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CHANGES IN DETERMINANTS OF LIFE SATISFACTION OF PEOPLE AGED 50 AND OVER BEFORE AND AFTER THE OUTBREAK OF COVID-19[2]

The goal of this longitudinal study is to analyse the changes in determinants of life satisfaction of older people in Europe and highlight risk predictors of frustration before and after the outbreak of Covid-19. Parallel analyses of Wave 7 and Wave 8 data of the Survey of Health, Ageing and Retirement in Europe (SHARE) are performed to examine the relationship between different determinants and life satisfaction in the basic model and post-COVID model. Logistic regression models are evaluated for both scenarios to explore the dependence between life satisfaction and various demographic, economic, health and behavioural factors. Transformation of the main model on Wave 8 data is applied to assess whether friends net, use of internet, vigorous sports activities and health care factors affect life satisfaction. The research provides an up-to-date picture of the changes in the behaviour of older people in Europe with a focus on specific challenges related to the global pandemic. Results suggest directions for interventions that will improve the life satisfaction of older people in ordinary scenarios and in severe times, as well as directions for a better fit between academic research and the needs of policymakers and practitioners in the sphere of design and implementation of social policies, focused on increasing the life satisfaction and ultimately aiming to foster economic growth.

Keywords: SHARE; Europe; older people; life satisfaction; pandemic; social policies
JEL: I3

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[2] This paper uses data from SHARE Waves 7 and 8 (DOIs: 10.6103/SHARE.w7.800, 10.6103/SHARE.w8.800) see Börsch-Supan et al. (2013) for methodological details.(1) The SHARE data collection has been funded by the European Commission, DG RTD through FP5 (QLK6-CT-2001-00360), FP6 (SHARE-I3: RII-CT-2006-062193, COMPARE: CIT5-CT-2005-028857, SHARELIFE: CIT4-CT-2006-028812), FP7 (SHARE-PREP: GA N211909, SHARE-LEAP: GA N227822, SHARE M4: GA N261982, DASISH: GA N°283646) and Horizon 2020 (SHARE-DEV3: GA N676536, SHARE-COHESION: GA N°870628, SERISS: GA N654221, SSHOC: GA N823782, SHARE-COVID19: GA N101015924) and by DG Employment, Social Affairs & Inclusion through VS 2015/0195, VS 2016/0135, VS 2018/0285, VS 2019/0332, and VS 2020/0313. Additional funding from the German Ministry of Education and Research, the Max Planck Society for the Advancement of Science, the U.S. National Institute on Aging (U01_AG09740-13S2, P01_AG005842, P01_AG08291, P30_AG12815, R21_AG025169, Y1-AG-4553-01, IAG_BSR06-11, OGHA_04-064, HHSN271201300071C, RAG052527A) and from various national funding sources is gratefully acknowledged (see www.share-project.org).
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1. Introduction

The global pandemic of COVID-19 caused multiple limitations, lockdowns and healthcare measures that destroyed thousands of lives globally causing increased depressive symptoms, anxiety and psychological distress that affect life satisfaction. Knowing that in European elections since 1970 life satisfaction of people is the best predictor of whether governments get re-elected – much more important than economic growth, unemployment or inflation, public policy needs a new focus: not "wealth creation" but "well-being creation" (Clark, Fletch, Layard et al., 2016). According to previous theories (Campbell A. et al., 1976), subjective well-being depends to the greatest extent on the objective circumstances of their lives. Numerous studies examine the effects of the pandemic on behaviour and mental health (Yap et al., 2014; Gawrych et al., 2021; Araki, 2022; López et al., 2020; etc.). However, its consequences for well-being are still not deeply investigated and it will be a hot topic for the next years to explore the changes in the factors affecting life satisfaction, especially of older people, being the most vulnerable group in terms of higher risk of mortality and modern challenges facing society: climate change, unknown diseases, war conflicts, the development of digitalization and artificial intelligence.

While policymakers focus their efforts on the development of the healthcare sector, which is important in short-term plan, it is also necessary to pay attention to improving the well-being and resilience of older people and to limit the economic and social problems in a long-term aspect. In this light, understanding the drivers behind well-being creation is a research question with growing importance. Moreover, the occurrence of pandemics followed by its measures amplifies the importance of this topic. Therefore, the research aims to investigate the changes in determinants of life satisfaction of people aged 50 and over in Europe since the outbreak and highlight risk factors for frustration before and during the pandemic. In accordance with the goal and the research issues, three working hypotheses are tested. In the first place, the research verifies the hypothesis that life satisfaction depends on different factors. The second hypothesis tested in the study is that life satisfaction varies across the investigated countries. Finally, the research argues in favour of the hypothesis that determinants of life satisfaction have changed since the outbreak of the global pandemic. Along with the research goal, the following tasks are formulated, including analyses of the socio-economic trends and observed changes across the investigated countries before and during the pandemic, analyses of the main drivers for life satisfaction in ordinary working scenarios and in severe times, investigation on the reasons for changes and formulation of social policies directed to each factor.

Unlike most of the papers, in the current research dimension reduction is used to combine strongly correlated characteristics in latent factors used for follow-up analysis of the determinants of life satisfaction before and during the pandemic. Apart from that, an additional post-Covid model is estimated, including factors, crucial for older people's well-being during times of restrictions. For the analyses answers of respondents from 24 European countries included in both Wave 7 (conducted before the pandemic) and Wave 8 (conducted during the pandemic) of the SHARE data are used for comparison and understanding of the most significant predictors of life satisfaction in both scenarios. The applied methodological framework could be used in authorities' monitoring as an algorithm for classification and risk identification of the key aspects of older people's well-being and satisfaction.

Among the limitations of the study are the missing or not enough data about some features that literature shows are predictors of life satisfaction like early life experiences, state and mood of the participants, number of children, quality of the environment, living standards, fear of COVID-19, etc. Moreover, the sample used for the estimated models in both waves is unbalanced with respect to both classes: satisfied and dissatisfied. Besides that, the data reveals only the self-perception of older people, which in the case of mental health problems could cause biased results (Angelini et al., 2012). Another limitation is that the analysis is not performed on a country-by-country basis because of small sample sizes on a country level, which could reveal insights into how the factors differ between countries. Despite the presented limitations, the study enriches the literature by exploring the relevant factors for the life satisfaction of older people in Europe, especially during severe times.

The rest of the paper is organized as follows: the next section provides a literature review. Section 3 reveals the research methodology. Section 4 presents the data and the main results, followed by a discussion. Section 5 concludes the research.

2. Literature Review

2.1. Definitions of life satisfaction

In Cambridge Advanced Learner's Dictionary (Walter, 2003), satisfaction is defined as "pleasant feeling you get when you receive something you wanted, or when you have done something you wanted to do; a way of dealing with a complaint or problem that makes the person who complained feel happy; the act of fulfilling (achieving) a need or wish". According to Hall (2014), the concept of life satisfaction is associated with the idea of happiness and well-being, it is often used as a synonym of happiness and a major component of well-being. According to Heady et al. (1991), there are two main types of theories about life satisfaction: „bottom-up", examining life satisfaction as a result of satisfaction in various areas of life, and „top-down" according to which the overall life satisfaction influences the satisfaction in the different spheres of life. In the research, the first approach is followed.

In the literature appear different definitions of life satisfaction:

Def. 1 Life satisfaction is the extent to which one cherishes his life (Veenhoven, 1996).

