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Happiness in the European Union: A Panel Regression Model and TOPSIS Analysis

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Abstract. *In this study data from EU member states from 2011 to 2022 is used to evaluate the impact of six factors on happiness within the EU. Using data from 2022 the researchers compare and rank nations using a regression model and the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) method. Key factors that have a significant impact on happiness across EU countries include social support healthy life expectancy and the freedom to make life choices. The results of the current study provide policymakers with pertinent information. Remarkably the regression coefficient for Generosity was not statistically significant and the only variable that negatively affected happiness was perceptions of corruption. The factors taken together explained 77% of the variation in happiness. Finland despite being a leader in happiness overall was only ranked eighth by the TOPSIS analysis which showed that nations like Sweden Denmark and the Netherlands had the highest scores and ranked favorably on the Happiness Index. These findings provide a basis for evidence-based policies meant to foster equitable growth and sustainable well-being throughout the EU by highlighting the significance of resolving regional disparities and putting transparent governance into place to reduce corruption.*

Keywords: happiness, sustainable development, panel data, fixed and random effects, TOPSIS analysis.

Introduction

The achievement of happiness and wellbeing has been a subject of concern in policy making and philosophy. In every society evolving at this pace and speed, the need to evaluate and work towards happiness needs still remains an important task.

This specific study tries to apply two quantitative methods of measuring the impact of variables such as the logarithm of GDP per capita, social support, life expectancy at birth, freedom in making decisions, generosity, perception of corruption, positive affect, and negative affect on the level of happiness. In this analysis the EU members will be the center and the focus from the year 2011 till 2022 for building a regression model and then using the TOPSIS method for ranking the data in 2022. The data for this analysis was collected from The World Happiness Report (WHR)

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(Helliwell et al., 2023). The authors of the report model chose variables often disregarded like social support because they capture a wide range of factors – economic, social, health, and even governance – that through rigorous analysis over the past decade have been proven to explain a large amount of the difference in happiness across countries for the last 13 years of the report. Moreover, these variables are measurable and easily accessible, so they are actually useful for analysis and comparison at a global level. These variables are ranked by the World Happiness Report to provide policymakers and researchers with meaningful data regarding the determinants of happiness and to provide a foundation for further research. The significance of the current research is achieved by providing results that have been obtained while following the subjective approach to the measurement of people's happiness and results obtained from the TOPSIS method – ranking objectively on the basis of the six most crucial indicators.

The first section of time is spent on reading technical literature, with particular emphasis on the theory of subjective well-being (SWB). It sets out the origins and early publications that establish SWB (Diener, 1984), identifying primary points and potential directions for future research (Diener et al., 1999). It also gives an overview of the history and method of gathering data of the World Happiness Report. In addition, it discusses the conclusions of what other researchers have learned regarding how six variables - corruption, gross domestic product per capita, social support, generosity, health, and freedom - influence happiness. Methodology describes the process of data collection, composition and presentation of indicators, and the use of panel analysis. Regressive panel analysis uses fixed-effect and random-effect regressions. Further, the paper offers a TOPSIS analysis on the basis of 2022 data, as available in the 2023 World Happiness Report (Helliwell et al., 2023).

Literature review

Ed Diener' article, "Subjective Well-Being" (Diener, 1984), is a pioneering study in subjective well-being (SWB) research. Diener, in this article, presents SWB as an open-ended construct susceptible to various meanings in philosophical, cultural, and empirical settings. The author identifies three fundamental conceptualizations of subjective well-being (SWB) that give rise to varied characterizations of the nature of happiness or well-being. The early definition put forth in the paper derived from the Aristotelian perspective in which eudaemonia is acquired through virtuous living highlights that here, happiness is not an individual emotional state of being joyful but living according to some standards of ethics or values (Eysenck, 2024). This definition highlights that well-being is not based on personal feelings but objective standards like virtue or success. The second definition is more reflective and focuses on life satisfaction as the key component of subjective well-being (SWB). Pleasure here is measured in relation to personal standards for a good life. This idea, with roots in ancient philosophy and growing higher on the agenda for modern psychology, is used to highlight the subjective nature of well-being. It suggests that happiness is a function of the way individuals measure the quality of their lives, in line with what Marcus Aurelius and later scholars (Shin & Johnson, 1978), assumed, those who see happiness as a universal self-assessment. The third concept of well-being is Bradburns' (1969) assumption that one can imagine happiness as an excess of positive over negative affect. This affective dimension of well-being is crucial to comprehending the way in which people are currently feeling or even over extended periods of time. This implies that being well may also be a personal quality or orientation towards experiencing increased positive affect.

The World Happiness Report (WHR) is a landmark and potent gauge of measuring happiness worldwide, providing profound insights into the determinants of human well-being for

countries (Helliwell et al., 2023). The report's main source data is the Gallup World Poll that provides a robust and representative measure of life evaluations in nations using the Cantril ladder. The Cantril Ladder is a subjective assessment of individual well-being and life satisfaction (Levin & Currie, 2014). According to this procedure, participants visualize a ladder with rungs marked from 0 to 10, where 0 is the worst place in life and 10 is the best. Participants then indicate where they currently stand on the ladder (Cantril, 1966).). This straightforward approach provides valuable insights into the self-reported happiness and life satisfaction of individuals. By accumulating around 1,000 responses annually per nation and weighting them to calculate national averages, the Gallup World Poll supplies reliable and comparable numbers. That the three-year average also improves the validity of happiness rankings reflecting an extensive representation of subjective well-being in the long run (Helliwell et al., 2023) justifies its employment. Based on the extensive analysis provided by the World Happiness Report (WHR), the current study narrows its focus by limiting its scope to the member countries of the European Union (EU).

