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Quality of life in the EU countries and regions before and during the COVID-19 pandemic years

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Abstract. The latest pandemic had disparate impacts on the quality of life of individuals around the world. The primary hypothesis guiding this research is that the impacts on quality of life during the pandemic years are associated with the pre-pandemic social and environmental conditions. However, the effects varied across certain groups of countries and regions, as well as across different years. In order to substantiate this assumption, an analysis will be conducted on the 27 member states of the European Union at the national and NUTS2 regional levels. The regression analysis demonstrates that life expectancy in 2021 decreased more where it was lower before the pandemic. In 2020 and 2022, there were no significant differences in terms of life expectancy changes across the countries. However, we get a more nuanced picture at the regional level. In terms of life satisfaction, a convergence between the EU countries is observed by 2022.

Contents:

1. Introduction

The latest pandemic, which occurred in the early 2020s, had a multitude of disparate direct and indirect impacts on the quality of life of individuals in various countries around the world. Many empirical studies have been conducted on the socio-demographic effects of the pandemic years, comparing different countries or groups of countries (Islam et al., 2021a; Islam et al., 2021b; Pifarré et al., 2021; Aburto et al., 2022; Huang et al., 2023). Some researchers have examined the effects at a subnational regional level as well. Hajdu and coauthors (2024), for example, analyzed the excess morality rate and variance of life expectancy from 2019 to 2022 in 201 NUTS2 European regions, finding that regions with lower health capital were more affected overall than regions with better socio-economic conditions. In addition to the direct socio-demographic effects, a number of studies have also been conducted to investigate the impact of the pandemic on social wellbeing (Brand et al., 2020; Büssing et al., 2020; Esposito et al., 2022; Bachmann et al., 2023; Clark & Lepinteur, 2023).

Compared to the numerous existing studies and empirical examinations on the social effects of the pandemic, the methodological novelty of the current study is its direct comparison of four EU country groups (Mediterranean, Scandinavian, Post-socialist and Western European) and their NUTS2 regions as dummy variables. This approach allows us to gain a more accurate understanding of the varying impacts of the pandemic on quality of life across the countries and regions of the European Union. Relying on Eurostat datasets, this paper examines two dimensions of quality of life, which are life expectancy and life satisfaction. Life expectancy is an objective measure, whereas life satisfaction is a subjective component of the quality of life concept.

The next section will present the broader conceptual context, after which the dataset utilized for the analyses will be presented, along with the methodology employed. The following sections will present the results and discussion, which are summarized and concluded in the Conclusion.

2. The concept, measures and correlates of quality of life

The concept of quality of life (QoL) has recently emerged as a primary focus in academic discourse, partially supplanting the prevailing emphasis on the classical welfare state. The extant literature on welfare state models examines the functionality of formal policy institutions related to employment and the labor market, taxation, social security benefits, healthcare, education, family allowances, and so forth (Ferragina & Seeleib-Kaiser, 2016). On the other hand, QoL encompasses a more extensive concept than that of the welfare state, incorporating the subjective elements of wellbeing and the environmental dimension. The extent to which welfare state models correlate (or uncorrelate) with wellbeing is a subject of academic debate. Veenhoven (2001) concludes that there is no correlation between welfare and wellbeing, while other empirical studies (Deeming & Hayes, 2012; Samuel & Hadjar, 2016; Carrasco-Campos, 2017) have identified welfare state systems as significant determinants of wellbeing. The divergent conclusions may be attributed to the utilization of disparate time-series data and methodological discrepancies.

Fuchs and coauthors (2022) identify two distinct branches of QoL, which are wellbeing and sustainable development. There are further sub-dimensions within them such as social aspects, political aspects, economic aspects, environmental quality and intra- and inter-generational equity. Conventional macro-economic indicators based on production and consumption, such as GDP per capita and national income, may cover only (and incompletely) the economic aspects of QoL.

A substantial body of research has demonstrated that no single composite indicator set can fully encompass the multifaceted concept of QoL due to the inherent complexity of the concept itself (Hoekstra, 2019; Gehringer & Kowalski, 2023). Nevertheless, while incomplete, certain proxy variables can encapsulate a significant proportion of its characteristics. This study employs two proxies as outcome variables to assess QoL: life expectancy (LE) and life satisfaction (LS). The selection of these two proxy indicators may be considered arbitrary; however, this choice is justified by the ability of these indicators to encompass multiple aspects of QoL. By putting data on LE and LS together, we can get a more detailed, although not exhaustive picture about the changing QoL.

Life expectancy correlates, either positively or negatively, with many different factors such as economic growth, health expenditure, social policies, inequalities, environmental conditions, pollution, etc. (Gulis, 1999; Mariani et al., 2009; Bayar et al., 2021). The extent and direction of the correlations may differ across times and countries; therefore, different policy recommendations are articulated to different countries, according to their level of development, in different times (Hassan, 2017; Wu, 2017; Chen et al., 2021). However, it is a general phenomenon

that, after a certain level of economic development, LE no longer correlates with the formal economic indicators because of the diminishing marginal utility. Other factors, such as the environment or public-welfare measures, are becoming more important determinants of LE than economic performance. For example, literature finds that the relatively low average LE in the United States, compared to the other developed countries, could be improved by more public expenditure on education and social policy (Walby, 2015; Reynolds & Avenado, 2018).