Def. 2 Life satisfaction is an overall evaluation of one's emotions and mindset about life at a particular moment (Diener, 1984).

Def. 3 Life satisfaction is the rate at which one considers life wealthy, sane, full, or of high quality (VandenBos, 2007).

Def. 4 Life satisfaction is a reasonable evaluation of one's life, usually affected by social factors (Ellison et al., 1989).

Each of the definitions has its pluses and minuses. While Def. 1 assesses the overall perception of one's life, Def. 2 splits the concept into two different aspects: emotions and mindset. On the other hand, Def. 3 is also appropriate because it looks at life satisfaction in 4 different aspects and Def. 4 adds the social factors in the picture. However, in none of these

definitions, so many drivers are considered together for the evaluation of life satisfaction as the ones investigated in the research.

Each definition contributes to the achievement of the research goal and the research tasks. Def. 1 is used for the fulfilment of the first research task where analysis of the trends in the overall level of satisfaction since the outbreak is performed. Def. 2. is used for the achievement of the second research task where analysis of the main drivers for life satisfaction in two particular moments (before and during the pandemic) is done. Def. 3. is used for the achievement of the second research task where drivers for life satisfaction in different spheres of life are deeply investigated in both scenarios. Def. 4. is used for the achievement of the second research task where additional factors for life satisfaction during the pandemic, including social factors, are assessed. All four definitions are used for the fulfilment of the last research tasks related to the investigation of the reasons for changes and formulation of social policies directed to each determinant of life satisfaction.

The next section provides a discussion on how life satisfaction is measured.

2.2. Measurement of life satisfaction

According to Mannell & Dupuis (2007), satisfaction with life is one of the most ancient investigative questions in the examination of obsolescence, directed originally to pathology and handling, afterwards transforming into a problem about the sensation of goodness of life. Several approaches are presented in the literature in terms of the measurement of life satisfaction. The most frequently used metrics in the literature include:

Metric 1: Life Satisfaction Index (Neugarten, Havighurst, and Tobin, 1961) consists of a 20-item questionnaire (11-item short form version) forming an overall measure of quality of life for adults over 50.

Metric 2: Satisfaction with Life Scale (SWLS), presented by Diener et al. (1985), is the most popular and widely used measure of life satisfaction. It consists of five statements that respondents rate on a scale from 1 (strongly disagree) to 7 (strongly agree).

Metric 3: The OECD[3] Better Life Index (OECD, 2016) measures the overall life satisfaction by the participating components and by counties on a scale from 0 to 10, where 0 means not at all satisfied and 10 is completely satisfied.

Metric 4: Riverside Life Satisfaction Scale (Margolis et al., 2018) is a measure combining 6 items rated on a scale from 1 (strongly disagree) to 7 (strongly agree), that aims to improve the previously measured life scale by increasing the scope of the measure and reducing the bias.

In the data used for the research, a measurement approach based on the third metric is applied, since in the chosen target characteristic respondents rate their satisfaction with life on a scale from 0 to 10.

[3] The Organisation for Economic Co-operation and Development.

2.3. Factors affecting life satisfaction

The research on the topic highlights a complex of factors that affect the feeling of satisfaction with life.

A study by Angelini et al. (2012) proves major determinants of life satisfaction are deteriorating health, physical limitations, and age. The research shows being female, married, having a job, high level of education and socioeconomic status, determine a higher level of satisfaction. In another study (Lu et al., 2019) low evaluation of the goodness of life is found to be related to lower education and higher stress at work, low income, inactivity, illness, mobility limitations or depression. According to Bruno & Faggini (2017), among the public expenses, education is significant both because of its share in total costs and its input to the various dimensions of well-being.

Arpino, Gumà, and Julià (2018) find happenings in the early stages of life affect the afterwards life paths, health and well-being. According to the authors, retirement from employment is generally associated with declining health, whereas when the initial status is unemployment or inactivity, the effect of retirement appears to be null or even positive. This conclusion is also supported by Dingemans and Henkens (2019). Another research by Solé-Auró et al. (2018), shows higher degrees of life gratification and felicity are linked to more prolonged and wholesome lives. Bjelajac et al. (2019) examine the relationship between employment and mental health showing jobless declare indications of loneliness more frequently than occupied, and besides that in rural regions, unemployment is linked to depression. Puvill et al. (2019) show wealthier countries report higher life satisfaction. The authors state differences in responses may be due to subjective factors such as the state and mood of the participants.

Regarding socio-economic factors, household size has a significant positive effect on satisfaction (Ferreira et al., 2013). On the other hand, Angeles (2010) finds a strong positive effect of the children. Besides that, Arsenijevic and Groot (2018) conclude loneliness rises with age and can negatively influence physical and mental health, it is connected to life-reshaping events such as the loss of a partner, retirement, or diminished mobility. Solé-Auró and Cortina (2019) find a protective effect of partnership at a later age is a much more significant predictor of gratification than the children.

Arezzo and Giudici (2017) reveal social interactions have a positive impact on health by protecting people from affliction from misconceptions of their well-being. Tomini et al. (2016) also reveal social assistance and social net size are related to overall or spiritual health. Maniscalco et al. (2020) show the quality of life is based on one's necessities, mental state, and anticipation. According to Börsch-Supan et al. (2019), individuals who are more outgoing, socially confident and emotionally steady feel greater gratification.

According to Ozdamar and Giovanis (2018) good environment is a predictor of prosperity, and it is important for policymakers to ameliorate the air purity and prevent the overall health. Numerous studies show significant associations between air pollution, depression, and suicide (Szyszkowicz et al., 2010; Lim et al., 2012; Mehta et al., 2015). Several studies point out country of residence is one of the most important factors for life satisfaction, health and well-being (Angelini et al., 2012; Börsch-Supan et al., 2019; Puvill et al., 2019).

The results of the research are a milestone for social policies focused on increasing life satisfaction, that could indirectly foster economic growth. While most of the literature investigates the effects of economic growth on life satisfaction, several studies explore the dependence from another perspective, namely the indirect effect of life satisfaction on economic development. Oswald et al. (2015) prove there is the existence of a causal link between well-being and human performance, revealing lower happiness is associated with lower productivity. Korkmaz & Korkmaz (2017) conclude an increase in productivity enables higher levels of output in the economy. According to Patel (1986) the term 'productivity' is almost synonymous with economic growth. Other studies on the topic (Adejumo et al., 2013; Affandi et al., 2019) reveal human capital has a direct or indirect impact on economic growth. According to Chiappero-Martinetti et al. (2015), human development and economic growth are two rather different paradigms that imply different objectives, measurement techniques, and policies for a common goal, namely socio-economic progress. These findings support the idea of the research, aiming at the identification of the main drivers of life satisfaction, that could be used by policymakers' implementation of social policies, on one hand, focused on people's happiness and on the other hand indirectly fostering economic growth.

2.4. Does life satisfaction change

According to Yap et al. (2014), many studies prove considerable change in subjective well-being can occur when people experience important life events. Several new studies show global pandemic, being the biggest health crisis in more than a century (Helliwell et al., 2021) affects well-being and life satisfaction. According to Gawrych et al. (2021), there is a significant medium decrease in the level of happiness and life satisfaction during the pandemic.

