Tomasz Panek • Jan Zwierzchowski

SUBJECTIVE WELL-BEING IN EUROPEAN UNION COUNTRIES

SGH Publishing House

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Introduction

For numerous years, welfare was largely associated with material wealth. The rate of economic growth was commonly used as the main indicator to measure societal progress. This viewpoint, anchored in material aspects of wellbeing, constitutes the foundation of the Scandinavian approach to quality of life measurement. This perspective was profoundly influenced by Drewnowski's studies in the 1970s and Titmuss' research on the British welfare state in the late 1960s and early 1970s (Drewnowski, 1970; Titmuss, 1968, 1974).

Within this framework, welfare is viewed as the access to diverse resources – including monetary wealth, assets, knowledge, psychic and physical energy, and social bonds – that allow individuals to intentionally shape their living conditions (Erikson, 1993, pp. 72–73). In this context, external living conditions are regarded as the primary factors that influence well-being.

This is not to imply that the subjective aspects of quality of life were ignored. Yet, as subjective evaluations can fluctuate based on individual aspirations, they weren't deemed appropriate criteria for guiding social policy within this framework. The principal aim of measuring quality of life in this context was to guide policy-making and societal development, with the focus thus being on more objectively measurable factors such as economic and material well-being.

While this approach holds merit, it has been both contested and enriched by other viewpoints that place more emphasis on the subjective aspects of well-being, acknowledging that personal life experiences are vital for a thorough comprehension of quality of life.

In the years that followed the emergence of welfare-oriented strategies for social progress, a fundamental paradigm shift occurred in understanding quality of life and social development. This shift was instigated by a burgeoning discourse on the limitations of using solely economic growth as a measure of social development and its impact on the natural environment. This debate was partly stimulated by the economic principle of diminishing marginal utility, initially proposed by Gossen (1983).

This principle maintains that every additional unit of a particular good consumed offers a marginal benefit or utility, which is lesser than that offered by the preceding

unit. Interestingly, this principle further posits that beyond a certain consumption threshold, acquiring more of the same good results not only in diminishing increments of satisfaction but may even cause a net decrease in utility or satisfaction levels. This can be interpreted as an over-saturation point, where having more of a good does not equate to more satisfaction, and can even reduce it.

Within this framework, the drawbacks of a perspective on social development that relied solely on objective, typically economic, indicators became increasingly evident. This paved the way for a comprehensive re-evaluation of how we understand and measure social development and quality of life.

This rethink manifested in a significant breakthrough in the 1970s when a unique American approach to measuring quality of life was formulated. This new approach, pioneered by such influential thinkers as Campbell, Converse, and Rodgers (Campbell and Converse, 1972; Campbell, Converse and Rodgers, 1976), defined the quality of life not merely in terms of objective indicators, but as the level of an individual's life satisfaction.

In this perspective, objective measures of the quality of life are considered the means to the ultimate end: life satisfaction. This signalled a departure from the previous view that equated the quality of life with material wealth or economic prosperity. However, this novel approach posits that the quality of life is not solely determined by an individual's attributes, such as their biological, mental, and social traits, but is also significantly influenced by their living and functional environment.

This approach offered a more holistic and comprehensive perspective on the quality of life. It shifted the ultimate goal of social development from improving just the objective characteristics of the quality of life to enhancing people's subjective well-being. This shift to considering subjective well-being as a crucial measure of the quality of life marked a significant milestone in the evolution of social development thinking.

More recently, the idea of considering welfare as the sole goal of social development has been superseded by a multi-dimensional understanding of the quality of life, encompassing non-material life aspects such as health, social relations, and environmental quality. Moreover, it includes subjective assessment of one's personal circumstances and overall life experience. In other words, the quality of life has come to be assessed not only on the basis of objective characteristics of living conditions and their subjective assessment but also by taking into account subjective assessments of overall experience of life.

Within the European Union, a lot of research has been conducted on sustainable socio-economic development, including the quality of life. Subsequent treaties of the European Union reveal a growing awareness of the need to strike a balance between economic development and social progress, while preserving the natural environment

and cultural heritage. In 1992, "improving the quality of life of residents" was mentioned as one of objectives of the Treaty of Maastricht. Improving the quality of life and social cohesion was also one of the key objectives of the EU 2020 strategy (Commission of the European Communities, 2010).

Important contributions to developing ways of measuring the quality of life were made in the European Commission's Communication "GDP and beyond: Measuring progress in a changing world" (Commission of European Communities, 2009) and the report of the Commission on the Measurement of Economic Performance and Social Progress, more commonly known as the Stiglitz Commission report, on improving the tools for measuring economic efficiency and social progress (Stiglitz, Sen and Fitoussi, 2009). Ideas included in the "GDP and beyond" road map and the Stiglitz Commission report were inspired, among other things, by Sen's theory of capabilities. The Stiglitz Commission report was a milestone in the development of the approach to measuring the quality of life within the European Union. It also gave an impulse to start efforts to define and measure subjective well-being (SWB) (National Research Council, 2013). The purpose of the report was to, first of all, identify the limitations of GDP as an indicator for assessing economic performance and social progress, and, secondly, to look for alternative instruments and promote discussions on how to correctly present statistical information. The report underlines the importance of using correct measures of economic and social processes and points out that in order to correctly evaluate social progress, the relative measures have to include the quality of life.

The EU and its Member States have developed and have been applying a wide range of social and environmental indicators, which were often nested within systems of sustainable development indicators. In 2011, Eurostat and the French National Institute for Statistical and Economic Research (INSEE) created the Sponsorship Group on Measuring Progress, well-being and Sustainable Development (SpG). The group developed a comprehensive framework for measuring the quality of life within the European Statistical System (Eurostat, 2011a, 2011b), originally proposed by Berger-Schmitt and Noll (2000), which also referred to the recommendations contained in the Stiglitz report on measuring social development. In the final report of the Expert Group on Quality of Life of the European Commission (Eurostat, 2017) subjective well-being (SWB) was proposed as one of the nine dimensions of the overall quality of life. It was divided into three subdomains to reflect the triadic conceptualization of SWB. The report also contains a complete set of observable indicators to measure the phenomena. As a result, subjective well-being has become one of the essential instrument for evaluating the effectiveness of national policies, making it possible to assess people's subjective reactions to implemented policies (Dolan and White, 2007; Helliwell and Barrington-Leigh, 2010).

The aim of this study is to estimate and compare subjective well-being in the EU member states. Moreover, the study investigates the objective factors influencing the level of SWB. Special attention was paid to the relationship between subjective well-being and income and subjective well-being and age. The study also contains a comparative analysis of national profiles of subjective well-being in the EU member states. In addition, the EU member states were classified taking into account the degree of similarity between the structure of subjective well-being (similarity of relationships between the indicators of SWB components).

The theoretical part includes a novel approach to measuring subjective well-being, which is based on recent recommendations of Eurostat and Sen's capabilities approach. Under this approach, heterogeneous ways of maximizing SWB are taken into account, resulting from individuals' capabilities and preferences and different living conditions, which depend on the stage of economic development and social customs in the country concerned. Moreover, this approach makes it possible to empirically verify hypotheses about potential factors influencing the dimensions of SWB. A multiple indicators and multiple causes (MIMIC) model was used to operationalise the capabilities approach. Based on the results of the MIMIC model, subjective well-being index (SWBI) and subjective well-being component indices (SWBCI) were proposed. The recommended method of constructing SWB indicators yields results that are comparable between countries and SWB components. In addition, a number of SWB kernel density estimations were performed in the general populations of the countries analysed in the study in order to gain addition comparative insights into SWB. A comparative analysis of national profiles by subjective well-being was carried out using one of the methods of factor analysis, namely correspondence analysis. The classification of the EU member states in terms of the similarity between their structures of subjective well-being (similarity of relationships between the indicators of SWB components) was conducted using agglomerative hierarchical cluster analysis. Various tools were proposed to analyse the relationship between subjective well-being and income and between subjective well-being and age. Firstly, the relationships were evaluated by estimating the kernel regression of SWB on income and on age, for each the EU country separately. Next, differences in the relationship between average SWBI and average equivalised income in the EU countries were analysed. Finally, the kernel regression function of average values of SWBI on average equivalised income was estimated for all data points representing the EU countries.

