

JOB QUALITY INDICES FOR EUROPE.
A Report Based On The Fifth European Working Conditions Survey.

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Executive Summary

Introduction: Principles for the Construction of Job Quality Indices.

Since the inception of the European Employment Strategy in 1997, and the subsequent promotion in the last decade of "flexicurity" policies within member states, the topic of job quality has been considered important for the development of employment policy. Europe 2020, a strategy for sustainable growth and jobs, includes the promotion of job quality within its core guidelines. Increased understanding of the social costs (including costs to government) of poor job quality sustains concern with the physical and social environments at work, while longer life expectancy has led to the assumption that jobs will have to be of good quality if more workers are to be attracted to stay longer in the workforce.

The desire has arisen, therefore, to clarify the concept and measurement of job quality across member states. While progress was made with several studies in the last decade, the time is now right to make use of emerging scientific knowledge about workplaces and improved data, to develop a more comprehensive picture of job quality across Europe.

In 2010 the 5th European Working Conditions Survey (EWCS5) was conducted in all 27 member states of the European Union and in addition 7 other countries in Europe. The first objective of this report is to design and construct indices of job quality using the data of EWCS5. These indices should then be available as building blocks for use, along with wider labour market variables, in policy analyses of the labour market. The second objective is to utilise the constructed indices, and some adapted indices derived from preceding surveys in the series, to present a picture of the variation in job quality across countries, between men and women, and between certain socio-economic groups and work situations, and to describe variations over time.

The report focuses on the perspective of the worker, this being a continuation and organic development of the approach taken by Eurofound (2002). In important aspects of job quality, however, there is likely to be a congruence of interest, or at least no adverse trade-off, between the perspectives of the worker and of the employer. There are connections between job quality and the quality of productive activity. For several aspects of jobs there is evidence of direct links between job quality and productivity, and indirect links through the associations between job quality and lower sickness absence, lower quitting, better mental health and greater job satisfaction.

As a shorthand, the report uses the term "job quality" as a synonym for "quality of work and employment". The character of the job is taken to be broader than the work itself, and to encompass also the nature of the employment situation in which the work is located; but not to cover the nature of the labour market or beyond.

Four Job Quality Indices

The report's model of job quality is a development of that adopted by the European Working Foundation in 2002. Job quality is comprised of four core elements: earnings, prospects for the job, intrinsic job quality, and working time quality.

The *Earnings* index is the monthly pay of employees, and the monthly earnings of the self-employed. It is converted to Euros, and multiplied by Purchasing Power Parity index to give comparability across countries in the value of the basket of goods which the earnings can command.

The *Prospects* index picks up three elements: job security (the chance of keeping one's job in the future), the expectation of progression, and the beneficial contract status of the job (that is, not a temporary post).

Intrinsic Job Quality is made up from four sub-indices, each with equal weights. The *Skills and Discretion* index captures the extent to which skills are used and to which workers have leeway and control over their jobs. The *Good Social Environment* index has both positive and negative elements. The positive elements refer to the support of managers and colleagues in the work, the negative to rare instances of abuse. The *Good Physical Environment* index captures having a low number of potential physical hazards or posture-related risks in the workplace. Finally, the *Work Intensity* index is seen as negative contribution to job quality, picking up where there is a high pace of work, and high physical or other demands on the worker.

The *Working Time Quality* index captures job features that contribute to the achievement of a good "work-life balance". The features available in the survey consist of aspects of the timing of the job. The report derives an indicator of the quality of working time, viewed in relation to the extent to which the duration, scheduling and flexibility of working time meets workers' needs for work-life balance.

Apart from *Earnings*, the other indices are all normalised, so that they range between minimum and maximum points of 0 and 100.

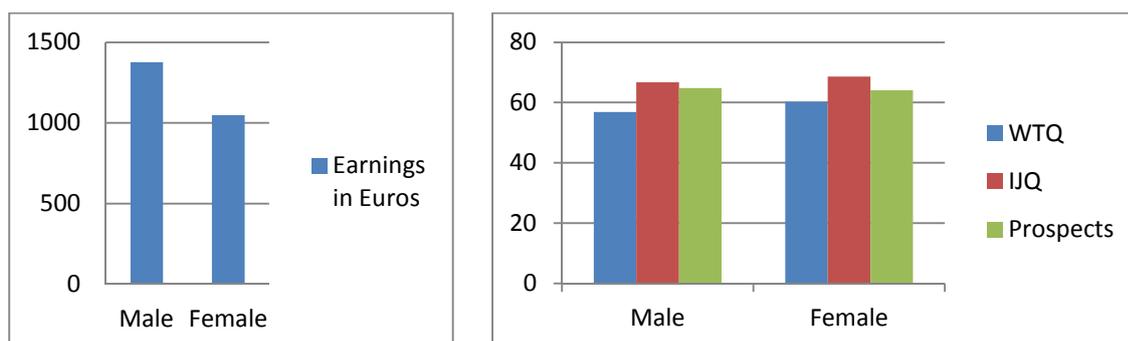
The report also considers the appropriate level of aggregation of job features. It was found that, expanding the number of indices above four, while feasible, would risk generating a confusing picture. Conversely, arguments for generating a single overall, summative, index were evaluated. However, the four indices are found to vary across jobs in significantly different ways, implying that it could be misleading to reduce further the number of job quality indices. In addition, policy-targeting could be difficult in relation to a single overall index, whose meaning was unclear. It is therefore held that, with a set of four indices, a clear but differentiated picture of job quality across Europe could be drawn; and that over time with the now-matured survey, with very few changes to the items making up the indices, a meaningful description of change over the coming decade would be revealed.

How Job Quality Varies in Europe

The levels of *Earnings*, *Working Time Quality (WTQ)*, *Intrinsic Job Quality (IJQ)*, and *Prospects (PR)* vary considerably across socio-economic groups of workers in Europe.

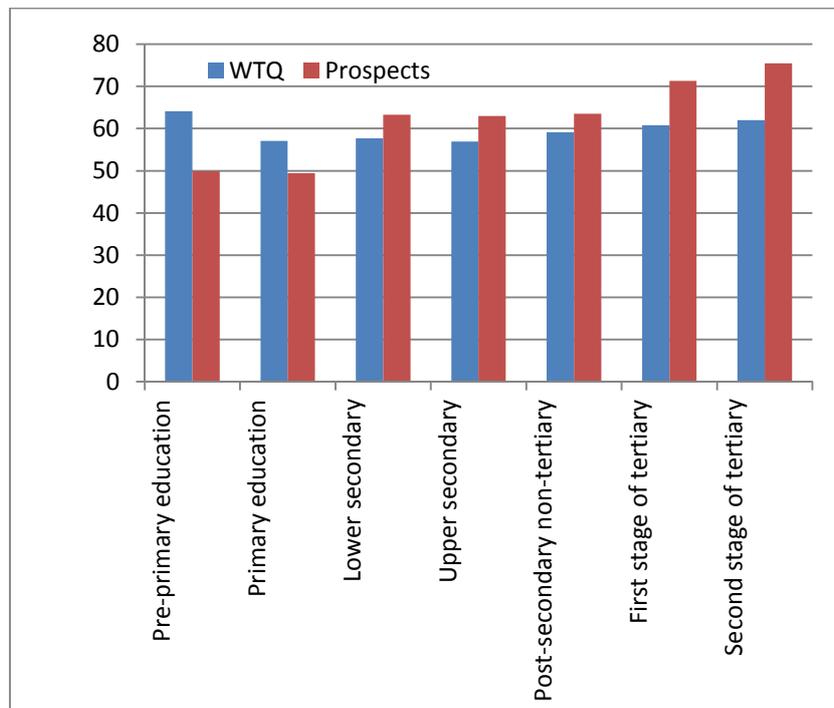
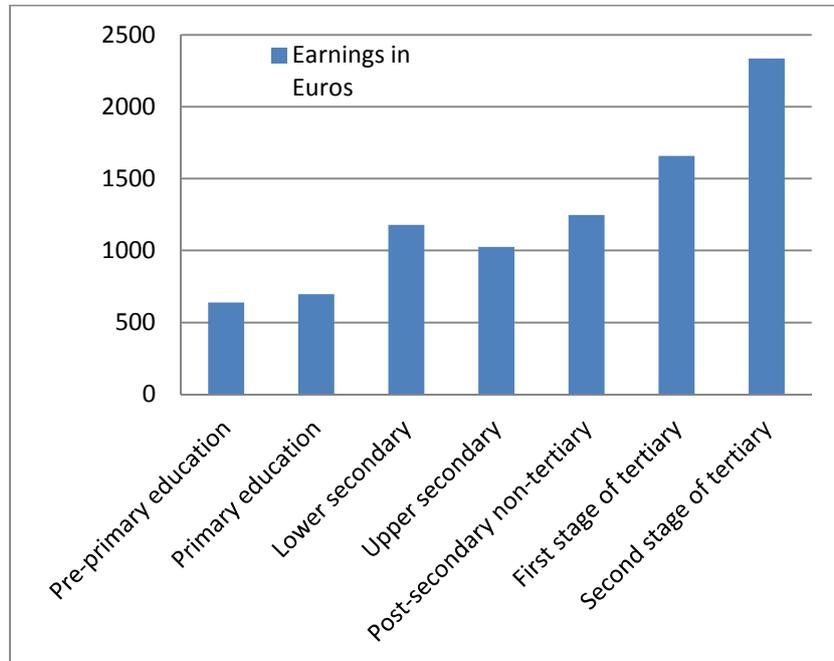
Gender differences in aspects of job quality, not only in respect of wages, but also concerning various other aspects of jobs, are especially relevant to an evaluation of progress towards the principle of gender equality. The gender monthly pay gap is approximately 23.8% of men's monthly pay. However, in terms of the *Working Time Quality* index, women have a slightly greater value. Women also enjoy a slightly higher level of *Intrinsic Job Quality*, which on closer inspection comes from working on average in somewhat better physical environments. Finally, the *Prospects* index is almost the same for men and women.

Figure ES 1. Average Job Quality Indices By Sex.



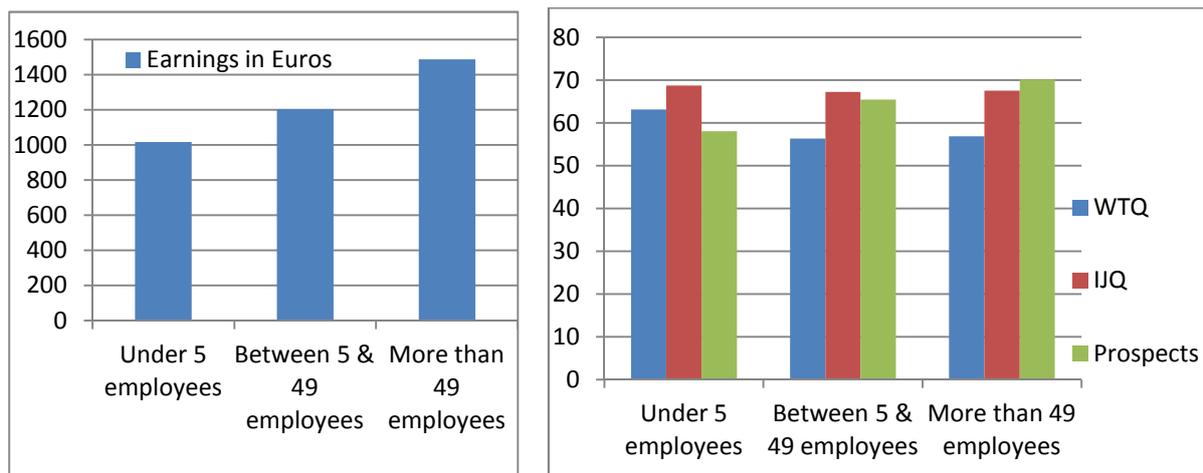
Both *Earnings* and *Prospects* are increasing with the level of education. This is to be expected since education is very important in opening up access to better jobs. The relationship of *Working Time Quality* with education, however, is less steep, being flat at the middle-to-lower end of the spectrum, and even negative for those few (0.5%) with only pre-primary education.

Figure ES 2. Average Job Quality by Level of Education.



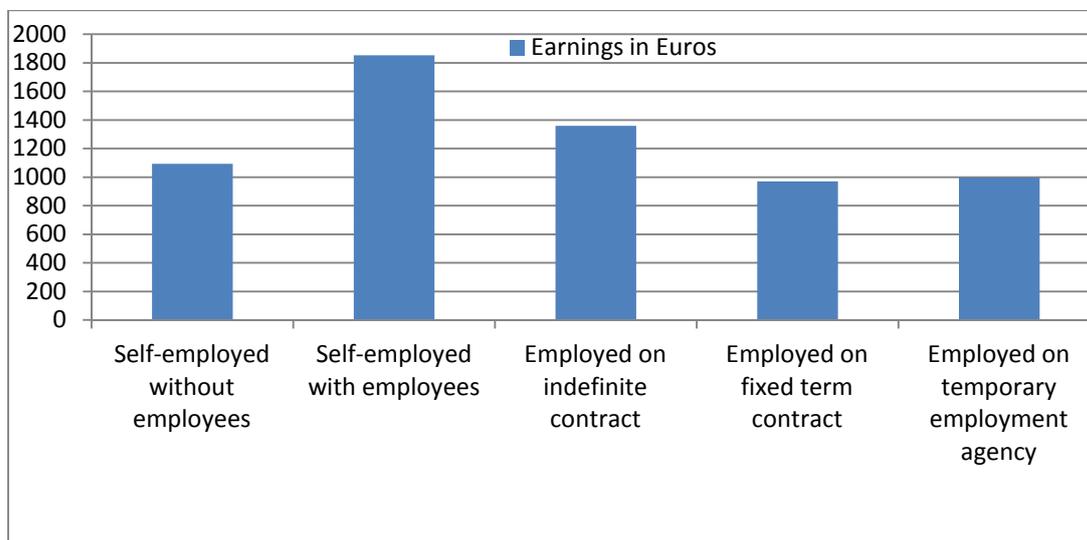
It is commonly found that wages increase with firm size and with establishment size. As can be seen, *Earnings* in establishments with more than 49 employees are substantially higher than those in smaller establishments. There are several explanations for why this happens. One possible explanation is that low earnings in smaller establishments are compensated by other job features that might be better than in larger establishments. Yet, it may be seen that, in European workplaces, the *Prospects* index also increases with the size of the establishment in which one works; while the *Intrinsic Job Quality* index has very little relationship with size. It is only with the *Working Time Quality* index that the relationship with establishment size is reversed, this being highest for firms with under five employees.

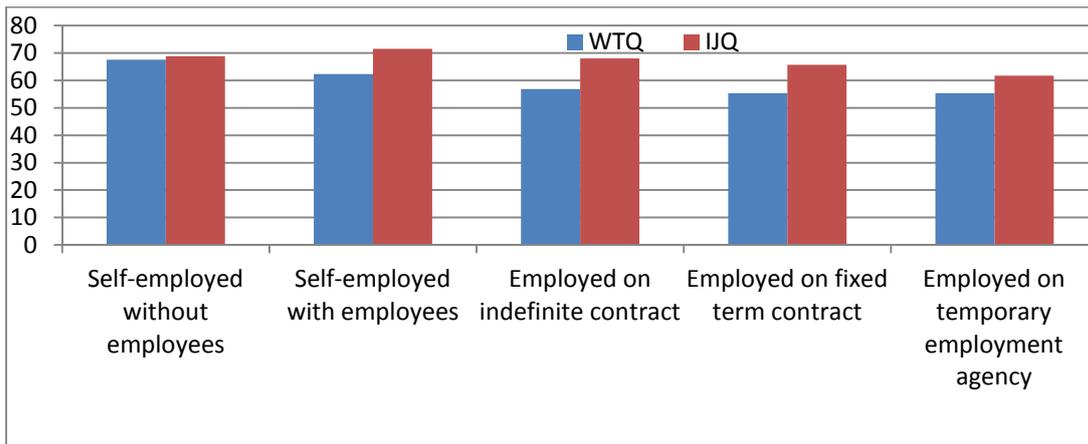
Figure ES 3. Average Job Quality By Establishment Size.



When it comes to the type of employment, the self employed with employees have the highest level of earnings. This happens because they are more likely to be the managers of a medium or small size company. In contrast, the self employed without employees have lower earnings yet a higher *Working Time Quality* index. The latter advantage arises from flexibility in the management of their work. Those employees with an indefinite contract have relatively high values on most of the indicators; while those employees with fixed term or temporary contracts have lower job quality on all dimensions.

Figure ES 4. Average Job Quality by Type of Employment



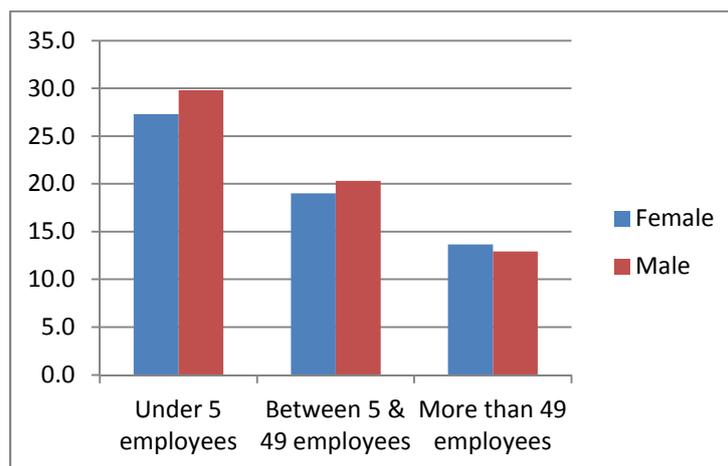


The report also documents variations in job quality across age groups, industries, sectors, occupational groups, and countries.

Jobs Where Workers Are At Risk Of Low Well-being

Using the job quality indices, the report identified a cluster of jobs where the indices were generally low, and where workers experienced low levels of subjective well-being, above-average numbers of health problems, less meaningful work, and a poor work-life balance. Classifying this group as having workers "at risk" of poor physical or mental health, approximately 1 in 5 workers belonged to this group. The proportions tended to be greater in countries with lower GDP per capita, in private sector jobs, and, as Figure ES 5. shows, especially in small establishments.

Figure ES 5. Percentage of Individuals with Low Quality Jobs by Establishment Size.



How Job Quality Has Changed Over Time

Job quality can change as a result of a combination of economic and social pressures, including technological and organisational change, greater global economic competitiveness, and pressures arising from the recent economic crisis. Policies stemming from European Union directives, and the open method of coordination applied to employment policies, could also be expected to address the problem of low quality jobs with high psychosocial risks, potentially bringing about a movement towards convergence between countries for some elements of job quality. It is therefore important to track job quality over a substantial period of time.

This can be done for the 15 countries that were members of the European Union in 1995 and have participated in every survey since then. However, the indices had to be adapted, since the questionnaire evolved over time as items were added, dropped and improved. Four indices lend themselves to this analysis: *Skills and Discretion (T)*, *Good Physical Environment (T)*, *Work Intensity (T)*, and *Working Time Quality (T)*, where the suffix (T) is added to emphasise that these indices for time trend analyses are adapted from the equivalent indices used in the 2010 analysis.

Skills and Discretion (T) index rose in 8 countries, while declining in just one. However, because there was either little change, or a decline, in the larger countries, there was only a small rise overall across workplaces in the EU15 countries. Meanwhile *Work Intensity (T)* rose in 8 countries and fell in 4 countries, leaving again a small rise overall. There was little change in the *Good Physical Environment (T)* index overall, and in fact only in three countries was there a notable rise in this index, Finland showing the greatest rise.

There was, by contrast, a substantial overall rise in *Working Time Quality (T)*, which is also shown in rises in the large majority of individual countries. Only in Denmark, Sweden and Germany were there no substantial increases. The largest rise was in France where, over the course of the 15 year period, this index increased by 11.3 points.

There was evidence of some convergence in job quality over the period. *Working time Quality* rose notably faster in countries which began with relatively low levels.

Figure ES 6. Change in *Skills and Discretion (T)* by Country in the EU15, 1995-2010.

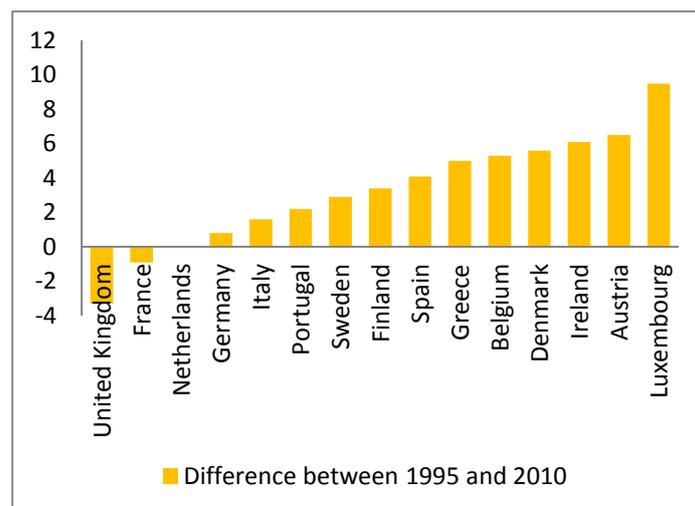


Figure ES 7. Change in *Work Intensity (T)* by Country in the EU15, 1995-2010.

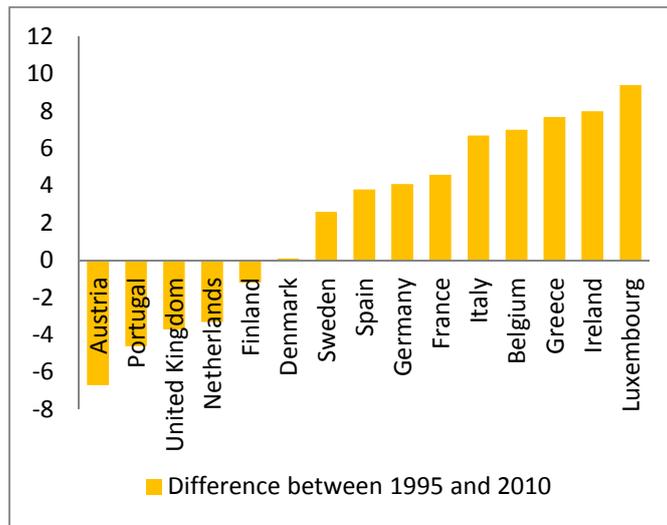


Figure ES 8. Change in *Good Physical Environment (T)* by Country in the EU15, 1995-2010.

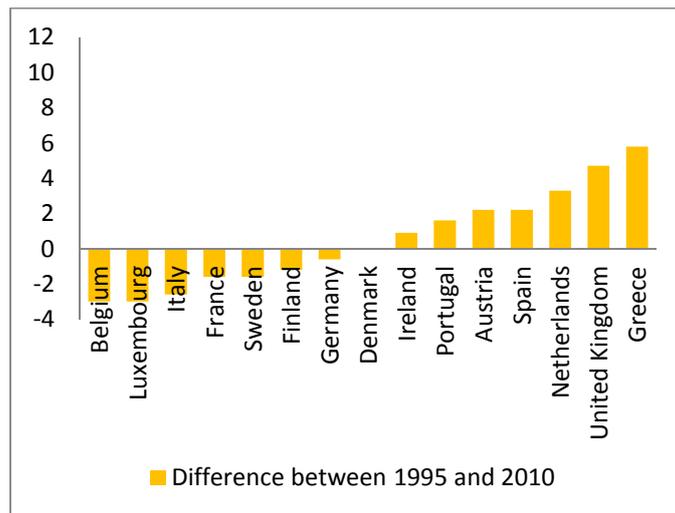
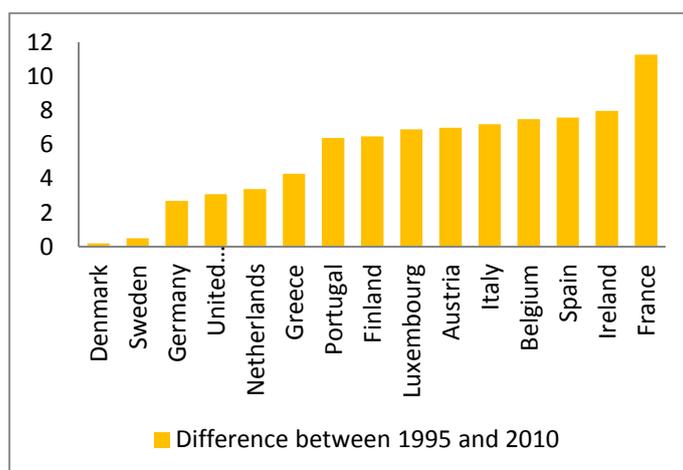


Figure ES 9. Change in Working Time Quality (T) by Country in the EU15, 1995-2010.