Zhang et al. (2020) investigate the relationship between health, distress, and life satisfaction and highlight more proactive individuals are more affected by restrictions. Araki (2022) shows there is a significant increase in older people's life satisfaction during the pandemic and older people in better socio-economic status are more satisfied in critical times. Another longitudinal study (Kwong et al., 2021), investigates two generations in England, finding evidence more people experience low life satisfaction after the outbreak. According to Dymecka et al. (2021), the increase in anxiety and stress during the pandemic has a negative impact on well-being. In another research, Dymecka, Gerymski and Machnik-Czerwik (2021) show people experiencing a strong fear of COVID-19 are more satisfied with life than people experiencing strong stress but weak fear of COVID-19. Moreover, loss of job, isolation, absence of social contacts or big change in life could be more dangerous for well-being than the risk of infection, which many people don't consider as a threat.

Another research (López et al., 2020) shows personal sensations of health, family, resistance, gratefulness and approval influence older people's well-being. According to Brandtstädter and Renner (1990), older people use strategies to adapt and cope with new challenges.

The literature presents various factors that influence the life satisfaction of older people in Europe. Nevertheless, most authors investigate the effect of a single factor or explore the

situation using a significantly smaller sample of people in one or several countries, or compare two generations of people (not limiting the research only to older people), or use data from older waves of SHARE data or research the changes in longitude data in ordinary working scenarios. None of the available studies suggests a standardized approach for identifying the changes in the determinants of life satisfaction of older people since the outbreak of the global pandemic, that could be used as an algorithm for better authority policies aiming to improve life satisfaction, that could indirectly influence the economic development in positive direction. Moreover, little attention has been paid to the post-Covid period and there is a wide research gap in terms of the effect of additional factors like hospitalisation, vaccinations, digital networks, alcohol consumption, active life and sports, that are not included in all SHARE waves but are crucial for the well-being of older people especially in severe times. Furthermore, the global pandemic is highlighting new inequalities, especially among older people whose consequences need deep investigation.

3. Methodology

3.1. Data

This study uses SHARE data, available on the official internet page of the project.

3.2. Study design and participants

In this research, comparative analyses of Wave 7(Börsch-Supan, 2022) and Wave 8 (Börsch-Supan, 2022) of SHARE data are used to assess the relationship between different factors and life satisfaction at basic and post-covid models. The target population is represented by 30615 adults aged ≥50 years including both waves.

3.3. Data extraction and data preparation

For the purposes of the study, six modules of wave 7 and seven modules of wave 8 data are used, including questions about activities, physical and mental health, personal and behavioural characteristics, housing conditions, etc. The unique number of the respondents ‘merged’ is used to merge the different modules. Digital encoding is applied to numerical variables. Qualitative variables with several levels are converted into factor characteristics. For some socio-demographic features binning is performed at several levels. Respondents younger than 50 are removed from the data. Factor analysis is used to generate four factors that are then dichotomized into two categories. Since Wave 7 was conducted in 2017 and Wave 8 in 2020-2021, for all the respondents there is a correction in the age with 2-3 years, so a dummy variable ‘ageing’ is created for Wave 8 data to show the effect of ageing, which takes the value of 1 if the respondent changes the age group and the value of 0 otherwise.

3.4. Life satisfaction

In the chosen target characteristic 'ac012_' respondents rate their satisfaction with life on a scale from 0 to 10. The average value of the answers in the sample is 7.73 in wave 7 data, and 7.88 in wave 8 data, or around 8 both before and during the pandemic. Based on this limit the target variable is converted into a dichotomous variable with two classes: class 1 /respondents dissatisfied with their lives/ and class 0 /respondents satisfied with their lives/. The choice of cut-off value is also based on the literature review. According to Ponocny et al. (2015), only strongly positive ratings (8+) can be taken as a clear dominance of positive over the negative aspects of people's feelings.

3.5. Statistical analysis

Chi-squared statistics are performed to analyze the differences in the distribution of the categorical variables with reference to life satisfaction for both datasets. P-values<0.05 are considered statistically significant. Decision trees and subset selection methods are applied in order to find the best predictors of life satisfaction of older people in different scenarios. Binary logistic regression models are estimated for both waves to examine the association between life satisfaction and different factors. Modification of the initial model for Wave 8 is used to show whether friends net, use of internet, sport and health care factors affect the life satisfaction of older people in Europe.

The following notations are used in the logistic regression equations: LS_i-Life Satisfaction, O_i-Optimism, I_i-Illness, A_i-Age, S_i-Single, J_i-Job situation, C_i-Country, T_i-type of building, AG_i-Agreeableness, EX_i-Extraversion, N_i-Neuroticism, OP_i-Openness, AC_i-Active Life, D_i-Depression, IN_i-Income, M_i-Marital status, CO_i-conscientiousness, E_i-Education, VS_i-Vigorous sport, H_i-Hospitalisation, IT_i-Internet, AL_i-Alcohol consumption, V_i-Flu vaccination, $S2_i$-Synergy2:No partnership & age>70, $S3_i$-synergy3:low extroversion/ conscientiousness/openness or high neuroticism, $S4_i$-synergy4:high level of neuroticism and single, where i = 1, …, N and N = number of respondents in both Wave 7 and Wave 8 data.

Equation (1) is used to analyze determinants of life satisfaction before the outbreak. Equation (2) is used as a baseline model during the pandemic. Equation (3) is used as a modified post-Covid model where additional factors like VS_i, IT_i, AL_i ,H_i, V_i are included.

$$LS_i = \beta_0 + \beta_1 O_i + \beta_2 I_i + \beta_3 A_i + \beta_4 S_i + \beta_5 J_i + \beta_6 T_i + \beta_7 C_i + \beta_8 AG_i + \beta_9 EX_i + \beta_{10} N_i + \beta_{11} OP_i + \beta_{11} AC_i + \beta_{12} D_i + \beta_{13} IN_i + \beta_{14} M_i + \beta_{15} S2_i + \beta_{16} S3_i + \beta_{17} S4_i + \varepsilon_i \quad (1)$$

$$LS_i = \beta_0 + \beta_1 O_i + \beta_2 I_i + \beta_3 A_i + \beta_4 S_i + \beta_5 J_i + \beta_6 T_i + \beta_7 C_i + \beta_8 AG_i + \beta_9 EX_i + \beta_{10} N_i + \beta_{11} CO_i + \beta_{12} E_i + \beta_{13} AC_i + \beta_{14} D_i + \beta_{15} IN_i + \beta_{16} S2_i + \varepsilon_i \quad (2)$$

$$LS_i = \beta_0 + \beta_1 O_i + \beta_2 I_i + \beta_3 A_i + \beta_4 S_i + \beta_5 J_i + \beta_6 T_i + \beta_7 C_i + \beta_8 AG_i + \beta_9 EX_i + \beta_{10} N_i + \beta_{11} CO_i + \beta_{12} E_i + \beta_{13} AC_i + \beta_{14} D_i + \beta_{15} IN_i + \beta_{16} S2_i + \beta_{17} VS_i + \beta_{18} H_i + \beta_{19} IT_i + \beta_{20} AL_i + \beta_{21} V_i + \varepsilon_i \quad (3)$$

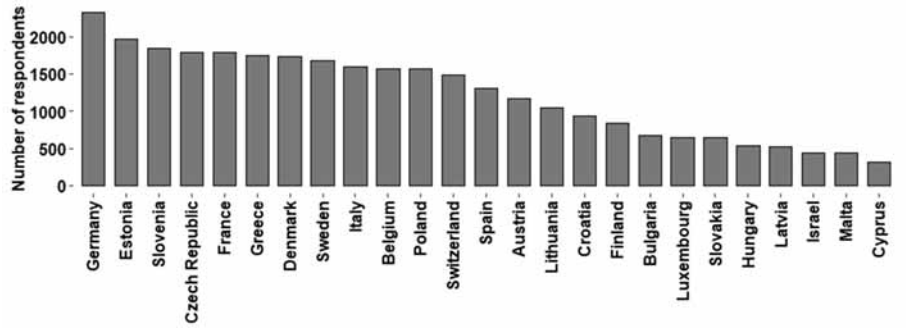
The response variable LS_i indicates whether the respondent is satisfied with life or not. Synergy variables are interaction terms between two or more conditions. The β_i coefficients show the effect which each predictor has on an individual's life satisfaction.