By highlighting this strategy, the authors hope to build a more precise and intensive examination of happiness among EU citizens, and carry out a comparison of the significance of variables in the proposed model and random effects model regression results derived from the smaller, region-based sample of countries. Other research papers utilizing panel data have also examined the impact of corruption on happiness and established a positive correlation between the control of corruption and happiness (Behera et al., 2024; Q. Li & An, 2020; Ma et al., 2022; Satrovic et al., 2018). GDP's impact on happiness has been a significant domain of concern in the expert literature, and a number of studies and research papers have examined the relationship between GDP and happiness (Akgun et al., 2022; Behera et al., 2024; Diener & Oishi, 2000; Monsef et al., 2019; Ortiz-Ospina & Roser, 2017, 2023). Generosity and social support are key aspects of well-being, as they build human connection, encourage kindness, and create a sense of community. Having friends and relatives near when in need, performing charitable acts, and being caring towards others greatly increase our well-being (Amati et al., 2018; Azizi et al., 2017; Fernandez-Portero et al., 2023; Jigani et al., 2024; Moeini et al., 2018; Samreen & Majeed, 2019; Zhang & Dong, 2022). The relationship between good living and happiness has been extensively researched, which shows that living in good physical health, good mental health, and a healthy lifestyle contributes significantly to one's happiness (Lawrence et al., 2015; Song et al., 2023; Tuna et al., 2023). Freedom has always been a significant aspect of human beings' life, impacting their level of life tremendously. The ability to choose and construct one's life reinforces a sense of agency and control. Numerous researchers have explored this relationship, with freedom as the central element to enhance overall well-being and happiness (Abdur Rahman & Veenhoven, 2018; Brulé & Veenhoven, 2014; Koohborfardhaghighi et al., 2022; C. Li et al., 2017; Verme, 2009).

Methodology

This section details the indicators used in the analysis and outlines the two quantitative methods designed to define the impact of the indicators on happiness; the study being carried out for the EU member states, initially for the period 2011-2022 (worth mentioning is that for the Czech Republic in 2019 and Luxembourg in 2020 and 2021 the data were missing, so those were predicted based on available historical data using exponential smoothing method) regarding the creation of a regression and later for the year 2022 to implement a ranking using the TOPSIS method.

Table 1 illustrates the indicators used in the World Happiness Report (Helliwell et al., 2023), the Gross Domestic Product per capita calculated at purchasing power parity, with 2017 as a reference and expressed in dollars is the first indicator taken into analysis, and due to the

difference in measurement scale between it and the other indicators, to perform the regression it was converted to a logarithmic scale. Next, another indicator considered in the analysis is social support, which is calculated for each country as the average of all answers given at the national level to the question with a binary answer "If you were in trouble, do you have relatives or friends you can count on to help you whenever you need them, or not?" (Helliwell et al., 2023). Healthy life expectancy at birth is a third indicator that the authors obtain from the World Health Organization report, the data appearing every five years, and to consider the annual nature of the World Happiness Report, they use interpolation methods and extrapolation.

Freedom to make life choices is calculated on the same principle as social support, representing the national average of the binary answers obtained to the question "Are you satisfied or dissatisfied with your freedom to choose what you do with your life?" (Helliwell et al., 2023). The same calculation methodology is applied to Perceptions of corruption, which is the average of two questions about government and business corruption. Generosity represents the residuals of regressing between the national average on the question "Have you donated money to a charity in the past month?" (Helliwell et al., 2023) and log GDP per capita. Positive and negative affect are calculated as averages of the emotions experienced the day before, laughter, interest and happiness for the positive ones, and worry, anger and sadness for the negative ones, respectively.

The connection with sustainable development is also carried out via indicators, for instance GDP per capita corresponds to the 8th SDG Decent work and economic growth, Healthy life expectancy at birth is related to the SDG3 Good health and well-being while the perception of corruption is materialized in the 16th SDG Peace, justice and strong institutions (United Nations, 2015).

Table 1. Indicators

Label	Name
lGDP	Log of GDP per capita
SS	Social support
HLEB	Healthy life expectancy at birth
FMLC	Freedom to make life choices
G	Generosity
PC	Perceptions of corruption
PA	Positive affect
NEA	Negative affect

Source: Authors' research.

As shown before, those research findings take (i) a regressive panel analysis including the values of the 27 EU member states during a-period of 12 years (2011-2022) to estimate the effect of the first six dimensions of Table 1 on the Life Ladder using fixed effect and random effect regression models.

Panel data allow the observation of the same cross-sectional data for several time periods, this fact leads to the increase of the sample, incorporating changes over time (Gujarati, 2003).

One problem in determining which type of regression to use concerns the homogeneity of the parameters. To model individual heterogeneity the error is separated into two components (idiosyncratic error and individual error). If in the case of idiosyncratic error, it is considered that it is independent of exogenous variables and individual error, the latter can be independent or correlated with these variables. If the individual component is correlated with the regressors, then the fixed effects model is used, otherwise, the random effects model is implemented (Croissant & Millo, 2008).

To choose between the two models, the Hausman test is applied, with the null hypothesis of no significant differences. When the null hypothesis is not rejected, the random effects model is chosen (Hausman, 1978).

The implementation of the two types of regressions as well as the Hausman test were carried out in RStudio using the PLM package (Croissant & Millo, 2008).