In the empirical part, we used the proposed methodology to estimate SWB indicators in the EU member states in 2018. Moreover, we examined which factors determined subjective well-being in these countries. Next, we conducted a **c**omparative analysis of national profiles in terms of subjective well-being and the clustering of EU-27

countries according to the similarity of their structures of subjective well-being. Finally, interrelationships between subjective well-being and its determinants were analysed. The empirical analyses was based on data from the European Union Survey on Income and Living Conditions (EU-SILC) for 2018.

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Part I

Theoretical background and methodology

1. Subjective well-being

Research on subjective well-being (SWB) has a long history initiated by Greek philosophers. However, the widespread interest in this field commenced in the 1960s when concepts such as SWB and quality of life appeared as an alternative to the dominant goal of social development, which was to improve material living standards. Since then, SWB and quality of life have been the subject of many studies in various research disciplines, such as economics, political sciences, sociology, psychology, philosophy and medical sciences (Kot, 2004; Phillips 2006; Panek, 2016). In recent years, interest in SWB has intensified as a result of the realisation that an accurate assessment of the phenomena may help to monitor economic, social and health conditions of populations and inform policy decisions (Ferreira and Moro, 2010; Krueger and Mueller, 2011; National Research Council, 2013; Dolan, Kavetsos and Tsuchiya, 2013). It is important to highlight here that a significant contribution to SWB research was also made by psychologists, particularly in psychometrics, and sociologists, mainly within the so-called social indicators movement (e.g. Andrews and Withey, 1976; Land 1983, 1996).

Subjective well-being describes how people experience and evaluate their overall life circumstances as well as specific domains and activities of life. The debate on how to define, identify and measure SWB has been continuing for decades. Especially noteworthy is the contribution of statistical sciences to this matter. In addition to the mentioned volume of recommendations regarding the inclusion of subjective well-being in public statistics research – developed by the Committee on National Statistics (NRC, 2013) – it is also worth paying attention to publications such as Statistics in Transition new series, entirely devoted to measuring subjective well-being

in survey research of official statistics, with example discussions of the most important issues regarding the conceptualization and measurement of subjective well-being in the most advanced countries in this respect, led by the UK (see Kalton et al., 2015). During the past decade, following the Stiglitz (2009) report, SWB became the subject of considerable interest not for researchers and academics but also for policy makers, national statistical offices and the media.

Different approaches to subjective well-being are proposed, depending on what theoretical model has been adopted. SWB models can generally be classified into hedonistic or eudemonistic (Ryan and Deci, 2001). The first one has its source in the philosophy of Aristippus of Cyrene. From the hedonistic perspective, subjective well-being is measured in terms of life satisfaction, which is associated with a balance of emotional experiences. Sometimes the hedonistic concept of subjective well-being also involves assessing satisfaction with specific aspects of life (Diener et al., 1999). In the eudemonistic model, which is based on Aristotle's philosophy, subjective well-being is defined as enjoying and striving for valuable attributes of life.

The pioneering works on SWB, relevant for the ongoing discussion in this field, include those written by Brudburn (1969) and Andrews and Withey (1976). Brudburn changed the paradigm related to understanding negative and positive affects. According to Brudburn, the two kinds of affects are independent phenomena rather than opposite ends of the same dimension. Therefore, any empirical research aimed at measuring SWB should contain tools for measuring both of these dimensions independently. Andrews and Withey laid foundation for the use of subjective, self-reported indicators in empirical social research. They advocated the use of subjective indicators of the quality of life. His works validated the application of empirical research in the measurement of SWB and, moreover, the inclusion of SWB in the overall assessment of the quality of life.

A psychological theory of SWB was summarized by Diener (1984). He divided SWB into three subcategories, namely positive and negative affect and general assessment of life satisfaction. Diener stated that the three components of SWB represent distinct constructs, which, even though closely related, should be understood separately.

A concept of SWB adopted in the European Social Survey combines the hedonistic and the eudemonistic approaches. However, it leaves out the category of associated with the evaluation of specific aspects of life. Subjective well-being is understood as the way people feel and how they function, on a personal and societal level, and how they evaluate their lives as a whole (Huppert et al., 2009; Huppert, Mickaelson and Vittersø, 2013).

More recently, the triadic conceptualisation of SWB has been proposed. The three categories of SWB are referred to as evaluative, experienced and eudaimonic well-being

(National Research Council, 2013). Evaluative well-being refers to people's global judgements of how satisfied they are with their lives. When applied to specific areas of life, these judgments represent sub-domains of evaluative SWB, such as satisfaction with relationships, health, professional career, etc.

Experienced well-being refers to people's emotional states and sensations, such as pain or arousal. It also comprises feelings of meaningfulness or pointlessness of life, which are somehow associated with emotional states. Experienced well-being is often divided into positive (joy, happiness) and negative (stress, pain, anxiety) experiences, which somehow correspond to Diener's positive and negative affects.

Eudaimonic well-being concerns perceptions of meaningfulness, the sense of purpose and the value of life. While it is somehow connected with evaluative and experienced well-being, eudaimonic well-being is viewed as constituting a distinct dimension of the phenomena. The most commonly used way of measuring it involves asking individuals to assess overall meaning and sense of purpose in their lives.

These components are not entirely independent and may be thought of in terms of a continuum, with real time assessments of experience, emotional states and sensations at one end (the shortest time-frame) and overall evaluations of life satisfaction, purpose or suffering at the other end (the long-term perspective). The three categories of SWB provide empirical researchers with a theoretical guide for constructing survey questions designed to measure SWB.

2. Determinants of subjective well-being

A number of personal, social and environmental exogenous characteristics affect a person's subjective well-being. They can strengthen and weaken SWB in different ways. Among different variables affecting subjective well-being, a person's wealth, measured in terms of personal income, has been analysed the most (Diener and Oishi, 2000; Diener and Biswas-Diener, 2002; Sanfey and Teksoz, 2005; Kahneman and Deaton, 2010; Jakobsson Bergstad et al., 2012). The link between income and subjective well-being has been the focus of extensive research dating back to the early 1970s. Various reports show that income increases significantly boost SWB for higher income classes, while lower incomes (mainly incomes insufficient to satisfy basic needs at an acceptable level) do not affect SWB in a similar manner, and the overall effect of income on SWB is weaker than people generally believe (Aknin, Norton and Dunn, 2009). This influence is relatively limited for several reasons. Firstly, a study by Easterlin (1974) revealed an interesting paradox: at a given point in time happiness varies proportionally to income both among and within nations, but over time happiness

does not increase as income continues to grow. This may suggest that the variation in subjective well-being is not determined by the level of absolute income as much as by income inequalities among individuals. Secondly, some studies indicate that as income grows, wealth aspirations also rise (see e.g. Kahnemanand and Krueger, 2006). Thirdly, after a change in income level subjective well-being tends to gradually return to the previous level, which seems to indicate that the effect of a higher income on well-being is only temporary (see e.g. Clark, Frijters and Shields, 2008).

Several studies have showed the existence of a strong relationship between demographic variables and SWB. However, the specific manner in which each of these variables contributes to SWB is a matter of debate in the literature. The impact of age, sex or life circumstances on well-being has been the subject of numerous studies (see e.g. Helliwell and Putnam, 2004; Abbott and Wallace, 2012; Luhmann et al., 2012; Steptoe, Deaton and Stone, 2015). Findings from large population-based surveys identified a U-shaped relationship between subjective well-being and age (Frijters and Beatton, 2012; Clark, 2019). Moreover, earlier studies show that age squared should be included in order to account for its non-linear effects (Abdallah, Stoll and Eiffe. 2013; Oguz, Merad and Snape, 2013). There is a consensus that subjective well-being is higher for young and elderly people and lower for individuals between these age groups. The impact of marital status and household composition on subjective well-being has also been systematically examined (see e.g. Haring-Hidore et al., 1985; Watson, Pichler and Wallace, 2010; Helliwell, Layard and Sachs, 2012; Feasel, 2013). Living alone, being divorced or separated have been found to have an adverse effect on subjective well-being. Conversely, being married increases subjective well-being. Sex is also considered to be an important determinant of SWB. However, research on sex differences in SWB has been inconsistent. Some studies have found that men have higher levels of SWB (Lucas and Gohm, 2000; Stevenson and Wolfers, 2009), while others provide evidence for an opposite pattern (Tesch-Römer, Motel-Klingebieland and Tomasik, 2008).

