LIFE SATISFACTION AND PUBLIC FINANCE: AN EMPIRICAL ANALYSIS IN THE EUROPEAN UNION

B.-F. DEDU[1]   G. DINCĂ[2]

Abstract: *Our study examines the impact of social and macroeconomic indicators on happiness score, using panel data from the "World Happiness Report". We conducted fixed effects and year-fixed effects regressions, aiming to analyse any potential changes in the way that the considered variables affect the reported life satisfaction. The database consists of panel data for the period 2011-2023, including all the member states from the European Union. Firstly, we considered the original happiness score assigned to each country, then created a dummy variable taking value one for higher happiness scores compared to the average. Our findings suggest that GDP per capita remains statistically significant but has a lower coefficient in the regression with a dummy dependent variable.*

Key words: *life satisfaction, public finance.*

1. Introduction

Happiness represents a popular concept in the current policy making, as it is directly impacting the generalized life satisfaction of the citizens. It is influenced by many factors, including both monetary and non-monetary aspects of life, as well as the social background, culture or education. However, the importance of considering individual happiness at the national level has been declined by some researchers, as evaluating life satisfaction is subjective and it may not always lead to the best decisions at macroeconomic level. In addition, another well-debated theory was the Easterlin Paradox, which regards the sustainability of happiness and its relationship with economic growth.

Therefore, considering all the debates and divergent opinions, we have conducted the current study in order to analyse if the allocation of public expenses, as well as other socio-economic factors actually impact the reported life satisfaction of the European Union citizens.

The selection of the explanatory variables has been established in accordance with the social and macroeconomic context, as well as with the gaps in the existing literature. We

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[1] Transilvania University of Braşov, bianca.dedu@student.unitbv.ro
[2] Transilvania University of Braşov, gheorghita.dinca@unitbv.ro

distinguish our paper by analysing indicators that are present in the citizens' everyday life, including also the impact of the time required by professional life in the overall happiness, besides to the additional monetary satisfaction.

2. Literature Review

Throughout time, life satisfaction and individual well-being have been intensively studied in the context of socio-economic determinants. Starting from the 18th century and continuing through to recent studies, theories that anticipated the modern concept of happiness in relation to economic satisfaction have emphasized individual happiness as a key factor that should be considered in the policy-making process (Easterlin, 2013b; Hirschauer et al., 2015).

However, the consideration of individuals' happiness and life satisfaction in the policy-making process have also been contested by many researchers, as these indicators imply a high level of subjectiveness, which may be highly dependent on personal background, education or values (Böhnke, 2008). Therefore, the mechanisms used for determining life satisfaction at both individual and national levels have faced a shift from personal-oriented factors to a collective-oriented approach, underlying the importance of efficient governance on individual life satisfaction (Nikolova, 2016).

As each individual is highly dependent on public services, considering and addressing public expenses as part of their life satisfaction has become an important aspect to be considered at the national level (Uchida and Oishi, 2016), even though life satisfaction and happiness are different from one individual to another (Tella et al., 2003).

Happiness is often associated with the general well-being of individuals, as well as a harmonized feeling of achievement, in both physical and mental dimensions (Jacobsen, 2007). There are plenty of characteristics influencing the appreciation of life satisfaction, and they will be categorized into two groups as follows: the pecuniary and non-pecuniary factors.

On the one hand, studies have shown that non-pecuniary aspects such as marriage, divorce or other major events in one's life have a long-lasting impact on happiness (Easterlin, 2003), as well as a genetical predisposition toward sustaining this feeling (Lyubomirsky et al., 2005). Moreover, social comparison has been another key factor to explain personal happiness, as it amplifies the personal perception of fulfilment, and the hedonic predisposition of some individuals (Lyubomirsky and Ross, 1997).

On the other hand, pecuniary aspects such as wealth, income or investments are having a mixed impact on overall happiness and life satisfaction. The Easterlin Paradox is an important aspect to consider while regarding the sustainability of national life satisfaction, as it states a direct and positive relation between increasing Gross Domestic Product (GDP) and happiness only for a period of 10 years (Easterlin, 2013a).

However, many studies have proven that this relationship may continue even for longer periods of time, depending on the development level of the country analysed (Bartolini & Sarracino, 2014; Easterlin and O'Connor, 2022) or the turmoil that took place during the considered period of time (Kalyuzhnova and Kambhampati, 2008; Ko et al., 2025).