Implications

The report recommends that the four indices of job quality be computed and regularly monitored for policy analysis purposes. The indices can be used by themselves or in conjunction with wider indicators of the labour market. Some of the reported associations are of particular concern for policy purposes. While gender gaps in job quality are much lower for the three non-wage indices, in some countries there were substantive differences between the proportions of men and women in low-quality jobs where workers are judged to be at risk. The analysis points to a differentiated policy approach across countries in light of the evidence. In several countries a pressing concern for policy makers may be rising work intensity, because of the potential implications of high levels of workers stress.

The report concludes with a number of recommended changes and issues for consideration in the next wave of the European Working Conditions Survey.

1. Introduction.

Following the introduction of the European Employment Strategy in 1997 through the Treaty of Amsterdam, and the subsequent launch of the Lisbon Growth and Jobs strategy in 2000, the idea of “more and better jobs” came to the fore among European Union policy objectives. This development was paralleled by similar concerns from transnational bodies such as the OECD, and from individual national governments who wished to complement their targets for the numbers of people in employment with objectives for the quality of work and employment. Subsequent years saw also the development at the European level of the concept of “flexicurity”, a strategy to foster the introduction of policies to improve both flexibility and security. While the focus of flexicurity policies was more on the labour market, rather than on individual jobs, flexicurity was seen as consistent with the aim of raising the quality of work and employment (European Commission, 2007; Eurofound, 2008).

The issues with which policy-makers were concerned surrounded both productivity and the welfare of working people, and involved a mix of factors relevant to both employers and employees. From the perspective of employers, raising individual and organisational productivity is essential in an era of increasing competition in the global market-place. Alongside investment and innovation, raising job quality, including the utilisation of skill and acquisition of new skills, can help to meet these objectives. From the perspective of employees there have also been concerns about apparently rising stress levels associated with “job strain” (a combination of highly-intensive work effort and low control), about other environmental and psychosocial risks, and about the apparently growing prevalence of “precarious” work.

Job insecurity became an especially salient issue with the onset of the global economic crisis in the latter half of 2008. Rising unemployment, especially among young people, elevated the importance of policies to keep young people in work where possible, and to offer decent training and education opportunities for those out of work. Nevertheless, it has been widely held that policies to encourage sustainable employment would entail a continuation of the drive to improve job quality. Europe 2020, which is a strategy for sustainable growth and jobs, includes as one of its core guidelines “developing a skilled workforce responding to labour market needs, promoting job quality and lifelong learning” (European Commission, 2010). Increased understanding of the social costs (including costs to government) of poor job quality sustains concern with the physical and social environments at work. Meanwhile ongoing demographic issues, including prolonged life expectancy and the ageing of the population, have led to the assumption that jobs will have to be of good quality if more workers are to be attracted to stay longer in the workforce.¹

The concern with employee welfare has run with the grain of the desire to incorporate more features of modern life than are contained in estimates of GDP per capita, when accounting for a nation’s wealth. Many observers have emphasised that other aspects of life contribute to the well-being of nations, and among these other aspects job quality is found to be a significant element. As declared in the influential Report by the Commission on the Measurement of Economic and Social Progress:

Paid work matters for quality of life partly because it provides identity to people and opportunities to socialise with others. However, not all jobs are equally valuable in this respect. This underscores the importance of collecting more systematic information on the *quality* of paid work. (Stiglitz et al., 2009: 49.)

The desire arose, therefore, to clarify the concept and measurement of the quality of paid work for the purposes of policy analyses. A number of studies had already identified

¹ See *Working longer through better working conditions, new modes of work and career organisation*, EU Conference, Brussels, 16-17 November.

important aspects of job quality, other than wages, on which analyses and policy should focus, drawing on a long tradition of studies in sociology, economics and psychology (e.g. Gallie et al., 1998; Green, 2006, Lehto and Sutela, 2005). In the first years of the new millennium a number of attempts were made to define internationally comparable indices of job quality (e.g. Eurofound, 2002; European Commission, 2001; 2002; 2008), with some considerable progress being made. However, these attempts were constrained by the need for indicators that could be available for all member states. For example, the primary source of regular labour market information across Europe, the Labour Force Survey, carried relatively little data about the nature of jobs. Other, later, studies built on periodic modules covering work orientations in the International Social Survey Programme (e.g. Olsen et al., 2011), though this also carried only limited coverage of work features needed for the study of job quality. The most comprehensive coverage, which supported analyses by Leschke et al. (2008), Holman and McClellan (2011), and by Muñoz de Bustillo et al. (2011), was provided by successive waves of the European Working Conditions Survey (EWCS), which had been carried out in 1990, 1995, 2000/1 and 2005.

This survey has evolved and improved over time, as more countries joined in, some from outside the European Union; and the selection of items to be asked changed with experience and making use of developing scientific knowledge about the workplace. With the completion of the 5th survey (EWCS5) in 2010 in 34 countries², the time is now right, therefore, for a new clarification of the concept of job quality, and of how it can be operationalised in support of policy analyses.

The first and most important objective for this report is to use the data of EWCS5, and preceding surveys in the series, to design and operationalise indices of job quality. As a shorthand, throughout this report we use the term "job quality" as a synonym for "quality of work and employment". Thus, we take the character of the "job" to be broader than the work itself, and to encompass also the nature of the employment situation in which the work is located; but not to cover the nature of the labour market or beyond. Once the indices of job quality are operationalised, the second objective is to utilise them to construct a descriptive picture of the variation in job quality across countries and between certain socio-economic groups and work situations.

The report begins with its central tasks in Sections 2 and 3, which set out the conceptual framework for job quality, and the way in which job quality indices are constructed from the data. Section 4 then shows how the indices vary according to the gender, age, education level, occupation and sector of the workers in these jobs, and according to size of establishment, contract status of employment, and country.

Section 5 shows the relationships between job quality indices and the health and well-being of workers. In Section 6 the report places some emphasis on identifying jobs which are more likely to put employees "at risk" of detrimental effects on health and well-being. In Section 7 the report examines how job quality has been changing over time, for those countries that have been participants in the survey since 1995. Finally, the report considers the implications of these descriptive findings for policy development, and makes recommendations for further incremental improvements in the survey to place more emphasis on skill and skill development.

² Parent-Thirion et al. (2012).

2. Conceptual Framework.

The aim in this section is to clarify the concept of job quality that will be used to motivate the construction of indicators and all subsequent analyses. It is to be noted, first, that this concept is not only about work itself, but also about its context, that is, employment in a job. The concept of job quality has its roots deep in the social sciences, having been discussed from various angles by sociologists, economists and psychologists for a very long time.

2.1 Previous studies and general principles

Objective versus Subjective Concepts.

A distinction can be made between two quite different concepts of work and employment quality. On one hand there is the subjective tradition, in which job quality is the "utility" that a worker derives from his or her job. That utility depends on job features, such as the wage, hours, and type of work, but it is subjective in that each worker has preferences over the different job features. Whether the utility of a job is directly measurable is a matter of debate and disagreement within economics. Some argue that utility can only be revealed through actions and behaviours around work. Some studies have argued that measures of well-being, including feelings and emotions, or job satisfaction, can be used as measures of subjective job quality.

On the other hand, in the objective tradition job quality is constituted by the features of jobs that meet a workers' needs from work. As such, any objective concept stems ultimately from a theory of what human needs are and proceeds to investigate how far jobs meet those needs. For example, Maslow's hierarchy of needs can be applied to the world of work, leading to a focus on a limited number of key job characteristics. Similarly, Green (2006) adapts Sen's capability approach, and develops the idea that a 'good job' is one that offers workers a high capability to do and be things that they value.³ The capability to achieve well-being depends on how far jobs enable workers to exercise influence over work and to pursue their personal work-related goals. The needs that workers choose to prioritise will vary, but a high quality job is one that allows for a full range of needs to be met. The ILO's concept of "decent work" is another objective concept, similar in spirit but broader in the scope of needs that it addresses.

We follow Green (2006), Muñoz de Bustillo et al. (2011) and others in maintaining that only an objective concept of job quality can be defended. Though emotions are very important and play a contributory role in validating indicators of job quality, measures of job satisfaction or of well-being at work are not constitutive of job quality. Well-being measures do not necessarily correspond to the satisfaction of needs, so they are not acceptable as proxies for job quality. Other factors, moreover, affect well-being and job satisfaction, such as people's expectations and their personalities.

By "objective", we mean that characteristics of the job are the constituent elements. Of course, in a survey of individuals such as the EWCS it is job-holders who are the informants about the job's working conditions. Self-reported variables are sometimes referred to as "subjective", but this is a potential source of confusion when the self-reports are about objective job features. Rather, "subjective" is a term that should be reserved for reports of feelings, perceptions, attitudes or values. Most data arises from individuals' reports, even that which is entered into ledgers and read off automatically. It can be argued that self-reported data about job features is open to certain random errors or biases, perhaps arising from the social esteem of the features being described; and if so those biases can be subjective. Yet such biases arise potentially in all data reporting, whether self-report or not, and the differences in degrees of potential bias have to be set against the knowledge of the

³ Green, F. (2006) *Demanding Work. The Paradox of Job Quality in the Affluent Economy*. Woodstock, Princeton University Press.

person reporting. In the case of jobs, the individuals doing them are arguably the most knowledgeable in many situations. Moreover, the argument about reporting accuracy should not detract from the conceptual distinction between objective and subjective variables about work.

Using an objective approach does not mean assuming that job quality captures the extent to which each and every worker's needs are being met. On the contrary, job quality is constituted by generic elements that meet universal needs, but the extent of those needs will differ according to a person's circumstances, including the social and physical environment in which a person lives. Work-life balance, for example, is a property of the relation between job and the worker. Whether a job meets the need for a good work-life balance depends both on job features, such as flexible working hours, and on personal features, such as caring responsibilities. In the first approach, for example, one would try to derive an indicator for subjective work-life balance that would depend on workers' circumstances. In the second, one derives an indicator of work-life balance features of the job. To take another example, in the first approach one might include measures of the labour market environment (such as the unemployment rate) since this affects workers' employability chances. In the second approach, such external factors are not included as part of job quality.

There arises, therefore, a dilemma of principle. In one approach, the aim could be to derive measures of the extent to which the job meets a worker's needs, given that worker's circumstances. In the second approach, the aim could be to obtain a measure of job quality independent of workers' personal circumstances; in other words, features of work and employment which on average or overall meet workers' needs. The difference between these approaches matters in certain instances.

The first approach is exemplified in the work of the United Nations Economic Commission for Europe (UNECE), which has recently settled on seven dimensions, each with multiple indicators, to capture the "quality of employment", as part of its work designed to help support improved employment policies.⁴ For instance, UNECE's approach incorporates measures of inappropriate child labour as a negative indicator for employment quality, thus reflecting the worker rather than just the job itself. The "quality of employment" is a broader concept than job quality, and deploys indicators (such as the unemployment rate) of items at the macro and meso levels as well as to jobs. Also wide-ranging is the International Labour Organisation's the concept of "decent work", for which multiple indicators have been proposed, extending to indicators of union density, social protection, child labour and old-age pensions (Ghai, 2003; Bescond et al., 2003).

Again following both Green (2006) and Muñoz de Bustillo et al. (2011)), this report follows the second approach that draws solely on the characteristics of jobs. This means that we are able to derive indices by concentrating solely on job features as reported in the survey data. However, this decision does not preclude other analyses using EWCS, where analysts would utilise additional data, for example pertaining to the welfare state, or to personal circumstances, or to the local labour market. Moreover, the job quality indices to be derived could be expected to have a varying importance across countries and cultures, depending on the institutions and norms of the particular society. To take an example, job insecurity is likely to matter more where social insurance is weaker. Thus, objective job quality indices should be seen as a central part of a wider framework of indices covering a nation's employment quality, where the latter includes labour market and welfare state variables.

Intermediary categories of variables that refer to the relationship between the individual and the job also need noting. One example is whether the individual's education or skills are at a

⁴ These dimensions are: safety and ethics of employment, income and benefits from employment, working hours and work-life balance, security of employment and social protection, social dialogue, skills development and training, workplace relationships and work motivation. For an example of the application of these dimensions to Germany, see T. Körner, K. Puch and C. Wingerter (2011) "Quality of employment. Earning money and what else counts." Wiesbaden, Statistisches Bundesamt (Federal Statistical Office).

higher or lower level than those required for the job: it is known that the skills match is an important determinant of job satisfaction. Another example concerns working time, that is, whether the hours of the job match the worker's desired hours. Where desired hours exceed actual hours, this is a form of under-employment, a close relative of unemployment. A third example refers to variables that capture an individual's response to working conditions, such as whether they use personal protective equipment when supplied. Although the survey contains measures of some intermediary variables, this report does not include them in the job quality indices, following the same principle that this would involve personal preferences and characteristics. Nevertheless, their role could be analysed using the survey data.

To summarise, the report derives indices:

- using only objective items,
- using only items about jobs, and excluding items about personal circumstances and qualities.

Positive and Negative Indicators.

Job features can usually be categorised according to whether they contribute positively or negatively to meeting workers' needs. Pay, for example, would be regarded positively; while features that are known to pose broad physical or psycho-social risks to health and well-being are regarded negatively. It is in effect the absence or low prevalence of such negative items that are incorporated into our indices of job quality. There are, in addition, certain job features covered in the survey, important in their own right, about whom there are no unambiguous prior views about whether they are positive or negative in meeting needs. These features have not been used in constructing the indices.

2.2 Job Quality, Health and Well-Being

While job quality is defined by objective features of jobs, it is expected that there will be relationships between job quality features and the health and well-being of workers. This can occur for two reasons. The job features can have causal positive or detrimental effects on well-being, such as when a worker is exposed to harmful substances in the workplace. Alternatively, there could be a selection process whereby people's states of health and well-being channel them into certain kinds of jobs; for example, health limitations might prevent someone taking up employment that requires intensive physical effort.

The impact of job quality features on health and well-being has been studied in many micro-social contexts for a long time, leading to a substantive body of knowledge about occupational health and well-being. Warr (2007) provides an overview of a large number of studies. The design of jobs is of course in the most immediate domain of employers. But it should be remembered that companies are operating in competitive environments, and in deciding on their employment policies must take account of developments in technology and forms of work organisation if they are to seek to remain competitive. Moreover the impact of jobs on health and well-being should be seen alongside the roles of governments and welfare states, of the state of the labour market, of families, and of the persons themselves. The determination of people's health is therefore a complex process involving several actors, in which job quality (for those in work) is important but only one element in the equation.

In EWCS5 the measures of health and well-being are entirely self-reported. While self-reported indicators are commonly shown to be related to objective measures of health, this subjectivity needs to be born in mind when comparing health and well-being outcomes when, as is the case here, the job quality features are reported by the same individuals who are reporting about their health. Personality traits and dispositions can give rise to associations between job quality features and health or well-being, which may not reflect the

predicted causal chains. Nevertheless, the expected associations with well-being provide a useful means for helping to validate the job quality indices derived using the data.

2.3 Job Quality and Productivity

This project is focusing on the perspective of the worker. It is not considering directly any effects of job quality on the quality of productive activity, which is the variable upon which most employers are likely to be focused. Nevertheless, there are connections between job quality and the quality of productive activity. For several aspects of jobs there is evidence of a link between job quality and productivity at various levels.

Certain aspects of job quality are known to have direct effects on productivity of individuals and organisations. The skill level of work is perhaps the area where the association between job quality and productivity is clearest and most direct. As will be discussed below, the skill level of the work will be taken as one item making up the index of intrinsic job quality. At the same time, there is evidence showing the positive impact that more-skilled workers can have on both their own individual performances and that of the organisation that they work for. Consider the example of a recent study of the effect of communication skills on the job performance of gynaecologists: differences in job performance between male and female physicians were fully accounted for by the differences in their communication skills (Christen et al. (2008). Taking a dynamic perspective on skill, there is also good evidence that training which enhances skill is also associated with higher productivity (Dearden et al., 2006).

Another important aspect of job quality with implications for productivity is the wage rate. According to "efficiency wage" theory in economics, higher wages may not simply reflect higher productivity, they may also generate higher productivity (Akerlof and Yellen, 1986). This can happen through various channels. One way is if a higher wage rate increases the cost of job loss from doing sub-standard work: the implicit or explicit threat of losing the higher wage increases the pressure on workers to be productive. Another channel is less direct: by making a "gift" of a wage rate above the going rate, an employer receives in return the hard and productive work of the committed worker. Third, higher wages, by reducing labour turnover, can reduce the cost of recruitment and initial training. [Ref: Check Thornton, Johnes and Kycklak book].

Other aspects of job quality are also associated with indicators of productivity. The importance of a physically safe and healthy working environment, for example, has a self-evident link with productivity: accidents lead to losses of productivity as well as grief for employees. Other studies have examined direct links between other aspects of working conditions. In one recent example, negative social relations in the workplace (termed "workplace incivility") is found to have detrimental effects on the productivity of nurses (Lewis and Malecha, 2011).

Indirect effects have also been investigated, in that working conditions affect well-being which in turn impact on productivity. Good working conditions are found to affect workers' health, subjective well-being or job satisfaction in a number of studies. To take one recent example, Cottini and Lucifora (2011) show, using data from earlier waves of the European Working Conditions Surveys and from external sources, that high psychological job demands and a poor physical environment are detrimental for the mental health of workers. To take another, Green (2011) establishes the effects of insecurity combined with lack of employability on poor mental health and low life satisfaction. And this report demonstrates, in Section 4, that all the positive job quality indices derived from the survey are associated positively with health and well-being outcomes. Several earlier studies also show positive effects of workers' health or well-being on staff turnover, sickness absence, "presenteeism", or other measures of job performance (Warr, 2007: 407-434). Thus, connecting these two sets of findings, it seems that good working conditions can have an indirect impact on job performance and on proxies for productivity, via their effect on workers' well-being.

This study of the connections between job quality and firm performance remains, however, at a relatively early stage. First, there have been few studies that, through the use of longitudinal data and other quasi-experimental methods, have established that high job quality is *causing* high productivity. Many of the studies still rest on the interpretation of cross-sectional data, often with quite small samples. These factors typically make it difficult to rule out the possibility of reverse causation and other conflating factors: for example, it might be that highly productive firms choose to use some of their extra resources to introduce better working conditions than less productive firms are able to afford. Second, there are even fewer studies which address whether any productivity increases are sufficiently great to generate increases in profitability, once the extra costs of providing better working conditions are taken into account. A recent, rare, exception is the large-scale study of manufacturing firms in Germany, France, the UK and the US, which shows that the use of family-friendly management practices has no significant effect on company performance (Bloom et al., 2011). Since they were also beneficial for workers' well-being, the authors conclude that this may be an indication that the managers who instituted family-friendly practices were promoting workers' well-being, and that the shareholders did not have to bear a cost for this in terms of lower profits. The study found that family-friendly practices were more likely to be adopted when there was a high proportion of skilled employees, and a high proportion of females among managers.

In conclusion, although this report focuses on the perspective of the worker, this being a continuation and organic development of the approach taken by Eurofound (2002), in important aspects of job quality there is likely to be a congruence of interest, or at least no adverse trade-off, between the perspectives of the worker and of the employer. The extent to which this is the case depends on the costs of provision of good working conditions, which vary considerably among different practices, and are beyond the scope of this report. The strength of this conclusion, however, awaits further evidence that is able to establish the direction of causation with still more confidence.

2.4 Core Elements of Job Quality

In 2002 the European Foundation for Living and Working Conditions developed an influential conceptual framework, in which job quality was built upon four blocks: "career and employment security", "health and well-being", "reconciliation of working and non-working life" and "skills development" (Eurofound, 2002). Since that time the European Working Conditions Survey has evolved further, as has scientific study of the workplace, facilitating improved indicators for some concepts. Here, we build on the 2002 framework, and put into practice the general principles set out above (Section 2.1).

The objective concept of job quality focuses on the essential characteristics of jobs that meet workers' needs for good work. We again use four building blocks, but set them up in a somewhat different way. We distinguish two sets of extrinsic job features, "*Earnings*" and "*Prospects*", a somewhat larger set of intrinsic features of the work itself which we term "*Intrinsic Job Quality*", and "*Working Time Quality*". Each set contains elements, and the different disciplines, especially economics, sociology, and occupational psychology often make different assumptions about which are most important. For example, economists tend to put a good deal of weight upon wages, because of their relationship to income and then to living standards; while others sometimes focus their discussions on certain intrinsic aspects of the job. We adopt an approach that incorporates these multi-disciplinary insights, while looking to obtain indices that are not unduly sensitive to alterations in the assumptions.

Earnings.

Both the level and fairness of wages are positive indicators. The indicator of the level is "net hourly earnings" and the equivalent for self-employed workers. This concept is now treated as a separate building block (unlike with Eurofound, 2002), both because of its evident importance for living standards and because of improved questions allowing a more satisfactory measurement. The fairness of wages could not, however, be adequately captured with this data, and forms one of the potential challenges for future development.

Prospects.

Prospects refers to the aspects of the job that contribute to a person's need for employment. This need is, in turn, related both to the material need for income (now and in the future), and to the psychological need for employment continuity and enhancement that is associated with a person's self-esteem and identity. Job security is one of the key features, meaning the probability that the job will continue in future years. Subject to that, another important feature is whether the job offers the prospect of advancement, this being especially relevant for younger workers.

Prospects needs to be distinguished from "employment security". The latter depends, not only on features of the current job, but on a person's own qualities and on the labour market environment. "Employability" is the term given to the potential for gaining another job (Green, 2011). Both employment security and employability could be studied using the survey data, but are not included among our job quality indicators. This is because of the principle established above that only features of the job itself are to be included in the concept of job quality.

Intrinsic Job Quality

"Intrinsic job quality" refers to the aspects of the job that concern the work and its environment. Four core sets of features of work are associated with meeting people's needs: the quality of the work itself, the social environment in which workers are situated, the physical environment, and the intensity or pace of the work:

Skill Use and Discretion

Two separate but correlated concepts underpin the idea of quality of the work itself: the skill required in the job, and the level of autonomy afforded in the job to the worker (Attewell, 1990). These two are connected, not least because workers must have the capability to understand the labour process if they are to make decisions about their own work tasks. In some sociological accounts, autonomy is itself regarded as an aspect of skill. For our purpose here, both the skill level and autonomy capture something of the extent to which the work fulfils a need for doing good work.

Social Environment

Research has shown the importance of the social environment in a job for meeting people's needs and for generating well-being (Parkes et al., 1994). On the positive side the level of social support that a worker receives is widely found to correlate positively with health and well-being (Warr, 2007: 128-133). While the majority of this research focused on the quality of line management, also important is the support available from colleagues or friends at work. Social support is known to be especially important in otherwise stressful work situations. On the negative side, social relationships with other employees can themselves be detrimental, especially on the relatively rare occasions when they become abusive or exploitative. Thus, both the positive and the

negative aspects of the social environment are essential features of job quality.

Physical Environment

It almost goes without saying that another essential feature of job quality is the absence of physical or posture-related hazards that are known to pose risks for health and well-being. These aims are at the core of the occupational health and safety profession, and are furthered by widespread regulation of workplaces. The progress of health and safety knowledge, and evolving regulation, has improved workplaces in Europe substantially since half a century ago, but further progress is needed and requires monitoring. An index capturing environmental security is therefore an essential feature of job quality.