In the case of the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) analysis, the first six indicators illustrated in Table 1 were considered, the examination being carried out for the year 2022, these being the data available from the 2023 report. TOPSIS represents a method of Multiple Attribute Decision Making (MADM) developed by Hwang and Yoon (1981) according to which, that alternative is chosen whose distance to the positive ideal solution is the shortest. The suitable answer represents a group of best ranges of all considered attributes, while the terrible best answer encompasses the worst recorded values of the attributes (Yoon & Hwang, 1995). This MADM method has been used in numerous research to assess both happiness (Coronicova Hurajova & Hajduova, 2021) and sustainability (Ciucu (Durnoi) et al., 2024; Mateusz et al., 2018).

As previously mentioned, the reason to create this study is to be found in the World Happiness Report (Helliwell et al., 2023). The authors in this report present outcomes obtained at the international level, and the main purpose of the current research was to track the influence of the six indicators applied by these authors on happiness only in the EU context. For since, in the view of this report's authors, these variables are not part of a composite indicator determining happiness but have only been shown to account for it to a highly considerable extent. Thus, a second objective of this research was to verify the differences resulting from using a method that involves the six indicators and provides an objective ranking (TOPSIS), as opposed to respondents' subjective opinion (i.e. Happiness Index).

Results and discussions

This section is dedicated to presenting the main results obtained by applying the two methods discussed in Methodology. The results begin with a series of regressions applied to the panel data presented in the previous section, and later, culminate with the TOPSIS method whose purpose is to determine a ranking of the countries' happiness based on the indicators chosen in the analysis.

Regression

Before presenting the results provided by implementing the two regression models associated with panel data, Table 2 was extracted from the World Happiness Report (Helliwell et al., 2023), which presents the outcome obtained by the authors of this report for most of the world's states.

Following the application of the Pooled OLS regression, the second column of Table 2 shows the values of the regression coefficients related to the first six indicators defined in Table 1. Hence, all the other variables seem to positively influence the Life ladder, except for the Perception of corruption. As for the influence of GDP per capita, it seems to have a negative influence on positive and negative affect. Also, as the years of healthy life are higher, positive emotions are reduced and negative ones get stronger. Also, social support is observed to create positive effects as much as it lessens negative ones. Freedom to make life choices and Generosity are not the same since they have a higher impact on the positive effects than on the negative ones. Moreover, the increase in generosity leads to the production of increased positive and negative affect. As expected, once Perception of Corruption expands, positive emotions decrease and negative

emotions increase, however, the impact of corruption is approximately 10 times greater for negative affect.

Table 2. Regressions to Explain Average Happiness across Countries (Pooled OLS)

	Dependent Variable			
Independent Variable	**Cantril Ladder**	**Positive Affect**	**Negative Affect**	**Cantril Ladder**
	(0-10)	**(0-1)**	**(0-1)**	**(0-10)**
Log GDP per capita	0.359	-0.015	-0.001	0.392
	(0.067)***	(0.009)	(0.007)	(0.065)***
Social support (0-1)	2.526	0.318	-0.337	1.865
	(0.356)***	(0.056)***	(0.046)***	(0.35)***
Healthy life expectancy at birth	0.027	-0.0005	0.003	0.028
	(0.01)***	(0.001)	(0.001)***	(0.01)***
Freedom to make life choices (0-1)	1.331	0.371	-0.090	0.505
	(0.297)***	(0.041)***	(0.039)**	(0.278)*
Generosity	0.537	0.088	0.027	0.33
	(0.256)**	(0.032)***	(0.027)	(0.245)
Perceptions of corruption (0-1)	-0.716	-0.009	0.094	-0.712
	(0.262)***	(0.027)	(0.022)***	(0.249)***
Positive affect (0-1)				2.285
				(0.331)***
Negative affect (0-1)				0.185
				(0.388)
Year fixed effects	**Included**	**Included**	**Included**	**Included**
Number of countries	156	156	156	156
Number of observations	1,964	1,959	1,963	1,958
Adjusted R-squared	0.757	0.439	0.334	0.782
” Coefficients are reported with robust standard errors clustered by country (in parentheses), ***, **, and * indicate significance at the 1, 5, and 10 percent levels respectively.” Helliwell et al. (2023)				

Source: Helliwell et al. (2023)

In order to find out which regression is employed to estimate the Life Ladder, the Hausman test was employed whose results are presented in Table 3, as per which the null hypothesis holds and is employed with the random effects model.

Table 3. Hausman Test Life Ladder

Hausman Test
data: LL ~ lGDP + SS + HLEB + FMLC + G + PC chisq = 4.75, df = 6, p-value = 0.58 alternative hypothesis: one model is inconsistent

Source: Authors’ research.

Table 4 shows the results that are derived by applying the random effects model, keeping in mind that generosity is the only one that is not statistically significant otherwise. Also, the resulting model is significant from a statistical point of view, the p-value being equal to 0. Moreover, the coefficient of determination is 77%, a sign that the variance of these indicators implies 77% of the Life ladder variability. Since theta has the value 0, the model becomes a pooled one (Jordan & Philips, 2023), which is exactly the same model proposed in Table 2.