3. Data and Methods
3.1. Data

We have conducted our study using panel data for the reference period 2011-2023, considering all the European Union member states at the moment. The happiness score, represented by the variable "Happiness Score" has been collected from the Gallup World Poll, the official data provider for the annual series "World Happiness Report". Due to data availability issues, values for Happiness Score recorded in 2013 were missing, therefore the authors have assumed the 2013 value as being equal to the 2012 one, for all the sample.

The Happiness Score has been measured on Cantril Ladder, on a scale from 0 (zero) to 10 (ten), 0 representing the worst possible life that one could have, while 10 stands for the best life. According to Gallup World Poll (*Understanding How Gallup Uses the Cantril Scale*, n.d.), values are then considered within three main categories: a score below 4 represent a "Suffering" condition for the respondent, which implies well-being being at high risk.

These respondents have both poor life expectancy at the moment and also negative views on their next five years. The second category is presented as "Struggling" and it assumes values between 4 and 7. This includes a moderate level of well-being, as well as moderate or even negative views on the next five years of life. Lastly, values over 7 are considered as "Thriving" for respondents, as they present a consistent well-being, a good evaluation of their current life (with a score higher than 7) and positive views on their next five years of life (reaching a score over 8). Overall, the Cantril Ladder provides more authentic and less biased responses, as sampled people are asked to evaluate their overall life satisfaction on the scale. All other public finance variables have been collected from the Eurostat database.

Table 1 presents the descriptive statistics for the entire sample, for the period 2011-2023. The "Happiness Score" is a variable measured by each respondent on a scale ranging from 0 to 10, representing the overall appreciation of personal life. A higher value corresponds to better life satisfaction and generalized well-being, while a lower value corresponds to a less satisfied life. For the entire sample, the average value is 6.38, being higher than the middle value of the scale. This suggests that most citizens of the European Union countries are generally self-satisfied with their current life and well-being and have a positive opinion on their life over the next five years.

"Social protection" represents the total general government expenses in this sector as a percentage of GDP, while the average for the sample equals 16.86. "GDP/capita" is measured in current prices and expressed in purchasing power standard (PPS) per capita. The mean logarithmic value of the variable reaches 10.25 in the considered sample.

Regarding the variable "Inflation", it stands for the inflation rate and has been expressed as the annual rate of change, while the average value for the sample is 2.63. "Inequality" has been expressed as the ratio of total income received by 20% of the population with the highest income, also known as the top quintile to the one received by 20% of the population with the lowest income, representing the lowest quintile.

Income has been regarded as an equivalized disposable income. As the mean value of the variable is 4.84 for the current sample, this suggests that the top quintile is having a four-time higher disposable income than the lowest quintile on average.

"Working hours" is measured as worked hours per week and is reaching a 38.20 on average for the current sample. This suggests that citizens in the European Union have worked around 38.20 hours per week on average throughout the period 2011-2023. "Tax Aggregates" represents the total receipts from taxes and social contributions after deduction and is expressed as percentage of GDP, while the average value of the current sample is 37.07.

		Descriptive statistics				Table 1
Variable	N	Mean	SD	Median	Min	Max
Happiness Score	351	6.377	0.792	6.391	3.889	7.856
Social Protection (sp)	351	16.864	4.129	16.9	7.3	27.3
Log GDP/capita (loggdp)	351	10.245	0.380	10.238	9.37	11.432
Inflation (infl)	351	2.631	3.341	1.8	-1.6	19.4
Inequality (ineq)	351	4.839	1.146	4.5	3.03	8.32
Working Hours (wh)	351	38.204	2.343	38.8	30.3	42.2
Tax Aggregates (tax)	351	37.068	6.159	37	20.2	50

Notes: *N stands for the number of observations and SD represents standard deviation*

We have divided the countries into four groups based on their geographical location in Europe: North, West, South, East, in which we have considered the following countries: Denmark, Sweden, Finland, Estonia, Latvia, Lithuania in the "North" group; Austria, Belgium, France, Germany, Ireland, Luxembourg, Netherlands for the "West" group; Cyprus, Greece, Italy, Malta, Portugal, Spain for "South" group and Bulgaria, Croatia, Czechia, Hungary, Poland, Romania, Slovakia, Slovenia in the "East" group.

Figure 1 illustrates the graphical representation of the Happiness Score evolution within the analysed period in the four main clusters. Hereby, there are a few major trends that can be observed over time. The Western cluster has registered a relatively stable score over the years, reaching the highest level of happiness score, showing that citizens of developed countries with stable and efficient economies reported a higher life satisfaction during the period considered.