Work Intensity

High "work intensity", which constitutes overall a negative contribution to intrinsic job quality, refers to the intensity of labour effort during work time. A broad conception of labour effort is adopted for this project, incorporating both physical and mental aspects. These are typically expressed in terms of a range of "demands" placed upon workers, whether physical, cognitive or emotional. At low levels of work intensity there is some theoretical and empirical ambiguity as to the relationship between work intensity and job quality. It could be argued that a job where workers were not challenged, and that entailed a lot of idling and a low pace of work, would become dull and fail to satisfy a need for activity. Whether or not that is accepted, increasing effort during work time – termed "work intensification" – has been widely recognised as a potential cause for concern in the last two decades (Wichert, 2002). Highly-intensive labour effort is known to be a major stressor, especially if it is required in combination with low levels of personal discretion and control in the job (Karasek, 1979). Emotional dissonance, when workers are expected to show false emotions or hide their own, is also known to be a source of stress, especially in service occupations (Zapf et al., 2001).

Working Time Quality.

"Work-life balance" encapsulates the extent to which a job meets the needs for a good balance between the demands of work and of life outside paid employment. Both paid work and other activities require time and resources. As such it is a concept that applies to the relationship between the job and the worker, not exclusively to the job. Work-life balance is not, therefore, *per se* an aspect of job quality; it is something that may or may not be achieved well by individuals. In this project the aim is capture features of the job that contribute to needs, so the relevant concept is that set of job features that are generally conducive to a good work-life balance. These features consist primarily of aspects of the timing of the job, but could also in principle include the provision of services such as child care. The survey contains extensive data on the timing aspects. The report aims to derive an indicator of the quality of working time, where "quality" here is viewed in relation to the expected extent to which the working time meets workers' needs for work-life balance.

2.5 The Number of Dimensions

The four building blocks and concepts outlined above suggest that it would be appropriate to construct four corresponding indices. The raw material, however, for the indices is a very much larger number of items in the survey, each describing detailed aspects of jobs. Combining them into a small number of indices involves looking for statistical correlations among similar items and for a theoretical coherence.

Deciding the number of dimensions requires an evaluation of the balance of opposing arguments. With fewer dimensions, the analysis of the distribution of job quality among groups becomes more tractable and easier to present. This advantage is to be set against the loss of detail, the necessity of relying on more assumptions about the weight to be attached to each element for which there may be less than full agreement, and the greater difficulty of interpretation when using very highly aggregated indices. The latter disadvantage has implications for how indices can be used for policy analyses.

The number of dimensions included above is seven, and a case might be made for working with indices for all seven. However, there is a good case for reducing these still further. In particular, it made sense to combine the constituents of intrinsic job quality into one index. The idea of intrinsic job quality would seem to be readily understandable. This aggregation requires weighting assumptions, since the correlations between elements are far from perfect – individual jobs and country averages that rank highly on one sub-index need not do so on another. We used weights guided by our findings about how each domain is related to various health and well-being measures, and conducted sensitivity analyses in support.

In some previous studies, analysts have gone much further in reducing the number of dimensions. They have aimed to reduce the number of dimensions to one, in other words to produce a single index of job quality. This might be justified from a rather pure theoretical perspective in economics, whereby there is assumed to be a utility associated with each job, and a single job quality index would then be seen as measuring that utility. However, to compute that index would require heroic assumptions about how individuals can trade off job quality features against each other in a "perfectly competitive" labour market, and find a job that closely matches their preferences given their skills. This "compensating differential" approach has been criticised elsewhere (Green, 2006).

It might nevertheless be argued that there is a case for reducing the number of dimensions to one, on the grounds of providing a greater ease of presentation – this is the reasoning behind the decision of Muñoz de Bustillo et al. (2011) to opt for a single index.⁵ We decided that this argument was not persuasive. The term "job quality" is evidently a multi-faceted concept, and we judge that when people use the term they are implicitly thinking of a set of dimensions. The problem in using a single job quality measure in scientific analysis is that it can be interpreted differently by different listeners. Not least, there is a well-known tendency for economists to think of job quality largely in terms of wages, and occasionally for other social scientists to think of job quality as anything else other than wages. Even among non-wage aspects, users of a single index would be confused as to which aspects are being measured and discussed. With a single index of job quality, the danger is that an artificial league table is encouraged that may serve as a somewhat blunt or even misleading guide for policy-makers.

In contrast, each index used in analysis should be readily interpretable and as transparent as possible. Our proposal for an *Earnings* index, a *Working Time Quality* index, a *Prospects* index, and an *Intrinsic Job Quality* index, better satisfies these criteria than a single "Job Quality" index. Four indices is not so many that they cannot be readily presented and appear meaningful in a range of settings. In addition, having four indices allows analysis of how the

⁵ Leschke et al. (2008) also opt for a single index, possibly for the same reason, but they do not present an argument for doing so. They call for a comprehensive index, with which we agree, but this need not have a single dimension.

different aspects may rank differently across countries and socio-economic groups; and analysis of the different ranks is likely to be of more value for policy purposes than analysis of an overall index of "job quality" whose meaning is unclear.

3. Construction of the Job Quality Indices.

Any development of job quality indices must confront an inherent problem, namely that, apart from wages, none of the other features has an obvious universal unit or metric. Their presence in a job can typically only be gauged up to some short ordinal ranking of intensity, often as simple as yes/no: "is the feature present or not?" This lack of a universal metric combines with the fact that job features are reported by fallible individuals. Researchers rarely have the opportunity to check the accuracy of responses to their surveys. However, these difficulties of measurement are not unusual and can be overcome if care is taken. To compensate one must construct items and indices that are transparent in their design and meaning, so that they can plausibly be compared between individuals, and in the case of a harmonised survey, between people's of different cultures and languages. While great care has been taken to adhere to this principle as far as possible in the design of items for the survey, equally important is that indices built with these items must be transparent.⁶

In this section we summarise how we constructed the four indices of job quality, based on the conceptual discussion above, and in each case present a brief initial presentation of the distribution of the indices across the entire sample of 34 countries. We start with some general considerations pertaining to index construction, as they apply in this case.

3.1 Some General Considerations.

3.1.1 Weights.

The indices of intrinsic job quality, working time quality and prospects are generated from multiple survey items, and from aggregation of sub-indices. To do so requires weights to be attached to each sub-index, and the issue arises as to how these should be determined. There are no universal rules for determining weights, and previous studies' practices vary. For example, Leschke et al (2008) assign their own normative weights, including an equal weighting to the six sub-indices that go to make up their overall index of job quality. Muñoz de Bustillo et al. (2011) impose weights on their sub-indices, and test for the sensitivity of their overall indices to the weights chosen.

We adhered to the following principles:

a) Where appropriate, similar items are first normalised so that they have a 0-1 range, and then grouped in a summative index. The extent to which items in a group capture a unified concept is shown by "Cronbach's alpha" statistic. Items whose inclusion would lower alpha significantly, or which had a low correlation with the index formed by remaining items, were excluded. Where relevant we report alpha on the base of the full sample of 34 countries. We also checked whether consistency differed substantially between separate samples of men and women. In no case did we find this to be so; hence we do not report these separate alpha statistics.

b) When multiple indices are aggregated together they were accorded equal weights, except where it is found that the indices have considerably different associations with subjective well-being and other 'outcomes'. The idea behind this principle is that our weights are guided by – but not determined by – the relationships with well-being. An alternative strategy followed in some previous studies (e.g. Holman and McClellan, 2011) is to allow weights of all items to be determined statistically by their relationships with job satisfaction and health

⁶ For an overview of some recent attempts to define job quality indices, see Muñoz de Bustillo et al. (2011).

outcomes. We did not follow that approach here for three reasons:

- i. The estimated conditional relationships between job quality and health/job satisfaction outcomes cannot be taken as unbiased estimates of causal effects, because of the risk that, in cross-sectional studies, there will be other factors affecting well-being that are also associated with job quality features.
- ii. The subjective well-being measures are inevitably imperfect and incomplete indicators of the emotions being felt.
- iii. Well-being indicators, however perfect, may be related to, but do not necessarily express the satisfaction of needs, according at least to some theories of need.

Hence, we did not think that the precision accorded to such a weighting procedure could be justified here. Rather, the relationship of an index with well-being is used by us as a guideline, and by extension as one of the means through which its validity can be checked. Other criteria, including theoretical relevance, are also used.

c) A further consideration, however, is conformity and compatibility with indices derived using earlier surveys in previous studies. Subject to the first two criteria, we have aimed to conform with some of the weighting decisions taken, in particular, by Muñoz de Bustillo et al. (2011).

3.1.2 Non-Linearity and Combinations?

For the most part, it is reasonable to input items linearly into indices. Arguments could, however, be made for including some form of non-linear inputs or combinations of inputs. One example is the proposition that more of some job features is beneficial up to a point, but that beyond that point there is less benefit to be had – this is the "vitamin" metaphor developed by Warr (2007). Another example is the demand-control model of Karasek (1979), whereby the detrimental effects of high effort jobs can be reduced by granting high levels of worker autonomy. A third illustration is the effort-reward model, whereby high work intensity is viewed as especially detrimental if combined with low levels of remuneration or other good working conditions (Siegrist, 1996).

In practice, however, it is difficult to identify precise thresholds to capture non-linear effects, especially in large nationally representative and heterogeneous samples; and it would be equally hard to construct harmonised and consensual combinations of sub-indices that would both incorporate the richness of the survey data and some of the more specialised models of the determinants of well-being. Such models could still be analysed, using combinations of the few relevant items in each case, but for the most part this report eschews the use of non-linear assumptions and combinations of indices for the construction of job quality indices.

3.1.3 Missing Values

Many items have missing values. In most cases these are few, and this is a good indication of data quality. Yet, when items are aggregated into indices, if cases with any missing values on any of the constituent items are discarded, one can end by losing many cases and much information, and potentially a non-representative sample of the national working population. Hence, where appropriate the method for generating indices makes use of the available non-missing items. This is possible for summative indices of items that are found to capture a unified concept: the resulting index is the average of the available items. Similarly, in cases where the index is the sum of job characteristics where present – for example, the number of sources of work pressure – we count the number ticked as present and set any missing items to zero. However, in other cases this is impossible, and in the case of monthly earnings there are an especially large number of missing values. Any index or combination

of indices derived from this item will therefore have many missing values. This gap could technically be filled by imputing the missing values from the non-missing data on other items, but this would require some quite strong statistical assumptions to be made. We have opted not to do so in this report.

3.1.4 Validation

A complete assessment of validity would entail independent methods of checking whether the indices are positively related to meeting needs, which is beyond the scope of this report. To partially assess the validity of the indices we follow certain principles. In their construction we aim for internal 'reliability' where summative indices from multiple items are presented as capturing unified concepts. We then look for some criterion validity in the constructed indices in two ways:

- Where appropriate, sub-indices have been compared to expected antecedents and outcomes. This is possible in a few instances. For example, we have prior expectations about how skill use and discretion are associated with the occupational hierarchy; and of how job insecurity in a country is connected to the unemployment rate.
- Overall, we expect the four job quality indices to be associated with indicators of well-being. In Section 5 we conduct an analysis of the association of the indicators with subjective well-being, the presence of health problems and other outcomes.

3.2 The Indices.

The overall structure and a brief description of the four job quality indices, and a list of the items that together are used to construct the indices, are shown in Table 1. We now describe how each index is assembled. The question numbers used in this section refer to the survey questionnaire (see Annex).

Table 1. Structure of the Indices of Job Quality

| Index | Brief description of content | Items Used In Construction * |
|------------------------------|--|--|
| <i>Earnings</i> | Hourly earnings | EF10, EF11, Q18 |
| <i>Prospects</i> | Job security, career progression, contract quality | Q77A, Q77C, Q6, Q7 |
| <i>Intrinsic Job Quality</i> | <i>Skill Use and Discretion (0.25)</i> | Q61A, Q61C, Q49C, Q49E, Q49F, Q50A, Q50B, Q50C, Q51C, Q51E, Q51I, Q51O, Q24H, ef1_isced, isco_08_2 |
| | <ul style="list-style-type: none"> • skills and autonomy | |
| | <i>Good Social Environment (0.25)</i> | Q51A, Q51B, Q58A, Q58B, Q58C, Q58D, Q58E, Q77E, Q70A, Q70B, Q70C, Q71A, Q71B Q71C |
| | <ul style="list-style-type: none"> • social support, absence of abuse | |

| | | |
|-----------------------------|--|---|
| | <p><i>Good Physical Environmental</i> (0.25)</p> <ul style="list-style-type: none"> • low level of physical & posture-related hazards | Q23A to Q23I, Q24A to Q24E |
| | <p>[100 - <i>Work Intensity</i>] (0.25)</p> <ul style="list-style-type: none"> • pace of work, work pressures, & emotional/value conflict demands | Q45A, Q45B, Q46A to Q46E, Q51G, Q51L, Q51P & Q24G |
| <i>Working Time Quality</i> | Duration, scheduling, discretion, and short-term flexibility over working time | Q18, Q32, Q33, Q34, Q35, Q39, Q40, Q43 |

* Question numbers refer to the questionnaire, in the Appendix to this report. The programmes used to construct the indices can be obtained on request from the authors.

3.2.1. Earnings

We considered two aspects of earnings in relation to job quality: its level and its fairness.

Level

The level of monetary rewards is a core element of job quality, and the main element of rewards is pay (or earnings for the self-employed). The survey captures net earnings, after deductions of taxes and social insurance contributions. Since these contributions vary considerably between countries, this indicator will differ from the labour costs borne by employers. There is a choice of target indicators between monthly earnings and hourly earnings. The second of these captures the price of labour, and thus the extent to which each hour contributes to needs; while the first captures the overall extent to which the job meets the needs for income to support a standard of living. It is this first indicator, monthly earnings, whether as employee or self-employed, which most closely corresponds to the objectives for the job quality indices, that is, to pick up the extent to which the job is meeting people's needs. Hence a harmonised monthly earnings variable is computed.

The survey contains four variables measuring income. EF10 is net monthly earnings from the main job in national currency. EF10_eu is net monthly earnings from the main job in Euro (obtained by converting EF10 into Euros). EF11 is income coded in bands. Note that respondents were asked to answer only one of the two questions. EF10 and EF10_eu have 29617 observations and EF11 has 7627. We combined the data from EF10_eu and from EF11. For the individuals who responded on EF11, we replaced the banded responses with average income obtained from the continuous variable EF10_eu for the same bands.

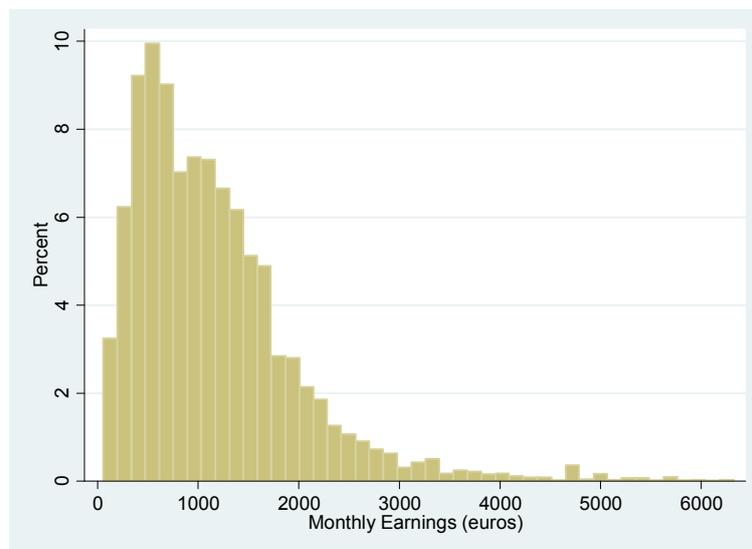
As is well known prices vary between countries, so the same monetary wage is worth less where prices are high. To account for this, monthly earnings were divided by the Purchasing Power Parity (PPP) index obtained from EUROSTAT, in order to make the figures comparable between countries in real terms.

Finally, we removed a small number of outliers by coding the top and bottom 0.25% of the income observations as missing. These were removed because they had an unusually high or low level of hourly income possibly caused by mistakes in data-entry. Unsurprisingly monthly earnings is the variable for which most data are missing; there is a minority, about 1 in 6, who do not respond about their monthly earnings in either way.

Note also that the survey does not cover subsidiary elements of the reward package, such as employers' contributions to occupational pension schemes. Since rights to future pensions – sometimes referred to as a "deferred wage" – is becoming more salient with the extension of expected retirement periods, it would be useful to consider including items to capture these rights in future surveys.

The distribution of hourly earnings across Europe is shown in Figure 1. With median and mean values at, respectively €984 and €1,160, the figure shows a monthly earnings distribution with a strong positive skewness: a small fraction of earners have very high earnings, which raise the average earnings above the median (the middle point of the distribution).

Figure 1. The Distribution of Monthly Earnings.



Fairness of wages

Also relevant for job quality is the extent to which monetary rewards are fairly determined. The latter may seem somewhat subjective, since perceptions of fairness vary among individuals; however, the need to be treated fairly is widespread, and most would sign up to the principle that persistent rewards above or below a normal return to effort, skill and risk-taking may indicate unfairness. Illegal pay discrimination, for example, would be a manifestation of such unfairness. In addition, perceptions of fairness may reflect the transparency and openness of processes of pay determination.

Designing indicators for fairness over wages is, however, complex. The survey investigates discrimination (Q65) but this variable cannot be used because it does not just apply to pay. Rather, it will be suitable for any analyst wanting to focus generally on discrimination. Q77b attempts to capture people's perceptions that they are "well paid" for the work, but we did not think that this was sufficiently tightly worded to capture the concept of fairness. The alternative might have been to estimate normal returns to effort, skill and risk-taking and obtain an indicator of unfairness from the residuals – the pay above or below what would be predicted for each individual. While in principle this might work, this method requires very good measures of the determinants of pay, to be sure that the residuals capture unfairness, rather than the returns to some hidden but acceptable factor such as an individual's exceptional talent.

In short, it was not possible to robustly capture the fairness of wages from the data. We think that it could be possible in future surveys to ask questions that would validly tap some aspects of unfairness.

3.2.2. *Prospects*

We capture *Prospects* through workers' reports about the future continuity and enhancement of the current job, comprising job security and career progression prospects. The first variable for capturing job security is Q77A, the probability of job loss. Second, Q77C captures career prospects. There is evidence that self-reports of the probability of job loss have validity, in that they predict subsequent job loss frequencies (Dickerson and Green, 2012).

As noted above, the prospects of a job are not the same as employment security. Thus Q77E (the ease of getting another similar job) is a crucial variable if the aim is to measure employment security, since it captures the extent to which a person is employable. But it does not capture a positive aspect of the job currently held, except perhaps indirectly in so far as that job might afford opportunities for the worker to gain certain skills and become more employable. Indeed Q77E might even be thought to have a negative connotation for job quality, in that lower-paid jobs might be more easy to replace than higher-paid jobs.

Also commonly used as an indicator of the prospects of a job is the nature of the job contract. quality, since this has potential implications for job continuity. An advantage of contract status is that it is relatively easy for workers to report it. The disadvantage for present purposes is that contract status is only a proxy for the concept that we are trying to measure, namely the likelihood of job continuity. Indefinite contracts can be ended, more easily in some countries than others. Fixed-term contract jobs are frequently renewed, as are temporary agency jobs. Both the meaning and the legal connotations of contract status can vary between countries. Compared with Q77A, therefore, contract status (Q7) is less satisfactory. Both Q77A and Q7 are workers' reports about job continuity, but Q77A matches the target concept more closely. The salience of contract status extends also to the question of whether the job falls in the informal economy, beyond the reach of national regulation, sometimes leading to a "vulnerable" state for workers. It is likely that the survey will not have reached some small sectors of highly vulnerable workers. In a significant minority of cases employees reported that they had no contract of employment at all.⁷

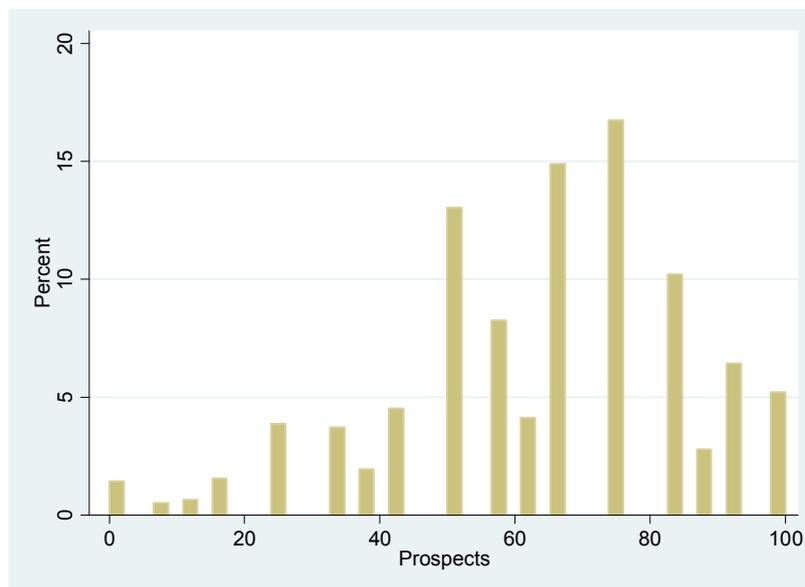
There then arises the question as to whether to augment the *Prospects* index by contract status, perhaps because that status is *per se* something that contributes to job quality, over and above any implications for job continuity. We opted to follow this approach. We defined an index of contract quality for employees to be 1 for an indefinite contract, 0.5 for any form of temporary contract, and 0 for employees with no contract.

Our index of prospects of the job averages the multiple ranked responses to job security, career prospects and contract quality. In the case of self-employed workers, the average is formed only from the other two variables.

The distribution of *Prospects* is shown in Figure 2. Unlike the other indices, this one has relatively few data points, but it is quite evenly distributed across the range. More items covering aspects of prospects for jobs in any future survey would help to generate a more fine-tuned index.

⁷ The category of "no contract" in the survey is heterogeneous, mixing the informal economy and legal situations where no written contract is requested. Individuals with no contract represent about 8.8% of the data and they have relatively low levels on the four job quality indicators. Three fifths (60%) of these are men. Also, the majority (61%) work in small establishments of less than 10 workers.

Figure 2. The Distribution of Prospects of Jobs.



3.2.3 Intrinsic Job Quality

We have sought unified indices to capture each of the four aspects of intrinsic job quality identified in Section 2, and then aggregated these to generate the *Intrinsic Job Quality* index. We first discuss each of the constituent indices, before describing how we combined them.

Skills and Discretion

The survey contains some items covering skills use, including task complexity, problem-solving, computer use frequency, employer-provided training, on-the-job training, and learning participation. Computer use indicates the skill of being able to use a ubiquitous new technology in the modern era, and is found in formal studies to be strongly related with other indicators of skill (Green, 2003). These items are of considerable value, but do not constitute a full coverage of skill requirements. The items are supplemented, first, by an index of the average education level found in the 2-digit occupation into which the job is classified ("AvEd"), normalised to the 0-1 range. This indicator, while not ideal, serves as a proxy for the education level required in the occupation, and is distinct from the person's own education. Second, the classification of the occupation is also used: a dummy variable, equal to one if the job is classified in groups 1 to 3 of ISCO_08, zero otherwise, is included in the index. These two additional indicators help but they are only proxies for the concepts of interest. We make some recommendations below (Section 8.4) for additional or substitute items that might, in future surveys, help to capture skills use. The current survey also includes several variables that capture aspects of the worker's discretion, over both the work itself and its timing, which are to be incorporated, given the theoretical association between discretion and skills use. The survey does not include any direct indicators of the level of prior education, training and experience required for each job.

These, then, are the variables, the sum of which are used for the *Skills and Discretion (SD)*

index, normalised to the 0-1 range: Q61A, Q61C, Q49C, Q49E, Q49F, AvEd, Q24H, isco_08_1, Q50A, Q50B, Q50C, Q51C, Q51E, Q51I, Q51O.⁸ They have a Cronbach's alpha of 0.80, which is considered adequate if the items are thought to capture a unified concept. The resulting index was then normalised to the range 0-100.

Other potential item concerned team autonomy and job rotation. In each of these cases it was found that, if the item was included, the relevant reliability statistic was reduced, and that there was a low correlation with the index formed by the remaining items. It was decided not to include either of them in the *Skills and Discretion* index.

Good Social Environment

This index is comprised of two elements covering social relationships in the workplace, one essentially positive, the other negative, in their contribution to job quality.