4. Results

4.1. Sample overview and demographics

In this study, 30615 respondents from 24 European countries and Israel are included. Figure 1 displays the distribution of the respondents in the sample per countries.

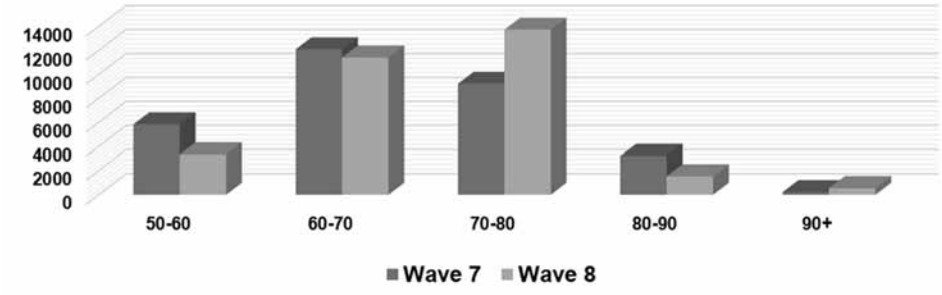
Figure 1. Distribution of respondents per countries



Source: Author's graph.

Figure 2 shows there is an uneven distribution of the respondents by age groups in both scenarios. Since all the respondents were older during the pandemic, some important changes are observed in Wave 8 data, namely an increase in the numbers in age groups 70-80 and 90+.

Figure 2. Distribution of respondents per age groups in Wave 7 and Wave 8 data

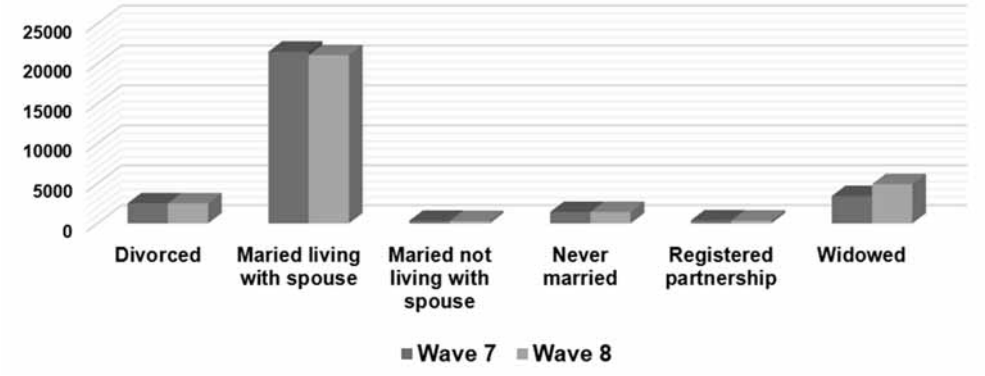


Source: Author's graph.

Regarding marital status, there is an increase of widowed older people at the expense of a decrease in the number of married and those with registered partnerships (Figure 3) due to older age and a lot of deaths during the pandemic.

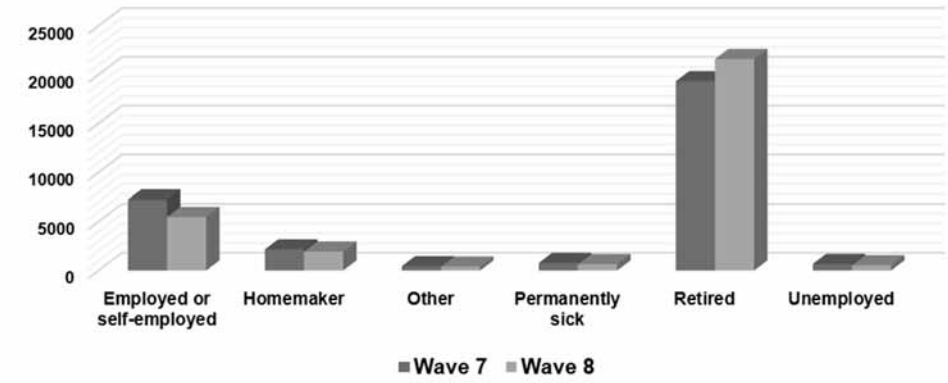
Concerning the job situation, the most important change is the transition from employment to retirement (Figure 4) due to the older age and job losses related to closed businesses during the pandemic.

Figure 3. Distribution of respondents per marital status in Wave 7 and Wave 8 data



Source: Author's graph

Figure 4. Distribution of respondents per job situation in Wave 7 and Wave 8 data



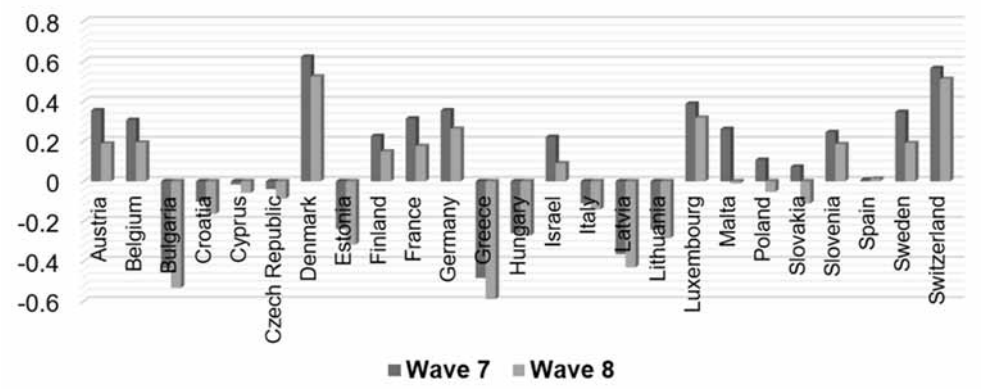
Source: Author's graph.

4.2. Factor analysis of the variables

Three factors (Optimism, Active life and Depression) are generated in data from both waves based on the analyses of Angelova (2021) and another factor Illness is generated from module gv_health: synthetic characteristics related to the general health status of the respondents.

Comparison between the levels of the four factors per countries shows similar results for most countries. The level of optimism decreased in all countries except for Hungary (Figure 5). It is visible that older people in Bulgaria are one of the biggest pessimists in Europe in both scenarios.

