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The Quality of Life of the European Population: SHARE Data-based Analysis

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Abstract

The quality of life, well-being and deprivation are significant factors affecting the ageing European population. The fifth (2013) wave of the Survey of Health, Ageing and Retirement in Europe (SHARE) covers the two indices of (material and social) deprivation along with various life quality and satisfaction indicators measuring (subjective and objective) well-being. Using the SHARE data, the present paper examines the 50+ population in 13 EU member states and Switzerland, emphasizing the relationships between distinctive characteristics. The gender gap is quantified for both the whole sample and particular age groups. Statistical comparisons between old and new EU countries are limited since only three of the latter (Estonia, Slovenia and the Czech Republic) took part in the 2013 SHARE survey.

Keywords: quality of life, SHARE survey, deprivation, satisfaction, loneliness.

1. Introduction

Longevity is one of the most significant achievements of modern societies. Europeans are living longer, healthier, and more active lives. Subsequent generations can benefit from longer lifespans lived together (COMMISSION1 (2014)). This spectacular achievement of European Union (EU) societies is accompanied by a change of a structure of European inhabitants with consequences to the economic situation causing challenging problems to pension schemes, health systems, long-term care, education and unemployment benefits. The maintenance of economic and social security and conservation of inter-generational solidarity are crucial cornerstones to cope with these challenges. It is necessary to raise awareness about what population ageing means not only to individuals but also to the families they live in, the economy and whole society. The quality of life (Qol) and associated satisfaction with life are phenomena at the centre of interest not only in developed countries. Improving life quality and reducing deprivation and exclusion is one of the cornerstones of the Europe 2020 strategic agenda (on employment, R & D, climate change and energy, education, poverty and social exclusion, COMMISSION3 (2017). The quality of life adds a crucial component to the overall evaluation of the economic and social progress of countries. The description of the European ageing population growth is a challenging research task, a thorough analysis of changing demographics providing the basis for competent political decision-making and allocation of

health and social care services to improve the lives of all citizens.

The in-depth analysis of their situation can provide a basis for the possible quality of life improvement as well as prepare European societies to the ageing of the population and allocation of health and social care services. While numerous definitions and theories of QoL have been proposed, an overall synthesis of the perspective of older adults themselves is lacking. The QoL aspects identified in the synthesis were categorized into nine QoL domains: autonomy, role and activity, health perception, relationships, attitude and adaptation, emotional comfort, spirituality, home and neighbourhood, and financial security. The results showed that although different domains can be distinguished, these are also strongly connected.

According to the EU Commission Report (COMMISSION2 (2018)) from 2018, the total population in the EU is projected to increase from 511 million in 2016 to 520 million in 2070. The working-age population will decrease from 333 million to 292 million. The ratio of people aged 65 and above and those aged 15 to 64 in the EU is projected to increase by 21.6 percentage points, from 29.6% to 51%. This implies that the EU would go through 50 years from having 3.3 working-age people for every person aged over 65 years to only two working-age persons. Moreover, this ratio is predicted to be highly country-specific.

The authors in van Leeuwen, van Loon, van Nes, Bosmans, de Vet, Ket, Widdershoven, and Ostelo (2019) provide a thorough analysis of QoL related studies of elderly people. The text gives an overview of relevant articles with details. The authors identified nine quality of life domains (Table 2 in van Leeuwen *et al.* (2019)): autonomy, role and activity, health perception, relationships, attitude and adaptation, emotional comfort, spirituality, home and neighbourhood, and financial security. These domains are covered by different variables, that are included in the various QoL indices from the present paper. The attention is often focused on older individuals, since they are most likely to experience negative events that jeopardize their autonomy and more generally the quality of their everyday life (e.g. hospitalization, institutionalization, disease, death of friends and family members).

Description of individual's or a group's perceived physical and mental health and their changes over time are main topics of health related quality of life (HRQoL). This concept is usually connected with some special illnesses and its consequences. Health is seen by the public health community as a multidimensional construct that includes physical, mental, and social domains. As medical and public health advances have led to cures and better treatments of existing diseases and delayed mortality, it was logical that those who measure health outcomes would begin to assess the population's health not only on the basis of saving lives, but also in terms of improving the quality of lives. García and Navarrro (2018) state that quality of life in elderly people is closely linked to factors strictly related to health and health-related ability to be independent in their daily activities.

Since it is difficult to precisely measure such complex, subjectively experienced phenomena as life quality and welfare or deprivation and social exclusion, there is no generally accepted tool to describe and quantify them, the commonly embraced economic concepts (GDP per capita, household income, etc.) having proved to be insufficient. It is therefore essential to construct composite indicators using a more complex set of descriptors that allow for comparison of the situation of citizens, regions and countries. The problem is multidisciplinary and it is examined from different points of view. Another option is to ask particular questions to obtain subjective perception. In the paper, we apply simple composite indicators (CASP, loneliness), weighted indicators base on hedonic weights (deprivation indices) and a simple question (satisfaction).

Attempts have been made to modify the usually employed indicators so that they can reflect as truly as possible the actual conditions of the ageing European population (Hyde (2003)), shifting the emphasis to health and retirement. The variables concerning the health condition of the population are to be involved in any case, yet avoiding too narrow a focus. According to George (2010), the complexities of the welfare of the elderly cannot be reduced to the biomedical component of health. The World Health Organization defines healthfulness mul-

tidimensionally as a state of general physical, mental and social well-being, not merely as the absence of ill health. Stowe and Cooney in Stowe and Cooney (2015), thus argue that the concept of successful ageing is to be embraced by a multidisciplinary life course perspective, applying, for example, the Active Ageing Index, UNECE (2019).

