

Measurement of quality of life in the European context: approaches and challenges

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ABSTRACT

The measurement of Quality of life and well being has recently attracted substantial political attention, in the European Union Member States and beyond. Several statistical offices have put together their knowledge of the topic in order to elaborate recommendations on how to better measure the phenomenon. Overall, there is a broad agreement from the statistical community to consider quality of life as being within the remit of official statistics, and that it is composed of several dimensions that have to be captured at individual level in order to allow for the analysis of the specific situation of various sub-populations of particular interest. This leads to a situation in which ideally all the dimensions should be captured by a single statistical instrument. In practice, such an instrument does not exist in the European Union. Nevertheless, EU-SILC, which is now the reference source for statistics and indicators on income, living conditions and social inclusion, contains a number of ingredients which are essential for measuring quality of life and could be complemented by other data sources, official or not.

The paper presents strategies to possibly remediate the situation. Mainly based on EU-SILC but not only, it uses available sources to present various elements of quality of life measurement at the EU level. Some sub-populations of particular interest for EU policy makers are analysed, in particular those at risk of poverty or social exclusion, as defined in the Europe 2020 headline target. Possibilities of enriching existing data with statistical matching techniques are being considered.

1. Quality of life: towards an established framework of indicators for policy making

There is a growing demand for new indicators and statistical surveillance tools that go beyond conventional economic measures. One of the key improvements foreseen in the coming years is finding appropriate measures of **quality of life**.

The importance and urgency of this demand is demonstrated by a series of recent European and international initiatives: the GDP and beyond communication, the Stiglitz-Sen-Fitoussi Commission' Report (September 2009), the OECD initiative on measuring progress of societies, the joint UNECE/Eurostat/OECD Task Force on measuring sustainable development.

While establishing a parsimonious system for measuring QoL is a difficult task, a consensus builds around a **multidimensional framework** that encompasses a "**range of features** in people's lives that are important either intrinsically, as objective expressions of a good life, or instrumentally to achieve valuable subjective states or other objective goals"¹. Quality of life is conceptualized as a broad concept that refers to the basic aspects of life that shape human wellbeing beyond the command of economic resources. This implies that statistics will not provide a single summary measure of quality of life, but a set of indicators that capture several dimensions:

- Material living conditions (income, wealth and consumption)
- Productive and valued activities (including work)
- Health

¹ Stiglitz-Sen-Fitoussi Commission' Report

- Education
- Governance and basic rights
- Leisure and social interactions
- Natural and living environment
- Economic and physical security
- + Overall experience of life

However, this overarching approach builds on **new premises** and there is no agreement reached on what are the appropriate outcomes within all these domains and on how they should be combined in overall indexes. Further steps need to be undertaken in order to provide a coherent set of validated quality of life indicators.

First of all, several discussions focused on the joint consideration of **objective** (economic, human and social conditions) and **subjective well-being concepts** that rely on people's feelings and evaluations. The recent focus on subjective measures emphasised also a series of problems and biases that affect the reliability of subjective concepts and their comparability across individuals and countries: adaptation that makes perceptions 'immune to real life conditions', expectations as anchoring points, personality traits, memory bias, mood in the moment of the interview. However, recent initiatives have emphasised that despite unresolved issues that need to be dealt for the implementation of these measures, subjective aspects are necessary for capturing an adequate picture for quality of life.

Secondly, **data requirements** need to be considered in relation both to the **coverage** of the different fields and to the **adequate levels of analysis**. As stated by the Stiglitz report, the emphasis is on people, on distributional and inequality aspects, as well as on multiple disadvantaged sub-groups. The ideal solution would be one single micro-data source that would enable us to capture the multidimensional aspect of quality of life at the individual level. EU-SILC was recognised at the EU-level as the core survey for measuring quality of life as it covers several of the relevant pillars highlighted by the Stiglitz Report². However, complementary sources need to be considered to ensure coverage of all relevant aspects of people's life. The selection of these sources should be made based on the fit for purpose principle: consider both the quality of the data but also the availability of ready to use indicators, the consistency of these sources and the existence of enough variables in common with EU-SILC to allow estimating inter-relations of dimensions for relevant sub-groups. Moreover, in the long term some dimensions will need further development of existing ESS data sources in order to ensure a better coverage of particular dimensions (e.g governance and basic rights, subjective well-being).

