Project: “No. 40051280/0”

A Validation Study of the Quality of Employment Indicators

Index

Introduction[1]

This study supports the work of UNECE Task Force on the Measurement of the Quality of Employment. It reports main findings from an in-depth analysis of the proposed indicators aimed at identifying those most suitable to measure the seven dimensions composing the quality of employment.

A first, preliminary phase of the present study consisted of a careful review of data availability. Electronic databases - created and maintained by international organization such as ILO, UNECE and EUROSTAT - were first explored. Then, in accordance with the Steering Committee, Eurostat was asked to provide a list of further indicators that were not available online. This phase represented a major challenge, due to the objective difficulty of measuring the quality of employment: not all proposed indicators in fact were available or were so for all countries.

The subsequent phase implied a thorough examination of the reviewed indicators, performed also by means of univariate and multivariate statistical techniques. Its aims were two-fold: firstly, the evaluation of the effective adequacy of the selected indicators to capture and describe each dimension of quality of employment; secondly, the individuation of the most suitable indicators so to ensure completeness at the same time avoiding information redundancy.

Lastly, the study will also highlight the relevance of indicators for the statistical framework suggested by the Task Force as well as provide evidence of the quality of employment indicators' applicability to the ILO framework of Decent Work. In particular, we will consider some legislative indicators in order to study the relationship between quality of employment indicators and the legislative framework.

[1] The Validation Study was carried out by the Italian National Institute of Statistics (ISTAT). In particular, Federica Pintaldi (coordinator) Francesca Della Ratta, Francesca Fiori and Elisa Marzilli contributed to work.

I. METHODOLOGY OF THE STUDY

1.1 Comparing Quality of Employment and Decent Work frameworks

The choice of indicators to be included in the validation study followed an attentive review of all the documents produced by UNECE/ILO/EUROSTAT Seminar on Quality of Work, by the Task Force, and finally documents edited within the framework of Decent Work of ILO.

To start, we compared the dimensions proposed within the framework of Quality of Employment to those of the ILO framework on Decent Work, to highlight similarities and differences.

We noticed that the first five dimensions proposed by Quality of Employment framework (i.e. Safety and ethics of employment, Income and benefits from employment, Working hours and balancing work and non-working life, Security of employment and social protection, Social dialogue) are also included in the ILO Decent Work framework. The other two dimensions (Skills development and life-long learning, Workplace relationships and intrinsic nature of work) are specific of the Quality of Employment framework, whereas the dimension "Employment opportunities" is only included within the ILO framework. Regarding the dimensions 6 and 7 we should consider that the structure of the dimensions of the Quality of Employment framework follows a logic that reflects a priority of human needs that may be satisfied through employment[2]. So these dimensions have less to do with the provision of basic human needs of safety and sustenance but describe many modern-day aspirations of the role of work.

The latter however refers to indicators that may be regarded as contextual indicators within the Quality of Employment framework. Subsequently, we compared the two frameworks to observe whether they proposed common indicators (table 1).

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[2] UNECE Task Force on the Measurement of Quality of Employment "Statistical Measurement of Quality of Employment:Conceptual framework and indicators", September 2009 p. 8.

Table 1 - Comparison between Quality of Employment framework and Decent Work framework: dimensions and indicators

Quality of employment	Decent Work	Indicators (main and fully accepted)
1. Safety and ethics of employment a) Safety at work b) Child labour and forced labour c) Fair treatment in employment (exceptional case: statistics should be produced across all dimensions for as many indicators of quality of employment as possible for the groups which may be relevant for individual countries)	8. Safe work environment 5. Work that should be abolished 7. Equal opportunity and treatment in employment	**QE and DW** • Fatal occupational injury rate (Workplace fatalities per 100,000 employees) **QE** • Non-fatal occupational injury rate (Workplace accidents per 100,000 employees) • Share of employees working in "hazardous" conditions • Employment of persons who are below the minimum age specified for the kind of work performed • Employment of persons below 18 years in designated hazardous industries and occupations. • Employment of persons below 18 years for hours exceeding a specified threshold **DW** • Child labour (draft ICLS resolution) • Occupational segregation by sex • Female share of employment in ISCO-88 groups 11 and 12 [L] Child labour (incl. public policies to combat it) • [L] Forced labour (incl. public policies to combat it) • [L] Anti-discrimination law based on sex of worker • [L] Anti-discrimination law based on race, ethnicity, religion or national origin • [L] Occupational safety and health insurance • [L] Labour inspection
2. Income and benefits from employment a) Income b) Non-wage pecuniary benefits	2. Adequate earnings and productive work	**QE and DW** • Low pay (share of employed with below 2/3 of median hourly earnings) **QE** • Average weekly earnings of employees • Share of employees using paid annual leaven in the previous year • Average number of days paid annual leave used in the previous year • Share of employees using sick leave • **DW** • Working poor • [L] Statutory minimum wage

Quality of employment	Decent Work	Indicators (main and fully accepted)
3. Working hours and balancing work and non-working life a) Working hours b) Working time arrangements c) Balancing work and non-working life	3. Decent hours 4. Combining work, family and personal life	**QE and DW** • Share of employed persons working 49 hrs and more per week **QE** • Average annual (actual) hours worked per person • Share of employed persons working less than 30 hours per week involuntarily • Percentage of employed people who usually work at night/evening • Percentage of employed people who usually work on weekend or bank holiday • Share of people with flexible work schedule • Ratio of employment rate for women with children under compulsory school age to the employment rate of all women aged 20-49 • Share of people receiving maternity/ paternity/family leave benefits **DW** • [L] Maximum hours of work • [L] Paid annual leave • [L] Maternity leave (incl. weeks of leave, replacement rate and coverage)
4. Security of employment and social protection a) Security of employment b) Social protection	6. Stability and security of work 9. Social security	**QE and DW** • Public social security expenditure as share of GDP **QE** • Percentage of employees 25 years and older with temporary jobs • Percentage of employees 25 years and older with job tenure (< 1 yr, 1-3 yrs, 3-5 yrs, >= 5yrs) • Share of employees covered by unemployment insurance • Share of economically active population contributing to a pension fund **DW** • Share of population aged 65 and above benefiting from a pension • Stability and security of work (developmental work to be done by the Office). • Incapacity for work due to sickness / sick leave • Incapacity for work due to invalidity • [L] Employment protection legislation (incl. notice of termination in weeks) • [L] Pension (public / private) •

Quality of employment	Decent Work	Indicators (main and fully accepted)
5. Social dialogue	10. Social dialogue, workers' and employers' representation	**QE and DW** • Share of employees covered by collective wage bargaining **QE** • Average number of days not worked due to strikes and lockouts (per 1000 employees) **DW** • Union density rate • Enterprises belonging to employer organization • Indicator for Fundamental Principles and Rights at Work • [L] Freedom of association and right to organize • [L] Collective bargaining right • [L] Tripartite consultations
6. Skills development and life-long learning	-	**QE** • Share of employed persons in high skilled occupations • Share of employees who received job training within the last 12 months • Share of employed who have more education than is normally required in their occupation • Share of employed who have less education than is normally required in their occupation
7. Workplace relationships and intrinsic nature of work a) Workplace relationships b) Intrinsic nature of work	-	No indicators proposed
-	1. Employment opportunities	**DW** • Employment-to-population ratio, 15-64 years • Unemployment rate • Youth not in education and not in employment, 15-24 years • Informal employment • [L] Government commitment to full employment • [L] Unemployment insurance
-	11. Economic and social context for decent work	**DW** • Children not in school (% by age) • % of working-age population who are HIV positive • Labour productivity (GDP per employed person) • Income inequality (percentile ratio P90/P10) • Inflation rate • Employment by branch of economic activity • Education of adult population • Labour share in GDP

The Quality of Employment framework includes 30 main indicators while ILO framework on Decent Work includes 18 main indicators and some additional normative information on working rights. The two frameworks present 5 indicators in common. Furthermore, there are some other indicators of fundamental relevance within one framework but playing an additional role within the other.

In the following phases of the study the focus had mainly been on the 30 indicators proposed by the framework on the Quality of Employment.

1.2 Indicators included in the validation study

As mentioned in the introduction, the project's first step involved the assessment of the indicators' availability. We started from the review of the data stored in several electronic databases maintained from recognized international organizations: Eurostat, ILO, UNECE, World Bank and European Foundation. Beside their availability, for each indicator we collected information on the data-source, on the dimension of the framework, its precise definition and the formula to compute it. Space was also dedicated for additional clarifying comments (annex 1). As regards the European countries, only 8 of the proposed indicators were not available. Data for the other 22 indicators were collected by nearly all countries, although not to the same extent (table 2). The indicators were thus classified into 5 groups according to their degree of availability: those directly available from online databases, those requiring further processing and elaboration, those replaceable by similar information, those completely unavailable. Several of the indicators requiring further processing were made available by Eurostat that computed all the variables we needed for the validation study[3].

Table 2 – Availability of indicators

Availability	**N**
Yes, directly from electronic database or publication	6
Yes, with an elaboration from electronic database	5
Yes, but a specific elaboration is needed (not from electronic database)	6
No, but available similar data	5
No, data not available	8
Total	**30**

With specific regard to the dimension *7 Workplace relationships and Intrinsic nature of work*, however, the Task Force did not agree on a commonly accepted set of indicators.

[3] Eurostat calculates several variables from LFS and SES.

Therefore, we decided to consider some of the variables proposed by the members of the Task Force. Specifically, the selected variables come from the Fourth European Working Conditions Survey.

We should highlight that the final number of computed variables is higher than the number of proposed indicators. The indicators, in fact, are often expressed in a generic form that may point at several variables. As a matter of fact, we identified for some indicators we identify many suitable variables with the intent to select the best throughout the study. We would better clarify this point though an example: let us consider, for instance, the indicator "Share of employed persons in high-skilled occupation". Depending on the choice of occupations classified as highly skilled, the variable referred to this specific indicator could be one of the following:

- the incidence of employed in Isco1
- the incidence of employed in Isco2
- the incidence of employed in Isco3
- the incidence of employed in Isco1_2_3
- the incidence of employed in Isco2_3

With specific regard to the above-described example, and following the principle of parsimony, we decided to include only the last variable, as it did not present any difficulty in its computation and at the same time is strongly correlated with the others (par. 2.1.6).

Furthermore, the reference population at the denominator may also vary. The incidence rate could be computed over total population, or over population in employment only, thus yielding to differing variables. It thus becomes clear that every single indicator may be operationalized in different ways, thus resulting in several variables.

Altogether, the number of computed variables originally amounted to 66. It should be born in mind that the required information was not always available for all selected countries.

In addition to the quantitative indicators, some information related to labour market legislation and social protection was also included. As a matter of fact, the normative framework on working conditions is deeply connected to the quality of employment, and we believe that the inclusion of this additional information may provide useful insights for the measurement of the concept of quality of employment itself.

The great majority of indicators derives from the proposals of the Task Force on the Measurement of Quality of Employment or from the ILO framework on Decent work. Following international recommendations, they are practical, simple and produced from data programs common in many countries. Several indicators were drawn from the database Condition of Work and Employment Laws of International Labour Organization (ILO). Other

indicators related to working conditions laws were collected from the research Doing Business of World Bank.

1.3 Selected countries

This project aims at the evaluation of a set of indicators related to the quality of employment. In particular the project had to test the covariance among some quality of employment indicators surveyed by twenty countries that are members of UNECE. Not all countries, however, were included in the study. The criteria of countries' selection were:

- *Eurostat data-base*: a group of 32 countries that belong to the European area were selected. This selection concerned both EU Member States and not-EU Member States;
- *availability of indicators:* the selection was restricted to those European countries for which almost all indicators were available;
- *comparability of indicators*: only those European countries which adopted the same methodology and standard to collect the data were selected;
- *consistency of employed population*: those countries with a number of employed population smaller than 500,000 were not considered;
- *variability*: a robustness analysis may be needed to ascertain whether the contexts are sufficiently different. We paid particular attention to take into consideration both EU Member States and not-EU Member States, in order to verify the indicators in different contexts.

On the base of a first recognition, we selected 22 countries (see table 3) to carry out the analysis. For each country we tested the variables selected about the quality of employment dimensions.

Table 3 – Countries selected for analysis

1. Austria	9. Greece	17. Portugal
2. Belgium	10. Hungary	18. Slovakia
3. Czech Republic	11. Italy	19. Slovenia
4. Denmark	12. Latvia	20. Spain
5. Estonia	13. Lithuania	21. Sweden
6. Finland	14. Netherlands	22. United Kingdom
7. France	15. Norway	
8. Germany	16. Poland	

1.4 The steps of analysis

The core part of the analysis was aimed at selecting the best variables for the measurement of the seven dimensions of quality of employment drawing from the originally identified 66 quantitative and 21 legislative variables. Since all the proposed variables were of equal relevance to the study, we adopted as discriminating factor the indicators' power to highlight differences among countries.

Therefore, we started from computing the univariate summary statistics (mean, minimum, maximum, standard deviation) of the 66 quantitative variables, which allowed us to identify those with the highest variability among countries. The variables resulting not available for most countries were eliminated from the study.

Then, we calculated the correlation. The intent was to further select the variables, observing their relationships and eliminating those highly correlated to avoid redundancy of information.

Lastly, by means of a Principal Components Analysis[4] (PCA) we observed simultaneously the performance and the relationship of the quantitative variables in the 22 countries. At this stage we had restricted the scope of our study to 22 selected variables.