The present paper explores both negative and positive aspects of the issue – the two indices of deprivation, severe deprivation and the loneliness index along with (objective) CASP quality of life measure and (subjective) life satisfaction. The relationship between these indicators is of interest and some information on the gender gap is included. As all these measures are highly country specific, comparison between countries is provided and more homogeneous subsets of participating countries are searched for. Basic statistical methods are applied, the descriptive graphical methods are used to illustrate the situation in the analysed population of European inhabitants over 50. Cluster analysis is used to find homogeneous countries based on analysed variables.

2. Composite indicators and SHARE survey

2.1. Indices quantifying Qol and deprivation in SHARE survey

The Survey of Health, Ageing and Retirement in Europe (SHARE) provides relevant information on changing demographics of the European population, the extensive panel survey covering the respondents' ageing process. It provides a representative sample of people in the EU (and Switzerland and Israel) above 50 years of age and the most qualitative data on the subject of population ageing. The data is provided for academic and research purposes free, and it enables a significant number of analyses based on the survey data. The respondents over 50 (and all their partners) are eligible for the survey; after entering the survey, the participants remain in the panel until the end of his/her life.

It creates a relevant panel database on a cross-national basis. The study from 2013 ($5th$ wave) SHARE provides a rich source of information on the population examined, Börsch-Supan (2016). The panel survey focused on respondents both in their old age and in the course of the ageing process. Since the number of interviewees declines during the SHARE data collection waves – due to death, refusal or relocation (although the respondents are traced within participated countries), additional respondents are sampled to maintain or increase sample sizes. The fifth wave of the SHARE survey was conducted in 15 countries – 13 EU ones (namely Austria [AT], Belgium [BE], the Czech Republic [CZ], Denmark [DK], Estonia [EE], France [FR], Germany [DE], Italy [IT], Luxembourg [LU], the Netherlands [NL], Slovenia [SI], Spain [ES] and Sweden [SE]), Switzerland (CH) and Israel (IL), the last not included in the present analysis.

It is possible to quantify the situation of inhabitants in monitored countries based on various general indicators. Although the GDP is not a sufficient measure of the quality of life, we provide information on the order of participated countries concerning this economic indicator. The volume index of GDP per capita concerning the EU28 average set to equal 100 per cent. According to the 2013 value, participating countries are listed in the following order: LU 261 %, NL 135 %, AT 131 %, DK 128 %, SE 125 %, DE 124 %, BE 120 % and FR 108 %, ranking above the mean, IT 98 %, ES 89 %, CZ 84 %, SI 82 % and EE 75 %, ranking under the mean value, Eurostat (2019). If we take more complex Human Development Index (HDI) Programme (2019) reflecting life expectancy, education, and per capita income indicators, analysed countries are in an excellent position in the world. The index in 2012 is Denmark (HDI 0.931, world rank 3), Germany (0.928, 5), the Netherlands (0.923, 7), Sweden (0.912, 12), Belgium (0.908, 17), Austria (0.897, 20), Luxemburg (0.892, 23), France (0.889, 24), Slovenia (0.885, 25), Italy (0.876, 26), Spain (0.875, 27), the Czech Republic (0.874, 28), Estonia (0.862, 29).

The SHARE survey tackles individual, subjective perception of positive and negative feelings

of well-being and seclusion (henceforth referred to as *satisfaction* and *loneliness*, respectively). The former is an answer to one question *"On a scale of 0 to 10 where 0 is completely dissatisfied and 10 is completely satisfied, how satisfied are you with your life?"*. The latter arises when the quality of interpersonal relationships fails to meet expectations, its well-established measure being the Revised UCLA Loneliness Scale, Lee and Cagle (2017), Russell, Peplau, and Ferguson (1978), Russell, Peplau, and Cutrona (1980). In Russell *et al.* (1978) in Table 1, there is given a list of 20 features included in the index. Ten of them is positively worded (I do not feel alone, There are people I can talk to, There are people I can turn to, ...) and ten negatively worded, for example I lack companionship, My interests and ideas are not shared by those around me, ...), asked on the 4-level scale *never*, *rarely*, *sometimes*, *often*. In Niedzwiedz, Richardson, Tunstall, Shortt, Mitchell, and Pearcea (2016), the authors analyse data from SHARE survey (the fifth way from 2013) and conclude that the risk of loneliness is highest in the least wealthy groups and lowest in the wealthiest groups. Frequent social participation was associated with a lower risk of loneliness and moderated the association between household wealth and loneliness, particularly among men. Compared to the wealthiest men who often took part in formal social activities, the least wealthy men who did not participate had a greater risk of loneliness. They stated that social participation may protect against loneliness associated with low wealth. There is a difference between loneliness and social isolation; some people feel lonely despite having friends and family, others have a poor social life but do not suffer from loneliness. Seniors' lack of social capital poses a serious problem that should be addressed systematically.

To measure the quality of life in older age, a modified version of the CASP-19 index (it was constructed to measure the QoL of retirees aged 65-75)– CASP-12 composite indicator (hereinafter CASP), is employed, Hyde (2003), Higgs, Hyde, Wiggins, and Blane (2003). It attempts to describe and quantify certain aspects of well-being more objectively and comprehensively than by sheer subjective feelings or often utilised material socio-economic measures, e.g. household income. The CASP index, which is applied in the SHARE project, quantifies the degree of meeting the needs of the elderly people in a four-dimensional model. The psychometric properties of the SHARE version of the CASP-12 and its cross-cultural robustness are given in Borrat-Besson, Ryser, and Gonçalves (2015). Te authors demand further research for old-old or unhealty people. A series of CASP questions and problem situations are assigned to assess the quality of life, assuming that it is determined by the degree of control over life, autonomy, self-realisation and pleasure, Wahrendorf, von dem Knesebeck, and Siegrist (2006). Each of these dimensions in the index includes 3 questions that allow answers on the four-level Likert scale ("often", "sometimes", "rarely", "never"). Questions are given in Table 1 in Borrat-Besson *et al.* (2015), where all questions from CASP-19 are shown with those included in CASP-12 used in SHARE. The included issues are coded in both direct and inverse sense. For each dimension, the sum of codes of responses is from 3 (all issues are frequent problems, three answers equal to 1) and 12 (all answers are never, three times value 4). The CASP index is a simple composite indicator defined as a non-weighted sum of all its dimensions, all the questions and assigned problems having the same weight, hence being of the same importance, Saisana, Saltelli, and Tarantola (2005). The construction of the indicator implies that the higher its value (ranging from 12 to 48), the higher the life quality.