Table 4. Random effect model - Regression to Explain Life Ladder

Coeficients	Estimate	Std. Error	z-value	Pr(>|z|)			Model	
Intercept	-4.10	1.20	-3.43	0.00	***		R^2	0.77
lGDP	0.59	0.10	5.68	0.00	***		Adj. R^2	0.77
SS	2.19	0.48	4.53	0.00	***		P-value	0.00
HLEB	0.03	0.01	2.13	0.03	*		Theta	0
FMLC	1.25	0.25	5.05	0.00	***			
G	0.10	0.18	0.57	0.57				
PC	-1.10	0.15	-7.45	0.00	***			
Significance 0 ”***” 0.01 ”*”								

Source: Authors' research.

The next variable that was considered endogenous was Positive affect, the implementation of the Hausman test indicating that in this case the model with fixed effects should be applied (Table 5).

Table 5. Hausman Test Positive Affect

Hausman Test
data: PA ~ lGDP + SS + HLEB + FMLC + G + PC
chisq = 13.61, df = 6, p-value = 0.03
alternative hypothesis: one model is inconsistent

Source: Authors' research.

In the case of regression with fixed effects, the only variable that has a negative impact on positive emotions is the perception of corruption, while in Table 2 it can be noted that including the increase in the logarithm of GDP per capita and Healthy life expectancy at birth lead to a decrease in feeling positive. Also, as with the results illustrated in Table 4, the coefficient of generosity is not statistically significant. Moreover, by comparing with the testing of the answers provided by the respondents of the 156 countries, in the case of the model formulated based on the answers of the respondents from the EU member states, the coefficient of determination is much higher - 69%. Whereas in the model suggested in the World Happiness Report (Helliwell et al., 2023), the boost in the GDP per capita has had a negative effect on the Positive affect, in the model developed from the data presented in Table 5, there is a positive effect.

Table 6. Fixed effect model - Regression to Explain Positive Affect

Coeficients	Estimate	Std. Error	z-value	Pr(>|z|)			Model	
lGDP	0.02	0.01	2.08	0.04	*		R^2	0.69
SS	0.12	0.05	2.25	0.03	*		Adj. R^2	0.68
HLEB	0.01	0.00	3.22	0.00	**		P-value	0.00
FMLC	0.16	0.03	5.70	0.00	***			
G	0.02	0.02	0.97	0.33				
PC	-0.11	0.02	-6.59	0.00	***			
Significance 0 ”***” 0.001 ”**” 0.01 ”*”								

Source: Authors' research.

To model negative affect through exogenous variables, the Hausman test was once again implemented, the model with fixed effects being chosen (Table 7).

Table 7. Hausman Test Negative Affect

Hausman Test
data: NEA ~ lGDP + SS + HLEB + FMLC + G + PC chisq = 23.37, df = 6, p-value = 0.00 alternative hypothesis: one model is inconsistent

Source: Authors' research.

According to Table 8, both the regression coefficients and the model are statistically significant, the increase in the logarithm of GDP per capita, of social support, but also of Freedom to make life choices leads to a decrease in negative affect, the results corresponding to those from the World Happiness Report (Helliwell et al., 2023).

Table 8. Fixed effect model - Regression to Explain Negative Affect

Source: Authors' research.

TOPSIS analysis

In the following, a series of maps designed to define the European context regarding the values recorded by the EU member states for the six indicators chosen to explain happiness will be illustrated. Later, based on this data, a score is highlighted to rank the countries according to the distance between them and the positive and negative ideal solutions.

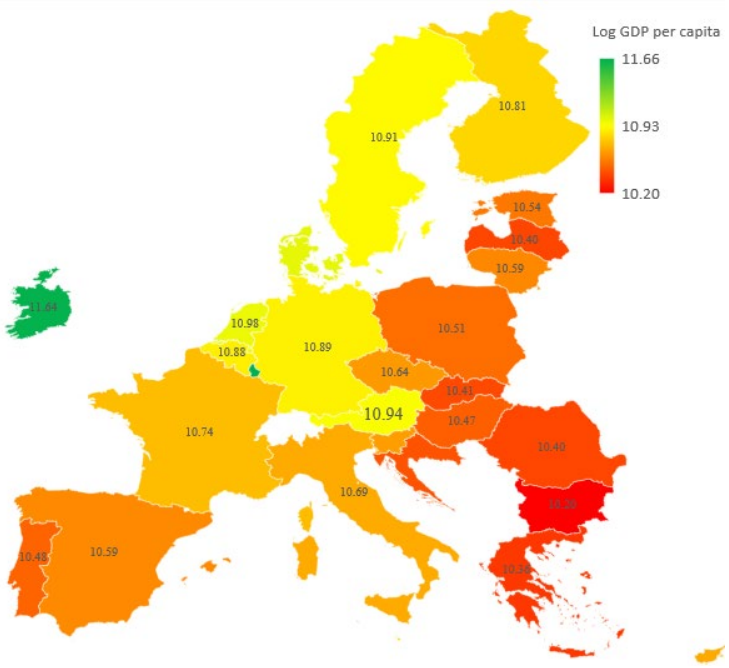

Figure 1. GDP per capita

Source: Authors' research using Excel

Regarding GDP per capita, discrepancies are noted between the central, northern and western areas of the EU compared to the southern and eastern areas, with the highest values being recorded in Ireland and Luxembourg, while countries such as Bulgaria and Greece are at the other extreme (Figure 1).

Figure 2 shows the values obtained in 2022 by the EU member states for social support, highlighting the low performances of Romania, Greece and Cyprus, while the Nordic countries together with Bulgaria, Denmark, Slovakia and the Czech Republic obtained the highest scores for

the studied year. In other words, Romanians, Greeks and Cypriots believe to a lesser extent compared to the rest of the EU states that they could rely on those close to them to help them if they were in trouble.