Thirdly, in areas where available indicators remain deficient further work will need to develop better metrics and **recognized statistical standards** (e.g. economic insecurity, environment, productive activities). The involvement of experts and stakeholders is envisaged at this step.

Finally, a series of **methodological choices** need to be made in relation to the type of indicators considered (scoreboards, synthetic or composite), the aggregation methods employed (linear aggregation versus geometric means, average versus cut-off indicators), to the possible adoption of different taxonomies for specific vulnerable sub-groups and to their presentation.

2. Computation of indicators based on EU-SILC and EQLS

In the **Sofia Memorandum**, the Directors-General of the EU Statistical Institutes (**DGINS**), recognised the importance of high quality data about people's quality of life and pointed out that the European statistics on income and living conditions (**EU-SILC**) should be developed as a core instrument for measuring Quality of Life dimensions. Therefore, in this study we rely on a limited set of indicators computed mainly on the basis of EU-SILC that cover several aspects of QoL, as set out by the Stiglitz report. The value of one single source relates to the possibilities for in-depth analysis that enables us to identify within each dimension suitable indicators that capture as much as possible the **individual wise variation** of the data.

² Sofia Memorandum

However, as we lack information on two relevant dimensions (governance and basic rights and overall experience of life), we complement the EU-SILC data with two indicators from the **European Quality of Life Survey (EQLS)**, launched in 2004 and 2007 by Eurofound³.

This section provides a short overview of the:

- a) The **basic concepts and principles** that guided the selection process;
- b) The **selection process of indicators** and **the methodology** used for the data analysis.

a) General principles for selection indicators

In thinking how best to measure QoL and to provide a workable framework of indicators some methodological choices were adopted:

- To take the individual as the fundamental unit of analysis and therefore rely mainly on one single micro-source (EU-SILC). This allowed an in-depth analysis of the structure and relationships between variables and indicators **at individual level**. This approach enables us to capture **distributional aspects, correlations across dimensions** and **multiple disadvantaged sub-groups**. Europe 2020 sets out an example of such subpopulations disadvantaged in several domains: **people at-risk-of-poverty or social exclusion**. Whenever necessary, an alternative micro-source that provided the necessary information (EQLS) was considered.
- To reduce complexity and to compute, to the extent possible, one **synthetic** indicator for each Quality of Life (sub) dimension. The main rationale is to organize the large amount of possible relevant factors along a limited set of indicators.
- To focus on the share of people that accumulate deprivations rather than average indexes that can hide heterogeneity within the population.

However, these criteria represent just one direction among several alternatives. Some **sensitivity analysis were performed** in order to assess the impact of reasoned but arbitrary choices and to improve the **comparability of selected aggregated indicators** across groups and countries. Further work will need to better exploit other sources within the ESS sources (e.g. Labour Force Survey (LFS), Household Budget Survey (HBS), Time Use Survey (TUS)) and refine the methodology for the selection and computation of indicators.

b) Selection process of indicators (based on EU-SILC and EQLS)

- Review of available variables

The main objectives of this part were the identification and analysis of a wide range of variables in EU-SILC in order to ensure to the extent possible a good coverage of the dimension and the identification of gaps and possible complementarities with other sources.

For each of the dimensions, whenever deemed necessary, **sub-dimensions** were delineated and all relevant variables available in EU-SILC selected. The selection process takes into consideration the indicators' **relevance** for describing the correspondent dimension and their ability to capture as much as possible the micro-level variance for each specific dimension. For the dimensions not covered in EU-SILC (governance and basic rights, overall experience of life) indicators are provided based on EQLS, but the analysis potential is limited.