In the 2013 SHARE wave, composite indices of material and social deprivation – *depmat* and *depsoc*, respectively – were applied (see Adena, Myck, and Oczkowska (2015)), Tables 1 and 2 listing the respective index questions. Alternative answers yes (if there are some problems) or no (without problems) are weighted in the indices, the weights being hedonic, based on regression analysis, Myck, Najsztub, and Oczkowska (2015), Saisana *et al.* (2005). Using the weights, both indicators are transformed into a [0,1] scale from zero (0) to the highest (1) level of deprivation. The material deprivation index includes only the information on living conditions of households, its value being equal for all members of the household. The index of social deprivation, on the other hand, encompasses questions reflecting on the situation

of households and personal life and emotions of their members. From the data generated, deprivation thresholds were determined as the third quartile of the whole sample (0.220 and 0.224 for *depmat* and *depsoc*, respectively). Adena *et al.* (2015) recommend defining severe deprivation as a condition when both indices exceed the threshold. In such a case, the respondent is in the fourth (upper) quartile of both indices. The threshold thus depends on the data used, the general value limit not being defined.

Table 1: Issues included in the material deprivation index

1	Your household does not eat meat, fish or chicken more often than three times per week because you cannot afford it.
2	Your household does not eat fruits or vegetables more often than three times per week because you cannot afford to eat it.
3	Can your household afford to regularly buy necessary groceries and household supplies?
4	Could your household afford to go for a week-long holiday away from home at least once a year?
5	Could your household afford to pay an unexpected expense without borrowing any money?
	In the last twelve months, to help you keep your living costs down, have you
6	continued wearing clothing that was worn out because you could not afford replacement?
7	continued wearing shoes that were worn out because you could not afford replacement?
8	put up with feeling cold to save heating costs?
9	gone without or not replaced glasses you needed because you could not afford new ones?
10	postponed visits to the dentist?
11	Was there a time in the past 12 months when you needed to see a doctor but could not because of the cost?

Source: Adena *et al.* (2015)

Table 2: Issues included in the social deprivation index

1	Less than one room per person in the household.
2	Poor reading or writing skills.
3	Poor computer skills or never used a computer.
4	Not feeling part of the local area.
5	Vandalism in the local area.
6	Local area not clean.
7	No helpful people in the local area.
8	Difficult access to the bank.
9	Difficult access to grocery shop.
10	Difficult access to a pharmacy.
11	Waiting too long to see a doctor.
12	Not attending any course in the past 12 months.
13	Not taking part in any organization in the past 12 months.
14	People cannot be trusted.
15	Feeling left out of things.

Source: Adena *et al.* (2015)

2.2. SHARE data and results

The database consists of 53,144 survey respondents, 29,178 of which are women (54.9 %) and 23,966 men (45.1 %), all aged above 50, with material and social deprivation index values available. Numbers of respondents in participating countries are given in the first column in Table 5. The mean age of all respondents is 66.7 years (with a standard deviation of 9.7

years), 66.6 for women (SD 10.0) and 66.9 for men (SD 9.5), the minimum and maximum ages are 50 and 102 years, respectively.

Table 3: Distribution of respondents in age groups (%)

gender	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
women	11.6	17	17.6	17.1	13.9	10.7	7.1	5.0
women, alone	4.5	9.7	12.9	15.3	16.2	15.3	14.0	12.1
men	9.5	15.8	18.9	18.4	15.1	11.0	7.2	4.1
men, alone	10.2	14.0	17.1	16.3	14.4	10.9	8.8	8.3
sample	10.6	16.6	18.2	17.7	14.4	10.8	7.1	4.6

Source: own computations

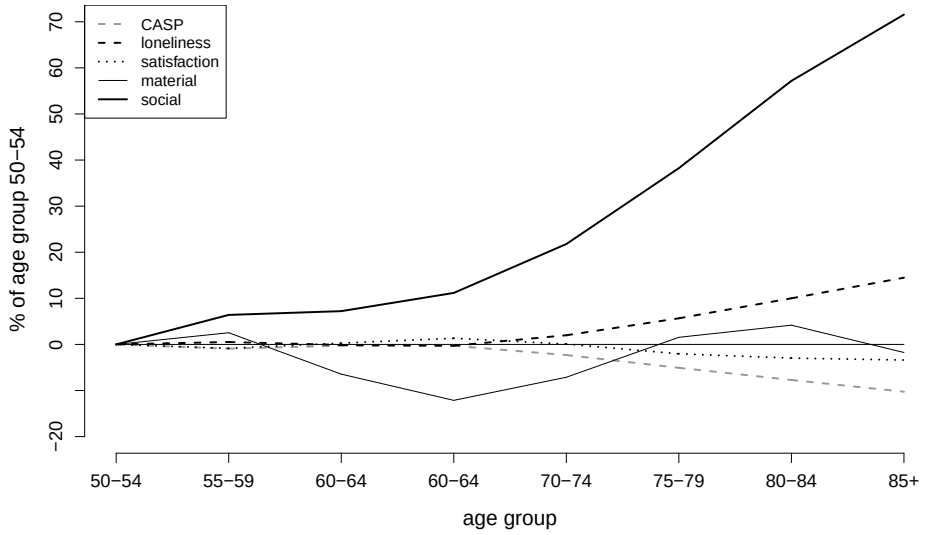
The respondents were divided into five-year age groups (from 50–54 to 80–84, the last age group including people aged 85+) because the analysed characteristics are presumed to depend on the age. The distribution of respondents in age groups is presented in Table 3, for the whole sample (last row of the table) and for men and women separately. The distributions are similar; they correspond to the almost equal mean ages. If we consider respondents living in a single household (rows labelled women, alone and men, alone), men live more frequently alone in lower ages and women at higher ages, differences equaling 6 and 4 p.p. in the groups 80-84 and 85+.