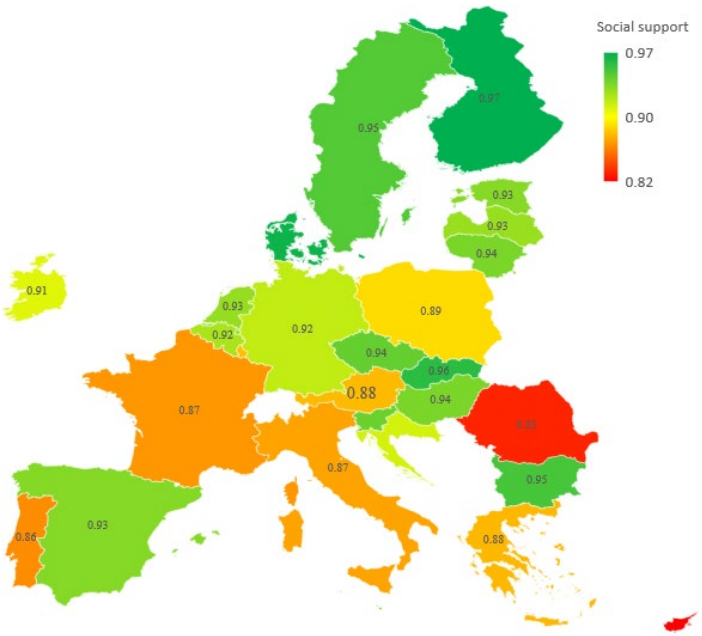

Figure 2. Social support

Source: Authors' research using Excel.

According to Figure 3, except for Greece and Cyprus, all Eastern EU countries experience the lowest values of the number of healthy life years, with the states where the number of years is expected to be higher being Italy, Sweden, France, Spain and Cyprus.

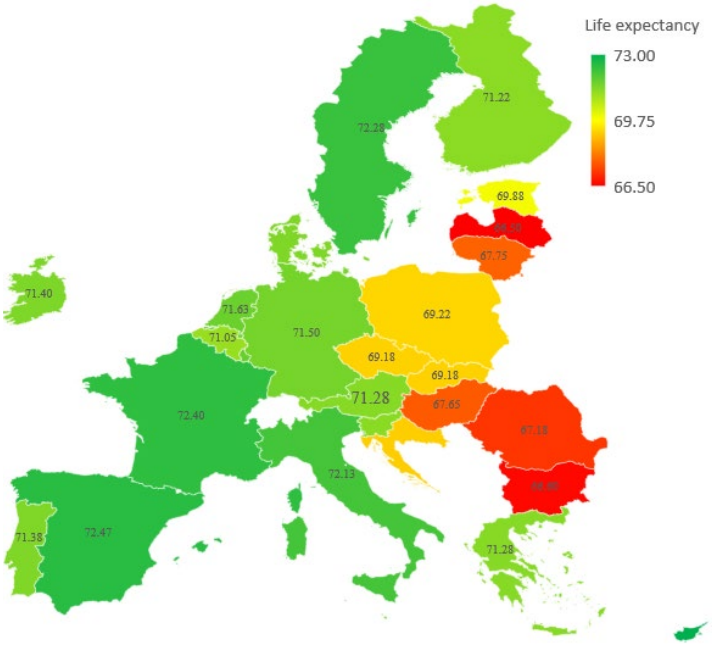

Figure 3. Healthy life expectancy at birth

Source: Authors' research using Excel.

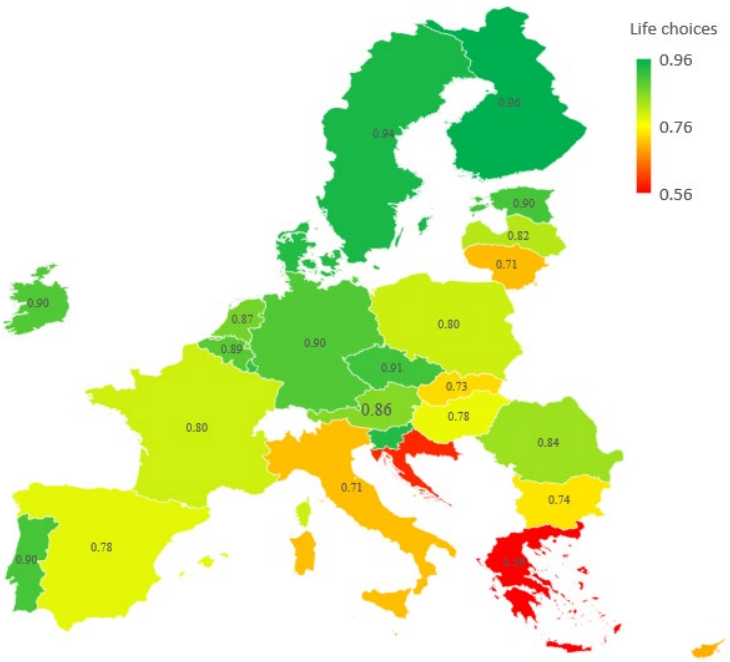

Figure 4. Freedom to make life choices

Source: Authors' research using Excel.

The freedom to make one's own decisions in life is another indicator investigated to determine the happiness of the EU population; the citizens with the greatest dissatisfaction with the freedom to choose what they want to do in life are Greeks and Croats. At the other extreme are countries such as Finland, Sweden, Slovenia and the Czech Republic, where more than 90% of respondents are satisfied with the freedom they have to make life decisions (Figure 4).