With the regard to the legislative variables on the countries' normative framework, we started form the analysis of their univariate frequency distributions, in order to assess their variability. Similar categories with too few cases were collapsed. Subsequently we carried out a multivariate analysis by means of a Multiple Correspondence Analysis[5] (MCA) to summarize the group of legislative indicators.

[4] Principal component analysis (PCA) is mathematical procedure that transforms a number of correlated variables into a smaller number of uncorrelated variables called principal components. The first principal component accounts for as much of the variability of correlation matrix, and each succeeding component accounts for as much of the residue variability as possible.

[5] The Correspondence analysis is a descriptive/exploratory technique designed to analyze multi-way tables containing some measure of correspondence between the rows and columns. Results provide information similar to those produced by Factor Analysis techniques, that allow to explore the structure of categorical variables.

II. EMPIRICAL STUDY

2.1 Variables collected for each dimension of Quality of Employment

For reasons of data availability and comparability, the variables used in the validation study come mainly from the Labour Force Survey (LFS). Other sources are: European Working Conditions Survey (EWCS), Structure of Earnings Survey (SES), National Account (NA), and administrative data.

This section presents main findings from the statistical analysis carried out on the collected variables. Their availability and difficulty of interpretation will also be discussed. Annex 1 and Annex 2 report for each indicator and for each variable a more detailed theoretical and operational definition, its data source and the database.

2.1.1 Dimension 1. Safety and ethics of employment

Safety and ethic of employment consists of three sub-dimensions: a) safety of work; b) child labour and forced labour; c) fair treatment in employment.

The sub-dimension *Safety of work* refers to unsafe job, risk of injury or death. Three are the indicators proposed to measure it. As regards the first two indicators ('Fatal occupational injuries rate' and 'Non-fatal occupational injuries rate'), the variables are available for most countries. Moreover there are no significant differences between the variables referred to all persons in employment and those referred to employees only (table 4).

Table 4 – Descriptive statistics of variables for dimension 1 Safety and ethics of employment

Variable	Mean	Std. Deviation	Minimum	Maximum	N
Fatal occupational injuries rate					
Fatal injuries (per 100,000 in employment)	3.1	1.8	0.7	7.6	22
Fatal injuries (per 100,000 employees)	3.7	2.2	0.8	9.2	22
Non- fatal occupational injuries rate					
Standardized incidence rate of serious accidents at work (per 100 000 in employment)	2,970	1,224	1,130	5,715	14
Non-fatal injuries (per 100,000 in employment)	1,602	1,267	162	4,534	21
Non-fatal injuries (per 100,000 employees)	1,915	1,547	182	5,507	21
Work-related health problems in the past 12 months (per 100 in employment)	10.9	10.8	2.7	52.0	22
Work-related health problems in the past 12 months (per 100 employees)	10.7	10.6	2.4	51.6	22

Accidental injuries at work in the past 12 months (per 100,000 in employment)	3.1	1.6	0.9	6.8	22

On the other hand, there were no available data to build the third indicator ('Share of employees working in hazardous conditions').

Figure 1 – Scatter plot between "Fatal injuries (per 100,000 employees)" and "Non-fatal injuries (per 100,000 employees)"

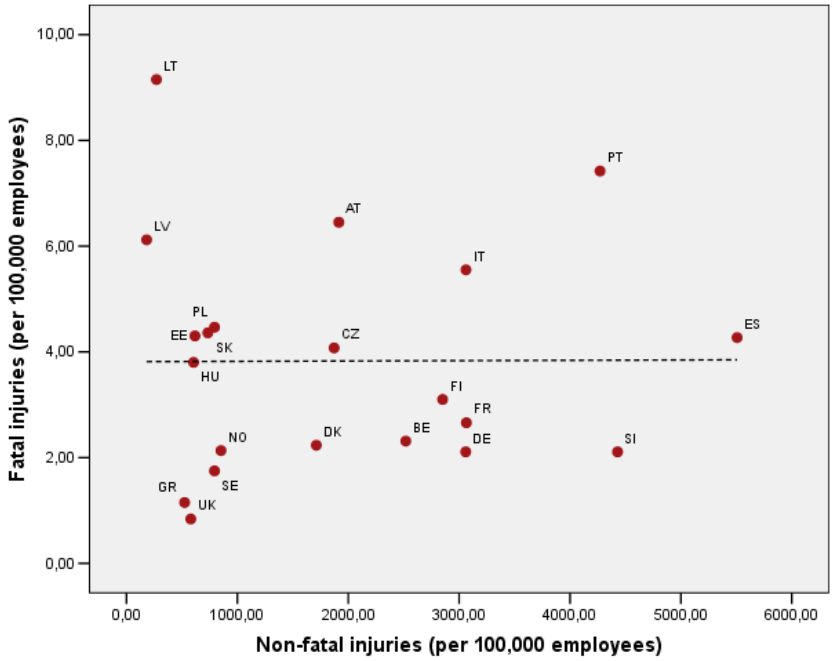
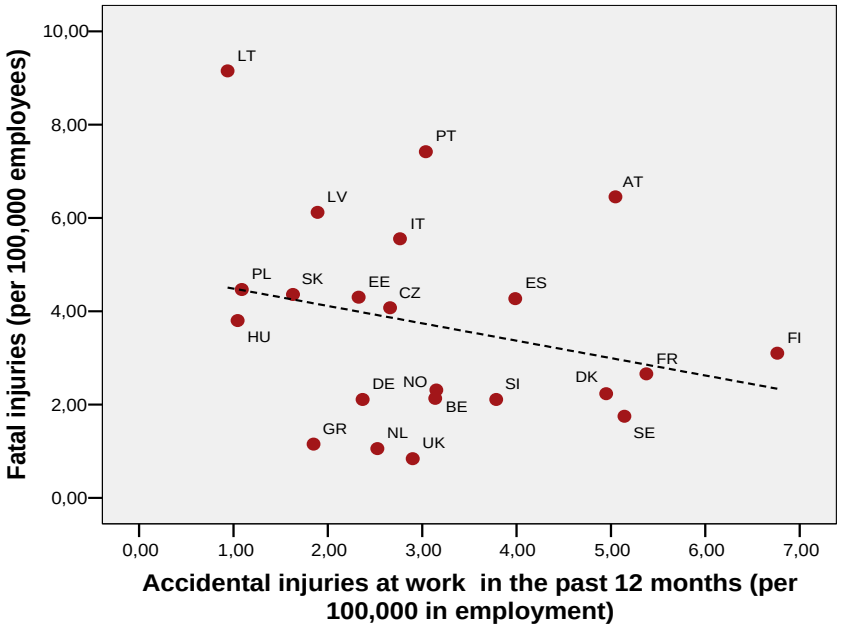


Figure 2 – Scatter plot between "Fatal injuries (per 100,000 employees)" and "Accidental injuries at work in the past 12 months (per 100,000 in employment)"



With respect to indicators comparability, we often suffered of the lack of a standard definition. For instance, the variables related to the indicator 'Non-fatal occupational injuries rate' proved not easy to be compared. The "Standardized incidence rate of serious accidents at work" is undoubtedly the best variable; unfortunately it was not available for all selected countries. Between the variables from LFS ad hoc module 2007, "Accidental injuries at work in the past 12 months" is more homogeneous compared to "Work-related health problems in the past 12 months".

As regards the second sub-dimension *(Child labour and forced labour*), the ILO Statistical Information and Monitoring Programme on Child Labour (SIMPOC) provides a great deal of statistics on child labour. Data are available for several countries, but not for European countries.

The last proposed sub-dimension should have been *Fair treatment in employment*. However the most recent recommendation of the Task Force suggested adopting a different approach: rather than identify specific indicators, it should be better to produce as many quality of employment indicators as possible disaggregated by gender, race, ethnic minority and by every other groups for which society might have concerns about their fair treatment[6]. Therefore, this sub-dimension is not considered in this study as a specific dimension on its won; rather, future development will be directed towards an exploration of the effective possibility of including it as transversal dimension of the proposed indicators.

2.1.2 Dimension 2. Income and benefits from employment

Dimension 2 includes two sub-dimensions: a) income from employment; b) non-wage pecuniary benefits. The first should provide information on any compensation paid to employees, or on income from self-employment. The remuneration should be calculated on a gross basis. The indicators proposed by the task force are two: 'Average weekly earnings of employees'; 'Low pay' (Share of employed with below 2/3 of median hourly earnings). From the Structure of Earnings survey we calculated 3 variables for the first proposed indicator and 2 variable with regard to the second indicator; they include only employees in enterprises with at least 10 employees excluding some NACE branches (agriculture, fishing, public administration, private households and extra-territorial).

The first three variables (mean monthly earning and median hourly earning full time and part-time) show a high correlation (about .98). Thus, we may consider sufficient

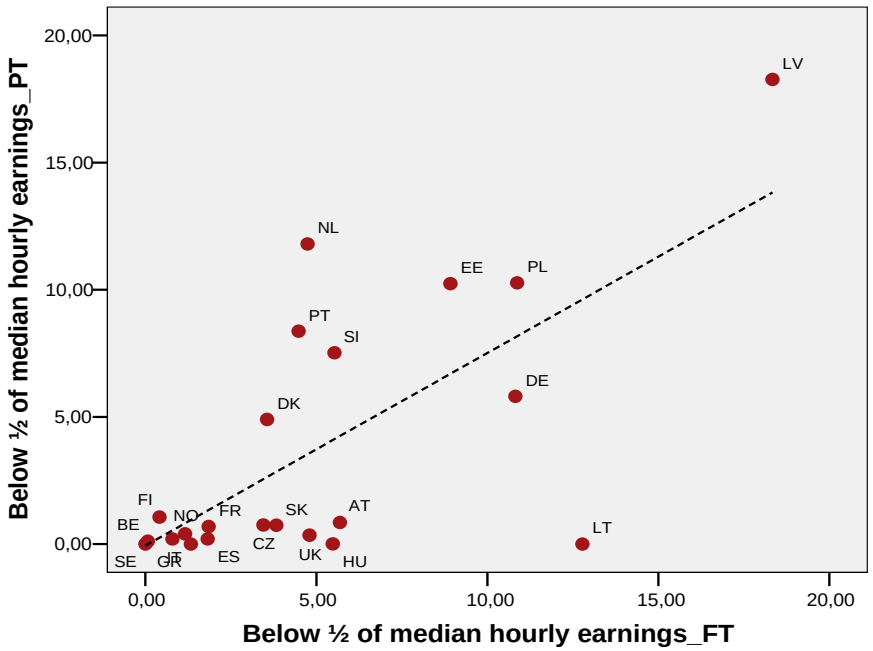
[6] UNECE Task Force on the Measurement of Quality of Employment "Statistical Measurement of Quality of Employment: Conceptual framework and indicators", September 2009 p. 10.

considering only one of them. The others two (below ½ of median hourly earnings full time and part-time) have a lower correlation (.69). However, we preferred the variable referring to full time employees rather than to part-time employees, since it presents a less concentrated distribution (figure 3).

Table 5 – Descriptive statistics of variables for dimension 2a Income from employment

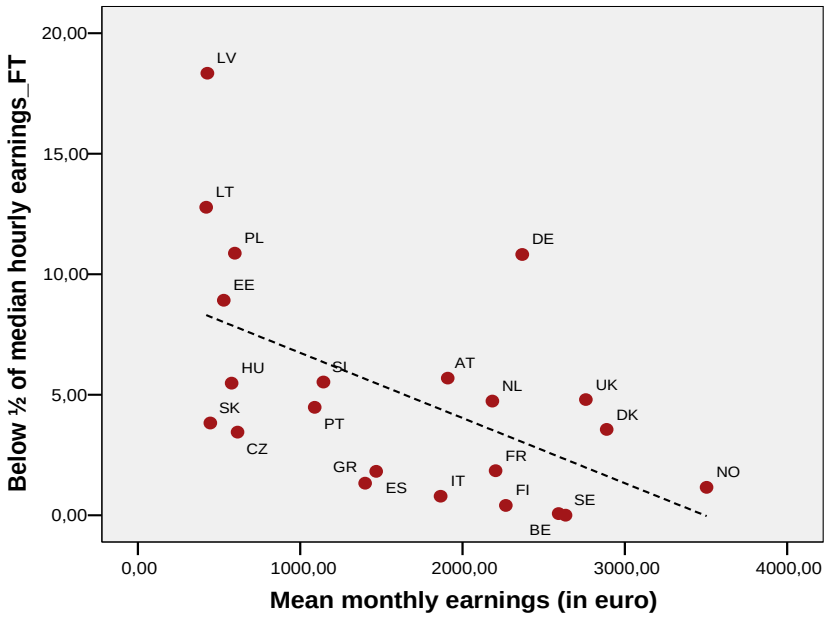
Variable	Mean	Std. Deviation	Minimum	Maximum	N
Average weekly earnings of employees					
Mean monthly earnings (in euro)	1,631	960	421	3,504	22
Median hourly earnings_FT (in euro)	9.8	6.5	2.0	22.5	22
Median hourly earnings_PT (in euro)	8.0	5.2	1.6	18.0	22
Low pay					
Below ½ of median hourly earnings_FT	5.0	4.7	0.0	18.3	22
Below ½ of median hourly earnings_PT	3.8	5.2	0.0	18.3	22

Figure 3 – Scatter plot between "Below ½ of median hourly earnings full time" and "Below ½ of median hourly earnings part-time"



As expected, the value of the correlation coefficient between the two selected variables is negative (-.55). Moreover, low pay is an useful indicator to differentiate countries with similar mean earning (figure 4).

