LIFE SATISFACTION, INCOME, SECURITY AND ENVIRONMENT: AN INTERREGIONAL ECONOMETRIC MODEL OF 372 REGIONS FROM EUROPE, AMERICA, ASIA AND OCEANIA IN YEAR 2016

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Abstract. This study analyzes the relationship between Life Satisfaction and several indicators related with income, security and environmental quality, estimating an interregional econometric model using data for 372 regions from 32 countries of the World, with OECD regional statistics in year 2016. Among the indicators of security we include labor security (related with a low unemployment rate), health security (related with high life expectation), and life security (related with low homicides rate). We include also income per capita and an indicator of pollution. In spite of the great impact of these variables, there are also other missing explanatory variables and we have included some dummy variables to have into account special circumstances. Average Life satisfaction varies from 4.77 in the lowest group of regions to 7.69 in the highest one. Average Unemployment Rate varies from 13.72 to 5.11 and average disposal income per capita, in thousand constant USD at PPPs, varies from 8.10 in group 1 to 20.93 in group 7. Life Expectaction takes an average value in group 1 of 77.94 and values higher than 80 in 5 of the 7 groups. The highest value of pollution corresponsds to group 1 (22.08 PM2.5) and the lowest to group 7 (9.23 PM2.5). There is a great variability of the homicides rate.

Keywords: Well-being, Life Satisfaction, Environmental quality, Development, Interregional econometrfic model, Europe, America, Asia, Oceania

JEL classification: C5, I31, O57, R11, R15

1. Introduction

After a long experience estimating interregional models of European countries, as seen in Guisán and Aguayo(2022), now we have the opportunity to estimate a cross-section interregional modelo with data not only from European regions but including also regional data from America, Eurasia, Asia and Oceania, thanks to the availability of homonegenous statistics from the OECD regional database. Among the 13 indicators from OECD statistics we have selected: Life Satisfaction (R13) as the dependent variable and the indicators R3 (Unemployment rate), R4 (Income per capita), R5 (Homicides rate), R7 (Life Expectation) and R8 (Pollution of PM2.5) as explanatory variables.

We would like to have got a panel for those regions, with data from several years. That would be interesting in order to specify a mixed dynamic model with the lagged value of the dependent variable as a regressor together with the increases of the exogenous variables as regressors.

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Section 2 presents a short review of the literature on econometric models of life satisfaction and development.

Section 3 includes a summary of data of the subjective indicator of Life Satisfaction at country and regional level. In the Annex there is a table with the indicators of the subjective and objective quality of life analyzed in this study.

Section 4 presents the estimation of the econometric model and Section 5 presents the main conclusions

2. Revision of the literature

The Stiglitz, Sen and Fitoussi Report: The commission was created at the beginning of 2008 on the initiative of the French govern. They suggest complementary measures of both Objetvie Welbeing (OWL) and Subjective Welbeing (SWL) in order to provie more information on advancements in Quality of Life (QoL).

There are many econometrics studies related with the impact of several variables on the indicators of Life Satisfaction, some of them based on samples on individuals and other ones from aggregated statistics at regional or country level. Some studies are based on international comparisons.

Improvements in Education usually contribute to increase production per capita and quality of life, but there are some exceptions, particularly when the increase in production per capita does not contribute to increase employment, wages, security, and quality of government or to diminish poverty.

1) Models with samples of Individuals: Many of them are based on samples of individuals data for a country or for several countries. The individual studies have into account specific variables of individuals like Age and Sex, together with socio-economic variables and indicators of labor quality

Somarriba and Pena(2008) present an study of the impacto of many indicators on European individuals. They use the European Quality of Life Survey (EQLS) because it includes both subjective and objective indicators.

"For more than three decades psycologists, sociologists and economists have used an ample rank of statistical and econometric tecniques to analyze the answers to the question of subjective well-being, of the all of these techniques the regression analysis has been the most important tool. The present an anlysis combining subjective perceptions and the objective condicitions with the purpose of analyzing the qualiry of life of Europeans".

They use the European Quality of Life Survey because it includes subjective and objective indicators, and assume the approach of "having, loving and being" for the selection of the variables of their model, following the approach introduced by Allardt(1975) in the Scandinavian Welfare Survey. They include satisfaction with the job and other conditions of individual life (house, education, standard of living, income, helath) as well as variables related with the family, trust and social environment and other variables as availability of green and recreative zones and air pollution

A summary of their interesting conclusions are the following ones:

"1) At the present time, it seems to exist certain consensus in that a suitable definition of quality of life must include objective and subjective information.

2) In relation to the determinants of quality of life at European level, we can draw the following conclusions: Variables as the age and sex are significant in our model. It is observed a small difference in favor of the women and a positive relation between age and subjective well-being.

3) The labor situation of the individual as their level of labor satisfaction are significant in the explanation of the quality of life,

4) Also it is observed like the correlation between satisfaction in the life is greater for the subjective variables that the objective variables.

5) They find a positive impact of education.

6) The variable income, traditionally it has had a paper of great importance in the explanation of the life satisfaction, although now it plays a secondary paper in the presence of variables of subjective character plays. Habitually the rent presents higher correlations with the satisfaction with the life in those less developed countries, losing intensity this relation when the country increases its level of development. This fact is) seen with clarity in Europe where countries of the east and the Mediterranean type show higher levels of correlation.

7) The variables of the component accommodation are not significant in the explanation of the subjective well-being, just like the variable pollution, of environmental type. In the family area, as much the marital status as having children plays an important role in the explanation of the subjective well-being. Nevertheless both variables affect the wellbeing of different form. To have partner affects positively, while to have children negatively, habitual result in literature on the subjective well-being.

8) Variables like access to recreational and green zones, social satisfaction, volunteer and trust in the others, variables of social type that would be fitted in loving and the being component are significant in the explanation of the life satisfaction."

Ortega-Gil et al/2021) analyzes the effect of environmental degradation on Life Satisfaction in 33 European countries, with data from the World Values Survey (WVS), the European Values Survey (EVS), the World Bankd and Eurostat. They find a highly significant inverse relationship between Life Satisfaction variables and both environmental problems and energy taxes. They also found some degree of significance related with the negative impact of noise pollution from neighbours.

2) Models of Countries: Education, development and quality of life.

Some interesting contributions, at World level, are the following ones:

Guisan, Aguayo and Exposito(2001) analyzed the effect of Schooling on average Fertility Rate and economic development, thorugh an econometric model with a sample of 86 countries all over the World, including data of Educational Level from Barro and

Lee. The model showed that one the more outstanding positive effects of the increase of Education is the moderation of the average Fertility rate of a country. Moderation of excessively high Fertility rates allows increase of investment per capita and production per capita and advances in Educación, Health and diminution of Poverty.

Deaton(2008) analyzed the relation between Income, Health and Well-being around the World with evidence from the Gallup World Poll. The results show a significant coefficient of income per capita on life satisfaction He also included more explanatory variables, like Life Expectancy but they did not show a significant effect in case of high degree of multicollinearity with PH.

Guisan(2009 a, b) analyzed relationships between Education, Development, Quality of Government and Women Participation (in income and social life), with an international sample of 132 countries, finding positive effects of Education on the other indicators.

Guisan and Aguayo (2010). Analyzed the correlations of three indexes of Life Satisfaction with other objective indicators and present an econometric model that relates Life Satisfaction with economic development, gender equality and other variables.

Clifton(2012) showed that the indicator Thriving increases with average level or income, both for Women and for Men. From lows levels of 14% and 16% of optimist people (both Women and Men) in low-income and lower middle-income countries, the percentage increased to 35% for Women and 37% for men in upper middle-income countries and to 45% (both for Women and Men) in High-income countries. Although there are some exceptions, as a whole the increase of real income plays a positive roll.