³ The European Foundation for the Improvement of Living and Working conditions
http://europa.eu/agencies/community_agencies/eurofound/index_en.htm

- Data analysis at micro-level

In order to **reduce complexity** of the data and to allow complex analysis between dimensions we proposed to compute, to the extent possible, one **synthetic** indicator for each Quality of Life (sub) dimension. The main rationale is to organize the large amount of possible relevant factors along a limited set of indicators.

Synthetic indicators were computed through the aggregation of several basic indicators (based on variables that are directly measured). The main principle was that these variables should be **highly correlated** so that we can support the assumption that they are measuring **the same latent concept**. In order to **validate the computation of synthetic indicators**, their uni-dimensionality and **internal consistency** was assessed through multivariate analysis techniques (correlations, Cronbach Alpha, correspondence / factor analysis for categorical/ordinal variables). Further considerations were made on how well **the measurement reflects the underlying concept**. This methodology facilitated the computation of a limited number of **'homogenous'** synthetic indicators for each (sub) dimension with **little loss of information**.

Whenever indicators capture distinct, but equally relevant sub-dimensions their aggregation might lack transparency about the different facets of the phenomena. Aggregation in this case might proceed through composite indicators that usually include a wide range of dimensions. However, this approach can create analytical and interpretative problems as it would involve very heterogeneous measures that are very different conceptually and metrically. Moreover, as mentioned in the Stiglitz report, the problem is the arbitrary character of the procedures used to weight their various components. Therefore, a **set of primary indicators** is provided for covering more in detail relevant aspects not included in the synthetic indicators (e.g. QoL at work).

Once the multivariate analysis was done and the variables to include in the computation of indicators were selected, we built **binary micro-indexes** that aim to discriminate between good /bad conditions based on a **benchmark value**. Some analyses were performed in order to assess the impact of various choices on these indicators but several aspects need to be further investigated: (1) the choice of **appropriate benchmarks** needs to undergo a validation process both through in depth statistical analysis (such as sensitivity analysis or estimates based on several years in order to control for volatility) and on the basis of consultations with experts and stakeholders regarding the 'basic human needs' in the specific dimension; (2) the **degree of consistency** in choices made across dimensions; (3) these aggregation methods are **limited in scope** when indicators draw on different surveys or when they target different populations (whole population vs. population at work).

- Selection aggregated indicators for each (sub)-dimension

Once the micro-indexes were computed, the macro units needed to be defined (country or sub-populations level indicators). Some analyses were performed (correlations of average versus threshold based indicators) in order to assess the impact of the threshold choice. In some cases we need to control for factors affecting comparability (health deprivation 18-64, 65+) or to identify relevant sub-populations (early school leavers).

Table 1: Selected indicators QoL

Dimension	Indicator	Source	Indicator
1. LIVING CONDITIONS	Monetary-based poverty (At-risk of poverty)	SILC 2009	Share of people with an equivalised disposable income below 60% of the national median equivalised disposable income after social transfers
	Non monetary poverty (Severe material deprivation)	SILC 2009	Share of people deprived in at least 4 items out of 9 (items related to arrears, constrained expenses, financial constraints)
2. PRODUCTIVE AND VALUED ACTIVITIES (WORK)	Low work intensity	SILC 2009	Share of people living in household where adults work less than 20% of their potential during the income reference year
	Job Quality (Constrained part time)	SILC 2009	Share of people at work, working less than 30 hours because he couldn't find full time job
	Job Quality (Temporary job)	SILC 2009	Share of employees with temporary contract
	Job Quality (Long working hours)	SILC 2009	Share of people at work, working more than 50 hours
	Job Quality (In work poverty)	SILC 2009	Share of people at work in previous year and at risk of poverty
3. HEALTH	Health deprivation	SILC 2009	Share of people having at least one health problem (bad health status, self-reported chronic illness, long-term activity limitations)
	Unmet needs	SILC 2009	Share of people having unmet needs for medical care (medical examination or dental treatment) for the following three reasons: financial barriers + waiting times + too far to travel.
4. EDUCATION	(Low) Education attainment	SILC 2009	Share of people that have at most lower secondary school and are not currently in formal education
5. LEISURE AND SOCIAL INTERACTIONS	(Low) Social support	AHM -2006	Share of people that reported lack of social support
	(Low) Social interactions	AHM -2006	Share of people that meet 'less than once a week' with both relatives and friends
6. PERSONAL INSECURITY	Economic insecurity	SILC 2009	Share of people either with financial difficulties (make ends meet, financial burden) or perceived future vulnerability (unexpected expenses)
	Physical insecurity	SILC 2009	Share of people worried about crime, violence and vandalism in the area
7. GOVERNANCE AND BASIC RIGHTS	(Low) Trust in Institutions	EQLS	Share of people with low scores on trust in various national institutions (if score <i>(lower) higher than the first quartile at EU level</i>)
8. NATURAL AND LIVING ENVIRONMENT	Environmental deprivation	SILC 2009	Share of people deprived in at least one item (problems either with 'noise' or 'pollution, grime or other environmental problems')
9. OVERALL EXPERIENCE OF LIFE	(Low) Life satisfaction	EQLS	Share of people with low <i>life satisfaction (=if life satisfaction (lower) higher than the first quartile at EU level)</i>

