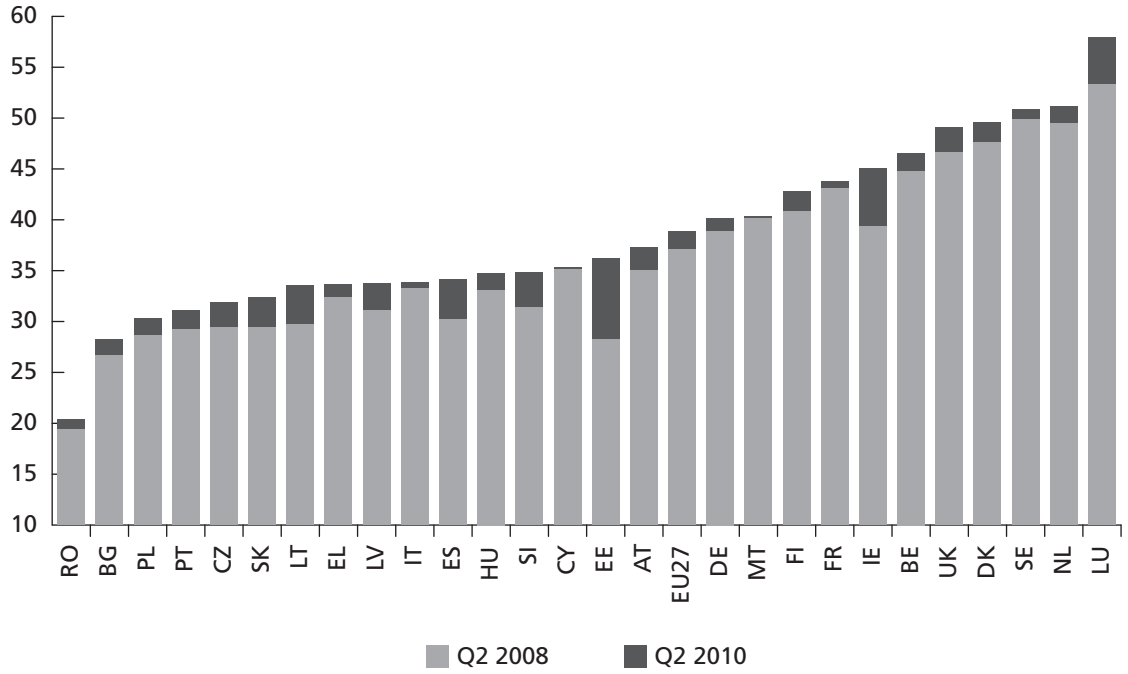
Looking at individual countries, we see that KIS employment in particular was an important determinant of whether countries recorded growth or relatively mild declines in higher-paid jobs. These were generally the same type of job and sector as for the aggregate EU figure – that is, with many jobs for professionals, especially in the predominantly state-funded sectors of health and education. A more private-sector mix of jobs was evident, however, in Belgium, France and Poland, for example. Hungary is something of an anomaly in that there was significant growth in low-paid public sector KIS jobs.[15]

Perhaps the most arresting country chart is that of Estonia, one of the countries whose labour market was most convulsed by the crisis (recording a peak-to-trough decline in employment of nearly 17% of its workforce). Notwithstanding these losses, the country succeeded in growing KIS employment in all quintiles except the bottom – and with notable employment growth in the top quintile, mainly in education, health and public administration (Figure 11). All Member States increased their share of employment in KIS between the second quarter of 2008 and the second quarter of 2010, some spectacularly so.

The recession has sharply increased the proportion of employment in KIS in every Member State but especially in those labour markets most affected by the crisis: it has risen by eight percentage points in Estonia, six in Ireland and four in Spain and Lithuania.

[15] Very early on in the crisis, Hungary (and Romania) increased public employment as a countercyclical measure. See ILO (2010) for details.

Figure 12: Proportion of employment in KIS, before and after crisis



Source: EU LFS (authors' calculations)

Patterns of employment change during the recession: by worker characteristics

In the sections that follow, we show how the net employment shifts during the recession were distributed by gender, age, employment status and other demographic variables. Specifically, we break employment change down by quintile and by the following background variables: gender, age, country of birth and various employment status dichotomies: full/part-time, self-employed/employee and fixed-term/permanent. We maintain the original job-to-quintile assignments already established for each country and use the charts to describe, first, the starting distribution in the second quarter of 2008 and, secondly, the net shift in employment (between this quarter and the second quarter of 2010) for the main categories of the selected background variable across the quintiles in each country.

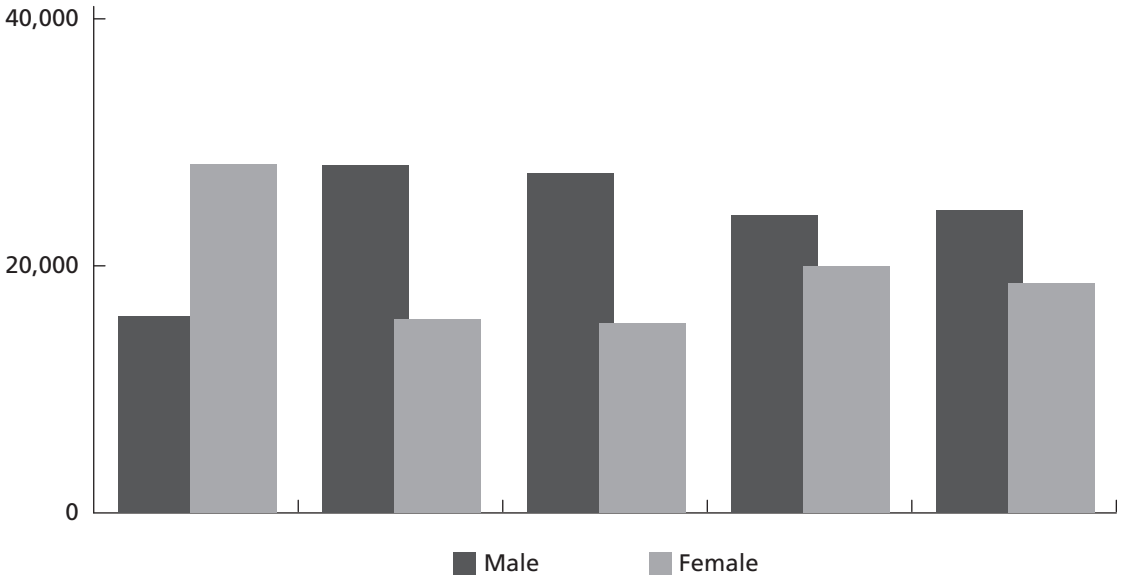
Gender

During the decade prior to the crisis, the gender employment gap continued to close, growth in female employment being greater in both relative and absolute terms than growth in male employment. The recession has accelerated this convergence. Before the crisis in 2007, the ratio of male to female workers was 55:45, having narrowed from 62:38 in 1987 (in the EU15). Because of the greater impact of the crisis on sectors that are male dominated, the gap has narrowed a further percentage point. In all three Baltic States, for instance, men went from outnumbering women in employment prior to the crisis to being outnumbered by women in the wake of the crisis. Here again the culprit was construction and to a lesser extent manufacturing. Throughout the EU, men accounted for over

80% of the net decline in employment between 2008 and 2010 and this tended overwhelmingly to be in middle- and lower-middle-paid jobs.

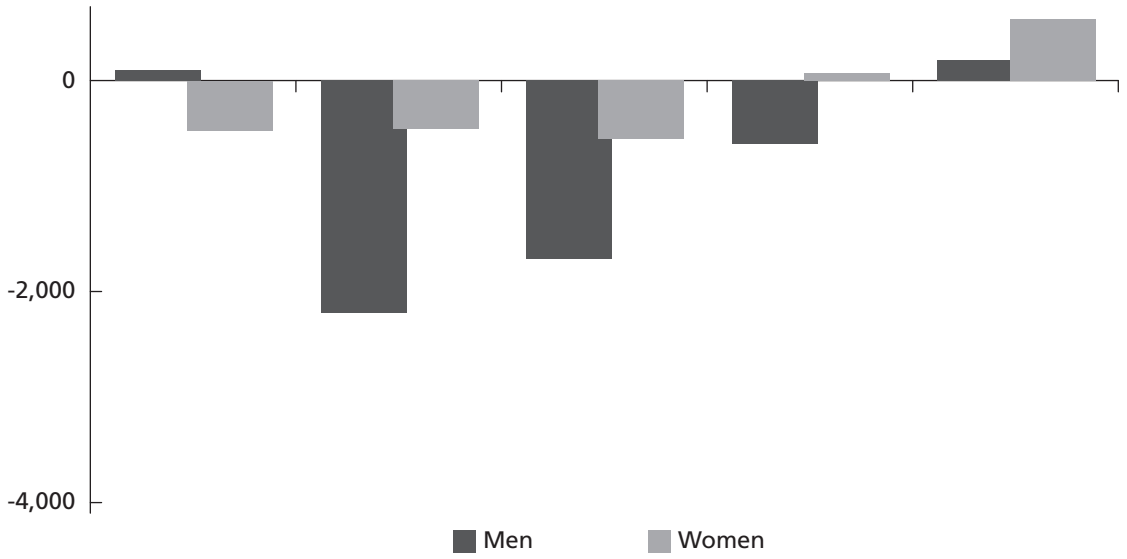
How does this compare to the pre-crisis period? From 1995 to 2006, growth was more or less equally skewed towards higher-paid jobs for both men and women; however, there was some evidence of greater polarisation for women than men, with comparatively higher growth in female employment in the lower quintiles (Fernández-Macías and Hurley, 2008, pp. 41–43; see also Grimshaw and Figueiredo, 2011). Overall, however, the main observation was that growth in female employment was greater in every job quintile: for example, three out of every five new highly paid white-collar jobs went to women.

Figure 13: Distribution of male and female employment by wage quintile, EU27, Q2 2008 (thousands)



Notwithstanding convergences in the gender distribution of work in recent decades and the higher proportion of newer well-paid jobs going to women, the distribution of men and women across the job-wage quintiles remained quite uneven at the outset of the crisis. As Figure 13 illustrates, women outnumbered men by almost two to one in lowest-quintile jobs while there were many more men in low-medium and medium quintile jobs. The differences in higher-paid jobs were less marked.

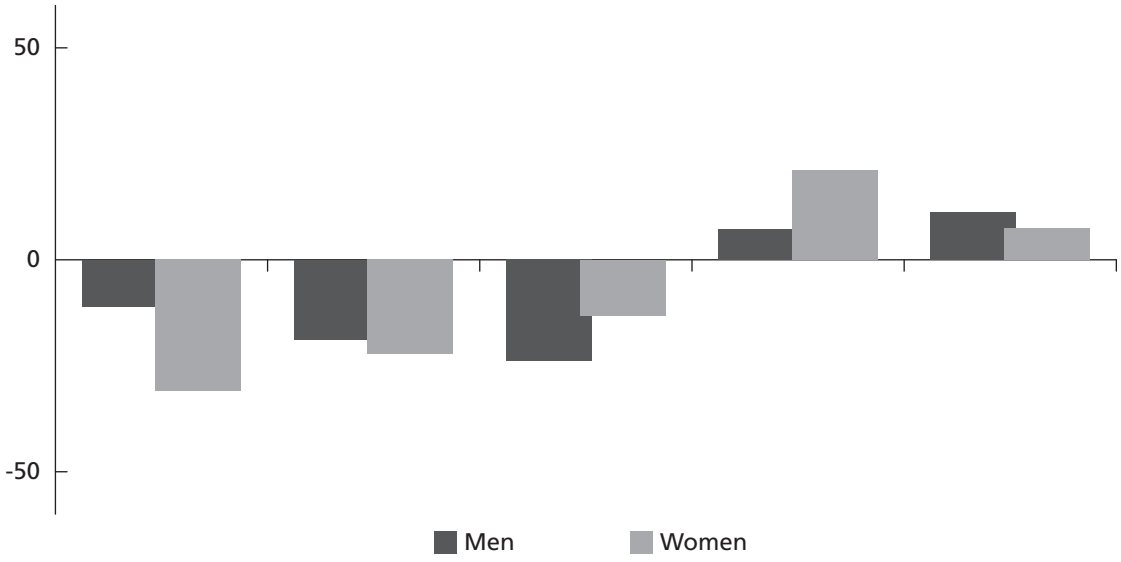
Figure 14: Job loss/gain for men and women by wage quintile, EU27, Q2 2008 to Q2 2010 (thousands)



Female employment has had a comparatively soft landing during the crisis both in qualitative and quantitative terms. Almost all the employment growth in the top quintile in the EU27 has gone to women (Figure 14). This has resulted largely from continued expansion of professional-grade jobs in the health and education sectors. Meanwhile, net female job losses have been exclusively in middle- and low-paid jobs: employment losses for females were highest in four bottom-quintile jobs, including retail salespersons, blue-collar workers in textiles/clothing manufacture and in agriculture. In fact, a clear contrast is visible between the patterns of employment decline for men and women: there is an upgrading pattern evident for women and a stark polarisation pattern for men – a partial reverse of the patterns observed during the pre-crisis period.