Bettincourt(2018) analysed the effects of the increase of Schooling, in several African countries, on the moderation of high average fertility rates and on increase of economic development and this author says: *" I study whether primary school completion rates have played any role in total fertility rates in all countries of the Southern African Development Community (SADC) during the 1980–2009 period. Contrary to conventional wisdom, the results, based on dynamic panel time-series methods, suggest that primary education is associated with lower fertility in the SADC".*

Helliwell, Huang and Wang(2019) present the estimation of an econometric model with a sample of 1516 observations (157 countries for the period 2005 to 2018), that relates (Happiness) with logarithm of Production per head (PH) and other variables, finding that PH has a positive and significant effect and the coefficients of some of the other explanatory variables have the expected signs and are significant, but not all. The high degree of multicollinearity, in spite of the big sample size, may explain lack of precision in some estimators.

Ortega-Gil et al(2021) analyses the impact of several variavle on life satisfac tion in 33 European countries, with special references to environmental matters, global warming, circular economy, energy and environmental taxes, investments and expenditures.

Guisan(2021) presents the estimation of several equations for 164 countries in year 2019, relating economic development, quality of government, peace, and other variables with Life Satisfaction. In that study there are references to Deaton(2008), Guisan(2009), Guisan and Aguayo(2010), Clifton(2012) and Helliwell, Huang and Wang(2019).

Ortiz-Ospina and Roser(2022), analyze the evolution of Life Satisfaction in 165 countries from 2003 t0 2020. In section 3, we presents a reference to their data and conclusions.

3) Models with samples of regions

Guisan and Frias(1996) presented and exploratory analysis of Well-being in 120 Europan regions at the ERSA Congress held in Zurich.

Ferrada(2017) studied job satisfaction in Chile, having into account geographic determinants.

Heald and Trevino-Aguilar(2020) analyz the case of subjective well-being in Mexico. They state that economic liberature indicates that Mexicans are relatively happy considerading that their average income per capita is not very high and the level of security is not high in several regions.

They have into account that although education usually contributes to increase work opportunities, in some cases lead to societies with a high level of stress. A high level of stress may diminish the subjective wellbeing and it may happen that a society with low income and low stress has an average indicator of happiness higher than a richer society with a high level of stress. They say: "*There are some explanations related with lack stressing life which may explain high values of QoL in regions with los income*".

Regarding the great influence of the Fitoussi Report they state: "The Fitoussi report makes a series of recommendations for future wellbeing studies which have influenced subsequent studies in many countries, including INEGI's BIARE survey.

The Paradox of Latin American Happiness in the Face of Adversity: These authors indicate that "an interesting finding is the detection of relatively high levels of well-being created by close extended family networks which are an essential part of a Latin American lifestyle ….However, Latin Americans are not immune to their many social and economic problems".

Other interesting findings of this study are the positive effects of education on diminution of violence indicators against women: *"women who participate in the labor force are not less likely to suffer domestic violence than those who do not. Education is important, as the more education a woman has, the less violence inflicted on her, so in terms of public policy, social programs could work to improve gender equity through social networks and education ".*

3. Life satisfaction: international data at country and regional level.

Life satisfaction at country level for the period 2000-2020

Data included in Roser and Ospina r(2017) for 165 countries around years 2003 and 2020, show many changes but the average of 165 countries only increased slightly from

5.3 to 5.5. The most outstanding results regarding decreases or increases in the Life Satisfaction based on WHR data are:

Countries with negative variation equal or lower than -25%: Alghanistan, Angola, Botswana, India, Jordan, Lebanon, Lesotho, South Sudan, Syria and Venezuela.

Countries with positive variation equal or higher than 25%: Armenia, Benin, Bulgaria, Cambodia, Cameroon, Comoros, Congo R, Cote d´Ivoire, Gambia, Georgia, Kosovo, Kyrgyz, Latvia, Liberia, Mongolia, Nicaragua, Niger, Philippines, Romania, Serbia and Togo.

In many cases the main causes of the positive or negative variation are related with the evolution of education, real income per capita, and other factors, with its effects on freedom, quality of government, quality of labor conditions, environment and peace.

In almost all the cases of diminution of qualitye of life there are problems of freedom, labor opportunities, poverty, lack of enough health assistance, corruption or other bad features, even in cases of increase in production per capita.

Two special cases are those of Botswana and India.

In the case of Botswana data shows levels of poverty higher than expected for a country with a relatively high production per capita.

The case of India has surprised to many researchers because for the period 2000-2020 the real income per capita has increased, the percentages of poverty have diminished and there has been several improvements on other indicators of objective wellbeing.

Jain(2021) states: **"***Where does India stand? The Happiness Index of the World Happiness Report (WHR) indicates that India's rank has deteriorated over the years. Starting with rank 111 in 2013, it has consistently been going down and was a dismal 139 in the 2021 report – a dip of 25%. This decline has happened irrespective of successive governments and apparent economic progress, and India being one of the fastest-growing economies in the world in the last several years".*

FEBureau(2022) refer to discrepancy between the rankinsg of Happy Plus Consulting (HPC) and United Nations WHR, and says:: "*India among top 25 happiest countries globally: The State of Happiness Report 2022. Accordingly to this source the poll of HPC included a sample of 20073 people across 36 states or territories* in 2021-2022 and claimed it seems to be seven times larger than the UN sample for India". The article says: "*According to HappyPlus Consulting's The State of Happiness report, India might be among the top 25 happiest countries in the world, with a happiness score of 6.84. This is contrary to the UN's World Happiness Report 2022, which recorded India's happiness score at 3.77"*.

In the case of big countries it is interesting to increase information of Life Satisfaction by social groups, ages and territories. It may be a great variability of Life Satisfaction in the case of India which may explain the differences between the two samples (HPC y UN), if they have different composition regarding the share of the different groups in the total sample.

International comparison in year 2017

At World level, Life Satisfaction Index in year 2017 varied, at country level, from a minimum of 2.5 points in Afghanistan to a maximum higher than 7.5 in countries like Denmark, Iceland, Sweden and Switzerland. It is important to analyze the social and economic policies that may contribute to increase quality of life in countries with low values.

Accordingly to Guisan, Aguayo and Exposito(2001), Guisan(2021) and other intrnational econometric models, Education is usually relevant because it contributes to diminish excessive average fertility rates, and to improve the levels of several positive objective indicators of quality of life. Some of most important variables to explain differences among countries, in the study by Guisan(2021), are real Income per capita, the indicator of Peace (with positive impact) or Conflict (with negative impact), quality of government, poverty. Education usually has a positive impact on these indicators.

There has been some controversy about the Easterling paradox that income does not increase Life Satisfaction, through time, although it shows a positive impact on cross-setion samples of countries.

As it may be seen in the graph by Ospina- and Roser (2013) and Guisan(2022) the effects of the increase of some objective indicators, like income per capita, have a high impact for countries or regions with low levels, and keep a positive but lower impact in countries or regions with high levels. This is aa possible explanation to the called Easterling paradox. The analysis of a country through time may not show a high impact of income per capita, or other indicators, if those indicators have scarce variability in that period.

The analysis of the effects of several indicators through time is complicated when the indicators show a relative position of a country in comparison with World average which does not change through time. In those indicators World average is 0 in case that the indicator has a range between -2.5 and 2.5, or it is 5 if the indicator is expressed in a decimal scale, from a minimum of 0 to a maximum of 10.

The HPC study found that the happiest average levels correspond to the following Indian territories: Himachal Pradesh, Punjab, Uttarakhand, Kerala, Maharashtra, Tamil Nadu, Puducherry, Chandigarh, Delhi, and Goa.

Ashish Ambasta, founder and CEO, HappyPlus is an expert on the impact of working stress in quality of life. It is considered that around 65% of Indians show suffering due to stress from workplace pressure, health, uncertaintly, financial empowerment and other factors.

Life satisfaction at regional level in 36 countries

In Annex 1 we include data of all the variables in the 402 regions of OECD regional statistics (including the 372 regions with availability of data for all the indicators).

At regional level, with the sample of 372 regions available from OECD(2022), we may found, in 33 countries included in the statistics, a minimum around 4.77 in the the lower positions and a maximum of 8.5 in the highest one.