3. QoL in Europe and multiple disadvantaged groups

This section provides an overview on QoL at country level, as well as some results concerning vulnerable sub-populations and multiple disadvantaged groups (e.g. AROPE⁴, single parents, disabled people). A single source approach allows not only the in-depth analysis of various pre-defined groups (age, gender, household composition, activity status), but also the identification of sub-populations multiple disadvantaged (AROE).

⁴ At-risk-of-poverty or social exclusion- the proportion of people who are either at risk-of-poverty and/or materially deprived and/or living in households with very low work intensity.

The indicators described in table 1 have been calculated for each Member-States (with the exception of Romania, due to missing data). Several analyses were performed. Some examples are shown below.

A **cluster analysis** was done based on national indicators. Six clusters were identified. Interestingly, quality of life seems to follow some geographical patterns. Based on the average score of each cluster on each dimension, on the one hand, several eastern countries have a higher propensity to be disadvantaged in both living conditions (monetary poverty, economic insecurity) and subjective aspects (trust in institutions, life satisfaction). On the other hand, northern countries seem to have high percentages of people that perform well in both economic well-being and on social aspects such as trust in institutions, life satisfaction or social support.

The other clusters show also some specificities. Southern countries show higher economic insecurity and low education attainment, but higher social support and interactions. Central European countries show an average pattern, and better scores for the education dimension and the social support. Western countries shows also an average pattern, but with less deprivation and more life satisfaction and social support. Bulgaria and UK are alone in their respective cluster.