Regarding Northern Countries, they have reported a constant upward trend, while the Southern states' life satisfaction has been considerably negatively impacted by the euro crisis that affected them as of 2010. On the other hand, Eastern European countries seem to considerably increase the general life satisfaction level over the years.
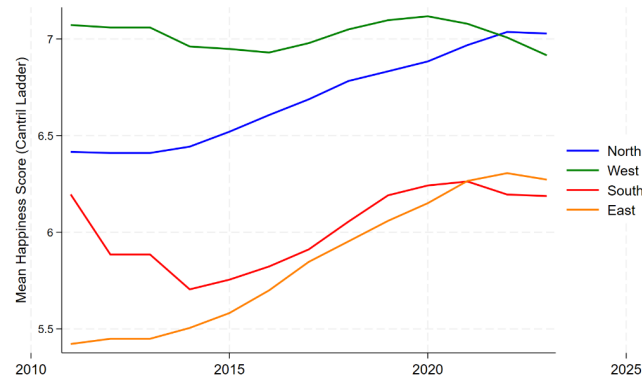
Fig. 1. *Happiness score evolution in the four geographical regions of the European Union during the period 2011-2023*

This remarkable improvement can be associated with the development of these states, most of them being part of the Ex-communist cluster of countries. Due to certain external factors, including accession to the European Union, these countries benefited from advanced technologies as part of the Catch-Up effect, which led to an increase in overall life quality and therefore satisfaction, as recent studies also suggest (Chen and Hsu, 2024).

3.2. Methods

We employed regression analysis in order to observe the impact of certain public expenses on the happiness score reported by each country considered in the panel. Moreover, year fixed effects have been considered in both regressions, aiming to study the impact of major events that took place during the addressed time period, mainly the COVID-19 pandemic and post-pandemic time, as well as the breakout of the Russian-Ukraine war.

In addition, we have applied fixed-effects regressions as different social backgrounds and cultural differences are considerably impacting the happiness score reported by each individual. Therefore, the results of the analysis are considerably impacted by a subjectivity-degree.

Table 2 presents the results of the Hausmann test, which has been addressed before applying the fixed-effects regression, implying the hypotheses:

H_0: Difference in coefficients is not systematic.
H_1: Difference in coefficients is systematic.

The results eventually confirm the motivation to consider the current approach instead of random-effects analysis. Since the P-value is lower than 0.5, H_0 will be rejected, therefore a fixed-effects model will be tested further on.

Hausmann test results	Table 2
	Coefficient
Chi-square test value	28.142
P-value	0.0001

In the first regression, we applied a fixed-effects and year fixed-effects regression on the panel data, which takes the following form:

$$hap_{it} = \alpha_i + \beta_1 \cdot sp_{it} + \beta_2 \cdot \log(gdp_{it}) + \beta_3 \cdot infl_{it} + \beta_4 \cdot ineq_{it} + \beta_5 \cdot wh_{it} + \beta_6 \cdot tax_{it} + \sum_{t=2012}^{2023} \delta_t D_t + \epsilon_{it} \tag{1}$$

Where hap_{it} is the continuous dependent variable measuring the Happiness Score, sp_{it}, $log(gdp_{it})$, $infl_{it}$, $ineq_{it}$, wh_{it}, tax_{it} are the considered independent variables, D_t is the dummy variable for each year of the sample ranging from 2012 to 2023, while δ_t stands for the coefficient corresponding to every year, α_i representing the individual fixed effects, and ε_{it} standing for idiosyncratic error.

Secondly, we have created a binary dummy variable for the Happiness Score, in which values higher than the median score of the sample are represented by 1, and scores lower than the median take value 0. In this case, all the independent variables have been assigned as aforementioned, as well as the fixed effects that have been considered. Therefore, the panel data regression takes the following form:

$$dummy\ hap_{it} = \alpha_i + \beta_1 \cdot sp_{it} + \beta_2 \cdot \log(gdp_{it}) + \beta_3 \cdot infl_{it} + \beta_4 \cdot ineq_{it} + \beta_5 \cdot wh_{it} + \beta_6 \cdot tax_{it} + \sum_{t=2012}^{2023} \delta_t D_t + \epsilon_{it} \tag{2}$$

4. Results and Discussions

We provide the output for both regressions applied to originally reported happiness scores, as well as dummy happiness scores, aiming to investigate potential changes that might occur in the importance of certain public expenses considered regarding the influence on the overall life satisfaction of citizens.