To distinguish one-person households is important, as there is a negative impact on income as there is not a possibility to share expenditures (Piekut (2020)). It is reflected mainly in the material deprivation index, but through the dependence between features and important role of the material situation in life satisfaction and quality of life it affects all analysed variables.

Figure 1 shows the percentage differences of the mean values of analysed indices for age groups with respect to the first age group 50-54 (100%). The mean loneliness score increases slowly up to the age of 64 (which coincides with the period of active working life). The slope of the growth is higher from 65 years of age. Other analysed indicators remain within the limits of ±10 per cent of the first age group's mean value, the social deprivation index rising, whereas the levels of CASP and satisfaction declining from the age of 65.

To illustrate the different position of men and women, Figure 2 expresses the percentage of the mean value of analysed indices for women in relation to that for men (100 %). The gender gap is obvious; the situation of women is worse for men for all analysed indices and all age groups. The maximum difference of 30 per cent occurs for material deprivation in the age group 75-79. The difference of medians (Mann-Whitney test, $\alpha = 0.05$) is statistically significant for all indices and age groups with the exception of material deprivation, CASP and satisfaction in the 50–54 age cohort, and satisfaction in groups of 55–59 and 60–65.

In the boxplots of Figures 3 and 4, the dependence of the distribution of deprivation indices on age is shown. Through the text, the median is used in boxplots to specify the centre of the empirical distribution, the box indicating lower and upper quartiles and whiskers are plotted from the minimum to maximum. A normal distribution cannot be assumed for the data (see also Figures 7 and 8), for this reason, the whiskers in the diagrams indicate the lowest and the highest observed values instead of possible outliers. The growth of medians with age starts in lower ages and is faster for the social deprivation index than the material index.



Source: own computations

Figure 1: Age-related change in mean values of analysed indices (as % of the mean value of each index for 50-54 age group)

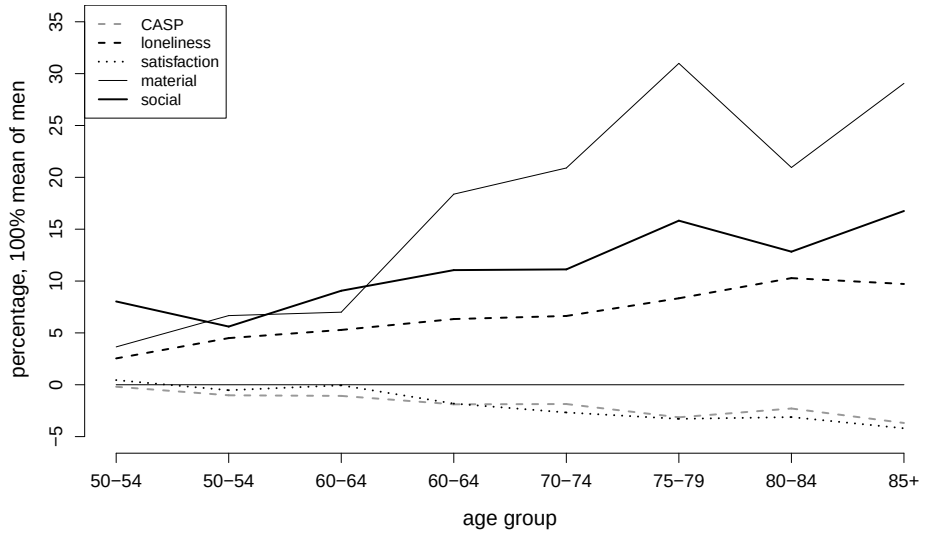


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Figure 2: Gender-related difference in mean values of analysed indices (as % of the mean value of men)