The *Social Support* index reflects the need for good social relations with line managers and fellow workers, and draws from the literature that finds that the presence of other supportive people in the workplace has direct beneficial effects for welfare; moreover, it moderates the negative impact of stressors. It is built from the following variables: Q51A and Q77E, capturing supportive colleagues and friends; and, for employees only, Q51B, capturing supportive management, and items Q58A to Q58E which are summed to give a measure of the quality of management provided by a worker's immediate manager or supervisor.

On the negative side, social relations in the workplace can be sour. The survey has several items designed to capture abusive experiences, including verbal abuse, threats and humiliating behaviour, physical violence, bullying and sexual harassment over defined recent periods. Although each of these experiences are thankfully uncommon, we reasoned that any such detrimental elements constitute a large detraction from the extent to which the job meets needs, and so opted for a non-linear measure. We computed a 0-1 dummy variable "*No Abuse*" to indicate if any of these items are replied to in the affirmative (0, if all items negative, then 1 if one or more abusive experience had taken place). An alternative approach would be to design a summative index, normalised to 0-1. In practice, this decision makes no great difference to the intrinsic job quality index.

The *Social Support* and the *No Abuse* indices are summed to generate the "*Good Social Environment*" index, which was then normalised to the 0-100 range. This means assigning equal weight to the positive and negative aspects of the social environment. We could see no reason to disproportionately weight either. (Referring to the well-being outcomes to be described below, Section 5, we found that subjective well-being was slightly more strongly associated with the *Social Support* index, while health problems were slightly more strongly associated with the *No Abuse* index).

Good Physical Environment

The survey contains several items capturing environmental hazards (all of Q23), and several more capturing posture-related risks (Q24 A, B, C, D, E, G). We excluded some other items in Q24 (interactions with people and use of the internet) which have no unambiguous relationship with needs and welfare; while computer use is included elsewhere. For the rest, the direction of the relationship with environmental hazard and hence need is clear.

There is in principle a choice between whether to focus on whether there is any exposure at all to each hazard; alternatively, one could give weight in the index to hazards which are

⁸ A further item, reporting whether the job involved "monotonous" tasks, was omitted from the index, even though it might be construed as a rough negative proxy for skill. If included it would have lowered the alpha statistic, and it had by some margin the lowest item-rest correlation (the correlation coefficient between the item and the scale formed by all other items); these suggested exclusion from the index.

experienced with a high frequency, perhaps more than half, or all of the time. In generating our index we opted for a simple and transparent approach which more heavily weights exposures which were more frequent. We computed the *Good Physical Environment* index, by allocating numbers to the frequency response scale from 0 (all of the time) to 6 (never), and summing the scores from all the posture-related and environmental risk features. We then normalised the resulting index to the 0-100 range.

Work Intensity

We constructed a summative index, labelled the "*Work Intensity*" index, from Q45A ("working at very high speed"), Q45B ("working to tight deadlines"), Q51G "You have enough time to get things done", a count of the number of sources of work pressure (Q46) (normalised to the 0-1 range), and an average of three items reflecting the pressure from hiding emotional/value conflict (Q51L, Q51P and Q24G). The index was normalised to the 0-100 range.

The case of *Work Intensity* illustrates a general point. We noted above (Section 2) that effort may have a non-linear relationship with well-being. On the whole, it is regarded as a negative indicator of job quality, but at low levels of work intensity the relationship could be small in magnitude or even positive. Indeed, we found some evidence of a quadratic association for some of our indicators with subjective well-being, consistent with Green (2008). However, feeding in asymmetry into the index, for example by taking a threshold for effort, above which it is deemed a negative contribution to work, adds an element of arbitrariness in the choice of the threshold level. It is not practical to generate a transparent and simple quadratic index. A simple "high-effort" index that captured being in the upper quartile would miss the significant differences between middle and lower quartiles. It is therefore better in this instance to leave analysts the option to conduct their analyses with non-linear combinations of the indices generated from the data, according to the particular problem in hand, while utilising the linear *Work Intensity* index within the overall index of intrinsic job quality.

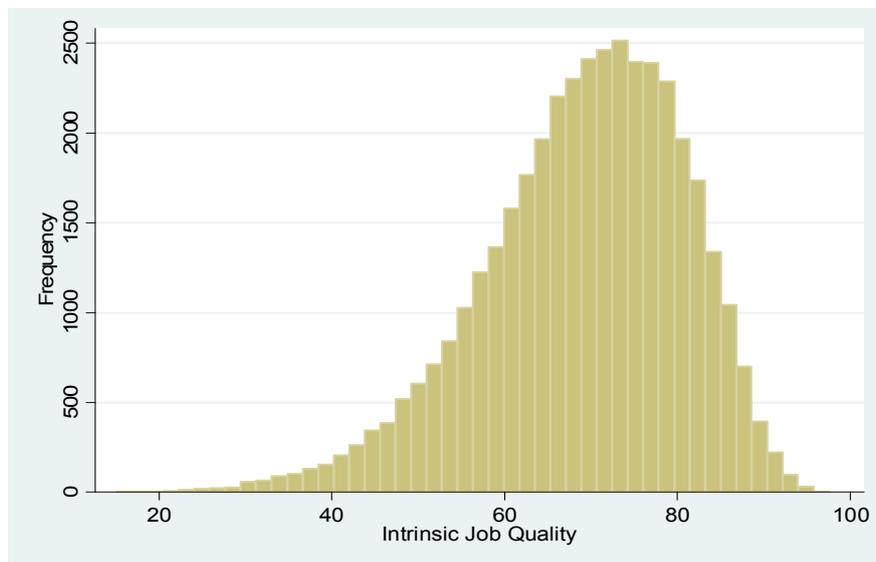
Overall Index of Intrinsic Job Quality

To generate the overall *Intrinsic Job Quality* (IJQ) index we first subtracted the *Work Intensity* index from 100 to create a positively-contributing index, which we then aggregated with the other three indices: *Skills and Discretion*, *Good Social Environment* and *Good Physical Environment*.

We weighted each of the four components equally in the aggregate index. We investigated an alternative approach which would have involved giving less weight to *Work Intensity*, since it might be argued that most workers' needs are more closely related to the other three aspects than to the pace of work. To do this, we first computed an alternative index that allotted a weight of only 0.1 to *Work Intensity*, and gave a weight of 0.3 to the other indices. Then we compared the levels of *Intrinsic Job Quality* with those of the alternative index, across 2-digit industries and across countries. The correlation coefficient was very high: 0.97 in the case of industry, 0.95 in the case of countries. Hence, the impact of the alternative weighting assumption would have been relatively small.

The distribution of IJQ is shown in Figure 3. As can be seen, this distribution is somewhat negatively skewed. Most jobs fall within the range of approximately 60 to 85 in the 100 point scale. There are a few very good jobs with scores up in the 90s, and at the other end quite a long tail of jobs with poor intrinsic job quality.

Figure 3. The Distribution of *Intrinsic Job Quality*



3.2.4. *Working Time Quality*

As with the other indices of job quality, with work-life balance the focus is on job features, not on the characteristics of individuals doing the jobs. Primarily, the balance to be struck involves time, even though a more complete index might also pick up the provision of other resources such as on-site child care. In practice the relevant available indicators all concern aspects related to time, rather than the availability of services. Hence we construct a *Working Time Quality* index comprised of four sub-indices.

We follow in an identical manner the approach taken in Muñoz de Bustillo et al. (2011) for three out of the four sub-indices. Thus, we construct sub-indices for the duration, conducive scheduling and discretion over working-time arrangements using exactly the same items. The first sub-index is usual weekly hours which is classified as: 0 (48 hours or more), 25 (42 to 47 hours), 50 (38 to 41 hours), 75 (20 to 37 hours) and 100 (under 20 hours).⁹ The second sub-index is derived from several items: the number of times a month the worker works more than 2 hours between 10.00 pm and 05:00 am, classified as 100 (0 hours), 75 (1 to 5 hours), 50 (6 to 10 hours), 25 (11 to 20 hours), 0 (more than 20 hours); the number of times a month the worker works more than 2 hours between 06.00 pm and 10:00 pm, coded exactly as the second; the number of Saturdays and Sundays worked by the respondent, again both coded in the same manner, 100 (0 days), 75 (1 day), 50 (2 days), 25 (3 days), 0 more than (4 days). Discretion over working time arrangements is coded as follows: 0 (if changes occur regularly and they are set by the company), 25 (if changes don't occur regularly but they are set by the company), 50 (if the worker can choose between several working schedules), 75 (if the worker can adapt his working hours within certain limit), 100 (if the working hours are determined by the worker).

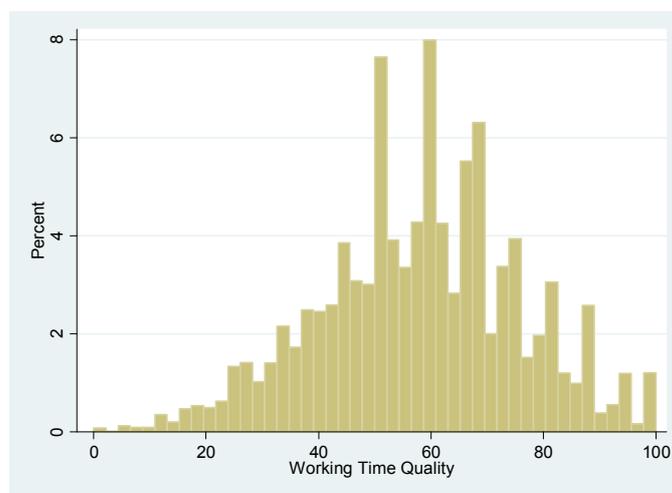
For the fourth sub-index we depart from the practice of Muñoz de Bustillo et al. (2011), who

⁹ It might be argued that a simple dummy variable for whether the working week exceeds 48 hours would be preferable, given that 48 hours is the threshold for the European Directive on Working Time. However, throughout the range of hours a negative association was found between working hours and well-being indicators, including subjective work-life balance (Q41), supporting the decision of Muñoz de Bustillo et al.

input an index of work intensity. In our view there is insufficient evidence and justification for including work intensity at this juncture, rather than as an aspect of intrinsic job quality (see above). Rather, the fourth element comes from an important new item in the 2010 survey that captures short-term flexibility (Q43): how easy it is for the worker to take an hour or two off during working hours to take care of personal or family matters. We generate a short-term flexibility sub-index of 0 ("very difficult"), 33.33 ("somewhat difficult"), 66.66 ("not too difficult") and 100 ("not difficult at all"). This and the other three sub-indices are summed with equal weight to give the *Working Time Quality* index.

The distribution of the *Working Time Quality* index is given in Figure 4. It shows a wide variation among jobs according to their ability to afford a good work-life balance.

Figure 4. The Distribution of the *Working Time Quality* Index



3.3 Important Item Sets Not Included In The Job Quality Indices.

It is not claimed that the Job Quality Indices derived in this report are all-inclusive. They do not, and could not practicably, cover every relevant job feature. A judgement has been made, initially at the stage of questionnaire design, on the inclusion of the most important variables. A second stage of judgement is required, however, at the analysis stage. There are some relevant aspects of jobs that do not fit neatly into any of our four indices, and may require to be analysed separately as required. Some other items are not included because they refer, at least in part, to the individual rather than the job.

3.3.1 Discrimination.

Discrimination is arguably a significant negative aspect of job quality, even if only a small minority experience it. Q65 refers to perceived discrimination on the basis of 7 characteristics. Only a few reported discrimination for each characteristic. We created a *Discrimination* index, being the count of reported experiences of discrimination. Overall, 6.2% of the overall sample said that they had been discriminated against in some form in the last year, with age discrimination the most prevalent.

However, since the items do not specify over what aspects of job quality the discrimination takes place (pay, conditions, or what), it is not possible to use these items to enrich any one of the job quality indices. The discrimination index correlated negatively with all indices, but generally only at a low level, except with the *No Abuse* indicator (at -0.24), and through that

with the *Good Social Environment* index at -0.24. One possibility could have been to include discrimination in the *Good Social Environment* index. However, discrimination can just as easily refer to other job quality domains, including pay. We decided, therefore, to omit these items from our indices since it is unclear where to place them. However, the *Discrimination* index could readily be used by those studying this aspect of employment relations, alongside the other indices.

3.3.2 Participation and Representation.

There is a distinction between workers' involvement in decisions that directly concern their own jobs and "participation" in organisation-level decision-making. The latter can, in turn, entail anything along a spectrum from being informed about organisation-level issues (e.g. via newsletters) to genuine involvement, perhaps through representation, in organisation-level decisions, through membership of boards.

The questionnaire includes a trio of items about forms of organisation-level participation (Q62, appraisal; Q63, unions; and Q64, meetings), and two more that are unclear about the level of involvement (Q51D and Q51O). The latter two have already been included in the *Skills and Discretion* Index. Should the former three be included as part of job quality?

There are two possible approaches to organisation-level participation and job quality. One is to view participation *per se* as something that meets peoples' needs from a job, in which case there should be an indicator for this, which might be embedded in one of the indices, or indeed regarded as an index in itself. Yet, with only three items (Q62, Q63 and Q64), it is questionable how fully we could capture reliably the nature and extent of organisation-level participation in an index. Moreover, it is less evident that organisation-level participation is something that is a significant part of many peoples' needs from a job – except in so far as it could be important for securing favourable pay and working conditions. In other words, there will be many for whom involvement in their organisation is important, but for many others this would be at most a secondary concern.

Alternatively one could view organisation-level participation as a means through which people may gain better job quality. One would therefore use the available variables as potential antecedents of job quality. More opportunities to express one's views would thus be expected to be associated with higher job quality.

We have decided not to develop a separate participation index on two grounds:

- the balance of the arguments is that participation *per se* is not near the top of the hierarchy of most people's needs from work,
- there are in any case too few items for a satisfactory self-contained index. Subject to other factors, this topic might be a potential area for further development of the survey. It is also noted that more detailed social dialogue indicators encompassing this domain of participation are being developed for the 2013 European Company Survey. We recommend that consideration be given to deriving a participation index from this more detailed data source when it becomes available.

3.3.3 Other Psychosocial Risk Items

The 5th survey contains other questions that have a bearing on the psychosocial risks of work. We have already noted the items covering the demands on one's emotions in the workplace: Q51M: "You get emotionally involved in your work", and Q51P: "Your job requires that you hide your feelings". Researchers could separately analyse these items, but it made no statistical sense to incorporate them into the indices.

Respondents are also asked to say whether they experience stress in their work (Q51N). As would be predicted, this variable is strongly associated with work effort. For those who

replied that they “never” experienced stress, the *Work Effort* index was 30.0, while at the other end of the scale, where they “always” experienced stress, the index was 57.0. We take this as contributing criterion validity to the index. However, “stress” itself should not be included in the index because it is a variable describing something about the worker’s reaction, rather than a feature of the job itself; and because it is an ill-defined term whose meaning is thought to be influenced by media attention and by different cultural milieu.

On the positive side, there are items covering the subjective feeling that work is meaningful and fulfilling (Q51H and Q51J). These items are, similarly, reports of subjective feelings arising from work, rather than specific job features that could be included in the indices. As predicted, however, both items show a strong correlation with the *Intrinsic Job Quality* index. Thus the *Intrinsic Job Quality* index ranges from 54.1 (“never gives you the feeling of a job well done”) to 72.6 (“always gives you the feeling of a job well done”); and from 55.9 (“never”) to 72.3 (“always”), in respect of the feeling of doing useful work.

3.4 Criterion Validity of the Indices

a) Relationship to Well-Being

The job quality indices, if they are valid, would be expected to be associated individually and collectively with well-being in the workplace. This is quite different from conceptually equating job quality with well-being. Rather, we arrived at the concepts and indices for job quality through a consideration of needs. However, it is a reasonable presumption that the satisfaction of needs will in most cases and on average be experienced as increased well-being. If an index is not related to well-being in the direction expected, one would not necessarily reject the index, but it would warrant further investigation and alternative sources of validation. Hence, one way of evaluating validity is to test the hypothesis that the job quality indices are related positively as expected to health and subjective well-being. While the details of this relationship are considered below in Section 5, it can be summarised in advance that all four indices have the expected relationships with well-being.

b) Relationships to Socio-Economic Variables.

For some categories of socio-economic variable, most notably occupational class, there are clear prior expectations about how they are related to job quality. We would expect, for example, that job quality is higher in managerial and professional occupations than in manual occupations. This finding is confirmed in the descriptive analyses which are presented below, in Section 4.

c) Other Routes to Assessing Criterion Validity of Specific Indices.

Some of the indices can be given further validity tests within the data. Consider the case of *Prospects*, for example, which contains job insecurity. The latter is expected, from previous studies, to be broadly related to aggregate unemployment rates at the national or regional level (Green, 2009). We thus would expect that job security and hence *Prospects*, is rather lower where the unemployment rate in the local environment is higher. We found that the correlation coefficient across countries between average job security and the unemployment rate was -0.41; the correlation coefficient across countries between average job security and the unemployment rate was -0.34, also statistically significant. It appears that, in this dataset as in others, self-reports of high insecurity reflect the reality of insecurity in conditions of high unemployment.

d) Potential external routes to criterion validity.

The indices and some constituent items could also be validity tested using external sources, by matching against these sources at country or industry level. For example, the earnings index could be validated against other sources of wage data aggregated to country level; or within countries at industry level. For this purpose it would be necessary to exclude the self-

employment.

4. Job Quality and Well-Being.

If job quality is a measure of the extent to which the features of jobs meet people's multiple needs from their work, and if the satisfaction of needs results in subjective feelings of well-being, one could expect to see some relationship between job quality and the subjective well-being of workers. To fully understand this relationship, it would be necessary to go beyond the scope of this report, and to take into account other sources of well-being from outside the workplace as noted in Section 2.3. If possible any study should also take consideration the possibility of a reverse causation mechanism whereby people with certain dispositions or who experience high well-being gravitate to jobs with distinct features. Nevertheless, it is of interest to investigate the associations between job quality and well-being. Is there a positive relationship between well-being and each of our four distinct domains of job quality when considered together, even after controlling also for basic demographic variables?

In the following table we present the results on the regressions of the four well being indices on our job quality indices and other controls. The dependent variables are the following:

Number of Health Problems: this index of subjective wellbeing is an additive variable that was constructed using question Q69 (over the last 12 months, did you suffer from any of the following health problems?). The question accounts for 14 different health problems; and the mean number of health problems in the sample was 2.9.

Health Issues Caused by Work: This variable was constructed using question 67 (Does your work affect your health, or not?). It has three categories (Yes positively, Yes negatively, and no). This variable was recoded into a binary variable, "yes negatively" was given the value of 1 and "yes positively" and "no" were given the value of 0, with 25.3% reporting a negative effect.

Subjective Wellbeing: this index was created using question E4, the WHO-5 index (Please indicate for each of the five statements which is the closest to how you have been feeling over the last two weeks: A- I have felt cheerful and in good spirits, B- I have felt calm and relaxed, C- I have felt active and vigorous, D- I woke up feeling fresh and, E- My daily life has been filled with things that interest me rested). For each of the statements, the respondents had 6 choices starting from "at no time" through to "all of the time". The index was created by averaging all the variables, and normalized to the 0-100 range, with a mean of 65.4 and a standard deviation of 20.8..

Subjective Work Life Balance: this index was created using question Q41 (In general, do your working hours fit in with your family or social commitments outside work very well, well, not very well or not at all well?). This variable was recoded into a binary variable with "very well", and "well" forming one group (value 1) and "not very well" or "not at all well" forming the other (value 0). The proportion in the latter group was about 1 in 5 (19.5%).

Meaningfulness of Work: this is a summative index that was created by adding two questions Q51H (Your job gives you the feeling of work well done) and Q51J (you have the feeling of doing useful work). Each of the questions had a scale of 4 points going from never to always. The additive variable is on a scale of 8 points, with 36.1% reporting the top level of most meaningful work.

The independent variables are: *Earnings*, *Working Time Quality*, *Intrinsic Job Quality*, and *Job Prospects*. It should be noted that these four indices were divided by 100 in order to

reduce their scale and make interpretation easier. The controls are gender, age and the square of age.

The regression methods vary according to the nature of the dependent variables. For subjective wellbeing and meaningfulness of work we used ordinary least squares regression because both are approximately continuous variables. For the number of health problem we used a Poisson regression because it is a count variable (it has a Poisson distribution). For health issues caused by work and subjective work life balance we used a Probit regression because the two outcome variables are binary. Before interpreting the results it is worth noting that all controls have a significant effect on the outcome variables. Furthermore, the inclusion of these controls does not cause any loss of significance on the coefficients on the job quality indices.

The main finding to note is that, in almost all case, each index has a significant association with the health or well-being outcomes. The only case where there is no association at all is the effect of earnings on health issues caused by work; besides this, the effect of *Working Time Quality* on the number of health problems is only significant at the 10% level, which means that it is possible that there is no relationship. Otherwise, all coefficients are significant at a high level. Taken together, this expected finding provides some "criterion validity" for the indices.

The magnitudes of the relationships with well-being vary a lot, and in many cases are quite small. Nevertheless, the effects are greatest where expected. For example, *Working Time Quality* has the greatest effect on Subjective Work-Life Balance; while *Intrinsic Job Quality* has the greatest effect on Subjective Well-Being. To illustrate the latter case: suppose that there were a rise of 10 points in *Intrinsic Job Quality*: this would, other things equal, raise Subjective Well-Being by 3.5 points. The higher importance of *Intrinsic Job Quality* is also shown for the Meaningfulness of Work and for the Number of Health Problems.

Table 2. Regressions of the Wellbeing Indicators on the Four Job Quality indices.¹⁰

| | Number of Health Problems | Health Issues Caused by Work | Subjective Wellbeing | Subjective Work Life Balance | Meaningfulness of Work |
|----------------------------------|---------------------------|------------------------------|----------------------|------------------------------|------------------------|
| <i>Earnings/100</i> | -0.00338 (0.000) | -0.000252 (0.805) | 0.113 (0.000) | -0.0106 (0.000) | -0.00844 (0.000) |
| <i>Working Time Quality/100</i> | -0.0709 (0.007) | -0.614 (0.000) | 6.483 (0.000) | 2.615 (0.000) | 0.317 (0.000) |
| <i>Intrinsic Job Quality/100</i> | -2.101 (0.000) | -3.403 (0.000) | 35.32 (0.000) | 1.777 (0.000) | 4.307 (0.000) |
| <i>Job Prospects/100</i> | -0.207 (0.000) | -0.257 (0.000) | 15.684 (0.000) | 0.558 (0.000) | 1.038 (0.000) |
| Male | -0.161 (0.000) | 0.0647 (0.000) | 3.288 (0.000) | -0.0483 (0.005) | 0.0646 (0.000) |
| Age | 0.0267 (0.000) | 0.0643 (0.000) | -0.975 (0.000) | -0.0342 (0.000) | 0.0231 (0.000) |
| Age ² | -0.000181 (0.000) | -0.000627 (0.000) | 0.00945 (0.000) | 0.000437 (0.000) | -0.000144 (0.005) |
| Constant | 1.993 (0.000) | 0.673 (0.000) | 47.096 (0.000) | -1.286 (0.000) | 2.120 (0.000) |
| <i>N</i> | 34924 | 33788 | 34849 | 34726 | 34391 |

p-values in parentheses

¹⁰ “Age²” is age squared, a quadratic term that reflects nonlinearities in the effect of age on the different wellbeing indicators.

5. Variation of Job Quality Indices by Gender and Socio-Economic Characteristics.

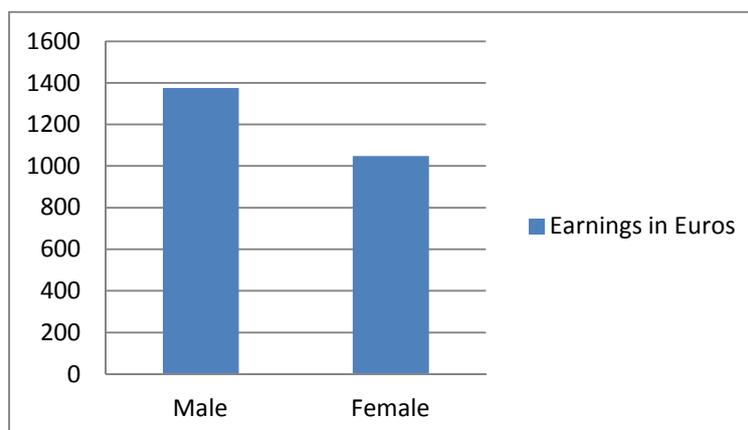
In this section we use descriptive statistics to show how the four indices -- *Earnings*, *Working Time Quality (WTQ)*, *Intrinsic Job Quality (IJQ)*, and *Prospects (PR)* – vary across socio-economic groups. The aim is to present a picture of which groups experience better, or worse, job quality, according to each of the four indices.