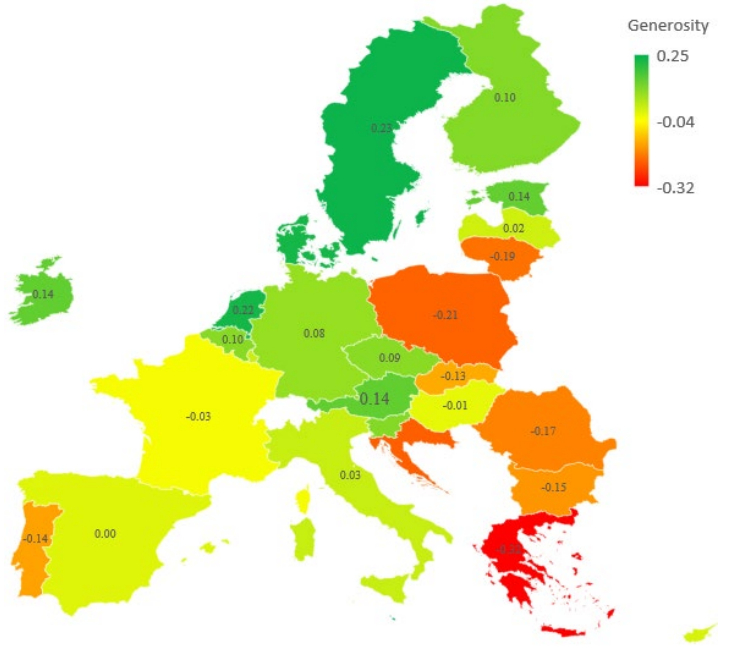

Figure 5. Generosity

Source: Authors' research using Excel.

Except for Portugal, most of the states where generosity is at minimum levels are found, according to Figure 5, in the east of the EU; Poland, Lithuania, Greece and Croatia recording the lowest values for 2022, while countries such as Sweden, the Netherlands and Denmark top the list of the most generous EU states.

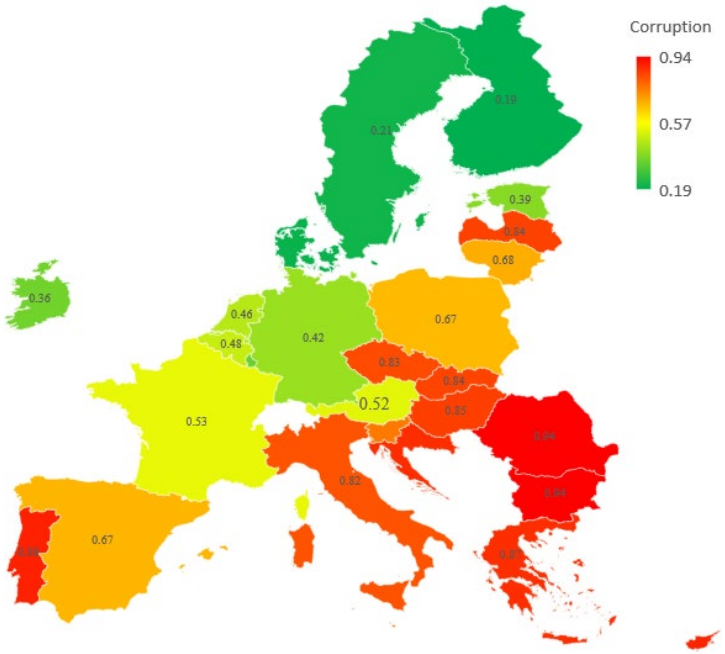

Figure 6. Perceptions of corruption

Source: Authors' research using Excel

As far as the perception of corruption is concerned, some demarcation between the south-east and north-west areas is highlighted, noting that most of the responding population in Bulgaria and Romania believe that there is corruption both at the governmental level and in the environment business. The countries where only a relatively small number of respondents believed that corruption exists are Denmark, Luxembourg, Sweden and Finland (Figure 6).

Table 9 presents the results obtained following the application of the TOPSIS method, calculating the positive and negative ideal solutions (ideal + and ideal –) related to each criterion, subsequently calculating the distances between these solutions and each individual country (SI+ and SI-), as at the end to calculate a score (P) on the basis of which to form the ranking of the happiest countries, the highest score being related to the country with the values of the indicators closest to the ideal positive solutions and further away from negative ideal solutions.

Table 9. TOPSIS analysis for the six chosen variables to explain Life Ladder

Country	Log GDP per capita	Social support	Healthy life expectancy at birth	Freedom to make life choices	Generosity	Perceptions of corruption	SI-	SI+	P
Austria	0.20	0.18	0.19	0.20	0.17	0.15	0.59	0.17	0.78
Belgium	0.20	0.19	0.19	0.21	0.12	0.14	0.54	0.21	0.72
Bulgaria	0.18	0.20	0.18	0.17	-0.19	0.27	0.22	0.55	0.28
Croatia	0.19	0.19	0.19	0.14	-0.27	0.25	0.14	0.62	0.18
Cyprus	0.19	0.17	0.20	0.16	0.01	0.25	0.41	0.37	0.53
Czechia	0.19	0.20	0.19	0.21	0.12	0.23	0.53	0.26	0.66