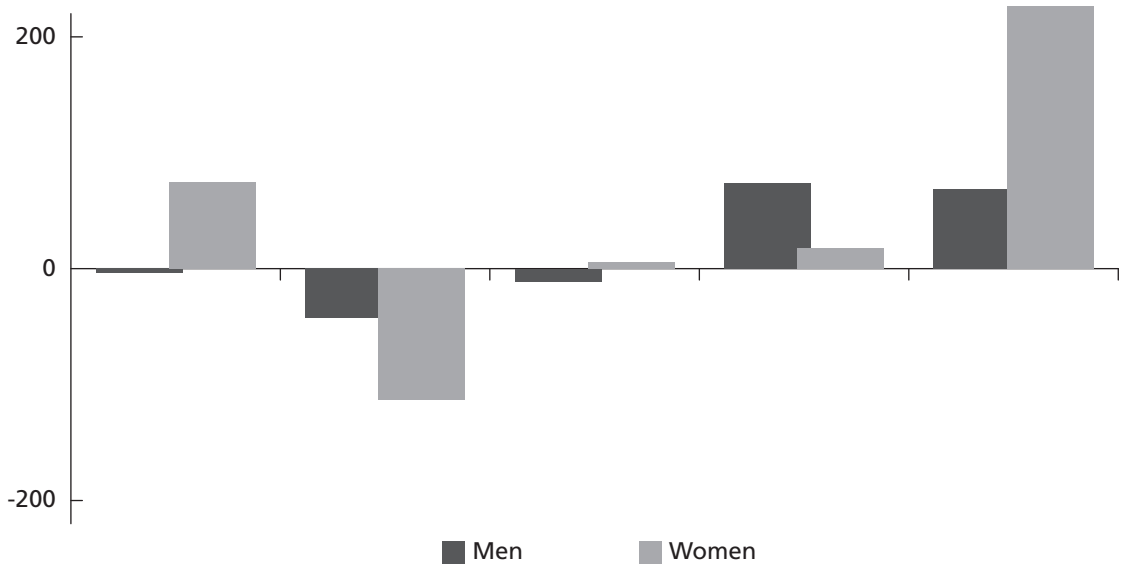
The upgrading of female employment during the recession can be observed in particular in western European, 'older' Member States, including Austria, Belgium, Finland, Germany, Luxembourg, the Netherlands and Sweden (as well as those Member States that suffered busts in construction). Each of these countries more or less mimics the overall EU gender contrast with polarised job loss for men and bottom-skewed job loss for women. In terms of sectoral employment shifts, the explanations for top quintile growth are in most cases the well-rehearsed ones: faster female employment growth in health and education skewed towards higher-paid occupations (professionals and associate professionals).

Figure 15: Job loss/gain for men and women in Sweden by wage quintile, Q2 2008 to Q2 2010 (thousands)



Sweden is something of an exception to the above generalisation. It is the one Member State where net employment decline was greater for women than for men (Figure 15). However, this should be put in context: Sweden is also the country in which a strong tradition of gender egalitarianism and female labour market participation means that the gender employment gap is in any case quite small (even if patterns of gender segregation are as marked here as elsewhere). Declining employment in the health sector for women, especially for blue-collar workers, has been the main explanation for the sharp declines in employment in the lower quintiles (male employment grew in the same sector). Moreover, the country has not undergone a construction sector crisis.

Figure 16: Job loss/gain for men and women in Poland by wage quintile, Q2 2008 to Q2 2010 (thousands)

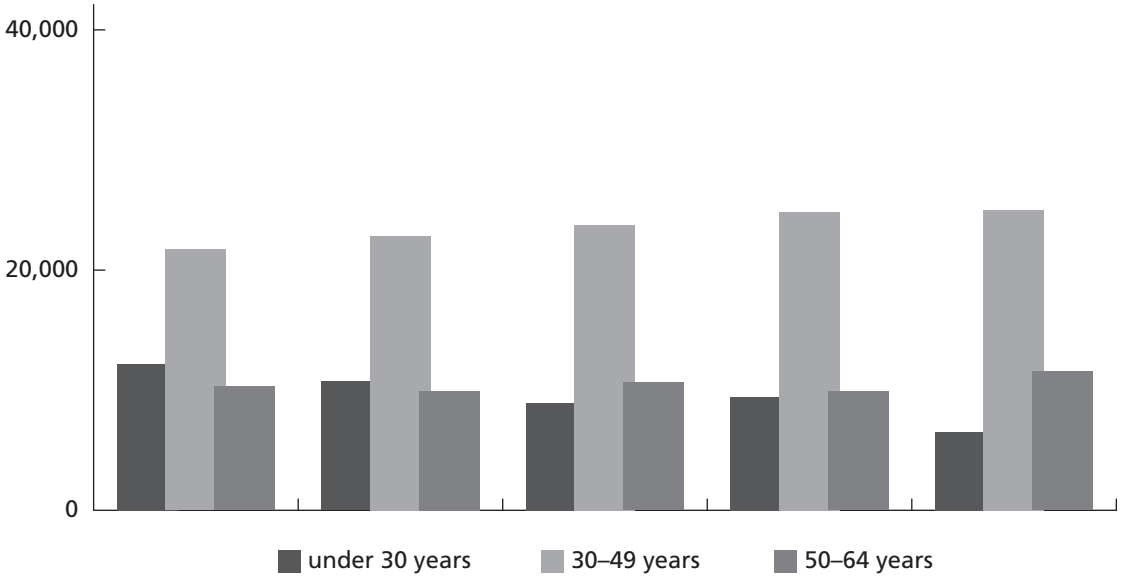


In Poland, job growth in the higher quintiles was much greater for women than for men (Figure 16). Of the 250,000 net new highly paid jobs created during the recession, four out of every five went to women. This reflects in particular the strongly gendered nature of public-sector employment in Poland – especially in education and health, where over three-quarters of employment is female. 'Teaching professionals in education' was the job contributing most to this female employment growth – over 70,000 net new jobs – while it recorded a net decline in employment for men. Other growing female jobs included a mix of public ('other professional' posts in public administration) and private (financial services and legal/accounting activities) professional jobs.

Age

Recessions tend to hit younger workers especially hard. Limited experience and opportunity to acquire workplace skills mean that their labour market attachment is often more tenuous than that of older workers (they are more likely to be in non-permanent work) and this can leave them more vulnerable to job loss than their older counterparts. So too can formal and informal applications of 'last-in, first-out' type redundancy policies.

Figure 17: Distribution of employment by age group and wage quintile, EU27, Q2 2008 (thousands)

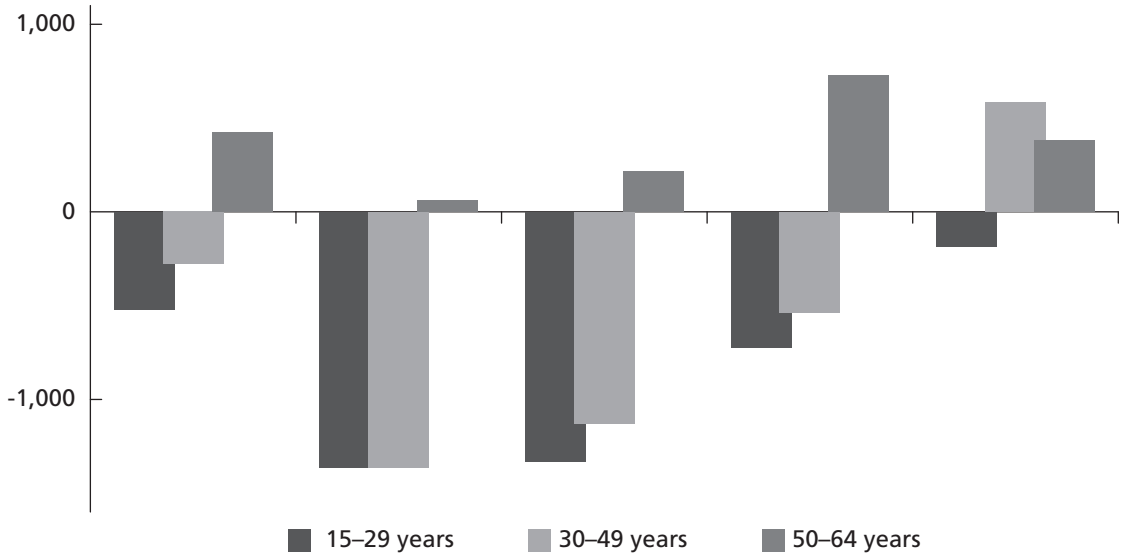


The distribution of younger workers across job quintiles reflects some of the disadvantages they face. In the second quarter of 2008, younger workers were twice as likely to be employed in the lowest-paid jobs as in the highest-paid jobs (Figure 17). By contrast, older workers were more evenly distributed across quintiles, with a small bias towards higher-paid jobs.

Compounding any inherent labour market disadvantages, recessions lead to a sharp fall-off in recruitment; this tends to impact disproportionately on younger applicants. By definition, all first-time job applicants are out of work. On average, they tend to remain so for much longer during and after recessions, with well-documented scarring effects on their future employability and earnings (Bell and Blanchflower, 2010).

Before the crisis, youth unemployment rates had been declining in the EU, falling from around 18% in 2000 to 15% by 2008, before rising to around 21% currently (data from Eurostat). They are currently over double the rates for those of the working age population (15–64 years of age) as a whole and are especially high in countries such as Spain (43%), Greece (37%) and Slovakia (36% in the fourth quarter of 2010).

Figure 18: Job loss/gain by age group and wage quintile, EU27, Q2 2008 to Q2 2010 (thousands)



As we see in Figure 18, employment loss has affected younger and core-age workers (those aged between 30 and 49 years) mainly in middle- and lower-middle ranked jobs. These categories of workers account for all net job loss in the EU between the second quarter of 2008 and the second quarter of 2010. Given that the figure characterises absolute employment change and that those aged under 30 years account for a much lower share of overall employment than core-age workers, their relative share of overall employment loss is much higher. Younger workers also suffered job losses across all quintiles and did not partake of any of the net employment gain in the highest-paid jobs.

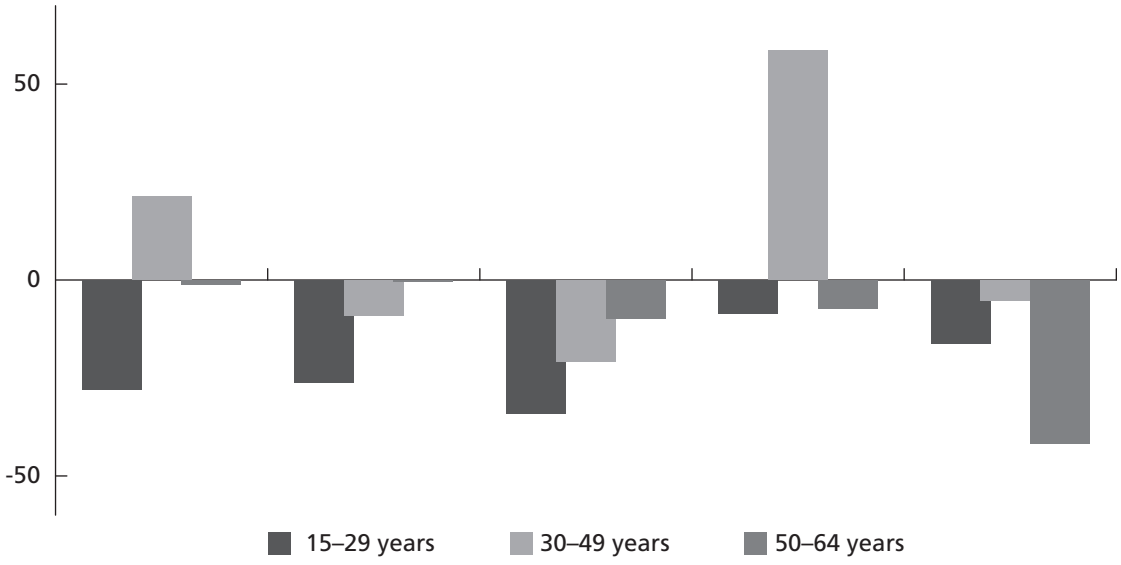
Perhaps the most striking feature is that employment of older people has been comparatively impervious to the recession, enjoying growth across all cohorts.[16] In Spain, for example, current employment rates for older workers are at 2006 levels and the peak quarter-to-quarter fall during the recession was 2.5 percentage points, much less than for the labour market as a whole and dramatically less than for their younger co-nationals.

Net employment growth for the older age category in the EU was skewed towards higher-paying jobs, with professional and associate professional jobs accounting for over half of the total net gains of 1.8 million jobs (compared with net losses respectively of over 4 million jobs in the under-30 age category, and of 2.7 million in the core-age category). But there were also gains in lower-paid jobs for older workers – for example, 240,000 new jobs in elementary occupations, which saw notable job loss for the young and core-age groups (a combined loss of 950,000 jobs).

[16] An important qualification is that because the charts breaking employment change down by age group are cross-sectional and break employment into age groups and job quintiles in two separate periods (Q2 2008 and Q2 2010), they include important cohort shifts as well as net employment loss/gain for each age group. The growth of the older worker category is augmented by the greater inflow of 48–49 year-olds than the outflow of 63–64 year-olds, for example. The decline of the younger age group also appears in starker relief for similar cohort reasons, though the effect in this case is the opposite.

Overall, there were net employment gains for older workers in 53 of the 88 NACE rev. 2.0 two-digit sectors, compared with 36 for core-age workers (between 30 and 49 years) and 22 for younger workers (those aged under 30). In the health sector, all net employment growth was enjoyed by older workers, while growth in education and residential care activities was more equally shared between older and core-age workers. The sectors in which employment growth was greater for core-age than for older workers tended to be in private services (management consultancy, civil engineering, other professional, scientific and technical activities at the higher end and food and beverages and buildings services at the lower end). Those in which older workers benefited most from employment growth tended to be in public services (health, education and social work activities).

Figure 19: Job loss/gain by age group and wage quintile, Czech Republic, Q2 2008 to Q2 2010 (thousands)



The less severe the scale of the recession in national labour markets, the more likely that employment growth in top-paid jobs was shared across the age cohorts. This was the case in Austria, Belgium, Germany, the Netherlands and Poland, though only in the latter did employment growth for younger and core-age workers outstrip that of older workers. On the other hand, employment destruction in Member States that experienced deeper adjustments – such as the Baltic States, Bulgaria and the Czech Republic – did not spare older workers. Contrary to the overall EU pattern, the Czech Republic saw a large decline in employment among older workers, especially in higher-paid jobs in mainly public administration and education; virtually all employment growth took place among core-age workers in low-paid and medium-high-paid jobs (Figure 19).

In summary, the recession impacted especially unfavourably on the employment levels of younger workers in the EU, while employment of older workers increased across the board but with a skew towards higher-paid jobs. The consequence of this, of course, is that the age profile of the EU workforce grew older while that of the growing ranks of the unemployed grew younger.