The education level is recognized as another variable significantly affecting a person's SWB (OECD, 2011; Kristoffersen, 2018). However, survey results concerning the impact of education on well-being are rather contradictory. A higher level of education is obviously associated with better labour market prospects but can also bring other benefits, such as better health, higher status and self-esteem and additional advantages in the labour market. All these benefits correlate positively with measures of subjective wellbeing (Graham and Pettinato, 2002; Mc Mahon, 2009). There are, however, a number of studies showing that the level of education has no effect (Flouri, 2004) or even a negative impact on subjective well-being (Melin, Fugl-Meyer and Fugl-Meyer, 2003; Hickson and Dockery, 2008; Shields, Wheatley Price and Wooden, 2009;

Dockery, 2010). Moreover, evidence from several studies suggests that the effect of education on subjective well-being can be mediated by its impact on other variables (Helliwell, 2008; Blanchflower and Oswald, 2011).

Many studies show that the labour market status (being employed, self-employed, unemployed, a student, retired, permanently disabled and confined to living at home) have a significant impact on subjective well-being (Helliwell, 2003; Helliwell and Putnam, 2004; Feasel, 2013; Flavin, Pacek and Radcliff, 2014; Axelrad, Sherman and Luski, 2020). Generally, unemployment is associated with a large negative impact on a person's life satisfaction. There is evidence from many studies that being out of work can decrease people's subjective well-being level drastically (Clark and Oswald, 1994; Winkelmann, 2009). However, economically inactive people, such as retirees, students and full-time parents, do not consistently report lower levels of life satisfaction (Blanchflower and Oswald, 2011; Hoang and Knabe, 2021).

Health is another determinant of subjective well-being, reported in many studies (see for example (Dolan, Peasgood and White, 2007; Fleche, Smith and Sorsa, 2011). Subjective well-being is significantly affected either by subjective (self-assessed health status) or objective health measures (e.g. heart attacks, strokes or high blood pressure). Empirical results also indicate that current well-being is determined by past health status (Layard et al., 2014). Moreover, longitudinal data show that there is an inverse relationship (Helliwell, Layard and Sachs., 2012, Cross et al., 2018). Some studies show that mental health has a bigger impact on well-being than does physical health (Fleche, Smith and Sorsa, 2011; Layard et al., 2014).

The analysis of subjective well-being accounts for variables measuring certain social and societal characteristics, such as people's personal and social relationships (family, friends, etc.), the general living environment (housing, local environment, physical insecurity, etc.) and public institutions (political institutions, the judicial system, police, etc.). Overall, personal and social relationships have the biggest impact on subjective well-being, which depends on their number and quality. All studies that account for variables measuring personal and social relationships (e.g. having someone you can trust, being able to rely on someone's help, the level of trust towards other people or the amount of time spent with friends) confirm that they are important determinants of well-being (see e.g. Godefroy and Lollivier, 2014; Helliwell et al., 2009). As regards the general living environment, studies show that a higher level of physical insecurity adversely affects subjective well-being. Several studies also conclude that the living environment (size of one's place of residence and the degree of satisfaction with it) have an impact on subjective well-being (see e.g. Helliwell, Layard and Sachs, 2012). Environmental problems, such as grime-covered buildings, pollution or noise can have severe negative effects on health and subjective well-being. Finally, trust

in public institutions (political, judicial, etc.) has an important, positive impact on subjective well-being (Hudson, 2006; OECD, 2017).

It is generally believed that genetic factors are the most important determinants of differences in the level of SWB in the general population. Several studies suggest that people's levels of happiness and overall SWB are, to a large extent, determined by their genetic make-up (Diener and Lukas, 1999; Inglehart and Klingemann, 2000, Cummins, Gullone and Lau, 2002; Røysambet et al., 2018). Multivariate studies indicate that some genetic factors enhancing SWB also protect against depression and other mental health problems (Røysamb and Nes, 2018) and determine personality traits (Røysamb et al., 2018). A wide range of personality traits seem to influence SWB, specifically, the traits from the five factor personality model (Soto and Jackson, 2020). While neuroticism is associated with poorer SWB, the other four traits, namely extraversion, agreeableness, conscientiousness and openness to experience tend to increase levels of SWB. Weiis, King and Enns (2002) even found that subjective well-being was genetically indistinguishable from personality traits such as neuroticism, extraversion and conscientiousness. According to various empirical studies, these traits are inherited in up to 50% of their total variability, meaning that the differences in SWB associated with them are also genetically determined up to a similar level of variability (Bouchard and Loehlin, 2001).

It is also worth mentioning the work of Brickman et al. (1978) on hedonic adaptation, which suggests that individuals tend to return to a certain baseline level of SWB over time, regardless of positive or negative life changes, including changes in health. They found that even individuals who had experienced serious health setbacks, such as a paralyzing accident, tended to return to their previous levels of SWB after some time had passed. This suggests that while external factors are indeed crucial for SWB at least in short term, individuals' adaptability and resilience also play significant roles in determining overall SWB.

3. Measuring subjective well-being under the capability approach

3.1. The concept of capabilities

The concept of capabilities was developed and refined by Amartya Sen in a series of books and journal articles (1982, 1985, 1987, 1999, 2000, 2010), following the Tanner lecture delivered in 1979 (Sen, 1980), in which he described how personal well-being should be measured. This approach has since been synthesised and applied by various authors in a wide variety of fields (Alkire, 2002; Robeyns, 2003, 2005; Kuklys, 2005;

Comim, Qizilbash and Alkire, 2008; Schokkaert, 2009; Basu and López-Calva, 2011; Schlosberg, 2012; Lorgelly et al., 2015; Slabbert, 2018; Panek and Zwierzchowski, 2020) Unlike other philosophical approaches to measuring people's happiness, which focus on desire fulfilment, income, consumption or satisfaction of basic needs, Sen's capability approach is concerned with people's capabilities, which describe what people are actually able to do and to be.

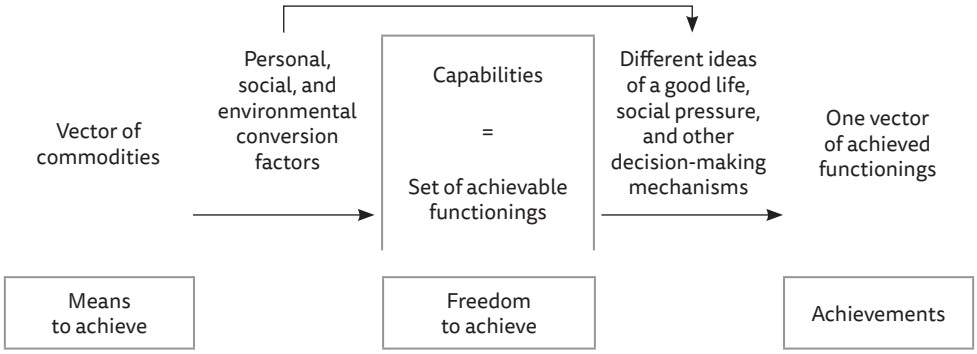
According to Nussbaum and Sen (1993, p. 27) a person's capability to live a good life can be defined as "the capability to achieve valuable functionings (…) where functionings represent parts of the state of a person – in particular the various things that he or she manages to do or be in leading a life. The capability of a person reflects the alternative combinations of functionings the person can achieve, and from which he or she can choose one collection." In other words, capabilities are potential ways of being and doing that are accessible. The set of capabilities available to an individual is limited by objective external factors and their personal characteristics. Functionings are people's actual beings and doings. They can be understood as observable manifestations of the way individuals live their lives and choices they make. According to Sen (1987), capabilities are the doings and beings that people can achieve, while functionings are capabilities that have been realised. Capabilities cover the notion of freedom to choose among real opportunities, whereas functionings are more directly related to people's current circumstances. Capabilities refer to possibilities of achieving certain states, such as the possibility of living a healthy life, being able to achieve a certain level of education or living a happier, more satisfied life. Functionings describe actual states of life achieved by the individual, such as being healthy, being educated or, in the context of subjective well-being, being happy.

