# A COMPARISON OF LIVING STANDARDS INDICATORS

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## ABSTRACT

The paper is a comparison of living standards indicators as a measure of the prevailing situation for the citizens of selected EU countries. The indicators used for comparison were representative of economic, social and environmental influence factors. The indicators were compared by means of meta-analysis, comprising a selection of all 11 chosen indexes (with a set of calculated indicators) and living-standards focused studies. The selected methodology for the meta-analysis is a weighted multiple linear regression. The results of the meta-analysis point to those studies whose indexes show a positive effect and indexes which show a negative effect as regards living standards.

## KEY WORDS

living standards, indicator, comparison, meta-analysis, cluster analysis

## JEL CODES

I31, I32

## 1 INTRODUCTION

Living standards (standard of living) is the term used to sum up the conditions a person or a nation lives under, and also helps to shape. Over time, this concept has seen a range of definitions, largely determined by the particular discipline within which each definition arose. Moreover, there is no unequivocal consistency in the approach to living standards within each of the given disciplines. The major scientific disciplines that concern themselves with the subject matter of living standards are first and foremost economics, sociology and psychology. Living standards are often associated, and sometimes confused with, quality of life and well-being. Together with the definition of the concept, the need arises for quantifiable indicators (metrics). From an economic point of view, living standards are assessed from a material standpoint, mostly at governmental level. The guiding factors are therefore the

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levels of income, consumption, or unemployment. The most commonly used and also most sharply criticized living standards indicator is Gross Domestic Product calculated per capita. Many economists take GDP per capita growth as the ultimate goal, but Krugman and Wells (2012) argue that it is not sufficient when judging human well-being and is by itself insufficiently useful as a policy-making decision tool. GDP per capita is not a direct reflection of the standard of living, but one of its many determining factors. While recognizing all the shortcomings of GDP as an indicator of living standards and the growing criticism of it in the course of trying to resolve the dubious aspects of GDP as a gauge of living standards, other indicators have been developing gradually over time, based on the initiatives of the UN, the OECD, the World Bank, the European Union, as well as other entities.

Večerník (2012) explains the concept of using a term of a multi-dimensional welfare, which is the quantification factor of living standard. An important stimulus to his pursuit was the Sarkozy report, which was prepared by the Commission of economists led by Stiglitz, Sen and Fitoussi. According to them, is the well-being affected by external factors, which are the material standards of living (income, consumption and wealth), health, education, personal activity, including work, social contacts and relations, the political environment, natural environment, personal and economic uncertainty (Stiglitz et al., 2007).

A given indicator exists to give an easily understandable entry point toward understanding what is going on in society, to help find our way around the given situation and subject area and to provide a body of objective information to stakeholders – particularly politicians, so that the appropriate measures can be adopted, to improve their decision-making and to avoid or mitigate the impact of crisis situations. The plethora of newly-emergent indicators, and their indexes, make the situation less clear, and these metrics, instead of contributing to simplifying the monitoring of living standards, act rather the contrary. This is why it is worthwhile to make a considered comparison of the respective indicators, to seek out a consensus as to their explanatory power, to look for suitable methods of monitoring their explanatory capabilities and thus to contribute to simplifying how people's living standards can be monitored, while recognizing the complexity of a population's standard of living and the multiplicity of factors that impinge upon it. This is the concept and objective of the present paper.

## 2 METHODOLOGY

The standard of living and more particularly how it may be quantified is a topic that many authors have focused on and published studies about. This fact opens up the option of addressing the same issue by applying the technique of combining and joining together the findings of primary studies, and so contributing to making research studies more effective. The method in question is meta-analysis with all the positives and negatives that it brings to the subject under study. The qualitative criterion for applying meta-analysis is that there are a number of indexes from economic, social and environmental domains (Tab. 1).