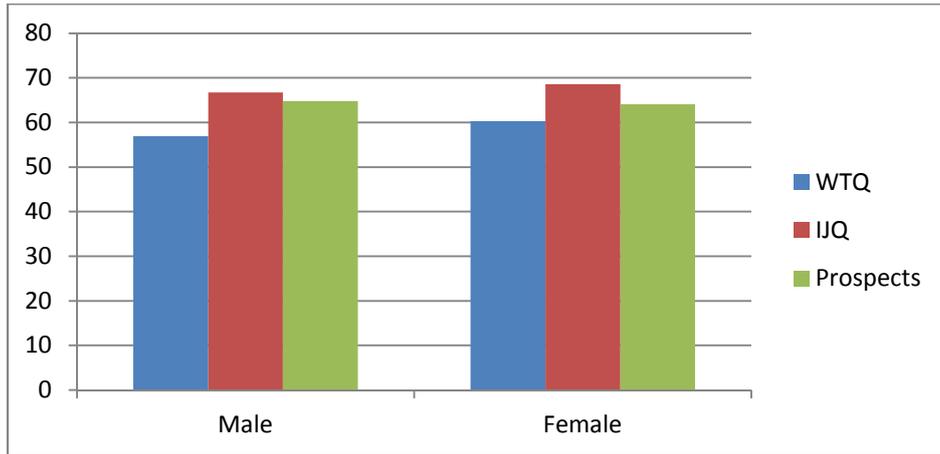
5.1 Gender.

Gender differences in aspects of job quality, not only in respect of wages, but also concerning various other aspects of jobs, are especially relevant to an evaluation of progress towards the principle of gender equality (Smith et al., 2008). Figure 5 presents the means for each index, across all 34 countries in the sample, according to the sex of the worker. The means are weighted to take account of sampling probabilities, and of the relative size of the populations of the different countries. It shows that, consistent with many other studies, on average men have higher monthly earnings than women. The gender monthly pay gap is approximately 23.8% of men's monthly pay. In terms of the *Working Time Quality* index, women have a greater value. Interestingly, on closer examination this is a reflection of the fact that women on average work shorter hours, and less frequently on shift work during non-standard hours; it does not come from having more flexible working hours arrangements than men. Women also enjoy a slightly higher level of *Intrinsic Job Quality*, which on closer inspection comes from working on average in somewhat better physical environments. Finally, *Prospects* is almost the same for men and women. Underlying this finding is a balance: as might be predicted, the jobs that men hold score more highly in terms of prospects for career progression; however, they score somewhat less well in terms of job security and of the quality of their contract status.

The detailed tables on which Figure 5 and subsequent charts are based are given in the Appendix. In order to facilitate more detailed comparisons of job quality by gender, the Appendix presents tables both for all workers combined (as reflected in the charts) and for men and women separately.

Figure 5. Average Job Quality Indices by Sex.



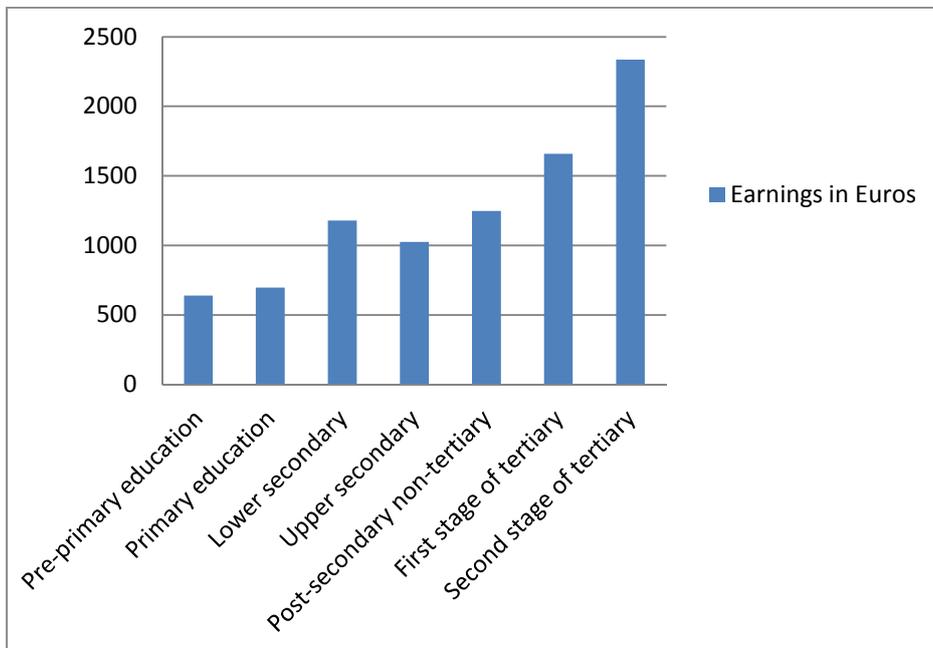


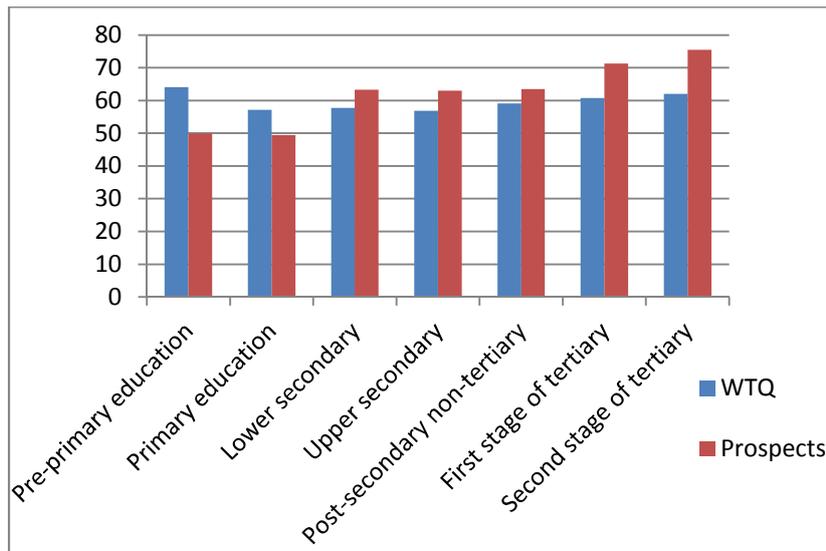
Source: Table A1.

5.2 Education.

Figure 6 shows that both *Earnings* and *Prospects* are increasing with the level of education. This is to be expected since education is very important in opening up access to better jobs. The relationship of *Working Time Quality* with education, however, is less steep, being flat at the middle-to-lower end of the spectrum, and even negative for those few (0.5%) with only pre-primary education. Note that *Intrinsic Job Quality* was not included in this chart since this index contains a measure of education; nevertheless, a key ingredient of *Intrinsic Job Quality* is *Good Physical Environment*, and this is also positively strongly correlated with education.

Figure 6. Average Job Quality by Level of Education.



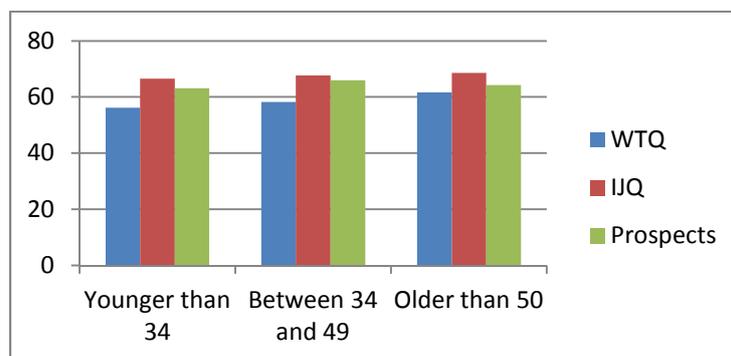
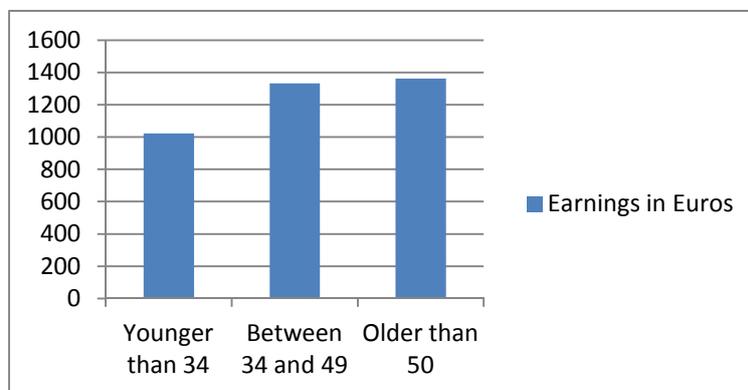


Source: Table A2.

5.3 Age.

Figure 7 shows that, as expected, earnings increase with age, faster in the first part of the working career, than in the second. This is a very common finding from very many studies of varied samples of workers from around the world. Second, the *Working Time Quality* index also increases with age. This may be an indication that job features are adjusted to meet varying needs over the life course. Third, the *Intrinsic Job Quality* index increases with age, but not by a great deal. Finally, *Prospects* have no clear relationship with age.

Figure 7. Average Job Quality by Age.

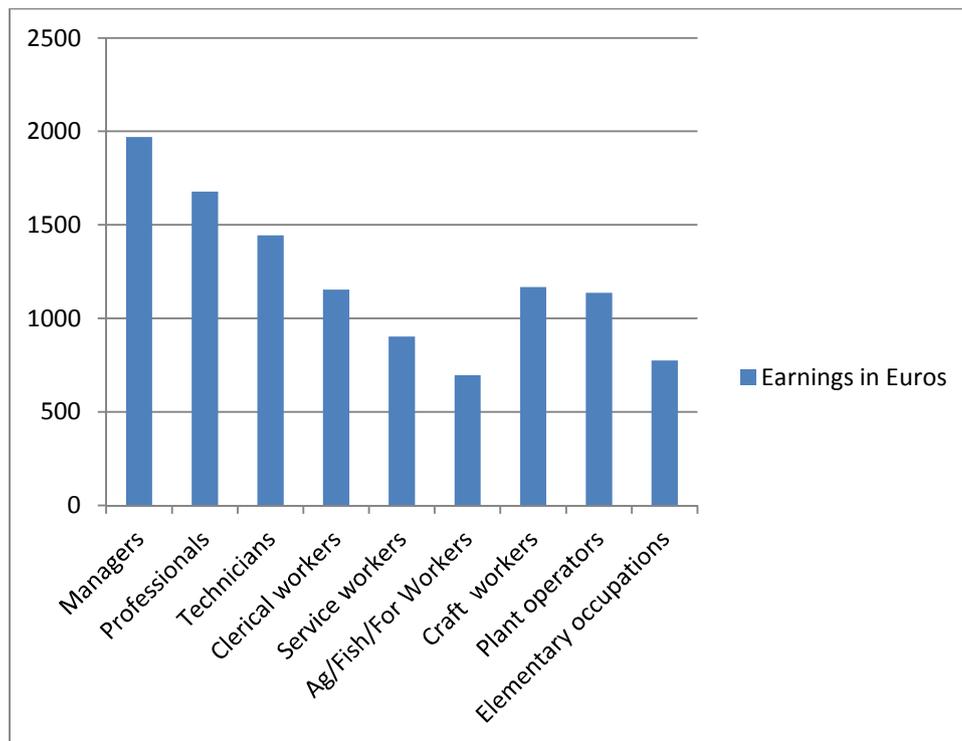


Source: Table A3.

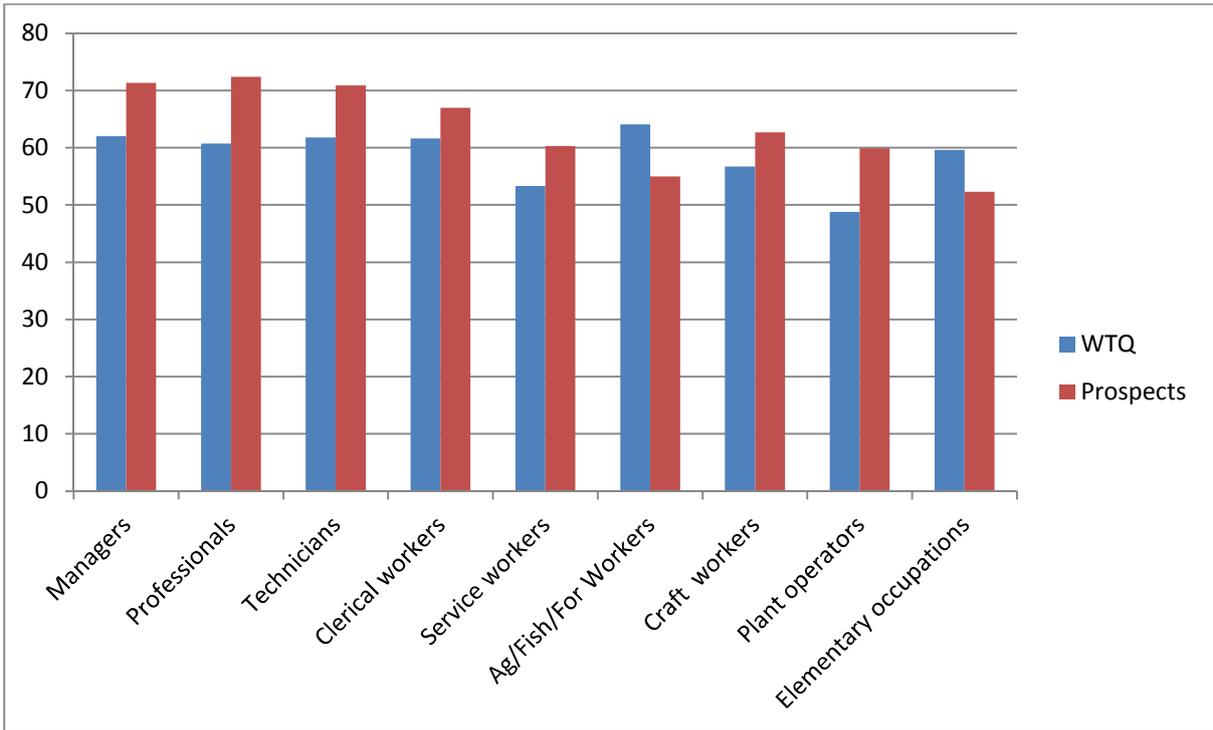
5.4 Occupation.

When the averages are computed by occupation, as shown in Figure 8, Professionals and Managers have higher earnings than Clerical, Agricultural, and Craft workers, as would be expected. Professionals and Managers also have higher *Prospects* than workers and machine operators. However, the ranking of occupations according to *Working Time Quality* is very different. For example, the highest ranking occupational group according to this index is Skilled Agricultural, Forestry and Fishery workers.¹¹ It remains the case that, apart from Sales and Service Workers, as a whole the non-manual occupations score better for *Working Time Quality*. However, across the occupations there is a low rank correlation coefficient between *Working Time Quality* and either *Earnings* (0.13) or *Prospects* (0.08).

Figure 8. Average Job Quality by Occupation.



¹¹ Note that *Intrinsic Job Quality* was not included since there is a measure of occupation within the index.

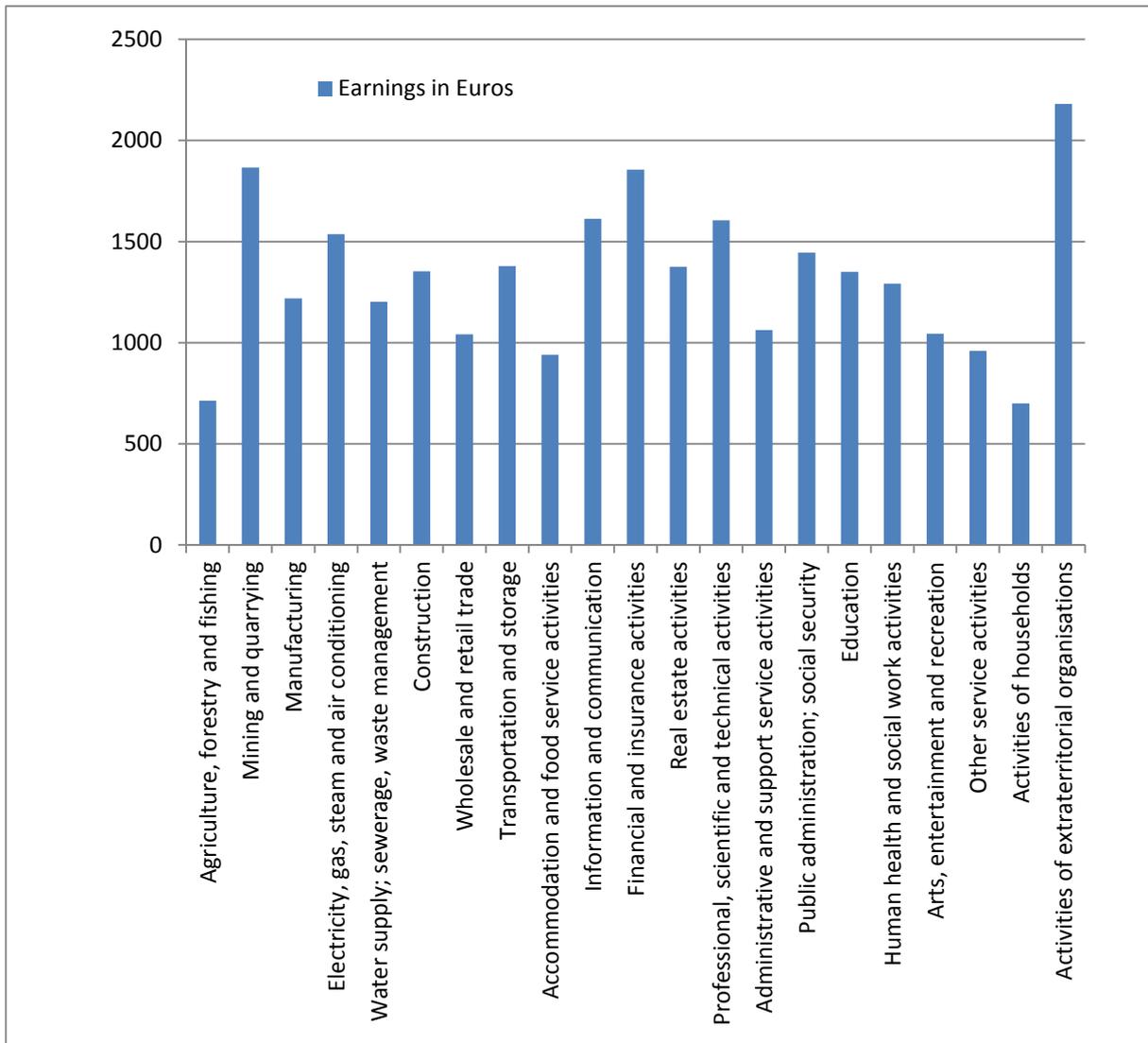


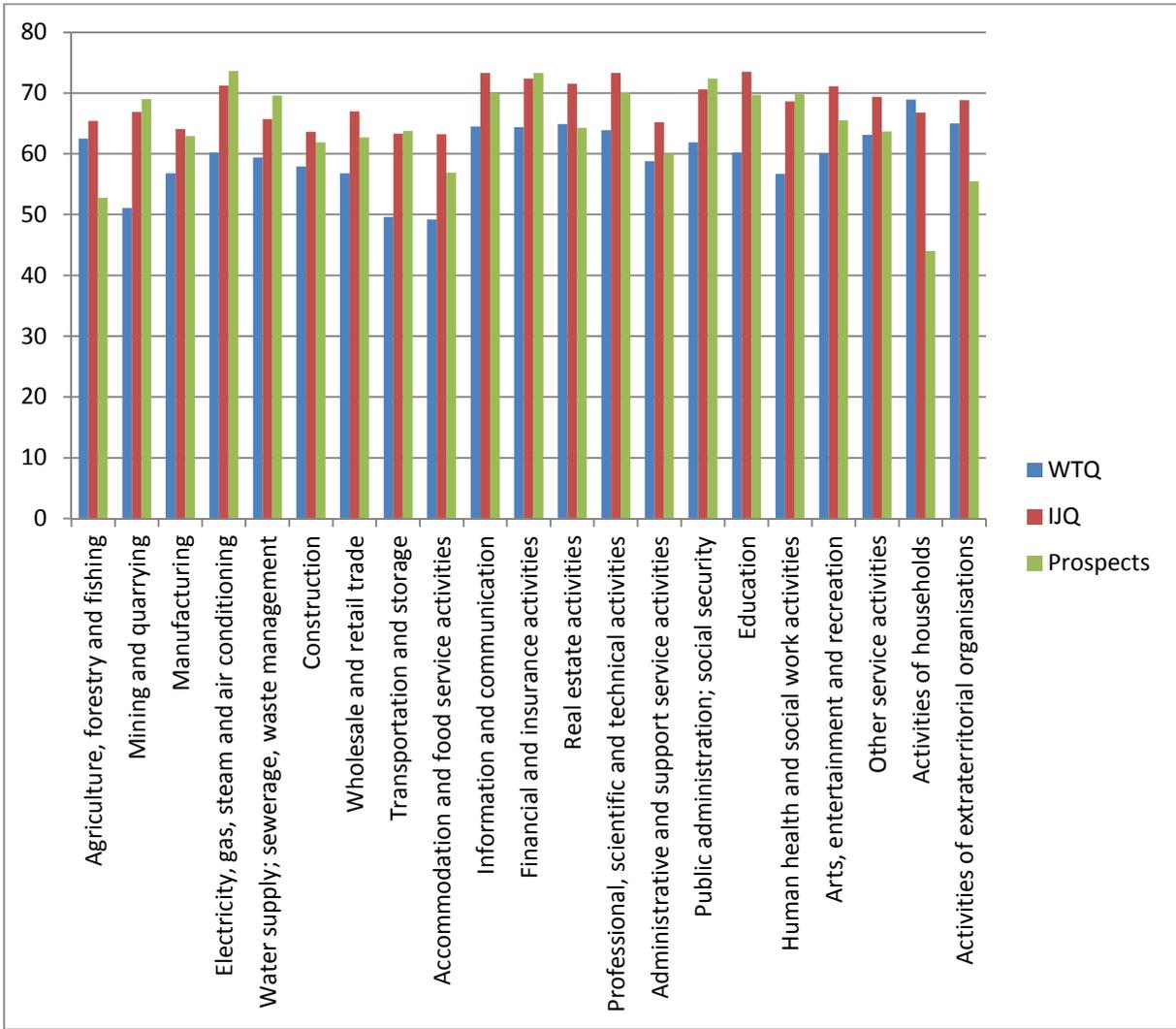
Source: Table A4.

5.5 Industry.

It has been widely found that wages in Europe vary across industries, and that the differences exist even among otherwise similar groups of workers (Magda et al., 2011). Figure 9 shows how the four job quality indices vary across industries in Europe. Those working in the sectors of Information & Communication, or in Finance and Insurance are highest ranked on most indices; though those in Public Administration are among the ones with the highest job *Prospects*. In contrast, those working in Agriculture, Forestry and Fishing have the lowest values on two of the indicators. Yet the ranking across industry by *Intrinsic Job Quality* is only moderately correlated with the *Earnings* ranking (a coefficient of 0.43). *Working Time Quality* is not highly correlated with the rankings of either *Earnings* (0.17) or *Prospects* (0.03).

Figure 9. Average Job Quality by Industry.