Figure 4 – Scatter plot between "Mean monthly earnings" and "Below ½ of median hourly earnings full time"



The sub-dimension *Non-wage pecuniary benefits*, that covers information on non monetary remuneration, includes three indicators: 'Share of employees using paid annual leave in the previous year', 'Share of employees using sick leave' and 'Average number of days paid annual leave used in the previous year'. We found information only for the last indicator. In particular, the variable "paid annual vacation" comes from Doing Business[7] while "Mean annual holiday" from SES. Both surveys consider only some employees.

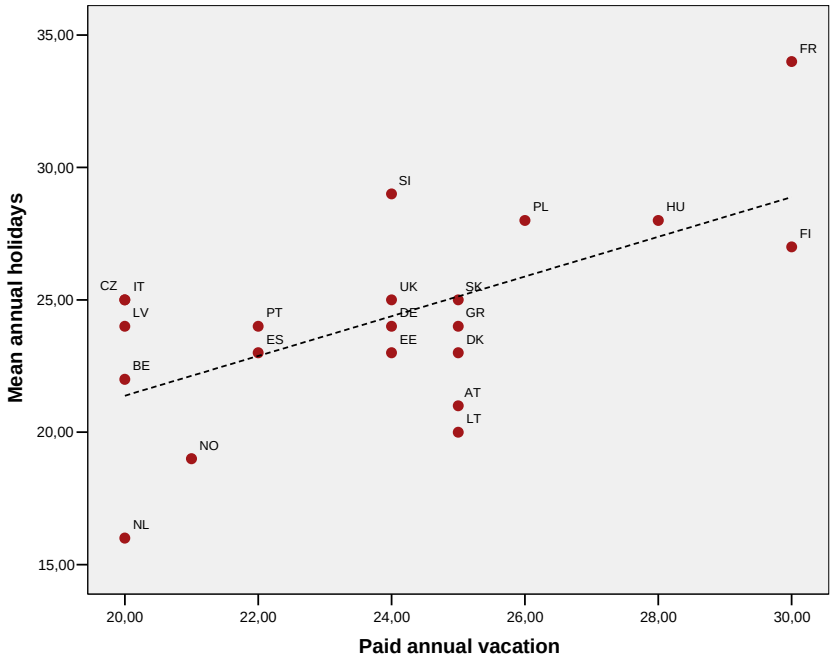
The two variables have the same mean but different range (table 6). Furthermore, both variables show particular trends. The first has only few values; the second presents some outliers (figure 5). Therefore we have decided to exclude both variables from the multivariate analysis.

Table 6 – Descriptive statistics of variables for dimension 2b Non-wage pecuniary benefits

Variable	Mean	Std. Deviation	Minimum	Maximum	N
Average number of days paid annual leave used in the previous year					
Paid annual vacation	24	3	20	30	22
Mean annual holidays	24	4	16	34	21

Figure 5 – Scatter plot between "Paid annual vacation" and "Mean annual holidays"

[7] note 10.



2.1.3 Dimension 3. Working hours and balancing work and non-working life

Dimension 3 consists of three sub-dimensions: a) hours worked; b) working time arrangements; c) balancing work and non-working life. Several indicators regarding the number of hours worked were proposed for the first sub-dimension (table 7).

Table 7 – Descriptive statistics of variables for dimension 3a hours worked

Variable	Mean	Std. Deviation	Minimum	Maximum	N
Average annual (actual) hours worked per person					
Average annual hours worked per person	1,749	196	1,419	2,069	22
Average weekly actual hours worked	37.8	2.5	31.7	41.3	22
Share of employed persons working 49 hrs and more per week					
Persons in employment working 49hrs and more	10.4	4.5	1.8	17.1	22
Employees 49hrs and more	6.0	3.2	0.5	13.0	22
Self-employed 49hrs and more	35.2	13.0	5.0	58.2	22
Share of employed persons working less than 30 hours per week involuntarily					
Involuntary part-time (per 100 part-time)	20.7	10.2	4.9	42.8	22
Wishing more hours (per 100 in employment)	6.8	4.7	0.8	22.7	22

High correlation (r=.77) was observed between the two variables proposed for the indicator on average annual hours worked; we selected “Average weekly actual hours worked” as the data come from LFS. For what concerns long hours, we should always bear in mind the significant difference between employees and self-employed (figure 7). Moreover, to improve the relevance of this indicator, it would be useful to consider also the involuntariness of the long hours.

Figure 6 – Scatter plot between "Average annual (actual) hours worked per person" and "Average annual hours worked per person"

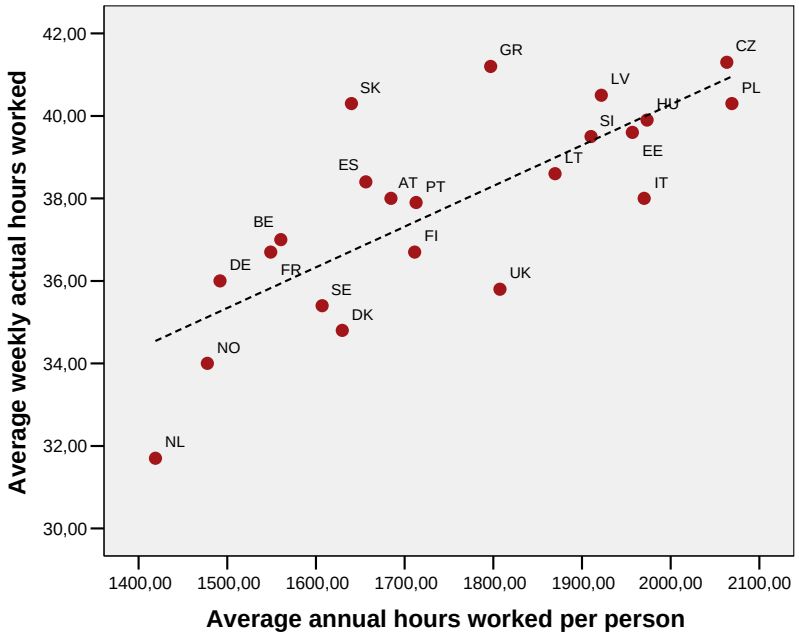
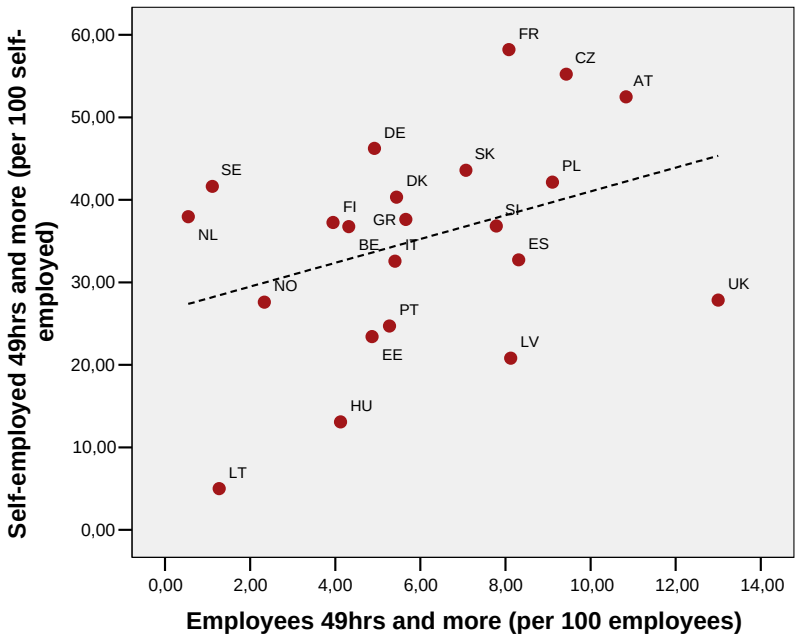
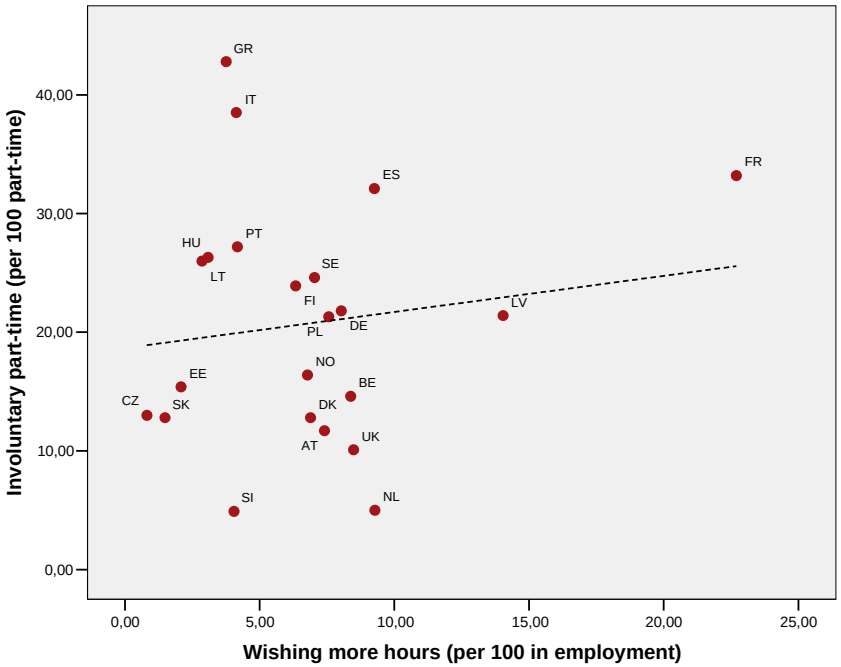


Figure 7 – Scatter plot between "Employees 49hrs and more" and "Self-employed 49hrs and more"



The involuntariness is the aspect that defines the last indicator: 'Share of employed persons working less than 30 hours per week involuntarily'. In this case we calculated two variables: "Involuntary part-time (per 100 part-time)" and "Wishing more hours (per 100 in employment)". The two variables show un-correlated distributions (figure 8), also due to the different incidence of part-time workers on total employment among countries. Therefore we decided to use both variables.

Figure 8 – Scatter plot between "Involuntary part-time (per 100 part-time)" and "Wishing more hours (per 100 in employment)"



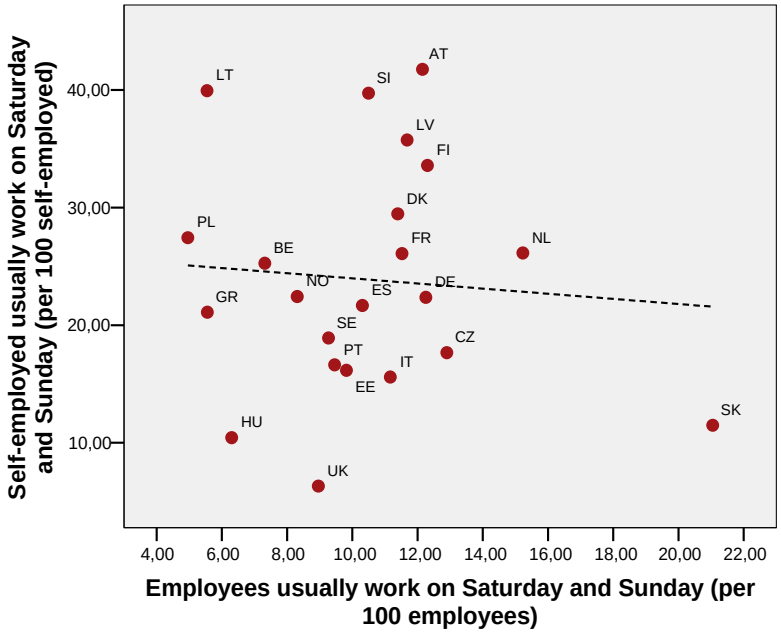
The second sub-dimension regards working time arrangements, and it highlights unusual and flexible working schedules. Its first two indicators refer to employed people who usually work at night and/or evening and on weekend. The concept of unusual hours includes various working arrangement, from working on Saturdays to the heavier schedules involving working at nights. We selected the variables "Usually work at night" and "Usually work on Saturday and Sunday". Again, we should not disregard the great difference between working arrangements of employees and self-employed[8].