The comparison of the selected indexes[1] will be carried out using meta-analysis, which refers to a statistical method for the combination of findings from various studies. In the first step of the meta-analysis all the indexes have to be sought out, together with studies designed to measure living standards, selecting those that are suitable for further processing. Regression models are to be created for the respective indexes, related to the last available year, and to all the countries of the world they encompass. For each index a set of indicators is then calculated (for more details see Tab. 2), forming the basis for extracting the necessary data,

[1]GDP, GSI, GCI, HDI, QLI, BLI, LPI, SSI, CPI, EPI and HPI

Tab. 1: Living standards indexes

| Index group | Index name | Abbreviation used |
|---|---|---|
| Economic | Gross Domestic Product per capita | GDP/HDP |
| | Genuine Saving Index | GSI |
| | Global Competitiveness Index | GCI |
| Social | Human Development Index | HDI |
| | Quality of Life Index | QLI |
| | Better Life Index | BLI |
| | Legatum Prosperity Index | LPI |
| | Sustainable Society Index | SSI |
| | Corruption Perceptions Index | CPI |
| Environmental | Environmental Performance Index | EPI |
| | Happy Planet Index | HPI |

Tab. 2: Input data for meta-analysis

| Name | Description | Type of variable |
|---|---|---|
| Study | name of study (index) | string |
| Variables | names of variables | string |
| Nlb | size of the observed group, calibrated | integer |
| NCb | size of the control group before calibration | integer |
| NCa | size of the control group, calibrated | integer |
| mean(la) | mean effect, observed group, calibrated | real |
| mean(Cb) | mean effect, the control group, calibrated | real |
| SD(la) | standard deviation of the effect, observed group, calibrated | real |
| SD(Ca) | standard deviation of the effect, control group, calibrated | real |
| MD | mean difference MD = mean(la) − mean(Ca) | real |
| ICI95(MD) | lower bound of the 95% confidence interval for the mean difference | real |
| uCI95(MD) | upper bound of the 95% confidence interval for the mean difference | real |
| ICI95(la) | lower bound of the 95% confidence interval for the mean of the observed group, calibrated | real |
| uICI95(la) | upper bound of the 95% confidence interval for the mean of the observed group, calibrated | real |
| ICI95(Ca) | lower bound of the 95% confidence interval for the mean of the control group, calibrated | real |
| uICI95(Ca) | upper bound of the 95% confidence interval for the mean of the control group, calibrated | real |
| $p$-value | $p$-value for the two-sided test | real |
| $t$-value | $t$-value for the two-sided $t$-test | real |
| df | degrees of freedom for the two-sided $t$-test | real |

encoding, and monitoring the quality of the encoding.

The approach chosen for the implementation of the meta-analysis is weighted multiple linear regression, to detect the influence of moderating variables on the size of the effect, so the research model can be represented by

$$\text{effect} = f(X_1 + X_2 + \ldots + X_m), \qquad (1)$$

where $X_i$ are the moderating variables, and $f$ is the most common selector function for the linear combination influence of moderating factors.

The meta-analysis performed is based on the model of fixed effects (FES), which allows us to estimate the effect of the variability of individual studies on the overall effect. The model-derived estimate will be given a weighting according to the size of the given study.

Firstly, we shall need to assess the homogeneity of the selected studies. We consider studies homogeneous if the size of the effects of the respective studies equates to the actual overall effect estimated by the meta-analysis. In order to verify the homogeneity, we use the Cochran $Q$ test, which posits the null hypothesis of study homogeneity

$$H_0 : T_1 = T_2 = \ldots = T_k = \overline{T}, \tag{2}$$

where $T_k$ is the size of the effect $k$ of the given study, $\overline{T}$ is the mean effect, i.e. the effect of all the studies, and $k$ is the number of studies included in the analysis. The alternative hypothesis is that at least one $T_k$ effect differs from the others. The Cochran coefficient is calculated as the sum of squares of the deviations of the effects from the overall effect estimate and takes the following form:

$$Q = \sum_{i=1}^{k} w_i \, (T_i - \overline{T})^2, \tag{3}$$

where $w_i$ is the weighting of the $i$-th study.

It then holds that when the resulting value of the test statistic $Q$ is greater than the critical value of the probability distribution at the $\alpha$ significance level for $(k-1)$ degrees of freedom, we reject the null hypothesis of study homogeneity.