The results of the first analysis are depicted in Table 3. The empirical analysis was conducted at 95% confidence interval, considering both fixed and year-effects. According to the results, a positive relation has been found between happiness score and social protection, suggesting that countries that allocate higher funds to social programs and financial aids are usually reaching higher life satisfaction levels (Nordheim and Martinussen, 2020; Turnbull, 2015). Another positive relation that highlights the crucial role of prosperity in the overall life satisfaction is the GDP per capita, which concludes that richer countries are usually bringing prosperity and eventually better living conditions and satisfaction to their citizens (Delhey and Kroll, 2013).

Regarding inflation, a direct and positive impact has resulted on the happiness score, which may come against the expected results. However, higher inflation rates might be associated with raising consumption or increased salaries. In this way, individual life satisfaction may increase, even though higher inflation rates may occur (Aknin et al., 2018).

Table 3

Explaining happiness score based on public expenses as percentage of GDP during the period: 2011-2023

Happiness Score	Coef.	St. Err.	t-value	p-value	[95% Conf	Interval]	Sig
Social Protection (sp)	.04	.015	2.63	.009	.01	.07	***
Log GDP/capita (loggdp)	2.12	.212	9.98	0	1.702	2.538	***
Inflation (infl)	.024	.009	2.67	.008	.006	.042	***
Inequality (ineq)	.1	.036	2.80	.005	.03	.17	***
Working Hours (wh)	-.058	.035	-1.66	.097	-.126	.011	*
Tax Aggregates (tax)	.033	.011	2.96	.003	.011	.055	***
2011 (Base year)	0	.	.	.	.	.	
2012	-.114	.058	-1.96	.051	-.228	.001	*
2013	-.141	.063	-2.26	.025	-.264	-.018	**
2014	-.23	.069	-3.32	.001	-.366	-.094	***
2015	-.256	.074	-3.44	.001	-.403	-.11	***
2016	-.249	.077	-3.24	.001	-.401	-.098	***
2017	-.274	.076	-3.58	0	-.424	-.123	***
2018	-.251	.081	-3.08	.002	-.41	-.091	***
2019	-.241	.087	-2.77	.006	-.413	-.07	***
2020	-.177	.089	-1.99	.047	-.352	-.002	**
2021	-.351	.095	-3.69	0	-.538	-.164	***
2022	-.684	.11	-6.21	0	-.901	-.467	***
2023	-.773	.113	-6.81	0	-.997	-.55	***
Constant	-15.281	2.488	-6.14	0	-20.176	-10.386	***

Mean dependent var		6.377	SD dependent var	0.792
R-squared		0.580	Number of obs.	351
F-test		23.471	Prob > F	0.000
Akaike crit. (AIC)		-106.301	Bayesian crit. (BIC)	-32.947

*** p<.01, ** p<.05, * p<.1

Another concept that has been reviewed by the literature is prosocial buying, which has been proven to significantly improve perceived happiness, rather than individual consumption (Aknin et al., 2012). Inequality has also resulted in a positive relationship with happiness score, which may not be expected.

However, this relationship might be caused by the different perspective of the social categories. Firstly, the higher income class usually declare themselves as being highly satisfied with their lives, while those which have lower income are usually dissatisfied not by the lower income they eventually have, but by the unfairness of the society (Oishi

et al., 2011). Secondly, studies have proven that in contrast with the social comparison theory, an additional increase in personal income is usually leading to long-term happiness as a sense of fulfilment is achieved (Prati and Mancini, 2023; Yang and Ma, 2020). Therefore, the positive result obtained regarding the relationship between increased social inequality and happiness score is explained by other factors, including personal fulfilment or the sense of unfairness. Working hours have proven to be significant at a P-value of 10%, negatively impacting the overall happiness of nations. Finally, the tax aggregates variable has not been statistically significant in the current analysis.

The year-fixed effects that have been considered show a negative impact over the period 2011-2014 due to the global financial crisis, as well as the euro zone crisis which induced uncertainty and general instability regarding the future.

Research has demonstrated that currency instability can significantly reduce citizens' happiness, as observed in a German case study (Chadi, 2015). However, this finding is not isolated; a wider empirical study indicates that economic volatility negatively impacts subjective well-being across multiple contexts (Ballas and Thanis, 2022).

A slight increase and a positive impact have been registered during 2015-2016, followed by a more acute decline in overall life satisfaction after that. However, the most significant year that negatively impacted the reported happiness score were within 2021 and 2023, as the coronavirus pandemic period considerably affected the life satisfaction of most citizens. Factors such as job loss, financial uncertainty or social insecurity have been among the most influential factors, according to the literature (Hetschko et al., 2020).