Table 1 shows the great differences between the regions of the lowest and highest levels of Life Satisfaction. In table A2, in the Annex, there is a more detailed information in 7 groups.

The average of the highest groups is one point higher than the average of all the groups, and lowest is almost 3 points below the general average.

Table 1: Average values iht the lowest (R13<5.1) and highest(R13>7.4)

Average value of R13	Nb regions	R13 Life Satisf.	R3 Unemployment Rate	R4 Income per capita	R5 Homicide Rate	R7 Life Expectancy	R8 Pollution PM2.5
Lowest <5.1	13	4.77	13.72	8.10	1.54	77.94	22.08
Highest >7.4	62	7.69	5.11	20.93	4.42	80.44	**9.23**
All regions	372	6.69	6.99	18.63	3.75	80.21	13.29

Note: Elaborated from OECD(2022). More information in the Annex.

The positive factors, for subjective well-being, like Income per capita and Life Expectancy are higher in the highest group than in the lowest. The negative indicators like Unemployment and Pollution have higher values in the countries with lowest Life Satisfaction. Homicide rates has variability among the groups and, in spite of having a higher value in the highest group, in the model it will show a negative and significant impact on Life Satisfaction, as for countries of similar features a higher value of the homicides rates usually implies less satisfaction.

In table 2 we show a general view of regional differences in the value of Life Satisfaction, and in Guisan(2022) we analyze the regional differences of the other variables of this study.

Group 1: Among the countries of this study there is a first group of countries with a value below 6.1 in Life Satisfaction: Greece, Hungary and Portugal.

Group 2: A second grupo have top regional values between 6.1 and 6.5 of Life Satisfaction: Japan, Korea R, Slovakia and Turkey.

Group 3. A third group have top regional values between 6.6 and 7.0: Czech R., Germany, Italy, Luxembourg, Poland and Spain.

Group 4: Life Satisfaction between 7.1 and 7.5: Austria, Belgium, Finland, France, Iceland, Ireland, Israel and United Kingdom.

Group 5_ Top regional values of Life Satisfaction between 7.6 and 8.5:Australia, Canada, Chile, Denmark, Mexico, Netherlands, New Zealand, Norway, Sweden and Switzerland and United States.

Group 6: Countries with all regions over 7.0 in Life Satisfaction. Those countries also have good values in objective indicators of quality of life as seen in Guisan(2022).

Table 2. Life satisfaction in regions and countries, year 2016.

1) All the regions values ≤6	Greece, Hungary, Portugal
2) All the regions values ≤ 6.5	Japan, Korea, Slovakia, Turkey
3) Several regions >6.5, ≤ 7.0	Czech R, Germany Italy, Luxembourg, Poland, Spain
4) Several regions >7.0, ≤ 7.5	Austria, Belgium, Finland France, Iceland, Ireland, Israel, UK
5) Several regions>7.5, ≤ 8.5	Australia, Canada, Chile, Denmark, Mexico, Netherlands, New Zealand, Norway, Sweden, Switzerland, United States
6) All regions >7.0	Austria, Canada, Denmark, Finland, Iceland, Netherlands, New Zealand, Norway, Sweden and Switzerland

Source: Elaborated from OECD regional statistics.

There is a positive correlation of 58.53% between the (descending ranking) of Life Satisfaction (R13) with the average of the following rankings: Descending rankings of R4 (Disposal income per capita in year 2016 at constant prices of 2010 and PPPs), and R7 (Life Expectancy), and ascending rankings of R3 (Unemployment rate %) and R8 (pollution PM2.5 micrograms per cubic meter). The top regions in Life satisfaction have usually top positions in quality of life accordingly to these criteria.

Some outstanding regions in the top 25% of the subjective indicator of Quality of Life (R13) and in, at least 4 top 25% out of the quality rankings measured by descending order of R4 and R7 and ascending order of R3, R5 and R8, are listed in table 3.

Table 3. Top 25%: subjective indicator (R13) and, at least, 4 objetive criteria

Region	R13	R4	R7	R3	R5	R8
8. Camberra (Australia)	7.7	54266	83.2	3.1	0.0	2.6
16. Tyrol (Austria)	7.5	23442	82.8	3.4	0.4	11.4
244. Oslo (Norway)	7.6	27125	83.0	4.8	0.4	5.6
247. Agder and Rogaland (Norway)	7.6	24603	82.5	5.3	0.5	6.3
248. Western Norway (Norway)	7.5	24291	82.7	4.2	0.2	4.4
249. Trondelag (Norway)	7.7	23395	82.8	3.0	0.2	4.5
250. Northern Norway (Norway)	7.5	23308	81.9	3.3	0.6	6.3
312.Central Switzerland (Switzerland)	7.8	24241	84.0	30	0.3	12.8

Note: Own elaboration from OECD regional data of table A1.

The top 25% regions in the subjective indicator (R13) are usually in top positions in one or more of the 5 objective criteria of this study. Among the top 25% of regions in R13 (92 regions), there are, besides the 8 regions of table 3 (with top 25% in at least 4 objective criteria), a group of 10 regions with top 25% positions in 3 objective criteria, 32 regioms in 2 objective criteria, 33 in 1 objective criteria, and 9 that are not included in Top 25% of quality in any of the 5 objetive criteria.

3. An interregional econometric model of Life Satisfaction in 372 regions

Data correspond to year 2016, from OECD regional statistics. The table with the variables is included in the Annex.

The effects of missing variables must be taken into account, having into account that the coefficients of the included variables measure the impact not only of those variables but also of other relevant excluded variables linearly related to them, as indicated in Chapter 5 of Guisán(1997) and in Guisan(2020). The effects of some missing explanatory variables not linearly related with the included regressors are included in the coefficients of the dummy variables.

The model includes 5 dummies for some groups of countries: The regions of the countries of groups N1 N2, N3 would have a lower intercept, due to the netavie impact of other excluded variables. The intercept will be higher in the regions of groups P1 and P2, due to the positive effect of some missing variables. Table 4 shows the country dummies with a significant effect:

Table 4. Country dummies.

DN1: 13 Hungary, 18 Japan, 19 Korea R, 27 Poland, 28 Portugal, 34 Turkey
DN2: 6 Czech R, 11 Germany, 12 Greece, 13 Hungary, 17 Italy, 29 Slovalia, 30 Slovenia
DN3: 5 Chile, 10 France, 36 United States
DP1: 4 Canada, 7 Denmark, 9 Finland
DP2: 23 Mexico, 24 Netherlands, 33 Switzerland

Note: Hungary is included both in the group DN1 and the group DN2, and them its negative difference with the common intercept is the sum of the negative coeffieients of both dummies.

We have estimated 3 equations for the relationship between R13 and the explanatory variables R3, R4, R5, R7 and R8, in 372 regions with available data in table A1. The source of data is OECD(2022) and the definition of variables appears in OECD(2018).

The variables of our model are the following ones:

R13: Satisfaction with Life (subjective indicator)

R4: Regional Income per capita around year 2016, expressed in Dollars of 2017 at Purchasing Power Parities (PPPs). Expected positive effect.

R7: Years of Life Expectation. Indicator of healthy life and health assistance.

R3 = Unemployment rate (% of Active Population). Expected negative effect.

R5= Homicides rate (per 100 thousand people). Expected negative effect.

R8 = Pollution (PM2.5). The level is measured in micrograms per cubic meter of air, being a microgram = one millionth ($1x10^{-6}$) of a gram. The unit symbol is μg.

We have estimated 5 equations: 1) Withouth dummies. 2) With country dummies and 3) with country and regional dummies.