The degree of heterogeneity is given by the $I^2$ index, which represents the portion of total variability explained by inter-study variability. It is calculated using the following formula:

$$I^2 = \begin{cases} \frac{Q-(k-1)}{Q} \cdot 100, & Q > (k-1) \\ 0, & Q < (k-1) \end{cases} \tag{4}$$

It holds that if $I^2 = 0$, the total variability of the effect is caused by a sampling error. If $I^2 = 25\%$, this means low heterogeneity, $I^2 = 50\%$ means moderate and $I^2 = 75\%$ indicates a high heterogeneity between studies.

As part of the analysis we will calculate the standard deviation (SD) and the standard error ($\mathrm{SE}_{\mathrm{effect}}$) for each element of the input studies:

$$\mathrm{SD} = \sqrt{\frac{\mathrm{SD(la)}^2 \cdot (\mathrm{Nla}-1) + \mathrm{SD(Ca)}^2 \cdot (\mathrm{NCa}-1)}{\mathrm{Nla} + \mathrm{Nca} - 2}}, \tag{5}$$

$$\mathrm{SE}_{\mathrm{effect}} = \sqrt{\frac{1}{\mathrm{Nla}} + \frac{1}{\mathrm{NCa}}}. \tag{6}$$

In the next step we calculate the effects of the study elements (*effect*) based on the ratio of the mean differences and the control group after calibration, and the standard deviation of the model:

$$\mathrm{effect} = \frac{\mathrm{MD}}{\mathrm{SD}} \tag{7}$$

In the final step, the confidence interval is calculated for each element:

$$\mathrm{CI95(effect)} = \mathrm{effect} \pm 1.96 \, \mathrm{SE}_{\mathrm{effect}}. \tag{8}$$

And subsequently we calculate the dispersion error bar values:

$$\text{value error bars} = \mathrm{SE}_{\mathrm{effect}} \cdot 1.96. \tag{9}$$

The effect of the size of each study is then the median of the sizes of the effects of the relevant results and the dispersion is the median of their deviations.

The results of the meta-analyses will be presented graphically, using a forest plot depicting the values of the effects and confidence intervals for the individual studies (Hendl, 2006; Kontopantelis, 2011; Nelson and Kennedy, 2009).

To compare how EU countries are categorized into groups on the basis of comparative indexes of living standards we apply multivariate statistical method – PCA-cluster analysis, the aim of which is to group the individual EU countries into clusters based on a cluster hierarchy. Clusters are formed on the basis of similarities and differences. The measure of similarity is based on the Euclidean distance of objects metric. The object clustering method of choice is the method of complete linkage. The result of the cluster analysis is a dendrogram (tree diagram) for each of the observed indexes that brings out which of the countries are similar to and correlated with one another (Meloun and Militký, 2012).

Tab. 3: Meta-analysis input indexes used

| Group of indicators | Indicator | Variable | NCa |
|---|---|---|---|
| Economic | GDP | final consumption expenditure, gross capital formation, net export | 38 |
| | GSI | gross savings, fixed capital consumption, national net incomes, education expenses, energy consumption, the consumption of minerals, consumption of forests, emissions harm, carbon dioxide emissions harm | 106 |
| | GCI | institutions, macroeconomic environment, health and primary education, goods market efficiency, labour market efficiency, financial market development, technological readiness, market size, business sophistication, innovation | 148 |
| Social | HDI | life expectancy at birth, average length of schooling, expected length of schooling, gross national income | 187 |
| | QLI | purchasing power, security, health care, consumer prices, real estate prices against income, commuting time, pollution | 67 |
| | BLI | housing, income, work, community, education, public engagement, health, satisfaction, security, work-life balance | 36 |
| | LPI | economy, social capital, personal liberty, security, health, education, Government, business and opportunities | 142 |
| | SSI | eating, drinking, sanitation, education, healthy living, gender equality, income distribution, population growth, the Government, biodiversity, renewable water sources, consumption, energy usage, energy saving, greenhouse gases, renewable energy, organic agriculture, net saving, GDP, employment, public debt | 151 |
| | CPI | AFDB, BF (SGI), BF (BTI), IMD, ICRG, WB, WEF, WJP, EIU, GI, PERC, TI, FH | 170 |
| Environmental | EPI | health impacts, air quality, water and sanitation, water resources, agriculture, forestry, fishing, biodiversity and the natural environment, climate and energy | 178 |
| | HPI | life expectancy, well-being, ecological footprint | 151 |