Figure 1: Quality of life - clusters of countries

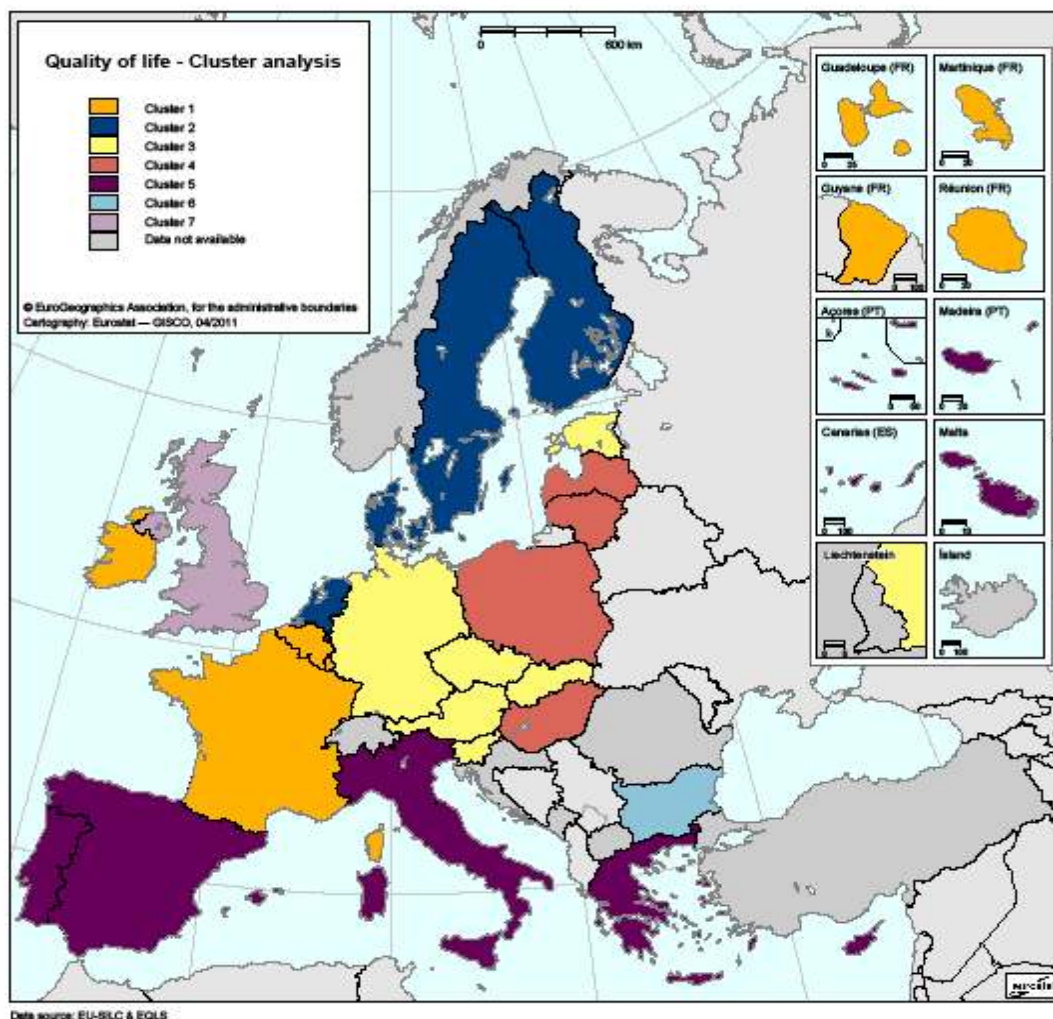


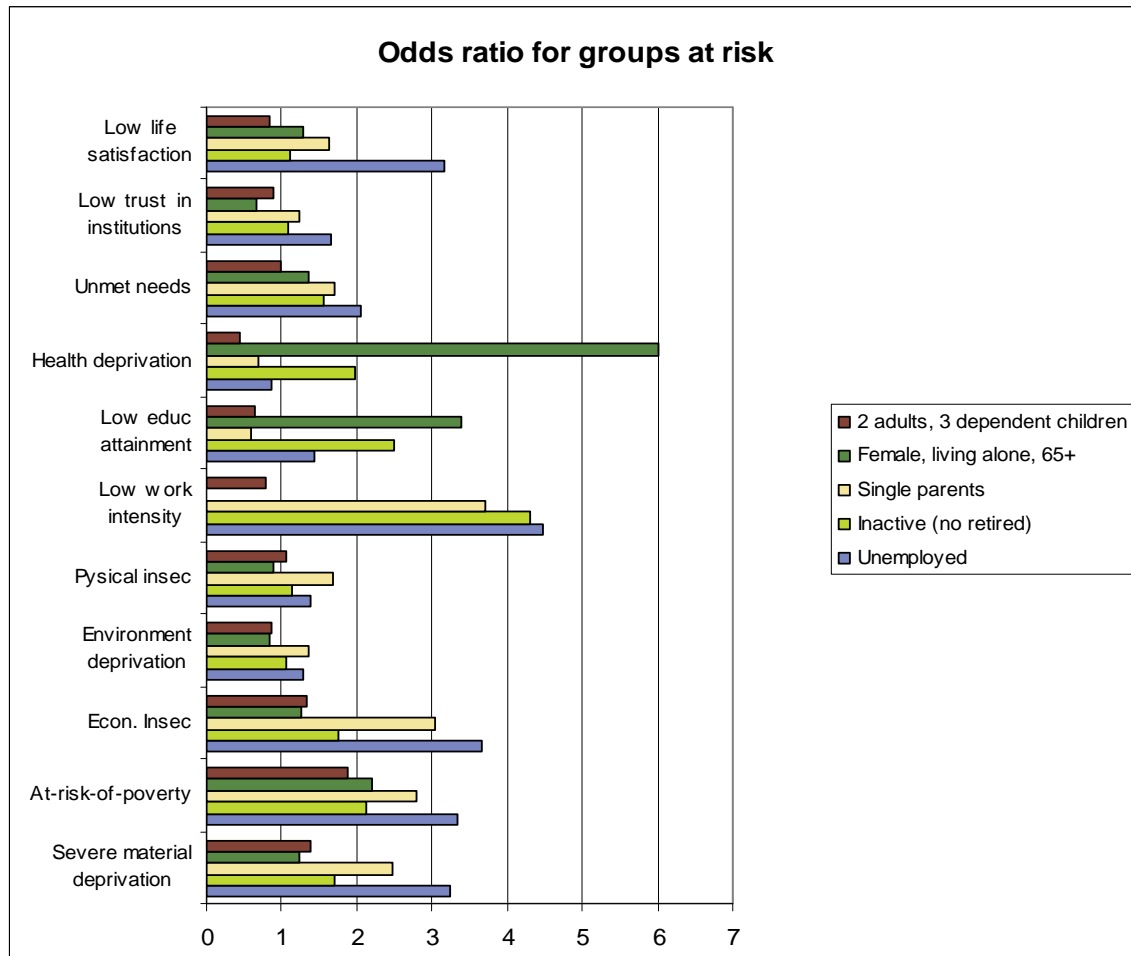
Table 2: Log odds ratio for the 6 cluster of countries

In log odd ratio	BG	HU LV LT PL	BE LU FR IE	DK NL SE FI	CY GR ES IT MT PT	AT EE CZ SK DE SI	UK
Severe deprivation	2.1	0.9	-0.6	-1.4	-0.1	-0.2	-0.9
AROP	0.4	0.2	-0.2	-0.3	0.1	-0.3	0.1
Economic Insecurity	1.1	0.8	-0.2	-0.9	0.5	-0.3	-0.3
Environmental deprivation	0.0	-0.2	-0.3	-0.3	0.3	-0.1	-0.1
Physical insecurity	0.7	-0.3	-0.1	0.0	-0.2	-0.1	0.6
Low work intensity	-0.3	-0.1	0.3	-0.1	-0.3	-0.3	0.4
Low education attainment	-0.1	-0.5	0.2	-0.2	0.9	-0.8	-1.1
Health deprivation	-0.2	0.3	-0.2	0.1	-0.1	0.2	-0.3
Trust in Institutions	1.5	0.8	-0.4	-1.7	-0.1	-0.1	0.2
Life satisfactor	1.6	0.7	-0.7	-1.7	0.0	0.1	-0.3
Social interactions	0.2	0.5	-0.1	-0.1	-0.8	0.2	-0.6
Social support	0.1	-0.7	-0.8	-1.5	-0.8	-1.0	2.1

The dashboard presented in table 2 gives the score of each cluster on each sub dimension, expressed as the logarithm of the odds ratio of the score on that dimension and the EU score. As the dimensions represents the share of the population showing some difficulties, negative values show better conditions of quality of life compared to the EU score.

Secondly, we performed a **multiple correspondence analysis** based on the binary micro-indexes from different domains and then we plotted several demographic groups (analysis done both on SILC and EQLS). The results show that the groups presenting the highest risks in several domains are: single parents, inactive people (disabled people, domestic tasks), unemployed, females older, families with a high number of children (see annex 1). However, for this last category we notice that even if they have a higher chance to be income poor or materially deprived, they tend to have a higher life satisfaction and trust in institutions. Figure 2 shows the odds ratio to be deprived in different dimensions by group at risk (compared to the whole population).