General life satisfaction is a subjective wellbeing indicator, which can correlate with the socio-economic, demographic and political conditions, as well as with the state of both the built-in and the natural/organic environment as proved by field and case studies (Drion et al., 2024; Mikuni et al., 2024; Portinga et al., 2024; Reece et al., 2024; Zahnow, 2024). Empirical studies have proved that the significance and the magnitude of the correlations of wellbeing dimensions differ across cultures because the interpretation of wellbeing is culture-dependent and not universal (White, 2016; Inglehart, 2018; Lakócai, 2023). Moreover, they also differ across countries according to their income clusters (Lee et al., 2020). According to the European Social Survey (2015) Report, LS often correlates with other wellbeing dimensions in the European context; however, this correlation is not always straightforward.

3. Data, classification and methodology

All the data used for the analyses originate from the Eurostat database. Data on LE at birth are available for each year until 2022 at national and NUTS2-regional levels. Data on LS are available only at national level for the years 2018 and 2022 and are expressed on a ten-point scale.

The objective of the analyses employed in this study is a direct comparison of QoL, proxied by LE and LS, between four groups of EU countries (Mediterranean, Scandinavian, Post-socialist and Western European) and their NUTS2 regions, as well as how QoL changed during the pandemic years. At country level, only the country groups are inputted into the model as categorical (dummy) independent variables. The group of the Western European (WE) countries is the reference category against which the other groups are compared. At the NUTS2 regional level, where the WE regions serve as the reference category, the category of capital regions is also inputted into the model as a further independent variable.

Table 1 shows the EU27 countries (and their regions) according to both their geographical and welfare system classification. The classification of these countries remains a subject of academic debate, with no consensus yet having been reached. The categorization employed in this study aligns with a conventional approach commonly observed in the extant literature, although it is not the sole categorization employed. According to the classical categorization of Esping-Andersen (1990), the Scandinavian welfare state model is distinguished from the Western continental model. Furthermore, Arts and Gelissen (2002) delineate the group of Mediterranean countries, whereas Aidukaite (2011) distinguishes the former socialist Central and Eastern European (CEE) countries as another separate model, emphasizing their distinct characteristics that set them apart. Among the CEE countries, part of the literature advocates for further sub-categorization, claiming that these countries are too diverse to classify them into a single cluster (Bartha & Valuch, 2024; Kollmorgen, 2010; Lauzadyte-Tutliene et al., 2018). Conversely, Pipień and Roszkowska (2019) argue that the post-socialist CEE area had become relatively homogeneous in terms of the formal socio-economic indicators by the second half of the 2010s. Without taking a conceptual position in the academic debate, the post-socialist CEE member states of the EU are classified into one group, distinguishing them from the three other macro-regions of the continent.

When only dummies are used in the regression as explanatory variables, the model is evidently

Table 1. Classification of the EU27 countries

Mediterranean	Cyprus, Greece, Italy, Malta, Spain, Portugal
Nordic (Scandinavian)	Denmark, Finland, Sweden
Post-socialist	Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia
Western European	Austria, Belgium, France, Germany, Ireland, Luxemburg, Netherlands

Source: authors own elaboration

not able to provide a comprehensive explanation for the dependent (outcome) variable. Instead, it makes a direct comparison easy between the given categories (Hardy, 1993). Therefore, it is important to highlight that the current study does not intend to provide an explanation for the changing QoL during the COVID-19 pandemic. The research objective, as mentioned before, is only the quantitative comparison of the QoL and its changes between the given groups of countries and regions in the European Union. The selection of WE countries and regions as the reference category in the linear regression models is based on the conceptual justification that the Western part of the continent is traditionally considered the core area of Europe. The remaining macro-regions (namely, CEE, Mediterranean and Scandinavia) are frequently analyzed in relation to their convergence or divergence from the continental core area.

Regression analyses are complemented with data visualizations. The regression models were executed using Stata software, and the graphs were generated with the Power BI data visualization tool.

4. Results

Table 2 summarizes the regression results on LE in 2019 (the last pre-pandemic year), as well as the differences in 2020, 2021 and 2022 from 2019. The average life expectancy at birth of a WE citizen in 2019 was 82.3 years. This value was not significantly different in the Mediterranean and Scandinavian countries, while in the Post-socialist countries it was roughly 4.7 years lower. During the three years of the pandemic, only in 2021 and only in the Post-socialist countries was the difference from 2019 significantly higher than in the WE countries. In the former groups of countries, LE in 2021 compared to 2019 decreased 1.9 years more than in the latter group. Furthermore, it is worth mentioning that 2021 is the only pandemic year when the overall regression model is significant. In other words, while the given country classification leads to a valid comparison in terms of LE in 2019 and 2021, it is less applicable for the years 2020 and 2022. As we will see in the Discussion part, this result is in accordance with existing empirical knowledge.