Foreign-born workers

Since soon after the oil crisis in the early 1970s, the EU – and its antecedents – has had a positive annual net migration balance with the rest of the world. In 2008, the EU labour market comprised around 12 million non-EU citizens as well as six million EU citizens working outside their country of birth. Migration to the EU rose quite dramatically in the early 2000s, to four migrants per 1,000 people in the population per annum. In 2004, this equated to 1.8 million people. Since the onset of the crisis, net migration to the EU is estimated to have declined sharply. In 2009 it stood at 1.9 persons per 1,000 of the population, but still remains positive (Eurostat, 2009). According to the EU LFS, employment levels of foreign workers have grown very marginally (by less than 1%) during the crisis, while those of native-born workers have borne the brunt of job losses (falling by 2.7%, between Q2 2008 and Q2 2010).

The most recent phase of immigration into Europe has been into countries that were formerly major sources of emigration – Cyprus, Ireland, Italy, Portugal and Spain – while the rate of growth of migrant populations has slowed in other traditional destinations such as Germany and France (Munoz de Bustillo and Anton, 2011). What have been the main factors behind the recent increase in immigration? On the demand side, a relatively healthy European economy in the decade up to 2008 and, on the supply side, the aftermath of the Yugoslav wars of the 1990s, economic crisis in Argentina and other South American countries in the early 2000s (resulting in large flows into Spain in particular), increased flows from new to older Member States before and after EU enlargement and increased flows from Africa into the southern European littoral. Clearly, geographical or cultural proximity has also played a role in directing immigrant flows to some countries rather than others, as have variations in the national regulation of immigrant flows and in the implementation of full freedom of movement for the newer Member States (the so-called transition arrangements).

Methodological considerations abound in relation to measuring the non-native working population; it is important to be clear about some of the decisions we took in relation to the brief analysis that follows. There are two questions in the EU LFS that capture the nationality of workers: each measures different things and therefore generates different estimates. One relies on country of birth (*countryb*), the other on citizenship (*nat*). We use 'country of birth', which conforms to the international standard definition of immigrant (Diez Guardia and Pichelmann, 2006), but note that it also tends to generate higher estimates for the migrant population than if the question about citizenship is used. (Citizenship is affected by naturalisation processes, which absorb proportions of the immigrant population in ways that vary markedly between Member States.)

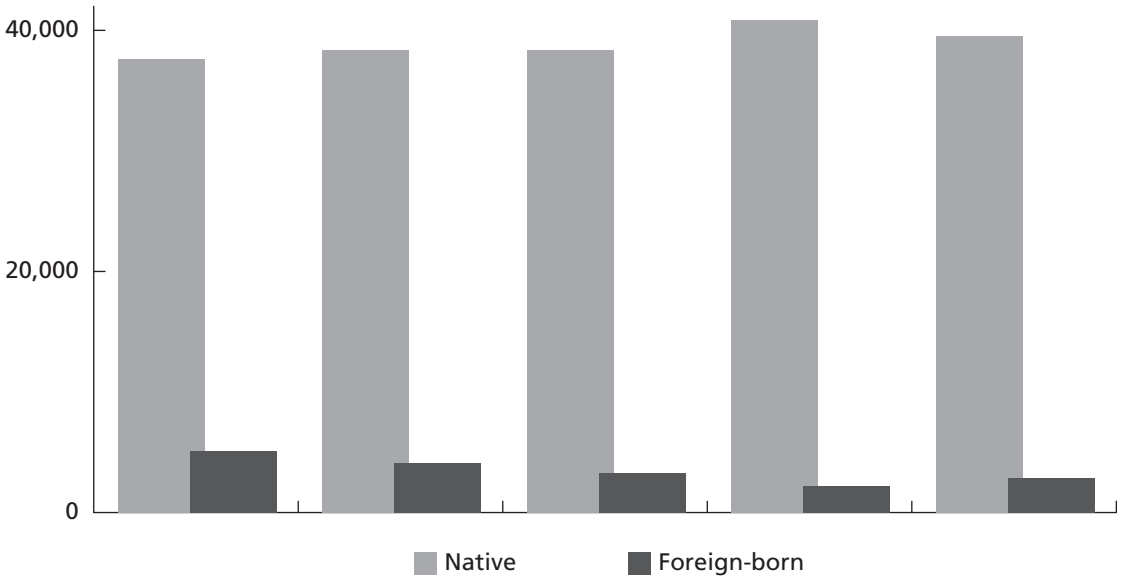
A general caveat on the analysis in this section is that estimating the non-native working population (in particular, changes in it) is fraught with difficulty for statistical reasons. These include:

- inadequate coverage of non-natives in population sampling frames;
- higher non-response rates;

- possible episodes of mass regularisation of immigrant workers (which are not always flagged in the data);[17]
- difficulties in covering the phenomenon because of, for instance, short-stay, return and circular migration.

One of the paradoxes of the cross-border movements of workers in Europe is that internal mobility remains comparatively weak despite freedom of movement being one of the core legal rights of EU citizens. Around 3.4% of EU-born workers work in a Member State other than that of their birth. The proportion of non-EU workers in the EU27 is twice as high (over 6.6% of the total in 2008)[18] as that of foreign EU nationals despite greater and in some cases growing legal obstacles to their incorporation into the labour force. During the crisis, however, this gap tended to diminish as the numbers of workers born outside the EU declined and those of foreign workers born in the EU increased. Again, the absolute figures are relatively marginal, so this can be considered only limited evidence of an increase in internal EU labour mobility at the expense of third-country immigration. It is, in any case, a preliminary estimate given that it relies on quarterly EU LFS data rather than more definitive annual data.

Figure 20: Distribution of employment by country of birth and wage quintile, EU27, Q2 2008 (thousands)

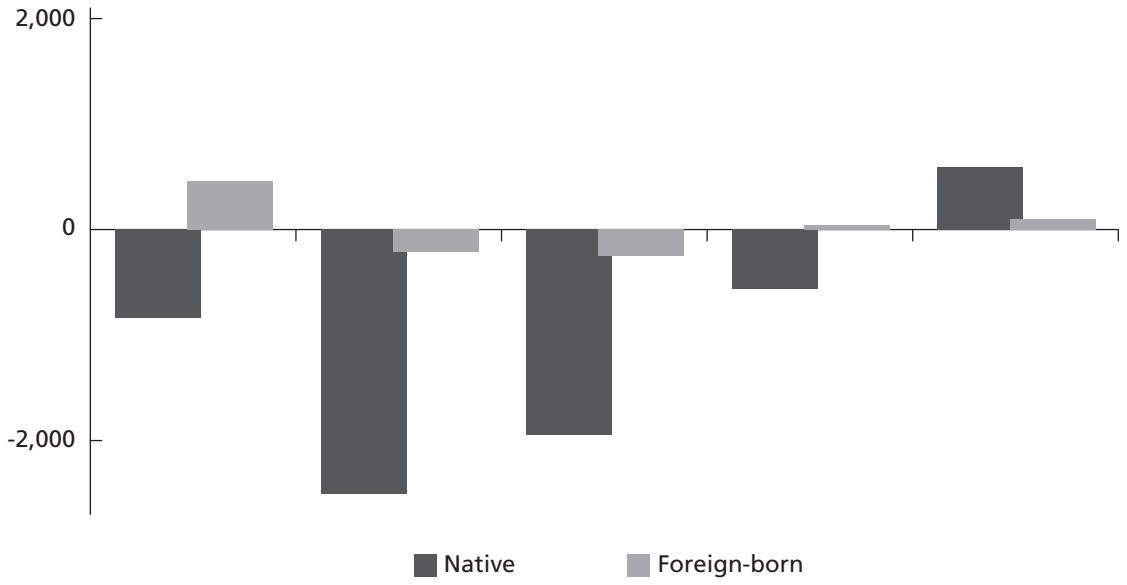


[17] This may in part explain the large rise of foreign-born workers in Italy recorded during the crisis.

[18] Some caution is required regarding indicated estimates of the proportion of foreign-born workers in the EU workforce due to partial data on the country of birth question from Germany, where all non-native-born workers were coded as 'non-response'. It does not make much sense to calculate EU aggregate employment shifts in foreign-born/native-born employment without accounting for the sizeable foreign-born population in the EU's most populous country; hence, our pragmatic solution is to reclassify 80% of the total German non-response figure as foreign-born workers (this equates to around 4.1 million persons, a conservative estimate given that the German foreign-born workforce was already estimated at 4.15 million in 2000). We then assign this total to two exclusive categories, foreign EU nationals and non-EU nationals, in proportion to their known ratio in the German non-citizen working population (the ratio being 42:58).

Overall, and excluding countries where the level of change was marginal, four countries reported a decline in foreign-born worker levels and 14 countries reported a gain. The foreign-born working population declined most over the period in Ireland (where it fell by 105,000) and Spain (a fall of 372,000). Meanwhile, the foreign-born working population rose most in Italy (by 405,000 persons),[19] the UK (136,000 workers) and Sweden. Employment gains for foreign-born workers took place mainly in low-paid jobs while declines were concentrated in medium-paid jobs, often in construction or manufacturing.

Figure 21: Job loss/gain for native- and foreign-born workers, by wage quintile, EU27, Q2 2008 to Q2 2010 (thousands)



The trend of growing employment in the bottom quintile for foreign-born workers was marked in several Member States – Austria, Belgium, Cyprus, Greece, Italy, Sweden and the UK – and occurred in conjunction with a sharp decline in native employment in the same quintile (in all countries except in the UK). This suggests a replacement of native by foreign-born employment. The jobs principally affected were in lower-level services jobs in household and personal services, retail, food and beverages, and agriculture.

Foreign-born workers are more likely to work in jobs in the lower quintiles than in the higher quintiles. Across the EU, there were nearly twice as many foreign-born workers in the lower two quintiles compared to the top two quintiles. The proportion of foreign-born workers in lower-paid jobs is especially high in the southern Member States (Figure 22). Conversely, their proportion in highly paid jobs is very high in newer Member States such as Poland and Romania, even though absolute levels of foreign workers remain very low in these countries. This appears to be related to the placement of professional staff in faster-growing post-accession countries.

[19] See footnote 17.

Figure 22: Pre-crisis foreign-born working population in EU27 – proportion of total employment and proportion in jobs in top two quintiles, Q2 2008 (%)

Source: EU LFS (authors' calculations)

The countries in which employment grew more or less across the quintiles for foreign-born workers were Belgium, Cyprus, Italy and Sweden – even if in all cases the growth was skewed towards lower quintiles. With German data unavailable, it is not possible to verify whether immigration policies favouring the entry of skilled foreign workers have been successful there in raising the educational/wage profile of new foreign-born labour market entrants. However, higher-quintile foreign-born employment has grown in the EU, if not spectacularly, and while being substantial in a knowledge-intensive services economy like Luxembourg, has been much lower overall than in bottom-quintile jobs.

Patterns of employment change during the recession: by employment status

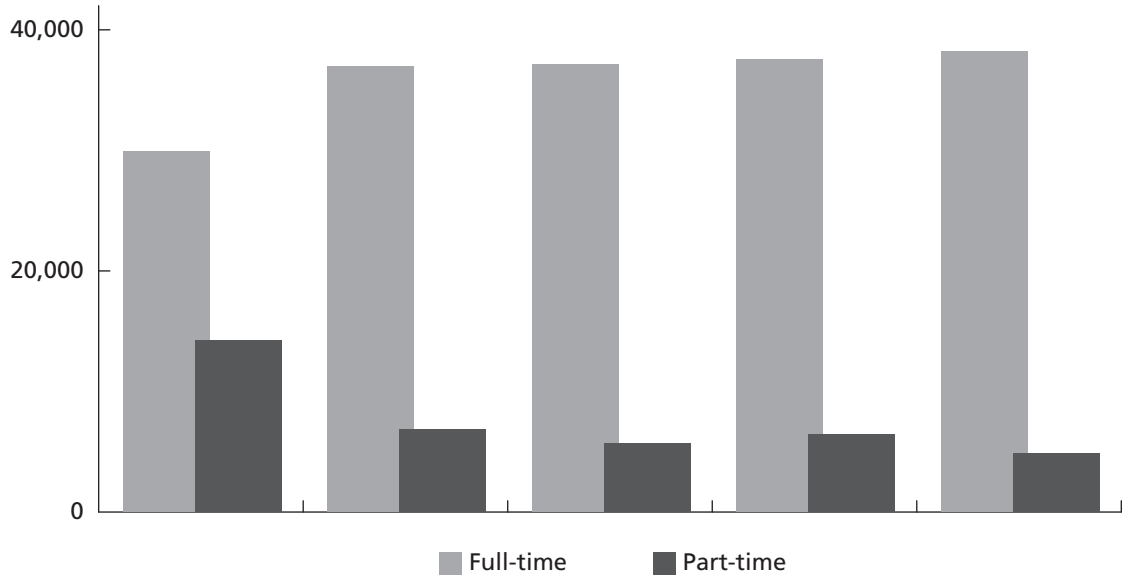
Self-employment and work on part-time and temporary contracts has become increasingly common in European labour markets in recent decades. However, in the years preceding the recession, these EU-wide trends were halted or even reversed. Of course, the EU average figures (both growth rates and levels) disguise significant variation between Member States, with some being strongly identified with one form or another of non-standard work – for example, Spain with fixed-term work, the Netherlands with part-time work. In the central and eastern European Member States (CEE), levels of part-time and fixed-term employment remain comparatively low while higher rates of self-employment are in large part related to higher shares of agricultural employment.

The consequences of the recession have been mixed as regards employment status. On the one hand, part-time employment has increased quite sharply (and this is not solely due to the increased employment of women relative to men); some replacement of full-time by part-time work may be another manifestation of labour hoarding and is possibly likely to be temporary in nature rather than permanent. On the other hand, the proportion of fixed-term employment fell – especially in the 2008–2009 phase of the recession – as non-renewal of fixed-term contracts was often the path of least resistance when dismissals were considered inevitable.