Country	Log GDP per capita	Social support	Healthy life expectancy at birth	Freedom to make life choices	Generosity	Perceptions of corruption	SI-	SI+	P
Denmark	0.20	0.20	0.20	0.22	0.28	0.06	0.72	0.03	0.96
Estonia	0.19	0.20	0.19	0.21	0.17	0.11	0.60	0.15	0.80
Finland	0.19	0.21	0.19	0.22	0.13	0.05	0.58	0.18	0.76
France	0.19	0.18	0.20	0.19	-0.03	0.15	0.39	0.36	0.52
Germany	0.20	0.19	0.20	0.21	0.10	0.12	0.53	0.22	0.71
Greece	0.19	0.18	0.19	0.13	-0.40	0.25	0.03	0.74	0.03
Hungary	0.19	0.20	0.18	0.18	-0.01	0.24	0.39	0.37	0.51
Ireland	0.21	0.19	0.20	0.21	0.17	0.10	0.60	0.15	0.80
Italy	0.19	0.18	0.20	0.17	0.03	0.23	0.44	0.33	0.57
Latvia	0.19	0.20	0.18	0.19	0.02	0.24	0.43	0.34	0.55
Lithuania	0.19	0.20	0.19	0.16	-0.24	0.19	0.18	0.57	0.24
Luxembourg	0.21	0.18	0.20	0.21	0.03	0.10	0.47	0.29	0.62
Malta	0.19	0.20	0.20	0.19	0.31	0.21	0.71	0.16	0.81
Netherlands	0.20	0.20	0.20	0.20	0.28	0.13	0.70	0.09	0.89
Poland	0.19	0.19	0.19	0.19	-0.26	0.19	0.17	0.59	0.22
Portugal	0.19	0.18	0.20	0.21	-0.17	0.25	0.24	0.52	0.31
Romania	0.19	0.17	0.18	0.19	-0.22	0.27	0.19	0.57	0.25
Slovakia	0.19	0.20	0.19	0.17	-0.16	0.24	0.24	0.51	0.32
Slovenia	0.19	0.20	0.19	0.22	0.12	0.21	0.53	0.25	0.68
Spain	0.19	0.20	0.20	0.18	0.00	0.19	0.41	0.34	0.54
Sweden	0.20	0.20	0.20	0.22	0.29	0.06	0.73	0.02	0.97
ideal -	0.18	0.17	0.18	0.13	-0.40	0.27			
ideal +	0.21	0.21	0.20	0.22	0.31	0.05			

Source: Authors' research.

In an attempt to make it more possible to better visualize each country's scores, Figure 7 was drawn, with again the contrast between the east, respectively south-east of the EU and the north, west and middle regions being emphasized.

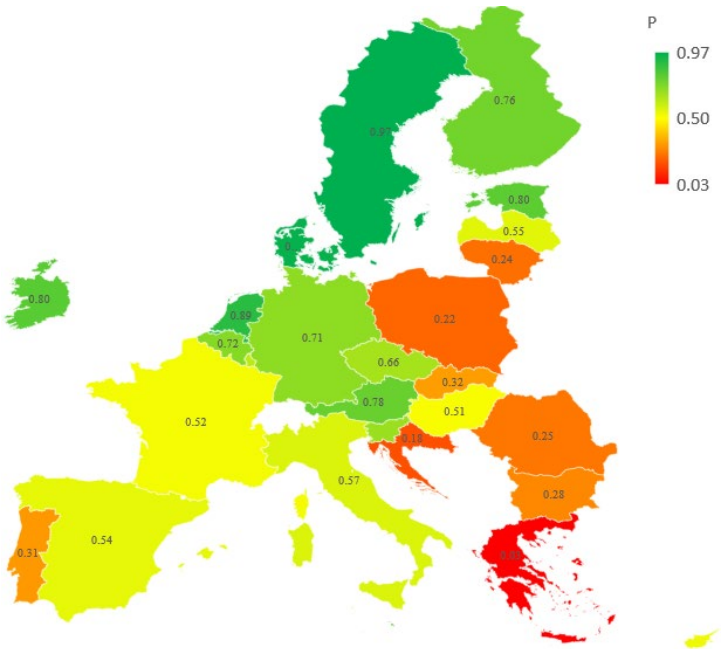

Figure 7. TOPSIS results – map representation

Source: Authors' research using Excel.

The lowest score seems to be obtained by Greece, followed by Croatia and Poland, while the countries with the happiest populations were the Netherlands, Denmark, Ireland and Sweden. It was desirable that the results obtained by implementing the TOPSIS method be compared with those associated with the Happiness Index.

Figure 8 indicates the values achieved by the EU countries in 2023 based on the World Happiness Report (Helliwell et al., 2023) and illustrates the same north-west/south-east differentiation as in the example of results obtained through the use of the TOPSIS method.

Despite the common elements that can be identified in Figure 7 and Figure 8, certain differences between the values provided by the application of these two methodologies are also emphasized Thus, in 2023, according to the Happiness Index, the best country in the world by score was Finland, while according to the TOPSIS methodology, the country is ranked only eighth. In addition, while in both cases Bulgaria is one of the poorest rankings, in the case of the Happiness Index this nation is ranked last in the EU, while based on the TOPSIS approach there are a number of countries which registered much lower values. These variations might be attributed to the fact that the six variables only explain 77% of the variance in happiness, and other variables account for the remaining 23%, not being included in the study.

Moreover, the Happiness Indicator is calculated based on the answers of a number of respondents in each country, which can be affected by their mood, culture or personal beliefs, elements that can be difficult to monitor and include in a quantitative analysis.