Sen (1999) uses the concept of "freedom" to describe the process in which people choose a particular way of living from among different available opportunities they encounter. Therefore, a low quality of life results from the lack of freedom to choose a satisfying way of living. Thus, a reported low level of SWB should be understood not merely as a low self-assessment of well-being, but rather as a deprivation of the freedom to undertake life activities which would eventually lead to higher levels of SWB.

Critical to the capability approach is the recognition of human heterogeneity, which results in people choosing different ways of living from a common set of capabilities. In order to transform capabilities into particular functioning, it is necessary to introduce three sets of conversion factors – personal, social, and environmental (Sen, 1992; Robeyns, 2005).

Figure 1 contains a diagram showing the relationship between commodities, capabilities, and functionings, using the key concepts of the capability approach.

Figure 1. The relationship between commodities, capabilities, and functionings in the capability approach



Source: own elaboration based on Robeyns (2005).

Personal conversion factors (personal characteristics, such as metabolism, physical condition, intelligence, or sex) influence what types and degrees of capabilities a person can generate from commodities. Social conversion factors are determined by the society in which a person lives (characteristics of social settings, social institutions, and power structures, such as social norms, public policies, societal hierarchies, rule of law, political rights, etc.). Environmental conversion factors emerge from the physical or built environment in which a person lives (environmental characteristics, such as climate, infrastructure, institutions, and public goods). The set of functionings that can be achieved is not only constrained by personal, social, and environmental characteristics (Robeyns, 2005; Crocker, 2008) but is also subject to personal preferences, social pressure, and other decision-making mechanisms.

Another important requirement is that individuals should have equal opportunities to function in the way they prefer (Sen, 2010). Given equal opportunities, people have the freedom to determine their capabilities, that is, their potential ways of functioning and to maximize their quality of life accordingly by realising subjectively optimal functionings. However, this does not mean that in a perfectly equal society all people will live the same lives, as their chosen functionings will depend on their individual conversion factors. Therefore, individuals with comparable levels of capabilities related to SWB may differ significantly in various areas and sub-dimensions of SWB, which is reflected by differences in basic values of SWB indicators.

3.2. Operationalization of the measurement of subjective well-being under the capability approach

The operationalisation of the measurement of the quality of life under the capability approach is a complex process. In his Tanner Lectures (1980) Sen argues that the right approach to the assessment of the quality of life (QOL) should not only accurately measure the natural complexity underlying the QOL concept (the criterion of validity) but also take into account the degree to which it can be applied in empirical assessment (the criterion of suitability).

Sen attempted to operationalize the way of measuring QOL (1985) based on capabilities and functionings. The starting point was the vector of goods (resources) owned by an individual, enabling them to function (Basu and Lopez-Calva, 2010). Based on the work of Gorman (1968) and Lancaster (1966), Sen used the fact that goods can be transformed into properties of goods – an individual can use the properties of owned goods to achieve certain functionings – the chosen ways of beings and doings. The individual has the freedom to choose from among the set of possibilities provided by the goods in their possession. In general, the bigger the set of available resources, the greater the freedom enjoyed by individuals. With a view to assessing the quality of life, Sen advocated measuring latent capabilities, which reflect the scope of freedom rather than observed functionings: " (…) human beings must have equal possibilities and equal opportunities in order to function. In this perspective the attention is moving from the means to real opportunities and the freedom of being and doings. With equal opportunities people have the freedom to express their capabilities, potentially reach the functionings and accordingly wellbeing. In this context in order to measure quality of life the focus has to rely on the measurement of the capabilities to function rather than on the achievements" (Sen, 2010, p. 148).

The implication is that policymakers should not attempt to design and constrain people's lives in order to optimize values of some abstract indices. Instead, they should strive to provide the population with a broad set of available ways of living to choose from and leave the optimisation process to individuals.

Following Sen, we propose assessing people's levels of well-being by estimating values corresponding to their capabilities rather than realised functionings. In other words, the broader the set of resources and possibilities available to an individual, which corresponds to their capabilities, the higher the level of well-being that can be achieved, regardless of actual, realised functionings.

Within this proposed approach we can also take into account the differences in individual resources, possibilities and preferences, as well as cultural diversity between EU countries and within each of these countries, which will facilitate

comparative empirical analysis. For example, in some cultures feeling happy may be regarded as being childish or immature. Therefore individuals may consciously refrain from undertaking activities which could result in momentary happiness but might undermine their well-being in the long run as a result of a lower self-assessment. In other words, there may be a trade-off between experienced and eudaimonic or evaluative well-being and different people may find it optimal to locate themselves at different points of the available spectrum. We believe that social researchers should focus on people's ability to choose their preferred way of living rather than on actual, realised well-being in any given moment in time.

Owing to the complex nature of the quality of life, it is usually difficult to directly observe its different aspects, including subjective well-being, which is why they are referred to as latent variables. When a given phenomenon cannot be directly observed and measured, other variables, called indicators, are used to measure it indirectly. An indicator is an observable and measurable property of the latent phenomenon. In the context of the current study, subjective well-being should be regarded as a latent, unobservable trait, which can, however, be estimated through a set of observable indicators.

In order to operationalise the measurement of subjective well-being under the capabilities approach, we apply a multi-indicator and multiple causes model (MIMIC). The MIMIC model was formulated by Hauser and Goldberger (1971) and then popularised by Jöreskog and Goldberger (1975), who presented its detailed assumptions as a special case of the structural equation model (SEM) (Bollen, 1989; Brown and Moore, 2012). Krishnakumar and Ballon (2008) pointed to the SEM approach as the most suitable tool for estimating capabilities that are not directly observable. This model makes it possible not only to measure the individual's subjective well-being, but also to explain it – it enables us to identify personal functionings that are derived from their capabilities, and to assess the impact of external determinants (the individual's personal, social, and environmental characteristics) on their latent capabilities. Moreover, with a MIMIC model, it is possible to use determinants of the latent variable along with its indicators (its symptoms).

The operationalised measurement of SWB by means of a MIMIC model can be presented as follows (Krishnakumar, 2007): capabilities representing SWB are unobservable endogenous latent variables. However, they can be estimated using two sets of variables. Firstly, a set of selected indicators, which can be interpreted as realised functionings, can be used to construct the reflective part of the model. The formative part of the model is constructed using the individuals' personal, social and environmental exogenous characteristics, which are interpreted as the conversion factors, which strengthen or weaken the capabilities and influence the process of transforming the capabilities into achieved functionings. The freedom of individual choice is represented

by an unobservable latent variable, which can be estimated using two sets of observable variables, i.e. symptoms and conversion factors (determinants) of SWB.

In order to determine the form of the MIMIC model for measuring SWB, one should start by identifying relevant indicators of the phenomena (symptoms of SWB), which are variables measuring capabilities available within the European Statistical System (ESS). Partial indicators of SWB, which represent individuals' achieved functionings in the model, are clearly defined in the report of the European Commission (Eurostat, 2017). On the other hand, individuals' exogenous characteristics (conversion factors) are not defined and should be selected depending on their availability and adequacy.

Formally, the MIMIC model equation for SWB has the following form:

$$\boldsymbol{y} = \boldsymbol{\Lambda}\eta + \boldsymbol{\varepsilon} \tag{1}$$

$$\eta = \boldsymbol{\Gamma}\boldsymbol{x} + \psi \tag{2}$$

where:

$\boldsymbol{y}$ – a vector of observable endogenous variables (symptoms of SWB represented by partial variables),

$\boldsymbol{\Lambda}$ – a matrix of factor loadings of endogenous variables,

η – the latent endogenous variable, which is interpreted as a composite indicator of SWB,

$\boldsymbol{\varepsilon}$ – a vector of error terms, which, in this context, consist of a classical measurement error and, moreover, specific variability of a given indicator, which is not shared with other indicators of SWB, and therefore, does not influence the estimates of the SWB measure,

$\boldsymbol{\Gamma}$ – a matrix of coefficients of contribution of the latent variable to observable exogenous variables x, defining the pattern of structural relations in the MIMIC model,

$\boldsymbol{x}$ – a vector of observable exogenous structural variables, which are interpreted as capabilities or objective causes for SWB,

ψ – error terms in the equation for the latent SWB variable. It can be interpreted as the part of variability of SWB that does not depend on objective, observable causes.