Part-time work

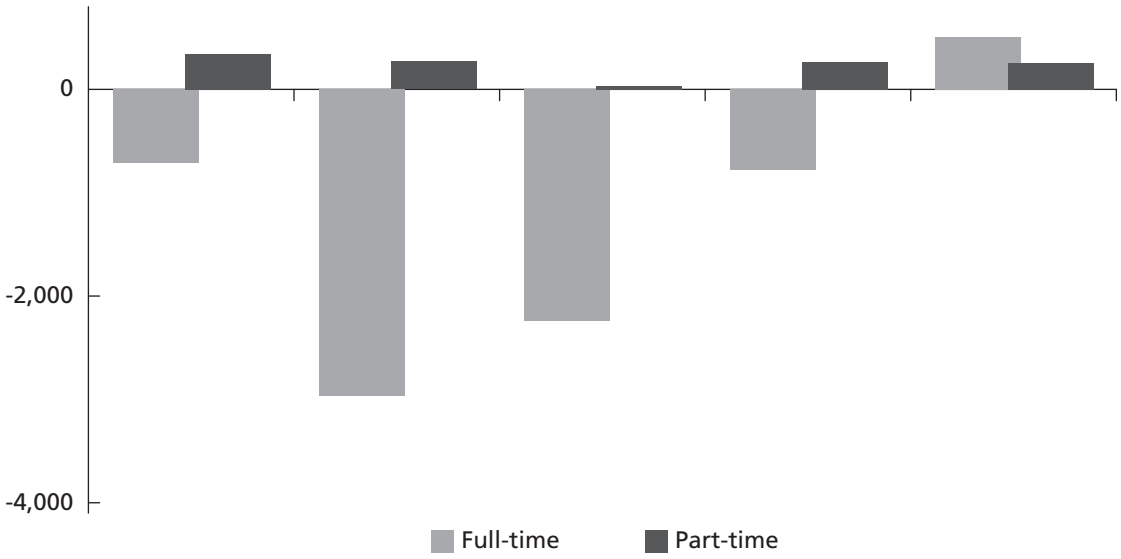
Despite the growth of part-time work, it still tends to be more prevalent among lower-paid jobs (partly as a result of part-time/full-time pay differentials). Before the crisis in the second quarter of 2008, the distribution of part-time workers in the EU27 was a simple and steep downward gradient across the quintiles (Figure 23).

Figure 23: Distribution of full- and part-time employment by wage quintile, EU27, Q2 2008 (thousands)



Part-time employment grew in all five quintiles between the second quarter of 2008 and the second quarter of 2010 (Figure 24). This growth was clearly polarised, with gains more evident in low-paid jobs and in highly paid jobs and marginal growth only in the middle. In the earlier Eurofound analysis of the 1995–2006 employment expansion in Europe, part-time growth had been similarly distributed, with the only difference being a more distinct skewing towards low-paid employment.

Figure 24: Loss and gain of full-/part-time jobs by wage quintile, EU27, Q2 2008 to Q2 2010 (thousands)

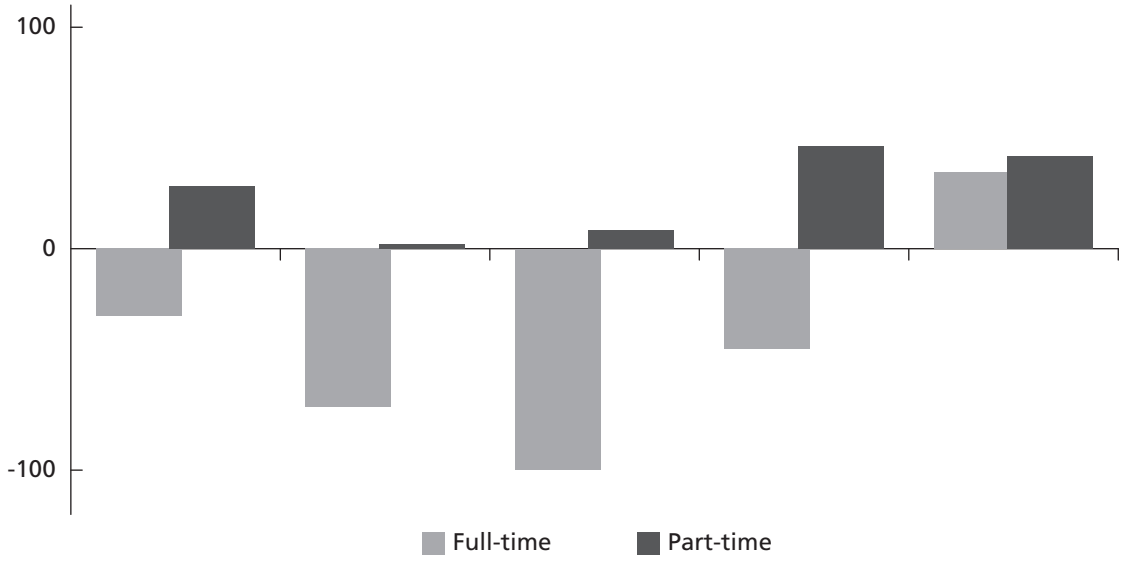


One other difference emerges, however, when we break down part-time growth by gender. Of the 1.2 million new part-time jobs created, as many were male as were female despite part-time work being overwhelmingly female in the EU (more than 80% of part-time jobs being held by females). New male part-time employment has been created primarily in lower-quintile jobs in agriculture, food and beverages and in building and landscape services, while over two-thirds of female part-time employment growth was in higher-paid jobs in education, health and professional services.[20] Thus the polarisation of part-time employment took place along two axes – one of gender and one of pay.

Part-time employment grew across the quintiles in Austria, Belgium, Hungary, the Czech Republic and Slovenia. In the latter three CEE countries, this growth comes from a very low base (5% or less of total employment). In Estonia and Ireland, sharp falls in full-time employment were contrasted with modest gains for part-time employment, again across jobs at all levels of pay. For some of the larger Member States, including Italy, France and the UK, part-time growth was strongest in low-paid employment but with some countervailing growth in well-paid jobs in France and the UK. Only in Sweden was part-time employment destroyed to any significant extent and nearly all in the two lowest quintiles (mainly residential care and social work and, to a lesser extent, some retail jobs).

[20] A caveat here is that the job may be a well-paid job from our Jobs Project perspective – that is, characterised by high mean hourly pay across all workers in the job – but may be less well paid and attractive in its part-time form.

Figure 25: Loss of full-/part-time jobs by wage quintile, the Netherlands, Q2 2008 to Q2 2010 (thousands)



In the Netherlands – the great 'national experiment' in part-time work – the long-standing shift from full-time to part-time work intensified during the recession. Nearly 200,000 full-time jobs were lost, while 100,000 new part-time jobs were added between the second quarter of 2008 and the second quarter of 2010. Equally remarkable is that growth in part-time employment has been very much skewed to the top, while losses in full-time employment have been greatest in medium-paid jobs (Figure 25). Part-time workers now account for over 48% of employment in the Netherlands. The normalisation of part-time work has – at least in this Member State and during the recession – been accompanied by an upgrading rather than a downgrading of this non-standard form of work.

Self-employment

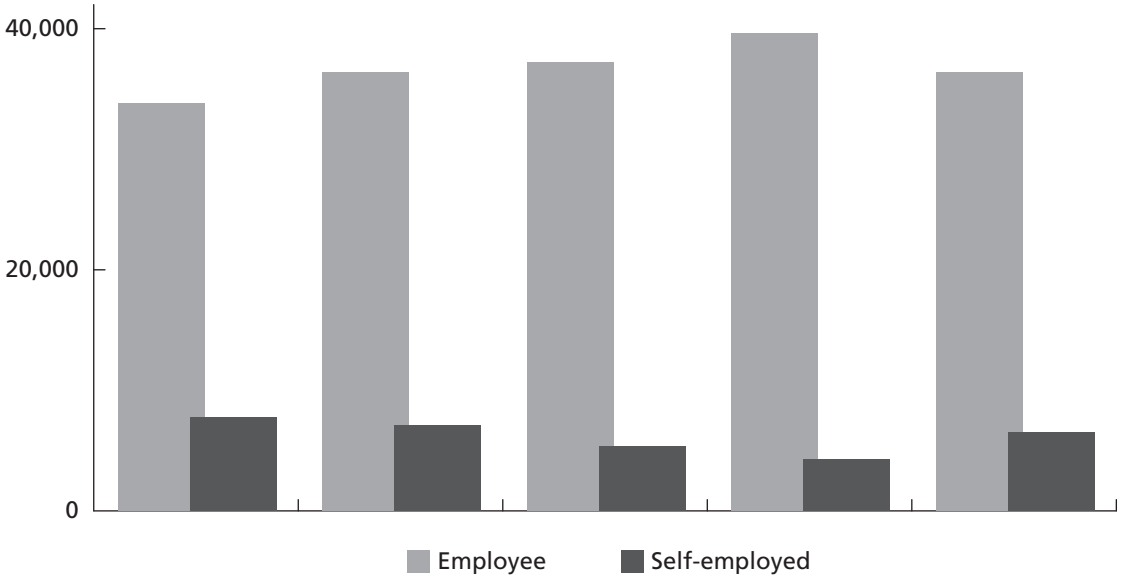
During the 1995–2006 employment expansion (addressed by the earlier Eurofound Jobs Project analysis), over two million net new self-employed jobs were created. The profile of this growth was monotonically top-skewed at aggregate EU level (for the 23 Member States covered).[21] Over half the total growth in self-employment took place in top-quintile jobs (primarily in the liberal professions), while job destruction took place in lower-paid jobs (primarily in agriculture). Despite these positive developments, those in self-employment at the outset of the recession were more likely to be in lower-paying jobs. However, the polarised distribution in the chart is indicative of the heterogeneity of self-employment, with high numbers of agricultural workers (predominantly self-employed) in lower quintiles and self-employed professionals and owner/managers in top quintiles.

During the recession, levels of self-employment in the EU declined by around 1%, relatively less than the labour market as a whole. The types of jobs affected tended to be somewhat different from those in the preceding expansion: for example, agricultural self-employment declined, but not

[21] This means that, in terms of the quintile charts, there is a clear linear pattern of the bars with lowest growth at the bottom of the income structures (the bars on the left-hand side of the chart), middling growth in the middle and most growth at the top. In other words, it is possible to draw a – more or less – upward-sloping line across the tops of the five bars.

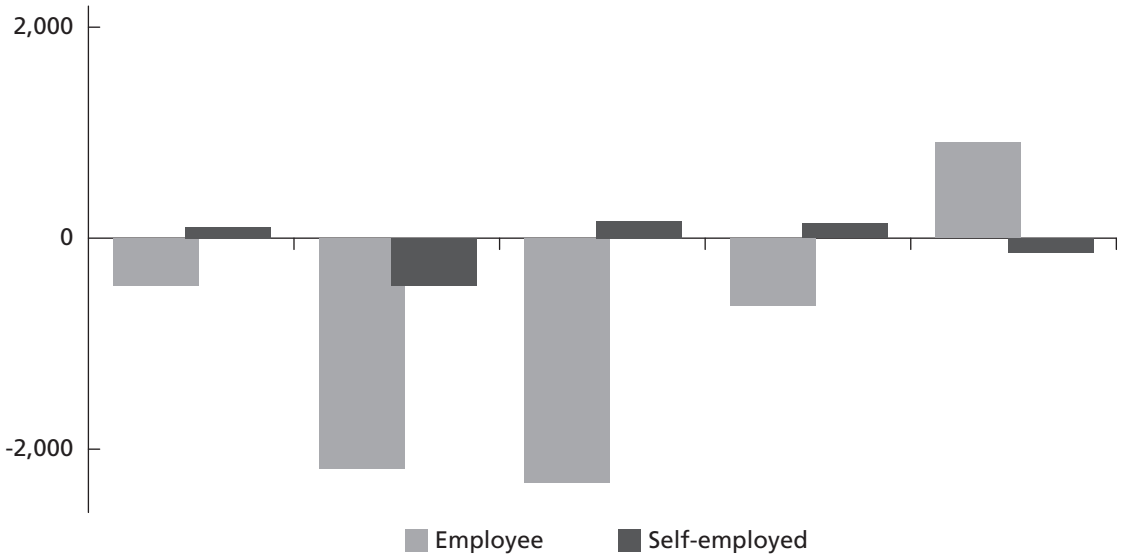
dramatically so. They also tended to vary from country to country and as a result the pattern of change by quintile lends itself less easily to interpretation.

Figure 26: Distribution of (self-)employment by wage quintile, EU27, Q2 2008 (thousands)



Self-employed job losses were greatest in medium-low paid jobs – mainly in construction and to a lesser extent in manufacturing. The other quintiles showed relatively small gains and losses.

Figure 27: Job loss and gain of employees and self-employed, by wage quintile, EU27, Q2 2008 to Q2 2010 (thousands)



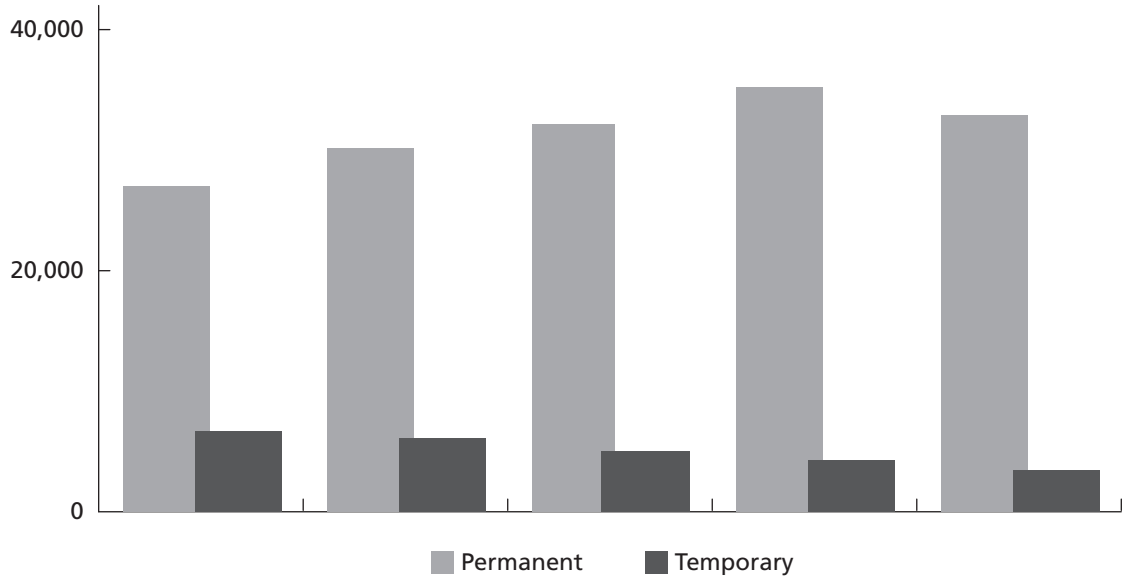
One noteworthy development is that job losses took place among the one-third of the self-employed who employed others, while the ranks of self-employed without employees actually increased. Possible explanations are that contraction or collapse of small businesses – notably in manufacturing, construction and retail – was one of the main contributors to the decline in self-employment and this is reflected in employment decline in the top quintile. Another possible impact of the crisis was that many self-employed people who employed others let go of staff and reverted to sole operator status. Such a hypothesis is supported by within-job shifts in sector categories such as professional, scientific and technical services (including legal, accounting professionals, architects and consultants) where a decline of around 5% in self-employed persons who employed others was accompanied by an increase of around 12% in sole operators.