The results of the second analysis are depicted in Table 4. In this case, the dependent variable has been the dummy happiness score, which was assigned to the value 1 if the reported happiness score was higher than the mean value of the sample, and 0, respectively, if the value was lower than the average value.

According to the results presented, there have been no significant differences regarding the direction in which the allocation of public expenditure influences the overall reported life satisfaction, apart from one notable exception. Inequality has proven a negative relationship against the dependent variable, even though it is not statistically significant, showing that in the more general circumstances, financial inequality and therefore social polarization leads to higher gaps in general life satisfaction.

However, the GDP per capita seems to have a less important impact on the overall happiness on the long term rather than individual life satisfaction, a fact which has also been mentioned in the specialized literature (Hagerty and Veenhoven, 2003). Moreover, working hours seem to have a positive impact on the generalized happiness, being statistically significant at a 10% P-value, as in the aforementioned analysis.

Table 4

Explaining the dummy happiness score based on public expenses as percentage of GDP during the period: 2011-2023

Dummy Happiness Score	Coef.	St. Err.	t-value	p-value	[95% Conf	Interval]	Sig
Social Protection (sp)	.051	.019	2.72	.007	.014	.088	***
Log GDP/capita (loggdp)	.69	.262	2.63	.009	.174	1.205	***
Inflation (infl)	.026	.011	2.37	.019	.004	.048	**
Inequality (ineq)	-.067	.044	-1.53	.128	-.154	.019	
Working Hours (wh)	.075	.043	1.76	.08	-.009	.16	*
Tax Aggregates (tax)	.005	.014	0.33	.739	-.022	.031	
2011 (Base year)	0	.	.	.	.	.	
2012	-.084	.072	-1.17	.243	-.224	.057	
2013	-.053	.077	-0.68	.495	-.205	.099	
2014	-.022	.085	-0.26	.793	-.191	.146	
2015	.012	.092	0.13	.895	-.169	.193	
2016	.031	.095	0.33	.743	-.156	.218	
2017	-.067	.094	-0.71	.479	-.252	.119	
2018	-.098	.1	-0.98	.329	-.295	.099	
2019	-.048	.108	-0.45	.655	-.26	.164	
2020	-.067	.11	-0.61	.543	-.282	.149	
2021	-.016	.117	-0.13	.894	-.247	.215	
2022	-.258	.136	-1.90	.059	-.525	.01	*
2023	-.237	.14	-1.69	.092	-.512	.039	*
Constant	-10.148	3.068	-3.31	.001	-16.185	-4.112	***

Mean dependent var	0.504	SD dependent var	0.501
R-squared	0.198	Number of obs	351
F-test	4.207	Prob > F	0.000
Akaike crit. (AIC)	40.863	Bayesian crit. (BIC)	114.218

*** $p<.01$, ** $p<.05$, * $p<.1$

Regarding the year-fixed effects, no significant changes have been noticed in the second regression, as the previously noted trends remain valid. However, the more generalized approach to the happiness score seems to reduce the coefficients for most of the considered years, showing that on average, the negative impact was lower than the one reflected at individual level.

5. Conclusions

Our analysis focused on how the allocation of certain public expenses impacts the overall life satisfaction reported by European Union citizens, using the Happiness Score provided by the annual publication "World Happiness Report". The regression methodology was applied in order to highlight potential changes that might occur regarding the significance of independent variables, in two different scenarios: an

analysis on the happiness score and eventually on the dummy happiness score, assigned as 1 if higher than the average, and respectively 0 if lower. Fixed-year effects and fixed effects on both regressions have been considered, after consulting the Hausmann test.

Our results indicate that social protection positively impacts both individual happiness, as well as the general one. Moreover, the GDP per capita has been proven to be an important factor in life satisfaction, even though it should be regarded more as a necessary driver, but not a sufficient one for increased happiness at European level.

We acknowledge several limitations of our study. Firstly, the classification of countries might be improved by considering other macroeconomic indicators, as unemployment rate or tax rate. Secondly, other independent variables should be included in order to explain more how public expenses influence the reported happiness, and also including social and political-related indicators, such as the corruption degree perceived by citizens or trust in public institutions.

Further research could focus on other categories of factors that influence life satisfaction in the European Union member states, including investment in equities or assets, and the openness degree of the national economy. Another approach that should be considered is increasing the sample size, expanding the analysed time interval, or dividing the sample into subgroups based on different criteria including age, income or education background.

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