Equation 1. Equation of R13 without dummies, 372 regions in year 2016

Dependent Variable: REG13. Method: Least Squares				
Sample: 1 402. Included observations: 372				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.650604	1.138693	2.327759	0.0205
R4/1000	1.20E-02	3.23E-03	3.707659	0.0002
R7	0.060188	0.014296	4.210244	0.0000
R3	-0.052166	0.006748	-7.730228	0.0000
R5	0.017320	0.004621	3.748194	0.0002
R8	-0.053835	0.004938	-10.90270	0.0000
R-squared	0.485279	Mean dependent var		6.686022
Adjusted R-squared	0.478248	S.D. dependent var		0.811154
S.E. of regression	0.585916	Akaike info criterion		1.784718
Sum squared resid	125.6471	Schwarz criterion		1.847926
Log likelihood	-325.9576	Hannan-Quinn criter.		1.809820
F-statistic	69.01308	Durbin-Watson stat		0.891179
Prob(F-statistic)	0.000000			

Source: own elaboration with data of table A1.

In equation 1, the sign of the coefficients is as expected for. R4/1000 and R7 (positive and significant effect) and for R3 and R8 (negative and significant effect). It is anomalous the sign of the coefficient of R5 as its expected to be negative, what may be due to the effect of missing explanatory variables (See Guisan(1997) Chapter 5).

Equation 2. Relation between Subjetive Satisfaction (REG13) and the objective indicaror R3, R4, R5, R7 and R8 and country dummies

Dependent Variable: REG13. Method: Least Squares				
Sample: 1 402. Included observations: 372				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.382652	0.741471	9.956764	0.0000
REG4/1000	0.011354	0.002336	4.860857	0.0000
REG7	0.001216	0.009210	0.132026	0.8950
REG3	-0.054197	0.004040	-13.41463	0.0000
REG5	-0.008210	0.002902	-2.828790	0.0049
REG8	-0.010145	0.003381	-3.000836	0.0029
DN1	-1.400812	0.066992	-20.91012	0.0000
DN2	-0.723501	0.055491	-13.03829	0.0000
DN3	-0.365234	0.065289	-5.594074	0.0000
DP1	0.330138	0.086046	3.836754	0.0001
DP2	0.204862	0.075687	2.706682	0.0071
R-squared	0.835506	Mean dependent var		6.686022
Adjusted R-squared	0.830950	S.D. dependent var		0.811154
S.E. of regression	0.333512	Akaike info criterion		0.670847
Sum squared resid	40.15408	Schwarz criterion		0.786728
Log likelihood	-113.7775	Hannan-Quinn criter.		0.716867
F-statistic	183.3615	Durbin-Watson stat		1.997789
Prob(F-statistic)	0.000000			

Source: Own elaboration from data on table A1 and table 2.

In equation 2, signs of the coefficients of the explanatory variables are as expected (positive for R4 and R7 and negative for R3, R5 and R8). The coefficient of R7 does not show significance because all the regions have relatively high values of Life Expectancy. In samples with greater variability of this variable, its coefficient is usually positive and significant because this variable implies quality of sanitation and health assistance.

Estimation of equation 3: In order to improve the goodness of fit, we include 2 regional dummies. One for regions with negative effects of missing variables (DNREG) and another one for regions with positive effects of missing variables (DPREG).

DNREG is a dummy that takes value 1 for the following ragions and zero in other case: 7, 36, 47, 106, 108. 190. 192, 197, 198, 202, 206, 209, 215, 217. 268, 269, 281, 285, 288, 326, 378, 381. (See names of regions in Table A1 in the Annex)

DPREG is a dummany that takes value1 for the following regions, and zero in other case: 21, 22, 38, 44, 84, 107, 188, 189, 201, 208, 210, 211, 213, 216, 260, 290, 320, 359, 363, 367, 368, 369, 370, 372, 375, 376, 377, 379, 386, 392, 397. (See names of regions in table A1 in the Annex).

Equation 3. R13 related with R3,R4,R5,R7,R8, and dummies for countries and regions.

Dependent Variable: REG13. Method: Least Squares				
Sample: 1 402. Included observations: 372				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.981583	0.504709	13.83290	0.0000
REG4/1000	0.008373	0.001577	5.309765	0.0000
REG7	0.007088	0.006264	1.131536	0.2586
REG3	-0.055865	0.002739	-20.39894	0.0000
REG5	-0.007820	0.001961	-3.987906	0.0001
REG8	-0.008452	0.002293	-3.686567	0.0003
DN1	-1.440709	0.045085	-31.95542	0.0000
DN2	-0.746777	0.037330	-20.00469	0.0000
DN3	-0.453832	0.044291	-10.24652	0.0000
DP1	0.248182	0.057992	4.279573	0.0000
DP2	0.177935	0.051224	3.473642	0.0006
DNREG	-0.691293	0.051880	-13.32473	0.0000
DPREG	0.644293	0.045657	14.11157	0.0000
R-squared	0.926050	Mean dependent var		6.686022
Adjusted R-squared	0.923579	S.D. dependent var		0.811154
S.E. of regression	0.224239	Akaike info criterion		-0.117889
Sum squared resid	18.05162	Schwarz criterion		0.019062
Log likelihood	34.92730	Hannan-Quinn criter.		-0.063502
F-statistic	374.6385	Durbin-Watson stat		1.591188
Prob(F-statistic)	0.000000			

Source: Own elaboration from data on table A1, table 2 and regional dummies.

The signs of coefficients are as expected. All the coefficients but that of R7 are significantly different from zero. As mentioned in equation 2, the lack of significance of the coefficient of R7 is due to the scarce variability of this variable in the sample, but

usually this variables shows a a positive and significant positive effects in samples with greater variablility of this variable.

5. Conclussions

There are many factors that have positive or negative impact on the subjective indicator of quality of life as it has been analyzed in many studies based on samples of individuals or aggregate datos of regions or countries. Poverty, lack of freedom, lack of opportunities, stress and insecurity are some of the main causes of low values of the average subjective index of quality of life at country or regional level. At individual level there are other variables related with family, health and other particular circumstances which are usually ver important for Life Satisfaction.

In this study we have related indicator R13 (Life Satisfaction) , at regional level with a sample of 372 regions with available data at OECD(2022), with the following explanatory variables: 1)Indicators related with economic security (income per capita as positive factor and unemployment rate as negative factors), 2) Indicators related with health security (life expectancy as a positive factor and pollution), 3) Factors related with social environment and life security (we only have got the indicator of homicides rates although it should be desirable to have other interesting indicators.

There is great variability in the value of Life Satisfaction among the regions of this study, with a few regions below 5 and a few regions over 8 as many regions between both values.

The countries with a value of R13 higher than 7 in all their regions in year 2016 were: Austria, Canada, Denmark, Finland, Iceland, Netherlands, New Zealand, Norway, Sweden and Switzerland.

The countries with a value of R13 lower than 6.1 were Greece, Hungary and Portugal. Very close to that situation was Turkey with all their regions but one below 6.1, and Poland with all their regions but two below 6.1,

There are 3 countries with a few regions over 8.0: Canadá, México and the United States. While regions of Canada and the United States have a high level of average income per capita, the case of the Mexico is different because the level of income per capita is much lower.

In table 3 there are 8 regions with Top 25% position in Quality of Life, both in the subjective indicator (R13) and at least 4, out of 5, objective indicators: 4 in Norway, and 1 in each of the following countries: Australia, Austria and Switzerland.

As it has been mentioned, many Latin American countries usually show average values of life satisfaction higher than expectated accordingly to the objective indicators. It seems due to some positive cultural and social factors related with social communication and help in those countries.

The econometric models show the positive impact of income and life expectancy and the negative effects of unemployment rate and pollution.

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List of countries and number of order of regions among 402 regions.

Regions with available data for all the variables (372 regions):
Australia (1 to 8); Austria (9 to 17), Belgium (18 to 20), Canada (21 to 30), Chile (34 to 48), Czech R (49 to 56), Denmark (57 to 61), Finland (67 to 70), France (72 to 84), Germany (85 to 100), Greece (101 to 109), Hungary (114 to 120), Iceland (121 to 122), Ireland (123 to 124), Israel (125-126, 128-130), Italy (131 to 151), Japan (152 to 161), Korea R (162 to 168), Luxembourg (185), Mexico (186 to 217), Netherlands (218 to 229), New Zealand (230 to 243), Norway (244 to 250), Poland (251 to 266), Portugal (267 to 273), Slovakia (274 to 277), Slovenia (278 to 279), Spain (280 to 298), Sweden (299 to 306), Switzeland (307 to 313), Turkey (314 to 339), United Kingdom (340 to 351), United States (352 to 402).