The effect of the crisis on self-employment has been undramatic at EU level but there have been notable rises in some Member States – France, Slovakia and the Czech Republic, skewed sharply to lower-paid jobs in the latter and combined with a fall-off of dependent employment in the same quintiles. Job losses in self-employment have been relatively greatest in Portugal as well as those countries that experienced booms and subsequent busts in construction (the Baltic States, Ireland and Spain).

Employment on fixed-term contracts

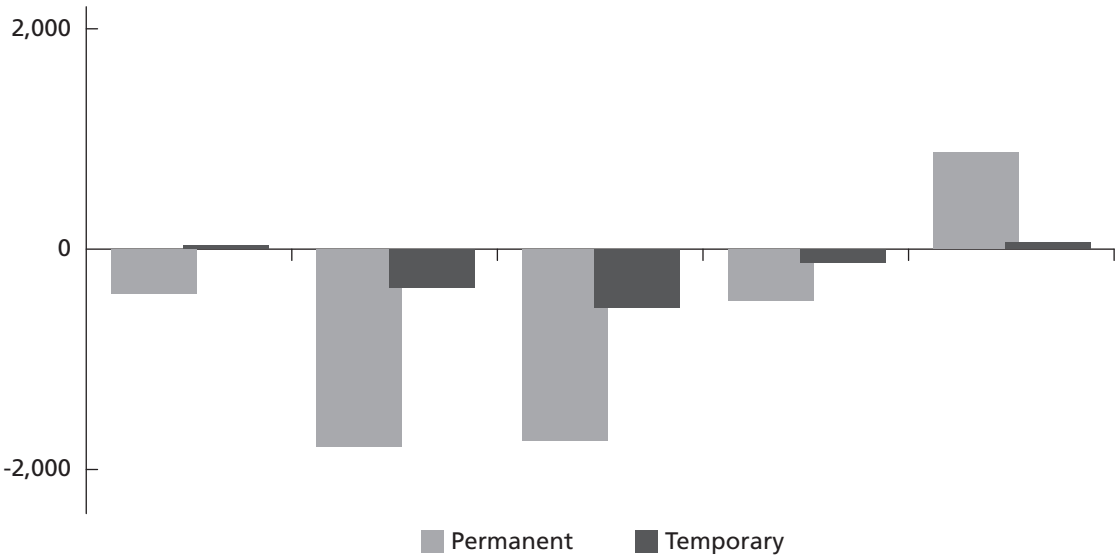
Employment on fixed-term contracts grew more or less evenly across the quintiles in the pre-crisis period from 1995 onwards. It also grew faster relative to overall employment, implying a shift in share away from permanent to temporary work; as mentioned, however, much of this shift occurred in earlier rather than more recent years.

Figure 28: Distribution of employment by contract type and wage quintile, EU27 (thousands)



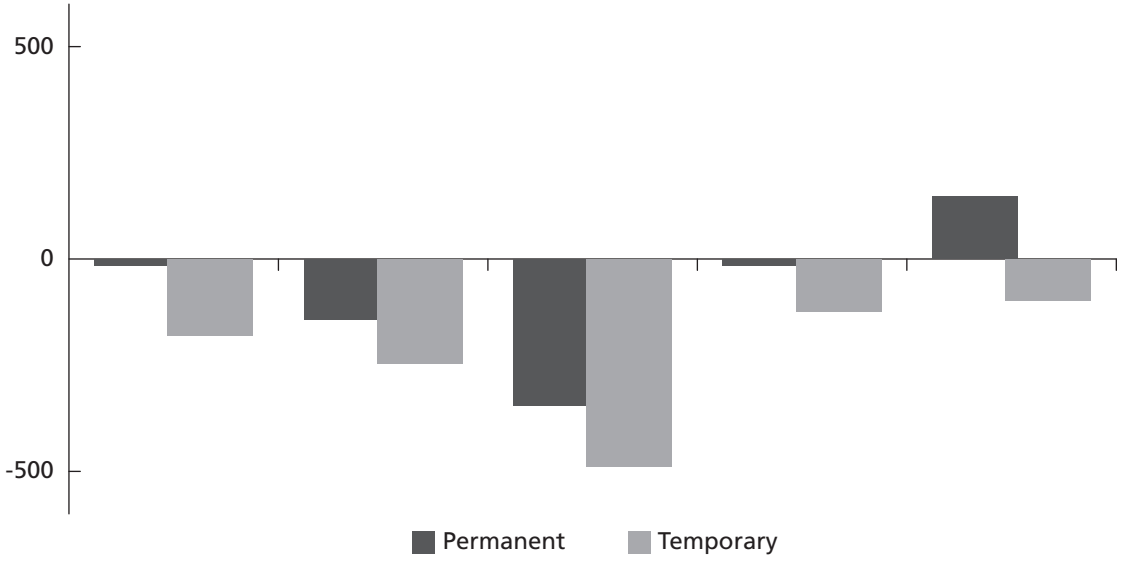
As with other forms of non-standard or atypical work, the distribution of jobs in the second quarter of 2008 was skewed towards lower-paid jobs, though – as already noted in the case of part-time work – pay differentials favouring permanent workers tend to push jobs with a high proportion of temporary workers into the lower quintiles.

Figure 29: Job loss and gain by contract type and wage quintile, EU27, Q2 2008 to Q2 2010 (thousands)



During the recession, fixed-term employment was one of the first forms of employment to suffer and fell especially sharply in (lower-)medium-paid jobs. Modest gains were registered in top and bottom quintiles (indicating polarised growth).

Figure 30: Job loss and gain by contract type and wage quintile, Spain, Q2 2008 to Q2 2010 (thousands)



All the net destruction of fixed-term employment was the result of developments in two sectors (manufacturing and construction) and one country (Spain). If we exclude Spain, the category of fixed-term employment added nearly 250,000 jobs across the EU during the crisis. The fall in the proportion of fixed-term employment in Spain from 34% to 25% (between 2006 and 2009) has left Poland as the Member State with the highest proportion of workers on fixed-term contracts (27%).

The time profile of employment changes for fixed-term employment gives some account both of its sensitivity to the business cycle and its acute vulnerability during the early phase of a recession. Between the second quarter of 2008 and the second quarter of 2009, fixed-term employment declined by 1.7 million jobs before recovering to record gains of around half this amount in the following 12 months, resulting in a net creation of 850,000 fixed-term jobs between the second quarter of 2009 and the second quarter of 2010.[22] Thus the data suggest that – as the recovery progresses but employers continue to exercise caution in recruiting permanent staff – there may be a continued increase in temporary jobs in the near future. Since the third quarter of 2009, the majority of workers in the EU who have been in their jobs for fewer than 12 months are working on fixed-term rather than permanent contracts.

[22] The quarter-to-quarter movements are even more abrupt, though some of this is due to seasonality. A large concentration of the decline in temporary employment took place in the six-month period between the third quarter of 2008 and the first quarter of 2009 and amounted to over three million net job losses.

4 Conclusions

This report describes the shifting structure of the European labour market over the course of the Great Recession. The basic unit used to describe this structural change is a job, defined as an occupation in a sector. It was argued that a jobs-based approach was useful from both a conceptual and policy perspective. The wage was used to assign a qualitative dimension to the jobs. While the report has interpreted 'quality' quite narrowly, taking it to refer mainly to the pecuniary value of the job, it does note that the concept incorporates other aspects of job quality.

The key to a successful implementation of the jobs-based approach is to obtain wage data of reasonable quality. It would appear that the EU LFS wage data used are largely compatible with EU-SILC as regards the wage ranking of occupations. However, the overall plausibility of most of the results provides perhaps the most convincing testimony that the wage data used in this way and at this level of aggregation are generally sound.

We would argue that the method and data now at hand can make a significant contribution to the description and analysis of changes in the structure of European employment in coming years. There is much to suggest that further changes in both the quantity and quality of jobs are imminent. Some of these changes are reasonably predictable. For example, some Member States' governments have announced their intention to significantly restructure the public sector. Other, private-sector developments, related both to further employment adjustment lags following on from the recession and the type of jobs that will be created when a significant employment recovery arises, are appreciably more uncertain. In such a situation, the capability of the jobs methodology to provide very timely information on the nature of changes in the job structure on a large EU-wide dataset should be a valuable instrument for policy analysis.

Possibly the most interesting empirical conclusions are to be drawn by comparing the results of the overall EU-wide shifts between 2008 and 2010 with the previous Eurofound study of the patterns of job expansion between 1998 and 2007. Up until the recession, the EU saw strong overall employment growth but with appreciably higher growth in the top (fifth) wage quintile, followed by the fourth quintile. However, there was also appreciable growth in the bottom quintile. Employment growth in the second and third quintiles was low. This pattern was characterised as upgrading with some polarisation. Thus, compared to the strong job growth in the US a decade earlier, growth in the EU was somewhat less polarised, with the top jobs showing clearly more growth than the jobs at the bottom.

It is very interesting that the period between 2008 and 2010, one of rapid employment contraction, exhibits a similar pattern to that of the preceding decade in terms of the distribution of employment shifts across the wage structure. The change in the wage structure (and possibly other dimensions of the job) during the recession indicate an acceleration of the previous trends. Net job changes are positive and largest in the top (fifth) quintile, followed by the fourth, first, third and second – a similar order to that of the previous decade.

During the preceding decade of job growth, the polarisation tendency was accounted for largely by the growth of services jobs at the two ends of the wage distribution. However, it is the massive job loss in manufacturing and construction – and the ensuing collapse of the middle-ranking jobs – that has driven the accentuation of the polarisation tendency through the recession. While some of the fall in manufacturing employment in the middle quintile is in high-technology sectors (in France, Slovakia, Slovenia and Sweden, for example), most of the employment decline in manufacturing in the middle quintile is in low-technology manufacturing, such as food processing and textiles.

Construction is the other sector accounting for job loss in the middle. Just as the construction boom held up the middle-ranking quintiles in the preceding decade, the collapse of construction in many countries accentuates the decline of the middle, compared with a long-term trend. The decrease in manufacturing is less likely to be cyclical, though the continued significant growth in high-technology manufacturing in Germany (mostly in the well-paid top quintile) is also very striking.

The persistence of job growth in the top quintile, while not occurring in all Member States, is striking. Even in Ireland and Spain, countries experiencing some of the greatest decline in employment in Europe, the number of jobs in the top quintile increased. The most significant exception to this story is Italy.

As in the preceding decade, job growth in the top was due mainly to an increase in knowledge intensive services (KIS). These include both public services (mainly in education) and private services (business services). Since the recession, the relative importance of public services for growth in the top quintile has increased.

Growth in top-paid jobs was overwhelmingly in KIS, while the decline in numbers in the lowest-paid jobs was comparatively modest. Other factors contributing to declining employment in the middle of the job-wage distribution include the polarised distribution of employment change for part-time and temporary work. In addition, shifts in gender composition of the labour force have been polarising: women tend to be under-represented in the middle of the job-wage distribution and men, who suffered greater employment losses, over-represented.

Though generally associated with the decline of manufacturing, perhaps the most important factor behind the 'disappearing middle' is the polarisation of services-sector employment. Services tend to generate employment at the top and the bottom of the employment structure but comparatively little in middle-ranking jobs. They cannot therefore be relied on to fill the gap created by the decline in manufacturing. In fact, they are one of the polarising forces in the labour market whose importance will continue to grow. This is likely to engender greater wage inequality. It also has the potential to increasingly segregate employment in low- and high-quality 'blocs', so limiting possibilities for career mobility for those in lower-end employment and thereby exacerbating problems of job-skills mismatch and over-qualification.

Women fared better on the labour market than men during the recession. They had also benefitted most from employment growth during the preceding decade. The employment lost in construction and manufacturing was largely male-dominated; by contrast, the few sources of – generally high quality – employment growth were in female-dominated jobs in health and education. Four 'male' jobs were lost for every one 'female' job during the crisis, though the sharply gendered distribution of losses at the beginning has tended to give way to a more equal pattern of loss in the later stages of the recession and during the recovery. Overall, the employment shifts show a strongly polarised development for men but an upgrading pattern for women.

The recession has made the European workforce older. Perhaps one of the most striking features of this recession is the stability of employment of older workers. Indeed, the recession has seen a significant increase in employment among those aged between 50 and 64 years. The jobs data reveal that while employment of older workers has increased in all wage quintiles, it was mainly located at either end, but particularly at the top. Younger workers were the most exposed to the effects of the crisis, their numbers declining in all quintiles.

The picture on employment status is mixed. Most of the net fall in temporary employment in the EU is attributable to developments in the Spanish construction sector. Excluding Spain, temporary work grew over the period covered, and has grown especially rapidly since 2009. Part-time work has also expanded in all quintiles with the greatest growth in the top and bottom quintiles. Interestingly, the growth in the number of part-time jobs was equally distributed among men and women. New part-time employment for men has been created primarily in lower-quintile jobs in agriculture, food and beverages and in building and landscape services. By contrast, over two-thirds of the growth in female part-time employment was in higher-paid jobs in education, health and professional services. While the Netherlands already has a very large proportion of part-time employment, it grew remarkably during the recession, with nearly 200,000 full-time jobs being lost but 100,000 new part-time jobs being added. These jobs were at both ends of the income distribution, but significantly more were in higher-paid quintiles.