At the level of the NUTS2 regions, the regression analysis provides us with a more nuanced and comprehensive comparison (Table 3). In 2019, LE at birth of an average WE citizen in a non-capital region was 81.9 years. In the non-capital Mediterranean regions, average LE was 1.25 years higher, while in the non-capital Post-socialist regions it was 4.65 years lower. In the non-capital Scandinavian regions, there was no significant difference. In the capital regions of the European Union, LE was 0.7 year higher than in the non-capital WE regions. In 2020, LE decreased significantly more in the non-capital Mediterranean and Post-socialist regions than in the non-capital WE regions. In terms of LE difference from 2019, the situation was similar in 2021, but in the Scandinavian non-capital regions, LE decreased significantly less than in the non-

Table 2. Regression on LE in 2019 and LE differences during the pandemic years compared to the pre-pandemic level in EU countries

	Life expectancy in	Life expectancy – difference from 2019		
	2019	2020	2021	2022
Scandinavian countries	-0.0333333	0.3619048	0.3571429	0.0428571
	(0.9779038)	(0.3429686)	(0.377716)	(0.2254937)
Mediterranean countries	0.4333333	-0.1214286	-0.3595238	-0.1238095
	(0.7884113)	(0.2765101)	(0.3045244)	(0.1817989)
Post-socialist countries	-4.690909***	-0.3350649	-1.906494***	-0.1207792
	(0.6851674)	(0.2403006)	(0.2646464)	(0.157992)
constant (WE countries)	82.3***	-0.6285714**	-0.4571429*	-0.4428571**
	(0.53562)	(0.1878516)	(0.2068836)	(0.123508)
model parameters	R²: 0.7691	R²: 0.1869	R²: 0.7704	R²: 0.0459
	adj. R²: 0.7390	adj. R²: 0.0809	adj. R²: 0.7404	adj. R²: -0.0786
	F stat.: 25.54	F stat.: 1.76	F stat.: 25.72	F stat.: 0.37
	Prob.: 0.00	Prob.: 0.1824	Prob.: 0.00	Prob.: 0.7762

Source: own calculation based on Eurostat data

Table 3. Regression on LE in 2019 and LE differences during the pandemic years compared to the pre-pandemic level in the EU NUTS2 regions

	Life expectancy in	Life expectancy – difference from 2019		
	2019	2020	2021	2022
Scandinavian regions	0.3707562	0.2091545	0.496628***	0.3055983***
	(0.3359381)	(0.1582971)	(0.1384972)	(0.0855126)
Mediterranean regions	1.249239***	-0.4274729***	-0.2962285**	-0.1768063**
	(0.2213239)	(0.1042898)	(0.0912452)	(0.0563377)
Post-socialist regions	-4.651322***	-0.7783948***	-2.137214***	-0.0624495
	(0.2215056)	(0.1043755)	(0.0913201)	(0.056384)
Capital regions	0.7270657**	-0.0374403	0.1512896	0.2017453**
	(0.2787545)	(0.1313517)	(0.1149221)	(0.0709566)
constant (WE non-capital regions)	81.88584***	-0.50847***	-0.5440652***	-0.6447781***
	(0.1392738)	(0.0656271)	(0.0574184)	(0.035452)
model parameters	R^2: 0.7623	R^2: 0.2524	R^2: 0.7596	R^2: 0.1578
	adj. R^2: 0.7579	adj. R^2: 0.2385	adj. R^2: 0.7552	adj. R^2: 0.1421
	F stat.: 172.38	F stat.: 18.15	F stat.: 169.88	F stat.: 10.07
	Prob.: 0.00	Prob.: 0.00	Prob.: 0.00	Prob.: 0.00

Source: own calculation based on Eurostat data

capital WE regions. In 2022, however, there was no significant difference between the non-capital Post-socialist and WE regions, while in the capital regions of the European Union, LE decreased significantly less than in the non-capital WE regions.

After LE and its changes during the pandemic, let us examine another QoL indicator, which is subjective LS. Data for this indicator are available only for 2018 and 2022 at the country level; therefore, I compare LS between the country categories for these two years, as well as the change in LS scores between 2018 and 2022. The reference category is still the group of WE countries.

Table 4 shows that, in 2018, LS was significantly lower in the Mediterranean and Post-socialist countries than in the WE countries, whereas it was not significantly different in the Scandinavian countries. Interestingly, there were no significant differences at all in 2022. Nor too is the overall regression model for 2022 significant, indicating that the four country groups do not differ significantly from one another in terms of their average LS scores. If we run a regression on the differences of LS scores between 2018 and 2022, we see that the Mediterranean and the Post-socialist countries significantly approached the WE countries.

Table 4. Regression on LS in 2018 and 2022, and the changes in LS between 2018 and 2022 in the EU countries

	Life satisfaction		Life satisfaction
	2018	2022	difference 2018–2022
Scandinavian countries	0.2428571	0.3380952	0.0952381
	(0.3428948)	(0.330091)	(0.1790373)
Mediterranean countries	-0.6571429*	-0.2285714	0.4285714**
	(0.2764506)	(0.2661279)	(0.1443445)
Post-socialist countries	-0.8298701**	-0.2558442	0.574026***
	(0.2402489)	(0.2312779)	(0.1254423)
constant (WE countries)	7.657143***	7.328571***	-0.3285714**
	(0.1878112)	(0.1807983)	(0.0980628)
model parameters	R^2: 0.4529	R^2: 0.1602	R^2: 0.5142
	adj. R^2: 0.3815	adj. R^2: 0.0507	adj. R^2: 0.4508
	F stat.: 6.35	F stat.: 1.46	F stat.: 8.11
	Prob.: 0.003	Prob.: 0.2509	Prob.: 0.00

Source: own calculation based on Eurostat data

The following section will discuss the findings of the regression analyses, contextualizing them within the existing knowledge derived from related literature and highlighting the novel aspects of these findings.