# 3 FINDINGS

We are interested in living standards from the economic, social and environmental points of view. Through the meta-analysis of selected indexes that measure living standards we shall be able to judge their effectiveness. To this end, we first sought out studies that set living standards metrics by means of specific indexes, which ultimately indicate the standard of living, well-being or quality of life of the various countries' populations. The analysis did not include data for all available years where this might be misleading. For example, the results of the Better Life Index were published for the first time in 2012, but this does not mean that this index rates lower than, say, the HDI, which was established in 1990. For this reason, the availability of data relating to the most recent possible year of published results, which had been set for 2013, was a prerequisite for included index selection. The results for all the countries the respective studies cover were taken into account. An overview of the indexes included in the meta-analysis is shown in Tab. 3.

First, we need to assess the homogeneity of the reference studies, as a measure of the differences between them. The Cochran $Q$ test result indicates the heterogeneity of the studies (scales), whereby homogeneity was rejected at the 5% significance level. This finding is confirmed by the value of the $I^2$ index, according to which the heterogeneity of the scales is very high ($I^2 = 99.78\%$), that is, 99.78% of the total variability of the model is due to the

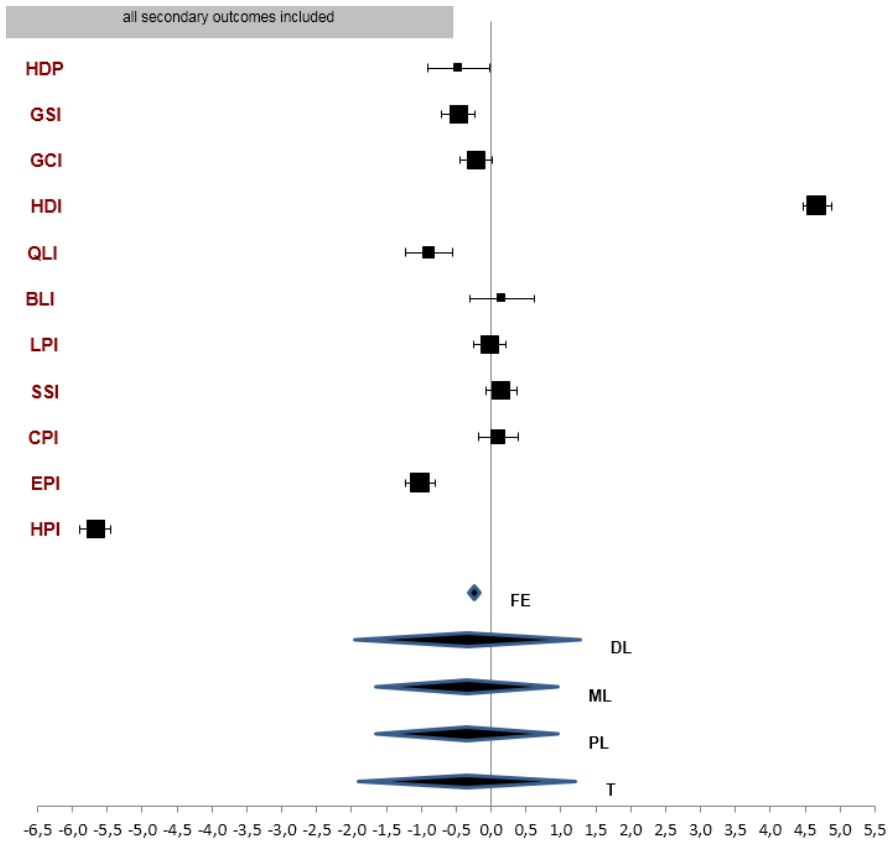


Fig. 1: Forest plot of the study effects

heterogeneity between the studies. This means the studies are not interchangeable.