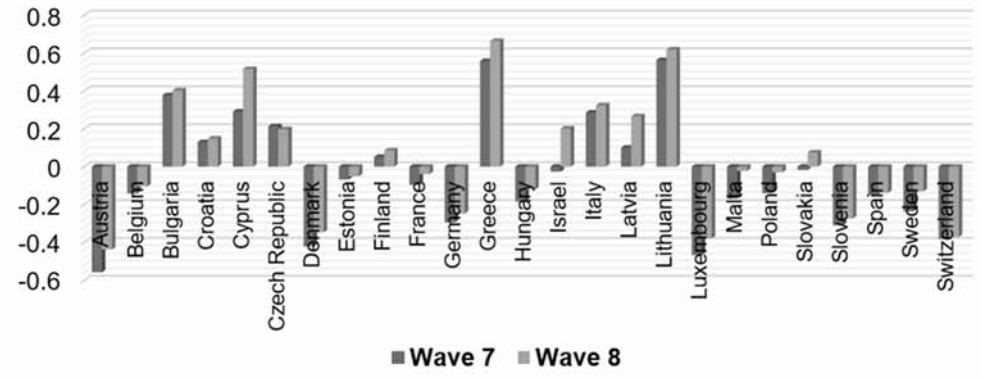
Figure 5. Factor Optimism before and during the pandemic



Source: Author's graph.

On the other hand, levels of depression increased in all countries except for Switzerland (Figure 6) due to higher level of stress during the pandemic. It is visible that older people in Bulgaria are one of the most depressed in Europe in both scenarios.

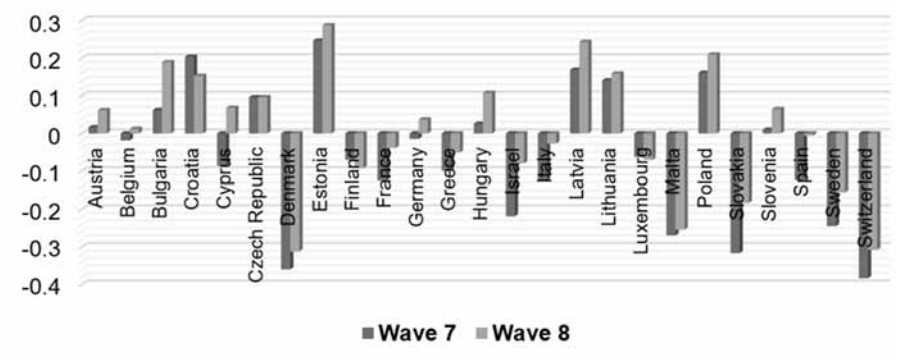
Figure 6. Factor Depression before and during the pandemic



Source: Author's graph.

Levels of illness, due to the severity and the fast spread of the virus, increased in all countries except for the Czech Republic where it stays at the same level and Croatia and Luxemburg where a decrease is observed (Figure 7). It is visible in Bulgaria both before and during the pandemic the levels of illness are one of the highest. However, during the pandemic, the levels of illness in Bulgaria increased drastically while in most countries the increase is much slighter.

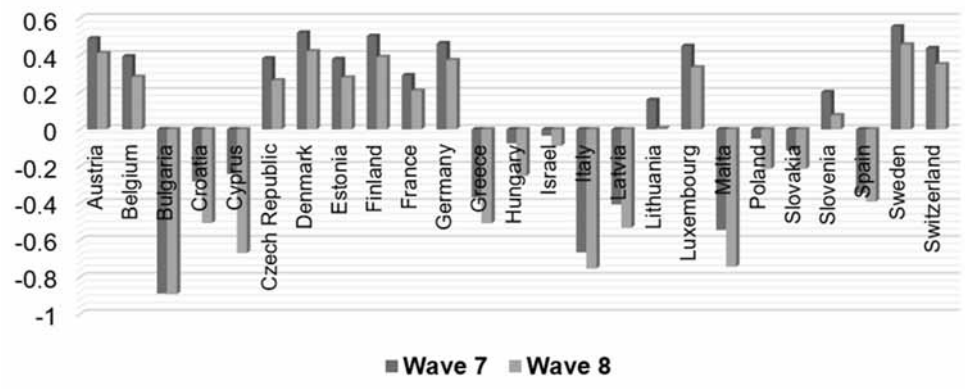
Figure 7. Factor Illness before and during the pandemic



Source: Author's graph.

In all countries, except in Bulgaria, the active live of older people decreased drastically (Figure 8) which is due to the restrictions of activities during lockdowns. The only country where levels of active life haven't changed since the outbreak is Bulgaria. However, the levels of active life in Bulgaria are also the lowest in Europe, so older people in Bulgaria are not active in general.

Figure 8. Factor Active life before and during the pandemic



Source: Author's graph.

4.3. Determinants of life satisfaction before and during the pandemic – testing of hypotheses

H1: Life satisfaction depends on different factors

For the analyses, 23 independent features in Wave 7 and 28 independent features in Wave 8 are used. Results of the Chi-squared test reveal the variety of factors that contribute to life satisfaction in both scenarios. Before the pandemic the dissatisfied people are more often women, without partners, low educated, unemployed or permanently sick, living in bigger cities and big buildings, with low levels of extraversion, openness, conscientiousness and

agreeableness, with high levels of neuroticism, with low income, inactive, pessimists, ill and depressed.

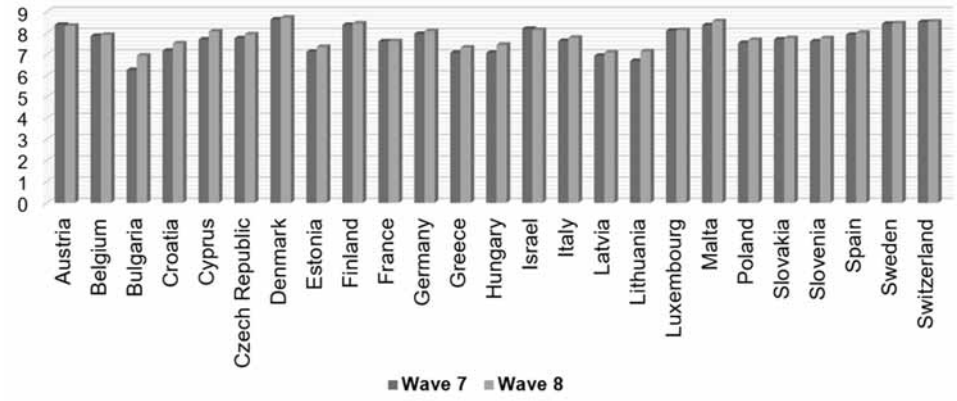
After the outbreak, the independent factors for life satisfaction are country, age, partnership, education, job situation, type of building, personality traits, income, active life, optimism, depression, illness, type of household, frequency of sports activities, alcohol consumption, friends net, hospitalization, flu vaccination, health insurance and usage of internet.

H2: Life satisfaction varies across the investigated countries

In most countries, the average level of life satisfaction increased during the pandemic (Figure 9) proving the results from other researches about the resilience of older people in critical situations.

In Bulgaria, we see before the pandemic the level of life satisfaction is the lowest in Europe, while during the pandemic the level is very close to that in several other countries. Moreover, Bulgaria is the country where during the pandemic the most drastic increase in the level of satisfaction is observed.