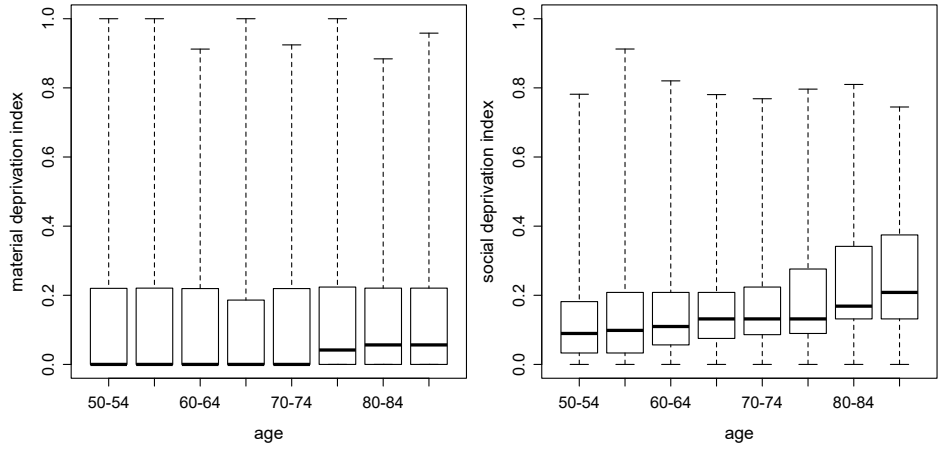

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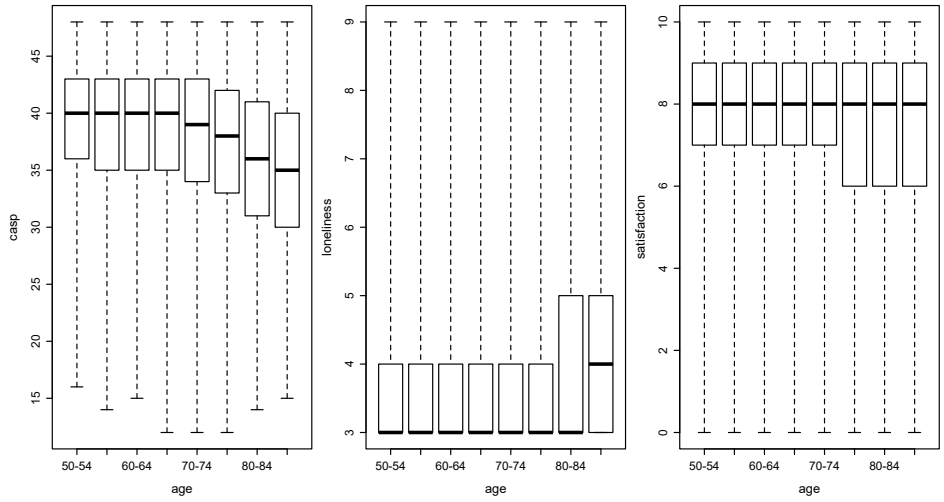
Figure 3: Age-related distribution of deprivation indices



Source: own computations

Figure 4: Dependence of CASP, *satisfaction* and *loneliness* on age groups

The Spearman coefficients in Table 4 demonstrate a positive correlation between deprivation indices and loneliness as well as between satisfaction and CASP. The coefficient between social deprivation level and loneliness is equal to 0.378; we have to take into account some common features of both indices. But the index is not so high as it is expected, as the perception of loneliness is a serious problem in social deprivation. Loneliness and CASP, along with satisfaction and loneliness, are negatively correlated. All correlations are available in Table 4, the test of independence being significant for all pairs of values ($p - value < 10^{-16}$). The empirical moderate correlations suggest that the variables explored actually capture closely related phenomena while reflecting their substantial differences as well as possible adequacy gap.

A large percentage of zeros (52.1% of respondents) is observed in the material deprivation index, referring to the problem-free situation with respect to issues included in the index, Table 1. The frequencies are highly heterogeneous through the countries – from 16% in Estonia (Slovenia 32%, Italy 36%) to 77% in Denmark (the Netherlands 75%, Sweden 74%). Therefore, the third quartile of the index is equal to 0 for all analysed countries, except for Estonia. The situation can also be seen in Figure 3, the median equalling 0 for age groups up to 70–74. For the social deprivation index, only 2.5% of zeros is obtained.

In Table 5, all participating countries (except Israel) are compared in terms of the mean values of the seven characteristics examined (social deprivation index 0.169, material deprivation index (zeroes included) 0.132, positive values of material deprivation index 0.510, frequency of respondents suffering from severe deprivation 0.110, CASP 38.176, loneliness index 3.755 and satisfaction index 7.603, respectively) for the whole sample. Plus and minus signs indicate whether the situation in the country is better (+) or worse (-) than the average. The only countries with all above-the-average means are Denmark and Austria; Sweden and Switzerland reporting only the relative frequency of non-materially-deprived respondents below the mean of 0.51. Estonia and the Czech Republic, on the other hand, are below the average in all characteristics, which also applies to Italy except for the frequency of respondents with no material deprivation. France appears to be the closest country to the average among the countries monitored, all its mean values being close to the total average.

Figure 5 plots the relationship between CASP and both deprivation indices, plotting boxplots of their values for particular values of CASP. Negative correlation is evident – the higher the quality of life, the lower the deprivation. Due to too few observations with the low CASP, values 12–16 were combined into one group of people with a poor quality of life (referred to as the middle value 14). From the CASP value of 37, the median of the material deprivation index is equal to 0. It means that at least one half of the respondents are not deprived in terms of material well-being. Social deprivation shows lower variability between respondents and a slower decline in medians than the material index. Figure 6 shows the positive and negative relationship between both indices and loneliness (right part) and satisfaction (left part), respectively.

Table 4: Spearman correlation coefficients

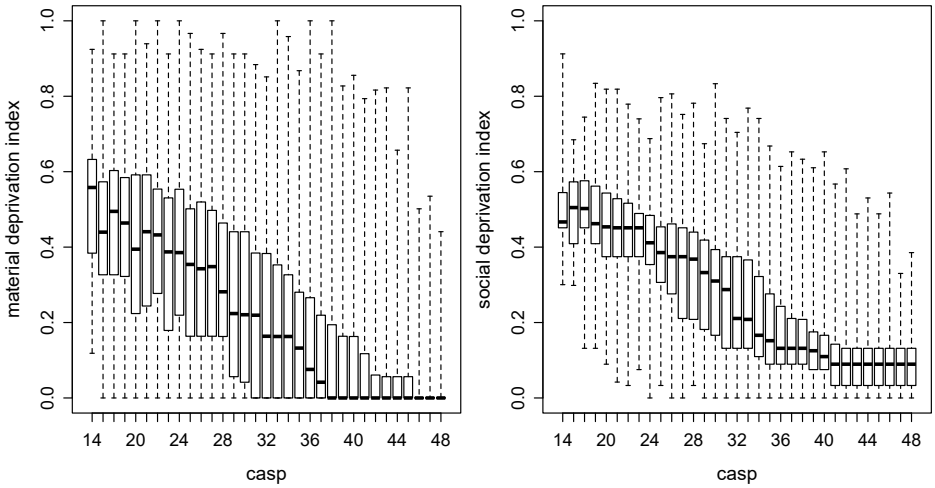
variable	*depmat*	*depsoc*	*CASP*	*loneliness*
depsoc	0.386			
CASP	-0.460	-0.550		
loneliness	0.211	0.378	-0.413	
satisfaction	-0.374	-0.353	0.549	-0.316