Tab. 4: Measuring heterogeneity

| | Value | df | $p$-value |
|---|---|---|---|
| Cochrane $Q$ | 4,582.60 | 10 | 0.0000 |
| $\tau^2$ estimate (DL) | 7.7110 | | |
| $\tau^2$ estimate (ML) | 5.0145 | | |
| $\tau^2$ estimate (PL) | 5.0145 | | |
| $I^2$ | 99.78% | | |
| $H^2_M$ | 457.2597 | | |

A systematic review of the results of the meta-analysis is shown in the graph in Fig. 1, in the forest plot where the horizontal axis represents the size of the effect, the size of the squares of the individual studies shows the weighting of the study and the length of the segment shows the confidence interval.

The studies that show a marked positive effect on the overall model of living standards (shown in Fig. 1 to the right of the vertical axis) are HDI, BLI, SSI and CPI. This means that these indexes contain elements that have a positive impact on living standards. The HDI index has an effect of size 4.6753, which is significantly more than that of the BLI (0.1573), the SSI (0.1493) and the CPI (0.1025). Within the elements covered by the HDI the most significant impact on living standards is that of life expectancy at birth, and conversely the least being gross national income.

The BLI covers elements some of which raise and others depress the standard of living. Those with a negative effect include, first and foremost, income, then public engagement and housing. A neutral effect is found when it comes to life satisfaction. The element with the largest positive impact is safety & security.

In the SSI study some items have a positive, some a negative impact. The positive effect is that of having renewable water sources, gender equality, health, education, good sanitation, satisfactory food and drink, net savings or the size of the public debt. By contrast, GDP, employment, consumption, energy, the Government, population growth and distribution of income have been shown as having a negative effect. The use of energy, greenhouse gases and biodiversity do have a positive effect, but close to zero. With these results, it is clear that among the positives are social and ecological, or nutritional factors. Of the economic items, applicable are only the real savings indicating the country's sustainable development, and the public debt, which is closely linked to servicing the national debt, which forms a significant part of the State budget. Public debt thus has an impact on the living standards of the population, because its level leaves no room for other significant elements that can directly improve the quality of life of the people, or to mitigate the impact of negative factors. Countries are compared internationally by public debt, leading to certain stereotypical prejudices that influence how the inhabitants themselves are judged. The remarkable thing is that GDP has been found to have a negative effect (as is the case with GDP indicator observed separately). Other economic indicators also have a negative effect within the SSI. Higher consumption does not in itself mean a better standard of living. Other elements appear to be more fundamental.

The Corruption Perception Index (CPI), and its constituent elements, has a mostly positive effect on living standards. This then means that the better the circumstances in terms of corruption, the more scope for the inhabitants' well-being.

According to the results of the meta-analysis, all of the GDP elements calculated by the expenditure model method have a negative effect on overall GDP. The largest negative effect within this indicator comes from net export, followed by gross capital formation and, lastly by the final consumption expenditure. Consumption tends to be used in economics as a synonym for a certain standard of living. It turns out that in the overall assessment based on all the factors involved in the 11 reference indicators, consumption has a negative effect, meaning it does not increase well-being.

The LPI prosperity index has a slightly negative, generally neutral effect. The positive factors within this indicator are the economy, business opportunities and personal freedom.

The smallest effect, $-5.6720$ in size, was found in the Happy Planet Index (HPI). Of its three indicators only one had a positive impact; life expectancy. The ecological footprint affects the standard of living in the negative, thus reducing how well the population fares. Well-being also lowers the standard of living.

The GSI (Genuine Savings Index) contains indicators that reduce the standard of living. At issue are primarily those associated with environmental problems, such as damage caused by carbon dioxide, harmful emissions, wasteful utilization of forests, minerals and energy, but also expenditure on education. A positive impact is seen from net national saving (gross savings, consumption of fixed capital).