Table 8 – Descriptive statistics of variables for dimension 3b working time arrangements

[8] For further details: "*Dimension 3 - Working hours and balancing work and non-working life: working time arrangements*" Federica Pintaldi, Task Force document for the meeting June 12 and 13 2008, Paris. http://www.unece.org/stats/documents/ece/ces/ge.12/2008/zip.6.e.pdf

Variable	Mean	Std. Deviation	Minimum	Maximum	N
Percentage of employed people who usually work at night/evening					
Usually work at evening	17.9	6.5	7.3	31.4	22
Usually work at night	6.9	3.2	3.1	17.2	22
Percentage of employed people who usually work on weekend or bank holiday					
Usually work on Saturday	24.4	6.9	11.4	38.2	22
Usually work on Sunday	13.4	3.0	7.0	20.2	22
Usually work on Saturday and Sunday	12.3	3.0	6.8	19.8	22
Employees usually work on Saturday and Sunday	10.4	3.6	5.0	21.1	22
Self-employed usually work on Saturday and Sunday	23.9	9.8	6.3	41.8	22
Share of people with flexible work schedule					
Flexible working schedule (per 100 in employment)	32.5	15.7	16.8	62.5	22

Figure 9 – Scatter plot between "Employees usually work on Saturday and Sunday" and "Self-employed usually work on Saturday and Sunday"



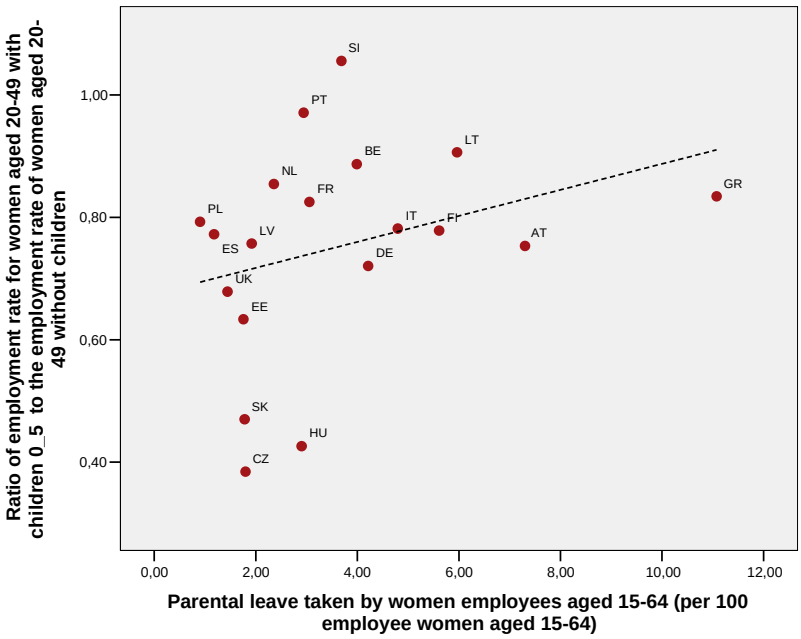
In respect to the indicator 'Flexible work schedule' we did not found variables that were systematically collected. Some information may be possibly found in LFS Ad-Hoc Module 2004 Work organisation and working time arrangements. In particular, we considered the share of employees whose working days had not a fixed start and end. This variable shows a negative correlation with average weekly actual hours worked (-.69).

The last sub-dimension *Balancing work and non-working life* considers the role played by women in unpaid work and child care including two indicators (table 9). The first indicator was computed using two different denominators: all women and women without children. The result is similar (r=.98). Unfortunately, information was not available for three of the selected countries (Denmark, Norway, Sweden).

Table 9 – Descriptive statistics of variables for dimension 3c balancing work and non-working life

Variable	Mean	Std. Deviation	Minimum	Maximum	N
Ratio of employment rate for women with children under compulsory school age to the employment rate of all women aged 20-49					
Ratio of employment rate for women aged 20-49 with children 0_5 to the employment rate of women aged 20-49	0.80	0.15	0.45	0.99	19
Ratio of employment rate for women aged 20-49 with children 0_5 to the employment rate of women aged 20-49 without children	0.75	0.17	0.38	1.06	19
Share of people receiving maternity/ paternity/family leave benefits					
Parental leave taken by persons aged 15-64 (per 100 in employment aged 15-64)	2.5	2.6	0.4	13.0	22
Parental leave taken by women aged 15-64 (per 100 women in employment aged 15-64)	3.7	2.8	0.8	13.1	22
Parental leave taken by men aged 15-64 (per 100 men in employment aged 15-64)	1.5	2.7	0.0	12.9	22
Parental leave taken by employees aged 15-64 (per 100 employees aged 15-64)	2.8	2.8	0.4	13.6	22
Parental leave taken by women employees aged 15-64 (per 100 employee women aged 15-64)	4.2	3.1	0.9	13.4	22

Figure 10 – Scatter plot between "Ratio of employment rate for women aged 20-49 with children 0_5 to the employment rate of women aged 20-49 without children" and "Parental leave taken by employees women aged 15-64"



The second indicator considers people receiving family leave benefits. In this respect, information was obtained from LFS Ad-Hoc Module 2005 Reconciliation between work and family life. We calculated four variables relating to parental leave by sex and status in employment. Anyway the correlations among the more generic variable "Parental leave taken by persons aged 15-64 (per 100 in employment aged 15-64)" and all the others are very high (almost .90). Moreover, this variable is not easy to interpret since the share of employed

people with children varies sensibly among countries. It could be better using only employed people involved with family care as denominator.

We also controlled the relationship between the first and the second indicator, the latter considered with reference to employees women only (figure 10).

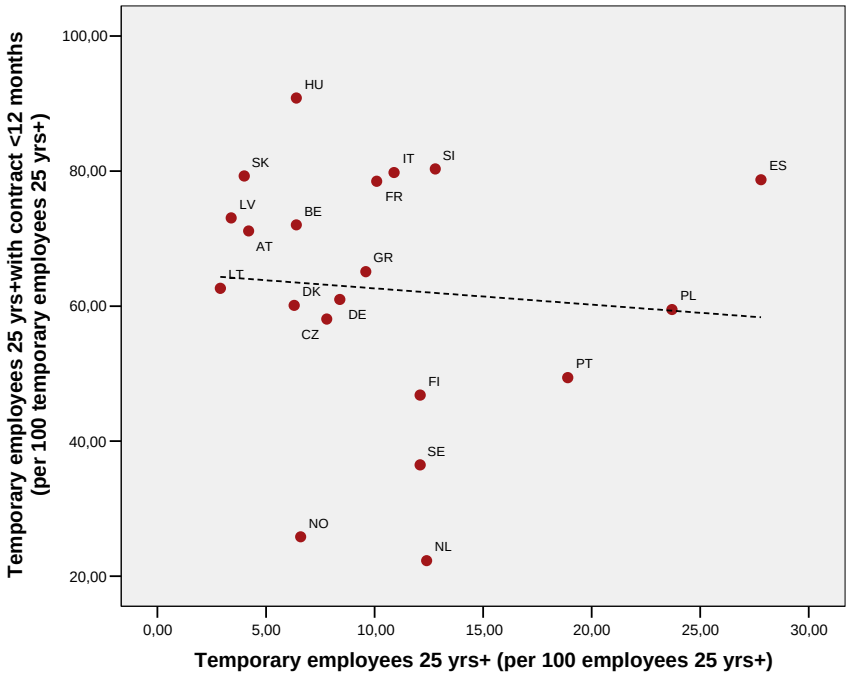
2.1.4 Dimension 4. Security of employment and social protection

Dimension 4 includes a) security of employment; b) social protection. As regards the first sub-dimension, two indicators were proposed and they both refer to employees in temporary positions: 'Percentage of employees 25 years and older with temporary jobs' and 'Percentage of employees 25 years and older with different job tenure'. The variables were computed both with reference to all employees and to those aged 25 and older, in order to highlight differences. The results are very similar (table 10). On the contrary, the relationship between the share of temporary employee and job tenure is not particularly strong (figure 11). Classifying job tenure of the last job in four categories (less 12 months, 1-3 years, 3-5 years, more then 5 years) the results don't change to a great extent. The first three variables are positively correlated among themselves, whereas they show negative correlation with the fourth variable. Thus, a deeper analysis would be necessary to understand which category with regards to the length of job tenure plays the greater role in relation to the quality of work.

Table 10 – Descriptive statistics of variables for dimension 4 security of employment and social protection

Variable	Mean	Std. Deviation	Minimum	Maximum	N
Percentage of employees 25 years and older with temporary jobs					
Temporary employees (rate for 100 employees)	12.6	7.8	2.1	31.7	22
Temporary employees 25 yrs+ (per 100 employees 25 yrs+)	9.7	6.7	1.5	27.8	22
Percentage of employees 25 years and older with job tenure (< 1 yr, 1-3 yrs, 3-5 yrs, >= 5yrs)					
Temporary employees with contract <=12 months (rate per 100 temporary)	62.1	19.2	23.9	91.9	20
Temporary employees 25 yrs+ with contract <12 months (per 100 temporary employees 25 yrs+)	62.5	18.6	22.3	90.8	20
Persons in employment 25 yrs+ with job tenure <12 months	11.8	3.0	6.8	19.7	21
Persons in employment 25 yrs+ with job tenure 1-3 years	12.3	2.6	9.1	19.6	21
Persons in employment 25 yrs+ with job tenure 3-5 years	8.9	2.0	6.7	14.3	21
Persons in employment 25 yrs+ with job tenure >5 years	66.4	6.2	54.1	76.3	21
Public social security expenditure as share of GDP					
Public social security expenditure as share of GDP	16.3	4.0	8.4	22.2	22

Figure 11 – Scatter plot between "Temporary employees 25 yrs+ (per 100 employees 25 yrs+)" and "Temporary employees 25 yrs+ with contract <12 months"



The second sub-dimension counts three indicators: 'Public social security expenditure as share of GDP', 'Share of employees covered by unemployment insurance', 'Share of economically active population contributing to a pension fund'. Unfortunately information was available for the first indicator.

2.1.5 Dimension 5. Social dialogue

Social dialogue is a dimension related to the freedom of association and to the right to organize and bargain collectively. It is measured by two indicators: 'Average number of days not worked due to strikes and lockouts' and 'Share of employees covered by collective wage bargaining'. As concerns the first indicator, information was found only for fourteen countries. Moreover it varies consistently over countries. The second indicator even ranges from 0 to 100% due to the existence of huge differences among countries in work legislation. Thus, the relationship between these indicators and the quality of work is not clear.

Table 11 – Descriptive statistics of variables for dimension 5 Social dialogue

Variable	Mean	Std. Deviation	Minimum	Maximum	N
Average number of days not worked due to strikes and lockouts					
Working days lost (per 1000 employed people)	30.6	30.7	1.7	116.0	14
Share of employees covered by collective wage bargaining					
Employees covered by collective wage bargaining	15.4	32.1	0.0	100.0	18

2.1.6 Dimension 6. Skills development and life-long learning

This dimension measures workers' qualification and skill development, with particular focus on over- or under-qualification. Specifically four indicators were proposed: 'Share of workers in high-skilled occupations', 'Share of workers receiving specific training', and 'Share of over-qualified and under-qualified workers'. Information was collected for the first three indicators only, since no operational definition was proposed to build variables related to under-qualification.

As concerns the indicator on high-skilled occupations, we calculated several variables by considering different aggregation of ISCO-88 at the first digit (table 12). Lastly we decided to select variable "Occupation Isco2_3 (per 100 persons in employment)" since the major group 1 does not consider a specific skill level. Additionally, we believe that considering separately major groups 2 and 3 could be misleading because these variables have a negative correlation (figure 12). Probably this distinction is too specific within the quality of employment framework.

In relation to job training, we calculated three variables. The first two come from LFS and consider all persons in employment or employees only who were in education or had some training in the previous 4 weeks; the values do not differ. The last variable, which comes from EWCS, counts persons in employment who were in paid-for training in the previous 12 months. The variable has the advantage of referring to a large interval of time, but the survey sample size is very limited. Anyway the variables are highly correlated (figure 13).

Table 12 – Descriptive statistics of variables for dimension 6 Skills development and life-long learning

Variable	Mean	Std. Deviation	Minimum	Maximum	N
Share of employed persons in high-skilled occupations					
Occupation Isco1 (per 100 persons in employment)	8.3	2.5	5.2	15.0	22
Occupation Isco2 (per 100 persons in employment)	14.2	3.3	8.6	21.0	22
Occupation Isco3 (per 100 persons in employment)	16.1	4.9	8.7	24.9	22
Occupation Isco1_3 (per 100 persons in employment)	38.5	5.4	24.0	47.3	22
Occupation Isco2_3 (per 100 persons in employment)	30.3	5.3	17.3	39.2	22
Share of employees who received job training within the last 12 months					
Persons in employment aged 15-64 in education and training in the previous 4 weeks	8.7	7.1	0.9	27.5	22
Employees aged 15-64 in education and training in the previous 4 weeks	9.0	7.3	1.1	28.1	22
Persons in employment in paid-for training in previous 12 months (per 100 in employment)	30.0	11.3	13.1	52.6	22
Share of employed who have more education than is normally required in their occupation					
Overeducation (per 100 in employment with Isced5-6)	17.0	6.7	6.1	34.7	22
Overeducation (per 100 in employment)	4.8	2.7	0.9	11.4	22

Figure 12 - Scatter plot between "Occupation Isco2" and Occupation Isco3"