5. Discussion

The results on LE corroborate existing knowledge that 2021 was the most severe pandemic year in terms of the excess mortality rate. The first pandemic year, 2020, contained two major waves of the coronavirus disease. The first wave, during the springtime of 2020, affected Western Europe more than Eastern Europe, as opposed to the second wave, which peaked in the late autumn of 2020 and which hit the Eastern European countries more heavily. The following year, 2021, saw the most significant global pandemic consequences in terms of the excess mortality rate due to the emergence of new variants of the coronavirus. The pandemic waves of this year hit the Eastern part of Europe hard in spite of the arrival of the new vaccines (Fan et al., 2022; Popa et al., 2022; Pronkina et al., 2023), exacerbating pre-existing social policy deficiencies and economic vulnerabilities in the post-socialist countries (Bohle & Eihmanis, 2022). At the aggregate population level, the effect of vaccinations on pandemic control became evident only in the latter half of the year. By the conclusion of the third year of the pandemic, in 2022, the incidence of deaths from COVID-19 had declined, with the disease becoming a periodic epidemic. In numerous EU regions, LE reached the level observed prior to the pandemic.

Hajdu and coauthors (2023), examined the excess mortality rate during the pandemic years at the level of NUTS2 regions. Their results coincide with the result in Table 3, where the pandemic effects are proxied by changes in LE compared to the pre-pandemic level. The geographical distribution of the pandemic effects changed considerably over the pandemic waves and years. The only year for which a significant positive correlation can be identified between the pre-pandemic LE and the changes in LE is 2021. In addition to this finding, it is worth examining the regions separately according to their geographical classification. In consideration of this classification, Figure 1 shows that significant correlations can be detected only among the Post-socialist and Scandinavian regions. Among the Mediterranean and WE regions, there was no correlation between the pre-pandemic LE and LE changes in 2021. Moreover, the average LE in 2021 in the Scandinavian regions exhibited minimal
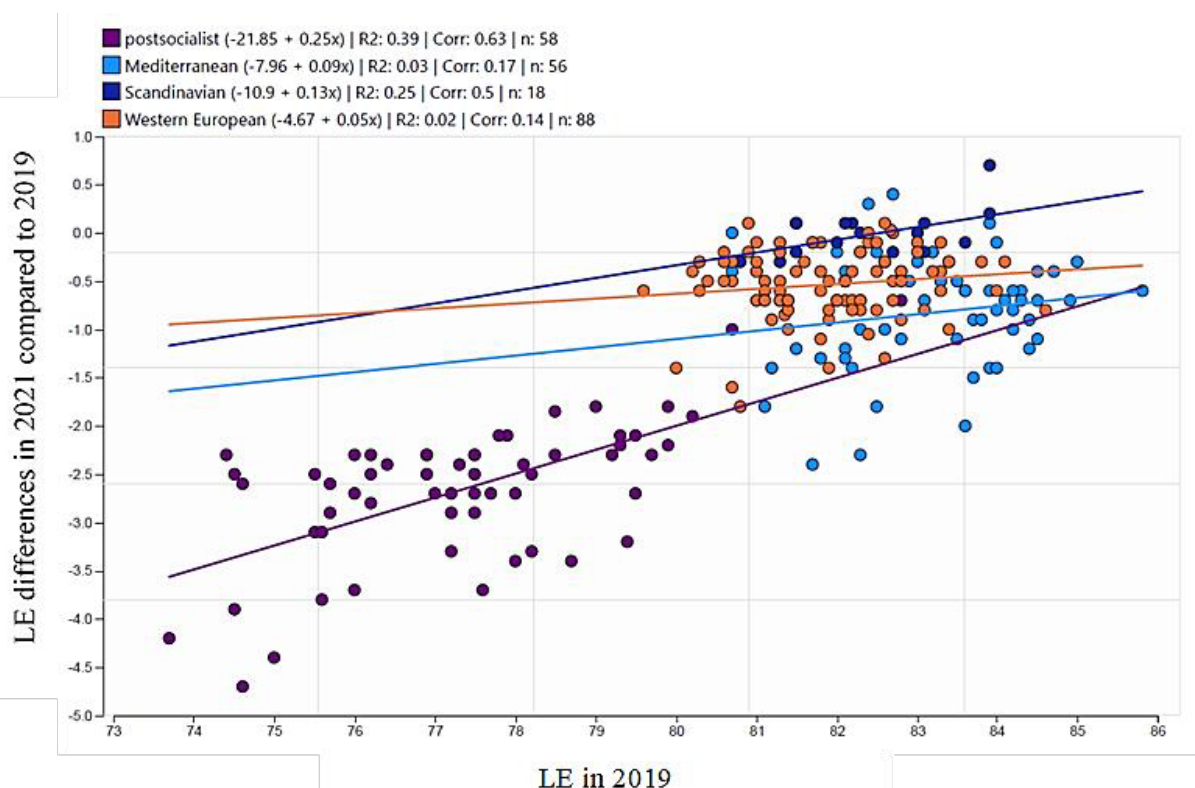