As was already pointed out, the main purpose of the MIMIC analysis is to estimate individual levels of SWB capabilities. It should be noted, however, that because individuals in different countries have different individual resources, possibilities, and preferences, they are characterised by various functionings derived from SWB capabilities. Furthermore, people's personal, social, and environmental characteristics can strengthen or weaken their SWB capabilities in different ways. Considering these differences, values of individuals' latent capabilities were estimated separately for each country using integrated MIMIC models. Thus, a distinct MIMIC model was estimated for each country. However, the models shared the same set of determinants and symptoms.

In the second step, we used the estimated values of individual latent SWB capabilities as proxies for calculating the subjective well-being index (SWBI) for surveyed individuals. SWBI was calculated using the following formula:

$$\mathrm{SWBI}_i = \frac{x_{e.i} - x^{*}_{min}}{x^{**}_{max} - x^{*}_{min}} \tag{3}$$

where:

$x_{e.i}$ is the estimated value of the latent variable (SWB capabilities) for the *i*-th individual, x^{*}_{min}, x^{**}_{max} are the lowest and highest achievable values (thresholds) for the latent variable (SWB capabilities), respectively.

The thresholds were created for each country separately. To calculate these thresholds, two artificial records were added to the database representing hypothetical individuals with the worst and best values of all symptoms and determinants of SWB (the person with the most desired values of all symptoms and determinants of SWB and the person with the least desired values of all symptoms and determinants of SWB). Then, using parameters of the estimated models for each country, values of the latent variables were obtained for these artificial records. These values were used as SWB thresholds, which represent the highest and lowest possible degree of SWB for each country; that is, the possibility to achieve the most and the least desired functionings. Thus, the critical values (thresholds) of the latent SWB capabilities were determined in such a way as to enable a comparative analysis of SWB between different countries.

The SWBI calculated in the proposed manner yields scores ranging from zero to one, where one indicates that a person has reached the highest possible level of SWB, while zero indicates the lowest possible level of SWB. The higher the value of the SWBI, the higher the level of SWB. The proposed approach reveals differences in how particular functionings are manifested among individuals living in different cultural and social circumstances, as it utilises distinct MIMIC models for each country. However, because of the proposed normalisation method, the results are still comparable between countries.

4. Comparative analysis of national profiles of subjective well-being

A comparative analysis of national profiles depending on subjective well-being was carried out using one of the methods of factor analysis, namely correspondence analysis. This is the only method of factor analysis that offers a graphic representation of relationships between spatial objects (between countries analysed in the study)

and between variables characterising these objects (indicators of subjective well-being components). Its results can therefore be used to reveal the underlying data structure and patterns.

The indicators used in this study represent three SWB components: evaluative well-being, negative experienced well-being and positive experienced well-being (see chapter 8). The indicators of SWB components (SWBCI) for surveyed individuals were calculated in a similar way as the SWBI indicator, using the following formula:

$$\mathrm{SWBCI}_{ki} = \frac{x_{e.ki} - x^{*}_{min.k}}{x^{**}_{max.k} - x^{*}_{min.k}} \tag{4}$$

where:

$x_{e.k.i}$ is the value of the *k*-th latent variable (SWB component) for the *i*-th individual, $x^{*}_{min.k}$, $x^{**}_{max.k}$ are the highest and lowest achievable values (thresholds) for the latent *k*-th variable (SWB component), respectively.

A SWBCI score ranging from zero to one, where one indicates that the highest possible level of one SWB component, and zero – the lowest possible level of that component. The higher the value of the SWBCI, the higher the level of that SWB component.

5. Correspondence analysis

In the empirical segment of the study, we utilized correspondence analysis for two distinct tasks. First and foremost, it was employed for the identification of anomalous parameter values in the MIMIC model equations for individual countries. Correspondence analysis detects unusual values, consequently enabling us to swiftly pinpoint any intriguing phenomena within individual countries, or in other words, the ways in which certain nations diverge from others in the process of forming and expressing subjective well-being.

Secondly, correspondence analysis served to trace national profiles with respect to the components of subjective well-being (SWB), namely evaluative well-being, negative experienced well-being, and positive experienced well-being.Correspondence analysis has several features that other methods of factor analysis lack. It is the only method that makes it possible to put points representing variables and points representing objects in the same factor space, thereby greatly facilitating the interpretation of results. Correspondence analysis can be used to analyse qualitative and quantitative data.

Correspondence analysis was developed in scientific centres in many countries in parallel (Beh, 2004). The primary contribution to the development of correspondence analysis was made by the research team led by Benzécri (1973a, 1973b).

The following data matrix is the most general starting point for correspondence analysis:

$$\boldsymbol{X} = \left[x_{ij} \right], \quad x_{ij} \geq 0; \qquad j = 1, 2, \ldots, m; i = 1, 2, \ldots, n \tag{5}$$

where:

x_{ij} – is the value of the j-th variable in the i-th object.

It should be noted that only non-negative entries can be used as elements of a data matrix (5). The rows of the matrix (13) can be interpreted in geometrical terms as coordinates of m-points – variables in an n-dimensional space of objects R^n. On the other hand, the column in this matrix can be interpreted in geometrical terms as coordinates of n-points objects in an m-dimensional space of variables R^m.

The starting point for correspondence analysis is to transform a data matrix into a relative frequency matrix, also called a correspondence matrix, by dividing each element of the matrix in question by the sum of its elements:

$$\boldsymbol{P} = \left[p_{ij} \right], \qquad j = 1, 2, \ldots, m; i = 1, 2, \ldots, n \tag{6}$$

where:

$$p_{ij} = \frac{z_{ij}}{\sum_{i=1}^{n} \sum_{j=1}^{m} z_{ij}}, \tag{7}$$

z_{ij} –is the standardized value of the j-th variable in the i-th object.

The $\boldsymbol{P}$ matrix is used to set profile matrices. The row profile matrix $\boldsymbol{R}$ is obtained by dividing the frequency in each row of the matrix $\boldsymbol{P}$ by the sum of all frequencies in this row:

$$\boldsymbol{R} = \left[r_{ij} \right] = \left[\frac{p_{ij}}{p_{i.}} \right], \qquad j = 1, 2, \ldots, m; i = 1, 2, \ldots, n. \tag{8}$$

The column profile matrix $\boldsymbol{C}$ is derived by dividing the relative frequencies in each column of the $\boldsymbol{P}$ matrix by the sum of all the relative frequencies in this column:

$$\boldsymbol{C} = \left[c_{ij} \right] = \left[\frac{p_{ij}}{p_{.j}} \right], \qquad j = 1, 2, \ldots, m; i = 1, 2, \ldots, n. \tag{9}$$

The elements of row profiles (column profiles) then become the coordinates of the row (column) vectors in an n-dimensional (m-dimensional) Euclidean space R^n (R^m).

The marginal relative frequencies of rows ($\boldsymbol{r}$) and columns ($\boldsymbol{c}$) in the $\boldsymbol{R}$ and $\boldsymbol{C}$ matrices are the average row and column profiles, respectively. Points represented by the average row and average column profiles are called centroids and lie in the middle of the coordinate system.

The distance between two raw profiles (between points representing objects) in space R^n is calculated using a weighted Euclidean metric, where the weights are the column marginal relative frequencies:

$$d^2(r_i, r_{i'}) = \sum_{j=1}^{m} \frac{1}{p_{.j}} \left(\frac{p_{ij}}{p_{i.}} - \frac{p_{i'j}}{p_{i'.}} \right)^2, \qquad i, i' = 1, 2, \ldots, n; i \neq i'. \tag{10}$$

In a symmetric fashion, we define the distances between column profiles (between points representing variables) in space R^m using a weighted Euclidean metric, where the weights are the row marginal frequency:

$$d^2(c_j, c_{j'}) = \sum_{i=1}^{n} \frac{1}{p_{j.}} \left(\frac{p_{ij}}{p_{.j}} - \frac{p_{ij'}}{p_{.j'}} \right)^2, \qquad j, j' = 1, 2, \ldots, m; j \neq j'. \tag{11}$$

Analysis of the distance between row profiles (column profiles) is identical to analysis of the distances between row profiles (column profiles) and the average row (column) profile. The distance thus obtained is called the chi-square distance. The chi-square distance is related to the concept of inertia. Inertia is a measure of variation between spatial objects or between variables characterising these objects.