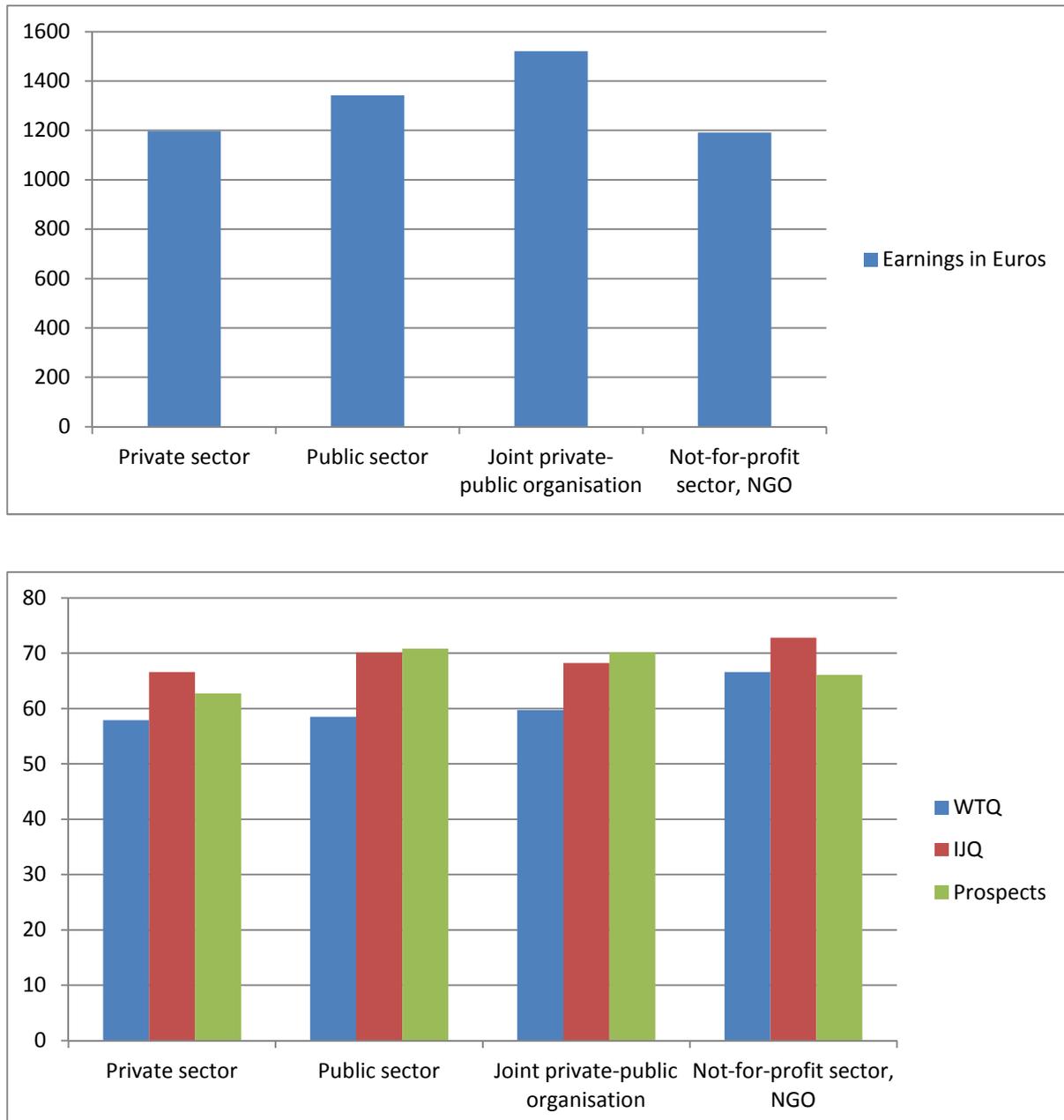


Source: Table A5.

5.6 Sector.

When the averages are computed by ownership type the findings are varied (Figure 10). The Public Sector offers the highest *Prospects* while it comes second in terms of *Earnings* and *Intrinsic Job Quality*, and third in terms of *Working Time Quality*. In contrast, the Private Sector offers the lowest values in all domains, though in terms of *Earnings* it is equal lowest with the Not-For-Profit sector. It should be recalled, however, that these averages do not reveal the large variation within each category: there are of course very many private sector jobs with high levels of job quality, and also many poor-quality jobs in the other sectors.

Figure 10. Average Job Quality by Ownership Type.

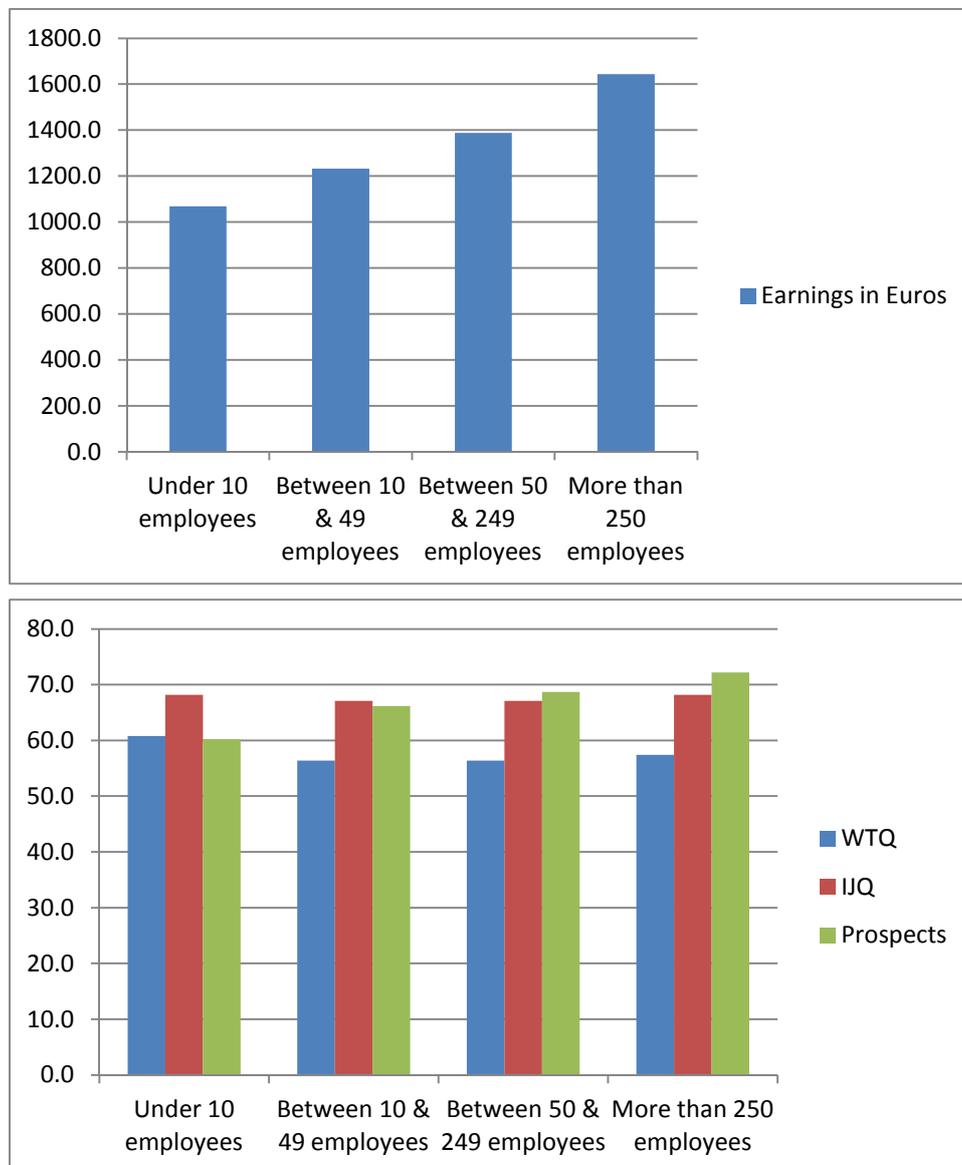


Source: Table A6.

5.7. Establishment Size.

Figure 11 examines how the job quality domains vary across establishments of different sizes, as measured by the numbers of employees. It is commonly found that wages increase with firm size and with establishment size, and there are several explanations for why this happens (Green et al., 1996). One possible explanation is that low earnings in smaller establishments are compensated by other job features that might be better than in larger establishments. As can be seen, in the EWCS5 data *Earnings* in establishments with more than 49 employees are substantially higher than those in smaller establishments. However, the *Prospects* index also increases with the size of the establishment in which one works; while the *Intrinsic Job Quality* index has very little relationship with size. It is only with the *Working Time Quality* index that the relationship with establishment size is reversed, this being highest for firms with under five employees.

Figure 11. Average Job Quality by Establishment Size.

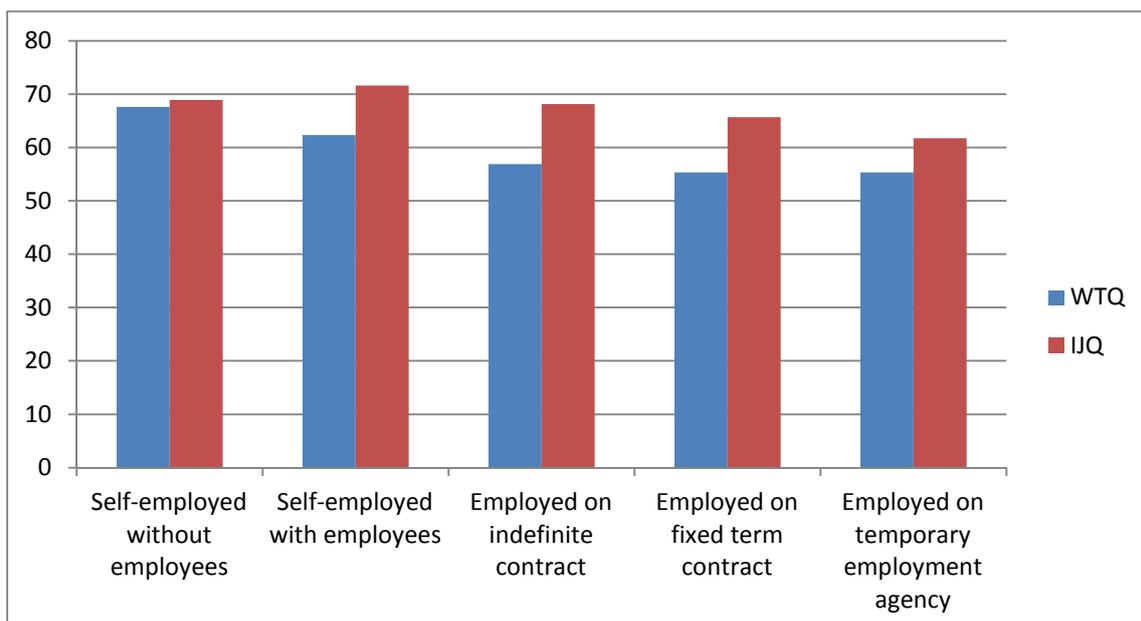
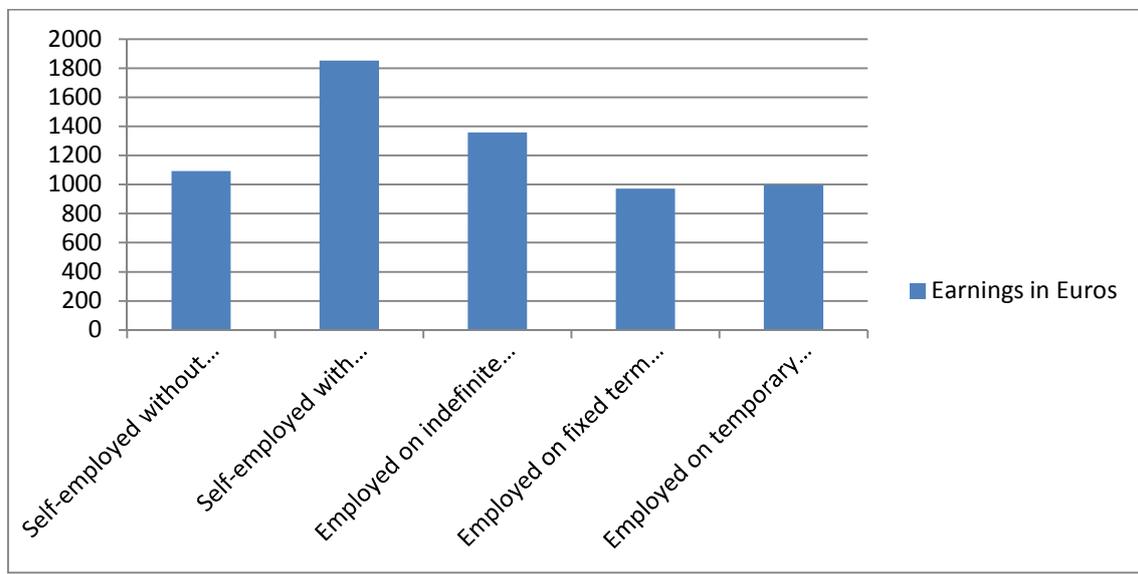


Source: Table A7.

5.8 Type of Employment.

When it comes to the type of employment, the self employed with employees have the highest level of earnings (Figure 12). This happens because they are more likely to be the managers of a medium or small size company. In contrast, the self employed without employees have lower earnings yet a higher *Working Time Quality* index. On closer inspection, this latter advantage is due to flexibility in the management of their work, not to their having lower work hours or less shift work. A substantial body of research in individual countries in Europe has found that various dimensions of job quality are lower in jobs with "atypical" and "non-standard" job contracts (for example, Olsen, 2006), and this finding is echoed here. Those employed on an indefinite contract have relatively high values on most of the indicators; while those employees with fixed term or temporary contracts have lower job quality on all dimensions.

Figure 12. Average Job Quality by Type of Employment.



Source: Table A8.

5.9 Cross-Country Differences.

In all the above analyses, the job quality indices were described for the whole sample of 34 countries. Some previous research on aspects of job quality in Europe has found considerable variation across countries (European Commission, 2008; Gallie, 2007), and we now examine differences between countries in the 2010 survey. Such differences are of interest in themselves, but it needs to be recalled that countries are at different stages of development, and have varying industrial structures. Since, as we have seen above (section 5.5), the job quality indices vary considerably across industries, differences between countries might emerge as a result of this varying industrial composition, rather than because of differences within the same industries.

Figure 13 therefore presents, for each job quality index, the differences between countries, both "in the raw" – that is, without making any allowance for the varying industrial structures – and after controlling for the industrial composition. For each index, the first bar (labeled "Without Controls" presents the raw differences of every country compared to the lowest-ranking country (which differs according to the index). The second bar (labeled "With Industry Controls") gives the differences compared to the same country, after controlling for industrial composition.

The estimates were obtained from regressions of the job quality indices on country and industry dummy variables. We carried out two regressions for each index. In the first, we included only country dummies, and the coefficients are the raw differences between every country and the lowest-ranking country, presented in the diagram. In the second regression we included both country and industry dummies; the country differences after controlling for industrial composition are then revealed by the regression coefficient on the country dummies in this second regression.

The initial point to note about Figure 13 is that the raw cross-country differences are close to the differences after controlling for industrial composition, for all four indices. This indicates that the industrial structure of each country does *not* account for much of the difference in the four indices.

One general pattern that can be observed is that the job quality in most cases is the lowest for East European countries and highest for the Nordic countries. Western European economies are middle ranking. Note that France and Germany have a very low ranking on *Intrinsic Job Quality*.

Looking, then, at the raw differences of job quality across countries, some general patterns can be observed. As has been found in previous cross-national comparisons of particular aspects of job quality, the Nordic countries are in general highly ranked according to all the indices, as are the United Kingdom and the Netherlands. Denmark, for example, is ranked highest in terms of *Intrinsic Job Quality* and *Prospects*, third for *Earnings*, and second for *Working Time Quality*.

In part these high rankings can be seen as a reflection of a high standard of living, as measured by GDP per capita, and on the whole the converse is true of the less affluent countries, where average job quality indices are at the lower ends of the scales.¹² Nevertheless, none of the indices have a strict relationship with GDP per capita, and in some cases there are substantive exceptions. Poland, for example, is in the lower half in terms of *Earnings*, but ranks 8th in terms of *Intrinsic Job Quality*. In France, job quality is ranked in the top half of countries for three of the indices, but is near the bottom in terms of *Intrinsic Job Quality*. Closer inspection reveals that behind the low level of *Intrinsic Job Quality* in France is a low ranking in terms of both the *Good Physical Environment* and the *Good Social*

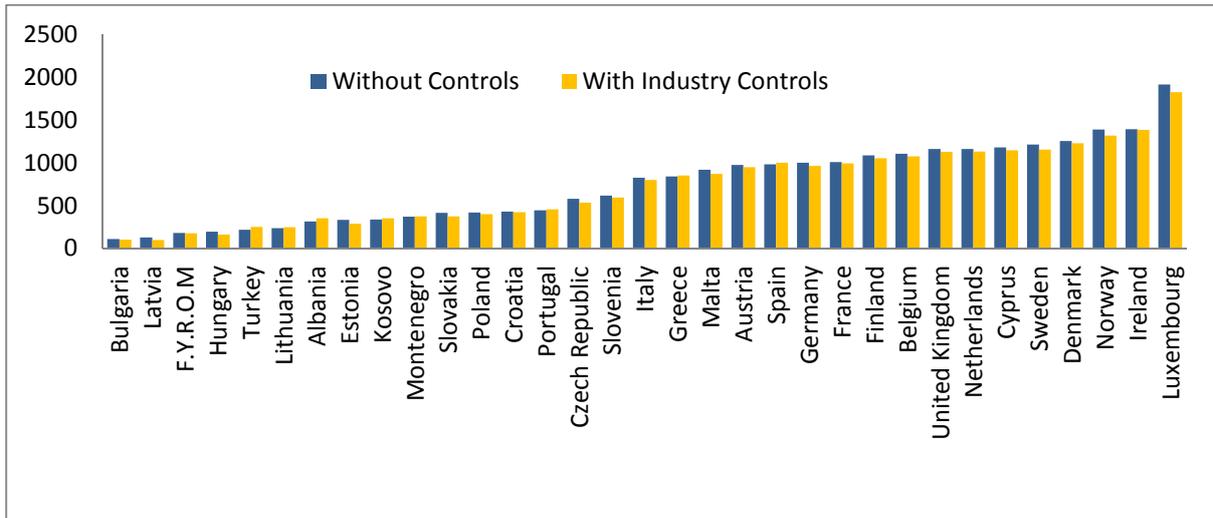
¹² In a similar vein Fields (2003) overviews some limited evidence of the positive relationship between economic growth and rises in "decent work".

Environment indices.

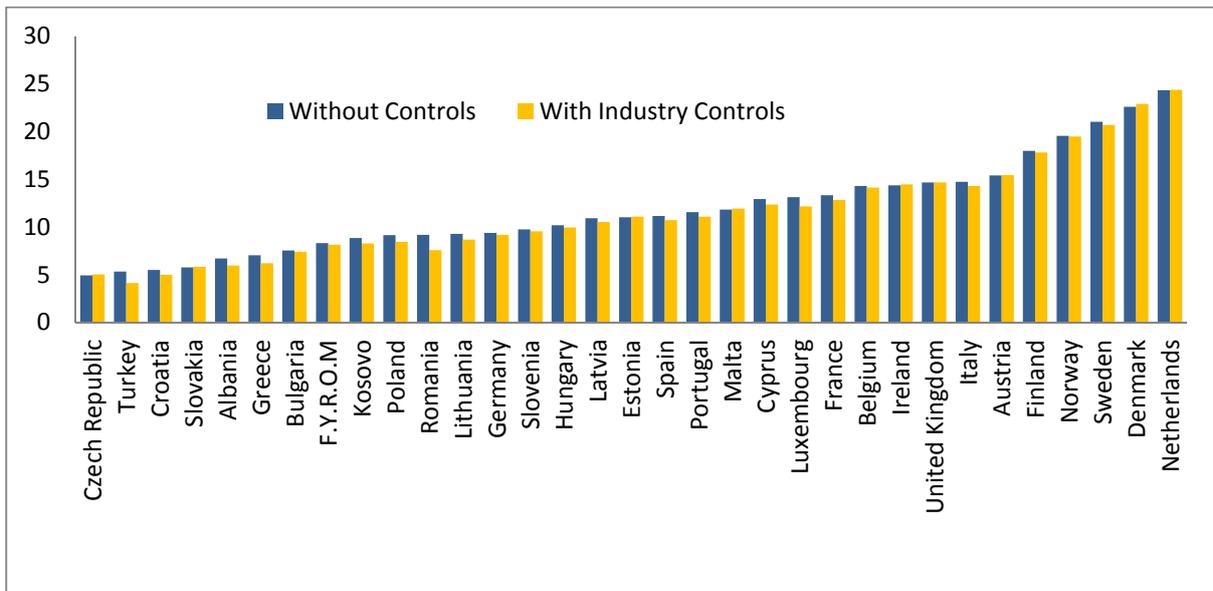
The above example also highlights the fact that there is considerable variation between the indices in their country rankings. For another case that illustrates this same point, jobs in Luxemburg come top in terms of both *Earnings* and *Prospects*, but only 12th and 14th in terms, respectively, of *Working Time Quality* and of *Intrinsic Job Quality*. Similarly, jobs in Germany are in the upper half in terms of *Earnings* and *Prospects*, but in the lower half in terms of *Working Time Quality* and of *Intrinsic Job Quality*. Formally, there is some considerable variation between the indices' ranking across countries. There are relatively low inter-index correlation coefficients (see Table A11 in the Appendix). For example, the rank correlation coefficient across countries between the *Prospects* index and the *Intrinsic Job Quality* index is only 0.44. This diversity in the pattern shows again the potentially misleading loss of detail that could result if the indices were to be combined in a single index.

Figure 13. Cross-Country Differences In Average Job Quality.

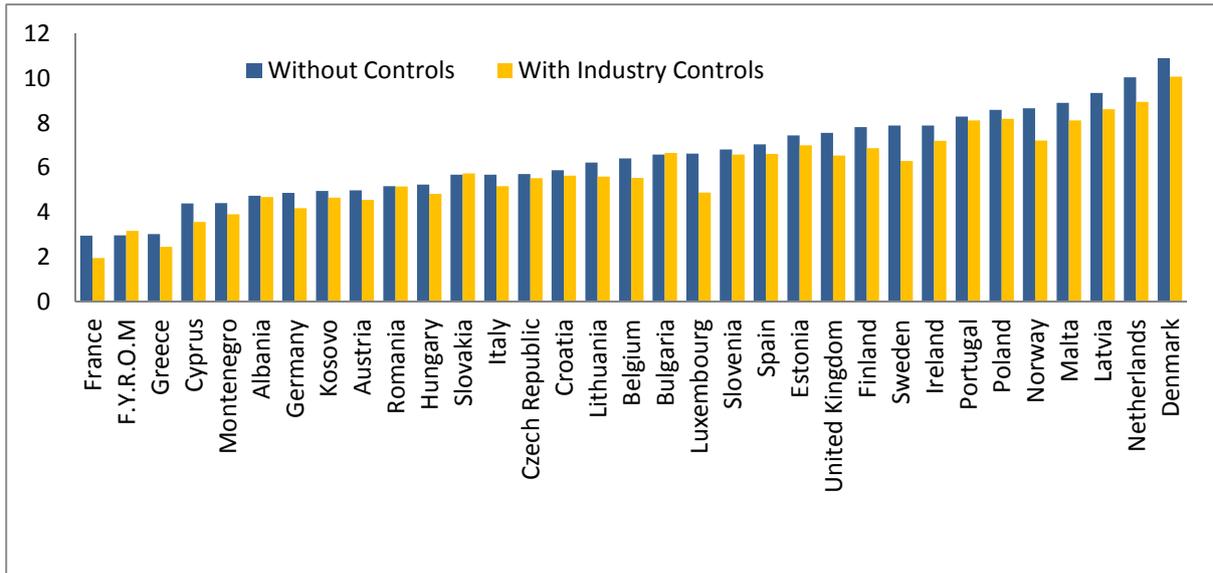
Earnings (relative to Romania).