Fig. 1. Correlation between LE in 2019 and LE differences in 2021 compared to 2019 in the EU NUTS2 regions
Source: own calculation based on Eurostat data

deviation from the pre-pandemic level, in contrast to the Post-socialist Eastern European regions. In some Nordic regions, LE even increased during the pandemic. This phenomenon can be attributed to a number of factors, including the sparse population density and the robust social public policies characteristic of the Nordic welfare states.

The results of the regression models on LS are somehow unexpected because they are in contrast with the pandemic effects in terms of LE. However, they demonstrate that the so-called wellbeing convergence in Europe had become nearly complete by 2022. This process started in the 2000s and accelerated in the 2010s (Guriev & Melnikov, 2018; Zelinský et al., 2022; Helliwell et al., 2023; Lakócai, 2024) despite a temporary standstill during the years following the 2008 financial and economic crisis (Decancq & Gamage, 2023). The wellbeing convergence can be associated with the narrowing (but still significant) prosperity gap identified by Gligorić Matić and coauthors (2020) in their analysis of the Legatum Prosperity Index (LPI) pillar variables among 32 European countries between 2007 and 2017.

It is interesting to examine the impact of the pandemic years on LE and LS together. The pandemic had a direct impact on LE by nature. The extent of the impact is correlated with the pre-pandemic LE, which is in turn correlated with either geographical-climatic conditions (as in the case of Mediterranean countries), the welfare systems in place (as in the case of Scandinavian countries), or the formal macro-economic performance (as in the case of WE countries). With regard to the impact of the pandemic on LE, the Mediterranean and Post-socialist regions came out worse from the pandemic than the WE regions, whereas the Nordic regions came out better. This suggests that the existing welfare state infrastructure, beyond the level of formal macro-economic development, matters in times of a crisis period. Notwithstanding this, the Mediterranean and Post-socialist societies not only exhibited convergence toward the other two country groups but also achieved parity with them by 2022 in terms of subjective LS. The scatter graphs in the Appendix provide a visual confirmation of the LS convergence between the EU countries, notwithstanding the widening LE gap that emerged during the pandemic.

The reasons for the completion of LS convergence during the pandemic may be multifaceted in nature and thus warrant further empirical research in the future. One potential explanation for this discrepancy is that the population in Central and Eastern Europe, as well as Southern Europe,

exhibited a lower sensitivity to the stringency of the pandemic policy measures and to the related pandemic recession than did the population of Western Europe. This may be attributed to the fact that 1) these countries already had lower pre-pandemic living standards, and 2) the initial lockdowns were less rigorous here than elsewhere in Europe (apart from Sweden). The second statement mainly applies to post-socialist CEE. Populist governments in most of these countries tried to avoid unpopular substantive measures and targeted policy responses, even at the cost of elevated public health risks (Bayerlein et al., 2021; Bohle & Eihmanis, 2022). Analyzing 15 Nordic, Southern and WE countries during the first pandemic year, Bachmann and coauthors (2023) find that the stringency of pandemic policy measures negatively correlated with LS in the Mediterranean and Western countries, whereas it correlated positively in the Scandinavian countries. The authors argue that the reason behind this finding is that the pandemic lockdowns were less stringent in Northern Europe than in the Mediterranean and WE countries. Less stringency resulted in the population in Northern Europe being concerned more about the spread of the disease than about the inconvenience of the policy measures, in contrast to the Mediterranean and WE. Clark and Lepinteur (2022) mostly underpin this conclusion too. If one accepts these findings, putting them together with the results in Table 4, two conclusions can be drawn. One is that, in spite of the initial shock and downturn, the wellbeing recovery by 2022 happened faster and more completely in the Mediterranean societies than in Nordic and WE countries. The other one is that the Post-socialist Central and Eastern European societies were less sensitive to the pandemic-related shutdowns both because of their lower initial living standards and because of the less stringent policy measures implemented by populist governments.

6. Conclusion

This study examined the impact of the pandemic years on two components of QoL, specifically LE and LS, at the country and NUTS2 regional levels within the European Union. The findings imply complex and multifaceted social effects. With regard to LE at birth and its fluctuations, as an objective indicator, the pre-pandemic situation exhibited a correlation with the overall severity of the pandemic effects. The results offer a more detailed representation of the geographical variations and

their temporal shifts at the regional level than at the country level. Findings on subjective LS present an opposing trend. The disparity in wellbeing within the EU diminished by 2022, suggesting a negative correlation between the aggregate impact of the pandemic years on LE and LS.