The total inertia of an input matrix determines the degree of dispersion of row (column) profiles with regard to the corresponding centroid. It indicates how much each row (column) profile differs from the average corresponding profile. Inertia also has a geometric interpretation as a measure of the dispersion of points representing the profiles in a multidimensional space. When the value of inertia is zero, the points representing row (column) profiles are concentrated in the origin. This corresponds to the case when all row (column) profiles are identical. The higher the value of inertia, the greater the dispersion of the points representing profiles from the origin.

The primary goal of correspondence analysis is to conduct a simultaneous analysis of row and column profiles. For this purpose, the $\boldsymbol{P}$ matrix is converted into matrix $\boldsymbol{A}$, called a matrix of standardized differences:

$$\boldsymbol{A} = \left[a_{ij} \right], \qquad j = 1, 2, \ldots, m; i = 1, 2, \ldots, n \tag{12}$$

where:

$$a_{ij} = \frac{p_{ij} - p_{i.}p_{.j}}{\sqrt{p_{i.}p_{.j}}}. \tag{13}$$

The transformation of the $\boldsymbol{A}$ matrix into the $\boldsymbol{P}$ matrix is symmetric with respect to rows and columns. Symmetric standardization of the input data matrix makes it possible to determine the factor structure of objects and the position of the variables in the same frame of reference, which cannot be achieved with any other method of

factor analysis. In other words, when conducting correspondence analysis, we seek to obtain a common orthogonal reference system for the points representing row and column profiles.

Correspondence analysis is a method of decomposing total inertia. Subsequent factor axes are searched to yield dimensions that explain the greatest proportion of total inertia. Decomposition of the $\boldsymbol{A}$ matrix by singular values is the most common method used to seek a common factor space for row and column profiles.

One data analysis method frequently used in correspondence analysis involves analysing the configuration of points representing variables or objects in a figure. When we reconstruct the distance between the points representing objects or variables in the maximum dimension space, we reproduce the original configurations of points without any distortion. The angles between vectors and the distances between vectors representing row (column) profiles are preserved, hence, the distances between points are also preserved. Any reduction in the maximum dimension of the factor space distorts the configuration of the points, signifying a loss of information about the phenomenon of interest.

The quality of representation of a point in the coordinate system, defined by the selected number of dimensions, is defined as the ratio of the point's squared distance from the origin in the chosen number of dimensions to the squared distance from the origin in the space defined by the maximum number of dimensions. This ratio is the same as the ratio of the share of a given dimension in inertia.

Graphical analysis of the configuration of points representing variables or objects (interpretation of perception maps) is considerably more convenient in two-dimensional space, where general patterns in systems of variables or objects can be visualised. This space is created by the first two factor axes.

When analysing the results, we consider primarily the following aspects of how the points are configured:

- the position of the points with respect to the origin,
- distances between the points representing objects or variables,
- position of the points representing objects in relation to points representing variables and vice versa, against the background of the configuration of all the points.

Different methods of normalization are used to analyse the points configuration, i.e. to determine whether and how the similarity of the row categories, the similarity of the column categories, and the relationship (association) between the row and column variables can be interpreted in terms of the row and column coordinates and the origin of the plot. If we want to study first two aspects of points configuration we perform the principal normalization method of raw and column coordinates (Greencare, 1984; Cox and Cox, 2001). If we are interested in analysing the position

of points representing objects in relation to points representing variables and vice versa we do symmetric, canonical normalization of raw and column coordinates. The objective of these normalization is to maximize the correlation between the scored raw and column (Greencare, 1984, 2007; Gower and Hand, 1996).

The profile of points representing objects situated near the origin does not differ greatly from the average profile, while points representing objects located far from the origin have significantly atypical profiles.

A small distance between a variable point and the origin indicates that variable values are less scattered compared to those of other variables. A large distance between a variable point and the origin constitutes evidence of a variable whose spread is larger than that of other variables.

If the points representing variables are located close to one another, this means that these variables in the examined objects are similar. Similarly, close proximity of points representing objects indicates that the structure of variables describing them is similar.

In correspondence analysis the distance between variable points and object points can be interpreted only by referring to the configuration of all the points. In geometric terms, the distance between raw point *r* and column point *c d* (*r*, *c*) can be written as the product of the length of vectors origin to *r* (OR), the length of origin to *c* (OC), and the cosine of the angle between OR and OC. The association in (r, c) is strongly positive if OR and OC point in roughly the same direction and the frequency of (*r*, *c*) is much higher than expected under independence, so the points r and c are close together. Similarly, the association is strongly negative if OR and OC point in opposite directions. Here the frequency of (*r*, *c*) is much lower than expected under independence, so *r* and *c* are unlikely to occur simultaneously. Finally, if OR and OC are roughly orthogonal (angle = ±90), the deviation from independence is small. The association of r and c increases with the lengths of OR and OC. Points far from the origin tend to have large associations. If a category is mapped close to the origin, all its associations with categories of the other variable are small.

6. Classification of EU member states depending on the similarity of the structure of subjective well-being

EU member states in the study were classified in terms of similarities between their structures of subjective well-being (similarity of relationships between the indicators of SWB components) using agglomerative hierarchical cluster analysis (Lance and Williams, 1967, 1968; Aldenderfer and Blashfield, 1984). This kind of

hierarchical cluster analysis starts by treating each object as a single-element cluster. Next, at each step of the procedure, two clusters with the highest degree of similarity are merged into a new bigger cluster. This similarity is measured in terms of distances between clusters of objects. The general formula for determining distances between a newly formed object cluster $G_{r''}$, obtained by combining object clusters G_r and $G_{r'}$, and remaining object clusters $G_{r'''}$, when creating a tree diagram (so-called dendrogram) has the following form (Lance and Williams, 1967, 1968):

$$d_{r'''r''} = \alpha_r d_{r'''r} + \alpha_{r'} d_{r'''r'} + \beta d_{rr'} + \gamma \left| d_{r'''r} - d_{r'''r'} \right| \qquad (14)$$

where:

$d_{r'''r''}$, $d_{r'''r}$, $d_{r'''r'}$, $d_{rr'}$ – distances between object clusters,

$\alpha_r, \alpha_{r'}, \beta, \gamma$ – transformation coefficients different for different agglomeration methods.

Pairs of clusters are successively merged until at the end all clusters have been merged into one cluster containing all objects.

A dendrogram is a graphical illustration of the hierarchy of connected objects representing the decreasing degree of similarity between objects included in the tree in subsequent stages and those included at earlier stages. The hierarchy of these connections makes it possible to determine the relative position of objects and groups of objects formed at successive stages of dendrogram creation (Sneath and Sokal, 1973).

Several different algorithms (agglomeration techniques) can be used in hierarchical cluster analysis to determine how linkages between clusters are created. Individual algorithms differ in the way distances between objects are determined (Wishart, 1969). In our survey complete linkage clustering (farthest neighbour) technique was applied. This method is based on the maximum distance, i.e. the similarity of any two clusters is the similarity of their most dissimilar objects. It creates a small number of clusters with relatively more objects. In this method, the transformation coefficients in formula (14) take the form: $_r = 0.5$, $a_{r'} = 0.5$, $b = 0$ and $g = -0.5$.

In order to identify clusters of objects that are as similar as possible in terms of the variables that describe them, we need to split the tree (see Table 14). For this purpose we look for a critical value of distance (d^*), at which branches of the tree are cut off, thus creating clusters of objects. The decision to determine the critical value is a subjective one.

7. The relationship between subjective well-being and its determinants

Various tools were considered to analyse relationships between subjective well-being and its determinants. We began the evaluation of the relationship between subjective well-being and its determinants by estimating kernel regression of SWB on income and age, for each EU country separately. Kernel regression is a non-parametric technique for estimating the conditional expectation of a random variable (Blundell and Duncan, 1998). Its objective is to find a non-linear relationship between a pair of random variables; in our study these are the subjective well-being index and income or age.