Regions without availabiliy of data for all the variables (30 regions):
Canada (3 regions: 31 Yukon, 32 Northwest Territories, 33 Nunavut)
Estonia ((5 regions: 62 to 66)
Finland (1 region: 71 Aland)
Greece (4 regions: 110 Attica, 111 North Aegean, 112 South Aegean, 113 Crete)
Israel (1 region: 127 Haifa)
Lativa (6 regions: 169 to 174)
Lithuania ((10 regions: 175 to 184)

Table A1. Indicators of Quality of Life in 402 regions of OECD countries

N402	Regions	R13	R4	R7	R3	R5	R8
1	New South Wales	7.2	29608	82.4	5.2	0.8	5.3
2	Victoria	7.4	25539	82.9	5.6	1.0	4.5
3	Queensland	7.3	25325	82.2	6.5	0.8	5.2
4	South Australia	7.4	25151	82.4	7.1	1.1	4.2
5	Western Australia	7.2	29120	82.5	5.7	1.2	7.5
6	Tasmania	7.7	23692	80.8	6.9	1.5	3.2
7	Northern Territory	7.0	36333	81.1	3.9	0.0	8.1
8	Canberra Capital Region	7.7	54266	83.2	3.1	0.0	2.6
9	Burgenland	7.2	23709	81.4	5.3	0.3	18.3
10	Lower Austria	7.3	24863	81.4	4.9	0.5	17.8
11	Vienna	7.2	23003	80.9	10.5	0.9	21.5
12	Carinthia	7.3	23031	81.8	4.9	0.0	14.1
13	Styria tienen dn1 dn2	7.4	23253	82.1	4.6	0.3	15.4
14	Upper Austria	7.4	23824	82.2	4.0	0.5	16.2
15	Salzburg	7.3	24376	82.7	3.2	0.4	13.9
16	Tyrol	7.5	23442	82.8	3.4	0.4	11.4
17	Vorarlberg	7.1	25084	82.7	3.8	0.3	12.4
18	Brussels-Capital Region	6.8	17608	81.3	15.0	2.2	14.3
19	Flemish Reg (Vlaams Gewest)	7.2	20822	82.6	4.4	1.0	14.9
20	Wallonia	6.8	17869	79.8	9.8	2.1	13.8
21	NewfoundlLabrador	8.1	23059	79.3	14.9	1.3	2.6
22	Prince Edward I	8.0	19902	81.4	9.9	0.0	3.3
23	Nova Scotia	7.4	20190	80.4	8.5	1.4	3.6
24	New Brunswick	7.3	20649	80.9	8.2	1.5	4.1
25	Quebec	7.4	19626	82.2	6.2	0.8	7.2
26	Ontario	7.3	22720	82.4	6.1	1.5	9.1
27	Manitoba	7.6	20584	80.1	5.4	3.2	5.9

28	Saskatchewan	7.4	23161	80.1	6.4	4.7	5.6
29	Alberta	7.4	26405	81.5	7.9	2.7	6.0
30	British Columbia	7.6	24350	82.5	5.1	1.8	5.8
34	Tarapacá	6.6	6432	79.1	7.8	9.6	12.9
35	Antofagasta	7.0	8107	78.1	8.1	9.7	11.2
36	Atacama	5.6	6165	79.4	8.2	9.2	7.4
37	Coquimbo	6.8	5172	80.1	8.1	7.0	7.3
38	Valparaíso	7.1	6066	79.1	7.5	9.0	14.0
39	O'Higgins	6.4	5547	79.1	6.3	6.7	17.8
40	Maule	6.6	5004	78.6	4.9	8.8	10.7
41	Bío-Bío	6.4	5333	79.0	7.3	8.1	10.4
42	Araucanía	6.4	5215	78.7	7.2	8.8	7.1
43	Los Lagos	6.6	5765	78.1	2.9	6.5	4.4
44	Aysén	7.9	8027	78.4	3.1	17.4	2.3
45	Magallanes y Antártica	7.3	8453	78.2	4.4	6.0	2.3
46	Santiago Metropolitan	6.8	8562	79.6	7.1	9.8	24.8
47	Los Rios	5.8	5110	78.3	4.5	9.1	5.3
48	Arica y Parinacota	6.4	4548	79.2	5.9	8.2	13.5
49	Prague	6.8	18176	80.6	1.8	1.6	18.3
50	Central Bohemian Region	6.2	14630	79.2	2.2	1.7	16.4
51	Southwest	6.4	13603	79.3	2.1	1.0	15.9
52	Northwest	6.3	12458	77.2	3.5	1.7	17.4
53	Northeast	6.6	13455	79.6	2.9	1.0	22.9
54	Southeast	6.5	13948	79.9	3.2	1.2	21.5
55	Central Moravia	6.6	12813	78.9	3.4	0.9	17.1
56	Moravia-Silesia	6.2	12662	78.0	4.8	1.4	23.2
57	Copenhagen Region	7.7	18996	80.8	6.2	0.9	10.2
58	Zealand	7.5	17980	80.2	5.6	0.4	11.8
59	Southern Denmark	7.5	17473	81.2	6.3	1.3	9.8
60	Central Jutland	7.6	17674	81.5	5.4	0.6	8.9
61	Northern Jutland	7.7	17418	80.5	5.5	0.9	7.5
67	Western Finland	7.5	17783	81.7	9.5	0.3	5.9
68	Helsinki-Uusimaa	7.5	20938	82.0	7.9	0.3	7.8
69	Southern Finland	7.5	18206	81.3	8.7	0.6	6.2
70	Eastern and Northern Finland	7.5	17192	81.0	9.9	0.4	6.4
72	Île-de-France	6.6	24302	84.2	8.8	1.2	16.0
73	Centre - Val de Loire	6.5	20481	82.5	8.7	0.9	12.3
74	Bourgogne-Franche-Comté	6.7	20339	82.3	9.2	0.7	13.4
75	Normandy	6.5	19968	81.9	10.1	1.0	13.0
76	Hauts-de-France	6.5	18165	80.7	12.1	1.2	15.2
77	Grand Est	6.5	19593	82.1	10.1	1.1	13.7
78	Pays de la Loire	6.8	19746	83.1	7.1	0.7	10.9
79	Brittany	6.9	19858	82.0	7.4	0.4	9.9
80	Nouvelle-Aquitaine	6.9	19859	82.9	9.5	1.2	11.2
81	Occitanie	6.8	19210	83.1	9.7	1.4	10.8
82	Auvergne-Rhône-Alpes	6.8	20829	83.6	7.5	1.2	13.9
83	Provence-Alpes-Côte d'Azur	6.7	20391	83.1	10.4	1.7	13.0
84	Corsica	7.3	18670	83.9	7.9	3.6	11.3
85	Baden-Württemberg	6.9	26052	82.0	3.0	0.7	14.1
86	Bavaria	6.9	26183	81.7	2.4	0.9	15.9
87	Berlin	6.4	21133	80.9	7.1	1.2	14.9
88	Brandenburg	6.2	20926	80.7	4.6	1.1	14.5
89	Bremen	6.9	22941	80.1	4.5	1.3	12.9