There has been some fall-off in the levels of foreign-born workers employed in the EU27. Again, however, this has been heavily influenced by developments in the construction sector, which tends to have a mobile workforce and where booming pre-crisis demand in some Member States encouraged an increase in the proportion of foreign-born workers. If we look beyond those countries where construction sector declines were the dominant vector of labour market change, we can see high levels of growth of employment of non-native workers in Belgium, Cyprus, Italy and Sweden. Such growth was more likely to be in lower-paid jobs, notably so in Italy.

These turbulent times are likely to continue. The recession has already changed somewhat the pattern of job growth compared with the decade before – from one of upgrading with some polarisation to stronger polarisation and some upgrading. As most of the growth at the top of the income structure was attributable to public-sector jobs, one might expect the impending restructuring of public sector employment in several Member States to lead to even more downgrading. Perhaps the most interesting and certainly the most crucial matter lies in what the recovery of employment in the private sector might bring to the structure of employment. In the aftermath of the massive destruction of jobs in this Great Recession, what type of jobs will be created between now and 2020? The European Jobs Monitor offers a means of monitoring this on an ongoing basis.

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Annex 1: Employment change in EU27 2008–2010

Table A1: Jobs with the largest employment decline, Q2 2008 to Q2 2010

ISCO		NACE		Quintiles		Employment levels and decline (thousands)			
(2-digit)	Occupation	(2-digit)	Sector	Wage	Education	2008 Q2	2010 Q2	Decline	Decline (%)
71	Extraction and building trades workers	43	Specialised construction activities	2	2	6,365	5,518	-847	-13.3
71	Extraction and building trades workers	41	Construction of buildings	3	1	3,252	2,920	-332	-10.2
93	Labourers in mining, construction, manufacturing and transport	43	Specialised construction activities	2	1	521	272	-250	-47.8
93	Labourers in mining, construction, manufacturing and transport	41	Construction of buildings	2	1	804	631	-172	-21.4
82	Machine operators and assemblers	25	Manufacture of fabricated metal products, except machinery and equipment	2	2	607	439	-169	-27.8
12	Corporate managers	43	Specialised construction activities	5	4	394	234	-161	-40.8
52	Models, salespersons and demonstrators	47	Retail trade, except of motor vehicles and motorcycles	1	3	8,617	8,466	-151	-1.8
72	Metal, machinery and related trades workers	25	Manufacture of fabricated metal products, except machinery and equipment	3	2	1,658	1,517	-141	-8.5
74	Other craft and related trades workers	14	Manufacture of wearing apparel	1	1	752	639	-114	-15.1
21	Physical, mathematical and engineering science professionals	43	Specialised construction activities	5	5	309	197	-112	-36.2
74	Other craft and related trades workers	31	Manufacture of furniture	2	2	663	552	-111	-16.8
71	Extraction and building trades workers	42	Civil engineering	3	1	500	399	-101	-20.2
41	Office clerks	69	Legal and accounting activities	3	4	944	845	-98	-10.4
42	Customer services clerks	64	Financial service activities, except insurance and pension funding	4	4	720	622	-98	-13.6
82	Machine operators and assemblers	14	Manufacture of wearing apparel	1	1	421	323	-98	-23.2
51	Personal and protective services workers	86	Human health activities	2	3	2,486	2,388	-98	-3.9
61	Market-oriented skilled agricultural and fishery workers	46	Wholesale trade, except of motor vehicles and motorcycles	1	1	119	23	-96	-80.9
83	Drivers and mobile-plant operators	52	Warehousing and support activities for transportation	3	2	635	540	-95	-14.9

ISCO		NACE		Quintiles		Employment levels and decline (thousands)			
(2-digit)	Occupation	(2-digit)	Sector	Wage	Education	2008 Q2	2010 Q2	Decline	Decline (%)
41	Office clerks	43	Specialised construction activities	3	3	558	471	-87	-15.7
41	Office clerks	47	Retail trade, except of motor vehicles and motorcycles	3	3	1,051	968	-84	-8.0

Source: EU LFS (authors' calculations)

Table A2: Jobs with the largest employment gain, Q2 2008 to Q2 2010

ISCO		NACE		Quintiles		Employment levels and gain (thousands)			
(2-digit)	Occupation	(2-digit)	Sector	Wage	Education	2008 Q2	2010 Q2	Gain	Gain (%)
51	Personal and protective services workers	87	Residential care activities	2	3	1,582	1,868	287	18.1
23	Teaching professionals	85	Education	5	5	8,176	8,397	221	2.7
32	Life science and health associate professionals	86	Human health activities	4	5	3,974	4,187	213	5.4
22	Life science and health professionals	86	Human health activities	5	5	2,626	2,789	163	6.2
21	Physical, mathematical and engineering science professionals	62	Computer programming, consultancy and related activities	5	5	1,020	1,166	146	14.3
92	Agricultural, fishery and related labourers	1	Crop and animal production, hunting and related service activities	1	1	1,229	1,360	131	10.7
24	Other professionals	84	Public administration and defence; compulsory social security	5	5	1,961	2,090	129	6.6
33	Teaching associate professionals	85	Education	4	4	1,681	1,806	125	7.5
51	Personal and protective services workers	85	Education	2	3	1,235	1,347	112	9.1
24	Other professionals	88	Social work activities without accommodation	4	5	319	429	110	34.5
91	Sales and services elementary occupations	81	Services to buildings and landscape activities	1	1	1,981	2,089	109	5.5
91	Sales and services elementary occupations	97	Activities of households as employers of domestic personnel	2	1	1,829	1,937	108	5.9
51	Personal and protective services workers	56	Food and beverage service activities	1	2	4,397	4,503	107	2.4
72	Metal, machinery and related trades workers	33	Repair and installation of machinery and equipment	4	2	435	537	101	23.3
34	Other associate professionals	66	Activities auxiliary to financial services and insurance activities	4	4	511	611	100	19.5
34	Other associate professionals	87	Residential care activities	3	4	481	579	98	20.3
41	Office clerks	86	Human health activities	3	3	793	891	97	12.3

ISCO		NACE		Quintiles		Employment levels and gain (thousands)			
(2-digit)	Occupation	(2-digit)	Sector	Wage	Education	2008 Q2	2010 Q2	Gain	Gain (%)
12	Corporate managers	70	Activities of head offices; management consultancy activities	5	5	150	248	97	64.8
21	Physical, mathematical and engineering science professionals	35	Electricity, gas, steam and air conditioning supply	5	5	150	226	76	50.4
93	Labourers in mining, construction, manufacturing and transport	42	Civil engineering	2	1	178	252	74	41.8

Source: EU LFS (authors' calculations)

Table A3: Employment shifts in jobs with greatest employment, Q2 2008 to Q2 2010

ISCO		NACE		Quintiles		Employment levels and change (thousands)			
(2-digit)	Occupation	(2-digit)	Sector	Wage	Education	2008 Q2	2010 Q2	Change	Change (%)
52	Models, salespersons and demonstrators	47	Retail trade, except of motor vehicles and motorcycles	1	3	8,617	8,466	-151	-1.8
23	Teaching professionals	85	Education	5	5	8,176	8,397	+221	+2.7
61	Market-oriented skilled agricultural and fishery workers	1	Crop and animal production, hunting and related service activities	1	1	6,795	6,825	+30	+0.4
71	Extraction and building trades workers	43	Specialised construction activities	2	2	6,365	5,518	-847	-13.3
51	Personal and protective services workers	56	Food and beverage service activities	1	2	4,397	4,503	+107	+2.4
32	Life science and health associate professionals	86	Human health activities	4	5	3,974	4,187	+213	+5.4
83	Drivers and mobile-plant operators	49	Land transport and transport via pipelines	3	2	3,834	3,776	-57	-1.5
34	Other associate professionals	84	Public administration and defence; compulsory social security	4	4	2,991	2,926	-64	-2.1
71	Extraction and building trades workers	41	Construction of buildings	3	1	3,252	2,920	-332	-10.2
22	Life science and health professionals	86	Human health activities	5	5	2,626	2,789	163	+6.2
41	Office clerks	84	Public administration and defence; compulsory social security	3	4	2,591	2,545	-46	-1.8
51	Personal and protective services workers	86	Human health activities	2	3	2,486	2,388	-98	-3.9
13	General managers	47	Retail trade, except of motor vehicles and motorcycles	3	2	2,369	2,308	-61	-2.6
24	Other professionals	84	Public administration and defence; compulsory social security	5	5	1,961	2,090	+129	+6.6
91	Sales and services elementary occupations	81	Services to buildings and landscape activities	1	1	1,981	2,089	+109	+5.5

ISCO		NACE		Quintiles		Employment levels and change (thousands)			
(2-digit)	Occupation	(2-digit)	Sector	Wage	Education	2008 Q2	2010 Q2	Change	Change (%)
51	Personal and protective services workers	84	Public administration and defence; compulsory social security	4	3	2,051	2,061	+10	+0.5
91	Sales and services elementary occupations	97	Activities of households as employers of domestic personnel	2	1	1,829	1,937	+108	+5.9
51	Personal and protective services workers	87	Residential care activities	2	3	1,582	1,868	+287	+18.1
51	Personal and protective services workers	88	Social work activities without accommodation	1	2	1,850	1,851	0	0.0
51	Personal and protective services workers	96	Other personal service activities	1	3	1,817	1,842	+25	+1.4
72	Metal, machinery and related trades workers	46	Wholesale and retail trade and repair of motor vehicles and motorcycles	2	2	1,825	1,814	-11	-0.6
33	Teaching associate professionals	85	Education	4	4	1,681	1,806	+125	+7.5
34	Other associate professionals	46	Wholesale trade, except of motor vehicles and motorcycles	4	4	1,767	1,719	-48	-2.7
72	Metal, machinery and related trades workers	25	Manufacture of fabricated metal products, except machinery and equipment	3	2	1,658	1,517	-141	-8.5
34	Other associate professionals	47	Retail trade, except of motor vehicles and motorcycles	4	3	1,431	1,446	+15	+1.0
24	Other professionals	69	Legal and accounting activities	5	5	1,386	1,389	+3	+0.2
92	Agricultural, fishery and related labourers	1	Crop and animal production, hunting and related service activities	1	1	1,229	1,360	+131	+10.7
51	Personal and protective services workers	85	Education	2	3	1,235	1,347	+112	+9.1
1	Armed forces	84	Public administration and defence; compulsory social security	5	3	1,344	1,339	-5	-0.4
41	Office clerks	46	Wholesale trade, except of motor vehicles and motorcycles	3	3	1,318	1,237	-81	-6.1
91	Sales and services elementary occupations	85	Education	1	1	1,239	1,188	-51	-4.1
21	Physical, mathematical and engineering science professionals	62	Computer programming, consultancy and related activities	5	5	1,020	1,166	+146	+14.3
21	Physical, mathematical and engineering science professionals	71	Architectural and engineering activities; technical testing and analysis	5	5	1,147	1,158	+11	+1.0
74	Other craft and related trades workers	10	Manufacture of food products	1	1	1,136	1,075	-61	-5.4
13	General managers	56	Food and beverage service activities	2	1	1,095	1,061	-34	-3.1
91	Sales and services elementary occupations	84	Public administration and defence; compulsory social security	2	1	1,054	1,043	-11	-1.0

ISCO		NACE		Quintiles		Employment levels and change (thousands)			
(2-digit)	Occupation	(2-digit)	Sector	Wage	Education	2008 Q2	2010 Q2	Change	Change (%)
42	Customer services clerks	47	Retail trade, except of motor vehicles and motorcycles	1	2	1,053	1,033	-20	-1.9
41	Office clerks	64	Financial service activities, except insurance and pension funding	4	4	1,020	995	-25	-2.5
41	Office clerks	47	Retail trade, except of motor vehicles and motorcycles	2	3	1,051	968	-84	-8.0
72	Metal, machinery and related trades workers	28	Manufacture of machinery and equipment n.e.c.	3	3	982	920	-62	-6.3

Source: EU LFS (authors' calculations)

Annex 2: Generation of job-wage rankings

To generate country job-wage rankings, we use wage data from an extraction from the 2008 annual EU LFS datafile provided by Eurostat. This extraction contains aggregated data, not microdata, and contains wage data for only a limited number of Member States at present. The countries for which we have used the wage data are Belgium, Estonia, France, Greece, Hungary, Italy, Latvia, Luxembourg, Lithuania, Poland, Portugal and the UK. Independently, we have used Danish national data based on company-level administrative registers from organisations employing at least 10 people. This data is generally recognised as being of very good quality.

The EU LFS 2008 annual data extraction includes weighted population estimates for all available combinations of the following variables: *occupation* (ISCO 2-digit), *sector* (NACE 2-digit), *avrgehwusual* (average weekly working hours for holders of a specific job in a specific country) and *avrgeincmon* (average net take-home monthly work income for holders of a specific job in a specific country). We generate an estimate of mean net hourly wage per job using the following formula (mean net hourly wage = *avrgeincmon*/(4**avrgehwusual*). This is used to generate an ordinal job-wage ranking in each of the 13 countries for which we have wage data.

In these countries, the job-wage rankings are used to assign jobs to quintiles in each country based on data (from the EU LFS) on employment levels in the second quarter of 2008 by job for that country. This assigns a quintile value of 1 to those jobs that contain the lowest-paid 20% of employment and a quintile value of 5 to those that contain the highest-paid 20% of employment. In other words, jobs are assigned to quintiles in each Member State based on the job-wage ranking, using employment as a weight.

As we have data for only 13 Member States, we are faced with the issue of how to include the other 14 Member States in our analysis. We have opted to use the existing data from these 13 Member States to generate a common EU job-wage ranking, which we then apply to those countries for which we have no wage data, as well as to the EU27 overall. This solution is of course not ideal but allows us to cover employment developments in all Member States, the main point of this comparative exercise. In its defence, we can point to the high correlation of existing national job-wage rankings (Table A5, Annex 3); the same jobs tend to be ranked similarly from country to country. We conducted the process according to the following steps.

1. We generate a min-max standardised version of each national job-wage ranking that we have already generated for the 13 Member States with the highest-paid job scoring close to 1 and the lowest-paid job scoring 0, based on the formula (Xi – Xmin)/(Xmax – Xmin), where Xi is the rank order of job *i* in a specific country, Xmin is the rank order of the lowest-paid job (= 1) and Xmax is the rank order of the highest-paid job (= total number of jobs) identified in the Member State.