The causes of this negative correlation are also complex and multifaceted. The poor performance of the Post-socialist EU countries, compared to the other EU countries, in managing the pandemic with regard to LE is attributable to their comparatively weaker socio-economic performance prior to the pandemic. In a contradictory way, this may also be the reason for their superior performance in terms of LS compared to the wealthier societies during the pandemic period. Because of their lower initial living standards, the Post-socialist societies may have been less sensitive to the shutdowns than their counterparts in the rest of the EU. Not only the Post-socialist countries in CEE, but the Mediterranean countries also converged to the WE core countries in their LS scores. In contrast to the Post-socialist countries, the primary factor contributing to this convergence may be attributed to the traditionally more relaxed Mediterranean lifestyle.

It is notable that, at the regional level, the Scandinavian regions demonstrated superior performance in terms of LE during the pandemic, even outperforming the WE core regions. The reasons for this relatively successful crisis management may be attributed to the traditionally strong Nordic welfare states and the relatively low population density, which facilitated the control of the spread of the pandemic.

Overall, the pandemic years brought to surface the relative strengths and weaknesses of each macro-region in the EU. In order to ensure a resilient post-pandemic recovery by enhancing each QoL dimension, it is essential that decision-makers take into consideration the strengths and weaknesses of their pandemic policy measures.

References

Aburto, J.M., Schöley, J., Kashnitsky, I., Zhang, L., Rahal, C., Missov, T.I., Mills, M.C., Dowd, J.B., & Kashyap, R. (2022). Quantifying impacts of the COVID-19 pandemic through life-expectancy losses: a population-level study of 29 countries. *International Journal of Epidemiology*, 51: 63–74. DOI: 10.1093/ije/dyab207.

Aidukaite, J. (2011). Welfare reforms and socio-economic trends in the 10 New EU member states of Central and Eastern Europe. *Communist and Post-Communist Studies*, 44(3): 211–219. DOI: 10.1016/j.postcomstud.2011.07.005.

Arts, W., & Gelissen, J. (2002). Three worlds of welfare capitalism or more? A state-of-the-art report. *Journal of European Social Policy*, 12: 137–158. DOI: 10.1177/0952872002012002114.

Bachmann, R., Gonschor, M., Korfhage, T., & Wübker, A. (2023). Covid-19 and life satisfaction across Europe. *Applied Economics Letters*, 30: 635–639. DOI: 10.1080/13504851.2021.2005766.

Bartha, E., & Valuch, T. (2024). Making or faking capitalism? Socialist dreams and postsocialist experiences in East-Central Europe. *Journal of Contemporary Central and Eastern Europe*, 32(2): 207–238. DOI: 10.1080/25739638.2024.2424644.

Bayar, Y., Gavriletea, M.D., Pintea, M.O., & Sechel, I.C. (2021). Impact of environment, life expectancy and real GDP per Capita on health expenditures: Evidence from the EU Member States. *International Journal of Environmental Research and Public Health*, 18: 13176. DOI: 10.3390/ijerph182413176.

Bayerlein, M., Boese, V.A., Gates, S., Kamin, K., & Murshed, S.M. (2021). Populism and COVID-19: How populist governments (mis)handle the pandemic. *Journal of Political Institutions and Political Economy*, 2(3): 389–428. DOI: 10.1561/113.00000043.

Bohle, D., & Eihmanis, E. (2022). East Central Europe in the COVID-19 crisis. *East European Politics*, 38: 491–506. DOI: 10.1080/21599165.2022.2122051.

Brand, R., Timme, S., & Nosrat, S. (2020). When pandemic hits: Exercise frequency and subjective well-being during COVID-19 pandemic. *Frontiers in Psychology*, 11: 570567. DOI: 10.3389/fpsyg.2020.570567.

Büssing, A., Recchia, D.R., Hein, R., & Dienberg, T. (2020). Perceived changes of specific attitudes, perceptions and behaviors during the Corona pandemic and their relation to wellbeing. *Health and Quality of Life Outcomes*, 18: 374. DOI: 10.1186/s12955-020-01623-6.

Carrasco-Campos, Á., Moreno, A., & Martínez, L-C. (2017). Quality of life, well-being and social policies in European Countries. In: A.A.V. Boas (ed.), *Quality of life, well-being and social policies in European Countries*. Rijeka: InTech Open.

Chen, Z., Ma, Y., Hua, J., Wang, Y., & Guo, H. (2021). Impacts from economic development and environmental factors on life expectancy: A comparative study based on data from both Developed and Developing Countries from 2004 to 2016. *International Journal of Environmental Research and Public Health*, 18: 8559. DOI: 10.3390/ijerph18168559.

Clark, A.E., & Lepinteur, A. (2022). Pandemic policy and life satisfaction in Europe. *Review of Income and Wealth*, 68: 393–408. DOI: 10.1111/roiw.12554.

Decancq, K., & Gamage, S.P. (2023). Well-being convergence in the European Union. EuSocialCit Working Paper, February 2023. DOI: 10.5281/ZENODO.7628683.

Deeming, C., & Hayes, D. (2012). Worlds of welfare capitalism and wellbeing: A multilevel analysis. *Journal of Social Policy*, 41: 811–829. DOI: 10.1017/s0047279412000499.