90	Hamburg	7.0	26408	81.2	4.3	1.1	12.6
91	Hesse	6.8	24689	81.6	3.4	1.2	14.3
92	Mecklenburg-Vorpommern	6.5	19589	80.1	5.2	0.7	12.7
93	Lower Saxony	6.9	23045	80.5	3.9	1.2	12.5
94	North Rhine-Westphalia	6.8	23613	80.6	4.2	0.5	13.9
95	Rhineland-Palatinate	6.8	24670	81.1	3.4	0.5	13.6
96	Saarland	6.7	22469	80.2	4.6	1.0	13.2
97	Saxony	6.2	20685	81.1	4.5	0.9	15.7
98	Saxony-Anhalt	6.1	20122	79.8	7.0	1.1	14.2
99	Schleswig-Holstein	6.9	24308	80.6	3.7	0.6	11.6
100	Thuringia	6.2	20361	80.4	4.5	1.0	14.1
101	East Macedonia - Thrace	5.9	11050	81.0	19.9	0.2	17.5
102	Central Macedonia	5.2	12069	81.3	23.2	0.4	15.3
103	West Macedonia	4.9	13096	81.8	29.7	0.4	19.8
104	Thessaly	5.3	11661	81.9	21.3	0.8	19.0
105	Epirus	5.1	11800	83.4	25.2	0.6	17.6
106	Ionian Islands	5.0	14538	81.4	20.4	1.0	17.0
107	West Greece	5.9	10738	81.2	26.8	1.1	17.8
108	Central Greece	4.8	11372	81.8	21.2	0.4	18.0
109	Peloponnese	5.9	11686	82.3	17.3	1.0	18.8
114	Central Hungary	5.0	10693	77.6	2.8	1.1	22.0
115	Central Transdanubia	5.2	11354	76.0	2.3	1.0	19.4
116	Western Transdanubia	5.3	11299	76.6	2.5	0.5	19.3
117	Southern Transdanubia	4.8	10275	75.9	6.4	1.0	18.5
118	Northern Hungary	4.5	9671	74.6	5.9	1.6	19.6
119	Northern Great Plain	4.9	9696	75.6	7.4	1.0	18.9
120	Southern Great Plain	4.8	10385	75.9	4.2	0.7	18.3
121	Reykjavik Region	7.1	16290	82.2	3.3	1.4	2.9
122	Other Regions	7.3	16290	82.2	2.4	0.0	1.7
123	Border, Midland and Western	7.2	15759	81.8	8.0	0.5	6.4
124	Southern and Eastern	7.0	18312	81.7	6.8	0.9	7.0
125	Jerusalem	7.3	6881	83.0	6.5	1.1	21.2
126	North	7.0	8477	81.4	5.9	1.4	20.4
128	Central	7.4	13960	83.6	4.0	1.5	21.9
129	Tel Aviv	7.5	16224	83.3	3.8	1.2	23.4
130	South	7.4	8882	81.0	5.7	1.5	24.3
131	Piedmont	6.5	22077	83.3	9.3	0.6	28.0
132	Aosta Valley	6.8	22258	83.0	7.9	0.0	21.1
133	Liguria	6.0	22290	83.6	9.7	0.5	26.2
134	Lombardy	6.3	23960	84.0	6.5	0.6	38.2
135	Abruzzo	6.1	17570	83.5	12.0	0.8	18.3
136	Molise	5.6	15759	83.4	14.9	0.3	15.6
137	Campania	5.6	13913	81.7	21.3	1.3	17.6
138	Apulia	5.9	14856	83.5	19.3	1.1	13.4
139	Basilicata	6.4	14580	83.1	13.1	0.3	11.2
140	Calabria	5.4	13609	82.9	22.0	2.4	11.4
141	Sicily	5.9	14095	82.4	21.9	8.5	12.5
142	Sardinia	6.2	16558	83.3	17.6	1.1	12.9
143	Bolzano-Bozen	6.7	26075	84.1	3.1	0.4	20.9
144	Trento	6.7	22556	84.3	5.8	0.8	13.8
145	Veneto	6.3	21271	83.9	6.5	0.2	33.5
146	Friuli-Venezia Giulia	6.5	21931	83.5	6.9	0.7	22.2
147	Emilia-Romagna	6.3	23781	83.7	6.7	0.6	33.1

148	Tuscany	6.1	21045	83.9	8.8	0.7	23.6
149	Umbria	6.1	19480	84.1	10.8	0.9	18.6
150	Marche	6.0	19930	84.0	11.0	0.5	20.7
151	Lazio	6.1	19864	83.2	10.9	0.9	17.6
152	Hokkaido	6.0	17748	83.9	3.8	0.7	11.2
153	Tohoku	5.7	17501	83.6	3.7	0.5	12.6
154	Northern-Kanto, Koshin	6.1	19751	84.1	3.3	0.7	13.0
155	Southern-Kanto	6.1	22290	84.3	3.5	0.7	15.4
156	Hokuriku	6.0	19135	84.5	2.9	0.7	13.6
157	Toukai	6.1	20911	84.2	2.7	0.6	14.4
158	Kansai region	6.0	19303	84.0	4.0	1.0	16.3
159	Chugoku	5.8	18884	84.4	3.4	0.7	16.5
160	Shikoku	5.8	17261	84.1	3.7	0.8	15.4
161	Kyushu, Okinawa	5.9	17454	84.2	4.2	0.7	16.7
162	Seoul Region	6.0	18352	82.4	4.2	1.5	33.0
163	Gyeongnam	6.0	17403	80.9	3.8	1.6	26.1
164	Gyeongbuk	5.7	16228	80.9	3.9	1.2	27.0
165	Jeolla	5.9	15696	81.2	2.9	1.2	29.7
166	Chungcheong	6.1	16511	81.7	3.2	1.5	31.5
167	Gangwon	5.7	15310	80.4	3.0	1.4	25.4
168	Jeju	5.8	16428	82.9	2.3	4.5	20.8
185	Luxembourg	6.9	29279	82.7	5.6	0.9	12.3
186	Aguascalientes	7.0	3695	76.0	4.2	3.8	10.0
187	Baja California	6.8	5058	74.2	2.5	32.2	12.0
188	Baja California Sur	7.8	4712	76.2	4.3	29.6	6.0
189	Campeche	8.6	3318	75.4	3.6	10.1	10.0
190	Coahuila	6.6	3716	76.0	4.9	8.5	9.1
191	Colima	6.8	3864	76.0	4.4	82.2	10.2
192	Chiapas	6.6	1652	73.0	3.3	10.4	12.5
193	Chihuahua	7.1	3904	73.5	3.9	47.1	7.3
194	Mexico City	7.5	5973	76.2	5.3	14.5	23.8
195	Durango	7.0	3078	76.0	5.3	11.7	7.1
196	Guanajuato	6.8	3249	75.6	3.9	20.7	14.1
197	Guerrero	6.2	2124	73.1	2.1	70.6	12.6
198	Hidalgo	6.3	2461	74.6	3.3	7.4	18.6
199	Jalisco	7.4	3831	75.7	3.8	16.2	10.7
200	Edo. Mexico	7.1	3114	75.4	5.6	16.1	21.7
201	Michoacan	7.7	2551	74.9	2.9	29.0	13.4
202	Morelos	6.5	3259	75.9	2.8	33.2	21.9
203	Nayarit	7.2	3201	75.4	4.1	12.0	6.9
204	Nuevo Leon	7.5	4760	76.7	4.3	12.1	11.4
205	Oaxaca	7.0	2118	73.2	2.2	19.4	12.0
206	Puebla	6.7	2609	75.0	3.1	11.7	19.3
207	Queretaro	7.4	4280	75.5	4.9	6.7	16.6
208	Quintana Roo	8.1	4238	75.8	3.1	11.8	4.9
209	San Luis Potosi	6.7	3017	74.9	2.5	11.6	11.5
210	Sinaloa	8.1	3732	75.8	3.9	42.6	8.4
211	Sonora	8.1	4095	75.5	5.2	19.3	8.5
212	Tabasco	6.8	2755	74.9	7.4	17.5	16.9
213	Tamaulipas	8.2	3877	76.0	4.7	22.5	10.3
214	Tlaxcala	7.4	2405	75.4	4.0	7.3	19.9
215	Veracruz	6.6	2591	74.2	3.9	12.8	16.3
216	Yucatan	8.2	3095	75.6	2.2	3.0	7.0