Source: own computations

Table 5: Situation in analysed countries, comparison to the overall mean

country	*n*	*depsoc*	*depmat*	*depmat* =0	Severe deprivation	*CASP*	*loneliness*	*satisfaction*
Austria	3,919	+	+	+	+	+	+	+
Belgium	4,829	+	+	+	+	-	-	+
Czech Republic	3,954	-	-	-	-	-	-	-
Denmark	3,510	+	+	+	+	+	+	+
Estonia	5,084	-	-	-	-	-	-	-
France	3,964	-	+	-	-	+	-	-
Germany	4,845	+	+	-	+	+	+	+
Italy	3,987	-	-	+	-	-	-	-
Luxembourg	1,416	+	+	-	+	+	-	+
Netherlands	3,329	+	+	-	+	+	+	+
Slovenia	2,540	+	-	+	+	+	+	-
Spain	5,207	-	-	+	-	-	+	-
Sweden	3,848	+	+	-	+	+	+	+
Switzerland	2,712	+	+	-	+	+	+	+

Source: own computations



Source: own computations

Figure 5: Dependence of the deprivation indices on CASP

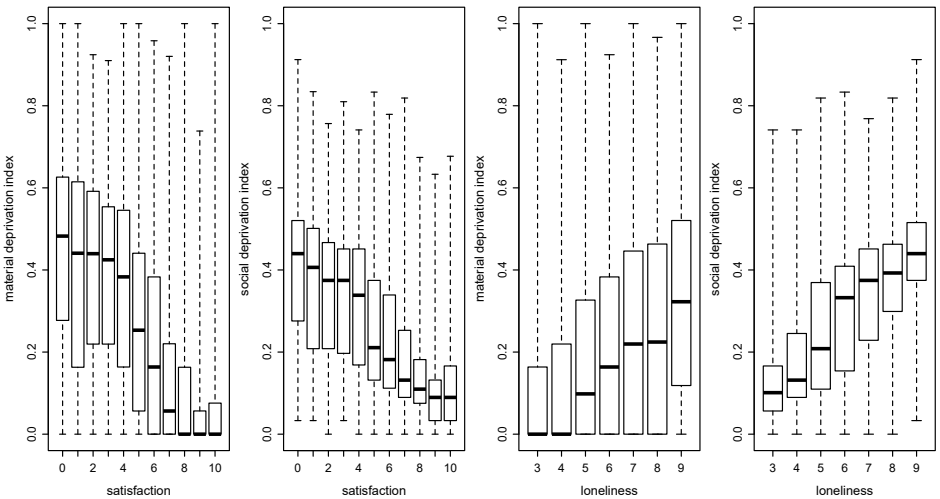


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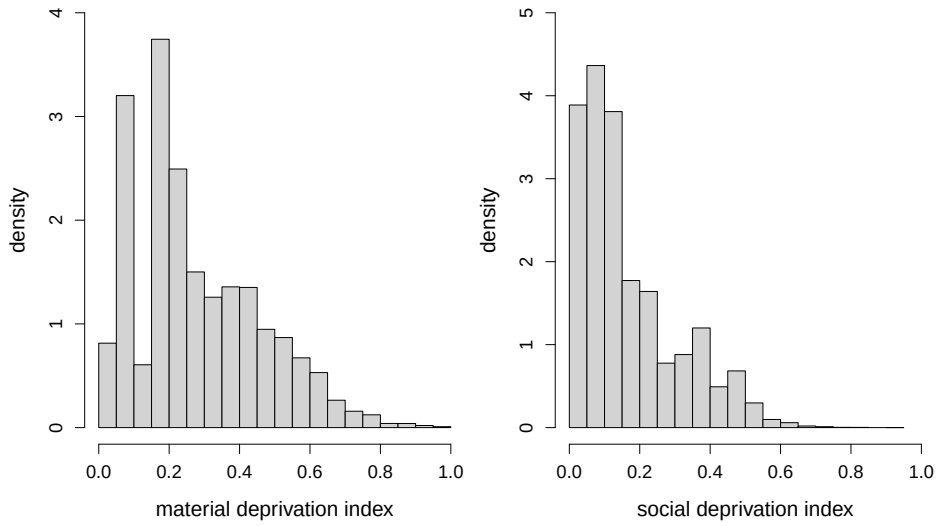
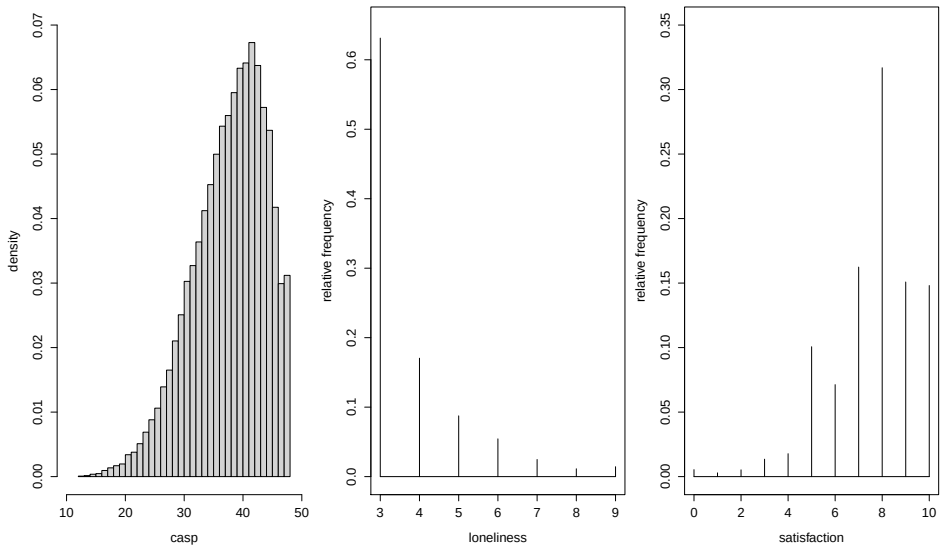
Figure 6: Dependence of the deprivation indices on *satisfaction* and *loneliness*