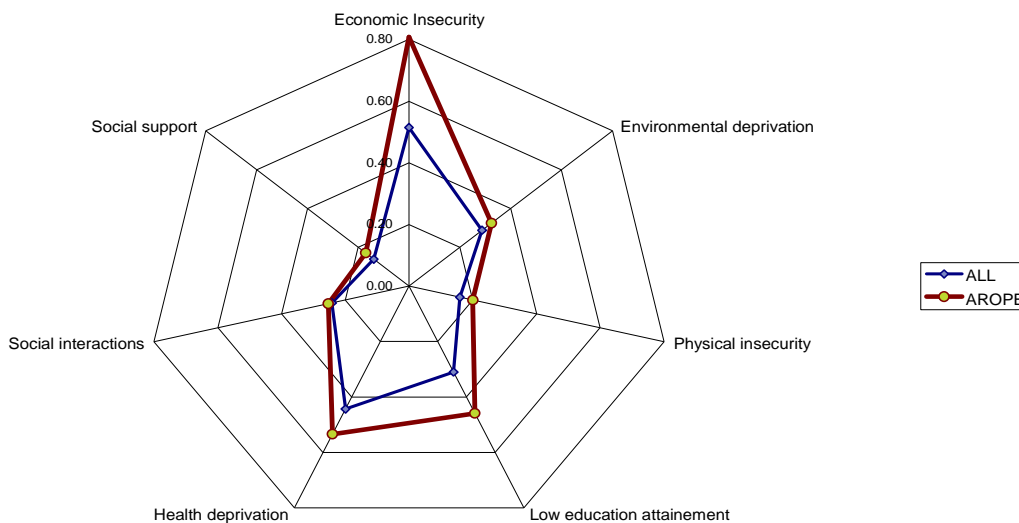
Figure 2: The odds ratio to be deprived in different domains by group at risk



Furthermore, an analysis of 'QoL at work' was performed for the four indicators on job quality, not included in the main set. The results show that age and education are both correlated with various dimensions of job quality. On the one hand, low education is correlated with in-work poverty. On the other hand, young people have a higher risk of getting an insecure job (temporary contract) or working part-time (involuntary), but the picture is very different across countries. For example, the risk of having an insecure job is much higher for young people in southern countries (ES, IT, GR, PT), but also in Netherlands and Poland (odds ratio>2).

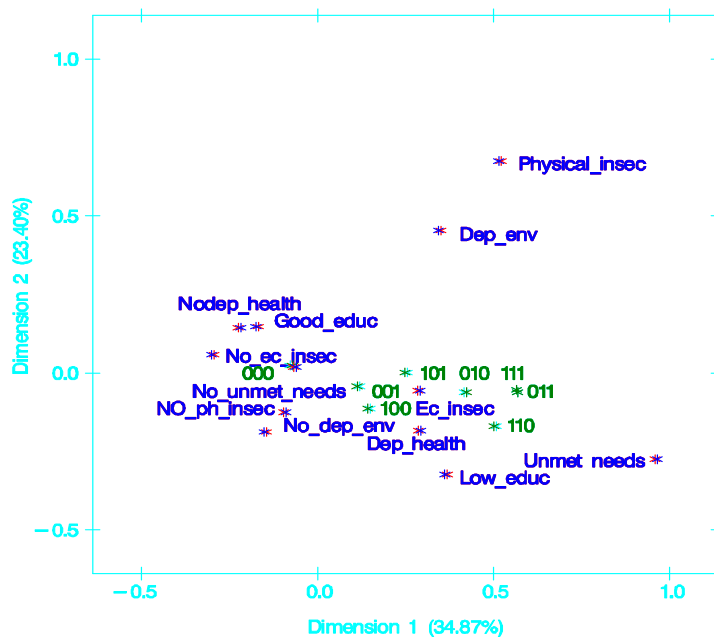
Finally, vulnerable subpopulations can be identified by analysing jointly a set of indicators. In this sense the **AROPE group** identifies people at-risk -of-poverty or social exclusion and they seem to cumulate deprivations in several dimensions (not only the three indicators that are used for their delimitation). Figure 3 shows the percentages of the respective population (the whole population and the AROPE population) presenting problems on each dimension.