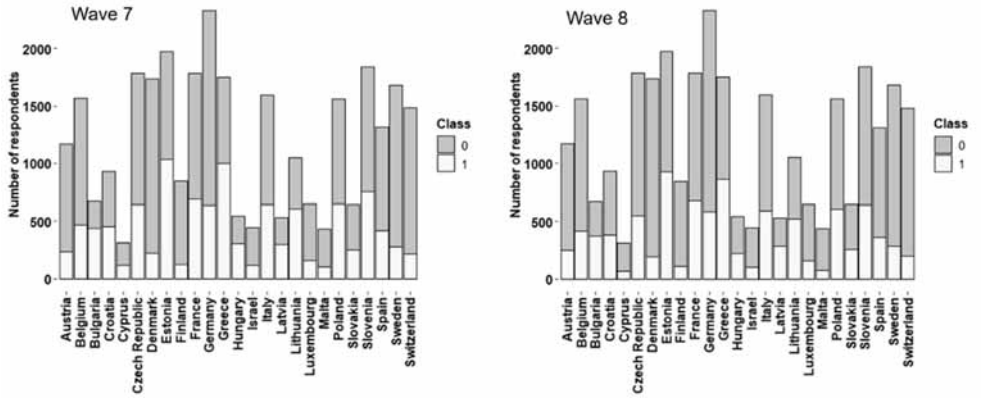
Figure 9. Changes in the average level of life satisfaction per countries before and during the pandemic



Source: Author's graph.

The baseline ratio of dissatisfied to satisfied people is 35.46%: 64.54% before and 31.66%: 68.34% after the outbreak of the global pandemic (Figure 10).

Figure 10. Distribution of satisfied (class 0) and dissatisfied people (class 1) before and during the pandemic



Source: Author's graph.

H3: Determinants of life satisfaction change since the outbreak of global pandemic

Table 1 shows the result of the logistic regression model for Wave 7 data. Results reveal factors increasing the probability of being dissatisfied before the outbreak are: aged 50-70; ill; single; depressed; no partnership, divorced, widowed or never married; unemployed or permanently sick; with low level of agreeableness, extraversion, openness; low or medium income, being at the same time single and with high level of neuroticism /anxiety/; being resident of Belgium, Bulgaria, Croatia, Check Republic, Estonia, France, Germany, Greece, Italy, Latvia, Lithuania, Hungary, Poland, Slovakia, Slovenia, Spain. At the same time factors that decrease the probability of being dissatisfied are: optimism; living in a house or housing complex; low level of neuroticism; lack of activities; being in no partnership, divorced, widowed or never married and at the same time aged over 70; being in one or more of the following personality states: high extroversion, high level of creativity and imagination, high level of agreeableness or low level of anxiety; being resident of Denmark or Finland.

Testing the baseline model with Wave 8 data with the same variables, results show factors that increase the probability of being dissatisfied during the pandemic are: being ill, aged 50-70, single, unemployed or permanently sick, low level of agreeableness, extraversion, conscientiousness, low education, lack of activities, depression, low income, being resident of Belgium, Bulgaria, Croatia, Estonia, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Poland, Luxemburg, Slovakia, Slovenia. At the same time, factors that decrease the probability of older people to be dissatisfied during the pandemic, using the baseline model, are optimism, living in a house of housing complex for the elderly, low level of neuroticism, having no partner and at the same time aged over 70, being resident of Cyprus, Finland, Denmark, Malta, Sweden, Switzerland. The variable that represents the effect of ageing shows no statistical significance, so it is dropped from the final model.

Table 1. Determinants of life satisfaction before the pandemic – logistic regression output (Wave 7 model)

Variables	Estimate	Std. Error	z value	Pr(>|z|)	Signif.
(Intercept)	-1.064	0.136	-7.819	5.33E-15	***
Optimism: Yes	-1.251	0.035	-35.521	< 2e-16	***
Illness: Yes	0.364	0.036	10.222	< 2e-16	***
Age: 50-70	0.162	0.042	3.851	0.000118	***
Single: Yes	0.270	0.085	3.188	0.001432	**
Marital status: No partner, divorced, widowed or never married	0.168	0.079	2.125	0.033576	*
Job situation: Unemployed or permanently sick	0.423	0.067	6.334	2.39E-10	***
Type of building: House of housing complex for elderly	-0.114	0.035	-3.263	0.001102	**
Belgium	0.361	0.118	3.047	0.00231	**
Bulgaria	1.508	0.143	10.523	< 2e-16	***
Croatia	0.963	0.128	7.540	4.69E-14	***
Cyprus	0.213	0.187	1.141	0.253924	
Czech Republic	0.254	0.113	2.244	0.024852	*
Denmark	-0.285	0.131	-2.177	0.029468	*
Estonia	1.160	0.110	10.541	< 2e-16	***
Finland	-0.752	0.152	-4.943	7.71E-07	***
France	0.822	0.113	7.249	4.21E-13	***
Germany	0.401	0.111	3.606	0.000311	***
Greece	0.730	0.115	6.355	2.08E-10	***
Hungary	1.345	0.147	9.157	< 2e-16	***
Israel	0.219	0.167	1.313	0.18916	
Italy	0.523	0.118	4.445	8.78E-06	***
Latvia	1.014	0.149	6.829	8.53E-12	***
Lithuania	1.009	0.125	8.085	6.20E-16	***
Luxembourg	0.290	0.149	1.942	0.052094	.
Malta	0.093	0.175	0.532	0.594388	
Poland	0.665	0.117	5.693	1.25E-08	**
Slovakia	0.631	0.145	4.342	1.41E-05	***
Slovenia	1.105	0.112	9.855	< 2e-16	***
Spain	0.338	0.122	2.759	0.005793	**
Sweden	-0.150	0.123	-1.214	0.224619	
Switzerland	-0.184	0.131	-1.408	0.159231	
Agreeableness: low	0.093	0.034	2.735	0.006244	**
Extroversion: low	0.231	0.037	6.231	4.62E-10	***
Neuroticism: low	-0.294	0.041	-7.203	5.88E-13	***
Openness: low	0.121	0.039	3.119	0.001814	**
Active life: No	-0.082	0.048	-1.718	0.085773	.
Depression: Yes	0.709	0.036	19.680	< 2e-16	***
Income: low	0.341	0.040	8.509	< 2e-16	***
Income: medium	0.116	0.052	2.239	0.025127	*
Synergy2: no partner & aged>70	-0.331	0.072	-4.607	4.08E-06	***
Synergy3: high extroversion/ high openness / high agreeableness / low neuroticism	-0.255	0.076	-3.342	0.000832	***
Synergy4: single with high neuroticism	0.303	0.072	4.190	2.79E-05	***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Source: Author's calculations.

Table 2. Determinants of active life during the pandemic – logistic regression output (Wave 8 –post-Covid model)