Source: own computations

Figure 7: Empirical distribution of positive values of the material index (left) and social deprivation index (right)



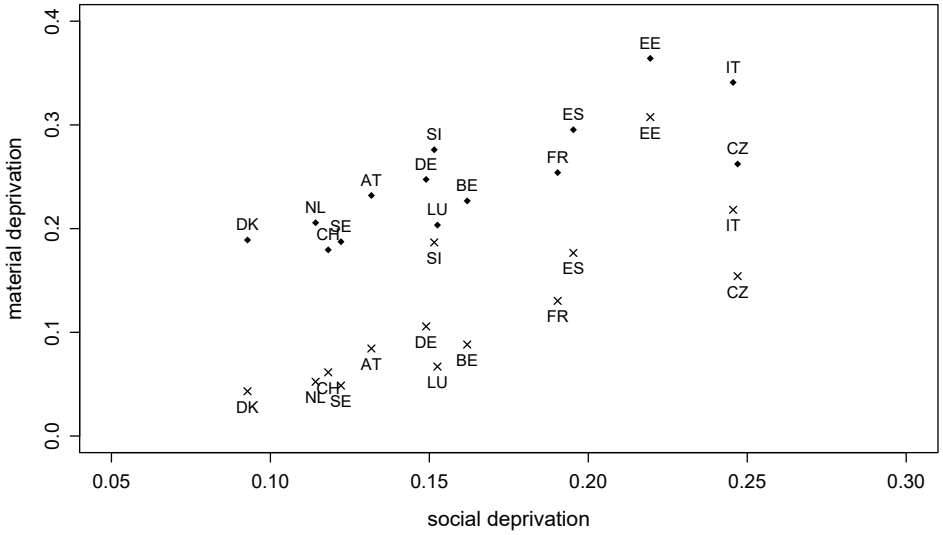
Source: own computations

Figure 8: Empirical distributions of CASP (left), loneliness (middle) and satisfaction (right)

The histograms in Figure 7 allow comparing empirical distributions of deprivation indices. The left part of the diagram shows the empirical distribution of values of material deprivation higher than 0 (47.9 % of all participants); it does not represent a set of respondents with zero value of the index (i.e. 52.1 % of the non-deprived ones). Moreover, there are some respondents with positive, albeit rather small, values of material deprivation (approx. in (0;0.175]). The social deprivation index distribution (part right, all observed values are included) is positively skewed. The figures are plotted for all countries, the distributions being highly heterogeneous and country-specific (not indicated here) with shapes different from the whole distributions given in Figure 7. Empirical distributions of other variables of interest are displayed in Figure 8. The distribution of the CASP index is negatively skewed and unimodal with the mode value 42 with a relative frequency of 0.065. For the loneliness variable, value 3 predominates (63 %). The empirical distribution of the satisfaction index is also unimodal,

the relative frequency of the mode 8 equalling 0.32.

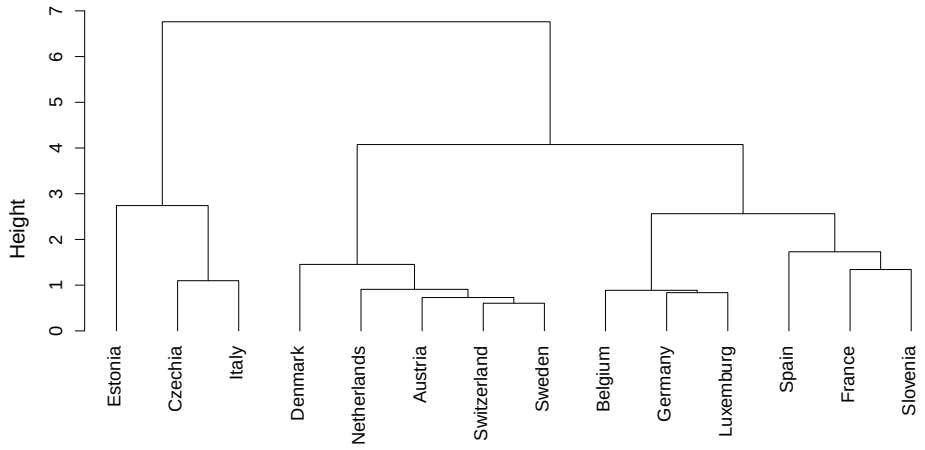
Figure 9 compares the means of social deprivation with the means of material deprivation (crosses) and averages (filled diamond) of only positive values of material deprivation by countries. The values on the horizontal axis are the same; the mean of positive values being higher than that of all values of the deprivation index (difference on the vertical axis). If both observations are highly distant, it refers to a large number of respondents with zero values of the material index. It occurs especially for countries with a high material standard of inhabitants as Denmark, Netherlands or Austria. The countries in the upper right corner show a worse situation in deprivation comparing to countries in the left bottom corner with low mean values of both indices. Positive relationship can be illustrated by the regression lines (0.559 (0.005), $R^2 = 16\%$; 0.422 (0.007), $R^2 = 17\%$) with slopes – due to the number of respondents – significantly different ($\alpha = 0.05$).