In the next step, we analysed differences in the relationship between the average SWBI and the average income in the EU countries. Moreover, we estimated the kernel regression function of SWBI average values on the average income for all data points representing the EU countries.

Part II

Comparative analysis of subjective well-being in EU member states in 2018

8. Data source and assumptions

Empirical analyses conducted in this study are based on data from the European Union Survey on Income and Living Conditions (EU-SILC) carried out in 2018. The main objective of the EU-SILC is to provide data that are comparable across the EU on income, poverty, social exclusion, and living conditions of the populations of the EU members states (Wolf et al., 2010). Although the survey is conducted by national statistical offices, it collects information on core variables in every EU member state. These core variables describe:

- the demographic composition of households;
- the health status and participation in education and economic activities of household members;
- the amount and source of households' income;
- the durable goods equipment of households;
- housing conditions;
- the existence of certain symptoms of material deprivation in households.

The survey is based on representative random samples of households and covers individuals aged 16 and older who are members of a sample of households in each EU member state. A household is defined as a group of people living in the same dwelling who share their incomes. Family members who live together but do not share their incomes are considered as separate households.

The EU-SILC is an instrument designed to collect timely and comparable cross-sectional and longitudinal micro-data using a rotational panel designed involving a four-year rotation scheme. The sample selected in each country is divided into four subsamples, all of which have the same size and structure. From the second year of the

survey onwards, one of the four sub-samples is removed from the sample and another is drawn that has the same size and structure as all of the sub-samples. From the third year of the survey onwards, each sub-sample is expected to stay in the survey for four years.

The survey results are weighted so that they represent the size and the structure of the entire population of households and citizens for each EU member state. The total sum of weights corresponds to the total number of households and individuals in a given country[2].

The sample sizes differ across countries and can be as low as 4000 households or as high as 20 000 households. Missing income data are imputed using methods of data imputation.

In 2018 the EU-SILC Survey Questionnaire contained an ad-hoc module on personal well-being. The following questions were identified as indicators of SWB, which clearly correspond to the indicators proposed in the EU Commission report (Eurostat, 2017):

1) How satisfied with your life are you in general? (Overall life satisfaction),
2) How often during the last month have you felt depressed? (Negative affect),
3) How often during the last month have you felt nervous? (Negative affect),
4) How often during the last month have you felt sad? (Negative affect),
5) How often during the last month have you felt calm? (Positive affect),
6) How often during the last month have you felt happy? (Positive affect),

The first variable measures evaluative well-being, while the remaining variables measure different aspects of experienced well-being. Variables created on the basis of these questions were used as symptoms of SWB in the MIMIC model. The variables measuring different aspects of experienced well-being are divided into two categories: negative experienced well-being and positive experienced well-being.

We used several individual characteristics in the formative part of the MIMIC model as conversion factors for SWB (determinants of SWB). These characteristics was selected after reviewing the literature on possible SWB determinants at the international level (Boarini et al., 2012; Jun, 2015; Joskin, 2017; Azizan and Mahmud, 2018; see also chapter 2). Moreover, when selecting the determinants, we took into account the underlying complexity of the SWB concept (the criterion of validity) and the degree to which it can be applied in empirical assessment (the criterion of suitability).

The final proposed MIMIC model includes eleven variables that measure the following four aspects: demographic characteristics (sex, household size, marital status: living alone), standard of living and poverty (equivalised household income, monetary poverty, material deprivation), economic activity (unemployment, retirement, being

[2] For instance, the weights system in Poland takes into account selection probability for dwellings, survey completeness within different categories of the place of residence, and consistency of the sample composition in terms of age and sex with data from the last census and current demographic estimates (CSO, 2019).

a student), health (self-perceived health, unmet medical needs). All these variables are drawn from the EU-SILC survey and not from the ad hoc module on well-being. The definitions of these SWB determinants are given in the appendix.

In our analysis of SWB, the unit of analysis is defined as a person. However, in the analysis of income, each person is assigned the equivalised disposable income of the household to which s/he belongs. To ensure comparability of income across EU countries, income values in the EU are given in the purchasing power standard (PPS), which is an artificial common reference currency used in the EU for international comparisons. Household income is defined as the yearly household equivalised disposable income in the last calendar year preceding the survey[3]. The disposable income is defined as the sum of the net monetary income earned by all household members. The disposable income does not take into account any fringe benefits received by household members (except for the use of a company car) and other forms of non-monetary income. However, food produced by households living in rural areas often substantially increases their ability to meet their basic needs. This can lead to the underestimation of the disposable income of certain households, particularly of those engaged in farming.

The equivalised disposable income is calculated by dividing the disposable household income by the OECD modified equivalence scales. The modified OECD scale assigns a value of 1 to the first household member, 0.5 to every additional household adult member and 0.3 to each child. The disposable income is defined as a sum of net monetary income gained by all households' members. It does not take into account any fringe benefits (with exception of a company car) and other types of non-monetary income. Each individual is assigned the value of their household's equivalised income.

Table 1 below presents summary statistics of the analysed national samples.

Table 1. Descriptive statistics of the analysed national samples

Country	Sample size	Age	Income in PPS	Material deprivation	Individual in percentage						
					Sex (women)	Unmet medical needs	Retired	Student	Unemployed	Impoverished	Living alone
AT	9756	51,0	29 077	0,39	54,0	0,4	30,8	5,0	3,6	14,1	22,9
BE	9908	50,9	24 959	0,68	51,9	2,3	28,6	6,5	4,6	16,5	19,4
BG	10 317	56,1	10 696	1,68	56,9	3,3	38,8	3,0	7,2	21,7	18,8

[3] With the exception of Great Britain (where the annual household income was estimated on the basis of the current monthly income) and Ireland (where the estimated annual income included half of the income from the year preceding the survey and half of the estimated annual income from the year of the survey).