Variables	Post Covid model Wave 8				
	β	Std. Error	z	Pr(>|z|)	Signif.
(Intercept)	-1.290	0.121	-10.67	< 2e-16	***
Optimism: Yes	-1.290	0.041	-35.47	< 2e-16	***
Illness: Yes	0.329	0.040	8.31	< 2e-16	***
Age: 50-70	0.245	0.043	5.72	1.10E-08	***
Single: Yes	0.467	0.050	9.25	< 2e-16	***
Job situation: Unemployed or permanently sick	0.470	0.072	6.54	6.10E-11	***
Type of building: House of housing complex for elderly	-0.083	0.035	-2.36	0.0183	*
Belgium	0.290	0.120	2.41	0.0158	*
Bulgaria	1.053	0.140	7.50	6.26E-14	***
Croatia	0.635	0.129	4.93	8.41E-07	***
Cyprus	-0.514	0.201	-2.56	0.010	*
Czech Republic	0.132	0.114	1.16	0.246	
Denmark	-0.404	0.136	-2.978	0.0029	**
Estonia	0.940	0.110	8.513	< 2e-16	***
Finland	-0.807	0.159	-5.080	3.78E-07	***
France	0.835	0.115	7.291	3.09E-13	***
Germany	0.283	0.113	2.507	0.0122	*
Greece	0.395	0.116	3.411	0.0006	***
Hungary	0.727	0.148	4.917	8.79E-07	***
Israel	-0.017	0.173	-0.097	0.9226	
Italy	0.429	0.118	3.627	0.0003	***
Latvia	0.965	0.148	6.517	7.17E-11	***
Lithuania	0.690	0.124	5.551	2.84E-08	***
Luxembourg	0.405	0.149	2.722	0.0065	**
Malta	-0.498	0.190	-2.625	0.0087	**
Poland	0.426	0.117	3.625	0.0003	***
Slovakia	0.585	0.144	4.067	4.75E-05	***
Slovenia	0.794	0.113	7.021	2.20E-12	***
Spain	0.188	0.124	1.514	0.1301	
Sweden	-0.227	0.125	-1.821	0.0687	.
Switzerland	-0.243	0.133	-1.830	0.0672	.
Agreeableness: low	0.110	0.034	3.203	0.0014	**
Extroversion: low	0.151	0.036	4.219	2.45E-05	***
Neuroticism: low	-0.291	0.035	-8.387	< 2e-16	***
Conscientiousness: low	0.137	0.037	3.681	0.0002	***
Education: low	0.082	0.038	2.147	0.0318	*
Active life: No	0.123	0.041	2.980	0.0029	**
Depression: Yes	0.676	0.037	18.370	2.28E-75	***
Income: low	0.245	0.041	5.930	3.03E-09	***
Income: medium	0.000	0.052	0.006	0.9949	
Synergy2: no partner & aged>70	-0.155	0.064	-2.432	0.0150	*
Vigorous sports: Weekly	-0.074	0.036	-2.071	0.0384	*
Hospitalisation last 12 months: Yes	0.160	0.045	3.534	0.0004	***
Flu vaccination: Yes	-0.072	0.038	-1.891	0.0586	.
Use of internet in past 7 days: Yes	-0.103	0.040	-2.559	0.0105	*
Alcohol consumption the last 7 days: Yes	0.071	0.036	1.966	0.0493	*

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Source: Author's calculations

In the post-Covid model some additional variables, significant independent factors for life satisfaction, are added. The results show being hospitalised in the last 12 months and drinking alcohol regularly increases the probability of being dissatisfied. On the other hand, doing vigorous sports, having flu vaccination and using the Internet regularly are factors that decrease the probability of being dissatisfied (Table 2).

Interesting is that factors like household type, friends net and health insurance are strong independent predictors of life satisfaction, but they don't show explanatory power in the multivariate logistic regression.

The estimated models don't have very high explanatory power due to the determinants that are not included in the research, but the literature review shows they also affect life satisfaction.

5. Discussion

The analyses prove there are significant changes in older people's attitudes towards well-being and life satisfaction. Estimated models show life satisfaction depends on a mixture of drivers. The results reveal one of the most important factors in both scenarios is the country of residence, which is in line with the finding of Angelova (2021) that the country is the most significant predictor of the behaviour of older people absorbing the effect of various factors. In another research, Yordanov et al. (2022) show that each country has its strengths and weaknesses in terms of its economic development, natural resources and social benefits.

Moreover, living in a house is also proved to be a factor that decreases the probability of being dissatisfied in both scenarios. One possible explanation is that houses allow more privacy, safety, silence and comfort. According to Gifford (2007), high-rises are less satisfactory than houses, because they are not optimal for children, social relations are more impersonal, helping behaviour is less, and crime and fear of crime are greater. Another explanation is that houses are usually surrounded by green spaces that help release stress, while tall buildings are typical for big cities with a lot of traffic and pollution. Moreover, during the pandemic, when 'stay-home' measures are imposed, it is not surprising that people feel more satisfied in a private house, where they can go out and do some gardening or other activities that make them feel happier (Sunga, Advincula, 2021).

Concerning the demographic factors, the research shows that younger respondents (aged 50-70) are more likely to be dissatisfied in both scenarios. One possible explanation consistent with other authors (Solé-Auró et al., 2018; Dingemans, Henkens, 2019) could be that people feel happier around retirement age. Another explanation is that people at a later age get used to difficulties more easily (Kwong et al., 2021; Brandtstädter, Renner, 1990; Araki, 2022; López et al., 2020). Another result is that the lack of a partner is a very important factor for being dissatisfied. This may be due to the fact that older people need more support and help, and usually, their children have their own living places and their partner is the most important person in their everyday life (Solé-Auró, Cortina,2019). Another factor that increases the probability of being dissatisfied in both scenarios is being unemployed or permanently sick. Possible explanations are that good health and activities are very important for older people's

well-being and self-care independence, older adults who are working, can meet and exchange ideas with other people and being busy makes them not think about their problems and have better mental health (Bjelajac et al., 2019; Arpino, Gumà, Julià, 2018; Angelini et al., 2012).

On the other hand, the baseline model in both scenarios reveals two very important factors that decrease the probability of being dissatisfied. The first one, being an optimist, is also proven to be a strong predictor of life satisfaction by other researchers (Leung et al., 2005). The second one, having a low level of neuroticism, is also consistent with previous studies (Hufer, Riemann, 2021). On the other hand, low level of agreeableness and extraversion are among the predictors that increase the probability of being dissatisfied which is also in line with other studies (Fors Connolly, Johansson, 2021). Moreover, Schimmack (2004) also proves the 'Big Five' are among the strongest predictors of life satisfaction.

One interesting finding in the post-COVID model is that while before the pandemic openness was one of the factors that determined life satisfaction, since the outbreak it is substituted by conscientiousness. One possible explanation is that personality changes with facing difficulties and new challenges in life like social isolation, traumatic experiences and environmental factors (Harris et al., 2016; Rubeena, 2020). Meanwhile, concerning socio-economic factors, before the pandemic low or medium income are among the factors that increase the probability of being dissatisfied, while during the pandemic medium income is no longer a factor. One possible reason is that because of restrictions on activities and closed restaurants and shops, people spend less and save more money (Yordanov et al., 2022). It is interesting, that since the outbreak low education appears to be one of the factors that increase the probability of being dissatisfied, while before the pandemic education is not among the significant factors. One possible explanation is that people with higher education have better jobs, they are better informed and make better decisions, which is very important for mental health and well-being during the pandemic (Ilies et al., 2019).

The biggest change since the pandemic concerns the effect of active life on life satisfaction. Results show that before the pandemic, inactive people were more satisfied with life than the active, while since the outbreak the situation has been the opposite. Moreover, the statistical significance of this factor since the outbreak has increased a lot. One possible explanation is that in ordinary scenarios most older people are enjoying their lives with passive activities like reading, watching TV, listening to the radio and spending time with family (Cho et al., 2018). Thus, before the pandemic older people are not thinking much about their active life, because there are no barriers. Moreover, according to Wicker and Frick (2015), the time spent on intensive physical activity is negatively related to subjective well-being. Another explanation is that before the pandemic lonely older people dissatisfied with life were searching for activities that would make life more interesting, like meeting people, going out, travelling, etc. This could be the reason since the outbreak's lack of activities increases the probability of being dissatisfied (Zhang et al., 2020). The pandemic causes more stress and depression, and the limitation of activities deepens mental health problems. According to Yordanov (2021), social distancing causes increased stress levels, depression and sleep disorders. According to Beall et al. (2022) participation in outdoor activities and exposure to nature improve mental well-being.