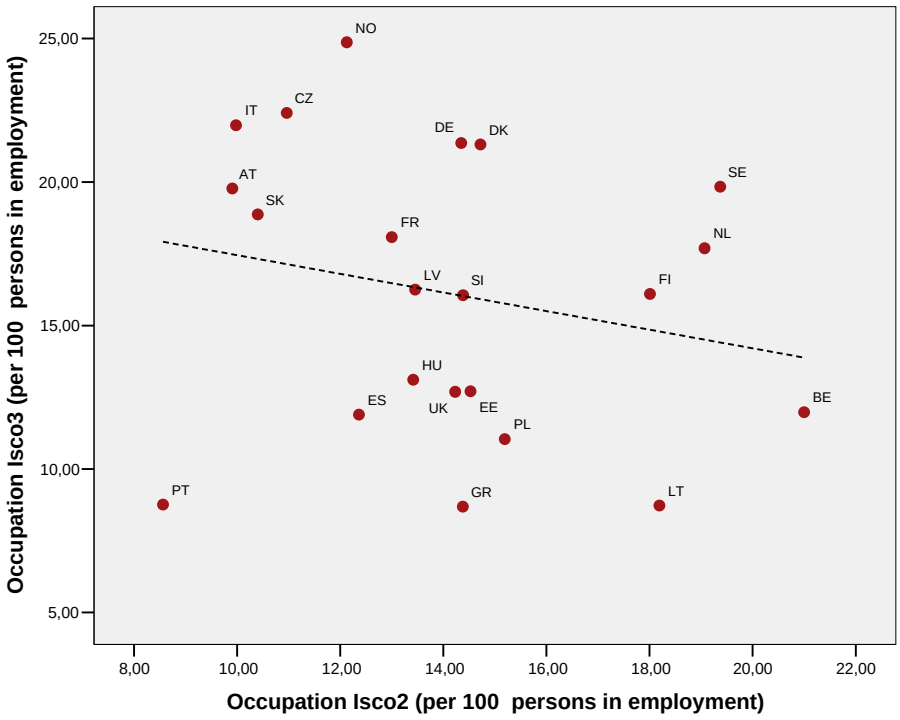
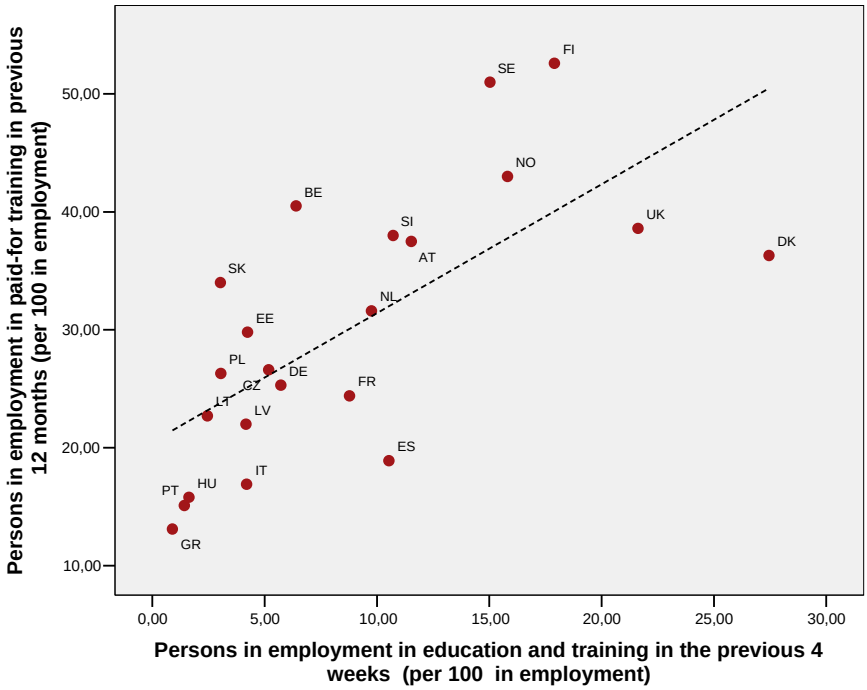


Figure 13 – Scatter plot between "Persons in employment aged 15-64 in education and training in the previous 4 weeks" and "Persons in employment in paid-for training in previous 12 months"



Lastly we classified as over-educated workers with educational level Isced 5-6 but working in occupations Isco 4-9. We computed the rate both as percent of total number of

persons in employment and of persons in employment with educational level Isced 5-6. We believe that the second variable is preferable as its denominator includes only the potentially overeducated population.

2.1.7 Dimension 7. Workplace relationships and intrinsic nature of work

This last dimension concerns two aspects: a) workplace relationships; b) intrinsic nature of work. Unfortunately, the task force did not entirely agree on a list of fully accepted indicator regarding this dimension, which is even the most difficult to measure as it often implies subjective evaluations. However, we conducted and exploratory study on potentially relevant variables from EWCS. For the first sub-dimension we considered three variables on the possibility to get assistance from colleagues and superiors and the presence of a teamwork job (table 13); the first two variables are so correlated that we selected only the first one (table 14). Moreover these variables are available with reference to all persons in employment, whereas it would be better if they were referred to employees only.

Table 13 – Descriptive statistics of variables for dimension 7a Workplace relationships

Variable	Mean	Std. Deviation	Minimum	Maximum	N
Can get assistance from colleagues	73.6	12.1	49.2	87.7	22
Can get assistance from superiors	62.1	12.9	33.6	78.7	22
Teamwork job (per 100 in employment)	60.3	12.1	38.5	84.8	22

Table 14 – Correlation matrix for dimension 7a Workplace relationships

	Can get assistance from colleagues	Can get assistance from superiors	Teamwork job
Can get assistance from colleagues	-	0.96	0.68
Can get assistance from superiors	0.96	-	0.65
Teamwork job	0.68	0.65	-

The sub-dimension *Intrinsic nature of work* is probably the most difficult to measure. We considered four variables form EWCS and the variable “share of employed people looking for another job” from LFS as a proxy of dissatisfaction (table 15).

Table 15 – Descriptive statistics of variables for dimension 7b Intrinsic nature of work

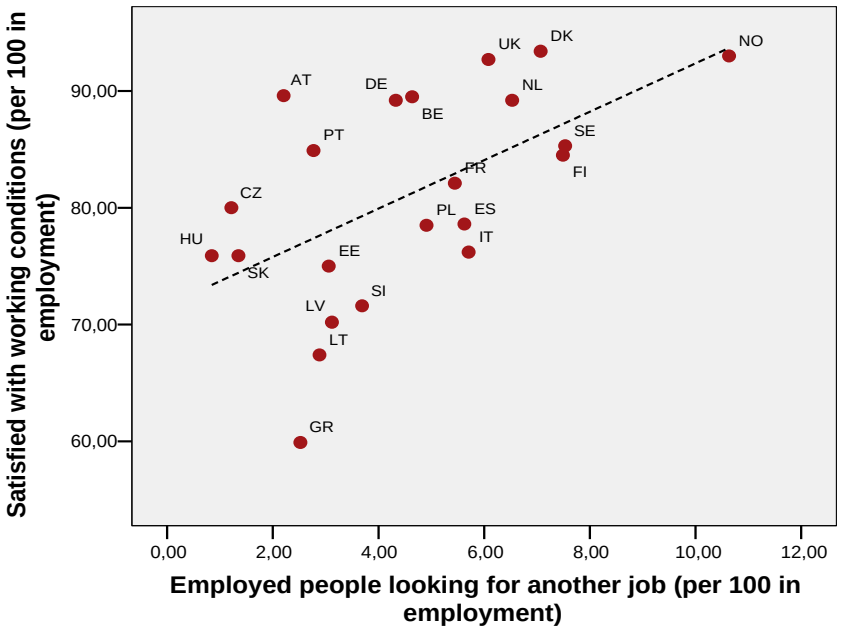
Variable	Mean	Std. Deviation	Minimum	Maximum	N
Employed people looking for another job	4.5	2.5	0.8	10.6	22
Satisfied with working conditions	81.0	9.1	59.9	93.4	22
Job offers good prospects for career advancement	29.3	6.4	18.0	42.4	22
Able to apply own ideas in work	60.4	7.6	46.0	73.1	22
Learning new things	73.0	10.0	56.6	90.0	22

We found an unexpected relationship between the variable from LFS and the others: countries with persons in employment most frequently looking for another job are also those with higher percentage of employed people satisfied with their working conditions (table 16). Regardless of ecological fallacy, this could mean that people look more frequently for other jobs in those countries with a more flexible labour market and with greater probability to find new and better jobs. However, we excluded the first variable from the multivariate analysis.

Table 16 – Correlation matrix for dimension 7b Intrinsic nature of work

	Employed people looking for another job	Satisfied with working conditions	Job offers good prospects for career advancement	Able to apply own ideas in work	Learning new things
Employed people looking for another job	-	0.56	0.42	0.61	0.66
Satisfied with working conditions	0.56	-	0.61	0.47	0.56
Job offers good prospects for career advancement	0.42	0.61	-	0.50	0.39
Able to apply own ideas in work	0.61	0.47	0.50	-	0.75

Figure 14 – Scatter plot between "Employed people looking for another job" and "Satisfied with working conditions"



2.2 Principal Components Analysis

The preliminary descriptive analysis carried within each dimension of the Quality of Employment framework allowed us to perform a selection of the variables. The selection process was guided by the following criteria: relevance, availability, easy computation, comparability, and data robustness.

The second step of our analysis examines the performance of the variables by using Principal Components Analysis (PCA), a method of factorial analysis that provides a synthetic and comprehensive view of the relationships among all variables. Specifically, this step aims at finding out how many (and which) of the proposed indicators are useful to draw a picture of the quality of work in the analysed countries. We should however always bear in mind the intrinsic multi-dimensionality of the concept of quality of work. Thus, our analysis should never aim at producing a synthetic index of quality of employment neither a ranking of the countries. Rather, we are interested in understand how many among the proposed variables are effectively representative of the correspondent dimension and which are their relationships.

Altogether we identified 22 variables (table 17). We were not be able to collect data for the sub-dimensions 1b child labour and forced labour, 2b non-wage pecuniary benefits and the dimension 5 social dialogue.

Table 17 – Variables used in Principal Component Analysis

Dimension	Variable	Source
1a. Safety at work	Fatal injuries (per 100.000 employees)	Administrative
2a. Income	Mean monthly earnings (in euro)	SES
	Below ½ of median hourly earnings_full time	SES
3a. Working hours	Persons in employment working 49hrs and more (per 100 in employment)	LFS
	Involuntary part-time (per 100 part-time)	LFS
	Wishing more hours (per 100 in employment)	LFS
	Average weekly actual hours worked	LFS
3b. Working time arrangements	Usually work at night (per 100 in employment)	LFS
	Usually work on Saturday and Sunday (per 100 in employment)	LFS
	Flexible work schedule (per 100 in employment)	LFS ahm
3c. Balancing work and non-working life	Parental leave taken by persons aged 15-64 (per 100 in employment aged 15-64)	LFS ahm
4a. Security of employment	Temporary employees 25 yrs+ (per 100 employees 25 yrs+)	LFS
	Temporary employees 25 yrs+ with contract <12 months	LFS
4b. Social protection	Public social security expenditure as share of GDP	NA
6. Skills development and life-long learning	Overeducation (per 100 in employment with Isced5-6)	LFS
	Persons in employment in education and training in the previous 4 weeks (per 100 in employment)	LFS
	Occupation Isco2_3 (per 100 persons in employment)	LFS
7a. Workplace relationships	Can get assistance from colleagues (per 100 in employment)	EWCS
	Teamwork job (per 100 in employment)	EWCS
7b. Intrinsic nature of work	Satisfied with working conditions (per 100 in employment)	EWCS
	Job offers good prospects for career advancement (per 100 in	EWCS

	employment)	
	Able to apply own ideas in work (per 100 in employment)	EWCS

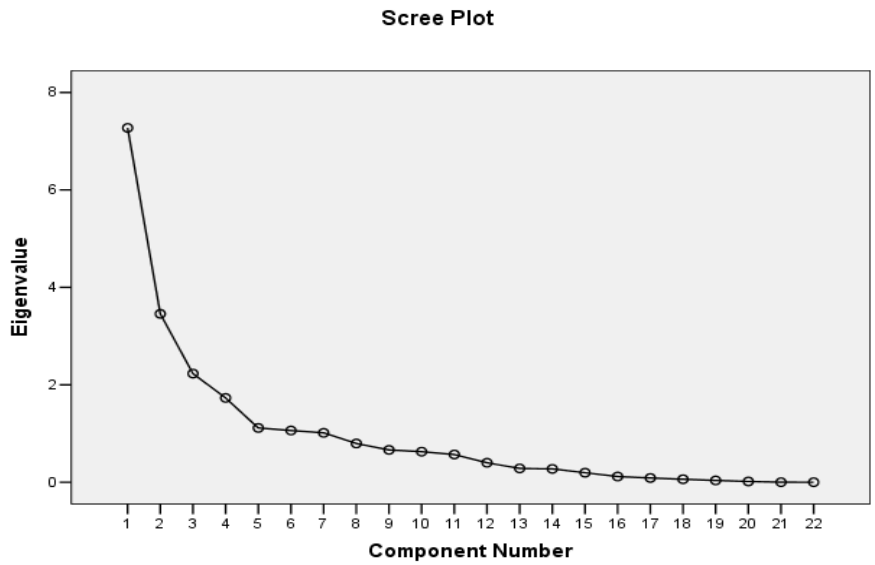
As known, the PCA synthesise the information contained by the original 22 varaibles into fewer orthogonal dimensions, which means that they are statistically uncorrelated.

Seven components have eigenvalue greater than one (table 18). The first component explains on its own the 33% of the general variance. Including up to the fourth component, we are able to consider a further 35% of the total variance (figure 15), for a total of more than two thirds of the original information.

Table 18 – Total Variance Explained

Component	Eigenvalues		
	Total	% of Variance	Cumulative %
1	7.3	33.1	33.1
2	3.5	15.7	48.8
3	2.2	10.1	58.9
4	1.7	7.9	66.8
5	1.1	5.1	71.8
6	1.1	4.8	76.7
7	1.0	4.6	81.3
8	0.8	3.6	84.9
9	0.7	3.0	87.9
10	0.6	2.8	90.7
11	0.6	2.6	93.3
12	0.4	1.8	95.1
13	0.3	1.3	96.4
14	0.3	1.2	97.7
15	0.2	0.9	98.6
16	0.1	0.5	99.1
17	0.1	0.4	99.5
18	0.1	0.3	99.8
19	0.0	0.2	99.9
20	0.0	0.1	100.0
21	0.0	0.0	100.0
22	0.0	0.0	100.0

Figure 15 - Scree Plot



The first component, explaining one third of the overall variance, is highly associated to a list of indicators well combined to express the main characteristics of **quality of working conditions** (figure 16).