Although the Global Competitiveness Index, judging by the results of the meta-analysis, appears to have a negative effect on overall standard of living, its component indicators such as the efficiency of the labour market and the goods market, the macroeconomic environment and most notably health and basic education have a positive effect on the standard of living. Most of these items are indeed closely linked direct to people's lives.

The Quality of Life Index (QLI) has a negative effect in the overall living standards model, mostly due to the house prices to income ratio indicator. The higher the ratio, the more property prices are beyond the reach of the populace, causing them to fall into debt if they want to own property. Time spent commuting to work and pollution levels also have a negative effect on the population's well-being. Interestingly enough, health care and safety within the QLI show a negative effect, while the opposite is true in the BLI.

There is a relationship between the weighting and the accuracy of the study. We can see

from the forest plot that studies with a greater weighting show a tighter confidence interval. The studies' estimated effect sizes are shown in Tab. 5.

Tab. 5: Index effect sizes

| Study | Effect | Lower 95% CI | Upper 95% CI | Error bars |
|---|---|---|---|---|
| GDP | −0.4603 | −0.9070 | −0.0135 | 0.4468 |
| GSI | −0.4700 | −0.7120 | −0.2279 | 0.2420 |
| GCI | −0.2091 | −0.4370 | 0.0187 | 0.2278 |
| HDI | 4.6753 | 4.4726 | 4.8780 | 0.2027 |
| QLI | −0.8965 | −1.2351 | −0.5579 | 0.3386 |
| BLI | 0.1573 | −0.3047 | 0.6193 | 0.4620 |
| LPI | −0.0202 | −0.2528 | 0.2124 | 0.2326 |
| SSI | 0.1493 | −0.0763 | 0.3748 | 0.2256 |
| CPI | 0.1025 | −0.1771 | 0.3822 | 0.2796 |
| EPI | −1.0161 | −1.2238 | −0.8083 | 0.2078 |
| HPI | −5.6720 | −5.8976 | −5.4465 | 0.2256 |

The HDI has the greatest weighting, because its published scores for the reference year encompass 187 countries. Conversely, the index with the smallest weighting index is the BLI, because its published scores encompass only 36 countries. These are OECD Member States, while additionally tracking Russia and Brazil. Despite the fact that the most commonly used indicator of standard of living is still GDP per capita, its weighting in the analysis conducted is the second lowest. This is due to the fact that in order to compile the input data we had to work with the indexes separated out. GDP per capita details for the individual components of the expenditure method of calculation were available for only 38 countries.

The study weightings shown in the chart correspond to the fixed effects model (labelled FE on Fig. 1), which underlies the meta-analysis calculation. From it we were able to estimate the impact of the studies on the overall standard of living model effects (Tab. 6).

The results of the meta-analysis revealed that many factors expressed as economic indicators have a negative effect on living standards. This even applies to the GDP itself, considered overall. Some of the values differ between indexes, when comparing similar indicators, due to the differing calculation methodologies. One clearly positive influencer is life expectancy, as well as other components of the HDI, followed by satisfactory eating and drinking or gender equality, but also low corruption State-wide.

Tab. 6: Model effects

| | Mean eff | Var eff | l95%CI | u95%CI |
|---|---|---|---|---|
| FE model | −0.2244 | 0.0015 | −0.3005 | −0.1484 |
| DL model | −0.3327 | 0.7031 | −1.9761 | 1.3107 |
| Q model | −0.3327 | 0.7031 | −1.9761 | 1.3107 |
| ML model | −0.3327 | 0.4579 | −1.6590 | 0.9936 |
| PL model | −0.3327 | 0.4579 | −1.7829 | 1.1175 |
| T-test | −0.3327 | 0.5017 | −1.9109 | 1.2454 |
| PE method | −0.3327 | NA | −2.6644 | 0.6595 |

The results could well have been different if, e.g. the Better Life Index were scored for more States. This is an OECD initiative, and is thus scored for only 34 Member States and 2 other States. Due to the fact that the input data to the meta-analysis are regression models (based on the results of only one year), if the BLI were calculated for the whole world the effect of this study as well as the indicators could differ. The differences could be associated with differences between objective and subjective indicators and the various methodologies used in the calculation.