217	Zacatecas	6.3	2796	75.5	3.2	35.8	6.7
218	Groningen	7.6	17424	80.8	7.4	0.5	13.4
219	Friesland	7.6	17589	81.3	5.7	0.5	13.0
220	Drenthe	7.5	17587	81.4	5.2	0.5	13.4
221	Overijssel	7.5	17599	81.6	5.2	1.3	13.8
222	Gelderland	7.5	18130	81.8	4.7	1.3	14.5
223	Flevoland	7.1	18485	81.7	5.9	1.3	15.0
224	Utrecht	7.5	19608	82.1	4.3	0.6	14.7
225	North Holland	7.5	20064	81.6	4.6	0.6	14.1
226	South Holland	7.5	18577	81.8	5.7	0.6	15.1
227	Zeeland	7.8	19124	82.1	3.0	0.6	16.3
228	North Brabant	7.5	18480	81.6	4.3	0.7	15.1
229	Limburg	7.3	18016	81.5	4.8	0.7	15.0
230	Northland	7.5	13438	80.6	9.7	1.2	2.5
231	Auckland	7.2	20356	82.3	5.8	1.3	5.7
232	Waikato	7.2	16461	81.0	5.6	0.9	4.3
233	Bay of Plenty	7.3	16087	81.1	5.7	0.7	3.3
234	Gisborne	7.4	15248	78.3	7.5	2.1	2.7
235	Hawke's Bay	7.4	15248	80.5	7.5	0.0	5.3
236	Taranaki	7.3	17922	80.8	6.1	0.9	3.8
237	Manawatu-Wanganui	7.1	15037	80.4	6.5	0.0	1.9
238	Wellington	7.1	21852	81.5	5.9	0.6	4.6
239	Tasman-Nelson-Marl.	7.4	15786	81.8	5.3	0.0	2.8
240	West Coast	7.6	15786	80.4	5.3	0.0	2.9
241	Canterbury	7.2	18030	81.5	3.6	0.9	7.0
242	Otago	7.7	15707	81.2	4.5	1.4	4.5
243	Southland	7.4	15629	80.3	5.4	0.0	4.8
244	Oslo Region	7.6	27125	83.0	4.8	0.4	5.6
245	Hedmark and Oppland	7.4	22645	81.7	2.9	1.0	4.2
246	South-Eastern Norway	7.6	23238	82.1	4.6	0.6	5.4
247	Agder and Rogaland	7.6	24603	82.5	5.3	0.5	6.3
248	Western Norway	7.5	24291	82.7	4.2	0.2	4.4
249	Trøndelag	7.7	23395	82.8	3.0	0.2	4.5
250	Northern Norway	7.5	23308	81.9	3.3	0.6	6.3
251	Lódzkie	5.8	13134	76.5	4.7	1.1	25.3
252	Mazowieckie	5.9	15626	78.4	4.9	1.3	23.3
253	Malopolskie	5.8	12386	79.3	4.2	0.5	24.7
254	Slaskie	5.8	14792	77.4	4.0	1.5	27.6
255	Lubelskie	5.7	11075	78.2	7.3	1.7	21.5
256	Podkarpackie	5.4	10363	79.2	8.6	0.7	20.9
257	Swietokrzyskie	5.4	11359	77.9	7.2	0.9	23.6
258	Podlaskie	5.8	10784	78.4	4.7	0.9	18.4
259	Wielkopolskie	6.0	13482	78.0	3.2	0.6	21.0
260	Zachodniopomorskie Pomerania O	6.6	12675	77.7	4.7	1.6	15.6
261	Lubuskie	5.9	11688	77.4	3.7	2.8	17.9
262	Dolnoslaskie	6.0	13622	77.7	4.8	1.8	21.6
263	Opolskie	5.8	12055	78.2	4.4	0.8	25.4
264	Kujawsko-Pomorskie	5.9	11524	77.8	5.6	1.1	20.5
265	Warminsko-Mazurskie	6.0	11194	77.1	7.3	1.6	18.1
266	Pomorskie	6.1	12632	78.3	4.3	0.9	16.4
267	North	5.3	12631	81.7	10.2	0.6	8.1
268	Algarve	5.2	15323	80.3	8.1	1.1	6.9

269	Central Portugal	5.1	13629	81.5	7.5	0.5	9.5
270	Lisbon	5.4	17624	81.7	9.8	0.6	7.2
271	Alentejo	5.4	13777	80.2	8.8	1.1	6.4
272	Azores	5.4	14678	77.6	9.3	0.4	3.2
273	Madeira	5.2	14063	78.5	11.0	1.2	5.0
274	Bratislava Region	6.5	19836	78.9	4.3	1.4	21.5
275	West Slovakia	6.1	12677	77.2	5.5	1.1	22.0
276	Central Slovakia	6.0	12441	77.0	9.5	1.0	20.1
277	East Slovakia	6.0	11167	77.2	12.1	1.0	19.9
278	Eastern Slovenia	5.9	14406	80.2	6.9	1.9	17.6
279	Western Slovenia	6.2	15182	82.6	6.4	2.0	18.9
280	Galicia	6.3	14885	83.0	15.8	0.4	8.1
281	Asturias	6.3	16566	82.6	13.9	0.6	8.3
282	Cantabria	7.0	15708	83.5	13.6	0.0	9.0
283	Basque Country	6.9	21119	83.9	11.4	0.3	10.0
284	Navarra	7.0	20133	84.1	10.3	0.2	10.3
285	La Rioja	6.2	16746	84.3	12.1	0.0	9.3
286	Aragon	6.7	17292	83.8	11.7	0.6	8.7
287	Madrid	6.4	20372	85.2	13.5	0.5	11.2
288	Castile and León	6.3	16060	84.3	14.2	0.4	8.2
289	Castile-La Mancha	6.3	13416	83.6	20.9	0.5	10.1
290	Extremadura	6.7	12193	82.6	26.4	0.6	9.3
291	Catalonia	6.4	18632	83.9	13.5	0.7	13.3
292	Valencia	6.3	14202	83.0	18.3	0.6	12.4
293	Balearic Islands	6.8	15933	83.4	12.6	0.8	11.7
294	Andalusia	6.4	12579	82.2	25.7	0.8	12.7
295	Murcia	6.9	12835	82.9	18.1	0.8	12.4
296	Ceuta	6.4	13981	81.4	22.7	4.7	18.7
297	Melilla	6.1	12481	81.2	28.0	1.2	24.8
298	Canary Islands	6.5	13287	82.7	23.7	1.0	14.1
299	Stockholm	7.4	23982	82.9	6.5	1.1	8.9
300	East Middle Sweden	7.3	20258	82.3	7.9	1.0	9.2
301	Småland with Islands	7.6	20052	82.7	5.7	0.4	10.2
302	South Sweden	7.5	20699	82.4	8.7	1.3	11.6
303	West Sweden	7.4	21193	82.4	6.2	0.7	8.2
304	North Middle Sweden	7.3	19796	81.8	7.2	0.7	6.4
305	Central Norrland	7.4	19973	81.7	6.5	0.3	5.2
306	Upper Norrland	7.4	20107	81.8	6.1	0.8	6.1
307	Lake Geneva Region	7.4	24086	84.2	8.1	0.9	14.5
308	Espace Mittelland	7.5	22233	83.1	4.4	0.4	12.9
309	Northwestern Switzerland	7.4	24192	83.6	4.6	0.2	14.5
310	Zurich	7.7	27214	83.9	4.6	0.7	14.3
311	Eastern Switzerland	7.8	22700	83.4	3.9	0.6	12.7
312	Central Switzerland	7.8	25241	84.0	3.0	0.3	12.8
313	Ticino	7.3	22009	85.0	6.2	0.6	20.8
314	Istanbul	5.1	7695	78.5	13.9	2.0	18.8
315	Thrace	5.8	6598	77.8	8.6	1.6	15.7
316	Southern Marmara - West	5.4	5924	77.7	6.1	2.6	17.0
317	Izmir	5.2	7032	78.5	14.3	2.4	20.9
318	Southern Aegean	5.1	5969	78.9	7.3	2.8	19.9
319	Northern Aegean	5.4	5832	77.1	6.4	3.1	18.9
320	Eastern Marmara - South	6.3	6968	77.6	9.8	2.2	18.2
321	Eastern Marmara - North	5.4	6350	77.9	11.1	2.1	16.6