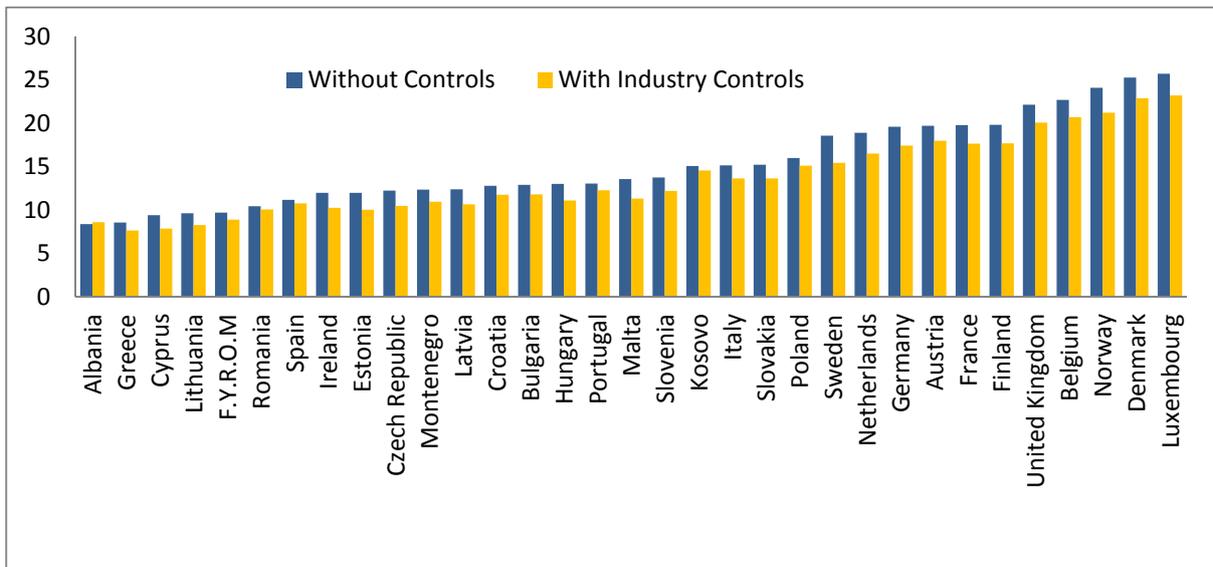
Working Time Quality (relative to Montenegro).



Intrinsic Job Quality (relative to Turkey).



Prospects (relative to Turkey).



Source: Table A10.

6. Jobs with At-Risk Workers.

Particular policy concerns surround workers who are in jobs which are associated with low levels of well-being. In addition to the personal costs for those workers, there are likely to be additional externalities facing societies when individuals experience physical health problems or mental health problems manifested in low levels of subjective well-being. While, the analysis of Section 4 above was not designed to establish causal links between job quality and well-being, many such links have been established in the literature cited, for example, by Warr (2007), and all the job quality indices are strongly associated with several well-being indices in the EWCS data. Where all of the indices are relatively low, therefore, there is reason to fear that job-holders may experience especially low well-being, and are in that sense more "at risk" of experiencing physical or mental health problems, relative to most other workers.

The aim of this section, therefore, is to study which groups of workers may be at risk. To do so, we utilise "cluster analysis" to identify clusters of jobs, the aim being to investigate if there is one or more clusters of jobs where job quality is low on multiple dimensions.

6.1 Identification and Characteristics of Job Clusters in the EWCS.

The main objective of cluster analyses is to identify groups of individuals or objects that bear some similarities according to a number of dimensions. Hence, individuals in the same group must be sufficiently different from those in other groups.

In a nutshell, cluster analyses consist of three steps. First, one has to choose the variables according to which the observations are clustered. Secondly, the variables have to be standardized so they contribute equally to the distance or similarity between cases. Finally, one chooses which clustering procedure to use.

In our analysis the aim is to cluster the individuals included in the EWCS 2010 database according to our four indices: *Earnings*, *Intrinsic Job Quality*, *Work Life Balance*, and *Prospects*. These were standardised into variables with an average of 0 and a standard deviation of 1. Finally, after some experimentation we decided to use K-Means clustering to construct our analysis and the number of clusters that we retained is 4. Note that the other possibility was hierarchical clustering, but this technique is not suitable for large datasets such as EWCS 2010.

The algorithm used in K-Means clustering starts with an initial set of means (selected arbitrarily) and classify cases based on their distances to these means. Next, it computes the cluster means again, using the cases that are assigned to the clusters. Then, it reclassifies all cases based on the new set of means. The process is repeated until cluster means do not change much between successive steps. Finally, the means of the clusters are computed once again and cases are assigned to their permanent clusters. K-Means clustering is very sensitive to outliers, since these will form their own cluster with a very limited number of cases. Out of the four indices we are using, only *Earnings* contain outliers. The other three indices are on a scale of 0 to 100. For *Earnings*, we dropped the top and bottom 0.25%. Note that because of missing values on *Earnings* and the other indices, the cluster analysis is performed with 80% of all available cases.

Table 3. Average Indices for Each of the Clusters.

| Clusters | Earnings | WTQ | IJQ | Prospects |
|------------------------------------|----------|------|------|-----------|
| Cluster 1: High-Paid Good Jobs | 2786.5 | 63.7 | 74.6 | 78.9 |
| Cluster 2: Well-Balanced Good Jobs | 1029.7 | 68.4 | 74.3 | 71.0 |
| Cluster 3: Poorly-Balanced Jobs | 1160.1 | 42.9 | 61.4 | 70.5 |
| Cluster 4: Low Quality Jobs | 726.9 | 52.7 | 57.3 | 34.4 |
| Total | 1245.7 | 57.2 | 67.2 | 64.5 |

Table 4. Percentage of Individuals in Each Cluster.

| Clusters | Freq. | Percent |
|------------------------------------|-------|---------|
| Cluster 1: High-Paid Good Jobs | 4780 | 13.6 |
| Cluster 2: Well-Balanced Good Jobs | 13040 | 37.2 |
| Cluster 3: Poorly-Balanced Jobs | 10137 | 28.9 |
| Cluster 4: Low Quality Jobs | 7093 | 20.2 |
| Total | 35050 | 100.0 |

Tables 3 and 4 present the results of this analysis. Table 3 shows the average values of the job quality indices in each of the four identified clusters, while Table 4 shows the proportions of jobs in each cluster.

Cluster 1 ("High-Paid Good Jobs") contains the best jobs. Individuals in this cluster receive by far the highest *Earnings*. They have the highest level of *Prospects* and *Intrinsic Job Quality*. However, individuals in this cluster have the second highest value on *Working Time Quality*, following cluster 2. This cluster accounts for 13.6% of all individuals.

Cluster 2 ("Well-Balanced Good Jobs") contains the second best category of jobs. Individuals in this cluster have the second highest levels of *Intrinsic Job Quality* and *Prospects*. They have the highest value on *Working Time Quality* and they rank third in terms of *Earnings* with slightly lower earnings than individuals in cluster 3. This cluster accounts for 37.2% of all individuals.

Cluster 3 ("Poorly-Balanced Jobs") contains jobs which rank third in terms of *Intrinsic Job Quality* and *Prospects* while having the lowest value on *Working Time Quality*. Individuals in this cluster have the second highest level of *Earnings* which probably results from the fact that these individuals work more and have the lowest WTQ. This cluster accounts for 28.9% of all individuals.

Cluster 4 ("Low Quality Jobs") contains jobs that are worst on three counts: it ranks in fourth position on *Earnings*, *Intrinsic Job Quality* and *Prospects*. One should note that *Prospects* for this cluster is by far lower than the value in the other clusters. However, this cluster, which accounts for 20.2% of all individuals, has better *Working Time Quality* than cluster 3.

Table 5. Percentage of Individuals in Each Cluster by Country.

| Country | Cluster 1: High-Paid Good Jobs | Cluster 2: Well Balanced Good Jobs | Cluster 3: Poorly Balanced Jobs | Cluster 4: Low Quality Jobs |
|----------------|--------------------------------------|--|---------------------------------------|-----------------------------------|
| Albania | 2.5 | 32.0 | 32.1 | 33.4 |
| Austria | 15.4 | 42.3 | 26.4 | 16.0 |
| Belgium | 15.8 | 45.2 | 27.4 | 11.7 |
| Bulgaria | 1.0 | 45.4 | 27.4 | 26.2 |
| Croatia | 2.4 | 38.6 | 37.2 | 21.8 |
| Cyprus | 21.7 | 28.4 | 19.9 | 30.0 |
| Czech Republic | 2.8 | 35.7 | 39.3 | 22.2 |
| Denmark | 29.4 | 49.1 | 14.1 | 7.4 |
| Estonia | 3.3 | 48.6 | 23.6 | 24.6 |
| Finland | 16.9 | 48.0 | 25.2 | 9.8 |
| France | 15.3 | 35.3 | 32.8 | 16.6 |
| F.Y.R.O.M | 2.9 | 34.2 | 29.0 | 33.9 |
| Germany | 17.8 | 31.3 | 37.1 | 13.8 |
| Greece | 10.6 | 27.9 | 29.9 | 31.7 |
| Hungary | 1.8 | 43.9 | 27.2 | 27.2 |
| Ireland | 32.2 | 28.8 | 16.4 | 22.6 |
| Italy | 7.9 | 45.9 | 27.9 | 18.3 |
| Kosovo | 3.6 | 39.7 | 34.7 | 22.0 |
| Latvia | 1.4 | 49.1 | 23.4 | 26.0 |
| Lithuania | 0.9 | 41.8 | 26.3 | 31.0 |
| Luxembourg | 48.7 | 21.7 | 21.1 | 8.5 |
| Malta | 14.1 | 43.1 | 22.0 | 20.8 |
| Montenegro | 4.2 | 24.4 | 46.1 | 25.3 |
| Netherlands | 28.7 | 51.0 | 10.7 | 9.6 |
| Norway | 38.1 | 37.8 | 16.3 | 7.8 |
| Poland | 3.8 | 46.7 | 31.9 | 17.6 |
| Portugal | 4.9 | 42.3 | 28.3 | 24.5 |
| Romania | 0.6 | 35.9 | 33.9 | 29.6 |
| Slovakia | 2.8 | 36.0 | 42.7 | 18.5 |
| Slovenia | 6.4 | 43.1 | 30.1 | 20.4 |
| Spain | 16.2 | 31.6 | 28.6 | 23.6 |
| Sweden | 26.5 | 47.7 | 14.2 | 11.6 |
| Turkey | 1.6 | 22.4 | 23.7 | 52.3 |
| United Kingdom | 24.3 | 40.7 | 24.8 | 10.3 |
| All countries | 13.6 | 37.2 | 28.9 | 20.2 |

Table 5 presents the percentage in each cluster by country. It is possible to see that countries in Eastern Europe are mainly dominated by jobs in cluster 3 and cluster 4. Hence, jobs in these countries are mainly lower quality jobs while the percentage of good jobs is very limited. The opposite is true for the Nordic countries, which are dominated by jobs with generally better job quality (cluster 1 and 2), having relatively few jobs in clusters 3 and 4. Other west European countries are middle ranking.

Job Where Workers Are At Risk.

With no unambiguous ranking of clusters on all indices, one cannot *a priori* identify which cluster contains the "worst" jobs, meaning the jobs that could be considered most subject to psycho-social risk. To resolve this issue, therefore, we next compare the clusters according to the well-being measures identified and analysed in the last section.

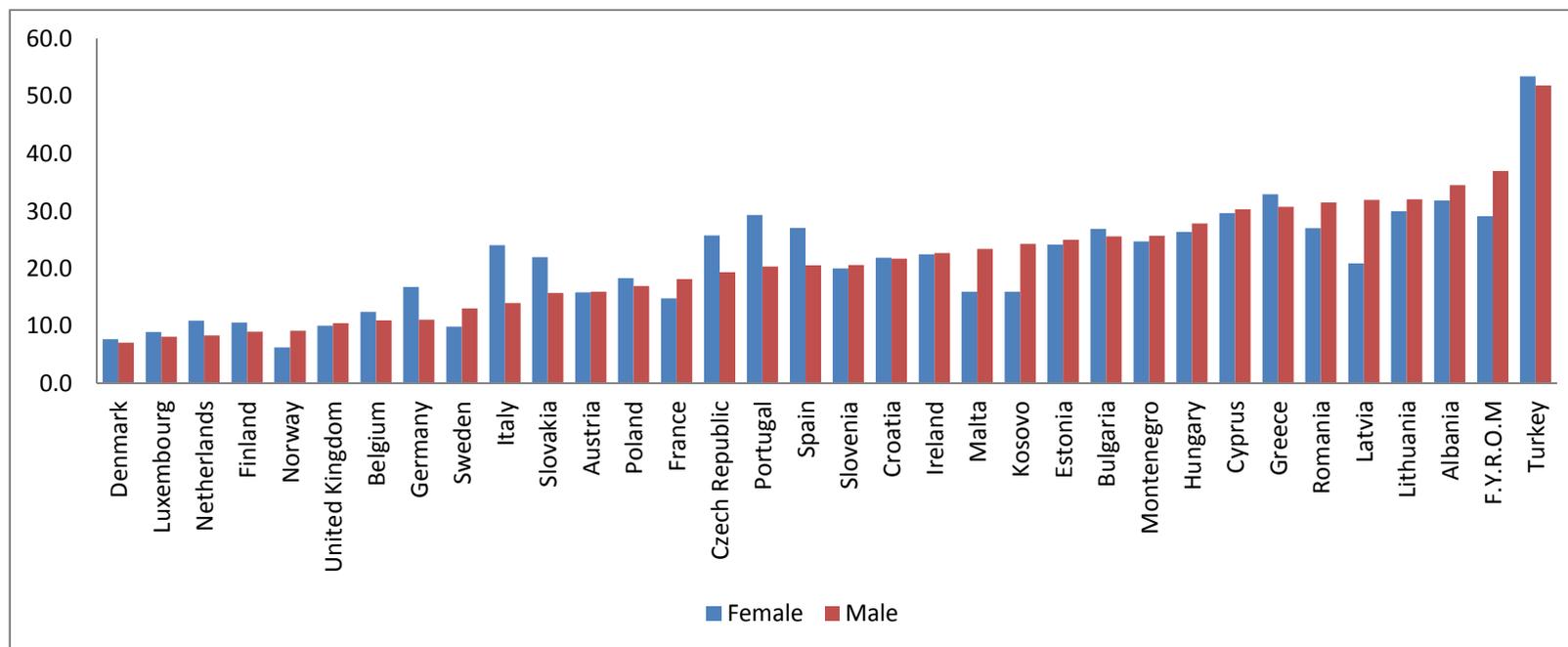
Table 6. Average Wellbeing Indicators for Each Cluster.

| Clusters | Number of Health Problems | Health Issues Caused by Work | Subjective Well Being | Subjective Work Life Balance | Meaningfulness of work |
|------------------------------------|---------------------------|------------------------------|-----------------------|------------------------------|------------------------|
| Cluster 1: High Paid Good Jobs | 2.24 | 17.77 | 70.11 | 83.18 | 6.70 |
| Cluster 2: Well Balanced Good Jobs | 2.39 | 15.46 | 68.83 | 91.95 | 6.84 |
| Cluster 3: Poorly balanced Jobs | 3.03 | 34.96 | 64.25 | 70.48 | 6.25 |
| Cluster 4: Low Quality Jobs | 3.67 | 36.54 | 57.69 | 71.64 | 5.53 |
| Total | 2.81 | 25.63 | 65.43 | 80.45 | 6.39 |

The average well-being in each cluster is given in Table 6, for each type of well-being outcome, as described in Section 4 (above). Cluster 1, which has the best job quality indices, has the lowest number of Health problems, and the second lowest prevalence of health issues caused by work, the highest subjective well being and the second highest subjective work life balance. Cluster 2 is also well-positioned, having the best subjective work life balance and scoring highest on "meaningfulness of work". Cluster 3 (Poorly Balanced Jobs) is a clear third on three measures, and is marginally even lower than cluster 4 (Low Quality Jobs) in terms of subjective work-life balance.

With that exception, Cluster 4 looks to be generally the worst group: it has the highest number of health problems and health issues caused by work, while having the lowest subjective well being, the second lowest subjective work life balance, and the least meaningful work. Cluster 4, therefore, identifies the jobs where workers are most at risk. Hence the subsequent analysis identifies the localities and groups which deploy the highest proportion of workers in this cluster.

Figure 14. Percentage of Individuals with Low Quality Jobs by Gender.

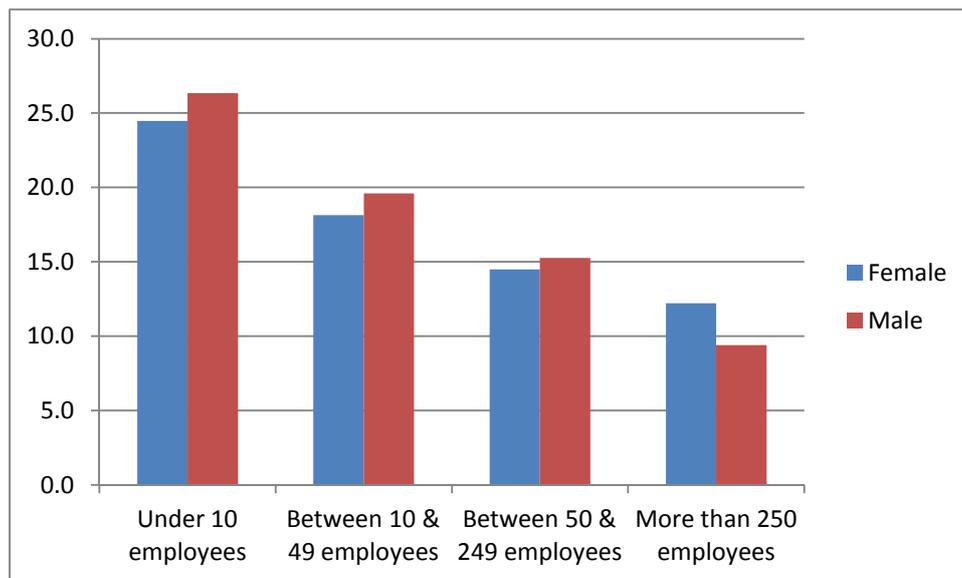


Source: Table A13.

In Figure 14 we show the percentage of individuals with low quality jobs (i.e. in Cluster 4) by gender for all countries. As can be seen, consistent with the broad association noted above in Section 5 between job quality indices and economic development, there is a generally negative relationship observed here between economic development and the proportions of jobs with workers at risk.

There are also some differences between the experiences of men and women. In some countries – Germany, Italy, Portugal, Slovakia, the Czech Republic and Spain there is a distinct imbalance, with substantially more women than men in the low quality jobs. The balance is reversed in favour of women, however, in Malta, Kosovo, F.Y.R.O.M. and Latvia.

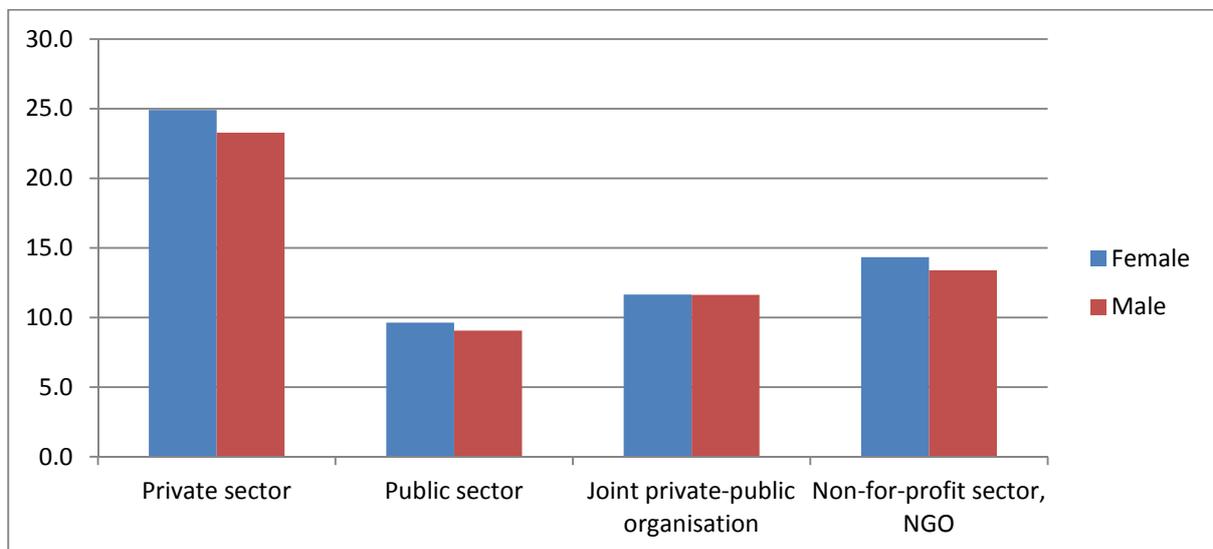
Figure 15. Percentage of Individuals with Low Quality Jobs by Establishment Size.



Source: Table A14.

When the percentage of Jobs at risk is computed by establishment size, as shown in Figure 15, it is shown that the smaller the establishment the higher the proportion of jobs at risk is irrespective of gender.

Figure 16. Percentage of Individuals with Low Quality Jobs by Ownership Type.



Source: Table A15.

The percentage of jobs at risk was also computed by the sector type (Figure 16). The findings indicate that the private sector has the largest proportion of jobs at risk which almost attains 25%. The private sector is followed by the non-for-profit sector, the joint private-public sector and finally the public sector. These findings hold for both gender groups.

7. Trends in Job Quality.

How has job quality been changing over time in the European Union? This question is of considerable interest for analysts and policy-makers concerned with the effects of the macro-economic crisis of late 2008 and the subsequent low growth rates of many EU countries. The better the quality of the jobs that emerge after a period of economic crisis, the more likely is it that the ensuing growth can be sustainable.

The effects of the economic crisis cannot, however, simply be observed by examining the picture of job quality in the two recent surveys in 2005 and 2010. This is because any observed changes over this period could be part of a longer-term trend. Job quality is expected to change over time as a result of a combination of economic and social pressures, including technological and organisational change and greater global economic competitiveness. Policies stemming from European Union directives, and the open method of coordination applied to employment policies, could also be expected to address the problem of low quality jobs with high psychosocial risks, potentially bringing about a movement towards convergence between countries for some elements of job quality. It is therefore important to track job quality over a substantial period of time.

The European Working Conditions Surveys permit such an analysis, but there are two sources of limitation on the scope of what is feasible. First, it is essential to make comparisons over time using the same group of countries, but the number of participating countries increased in later waves. In the very first survey there were only 12 members. This expanded to 15 in 1995 and 2000/1, 31 in 2005 and 34 in 2010.

Second, the questionnaire evolved over time as items were added, dropped and improved. Comparisons are only valid when the wording and response scales remain unchanged. The principle of continuity in questionnaire design has been followed for just this purpose in many cases, and there are consequently many items in the 2010 survey that can be validly analysed alongside the same items in previous surveys. Nevertheless, it needs to be noted that, even when items in the English version of the questionnaire are unchanged there could be alteration in the translations used in some countries. There can also be changes in the questionnaire structure and sequences which can alter the context in which questions are responded to.

Many of the items needed for the job quality indices were introduced for the first time in 1995, while only a minority date from the very first survey. Hence, to provide a long-term picture while keeping a reasonably large number of countries and usable items to form indices, this report examines the 1995 to 2010 period for 15 countries ("the EU15"). In this section the report describes how the indices are adapted for this purpose, presents findings about changes in job quality in the EU15, and investigates whether there has been convergence between the EU15 countries.

7.1 Construction of Indices for Trend Analyses.

The above considerations mean that *Working Time Quality* and three sub-indices of *Intrinsic Job Quality* are able to be analysed over time since 1995, namely *Skills and Discretion*, *Good Physical Environment*, and *Work Intensity*. For the purposes of this report these latter three will be treated separately, giving four indices where the trends can be analysed.