2. We calculate the weighted mean of the resulting 13 scores for each job (NACE x ISCO combination) using the working population of the country as a weight. Why use weighting? The countries for which we have wage data includ a combination of smaller and larger Member States. On the assumption that larger samples generate more robust job-wage estimates, especially given the detailed breakdown required by the jobs approach, we elected to weight the EU mean standardised score by country employment totals (for 2008). The effect of this is to give substantial weight to France, the UK, Italy and Poland, the four largest countries of the 13

in the overall EU standardised score. Arguably, this group of four countries is not in any case an unrepresentative EU sub-sample as it runs along both an 'old'–'new' Member State axis and a north–south axis. Our European job-wage ranking is simply a ranking of these weighted mean scores (on a scale of 0–1) for each job identified.

3. In the 14 Member States where we have no wage data, we use our European job-wage ranking to assign jobs to quintiles in each country based on data (from the EU LFS) on employment levels in the second quarter of 2008 by job for that country. We also use this common EU job-wage ranking to generate job-wage quintiles at EU aggregate level. As before, this assigns a quintile value of 1 to those jobs that contain the lowest-paid 20% of employment and a quintile value of 5 to those that contain the highest-paid 20% of employment. In other words, jobs are assigned to quintiles in each Member State based on the job-wage ranking using employment as a weight.

One practical advantage of the EU job-wage standardised score is that it covers more jobs (as always, occupation * sector combinations), allowing us to compensate for limited coverage of the national rankings generated from the 2008 annual EU LFS data. If jobs are not ranked – for instance, because there were no wage observations for an individual job in a country in the EU LFS 2008 annual data – they cannot be assigned to quintiles, and employment changes in them will have to be disregarded. To avoid this, we take advantage of the EU standardised scores to 'fill in the gaps' of the national rankings for the 14 Member States. We do this by interpolating the EU standardised scores in the national standardised scores where we have no wage data for a particular job in the national data. It should be pointed out that this interpolation applies only to a very small proportion of employment in each country where we already have national wage rankings, so has little impact on the overall results or quintile charts.

As already noted, assignment of jobs to quintiles does not always lead to a smooth share of 20% of employment per quintile. Some jobs are 'lumpy', accounting for a large share of employment in a given country. The job of skilled agricultural workers in agriculture accounts for fully 20% of Romanian employment. It is, however, only in this country that such lumpy jobs unreasonably distort the initial allocation of employment to quintiles. In all other countries, the allocation is reasonably even.

The charts themselves record the net employment change (or flows) at quintile level in each country between the second quarter of 2008 and the second quarter of 2010. Separately, for some background variables, we have included an indication of the EU27 distributions of employment across the quintiles (stocks).

Annex 3: Notes on the job-wage rankings

It is difficult to be conclusive regarding some of the data issues relating to wages. Availability of wage data in the EU LFS is a very recent development and, to our knowledge, they have yet to be used in any research. However, it should be noted that we use not the wage itself but a wage ranking and that these rankings are then further aggregated into five big groups or quintiles ranked in terms of average wage level. The allocation of all national employment from between 400 and 2,000+ national job 'cells' (see Table A4) into five quintiles of equal employment size implies limited demands on the wage data and, as the country quintile charts and breakdowns demonstrate, they generate generally very plausible results.

Table A4: number of job (ISCO 2-digit x NACE 2-digit) combinations wage-ranked by country

LU	EE	DK	EL	LV	PT	LT	PL	BE	HU	UK	FR	IT	EU27
413	773	871	964	982	1,005	1,073	1,084	1,161	1,172	1,262	1,268	1,639	2,041

Source: EU LFS (authors' calculations)

One of the reasons for the robustness of the jobs approach is that it includes some inherent self-correcting mechanisms. At our level of detail, any within-quintile error in the ranking would have no impact on the results. Erroneous wage data is only a problem when a job is allocated to the wrong quintile. Such misallocations are much more likely to occur when there are few observations in a particular NACE/ISCO cell in the EU LFS, but by definition these small jobs will tend to have much smaller impacts in terms of shifts in employment levels than the bigger jobs. Ultimately, the most important determinant of the shape of the quintile chart in each country is the shifts in levels of employment in larger-employing jobs and, for these jobs, wage estimates are based on many observations and are likely to be more reliable and accurate.

Table A5: Pairwise correlations of country job-wage rankings (weighted by employment in job)

	BE	DK	EE	FR	EL	HU	IT	LT	LU	LV	PL	PT	UK
BE	1.00												
DK	0.78	1.00											
EE	0.51	0.70	1.00										
FR	0.79	0.86	0.61	1.00									
EL	0.78	0.74	0.52	0.76	1.00								
HU	0.72	0.81	0.67	0.74	0.70	1.00							
IT	0.85	0.84	0.55	0.85	0.86	0.76	1.00						
LT	0.56	0.69	0.73	0.64	0.59	0.68	0.58	1.00					
LU	0.82	0.77	0.43	0.81	0.84	0.68	0.88	0.50	1.00				
LV	0.58	0.71	0.69	0.64	0.57	0.69	0.61	0.66	0.56	1.00			
PL	0.70	0.79	0.67	0.75	0.72	0.77	0.76	0.65	0.68	0.68	1.00		
PT	0.82	0.80	0.59	0.82	0.83	0.76	0.88	0.61	0.83	0.63	0.76	1.00	
UK	0.78	0.87	0.65	0.85	0.75	0.78	0.83	0.69	0.81	0.68	0.76	0.80	1.00

Source: EU LFS (authors' calculations)

While comprehensive national wage data are of course preferable, it should also be pointed out that there are some practical advantages to using an EU ranking over national rankings. Above all, the EU ranking benefits from having appreciably more observations than national rankings. Particularly in small jobs in small countries, the EU ranking provides a higher level of statistical confidence for the wage estimates of the population mean of the NACE/ISCO cell. The EU standardised ranking also tends to 'smooth out' outlier national job-wage rankings that may be attributable to statistical artefacts arising from small numbers of observations.

There are many things the jobs approach can do to cast a light on developments in terms of employment structure, but – as with most methods – there are also things that it cannot do. Firstly, the fact that it is relative and highly aggregated means that it cannot reflect the scale of the inequalities that exist in terms of wages between jobs in the different countries. This is a subject of growing importance, but it is one about which the jobs approach cannot say much, as it does not cover changing wage distances or relativities between jobs. What it does is provide relevant data on the related issue of the distribution of employment shifts across the wage structure. Secondly, it should be stressed that the jobs approach can say nothing about changes in the quality of a given job. Whether or not individual jobs are becoming relatively better paid or reflecting a higher level of education is of course an interesting question but is beyond the scope of this report. The wage measures are fixed in 2008. What the development of the quintiles show is how the changing quantity of employment in the following two years is allocated among the fixed, pre-defined ranking of jobs by wages. Our main focus is on the employment structure, not on the wage structure. Thirdly, we use job-wage rankings and quintile assignments that are fixed in time (in the second quarter of 2008). While relative job-wage hierarchies are reasonably robust over time, they do change, so using a fixed ranking does imply some degree of oversimplification (even if this is probably only a very minor issue for the short two-year period we cover in this report).

Annex 4: Checking the job-wage rankings

Testing our wage rankings with external wage data sources is problematic, given the lack of available data at the required level of detail, especially following the transition to a new sectoral classification (NACE rev. 2.0). Nonetheless, we have used another data source (EU-SILC) to do some partial testing of the validity of the job-wage rankings generated using the 2008 EU LFS annual data. The results are broadly reassuring, though more detailed testing is necessary and will be carried out. The chart below compares wage rankings of two-digit occupations from the source used to generate the job-wage quintiles in this report, the EU LFS 2008, and the EU-SILC 2008, for 12 of the Member States for which we have wage data from both sources. The EU-SILC rankings are based on estimates of net hourly earnings from market-based activities for workers in each occupational category. Given the recent transition to the new NACE rev. 2.0 sector classification and the unavailability of EU-SILC data in two-digit NACE rev. 2.0, comparisons of wage rankings from these two different EU sources are only possible for occupations. In any case, the type of comparison chart presented below would be unfeasibly large for our more detailed occupation × sector breakdown.

The rankings generally follow the implicit hierarchy from top occupational grades (managers, professionals) to bottom (elementary occupations); the level of correlation between the national rankings from the two sources is very good (0.9+) for all but one country, Belgium. Here, there are notable discrepancies between the two in relation to the following occupational categories – general managers, life science and health associate professionals, customer service clerks and machine operators.

Table A6: Comparison of occupational wage rankings, selected countries

	BE		DK		EE		EL		HU		IT		LT		LU		LV		PL		PT		UK	
ISCO-88	EU LFS	EU-SILC	EU LFS	EU-SILC	EU LFS	EU-SILC	EU LFS	EU-SILC	EU LFS	EU-SILC	EU LFS	EU-SILC	EU LFS	EU-SILC	EU LFS	EU-SILC	EU LFS	EU-SILC	EU LFS	EU-SILC	EU LFS	EU-SILC	EU LFS	EU-SILC
11	1	2	1	6	1	1	3	1	1	1	4	4	2	3	2	1	1	1	1	2			1	6
12	2	1	2	3	3	2	2	2	4	4	2	1	1	1	1	2	4	2	3	1			3	1
13	18	4			5	7	8	10	6	2	8	19	4	8	9	8	8	7	10	9	8	4	11	11
21	4	3	4	2	4	4	5	6	2	3	6	5	3	5	3	4	2	5	4	4	3	5	4	4
22	6	7	3	1	2	6	4	7	5	6	3	2	6	4	6	6	5	3	8	8	2	2	2	2
23	3	5	8	8	10	12	1	3	7	7	1	3	7	6	5	3	6	8	2	3	1	1	7	7
24	5	6	5	4	6	3	6	8	3	5	7	7	8	9	4	5	3	4	5	5	4	6	5	5
31	9	8	7	5	8	8	7	5	8	8	10	8	5	2	8	10	7	6	9	7	7	9	8	10
32	7	16	9	9	15	19	11	13	12	11	9	9	17	17	7	9	18	14	15	15	9	8	9	9
33	11	15	12	11	17	11	10	4	10	17	5	6	25	24	10	12	13	15	6	13	5	3	10	8
34	8	11	6	7	12	9	9	12	9	9	11	10	10	10	11	7	10	9	7	6	6	7	6	3
41	10	14	18	15	13	15	12	11	14	10	13	12	15	18	12	13	15	18	18	16	10	13	16	13
42	12	23	16	14	22	20	17	21	16	14	12	11	16	15	14	15	17	13	20	19	14	10	19	20
51	15	17	22	22	23	23	19	18	19	18	19	16	20	20	16	21	21	20	21	22	17	16	22	16
52	22	21	24	24	24	24	25	25	23	22	21	20	24	22	26	24	24	23	25	25	19	19	25	23
61	25	25	19	25	19	14	21	19	24	24	24	25	23	23	20	19	22	24	19	21	23	21	23	25
71	20	20	13	19	7	5	18	20	17	19	20	22	9	7	22	20	9	10	14	12	15	15	13	14
72	17	13	11	12	11	13	13	14	11	15	16	15	11	11	13	16	12	12	11	11	12	12	12	12

	BE		DK		EE		EL		HU		IT		LT		LU		LV		PL		PT		UK	
ISCO-88	EU LFS	EU-SILC	EU LFS	EU-SILC	EU LFS	EU-SILC	EU LFS	EU-SILC	EU LFS	EU-SILC	EU LFS	EU-SILC	EU LFS	EU-SILC	EU LFS	EU-SILC	EU LFS	EU-SILC	EU LFS	EU-SILC	EU LFS	EU-SILC	EU LFS	EU-SILC
73	14	12	14	17	14	17	16	16	15	12	17	18	19	14	18	11	14	16	16	17	16	18	14	15
74	24	22	21	18	20	18	22	23	20	21	23	24	22	21	21	23	23	21	23	24	24	23	20	21
81	13	10	10	10	18	16	14	9	18	13	15	13	13	12	17	14	20	22	12	10	13	14	15	18
82	19	9	17	16	21	21	20	17	21	20	18	17	14	16	19	22	16	17	17	18	18	17	18	22
83	16	19	15	13	9	10	15	15	13	16	14	14	12	13	15	18	11	11	13	14	11	11	17	17
91	23	24	23	21	26	26	24	24	25	23	25	23	26	26	25	25	26	26	26	26	20	20	24	24
92	26	26	25	23	25	25	26	26	26	26	26	26	21	25	23	26	25	25	24	20	21	22	26	26
93	21	18	20	20	16	22	23	22	22	25	22	21	18	19	24	17	19	19	22	23	22	24	21	19
Correla-tion	0.79		0.94		0.94		0.95		0.94		0.94		0.96		0.92		0.97		0.97		0.97		0.95	

Notes: No wage data in EU-SILC for ISCO occupations 11, 12 in Portugal or 13 in Denmark. See below for occupational descriptions.
Source: EU LFS, EU-SILC (authors' calculations)

ISCO-88 occupation codes, two-digit

11 Legislators and senior officials
12 Corporate managers
13 General managers
21 Physical, mathematical and engineering science professionals
22 Life science and health professionals
23 Teaching professionals
24 Other professionals
31 Physical and engineering science associate professionals
32 Life science and health associate professionals
33 Teaching associate professionals
34 Other associate professionals
41 Office clerks
42 Customer services clerks
51 Personal and protective services workers
52 Models, salespersons and demonstrators
61 Market-oriented skilled agricultural and fishery workers
71 Extraction and building trades workers
72 Metal, machinery and related trades workers
73 Precision, handicraft, printing and related trades workers
74 Other craft and related trades workers
81 Stationary-plant and related operators
82 Machine operators and assemblers
83 Drivers and mobile-plant operators

91 Sales and services elementary occupations

92 Agricultural, fishery and related labourers

93 Labourers in mining, construction, manufacturing and transport

Good wage data are an important element of the jobs approach, and the availability of wage data in the EU LFS – the same survey instrument that we use for measuring employment shifts – is an improvement on the previous situation where job-wage rankings could only be compiled using complex mergings of several different EU sources (see Stehrer and Ward (2008) for details of the elaboration of the job-wage ranking for previous Eurofound jobs-based analysis). The delivery of such data in the national EU LFS submissions to Eurostat is now a legal requirement for EU27 Member States. This holds out the promise of improvement in the availability and coverage of good-quality comparable wage data in the EU. Eurofound will continue to explore these possibilities with Eurostat and to cooperate with Member State statistical offices to maintain and refine the job-wage rankings.