This component, in fact, is positively associated to the mean monthly earning, to the share of persons in employment with flexible working schedule, to the share of employed people participating in education and training, to the share of skilled occupations, to workers' satisfaction with working conditions, and to public social security expenditure.

On the other hand, it is negatively correlated to the average weekly actual hours worked per person, to the number of fatal accident, to the share of temporary employees with contract less of 12 months, to the share of employees with low earning, and to the share of involuntary part-time.

Summing up, on the right side of the factorial plan, placed along the first component, we find variables pointing at situations of positive working condition, whereas the variables placed on the left draw a negative picture characterized by precariousness, unsafeness and unpleasant working schedules.

Indicators which are poorly correlated with the first component are placed close to the barycentre of the factorial plan (over-education, atypical working hours, temporary employees, workplace relationships and excessive hours of work).

The others components reproduce the residual variance of correlation matrix and they are related to fewer variables (table 19).

The second component, that explains 16% of variance, is basically related to the two variables expressing workplace **relationships** ("Teamwork job per 100 in employment" and "Can get assistance from colleagues per 100 in employment").

The third component, that explains 10% of variance, is strongly associated to variables describing **working time arrangements**, being positively correlated to the percentage of employed people who work at night and on weekend, and to the share of those working long hours. On the other hand it is negatively associated to the share of employed people who have taken parental leave.

Lastly, the fourth component, explaining 8% of the total variance, well expresses the phenomena of **overeducation** arising when supply of highly educated labour force exceeds demand for high-skilled employment; moreover the component is also correlated to the share of employees with low earning.

Figure 16 - Component loading of the first component

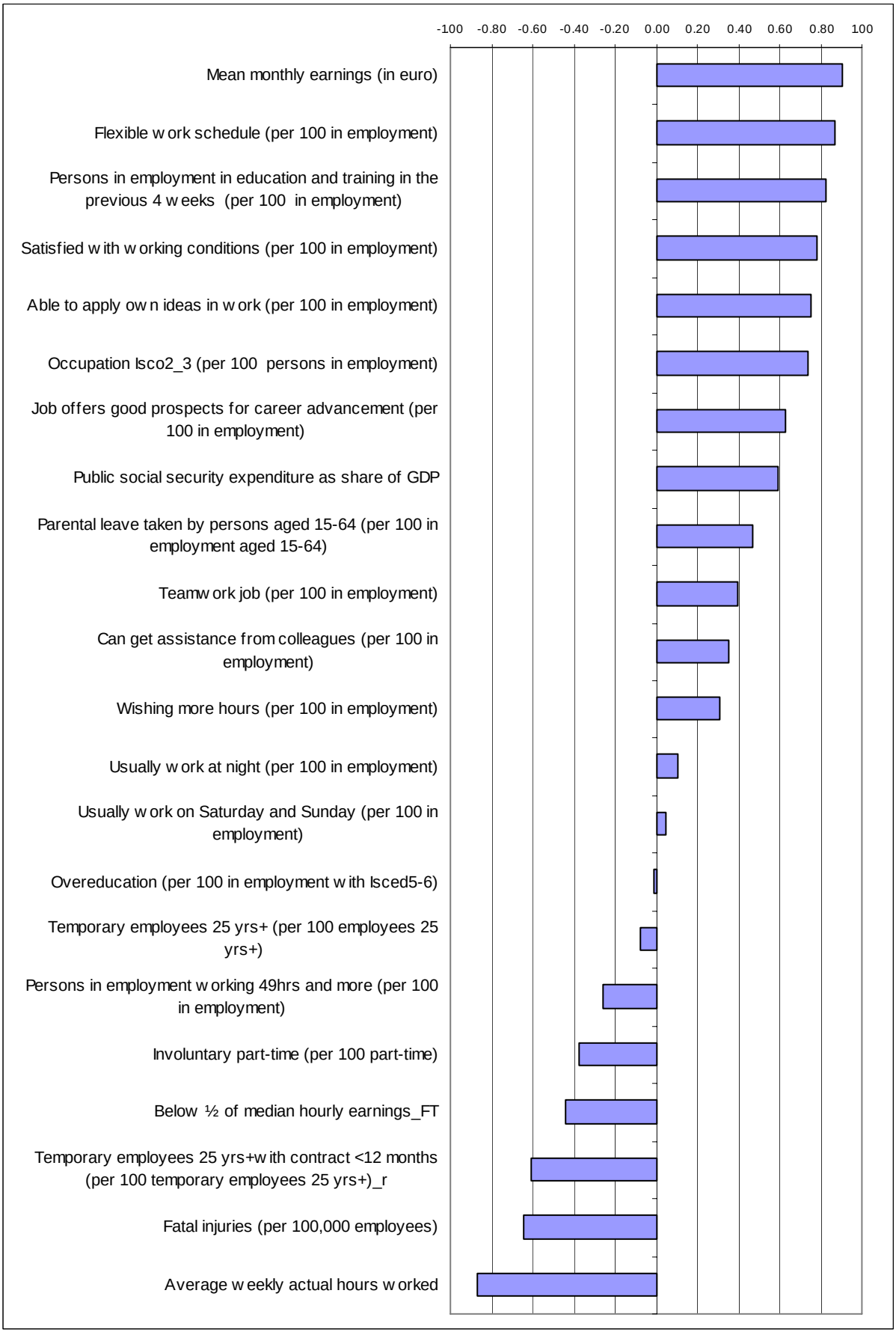

-100
-0.80
-0.60
-0.40
-0.20
0.00
0.20
0.40
0.60
0.80
100
Mean monthly earnings (in euro)
Flexible work schedule (per 100 in employment)
Persons in employment in education and training in the previous 4 weeks (per 100 in employment)
Satisfied with working conditions (per 100 in employment)
Able to apply own ideas in work (per 100 in employment)
Occupation Isco2_3 (per 100 persons in employment)
Job offers good prospects for career advancement (per 100 in employment)
Public social security expenditure as share of GDP
Parental leave taken by persons aged 15-64 (per 100 in employment aged 15-64)
Teamwork job (per 100 in employment)
Can get assistance from colleagues (per 100 in employment)
Wishing more hours (per 100 in employment)
Usually work at night (per 100 in employment)
Usually work on Saturday and Sunday (per 100 in employment)
Overeducation (per 100 in employment with Isced5-6)
Temporary employees 25 yrs+ (per 100 employees 25 yrs+)
Persons in employment working 49hrs and more (per 100 in employment)
Involuntary part-time (per 100 part-time)
Below ½ of median hourly earnings_FT
Temporary employees 25 yrs+with contract <12 months (per 100 temporary employees 25 yrs+)_r
Fatal injuries (per 100,000 employees)
Average weekly actual hours worked

Table 19 – Component matrix

Variable	Component			
	1	2	3	4
Fatal injuries (per 100,000 employees)	-0.64	-0.05	-0.10	0.24
Mean monthly earnings (in euro)	0.90	0.31	0.00	0.03
Below ½ of median hourly earnings_FT	-0.44	-0.43	0.03	0.54
Persons in employment working 49hrs and more	-0.26	0.37	0.59	-0.29
Involuntary part-time (per 100 part-time)	-0.38	0.70	-0.38	-0.13
Wishing more hours (per 100 in employment)	0.31	0.41	0.27	0.40
Average weekly actual hours worked	-0.87	-0.06	0.01	-0.22
Flexible work schedule (per 100 in employment)	0.87	0.04	-0.09	-0.12
Usually work at night (per 100 in employment)	0.10	-0.26	0.70	-0.35
Usually work on Saturday and Sunday (per 100 in employment)	0.04	-0.32	0.64	-0.33
Parental leave taken by persons aged 15-64	0.47	0.05	-0.59	-0.34
Temporary employees 25 yrs+ (per 100 employees 25 yrs+)	-0.08	0.51	0.04	-0.06
Temporary employees 25 yrs+ with contract <12 months	-0.61	0.21	0.28	-0.07
Public social security expenditure as share of GDP	0.59	0.59	-0.05	-0.30
Overeducation (per 100 in employment with Isced5-6)	-0.01	0.42	0.08	0.62
Persons in employment in education and training in the previous 4 weeks (per 100 in employment)	0.82	-0.01	0.14	0.13
Occupation Isco2_3 (per 100 persons in employment)	0.74	-0.31	-0.10	-0.18
Can get assistance from colleagues (per 100 in employment)	0.35	-0.75	-0.12	0.07
Teamwork job (per 100 in employment)	0.39	-0.77	-0.02	0.12
Satisfied with working conditions (per 100 in employment)	0.78	0.08	0.25	0.18
Job offers good prospects for career advancement (per 100 in employment)	0.63	0.32	0.42	0.34
Able to apply own ideas in work (per 100 in employment)	0.75	0.04	-0.15	-0.02

The plot of component loadings of first and second principal component allows detecting which variables within the same dimension are close by on the factorial plan (figure 17).

On the factorial plan determined by the relationships among the 22 variables, it is then possible to project the position of the countries, according to their coordinates (figure 18). Countries neighbours in the factorial plan show similar values in relation of the variables involved in the analysis.

Figure 17 - Plot of component loadings of first and second principal component

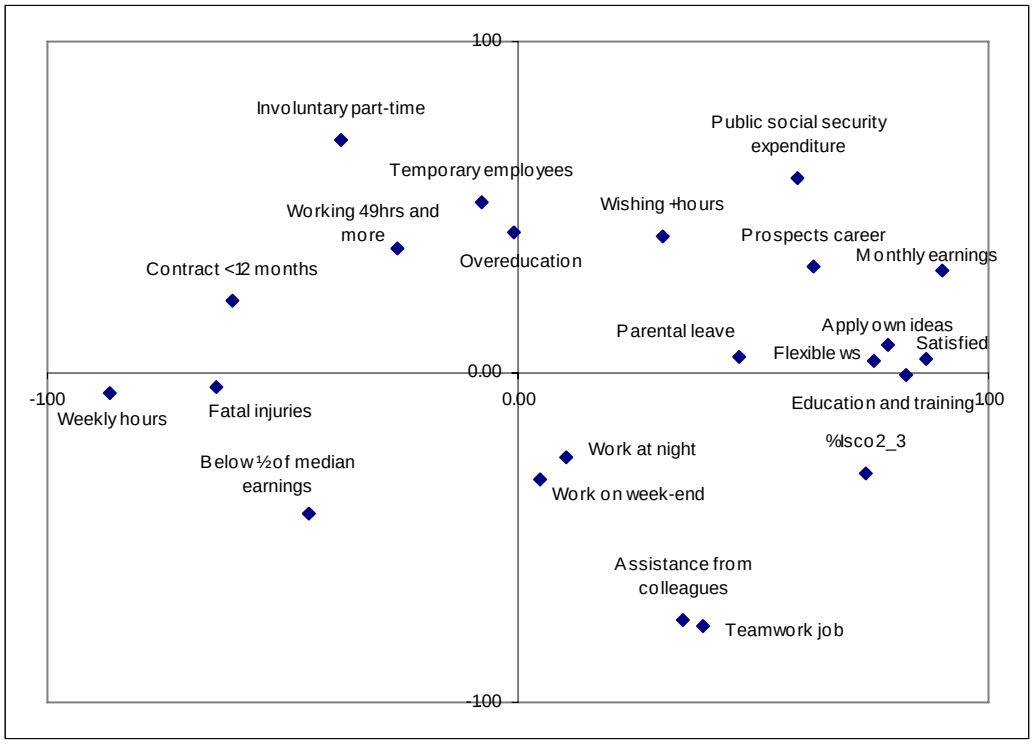
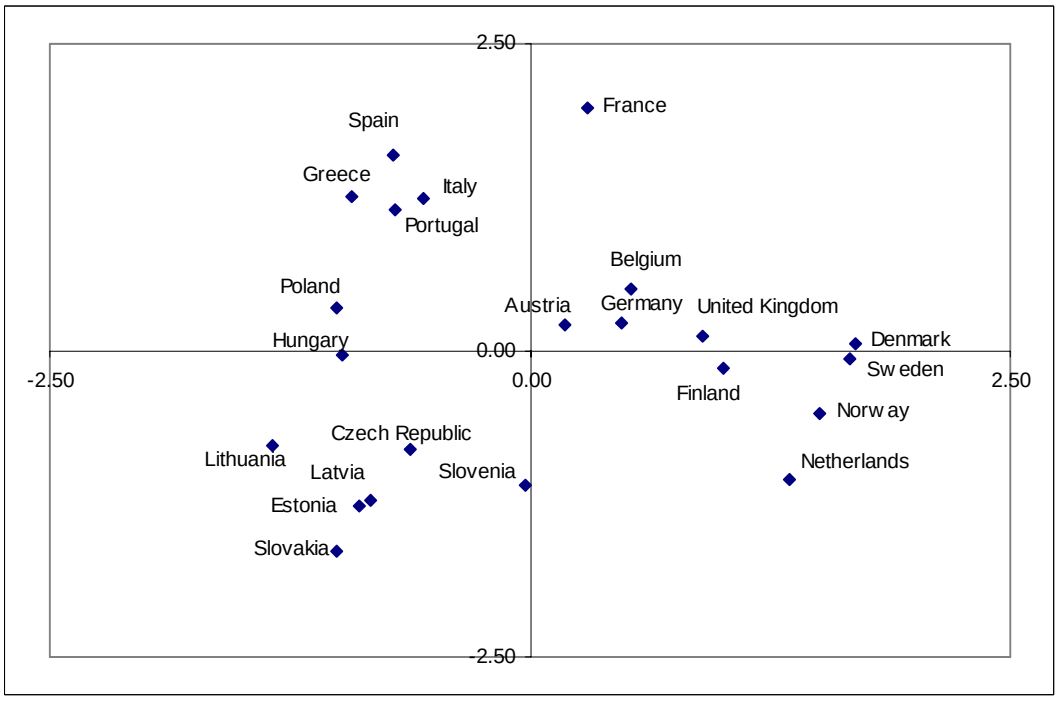


Figure 18 - Plot of countries' component scores on first and second components



Of course, for a better understanding the relationships among variables an in-depth knowledge of the labour market in each analysed country would be necessary. However, the multivariate analysis allows to highlight simultaneously all the existing relationships, even those that are often not immediately manifest and evident.