Source: own computations

Figure 9: Means of deprivation indices. Cross all values, diamond positive values

From Table 5, subgroups with similar situation seem to exist in the monitored countries. The cluster analysis provides methods for identification of homogeneous subsets of variables or items. In the text, we use means of five analysed variables and construct a dendrogram for hierarchical clustering of 14 monitored countries. We scaled the means and chose Euclidean distance to quantify the distance between pairs of countries. To find a distance between two clusters, we evaluated maximum distance between pairs of their members. The results are highly dependent on these choices, but the basic structure is common for all possible models. We obtain a dendrogram shown in Figure 9. Two main sub-groups were identified, the first (left part) comprising three close countries (IT, CZ, EE), the second (right part) consisting of the rest of 11 participating countries. The second cluster consists of countries with a high quality of life and low deprivation and loneliness can be divided into two sub-groups: the best performance countries including Scandinavian countries (Denmark, Sweden) and Central Europe countries (the Netherlands, Austria, Switzerland) and other countries in two sub-clusters: Belgium, Germany and Luxemburg relatively close to the previous cluster and countries with a slightly worse situation including France, Spain and Slovenia. In some models, the last sub-cluster is mixed with the first one indicating the relative closeness of included countries.



Source: own computations

Figure 10: Dendrogram based on all analysed variables

3. Conclusion

The purpose of composite indicators is to quantify complex phenomena that are not measurable and to be able to compare their development in time and/or between individuals, regions or countries. If we want to construct a composite indicator, the choice of included issues and their weights is crucial to obtain a valuable quantification as a proxy to real situation or perception without any remarkable adequacy gap.

The 2013 wave of SHARE project includes a questionnaire module dealing with deprivation additional to regularly surveyed variables. Two newly proposed indices of deprivation are evaluated together with more indices, indicators and subjective questions dealing with the quality of life or feelings like satisfaction with life or loneliness. From the theoretical background of described problems, it is possible to predict at least a direction or relationship, but having values of all variables for a large number of respondents enables us to study the relationship more deeply.

The emphasis of both deprivation indicators constructed for the $5th$ wave of SHARE survey concentrates on problems with the availability of health services and meeting everyday needs; the indices are prepared to reflect especially deprivation of older adults and their particular issues. Moreover, the authors try to distinguish between deprivation related to material problems and social and relationship problems.

The availability of values of frequently applied indicators (loneliness, CASP), new indicators (material and deprivation indices) and a subjective feeling of life satisfaction for a representative sample from the population of inhabitants over 50 allow us to analyse the situation in complexity. The relationship between all variables is moderately strong with the expected (from theoretical reasoning) direction. The analysis of the quality of new indicators was provided by the authors of indices (Adena *et al.* (2015)). We can derive from our study, that clustering into homogeneous subgroups based on the deprivation indices is similar to the clustering based on all analysed variables.

The set of countries involved in the SHARE survey (EU countries, Switzerland and Israel) was different in the seven waves of the project; at present, all EU countries take part in the survey. Unfortunately, only three of the newly acceded EU member states, namely Estonia, the Czech Republic and Slovenia, took part in the analysed (fifth) wave of the survey. The

present analysis is allowing for a comparison of the EU countries with Switzerland, but hardly a comparison of old and new EU member countries. The Czech Republic and Estonia are more distant from other countries than Slovenia, which seems to have a more similar situation. Italy is closer to Estonia and the Czech Republic according to our analysis, Estonia showing the worst results also from the point of view of empirical distributions (not given in this text), not only characteristics given in this text. Nevertheless, the three former members of the socialist bloc still do not bear comparison with the Scandinavian countries, the Netherlands, Austria and Switzerland in particular, which receive higher well-being rankings (in introductory section as well as in our analysis). But the world rankings of EU countries in different international lists (Human Development Index or GDP per capita) is very high making the comparison to be very strict for the new EU countries.

To show the relationship of analysed indices and age of respondents, the included survey participants aged from 50 to 102 years were divided into eight five-year age groups. In the sample, the distribution of participating men and women are similar; the difference occurs in frequencies of respondents living in a single household with more women living alone in higher ages comparing to man. This observation might be a factor for the material problems of older women living alone. Sharing of expenditures is crucial for older people to be able to meet their needs based on maybe limited income after retiring. The highest difference between men and women was found in higher age groups for the material deprivation index.

The situation described by all analysed indices gets worse with increasing age, but this relationship is more complicated than a monotone change of equal speed. The variability of results in the last age group (above 85) is affected by the small number of respondents with very variable values of indicators. The condition of respondents described by all indices deteriorates with age, in percentage terms, there is the most considerable difference in the social deprivation index. Other variables, according to the size of the differences in percentage points, are CASP and loneliness. This result reflects the welfare state qualities in the countries of the EU, providing basic economic security and equitable distribution of wealth for all their citizens regardless of age. The respondents feel problems with loneliness and social deprivation to be more serious. For this reason, the social relationship should be in the centre of attention of families, and municipalities and other authorities.

The present study confirms that social and material deprivation – the former form more adversely than the latter – affects the population of older inhabitants of EU countries, increasing pressure on governments to implement effective measures to maintain welfare standards of the ageing society.

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