Figure 3: Quality of life and population at risk of poverty or social exclusion (AROPE)



In figure 4, we plot the AROPE subgroups on the first two dimensions resulted from the correspondence analysis of all micro-level indexes covered in EU-SILC 2009 (without the indicators that are used for the delimitation of the AROPE sub-group). The first dimension opposes the absence and the presence of risks and the second axis introduces a distinction between material deprivation and low education on one hand and physical insecurity, environmental deprivation on the other hand. The different subgroups of the AROPE population show stronger relations with the first axis.

Figure 4: Multiple correspondence analysis (partial micro-level indexes) with AROPE



More in depth analysis can be done by analysing the **accumulation** of disadvantages: not only AROPE people have lower scores in several domains, but the gap is getting wider when in the case of people that are simultaneously, income poor, materially deprived and live in Low Work Intensity households (see table 3)

Table 3: % people deprived for detailed subgroups in the AROPE and by sub-groups of AROPE (1st digit=AROP; 2nd digit=Severe Material deprivation; 3rd digit=Low work intensity).

AROPE	Economic insecurity	Environmental deprivation	Physical insecurity	Low education attainment	Health deprivation	Unmet needs
All	51.1%	29.1%	15.8%	31.2%	44.3%	6.6%
AROPE	79.6%	32.4%	19.2%	46.0%	53.3%	13.9%
000	42.7%	28.1%	14.8%	27.0%	41.7%	4.4%
001	57.4%	31.3%	18.8%	38.0%	58.9%	7.1%
010	98.8%	37.6%	22.2%	41.6%	52.2%	23.0%
011	99.0%	45.4%	28.3%	44.9%	70.4%	27.0%
100	68.9%	27.2%	15.1%	47.8%	50.7%	7.5%
101	84.1%	37.5%	22.0%	39.1%	50.4%	9.6%
110	98.9%	34.0%	21.1%	59.4%	54.7%	28.4%
111	99.9%	42.3%	31.0%	53.7%	61.1%	26.5%

Also in the case of AROPE, people most at risk are the unemployed, followed by other inactive not retired and the single-parent households. Being born outside EU and living alone are important risk factors as well. However, the potential analysis of this group in different domains is limited. As EQLS doesn't collect the same variables we cannot identify this group and therefore we lack information regarding more subjective aspects such as trust in institutions, life satisfaction or social exclusion perception. However, multivariate analysis shows that several common variables (e.g. lack of basic, economic necessities, being unemployed, marital status and living alone) are critical factors for both poverty indicators and life satisfaction. Further work on data integration and statistical matching techniques could provide joint information on people at-risk-of-poverty and their subjective perceptions and life evaluations based on their socio-economic characteristics.

4. Conclusions

The main purpose of this paper was to provide a preliminary set of indicators of quality of life based to the extent possible on a single source, EU SILC. This allowed us to analyse in some depth the structure and relationships between variables and indicators. On the basis of multivariate analysis techniques we built synthetic indicators that are based on percentages of people that cumulate bad conditions in each dimension (based on available variables).

The study emphasises further work needed to deal with particular difficulties and to elaborate appropriate recommendations for future implementation: building a sound methodology for supporting certain choices (variables, thresholds), explore possibilities for integration when indicators or variables draw on different surveys, ensuring consistency of the approach in order to provide a coherent and policy relevant picture for quality of life. The study shows as well that particular attention has to be paid to the communication aspects. Several options for representing the data have been shown, that present advantages and draw backs.

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Annex 1: Multiple correspondence analysis (QoL indicators and groups at risk): SILC (fig 1) & EQLS (fig2)