The analysis results show that the majority of the indicators included in the indexes observed have a negative effect on standard of living, meaning they lower the well-being of the people. The Government should strive to reduce their influence, or to obviate them. Particularly so in the case of the ecological harm factors, such as air pollution.

Further research would benefit from including a greater number of studies, which could not be included in this meta-analysis due to limited access to detail-level results. The living standards domain would warrant conducting several separate meta-analyses in light of the fact that this subject area is very broad and under the influence of a large number of determining factors.

Looking at Tab. 8, which shows the results of the cluster analyses by social indexes, we see that the reference countries monitored stand apart in the case of BLI. The CPI

Tab. 7: Clustering of countries by economic indexes

| GDP | GSI | GCI |
|---|---|---|
| RO, PL, MT, SK, LU, EE, LT, BG | HL, UK | SI, ES, PT, IT, HL |
| UK, IT, SI, HR, ES, CY, HL, HU, LV, PT, IE | SK, LU, SI, CZ | LV, EE, MT, CY |
| FI, SE, AT, FR, DE, NL, CZ, DE, BE | HR, FR, ES, PT, IT, FI, BE | PL, LT, CZ |
| | RO | RO, HU, HR, SK, BG |
| | PL | LU, SE, FI |
| | IE, SE, NL, EE | UK, IE |
| | BG, DK, HU, DE, AT | FR, NL, DE, BE, DK, AT |

Tab. 8: Clustering of countries by social indexes

| HDI | QLI | BLI | LPI | SSI | CPI |
|---|---|---|---|---|---|
| PL, SK, HU, LV, LT, EE | SI, LT, EE | EE | ES, SI, PT | LU, SI, SK, PL, SE, DK, EE, FI, CZ | SI, EE, PL, HU, CZ |
| BG, RO, HR | ES, SK, PT, CZ | PT, IT, EL | LT, EE, SK, PL, IT, CZ, HU, CY | LV, LT, HR, RO, BG | SK, LT, LV, HR, RO, BG |
| MT, CY | EL, RO, PL, HR | SI, PL, HU, SK, CZ | EL, LV, HR, RO, BG | PT, ES, IT, EL, MT, HU, IE, CY | ES, PT, IT, EL |
| PT, IT, ES, EL, FI | HU, BG | FI, SE, DK | SE, UK, NL, IE, FI, DK | UK, FR, NL, BE, DE, AT | LU, IE, MT, CY |
| IE, NL, DK, UK, DE, SI, CZ | IE, FR, BE | ES, IE | LU, MT, FR, BE, DE, AT | | SE, FI, DK, NL, BE, UK, DE, FR, AT |
| LU, SE, AT, FR, BE | UK, NL, FI | LU, DE, FR, NL, BE | | | |
| | DE, DK, SE, AT | UK, AT | | | |

sorts the countries into clusters such that they form groups for which the status observed is very similar to most of the charts used in the preceding chapters. Finland, the United Kingdom and France are in one group, and Spain and the Czech Republic are in separate groups. We can make similar interpretations in the case of the QLI and LPI.

In view of the fact that the respective EU countries use a variety of indicators for the various indexes of measuring the standard of living, it can be expected that the European Union will separate out into different groups, according to the indexes used. To this end we carried out cluster analysis across all the indexes.[2] Here too the indicators were divided up into economic, social and ecological. The cluster analysis encompasses all the EU countries for 2013, while tracking the standings of 5 reference countries.