Annex 5: Job-education rankings

One of the advantages of the jobs-based approach is that different potential job quality proxies can be used to generate the quintiles. One obvious possibility is to use the average education level of the job holders as a proxy of the skills level of the job. We have used this as a second-level job quality proxy and also as a check on the main job-wage-based findings.

To generate country job-skill/education rankings, we used educational level attainment data from the EU LFS quarterly data, from Q2 2008 to Q2 2010. This data is available for all Member States. We use pooled data across all 10 quarters in order to increase the robustness of estimates. This also serves to increase the coverage of jobs for each country. Based on the following conversion, we estimate the average years of education of each job in each country and follow a similar method to that outlined above for wages when calculating an overall EU job-skill/education ranking.

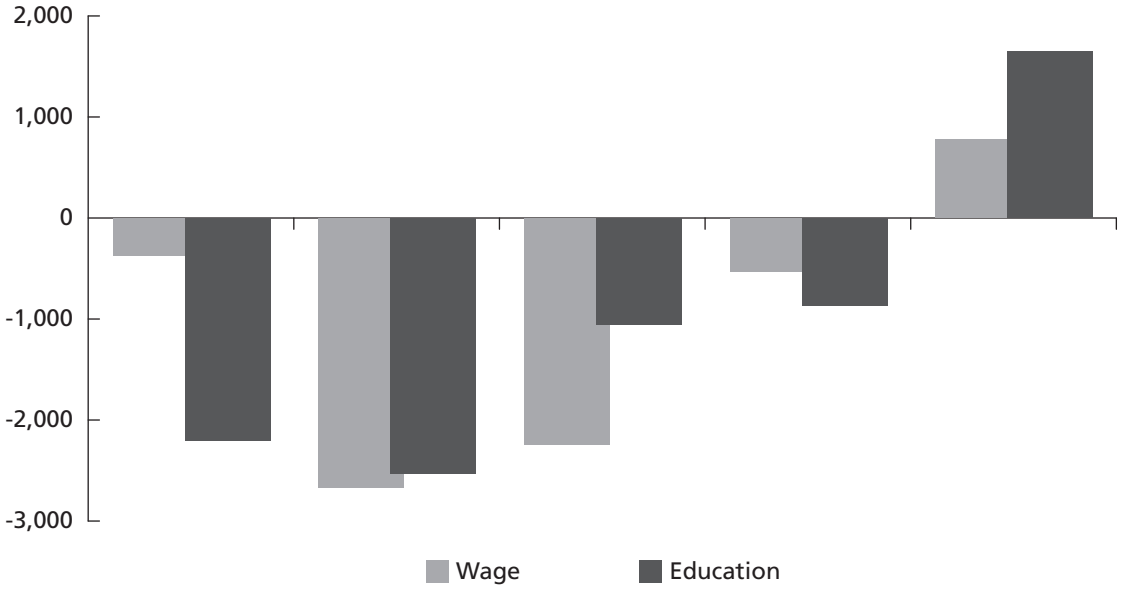
Table A7: Mapping of ISCED levels of attainment with years of full-time education

Variable: *hatlevel* (ISCED educational attainment levels 0–6)[23]	Description (completed level of education)	Equivalent years of completed full-time education
0–1	Primary education	6
2	Lower secondary	10
3	Upper secondary	13
4	Post-secondary, non-tertiary	14
5	Tertiary, first stage (degree)	17
6	Tertiary, advanced (PhD)	21

As we are interested only in ranking jobs **within** each country, the fact that duration may vary for the same educational level from country to country need not concern us. We are only interested in the within-country relative positions of jobs based on average years of completed education. The job education/skill rankings are then used to assign jobs to quintiles in each country based on EU LFS data on employment levels (from the second quarter of 2008) by job for that country. This assigns a quintile value of 1 to those jobs that contain on average the lowest-educated 20% of employment and a quintile value of 5 to those that contain on average the highest-educated 20% of employment.

[23] International Standard Classification of Education (ISCED)

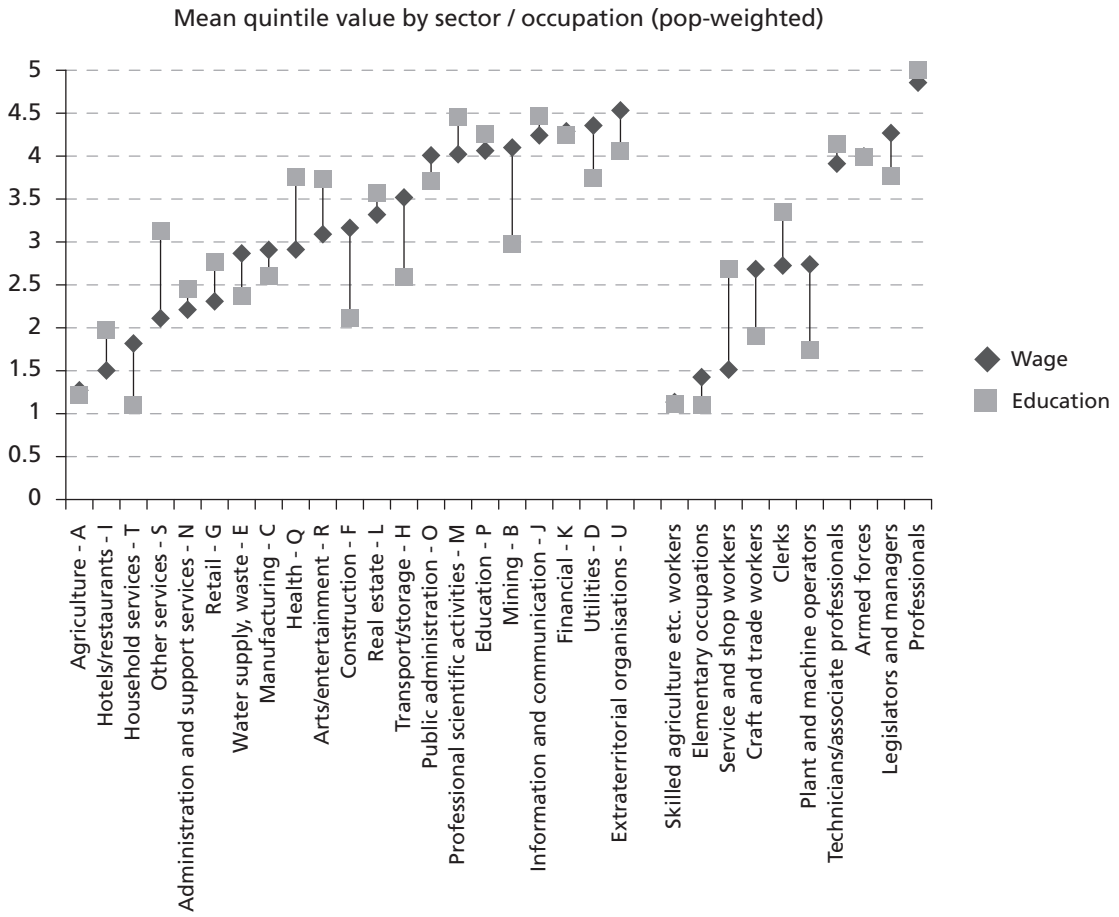
Figure A1: Employment shifts, comparing job-education quintiles and job-wage quintiles EU27, Q2 2008 to Q2 2010 (thousands)



Source: EU LFS (authors' calculations)

In order not to complicate the analysis in the main body of the text, we limited ourselves to some brief mentions of how employment shifts using an education/skill job ranking differs from that of our main wage-based ranking. The chart above shows that for the EU27 as a whole, employment shifts during the recession were more clearly upgrading if we take the average education level of the job holder as our basis of assigning jobs to quintiles. This is consistent with earlier findings from the UK (Felstead et al, 2007), where skill-based measures of job quality point unambiguously to upgrading of the employment structure. Job growth was almost twice as high in the top education quintile compared to the top wage quintile. There is a more linear pattern of employment shift for job-skill quintiles, with the lowest quintile experiencing most destruction, medium-skilled jobs somewhat less, with significant growth in high-skilled jobs. The main explanation for the differences is that those low-skilled jobs that suffered most from employment decline during the recession – in manufacturing and in construction – tend to benefit from a wage premium in respect of the education level of their job-holders. They tend to be closer to the medium in terms of pay and closer to the bottom in terms of educational attainment, as Figure A2 illustrates.

Figure A2: Comparison of mean job-wage and job-education quintile value, by sector and occupation (employment-weighted, EU27)



Note: For country job-education quintile charts, see *Shifts in the job structure in Europe during the Great Recession – Technical background paper*, available online.

Annex 6: Non-response: ISCO and NACE variables

Where we encountered non-response values on the key ISCO and NACE variables, we deleted the observations and regrossed up employment across all valid ISCO*NACE combinations. The main purpose of this procedure was to ensure that the charts conveyed a correct estimate of changes in employment levels, at country level, between the two limit periods. This was only a significant issue in two Member States, the Netherlands and Luxembourg. In the Netherlands, 6% of employment in Q2 2008 and 9% of employment in Q2 2010 was unclassified; in Luxembourg, the equivalent figures were 0% and 5% (Table A8). The unclassified jobs (mainly *non-response* on the NACE sector variable) contributed significantly to overall employment change in our two-year period in both countries. We have however no reason to consider that there was any quintile bias in the unclassified jobs, as the employment distribution by ISCO occupation for these jobs – for example – appears consistent with that of the overall national sample.

Table A8: Proportion of employment with valid ISCO/NACE assignment (%)

	Q2 2008	Q2 2010
Netherlands	93.6	90.9
Luxembourg	99.9	94.6
Portugal	96.9	97.0
France	98.4	98.5
Latvia	98.7	98.6
Germany	98.7	98.8
Slovenia	99.1	99.1
Finland	99.3	99.2
UK	99.6	99.3
Bulgaria	99.1	99.3
Ireland	99.6	99.5
Denmark	99.7	99.6
Sweden	99.3	99.7
Poland	99.9	99.9
Estonia	99.8	100.0
Czech Republic	100.0	100.0
Slovakia	99.9	100.0
Lithuania	99.6	100.0
Malta	99.8	100.0
Belgium	100.0	100.0
Austria	100.0	100.0
Cyprus	100.0	100.0
Spain	100.0	100.0
Greece	100.0	100.0
Hungary	100.0	100.0
Italy	100.0	100.0
Romania	100.0	100.0

Annex 7: Defining sectoral terms

Sector (NACE rev. 2.0 two-digit) breakdowns used for high- and low-tech manufacturing and knowledge-intensive services (KIS) and less knowledge-intensive services (LKIS) (for reference, see this document on the Eurostat web site: epp.eurostat.ec.europa.eu/cache/ITY_SDDS/Annexes/htec_esms_an3.pdf)

Manufacturing

High- and medium-high technology (= high-tech manufacturing)

Manufacture of chemicals (20); basic pharmaceutical products (21); computer, electronic and optical products (26); electrical equipment, machinery, auto, transport equipment etc. (27 to 30).

Low- and medium-low technology (= low-tech manufacturing)

Manufacture of food products, beverages, tobacco products, textiles, wearing apparel, leather and related products, wood and of products of wood, paper and paper products, printing and reproduction of recorded media (10 to 18); coke and refined petroleum products (19); rubber and plastic products, other non-metallic mineral products, basic metals, fabricated metal products, except machinery and equipment (22 to 25); repair and installation of machinery and equipment (33); furniture and other manufacturing (31 and 32).

Services

KIS

Water transport, Air transport (50, 51), Publishing activities, Motion picture, video and television programme production, sound recording and music publishing activities, Programming and broadcasting activities, Telecommunications, Computer programming, consultancy and related activities, Information service activities (58 to 63); Financial and insurance activities (64 thru 66), Legal and accounting activities, Activities of head offices; management consultancy activities, Architectural and engineering activities; technical testing and analysis, Scientific research and development, Advertising and market research, Other professional, scientific and technical activities, Veterinary activities (69 to 75); Employment activities (78); Security and investigation activities (80); Public administration and defence, compulsory social security, Education, Human health and social work activities, Arts, entertainment and recreation (84 to 93).

LKIS

Wholesale and retail trade; repair of motor vehicles and motorcycles (45 to 47); Land transport and transport via pipelines (49); Warehousing and support activities for transportation, Postal and courier activities (52, 53); Accommodation and food service activities (55, 56); Real estate activities (68); Rental and leasing activities (77); Travel agency, tour operator reservation service and related activities (79); Services to buildings and landscape activities (81); Office administrative, office support and other business support activities (82); Activities of membership organisations, Repair of computers and personal and household goods, Other personal service activities (94 to 96); Activities of households as employers of domestic personnel; Undifferentiated goods- and services-producing activities of private households for own use, Activities of extraterritorial organisations and bodies (97 to 99).

Country codes used in report

AT	Austria
BE	Belgium
BG	Bulgaria
CY	Cyprus
CZ	Czech Republic
DE	Germany
DK	Denmark
EE	Estonia
EL	Greece
ES	Spain
FI	Finland
FR	France
HU	Hungary
IE	Ireland
IT	Italy
LT	Lithuania
LU	Luxembourg
LV	Latvia
MT	Malta
NL	Netherlands
NO	Norway
PL	Poland
PT	Portugal
RO	Romania
SE	Sweden
SI	Slovenia
SK	Slovakia
UK	United Kingdom

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This report describes the impact of the 'great recession' on employment and the job structure in the EU27. It finds that despite a net loss of over five million jobs between 2008–2010, employment continued to grow in top-paying jobs, largely in knowledge-intensive services and business services. Meanwhile, sharp losses in medium-paying jobs in construction and manufacturing led to a shrinking of employment in the middle of the wage spectrum. More jobs were lost to men than to women and employment levels of older workers grew while those of core-age and, in particular, younger workers declined. Part-time work expanded across the wage spectrum while levels of temporary employment began to recover quickly from 2009 onwards after having borne the brunt of the early-recession job losses.

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