2.3 Legislative indicators

2.3.1 Variables collected

In addition to the quality of employment indicators we considered some indicators related to labour market legislation and social protection. We looked at the database Condition of Work and Employment Laws of International Labour Organization[9] (ILO) that contains comprehensive legal information from countries around the world. The ILO database covers legislation on minimum wages, working time and maternity protection, which are three of the most significant aspect of working conditions. We considered the following indicators:

Database ILO

1. ***Monthly minimum wages:*** is the lowest monthly wage that employers may legally pay to employees or workers. Equivalently, it is the lowest wage at which workers may sell their labour. Minimum wages are designed in the laws of almost all counties and at the international level.
2. ***Minimum wage fixing mechanism:*** the mechanism by which minimum wage rate are set. Generally the Government plays a central role in setting minimum wage rates. These could be set in consultation with a specialized body.
3. ***Minimum wage fixing levels:*** a minimum wages can be introduced as a single national rate or a range of different rates that vary among sectors and /or occupations. Between these extremes, a range of approaches are possible. It is possible to identify 5 levels at which the minimum wage can be set: : a) by sector and/or occupation; b) national – single rate; c) national by sector and/or occupation; d) regional – single rate; e) regional by sector and/or occupation.
4. ***Normal weekly hours limits:*** the hours that can be worked each week before overtime payments become due.
5. ***Maximum weekly hours limits:*** a kind of maximum limit on weekly working hours
6. ***Overtime limits:*** most labour laws place an upper limit on overtime hours (beyond the weekly hours limit). These laws limit overtime by: a) placing direct limits on overtime hours (usually on a daily, weekly or annual basis, or as a combination of these limits; b) limiting total working hours; c) specifying minimum daily rest periods.
7. ***Minimum annual leave:*** working time laws generally provide for minimum holidays period to allow workers to take longer periods of rest. These legislated standards are minimums and can be extended by workplace policies. They are also in addition to days that are designated as public holidays.
8. ***Length of maternity leave:*** is a period (not smaller than 14 weeks) in which mothers are allowed to take time off work in order to follow the birth of a child.

[9] http://www.ilo.org/public/english/protection/condtrav/database/index.htm

9. ***Amount of maternity leave benefits:*** the level of benefits available during the maternity leave. Two elements are considered: a) the proportion of the worker's earning to be paid; b) the period over which they are to be paid
10. ***Source of maternity leave benefits*****:** the source of founding for maternity leave benefits. System for founding maternity leave is classified in three forms: a) employer-founded (employers are solely responsible); b) social insurance or other public founds; c) mixed systems (contributions from both employers and public found).

Other indicators related to laws regulating working conditions are collected from the research Doing Business of World Bank. In particular, referring to the dimension *Employing Workers* we considered simple indicators (no composite index) that measure the regulation of employment, specifically with regards to the hiring and firing of workers and to the rigidity of working hours[10]. Altogether, we selected the following fourteen questions:

Doing Business – dimension Employing Workers

1. Are fixed-term contracts prohibited for permanent tasks? *(Yes. No)*
2. What is the maximum duration of fixed-term contracts (including renewals)? (*12-24 months. 25-60 months. >60 months. no limit)*
3. Can the workweek extend to 50 hours (including overtime) for 2 months per year to respond to a seasonal increase in production? *(Yes. No)*
4. What is the maximum number of working days per week? *(five days. six days)*
5. Are there restrictions on night work? *(Yes. No)*
6. Are there restrictions on "weekly holiday" work? *(Yes. No)*
7. Is the termination of workers due to redundancy legally authorized? *(Yes. No)*
8. Must the employer notify a third party before terminating one redundant worker? *(Yes. No)*
9. Does the employer need the approval of a third party to terminate one redundant worker? *(Yes. No)*
10. Must the employer notify a third party before terminating a group of 25 redundant workers? *(Yes. No)*
11. Does the employer need the approval of a third party to terminate a group of 25 redundant workers? *(Yes. No)*
12. Is there a retraining or reassignment obligation before an employer can make a worker redundant? *(Yes. No)*
13. Are there priority rules applying to redundancies? *(Yes. No)*
14. Are there priority rules applying to re-employment? *(Yes. No)*

[10] The data on employing workers are based on a survey of employment regulations that is completed by local lawyers and public officials. Employment laws and regulations as well as secondary sources are reviewed to ensure accuracy. To make the data comparable across economies, several assumptions about the worker and the business are used. Assumptions about the worker are the following**:** being 42-year-old, non executive, full-time, male employee; having worked at the same company for 20 years; earning a salary plus benefits equal to the economy's average wage during the entire period of his employment; being a lawful citizen who belongs to the same race and religion as the majority of the economy's population; residing in the economy's largest business city; not being a member of a labour union, unless membership is mandatory. For more information see the website http://www.doingbusiness.org/MethodologySurveys/EmployingWorkers.aspx

For the 22 selected countries, we analysed the frequency distribution of the legislative variables in order to choose those more relevant (table 20). We excluded the indicators with low variability. In some cases we reduced the number of modalities.

Table 20 – Frequency of the legislative variables

ILO Monthly minimum wages

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	100-499 USD	7	31.8	31.8	31.8
	500-1000 USD	4	18.2	18.2	50.0
	over than 1000 USD	11	50.0	50.0	100.0
	Total	22	100.0	100.0	

ILO Minimum wage-fixing mechanism

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Gov consulting social partners	2	9.1	9.1	9.1
	Gov following specialized body recommendation	9	40.9	40.9	50.0
	Specialized body	4	18.2	18.2	68.2
	Collective bargaining	7	31.8	31.8	100.0
	Total	22	100.0	100.0	

ILO Minimum wage-fixing levels

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	National	12	54.5	54.5	54.5
	National by sector and/or occupation	3	13.6	13.6	68.2
	Regional by sector and/or occupation	2	9.1	9.1	77.3
	By sector and/or occupation	5	22.7	22.7	100.0
	Total	22	100.0	100.0	

ILO Normal weekly hours limits

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No universal national limit	3	13.6	13.6	13.6
	35-39 hours	3	13.6	13.6	27.3
	40 hours*	16	72.7	72.7	100.0
	48 hours	3	13.6	13.6	13.6
	Total	3	13.6	13.6	27.3
Total		22	100.0		

** Greece value was missing: the modal case was imputed*

ILO Maximum weekly hours

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	40 hours	1	4.5	4.5	4.5
	41-47 hours	4	18.2	18.2	22.7
	48 hours*	16	72.7	72.7	95.5
	49-59 hours	1	4.5	4.5	100.0
	Total	22	100.0	100.0	

** Greece value was missing: the modal case was imputed*

ILO Overtime limits

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No universal national limit	1	4.5	4.5	4.5
	Overtime limits included in maximum weekly hours limits	4	18.2	18.2	22.7
	Overtime limits <=150 hours per year	4	18.2	18.2	40.9
	151<Overtime limits<300*	10	45.5	45.5	86.4
	Overtime limits> 300 hours per year	3	13.6	13.6	100.0
Total		22	100.0		

** Greece value was missing: the modal case was imputed*

ILO Minimum annual leave

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20-23 days	16	72.7	72.7	72.7
	24-25 days	5	22.7	22.7	95.5
	more than 25 days	1	4.5	4.5	100.0
Total		22	100.0		

ILO Length of maternity leave

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	14 weeks	1	4.5	4.5	4.5
	15 to 17 weeks	10	45.5	45.5	50.0
	18 weeks or more	11	50.0	50.0	100.0
	Total	22	100.0	100.0	

ILO Maternity leave benefits

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than two-thirds pay for a minimum of 14 weeks	2	9.1	9.1	9.1
	At least two-thirds but less than 100% for 14 weeks	6	27.3	27.3	36.4
	Full pay for 14 weeks or more	14	63.6	63.6	100.0
	Total	22	100.0	100.0	

ILO Source of maternity leave benefits

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Social insurance or other public funds	19	86.4	86.4	86.4
	Mixed system	3	13.6	13.6	100.0
	Total	22	100.0	100.0	

DB Are fixed-term contracts prohibited for permanent tasks?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	11	50.0	50.0	50.0
	No	11	50.0	50.0	100.0
	Total	22	100.0	100.0	

DB maximum duration of fixed-term contracts

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	12-24 months	6	27.3	27.3	27.3
	25-60 months	7	31.8	31.8	59.1
	over 60 months	2	9.1	9.1	68.2
	no limit	7	31.8	31.8	100.0
	Total	22	100.0	100.0	

DB possibility to extend to 50 hours to respond to a seasonal increase in production

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	50 hours_Yes	20	90.9	90.9	90.9
	50 hours_No	2	9.1	9.1	100.0
	Total	22	100.0	100.0	

DB maximum number of working days per week

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Five days	3	13.6	13.6	13.6
	Six days	19	86.4	86.4	100.0
	Total	22	100.0	100.0	

DB restrictions on night work

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Night work restrictions	19	86.4	86.4	86.4
	Night work no limits	3	13.6	13.6	100.0
	Total	22	100.0	100.0	

DB restrictions on weekly holiday work

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Weekly holiday restrictions	20	90.9	90.9	90.9
	Weekly holiday no limits	2	9.1	9.1	100.0
	Total	22	100.0	100.0	

DB legally authorized termination of workers due to redundancy

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	22	100.0	100.0	100.0

DB Does the employer need the approval of a third party to terminate one redundant worker?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	1	4.5	4.5	4.5
	No	21	95.5	95.5	100.0
	Total	22	100.0	100.0	

DB Must the employer notify a third party before terminating a group of 25 redundant workers?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	22	100.0	100.0	100.0

DB Does the employer need the approval of a third party to terminate a group of 25 redundant workers?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	4	18.2	18.2	18.2
	No	18	81.8	81.8	100.0
	Total	22	100.0	100.0	

DB Is there a retraining or reassignment obligation before an employer can make a worker redundant?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Reassignment obligations	15	68.2	68.2	68.2
	No reassignment obligations	7	31.8	31.8	100.0
	Total	22	100.0	100.0	

DB Are there priority rules applying to redundancies?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Priority for redundancies	14	63.6	63.6	63.6
	No priority for redundancies	8	36.4	36.4	100.0
	Total	22	100.0	100.0	

DB Are there priority rules applying to re-employment?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Priority for re-employment	11	50.0	50.0	50.0
	No priority for re-employment	11	50.0	50.0	100.0
	Total	22	100.0	100.0	

DB Must the employer notify a third party before terminating one redundant worker?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Third part notify	10	45.5	45.5	45.5
	No notify	12	54.5	54.5	100.0
	Total	22	100.0	100.0	

2.3.2 Multiple Correspondence Analysis

We carried out a MCA on 11 variables for a total of 23 modalities (table 21). We excluded the indicators about working time (maximum weekly hours, overtime limits, maximum number of working days per week, restriction on night and on weekly holiday work) and some other indicators due to their excessively low variability. In other cases we reduced the number of modalities.

Table 21 - List of variables used for Multiple Correspondence Analysis

ILO	Monthly minimum wages (*less than 1000 $ /over than 1000 $*) Minimum wage-fixing mechanism (*Government consulting social partners o collective bargaining / Government without consulting social partners*) Minimum wage-fixing levels (n*ational fixing-wage / others fixing-wage*) Minimum annual leave (*10-23 days / more than 23 days*) Length of maternity leave (*18 weeks or more /14 to 17 weeks*)
DB	Are fixed-term contracts prohibited for permanent tasks? (*yes / no*) Maximum duration of fixed-term contracts (*12-24 months / 25-60 months / over 60 months*) Is there a retraining or reassignment obligation before an employer can make a worker redundant? (*yes / no*) Are there priority rules applying to redundancies? (*yes / no*) Are there priority rules applying to re-employment? (*yes / no*) Must the employer notify a third party before terminating one redundant worker? (*yes / no*)

The system of associations among variables is well represented by the factorial plan, and the position of the variables on the plan provides clear indications to interpret the factors' meaning. The countries may also be projected on the factorial plan and their position depends on the values assumed by the categorical variables (figure 19).

The first two factors explain together the 48% of the general variance.