322	Ankara	5.8	8690	79.2	11.4	1.9	23.3
323	Central Anatolia - West and South	5.6	5652	78.4	6.1	2.5	24.0
324	Mediterranean region - West	5.5	6608	79.2	12.2	2.0	21.3
325	Mediterranean region - Middle	5.5	5040	77.5	10.9	3.3	25.1
326	Mediterranean region - East	4.4	3678	78.2	11.8	2.5	24.5
327	Central Anatolia - Middle	5.4	5137	78.1	11.7	2.3	23.6
328	Central Anatolia - East	5.6	5775	77.8	12.1	1.6	22.8
329	Western Black Sea - West	5.3	6316	78.0	7.7	2.5	15.2
330	Western Black Sea - Middle and East	6.0	5626	78.3	5.1	3.0	16.4
331	Middle Black Sea	5.7	5213	78.2	7.1	2.7	18.2
332	Eastern Black Sea	5.4	5923	79.9	3.8	1.7	18.0
333	Northeastern Anatolia - West	5.6	4975	78.1	5.5	1.7	23.6
334	Northeastern Anatolia - East	5.3	3262	77.4	5.7	3.9	25.8
335	Eastern Anatolia - West	5.5	4428	78.8	7.2	2.4	24.9
336	Eastern Anatolia - East	4.9	2948	77.4	12.9	1.8	27.4
337	Southeastern Anatolia - West	5.0	3578	77.0	14.6	3.1	25.9
338	Southeastern Anatolia - Middle	4.6	2763	77.7	14.0	3.4	27.0
339	Southeastern Anatolia - East	4.4	2625	78.3	27.1	2.0	30.2
340	North East England	6.7	17738	79.9	5.7	1.0	6.7
341	North West England	6.8	18419	80.0	4.2	1.3	10.3
342	Yorkshire and The Humber	6.9	17716	80.7	5.0	3.0	7.8
343	East Midlands	6.9	18476	81.3	4.1	1.1	7.4
344	West Midlands	6.8	18010	80.9	5.7	1.1	7.8
345	East of England	6.9	21369	82.2	4.1	0.8	12.1
346	Greater London	6.7	26727	82.8	5.4	1.2	11.3
347	South East England	6.9	23349	82.5	3.4	0.7	10.1
348	South West England	7.0	20622	82.0	3.8	0.7	9.9
349	Wales	6.8	17733	80.4	4.7	1.1	10.5
350	Scotland	7.1	19994	79.3	4.2	1.2	7.6
351	Northern Ireland	7.0	17233	81.1	4.7	0.9	7.0
352	Alabama	7.4	32686	75.4	4.4	8.4	10.1
353	Alaska	6.8	46338	78.3	7.1	7.0	6.7
354	Arizona	6.9	33304	79.6	4.9	5.5	10.6
355	Arkansas	7.0	32574	76.0	3.7	7.2	10.3
356	California	7.4	44093	80.8	4.8	4.9	13.7
357	Colorado	7.4	41740	80.0	2.8	3.7	7.4
358	Connecticut	6.9	54925	80.8	4.7	2.2	9.2
359	Delaware	8.1	39885	78.4	4.6	5.9	11.0
360	District of Columbia	6.8	59267	76.5	6.0	20.4	11.5
361	Florida	7.0	37510	79.4	4.2	5.4	8.3
362	Georgia	7.0	34116	77.2	4.7	6.6	10.0
363	Hawaii	7.6	41620	81.3	2.4	2.5	5.1
364	Idaho	6.8	32368	79.5	3.2	2.9	7.3
365	Illinois	6.9	41661	79.0	5.0	8.2	12.1
366	Indiana	7.0	35874	77.6	3.5	6.6	12.2
367	Iowa	7.5	38438	79.7	3.1	2.3	10.6
368	Kansas	7.4	40002	78.7	3.6	3.8	8.8
369	Kentucky	7.1	32509	76.0	4.9	5.9	9.7
370	Louisiana	7.4	36214	75.7	5.0	11.8	9.7
371	Maine	6.8	36549	79.2	3.3	1.5	6.7
372	Maryland	7.4	46107	78.8	4.1	8.0	10.8
373	Massachusetts	7.0	50499	80.5	3.7	2.0	8.5
374	Michigan	6.9	36150	78.2	4.6	6.0	11.0

375	Minnesota	7.4	41291	81.1	3.5	1.8	9.6
376	Mississippi	7.3	30303	75.0	5.0	8.0	9.6
377	Missouri	7.2	35767	77.5	3.8	8.8	9.8
378	Montana	6.6	34462	78.5	4.0	3.5	5.8
379	Nebraska	7.8	40618	79.8	2.9	2.6	9.4
380	Nevada	6.8	35987	78.1	5.0	7.6	7.3
381	New Hampshire	6.9	48205	80.3	2.7	1.3	7.7
382	New Jersey	7.1	49152	80.3	4.6	4.2	10.2
383	New Mexico	7.1	32463	78.4	6.1	6.7	6.0
384	New York	7.1	46512	80.5	4.7	3.2	10.0
385	North Carolina	7.4	34334	77.8	4.6	6.7	8.7
386	North Dakota	7.9	45071	79.5	2.6	2.0	6.8
387	Ohio	6.8	36638	77.8	5.0	5.6	12.4
388	Oklahoma	7.0	38008	75.9	4.3	6.2	9.2
389	Oregon	7.0	36093	79.5	4.1	2.8	5.9
390	Pennsylvania	7.0	41673	78.5	4.9	5.2	10.3
391	Rhode Island	7.5	41969	79.9	4.5	2.7	8.8
392	South Carolina	7.7	32729	77.0	4.3	7.4	9.4
393	South Dakota	7.1	39992	79.5	3.3	3.1	8.0
394	Tennessee	7.4	36500	76.3	3.7	7.3	9.4
395	Texas	7.3	39256	78.5	4.3	5.3	9.1
396	Utah	7.1	33302	80.2	3.2	2.4	7.9
397	Vermont	8.0	41425	80.5	3.0	2.2	7.0
398	Virginia	7.4	43221	79.0	3.8	5.8	9.2
399	Washington	7.2	43860	79.9	4.8	2.7	6.8
400	West Virginia	6.8	31055	75.4	5.1	4.4	8.9
401	Wisconsin	7.2	38502	80.0	3.3	4.0	10.1
402	Wyoming	7.8	45393	78.3	4.2	3.4	5.4

Source: Elaborated from OECD data of 2016. Notes: R13 Life Satisfaction, R3 Unemployment rate (% of Active Population), R4 Income per capita in year 2016 (Dollars at 2010 prices and PPPs), R5 Homicide rate (per 100 thousand people), R7 Life Expectancy, R8 Pollution (level of PM2.5, micrograms per cubic meter of air). Definitions in OECD(2018).Regarding possible underestimation of the indicator R4 in Mexico see the Annex of Guisan(2022).

Table A2. Non weigheted averages of R13 in groups of 372 regions.

Group	R13	Nº regiones	xr13 satisfac tion	xr3 unem ployment.	rx4 income per capita(th)	xr5= homicide	xr7 lex	xr8= Pm2.5
1	<5.1	13	4.77	13.72	8.10	1.54	77.94	22.08
2	5.1 to 5.5	28	5.31	10.55	9.67	1.64	79.22	16.39
3	5.6 to 6	46	5.84	7.91	13.13	1.82	80.32	19.65
4	6.1to 6.5	55	6.30	8.86	15.53	4.16	81.15	16.83
5	6.6 a 7	88	6.83	5.89	21.67	5.22	79.85	11.66
6	7.1 a 7.4	80	7.29	5.32	23.65	3.58	80.41	9.65
7	>7.4	62	7.69	5.11	20.93	4.42	80.44	**9.23**
All	4.4 to 8.6	372	6.69	6.99	18.63	3.75	80.21	13.29

Source: elaborated from regional statistics OECD(2022). XRi is the non weighted average of indicator Ri.