Nevertheless, in each case the computed index is somewhat more limited, by reductions in the numbers of items, compared to what was available for the 2010 analysis above. When comparing countries and groups in 2010, one should use the more comprehensive indices described above, rather than the trend indices.¹³ To distinguish each trend index formally

¹³ Because of the restrictions on the trend indices, any findings about the differences and rankings across groups and countries can occasionally deviate from findings based on the 2010 indices. The trend indices should only

from those calculated for 2010, we use the suffix (T). The restrictions are as follows:

Skills and Discretion (T)

The index is comprised of the same variables as for 2010, minus Q61Cp (on-the-job training), and four of the discretion items: Q51Cp (consulted over targets), Q51Ep (choice of working partners), Q51I (can apply own ideas) and Q51O (can influence decisions). Also omitted is the average educational level of the occupational group, mainly because there may have been credentialism over time (employers raising their educational requirements in line with the rising stocks of education labour rather than with rising skill requirements), but also because the available consistent education variable is quite crude, referring to the age left school which is classified in only three bands.

Good Physical Environment (T)

The index is comprised of the same variables as for 2010, minus Q24B (lifting or moving people), Q24D (standing), Q23F (harmful vapours), Q23G (contact with chemical products), Q23H (secondary smoking) and Q23I (contact with infectious materials).

Work Intensity (T)

The index is comprised of the same variables as for 2010, minus Q51(G) time pressure, and value conflict (items Q24G, Q51L and Q51P). *Work Intensity* is a negative indicator of job quality.

Working Time Quality (T)

The index is comprised of the same variables as for 2010, minus Q39 and Q40 (work time arrangements) and Q43 (flexible emergency time).

7.2 Average Job Quality Over Time in Europe.

Universal pressures from the developing global economy, from technological change, or from European policy initiatives, might be expected to have common effects across member states. Thus, although the pace at which such effects might happen could be expected to vary across member states, it is first of interest to examine changes in job quality over all countries in the sample taken together.

Looking at the overall levels of average job quality in the 15 member states that have participated at every wave since 1995, we observe a pattern of comparative stability in three of the indices: *Skills and Discretion (T)*, *Work Intensity (T)* and *Good Physical Environment (T)*. Only a slow pattern of change is discernible. Thus, the mean level of the *Work Intensity (T)* index rose by 2.2 points – a statistically significant rise, but less than a tenth of the standard deviation of the distribution. The *Skills and Discretion (T)* and *Good Physical Environment (T)* indices remained largely unchanged.¹⁴

In contrast, there was a substantive rise of 5.4 points over time in the *Working Time Quality (T)* index. This rise reflects both declining work hours and the falling use of shift work at weekends and night time. The magnitude of this change compares with a standard deviation of 20.9 for the whole distribution. To gain an idea of what this means in practice, one could note one of the ingredients of this change: the proportion of workers in the EU15 countries who never worked on Saturdays rose from 44% to 50% over the period.

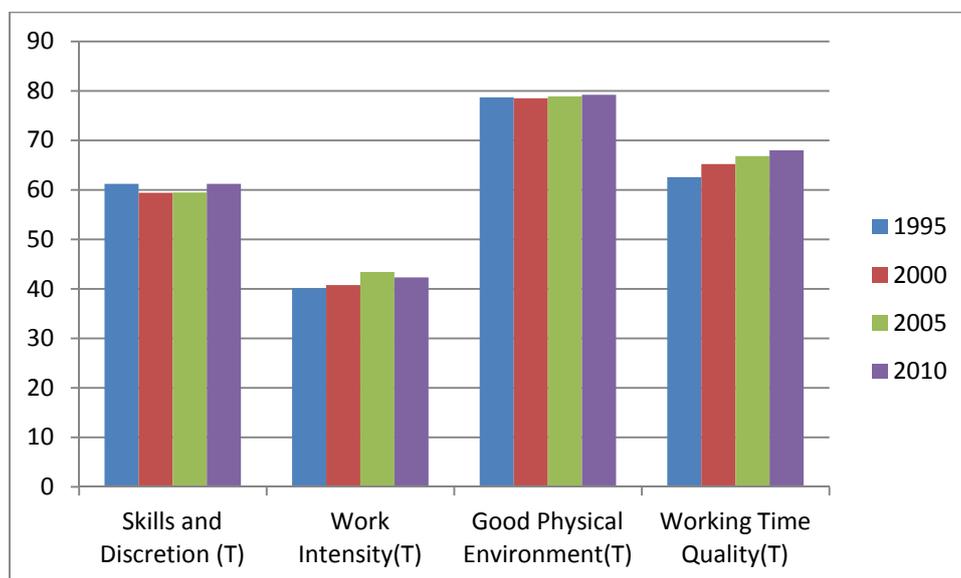
This change, along with other improvements that collectively add up to the rise in this index, suggests that workplaces have become somewhat better at meeting employees' needs for a

be used for comparisons over time.

¹⁴ In the case of the *Good Physical Environment* index, further analyses reveals that there were small improvements through the reduction of environmental hazards, but these were counter-balanced by increases in the prevalence of posture-related risks.

good work-life balance. A word of caution is required, however, owing to the restrictions on this index that were necessary to make it consistent from 1995 onwards. When the flexibility of working time arrangements is considered, which is possible from 2005 onwards, a less optimistic picture is found: the proportion of jobs where the job-holder had some possibility to choose or adapt their working time arrangements fell from 46% to 42%.

Figure 17. Job Quality Indices in EU15 Countries, 1995-2010.

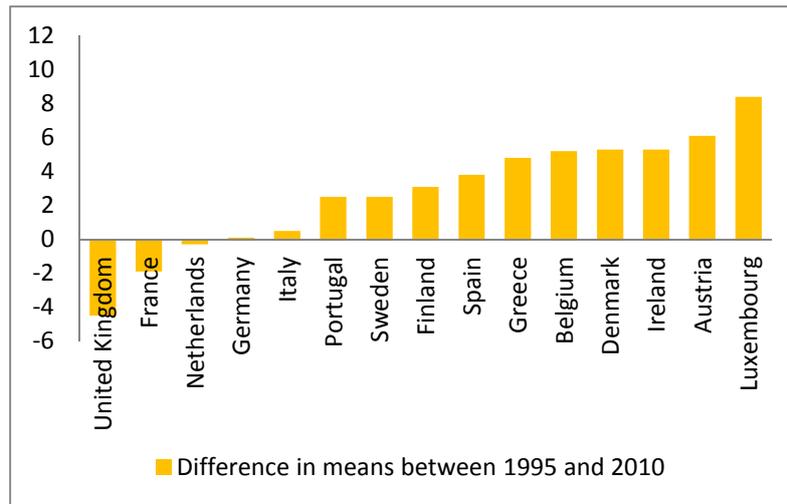


Source: Table A16.

To set against this aggregate picture of all 15 countries, however, it should be recalled that national institutions, policies and cultures could be expected to have differential effects on how job quality evolves over time, with the possibility of job quality moving in opposite directions across countries. Moreover, the aggregate picture tends to be more strongly influenced by changes that take place in the larger countries, since population size more heavily weights the observations from these countries. This means that some changes in small countries might not be reflected in the aggregate. It is therefore important to study both the overall change in job quality in Europe and the changes in individual countries.

Figure 17 depicts the changes in *Skills and Discretion (T)* in each country from the start to the end of the observation period. The figure is derived from tables in the Appendix which present the findings in more detail, covering every intervening wave of the survey. In order to focus on substantive changes, it is useful to delineate a clear, if slightly arbitrary, change threshold, namely at three points (within the 100 point range). Thus, wherever an index rises or falls by at least this amount the change can be regarded as "substantive", while a change of anything less than three over a 15 year period is unlikely to have been noticed much.

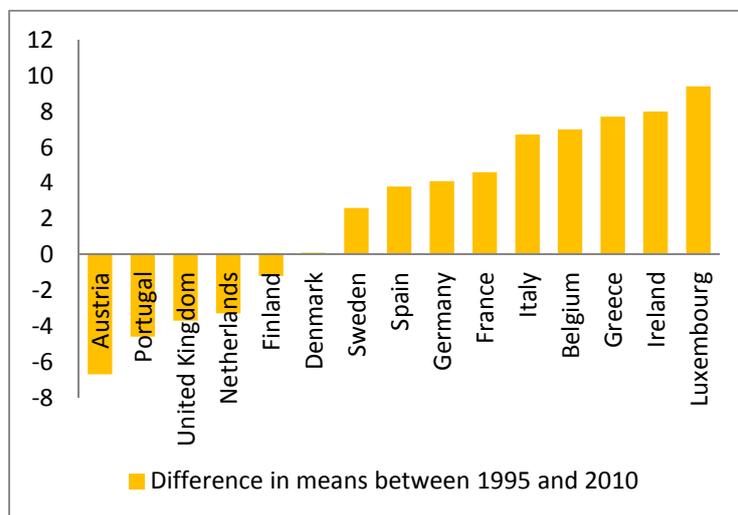
Figure 18. Change in *Skills and Discretion (T)* by Country in the EU15, 1995-2010.



Source: Table A18.

Using this guideline, one can observe that the *Skills and Discretion (T)* index rose in 8 countries, while falling in just one, the UK (Figure 18). Part of the latter fall, which was more substantial for males than for females (see Appendix, Table A18), reflects in particular a decline in task discretion that has been found from data in the UK Skills Surveys (Gallie et al., 2004). By contrast, the *Skills and Discretion (T)* index rose by the most (9.5 points) in Luxembourg. The more general experience of rising *Skills and Discretion (T)* is consistent with predictions of rising skill demands.

Figure 19. Change in *Work Intensity (T)* by Country in the EU15, 1995-2010.

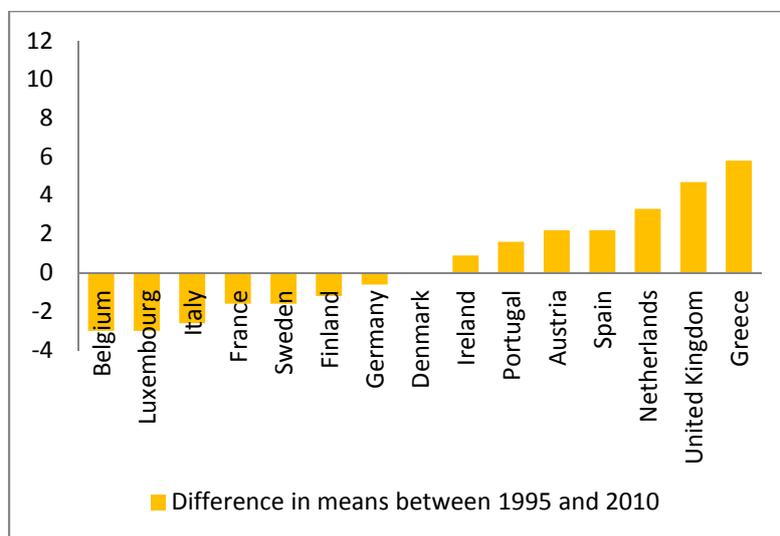


Source: Table A19.

Turning to *Work Intensity (T)*, our one negative index of job quality, most countries in the EU15 experienced a substantive intensification of work over the (1995 – 2010) period (Figure 19). These countries are: Belgium, France, Germany, Greece, Ireland, Italy, Luxembourg and Spain. There are, however, four contrasting countries: Austria, Portugal, Luxembourg and Spain.

the UK and the Netherlands, where work intensity fell over this period.¹⁵ The direction of change was the same for men and women in every country.

Figure 20. Change in *Good Physical Environment (T)* by Country in the EU15, 1995-2010.

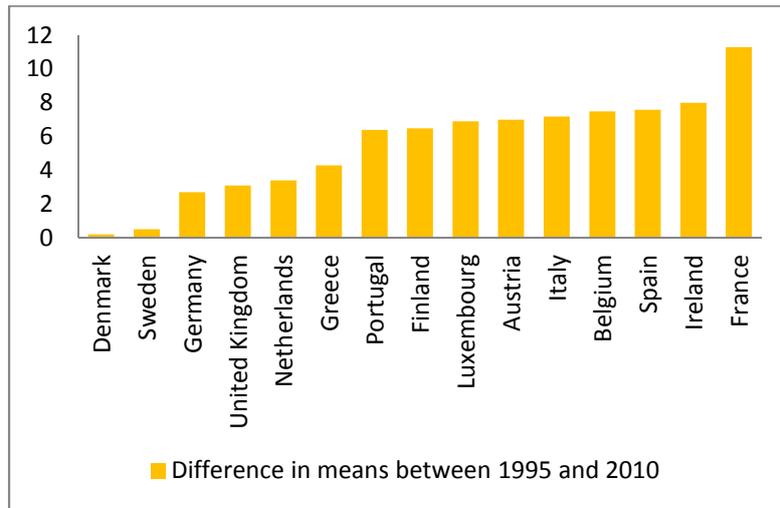


Source: Table A20.

With the *Good Physical Environment (T)* index, the stability in the aggregate picture is also reflected in there being only small amounts of change in most countries, as shown in Figure 20. In three countries there was a substantive rise in job quality (using, still, the same threshold for "substantive") – these are Greece, the United Kingdom and the Netherlands. In these countries, the index rose for both men and women, but the increase for women was twice as fast (see Appendix Table A20.). Meanwhile, in Belgium and Luxembourg there were falls of exactly three points.

¹⁵ In Austria and Portugal *Work Intensity (T)* was volatile, and arrived at a relatively low level in 2010 while being high in 2005. In the UK work intensity was at an exceptionally high level in 1995, and subsequently declined somewhat; the early 1990s was, according to both the EWCS and other sources, a period of exceptional substantial intensification. Comparing the 2000s with the start of the 1990s, work intensity in the UK rose according to multiple sources (Green, 2006).

Figure 21. Change in *Working Time Quality (T)* by Country in the EU15, 1995-2010.



Source: Table A21.

The overall rise in *Working Time Quality (T)* seen above (Figure 21) is reflected in rises in the large majority of individual countries. Only in Denmark, Sweden and Germany were there no substantial increases. The largest rise was in France where, over the course of the 15 year period, this index increased by 11.3 points. There, most of the rise is associated with the fall in work hours over the period, though there was also a reduction in the prevalence of night-time and weekend working.

7.3 Convergence or Divergence?

To what extent do these changes imply that there has been some convergence in job quality among member states over this period, as suggested in previous analyses using earlier EWCS data, and alternative data sources (Olsen et al., 2010; Eurofound, 2009)? Some convergence can be seen in individual cases. For example, the substantive rise in the *Good Physical Environment (T)* in Greece represents a convergence of that country towards the typical levels found elsewhere, starting from a low level in 1995; similarly, the large rise in *Working Time Quality* in Ireland was from an initial level lower than most other countries.

To examine formally whether there was convergence or divergence, we investigated using regression analysis whether the initial value of each index was statistically associated with its subsequent change. A negative association would imply convergence, and a positive association would imply divergence. We also computed the coefficient of variation across countries of the average levels of the job quality indices. The coefficient of variation is one measure of the extent to which country averages are unequal. A narrowing of the differences between countries, (that is, convergence) should then be reflected in a fall in the coefficient of variation.

We found that the coefficient of variation across country averages fell from 0.63 to 0.61 for the *Work Intensity* index, from 0.24 to 0.23 for the *Good Physical Environment* index. Thus, for each of these aspects of job quality there appears to have been a slight convergence. In the case of the *Working Time Quality* index, the convergence is more notable, the coefficient of variation having fallen rather more substantially, from 0.35 to 0.30.

In the case of *Skills and Discretion*, however, no evidence of statistically significant cross-national convergence or divergence was evident. See Table A22.

8. Conclusions and Implications

8.1 Overview and Implications for Policy Analyses.

The main aim of this report was to construct indices that would provide a fair and accurate summary of job quality in the 27 countries of the European Union, and in the 7 additional countries in Europe that participated in the European Working Conditions Survey. In the light of these new indices, the further aim has been to provide a descriptive account of job quality and how it varies across Europe, and over time.

At the outset, the report adopted an objective concept of job quality, thus excluding indicators of workers' values, preferences, subjective well-being or attitudes. This meant building the indices on the self-reported features of jobs that are associated, in one way or another, with meeting peoples' needs from work. It was also noted, however, that the concept did not incorporate individual and contextual variables, even though these affect the well-being of workers. Indicators of the external labour market environment such as unemployment and social protection were not included in the job quality indices.

The report recommends the adoption of four indices, namely *Earnings*, *Prospects*, *Intrinsic Job Quality* and *Working Time Quality*. Each of these indices is theoretically and conceptually coherent, and can expect to be well understood; yet they are related only to some extent with each other, and the differences are so substantive that it would be misleading for policy analysts or researchers to try to reduce them to a single index of job quality. Over time their associations with each other show no signs of increasing, while the indices in many cases move in opposing directions.

These four indices are suitable for analyses, both in themselves, and as inputs into a broader set of indices covering the quality of employment that can be used for policy analyses. Wider measures of labour markets tend to change more from year to year, especially with the progress of the economic cycle, and therefore such broader indices need to be computed frequently, typically on an annual basis. Job quality, however, is likely to be more resistant to large alterations over short periods. Hence it is quite suitable that it is monitored less frequently for policy purposes, and the periodicity of the EWCS (five years) is about right. Nevertheless, the job quality indices could still be fed as ingredients into more-frequently-changing broader indices of the quality of employment.

While this section is not intended as a comprehensive summary, several features of the indices stand out from the descriptive analyses of job quality across Europe. The indices all showed a positive correlation with the education level of job-holders. Even *Working Time Quality*, which might not necessarily be expected to be associated with education, is weakly positively correlated, except at the sparsely populated lowest end of the education spectrum.

Another notable finding is that the gap between men's and women's earnings, found in countless other sources, is not mirrored by similar gaps in respect of the other elements of job quality. With respect to *Prospects*, *Intrinsic Job Quality* and *Working Time Quality* the gaps were much smaller in relation to their overall variation, in the case of the latter two the index is somewhat higher for women than for men. This finding appears to imply that redoubled policy efforts to reach gender equality should be focused primarily at pay gaps, but more detailed analyses would reveal the cases where the gender differences in non-wage aspects of job quality also become acute.¹⁶

The report also pointed a searchlight at jobs which exhibited a multitude of poor job quality features. A cluster analysis was used to identify groups of jobs that were similar in respect of the four indices, and one group, numbering around 1 in 5 of all jobs, fitted the description of all-round bad jobs. As expected, the workers who were in these jobs also had, on average,

¹⁶ The tables in the Appendix are presented separately for men and women.

the lowest levels of health and well-being, showing more health problems, lower subjective well-being, and finding less meaning in their work. The analysis was not intended to prove that certain jobs caused low levels of health and well-being; but the strong association suggested that an analysis of the cluster of poor quality jobs could be helpful for identifying where policy-makers should direct their attention.

The fact that as many as 1 in 5 jobs fall into this category suggests that policy towards ameliorating the detrimental effects of work on health and well-being needs to be conducted on a fairly broad front. It was found that poor quality jobs, where workers could be said to be most at risk, were especially concentrated in establishments with under 5 employees, and in the private sector. They were also more prevalent in countries with lower levels of GDP per capita, though the association with national income is far from perfect. In a few countries there was a distinct gender imbalance in the prevalence of low quality jobs, which suggesting a need for attention by policy-makers in these countries to promote greater equality.

The trend findings showed a considerable degree of continuity in respect of those aspects of intrinsic job quality that could be tracked over a long period, that is, from 1995 to 2010. Three of the indices showed only small changes across the 15 EU countries that participated in all waves over this period, with virtually no aggregate change in the *Good Physical Environment (T)* index. While findings elsewhere are more positive about some specific aspects of the physical environment – for instance in respect of having to work in a smoky environment, which improved between 2005 and 2010 – the lack of aggregate change in the physical environment suggests that efforts be redoubled to bring about improvements. Policy could usefully be focused on the increasing prevalence of posture-related risks in the workplace. Similarly, rising levels of work intensity in the majority of countries contribute to raising the risks of high levels of stress and consequent ill effects on health and well-being. Policies to reduce the presence of stressors are indicated, as well as programmes to ameliorate the effects of high levels of stress.

Some positive signs are found in the increases in the growth of the *Skills and Discretion (T)* index, revealed for the majority of countries. This index goes to the heart of the intrinsic character of work, and is at the same time associated on average with higher levels of productivity. In some countries where there is, however, evidence of a decline in this index, policy attention needs to be directed at the source of this fall. In the case of the UK, for example, the index declined because of reductions in the average levels of discretion afforded to employees, confirming what has been found with separate data from that country.

The largest aggregate change, however, took place for the *Working Time Quality (T)* index, and here the picture is positive, showing rises both overall and in most countries separately. These changes arise largely from reductions in working time and in having to work during non-standard hours. However, it is recommended that the flexibility of working time for workers is closely monitored in future by policy-makers, as there is as no evidence of improvement on this front over the 2005-2010 period.

8.2 Implications for the Development of the Working Conditions Survey.

In deriving the job quality indices we have at various points suggested that there is room for potential improvement in the indices that could be introduced with future European Working Conditions Surveys. In bringing these recommendations together, it is worth prefacing them with the remark that the continuity of items is of the greatest value for understanding the processes of change in European workplaces. Ideally, the large majority of questions should be framed in identical ways with identical translations and response scales, and the questions should be posed in the same sequence as in previous surveys so as to minimise possible distortions from order effects, and using the same mode of delivery. However, with

a few items it is sometimes found that the value of improvements outweighs those of continuity, especially where the primary objective is to know as accurately as possible the prevalence of a particular job feature and its comparison across socio-economic groups, or where new issues come to prominence in policy discourse. It is within this spirit that the recommendations are offered.

a) We considered, in Section 3.2.1, the possible inclusion of an indicator for the fairness of wages. "Fairness" would be conceived as being paid according to one's skill and effort, and unfairness arises if wages are significantly above or below this amount. However, objective measures of fairness are hard to construct, since it proves impossible to capture in a survey all the potential elements of skill and effort, and any potential compensating factors, that might account for fair pay. Any measure of fairness of wages, then, would have to be based on subjective perceptions. Such an indicator would have no place in the job quality indices as conceived here, but nevertheless could be of interest in itself. One subjective but vague item in the current survey (Q77B: scale of agreement with "I am well paid for the work I do") might be developed further for this purpose.

More promising would be to develop the reports of discrimination covered in Q65A to Q65 G. In the current survey, 6% of workers report being subject to discrimination, with the most prevalent single criterion of discrimination being age (3%). While not covering the idea of unfair treatment comprehensively, discrimination is one of the most important specific manifestations of unfairness. We would recommend considering a follow-up question to establish the focus of the discrimination, whether it is on wages, working time quality, job prospects or aspects of intrinsic job quality.

b) We noted, in Section 3.2.3, that the measures of skills use might be improved. While respecting the continuity principle, the literature in this field suggests that future surveys should cover the qualification requirements of jobs, as an additional indicator of skills use. Potential indicators have been developed elsewhere, both for national surveys and for harmonised internationally comparable surveys. In some cases these have been extended to capture the required prior work experience for job applicants. Together, such measures would give an improved index for the skill level of the job, which should be an integral element of job quality. Other variables of less value could be dropped if space were a problem, but the large majority of items could remain so as to preserve a continuous index of skills use for trend analyses.

c) The *Prospects* index is strongly related to well-being, and is closely linked to developments in the labour market and in policy. It is also the "thinnest" of the four indices developed here, in the sense that it has the smallest number of discrete data points, just 17. There would be value, therefore, in considering ways in which the three ingredients of this index – job security, career prospects and contract status – could be supplemented with additional items that would generate a somewhat more fine-tuned measure. More information could be obtained about promotion prospects in the job, and/or about the security of intrinsic aspects of jobs.

d) *Working Time Quality* is the area that shows the most promising trends between waves. However, the trend index dating back from 1995 is less than comprehensive, since it does not include measures of the extent to which employees can choose their working hours, or of their ability to take time off in emergencies to deal with caring responsibilities. These are now included in the index for 2010, and we think it important that these be continued in future surveys. Moreover, we recommend that consideration be given to adding an item to capture the provision of child care facilities at workplaces.

d) In Section 3.3 we rehearsed arguments for incorporating items covering organisation-level participation and representation. We noted that this concept would be included in the 2013 European Company Survey, from which country-level indices could be derived, but that it has not been included among the job quality indices generated in this report. Yet it remains possible that organisation-level participation and representation are reported differently by,

and have a different significance for, employees. Communication and influence channels for ordinary employees, for example, could be considered an important aspect of job quality. An option, therefore, for future surveys could be to develop additional items to supplement those already present, in order to be able to generate an index of organisation-level participation.

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