The first factor can be related to the industrial relations system, in particular as it concerns the **level of social negotiation** (table 22). On one side, in fact, there are countries where governments decide wage-fixing mechanisms consulting social partners or through collective bargaining, where the monthly minimum wage is over 1,000 $, the minimum of annual leave is longer than 23 days and the length of maternity leave is 18 weeks or more. Furthermore, also variables related to social labour protection, such as limits for using fixed-term contracts for permanent tasks, are associated to this dimension. As concerns the supplementary variables, we observe that in these countries maternity leave benefits are not entirely paid (less than 100% for a minimum of 14 weeks) and overtime limits are included in maximum weekly hours limits.

On the other side, there are countries where governments decide wage-fixing mechanism without consulting social partners, monthly minimum wage is lower than 1,000 $, the limit to use fixed-term contracts for permanent tasks does not exist, the length of maternity leave is between 14 and 17 weeks and the minimum annual leave is between 10 and 23 days. Moreover, in these countries some priority rules are applied to redundancies and reassignments. Maternity leave benefits are full paid for 14 weeks.

Table 22 – Active variables-modalities associated to the first factor: level of development of industrial relations systems (high or low)

variables	modalities	coordinate	absolute contribution	v-test
ILO Minimum wage-fixing levels	other fixing-wage	-0.87	10.55	0.62
ILO Minimum wage-fixing mechanism	government consulting social partners o collective bargaining	-0.84	9.05	0.49
DB Is there a retraining or reassignment obligation before a	no reassignment obligation	-0.87	7.39	0.35
ILO Minimum annual leave	more than 23 days	-0.87	6.35	0.28
ILO Monthly minimum wages	over than 1000 $	-0.63	6.07	0.39
DB Are fixed-term contracts prohibited for permanent tasks?	not fixed-term for permanent tasks	-0.61	5.83	0.38
DB Are there priority rules applying to redundancies?	no priority for redundancies	-0.70	5.47	0.28
ILO Length of maternity leave	18 weeks or more	-0.43	2.85	0.18
CENTRAL ZONE				
ILO Minimum wage-fixing levels	national fixing-wage	0.72	8.79	0.62
ILO Minimum wage-fixing mechanism	gov without consulting	0.58	6.26	0.49
ILO Monthly minimum wages	less than 1000 $	0.63	6.07	0.39
DB Are fixed-term contracts prohibited for permanent tasks?	no limits for fixed-term contracts for permanent tasks	0.61	5.83	0.38
DB Is there a retraining or reassignment obligation before a	reassignment obligation	0.40	3.45	0.35
DB Are there priority rules applying to redundancies?	priority for redundancies	0.40	3.13	0.28
ILO Length of maternity leave	14 to 17 weeks	0.43	2.85	0.18
ILO Minimum annual leave	10-23 days	0.33	2.38	0.28
DB Must the employer notify a third party before terminating one redundant worker?	third part notify	0.39	2.12	0.13

The second factor can be related to the **labour protection system**, particularly to the regulations concerning redundancies and the length of fixed-term contracts (table 23). On one extreme of the factorial axe there are countries where specific rules in cases of redundancies don't exist (priority for re-employment, priority for redundancies, reassignment obligation); these variables are associated to the lowest minimum wage (less than 1000$), shorter minimum annual leave (10-23 days) and maximum length of fixed-term contracts is between 25 and 60 months.

On the opposite side, there are countries with some guaranties in case of redundancies, minimum annual leave at least equal to 23 days and minimum wage higher than 1.000$. Furthermore, fixed-term contracts must not be longer than 24 months. The value test for supplementary variables is not significant.

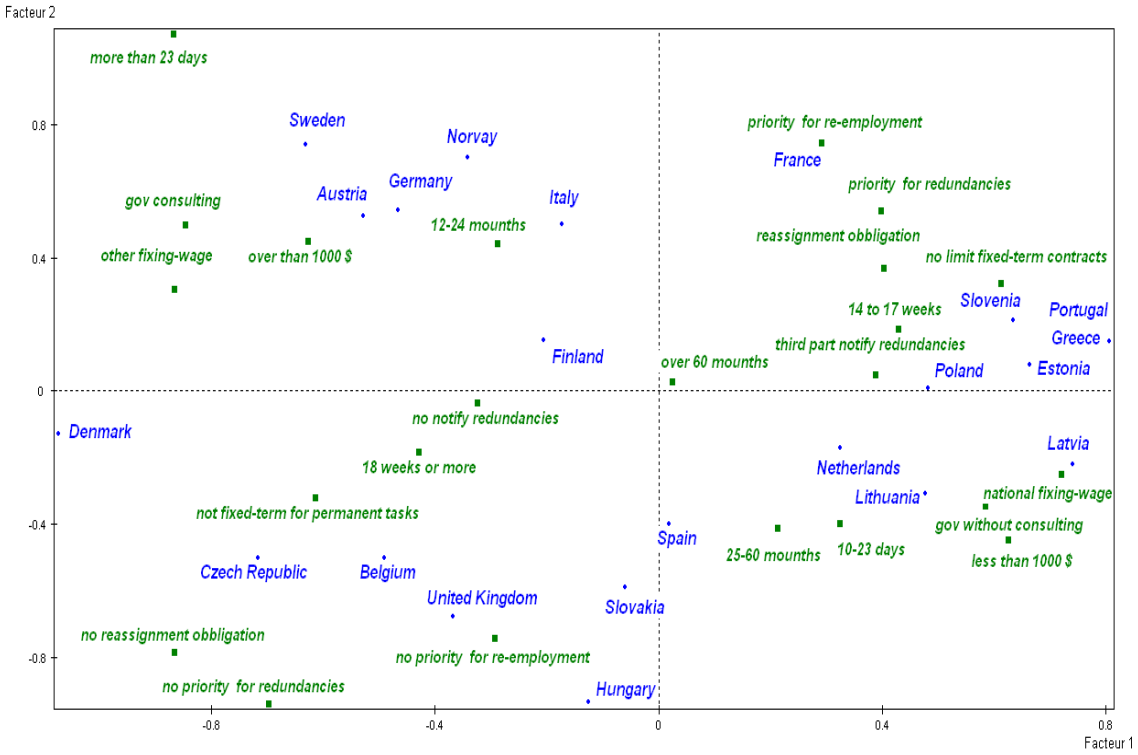
Table 23 – Active variables-modalities associated to the second factor: low or high level of labour protection

variables	modalities	coordinate	absolute contribution	v-test
DB Are there priority rules applying to redundancies?	no priority for redundancies	-0.94	13.04	0.51
DB Are there priority rules applying to re-employment?	no priority for re-employment	-0.74	11.16	0.55
DB Is there a retraining or reassignment obligation before a	no reassignment obligation	-0.79	7.95	0.29
ILO Minimum annual leave	10-23 days	-0.40	4.72	0.43
ILO Monthly minimum wages	less than 1000 $	-0.45	4.09	0.20
DB maximum duration of fixed-term contracts	25-60 months	-0.41	2.17	0.08
CENTRAL ZONE				
ILO Minimum annual leave	more than 23 days	1.07	12.58	0.43
DB Are there priority rules applying to re-employment?	priority for re-employment	0.74	11.16	0.55
DB Are there priority rules applying to redundancies?	priority for redundancies	0.54	7.45	0.51
ILO Monthly minimum wages	over than 1000 $	0.45	4.09	0.20
DB Is there a retraining or reassignment obligation before a	reassignment obligation	0.37	3.71	0.29
DB maximum duration of fixed-term contracts	12-24 months	0.44	2.16	0.07

In the factorial plan it is possible to project countries to check their position in relation with categorical variables (figure 19).

Anyway, the analysis shows the relevance of legislative indicators to give a more complex overview of the quality of employment. However, a deep knowledge of the legislative context would be desirable in order to assure the effective data comparability and to interpret the findings correctly. Furthermore more detailed information on welfare schemes, such as unemployment benefit or measures to increase female participation to labour market, would also prove very useful.

Figure 19 – Factorial plan of the first and second factor



2.4 Conclusions

This study supports the work of UNECE Task Force on the Measurement of the Quality of Employment by means of an empirical analysis on the proposed indicators.

The project's first step involved the assessment of the indicators' availability. The focus had mainly been on the 30 indicators proposed by the framework on the Quality of Employment. We started from the review of the data stored in several electronic databases maintained from recognized international organizations.

A second important step consisted of evaluating the existence of an operational definition of the indicators. Some indicators, in fact, were expressed in a generic form (eg.. Share of employees working in "hazardous" conditions, Share of people with flexible work schedule, Share of employed who have less education than is normally required in their occupation) while others were clearly defined (Fatal occupational injuries rate, Share of employed persons working 49 hrs and more per week, Percentage of employees 25 years and older with temporary jobs). As a matter of fact, for some indicators we identified many suitable variables with the intent to select the best throughout the study. In some circumstances it was not possible to calculate the indicator.

With reference to Decent work framework, some information related to labour market legislation and social protection was also included in addition to the quantitative indicators.

As a matter of fact, the normative framework on working conditions is deeply connected to the quality of employment, and we believe that the inclusion of this additional information may provide useful insights for the quality of employment.

The core part of the analysis was aimed at testing the variables for the measurement of the seven dimensions of quality of employment drawing from the originally identified 66 quantitative and 21 legislative variables. Multivariate analysis has allowed highlighting not immediately evident relationships among variables. That proved useful to understand the relations among the dimensions of quality of employment.

On the whole the empirical study confirms the multidimensionality of the concept of quality of employment and the importance to consider several indicators. Certainly there is still work to do in order to decide the core variables in accordance with criteria of relevance, availability, comparability, simplicity, etc. Moreover, each country will fit the framework in relation to specific market labour conditions; some indicators will be more relevant than others.

The study also highlighted the relevance of legislative indicators for the statistical framework suggested by the Task Force. In this respect, it is important to develop a standard methodology to define the legislative indicators. The problem is the lack of an operational definition, i.e. a translation of labour regulations into indicators and variables which are comparable across countries. In this direction, valuable work is already being done by ILO.

To conclude, table 24 highlights for each indicator the main results coming from empirical study in regards to the following four aspects: operational definition; availability; comparability; source. They are closely intertwined: without a clear operational definition the comparability becomes difficult; if an indicator is not available we can evaluate neither its comparability nor the source. The table shows similarities and differences among the 22 European countries analysed, allowing international comparison.

Table 24 – Relevance of indicators in the empirical study

Dimension and Indicator	Empirical study			
	Operational Definition	Availability	Comparability	Source
Dimension 1. Safety and ethics of employment				
Fatal occupational injuries rate (Workplace fatalities per 100.000 employees)	+++	+++	+++	Administrative
Non-fatal occupational injuries rate (Workplace accidents per 100.000 employees)	++	++	+	Administrative
Share of employees working in "hazardous" conditions	+	-	-	-
Employment of persons who are below the minimum age specified for the kind of work performed	+	-	-	-
Employment of persons below 18 years in designated hazardous industries and occupations	+	-	-	-
Employment of persons below 18 years for hours exceeding a specified threshold	+	-	-	-
Dimension 2. Income and benefits from employment				
Average weekly earnings of employees	+++	++	+++	SES
Low pay (Share of employed with below 2/3 of median hourly earnings)	+++	++	++	SES
Share of employees using paid annual leave in the previous year	+	-	-	-
Share of employees using sick leave	+	-	-	-
Average number of days paid annual leave used in the previous year	++	++	+	SES
Dimension 3. Working hours and balancing work and non-working life				
Average annual (actual) hours worked per person	+++	+++	+++	NA, LFS
Share of employed persons working 49 hrs and more per week	++	+++	++	LFS
Share of employed persons working less than 30 hours per week involuntarily	+++	+++	+++	LFS
Percentage of employed people who usually work at night/evening	+++	+++	+++	LFS
Percentage of employed people who usually work on weekend or bank holiday	+++	+++	+++	LFS
Share of people with flexible work schedule	++	+	+	LFS (HM)
Ratio of employment rate for women with children under compulsory school age to the employment rate of all women aged 20-49	++	++	++	LFS
Share of people receiving maternity/ paternity/family leave benefits	+	+	+	LFS (HM)
Dimension 4. Security of employment and social protection				
Percentage of employees 25 years and older with temporary jobs	+++	+++	+++	LFS
Percentage of employees 25 years and older with job tenure (< 1 yr. 1-3 yrs. 3-5 yrs. >= 5yrs)	++	+++	+++	LFS
Public social security expenditure as share of GDP	++	+++	+++	NA
Share of employees covered by unemployment insurance	++	-	-	-
Share of economically active population contributing to a pension fund	++	-	-	-
Dimension 5. Social dialogue				
Share of employees covered by collective wage bargaining	+	+	+	SES
Average number of days not worked due to strikes and lockouts	++	++	+	Administrative

Dimension and Indicator	Empirical study			
	Operational Definition	Availability	Comparability	Source
Dimension 6. Skills development and life-long learning				
Share of employed persons in high-skilled occupations	++	+++	+++	LFS
Share of employees who received job training within the last 12 months	+++	++	+++	LFS
Share of employed who have more education than is normally required in their occupation	++	+++	+++	LFS
Share of employed who have less education than is normally required in their occupation	+	+++	+	LFS
Dimension 7. Workplace relationships and intrinsic nature of work				
Share of employees who feel they have a strong or very strong relationship with their co-workers *(not fully accepted)*	+	+	++	EWCS
Share of employees who feel they have a strong or very strong relationship with their supervisor *(not fully accepted)*	+	+	++	EWCS
Share of employees who feel they are able to apply their own ideas in work *(not fully accepted)*	++	+	++	EWCS
Share of employees who feel satisfied with their work *(not fully accepted)*	++	+	++	EWCS

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