Tab. 7 provides an overview of groups of countries by GDP, GSI and GCI. It turns out that only in the case of GCI are the reference countries in separate groups. The Czech Republic is in a group with Poland and Lithuania, Finland with Luxembourg and Sweden, France with the Netherlands, Germany, Belgium, Denmark and Austria. The United Kingdom is with Ireland, and Spain with Slovenia, Portugal, Italy and Greece. These groupings closely reflect the divisibility of the EU by zones of cultural affinity. It could be said that the influence of culture is reflected in the 12 pillars of competitiveness that the GCI monitors. As for the GDP per capita, the reference countries are in two groups and in the case of GSI in three groups. It turns out that the groups are not coherent by economic indexes, because in terms of GDP the United Kingdom and Spain are most alike, and Finland belongs

[2] All the available data for 2013 were used.

Tab. 9: Clustering of countries by environmental indexes

| EPI | HPI |
|---|---|
| HU, IE, RO, HR, CY, BG | PT, CZ, EL, SI, MT, CY, SK, PL, HR |
| MT, LV, LT, EE | LT, EE, RO, LV, HU, BG |
| ES, PT, SE, FI, HL, DK | LU, DK |
| IT, PL | ES, IT, UK, DE, FR |
| FR, UK, DE, NL, BE | BE, NL, IE, FI, SE, AT |
| SI, CZ, SK, AT, BE | |

in a group with France and the Czech Republic. In terms of GSI the United Kingdom stands alone, while the Czech Republic and France, Spain and Finland are in the same group.

The last grouping is made using the environmental indexes. The results, which are illustrated in Tab. 9 show that the country groupings are similar. When we take into account only the reference countries, only Spain takes a different position, by using the EPI siding with Finland, and using the HPI grouped with the United Kingdom and France. The Czech Republic is elsewhere in both cases, but each time with different Member States.

When comparing the results of the cluster analyses for each of the indexes we see that the country clusters are always different. In some instances, there are certain similarities, but none of the indexes gives a clustering of the countries like another. This finding is essentially a manifestation of the study homogeneity findings, which demonstrated the high heterogeneity of the indexes. This diversity is also why the Member States cluster into groups in diverse ways.

# 4 CONCLUSION

The results of the meta-analysis have shown that the studies with a positive size effect on the overall living standards model (shown to the right of the vertical axis in Fig. 1) are the Human Development Index (HDI), the Better Life Index (BLI), the Sustainable Society Index (SSI) and the Corruption Perception Index (CPI). This means that these indexes contain elements that have a positive impact on living standards. The HDI has an effect of size 4.675, which is significantly higher than the BLI (0.1573), the SSI (0.1493) or the CPI (0.1025). Within the elements covered by the HDI the most significant impact on living standards is that of life expectancy at birth, the least by contrast being gross national income.

We can conclude from the meta-analysis results that all the elements of the GDP calculated by the expenditure method have a negative effect on the overall living standards model. The largest negative effect within this indicator comes from net export, followed by gross capital formation and, lastly by the final consumption expenditure. Consumption tends to be used in economics as a synonym for a certain standard of living. It turns out that in the overall assessment based on all the factors involved in the 11 reference indicators, consumption has a negative effect, i.e. does not increase well-being.

The meta-analysis undertaken does not improve the quality of the input data, but is merely their empirical summary. This means that the results are greatly influenced by the input data. The main limiting factor is the number of studies included, which was influenced by the available data. A problem with this analysis is what is known as publication bias, which lies in the fact that the public tends to be shown only positive results, i.e. good performance studies, thus distorting the conclusions of this analysis. While this fact has

not been addressed in our paper, it should not diminish the credibility of the findings with respect to the other analyses undertaken, which are conformant with the meta-analysis findings in many ways.

To eliminate the fact that the individual EU countries may use different indicators for the various indexes, we carried out cluster analyses separately for the economic, social and environmental index groups and took note of the minor differences found in the countries' clustering pattern.

Further research would benefit from involving more studies, for the greater validity of the findings. The living standards domain would warrant conducting several separate meta-analyses in light of the fact that this subject area is very broad and is influenced by a large number of determining factors. The results of applying exacting scientific methods clearly indicate that the standard of living is a very broad area that encompasses elements from many disciplines, and therefore requires inter-disciplinary cooperation in its investigation.

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