Drion, A., Jacquet, P.O., Brown, K., & Batterham, P.J. (2024). Do perceived natural environment and eco-anxiety relate to mental health and quality of life? Findings from a representative adult sample. *Wellbeing, Space and Society*, 7: 100220. DOI: 10.1016/j.wss.2024.100220.

Esposito, C., Di Napoli, I., Agueli, B., Marino, L., Procentese, F., & Arcidiacono, C. (2021). Well-being and the covid-19 pandemic: A community psychology systematic review. *European Psychologist*, 26: 285–297. DOI: 10.1027/1016-9040/a000468.

European Social Survey. (2015). *Measuring and reporting on europeans' wellbeing: findings from the european social survey*. London: ESS ERIC.

Fan, G., Song, H., Yip, S., Zhang, T., & He, D. (2022). Impact of low vaccine coverage on the resurgence of COVID-19 in Central and Eastern Europe. *One Health*, 14: 100402. DOI: 10.1016/j.onehlt.2022.100402.

Ferragina, E., & Seeleib-Kaiser, M. (2011). Thematic Review: Welfare regime debate: past, present, futures? *Policy & Politics*, 39: 583–611. DOI: 10.1332/030557311X603592.

Forslund, M. (2023). Education and self-rated health: The moderating effect of primary care quality in 24 OECD countries, 2002 to 2018. *Wellbeing, Space and Society*, 5: 100168. DOI: 10.1016/j.wss.2023.100168.

Fuchs, D., Schlipphak, B., Treib, O., Long, L.A.N., & Lederer, M. (2020). Which way forward in measuring the quality of life? A critical analysis of sustainability and well-being indicator sets. *Global Environmental Politics*, 20: 12–36. DOI: 10.1162/glep_a_00554.

Gehringer, A., & Kowalski, S. (2023). *Mapping sustainability measurement. A review of the approaches, methods, and literature*. Springer Nature Switzerland.

Gligorić Matić, M., Gavrilović, B.J., & Stanišić, N. (2020). GDP and beyond: Prosperity convergence in the countries of Western and Eastern Europe. *Acta Oeconomica*, 70: 493–511. DOI: 10.1556/032.2020.00033.

Gulis, G. (2000). Life expectancy as an indicator of environmental health. *European Journal of Epidemiology*, 16(2): 161–165. DOI: 10.1023/a:1007629306606.

Guriev, S., & Melnikov, N. (2018). Happiness convergence in transition countries. *Journal of Comparative Economics*, 46: 683–707. DOI: 10.1016/j.jce.2018.07.003.

Hajdu, T., Krekó, J., & Tóth, C.G. (2024). Inequalities in regional excess mortality and life expectancy during the COVID-19 pandemic in Europe. *Scientific Reports*, 14: 3835. DOI: 10.1038/s41598-024-54366-5.

Hardy, M.A. (1993). *Regression with dummy variables*. London, New Delhi: Sage Publications.

Hassan, F.A., Minato, N., Ishida, S., & Mohamed Nor, N. (2016). Social environment determinants of life expectancy in developing countries: A panel data analysis. *Global Journal of Health Science*, 9: 105. DOI: 10.5539/gjhs.v9n5p105.

Helliwell, J.F., Huang, H., Norton, M., Goff, L., & Wang, S. (2023). World happiness, trust, and social connections in times of crisis. In: J.F. Helliwell, R. Layard, J.D. Sachs, J.E. Neve, L.B. Aknin, & S. Wang (ed.), *World Happiness Report 2023*. New York: Sustainable Development Solutions Network.

Hoekstra, R. (2019). *Replacing gdp by 2030. Towards a common language for the well-being and sustainability community*. Cambridge: Cambridge University Press.

Huang, G., Guo, F., Zimmermann, K.F., Chen, B., & Wang, S. (2023). The effect of the COVID-19 pandemic on life expectancy in 27 countries. *Scientific Reports*, 13: 8911. DOI: 10.1038/s41598-023-35592-9.

Inglehart, R.F. (2018). *Cultural evolution: People's motivations are changing, and reshaping the world*. Cambridge: Cambridge University Press.

Islam, N., Jdanov, D.A., Shkolnikov, V.M., Khunti, K., Kawachi, I., White, M., Lewington, S., & Lacey, B. (2021a). Effects of covid-19 pandemic on life expectancy and premature mortality in 2020: time series analysis in 37 countries. *BMJ*, 375: e066768. DOI: 10.1136/bmj-2021-066768.

Islam, N., Shkolnikov, V.M., Acosta, R.J., Klimkin, I., Kawachi, I., Irizarry, R.A., Alicandro, G., Khunti, K., Yates, T., Jdanov, D.A., White, M., Lewington, S., & Lacey, B. (2021b). Excess deaths associated with covid-19 pandemic in 2020: age and sex disaggregated time series analysis in 29 high income countries. *BMJ*, 373: n1137. DOI: 10.1136/bmj.n1137.

Kollmorgen, R. (2010). Transformation theory and socio-economic change in Central and Eastern Europe. A conceptual framework. Employment and economy in Central and Eastern Europe: 1–17.

Lakócai, C. (2024). Wellbeing and sustainability in Europe in the 2010s – An empirical analysis. *Wellbeing, Space and Society*, 7: 100225. DOI: 10.1016/j.wss.2024.100225.