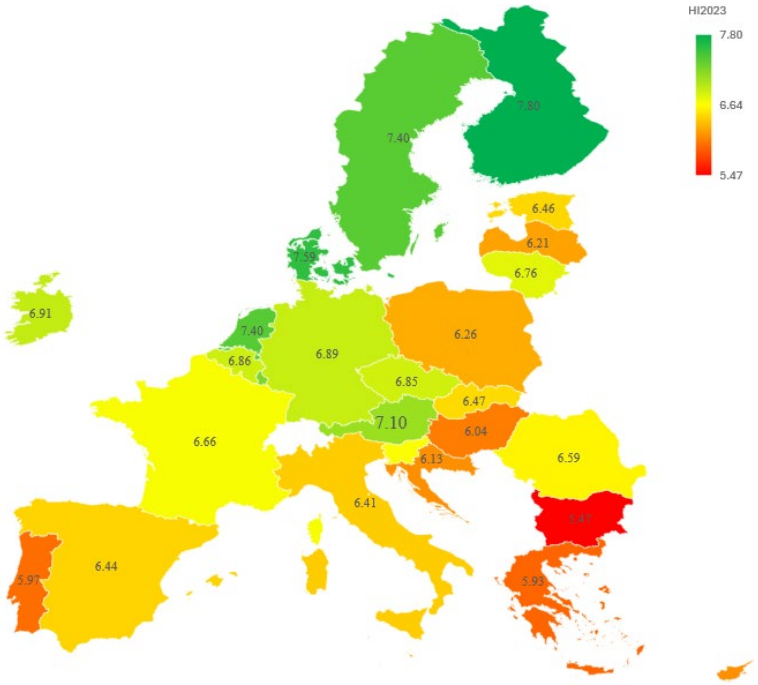

Figure 8. Happiness Index – map representation

Source: Authors' research using Excel.

Considering the variables introduced in the current research, the positive effect of freedom on happiness was also confirmed in the study conducted by Rahman and Veenhoven (2018), the authors showing that the connection between the two differs across cultures, this fact supporting what was mentioned previously, namely, that the impact of the variables on happiness varies depending on certain contexts related to the geographical positioning of the respondents. Additionally, when one looks at the study conducted by Brulé and Veenhoven (2014), it is observed that even though Finland and France are nations whose GDP per capita values are similar, and thus similar economic factors, the level of happiness is different. Social circumstances make the Finns happier, and psychological freedom is more proportionately associated with happiness in nations with a greater per capita GDP, and therefore it is for the same reason that the researchers state Finns are happier because they risk more to become free. But the authors confirm the impact of GDP on happiness and therefore adopt the conclusion of the present research. Regarding social support, the present study validated its strong influence on happiness, also validated in the research constructed by Azizi et al. (2017) where the authors establish that marriage status, parents' relations, and social activity relate to happiness. The present study had the objective of evaluating the influence of these six indicators on happiness in the EU.

Another variable for which a positive effect on happiness was observed is healthy life expectancy at birth, the link between the two being confirmed in several studies (Lawrence et al., 2015; Song et al., 2023), the authors of which state that happy people live longer. The only variable for which the observed impact was negative is corruption, this being a problem observed at a global level, combating it constituting one of the targets of the 16th Sustainable Development Goal. According to a study conducted by Li and An (2020) for 126 countries, the increase in corruption leads to the decrease of subjective well-being, which is consistent with the results obtained in this paper.

Conclusion

According to the World Happiness Report, happiness is obtained through six indicators: GDP per capita, Social support, Healthy life expectancy at birth, Freedom to make life choices, Generosity and Perceptions of corruption. For this purpose, regression models were initially run based on panel data covering the years 2011–2022 with the objective of understanding the effect of such indicators on happiness, but also positive and negative affect. Thus, it was found that Perceptions of corruption alone was the one variable with a negative effect on happiness, and that the regression coefficient for Generosity was not significant; the remaining five variables' variance explaining 77% of the variance in happiness. As per the information revealed by the same report in 2023, the performances of the nations for the year 2022 were released, in most instances, the differences between the eastern and southern and those in the center and north, being west of the EU were emphasized.

The top positions, as per the TOPSIS analysis conducted, are occupied by nations like Sweden, Denmark and the Netherlands, these nations also being placed in the most desirable positions in terms of the Happiness Index, Finland, which stands on the top rank is placed at the eighth position only if the TOPSIS analysis is applied. And at the bottom of the ranking achieved using TOPSIS were Poland, Croatia and Greece, while for the Happiness Index, Bulgaria, Greece and Portugal had the lowest scores.

The current study determined the significant impact of five of the six variables considered to explain the variance of happiness. According to the results obtained, it was noted that both economic and social factors influence happiness, so the possible policy implications in increasing citizens' happiness should not stop only at increasing their incomes, but also at encouraging healthy lifestyles, human interactions and personal development.

Although these variables explained a very large proportion of citizens' happiness, there are still differences between individuals' perceptions and the results obtained based on the six indicators. Therefore, future research directions may refer to the identification of new variables that can explain the variance of happiness. Another alternative could imply the identification of the influence of these values for other regions of the globe and comparing their impact on happiness based on geographical differences.

The limitations of the study relate to the research methods chosen, in the sense that applying another multicriteria decision-making method could have led to different results, the same applies to the regression, there are other models that could have been used to determine the impact of these variables on happiness. However, given that, in the case of regression, the model chosen is similar to that of the authors of the World Happiness Report, and TOPSIS is one of the most widely used decision-making techniques.

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