Regarding the additional factors in the post-Covid model it is found being hospitalised in the last year increases the probability of being dissatisfied. A possible explanation is that

hospitalization causes strong anxiety and depression (Vlake et al., 2021). Another factor that increases the probability of being dissatisfied during the pandemic is regular alcohol consumption. The possible reason is that people who drink alcohol regularly either feel lonely or have mental health problems, or try to cope with stress, or search for pleasure or are socially influenced (Mäkelä et al., 2015; Abbey, 1993). Thus, there is a positive relationship between dissatisfaction and alcohol consumption in both directions.

On the other hand, an additional factor in the post-Covid model that decreases the probability of being dissatisfied is doing vigorous sports. One possible explanation is that sport helps release stress and be in good health (Kaur et al., 2020). Moreover, it is a good way to distract from everyday bad news about the victims of the pandemic. Another factor that decreases the probability of being dissatisfied is having a flu vaccination. This may be due to the increased campaigns about the benefits of vaccinations in the media, that make older people feel safer if they have one. According to Conlon et al. (2021), influenza vaccination is associated with decreased positive COVID-19 testing and improved clinical outcomes. One can assume older people who are afraid of infections will prefer to have the vaccine as protection, which will make them feel more satisfied (Dymecka, Gerymski, Machnik-Czerwik, 2021).

The last additional factor positively correlated to life satisfaction is regular Internet usage. One reason is that the Internet allows people to stay connected with their family and friends during the restrictions. Moreover, the Internet gives the opportunity to work or study from home (Mochón, 2021). According to Karakose et al. (2022), there is a positive relationship between COVID-19-related quality of life and loneliness, and that loneliness positively predicts Internet addiction. Moreover, Venuleo et al. (2020) detected three motives for Internet use being leisure and social interaction, knowledge and learning/working.

6. Conclusion

The results show the feeling of satisfaction is a subjective process that depends on multiple predictors, thus confirming the first hypothesis of the research. The research provides an up-to-date picture of the changes in the behaviour of older people in Europe with a focus on the specific challenges related to the pandemic.

Findings emphasize the need to invest in mental health interventions, prevention and coping strategies focusing on improving the life satisfaction of older people. Knowing the main drivers for life satisfaction, policymakers could design specific social policies directed to each factor that could lead to an increase in the level of satisfaction, which will in turn indirectly foster economic growth.

Talking about the factors of age and partnership, policymakers should focus on the development of programmes aiming at reducing loneliness and social isolation (Fakoya et al., 2020) like social bonding, social skills training, support groups and educational programs (Andersson, 1998), creating age-friendly communities, including housing and technology (Van Hoof et al., 2019).

As for the factors of income, education and job situation, appropriate action is social policy focused on the bottom of the income distribution, as well as implementing educational policy

aiming to afford more efficient education and skills (Swagel, Boruchowicz, 2017). According to Affandi et al. (2019), high-quality educational infrastructure and a curriculum that focuses on enhancing cognitive skills are key to ensuring higher economic growth.

Possible solutions focused on factors of optimism, depression and changes in personality traits could be an integration of mental health policy into public health policy and general social policy (Jenkins, 2003).

As for the factors of illness and hospitalisation, policymakers should focus on improving the quality of health care services, enhanced training to manage common medical conditions, home-based services and development of information technology and caregiver support (Kripalani et al., 2014), which will lead to improved patient experience and saved costs (Walsh et al., 2016).

In order to promote the factors of sport and active life, the necessary measures are setting- and target-group-specific policies, as well as policies that make changes to the environment and transport infrastructures (Gelius et al., 2020), that encourage people to participate in more physical activities.

As for factor Internet usage, policymakers should focus on the improvement of digital skills in collaboration with private and public stakeholders, self-training promotion strategies and local training initiatives (Fuller, 2020), better Internet usage opportunities or benefits, as well as mitigating the digital divide via increase of social programs adapted to disadvantaged groups in their communities (Van Dijk, 2020).

Regarding the factor of regular alcohol consumption, policymakers should support community programs for high-risk social groups, develop non-alcoholic environments, socio-professional reintegration, and relapse prevention (Nistor, 2019), that are relevant to improvement of the mental health.

To support factor flu vaccination, the needed policies are publicity promoting vaccines, better access to vaccination via services such as workplaces and pharmacies, as well as increased knowledge about the importance of vaccination for disease prevention, and medical office staff trained to assess the vaccination needs of patients (Anderson, 2014).

Regarding factor country, policymakers should focus on the development of infrastructure, supportive environments and spaces taking into account different aspects of design, dimensions and colours (Sungur, Polatoglu, 2010) and special planning aiming at more green spaces associated with better health of the residents (Maas et al., 2006), as well as implementation of regulatory policy, insuring political and bureaucratic transparency and anticorruption measures (Dimant, Tosato, 2018). On one hand, changing the living environment design will increase the physical activity of people (Giles-Corti et al., 2015), which is one of the drivers of life satisfaction. On the other hand, these policies will have a positive effect on the country's image and indirectly affect foreign direct investments, which in turn will foster economic growth.

Focusing on Bulgaria, the results show older people there are the biggest pessimists and the most depressed in Europe. Moreover, during the pandemic extreme increase in the levels of illness is observed while the very low level of activeness stays at the same level. Thus,

specific social policies could be implemented on a national level in response to these issues. Knowing that optimism and depression are proven to be one of the strongest predictors of life satisfaction, policymakers in Bulgaria should focus their efforts on social policies for reducing loneliness and improving the mental health of older people, including training programs for physical exercises like yoga, yoga laughter, tai-chi, dances; for relaxation exercises like breathing, meditation, music therapy, drawing, etc.; organising tourism activities and voluntary work; developing measures like social assistants and private assistants that support older people in their daily life. These policies would positively affect the high levels of illness and the low level of activeness in Bulgaria.

The research generates several findings. First, the results prove in both scenarios life satisfaction depends on the mixture of drivers. Moreover, to the best of the author's knowledge, in no other research, so many drivers are considered together and so deeply investigated. Second, it adds new knowledge about the significant changes in older people's mindset as well as providing the possible reasons for the changes. On one hand, changes in the personality traits are observed. On the other hand, in comparison with the times before the pandemic where low and medium income are significant predictors of life satisfaction, in the post-Covid period only low income is crucial for being satisfied. Furthermore, during the pandemic low education is one of the factors that increase the probability of being dissatisfied, while before that it wasn't the case. Besides that, before the pandemic, inactive people were more satisfied with their lives than the active, while since the outbreak the situation has been the opposite. Moreover, the post-Covid model reveals additional factors that affect life satisfaction. On one hand, hospitalization and regular alcohol consumption increase the probability of being dissatisfied. On the other hand, additional factors that decrease the probability of being dissatisfied during the pandemic are doing vigorous sports, flu vaccination and regular Internet usage. The results are important to the design and implementation of social policies ultimately aiming to foster economic growth. The final contribution of the research reveals detailed recommendations for such social policies, based on the results and supported by an extensive literature review, as well as recommendations for policies with emphasis on Bulgaria.

The results could be implied in European, national, and local policies, directed towards care of human life and happiness, improving the mental health and quality of life of older people as well as keeping this group involved in the social and economic life. Implementation of such social policies could lead to better performance of the labour force and higher productivity (Oswald et al., 2015) which could positively affect economic growth (Korkmaz, Korkmaz, 2017; Patel, 1986; Adejumo et al., 2013).

The results suggest a direction for a better fit between academic research and the needs of policymakers and practitioners aiming at an increase in life satisfaction and economic development.

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