Lauzadyte-Tutliene, A., Balezentis, T., & Goculenko, E. (2018). Welfare state in Central and Eastern Europe. *Economics & Sociology*, 11(1): 100–123. DOI: 10.14254/2071-789x.2018/11-1/7.

Lee, S.Y., Kim, R., Rodgers, J., & Subramanian, S.V. (2020). Associations between subjective wellbeing and macroeconomic indicators: An assessment of heterogeneity across 60 countries. *Wellbeing, Space and Society*, 1: 100011. DOI: 10.1016/j.wss.2020.100011.

Mariani, F., Pérez-Barahona, A., & Raffin, N. (2010). Life expectancy and the environment. *Journal of Economic Dynamics and Control*, 34: 798–815. DOI: 10.1016/j.jedc.2009.11.007.

Mikuni, J., Dehove, M., Dörrzapf, L., Moser, M.K., Resch, B., Böhm, P., Prager, K., Podolin, N., Oberzaucher, E., & Leder, H. (2024). Art in the city reduces the feeling of anxiety, stress, and negative mood: A field study examining the impact of artistic intervention in urban public space on well-being. *Wellbeing, Space and Society*, 7: 100215. DOI: 10.1016/j.wss.2024.100215.

Pifarré i Arolas, H., Acosta, E., López-Casasnovas, G., Lo, A., Nicodemo, C., Riffe, T., & Myrskylä, M. (2021). Years of life lost to COVID-19 in 81 countries. *Scientific Reports*, 11: 3504. DOI: 10.1038/s41598-021-83040-3.

Pipień, M., & Roszkowska, S. (2019). Heterogeneity of convergence in transition countries. *Post-Communist Economies*, 31(1): 75–105. DOI: 10.1080/14631377.2018.1443245.

Popa, A.D., Enache, A.I., Popa, I.V., Antoniu, S.A., Dragomir, R.A., & Burlacu, A. (2022). Determinants of the hesitancy toward covid-19 vaccination in Eastern European Countries and the relationship with health and vaccine literacy: A literature review. *Vaccines*, 10: 672. DOI: 10.3390/vaccines10050672.

Portinga, R.L.W., Levkoe, C.Z., & Galway, L.P. (2024). The contributions of community seed saving to health and wellbeing: A qualitative study in Thunder Bay, Canada. *Wellbeing, Space and Society*, 7: 100227. DOI: 10.1016/j.wss.2024.100227.

Pronkina, E., Berniell, I., Fawaz, Y., Laferrère, A., & Mira, P. (2023). The COVID-19 curtain: Can past communist regimes explain the vaccination divide in Europe? *Social Science & Medicine*, 321: 115759. DOI: 10.1016/j.socscimed.2023.115759.

Reece, R., Elliott, L., Bray, I., & Bornioli, A. (2024). How properties of urban greenspaces shape well-being across age groups: A qualitative study. *Wellbeing, Space and Society*, 7: 100206. DOI: 10.1016/j.wss.2024.100206.

Reynolds, M.M., & Avendano, M. (2018). Social policy expenditures and life expectancy in high-income countries. *American Journal of Preventive Medicine*, 54: 72–79. DOI: 10.1016/j.amepre.2017.09.001.

Samuel, R., & Hadjar, A. (2016). How welfare-state regimes shape subjective well-being across Europe. *Social Indicators Research*, 129: 565–587. DOI: 10.1007/s11205-015-1125-0.

Schleicher, J., Schaafsma, M., Burgess, N.D., Sandbrook, C., Danks, F., Cowie, C., & Vira, B. (2018). Poorer without It? The Neglected Role of the Natural Environment in Poverty and Wellbeing. *Sustainable Development*, 26: 83–98. DOI: 10.1002/sd.1692.

Veenhoven, R. (2000). Well-being in the welfare state: Level not higher, distribution not more equitable. *Journal of Comparative Policy Analysis: Research and Practice*, 2: 91–125. DOI: 10.1080/13876980008412637.

Walby, S. (2009). *Globalization and inequalities. Complexity and contested modernities*. Los Angeles, London, New Delhi, Singapore, Washington DC: Sage Publishing.

White, S.C. (2016). Introduction: The Many Faces of Wellbeing. In: S.C. White & C. Blackmore (ed.), *Cultures of wellbeing. Method, place, policy*. London: Palgrave Macmillan. DOI: 10.1057/9781137536457.

Wu, C. (2017). Human capital, life expectancy, and the environment. *The Journal of International Trade & Economic Development*, 26: 885–906. DOI: 10.1080/09638199.2017.1314543.

Zahnow, R. (2024). Social infrastructure, social cohesion and subjective wellbeing. *Wellbeing, Space and Society*, 7: 100210. DOI: 10.1016/j.wss.2024.100210.

Želinský, T., Mysíková, M., & Garner, T.I. (2022). Trends in subjective income poverty rates in the European Union. *European Journal of Development Research*, 34: 2493–2516. DOI: 10.1057/s41287-021-00457-2.

Appendix

Scatter graphs showing distribution of the EU27 countries according to LE and LS before the pandemic (above) and changes in LE and LS during the pandemic (below)