cont. Table 1

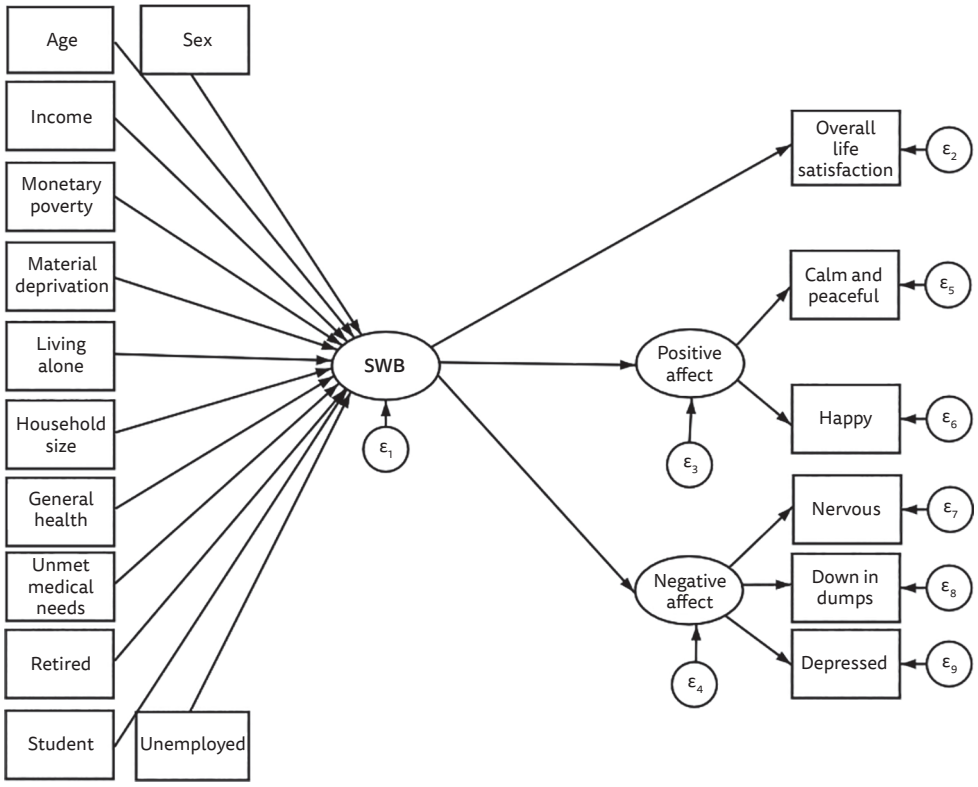
Country	Sample size	Age	Income in PPS	Material deprivation	Individual in percentage						
					Sex (women)	Unmet medical needs	Retired	Student	Unemployed	Impoverished	Living alone
CY	8057	51,5	18 291	1,18	53,9	1,7	27,5	4,9	7,1	15,2	10,1
CZ	9840	56,4	16 750	0,64	61,9	2,3	42,1	1,9	2,0	11,5	26,0
DE	20 034	53,3	29 823	0,51	52,8	0,4	32,3	5,7	2,7	12,6	22,1
DK	5398	56,5	32 545	0,47	52,8	5,8	36,1	5,1	2,8	7,2	34,1
EE	9775	51,8	17 164	0,85	57,9	16,3	26,9	6,4	3,3	23,3	16,8
EL	44 608	54,7	13 535	1,62	52,3	11,2	31,8	5,3	9,9	17,7	14,8
ES	27 733	51,6	23 410	0,86	52,3	0,4	20,5	7,0	10,8	19,7	11,2
FI	9014	51,4	29 673	0,47	48,5	5,3	26,3	7,3	5,5	10,8	25,5
FR	14 318	54,5	29 606	0,67	57,9	3,4	37,3	2,9	5,3	12,1	23,0
HR	10 068	58,4	12 739	1,49	58,9	5,5	48,0	1,7	10,0	26,5	21,0
HU	12 549	55,0	11 234	1,25	58,8	5,6	40,0	4,7	2,9	15,6	20,3
IE	5405	54,1	28 452	0,80	56,5	2,8	23,1	3,0	4,6	18,8	22,2
IT	27 956	56,2	25 810	0,98	54,7	2,7	32,1	3,4	4,8	16,4	26,4
LT	5811	55,8	8218	1,49	65,1	3,7	32,5	2,8	5,9	23,2	22,1
LU	5906	49,0	49 024	0,35	55,5	1,2	20,7	5,6	3,6	16,0	12,2
LV	7772	55,4	7715	1,47	64,1	11,5	34,2	3,3	5,3	30,9	26,7
MT	8173	49,1	16 034	0,63	50,8	0,5	21,5	6,1	1,0	18,1	9,4
NL	12 003	54,5	29 598	0,44	54,6	1,0	23,1	5,2	1,9	10,0	35,2
PL	19 966	54,5	14 354	0,96	64,0	8,8	36,0	3,1	4,2	18,4	16,5
PT	18 681	55,8	16 119	1,18	58,3	5,0	33,1	3,0	7,7	19,8	16,1
RO	12 187	53,1	9167	1,61	53,4	7,6	37,2	5,8	0,3	20,9	15,6
SE	5555	51,3	29 298	0,27	50,0	3,4	28,2	10,1	2,9	12,5	23,3
SI	6536	53,7	20 413	0,79	57,9	3,9	39,0	5,0	6,6	15,4	17,8
SK	11 326	49,5	12 796	1,08	54,6	6,2	29,7	8,1	4,6	11,7	8,6
UK	17 114	56,0	27 639	0,62	54,3	7,8	38,4	2,1	1,9	20,4	21,2

Source: own elaboration based on Eurostat data from EU-SILC (2018). The responsibility for all conclusions drawn from the data lies entirely with the authors.

9. Estimating the MIMIC model

All estimation procedures were conducted using the SEM module within the Stata 15 program. Parameters of the MIMIC sub-models were estimated using the maximum likelihood method. The results of these estimates are presented in Tables 2, 3 and in Figure 2.

Figure 2. The proposed form of the MIMIC model



Source: own elaboration.

It should be noted that the method of constructing the MIMIC model for SWB was determined by solutions adopted during the operationalisation of the approach to measuring the individual dimensions of the quality of life proposed by Eurostat. In other words, we assessed to what extent the approach to measuring SWB proposed by Eurostat was consistent with the data obtained from the EU-SILC study.

The overall fit of the models was assessed using three fit measures (Hu and Bentler, 1999): NNFI (Non-Normed Fit index), CFI (Confirmatory Fit index), and RMSEA (Root Mean Square Error of Approximation). The NNFI and CFI measures take values in the range [0; 1], with higher values indicating a better fit. In this case, index values of not less than 0.95 indicate a very good fit of the model. By contrast, lower values of the RMSEA index indicate a better model fit, with values below 0.08 representing an acceptable model fit.

For all the models and countries, the RMSEA met the imposed criteria (see Table A1 in the Appendix). Moreover, values of the CFI and NNFI were higher than 0.81 for all

the models and countries. Still, given the complexity of the underlying theoretical concepts, the models exhibit an overall good fit. It means that the list of SWB indicators proposed by Eurostat experts is well suited to measure the phenomenon.

Table 2 contains results of estimating the formative part of the MIMIC model, i.e. estimates of parameters in the regression model of the latent SWB variable. These parameters are estimated for standardised variables to make sure that their values are comparable and their interpretation is similar to the way factor loadings in factor analysis were interpreted. Therefore, higher absolute values indicate that a given determinant is more important in shaping the overall SWB values, whereas the lack of statistical significance may suggest that a certain variable does not influence overall SWB. The value of R^2 in this equation is equal to 0.35, which means that 35 of the SWB variance can be explained by observable exogenous characteristics used in the linear regression model. Therefore, the majority of individual differences in SWB are due to other, probably unobservable factors.

For the majority of countries, the highest absolute values of estimated parameters are associated with two variables – self-perceived health and material deprivation (see Table 2). This means that, out of the whole analysed set, these two variables are the strongest observable determinants of SWB. The variables which have a positive effect on SWB are better self-perceived health, higher income, the fact of being a student or a retiree and bigger household size. The variables that can be associated with lower SWB include older age, monetary poverty and material deprivation, being unemployed, having unmet medical needs.

Self-perceived health and material deprivation proved to be major determinants of subjective well-being according to the estimates of formative parts of MIMIC models in majority of countries (see Table 2). However, countries differed with respect to the importance of other factors. In order to uncover unique patterns in each country and identify intriguing insights, we conducted a correspondence analysis of coefficients from the formative part of the MIMIC model. Correspondence analysis is a statistical technique that can transform complex relationships in a large dataset into a more manageable, two-dimensional graphical representation. This type of analysis allows us to simultaneously examine multiple parameters from several models by mapping the relationships between various categorical variables in a visual format, which makes it an excellent tool for exploratory data analysis.

Table 2. Parameter estimates in the formative (structural) part of the MIMIC model

Country	Age	Sex	Income	Health	Unmet medical needs	Retired	Student	Unemplo – yed	Monetary poverty	Material deprivation	Household size	Living alone	Negative affect	Positive affect
AT	−0.009 (0.020)	−0.069*** (0.012)	0.037** (0.013)	0.389*** (0.015)	−0.039** (0.013)	0.046* (0.019)	−0.024 (0.015)	−0.061*** (0.018)	−0.014 (0.015)	−0.248*** (0.018)	0.018 (0.019)	−0.036* (0.017)	−0.898*** (0.010)	0.972*** (0.013)
BE	0.022 (0.020)	−0.052*** (0.011)	0.019 (0.012)	0.318*** (0.013)	−0.105*** (0.016)	0.063*** (0.017)	0.033** (0.012)	−0.048** (0.016)	0.006 (0.015)	−0.348*** (0.018)	0.032* (0.015)	−0.089*** (0.015)	−0.829*** (0.011)	0.930*** (0.013)
BG	−0.222*** (0.020)	0.015 (0.011)	0.128*** (0.012)	0.236*** (0.011)	−0.093*** (0.010)	0.048** (0.016)	0.030* (0.014)	−0.162*** (0.012)	−0.053*** (0.013)	−0.288*** (0.013)	−0.060*** (0.014)	0.002 (0.013)	−0.736*** (0.010)	0.771*** (0.009)
CY	−0.080*** (0.023)	−0.046*** (0.014)	0.019 (0.014)	0.302*** (0.017)	−0.085*** (0.018)	0.130*** (0.020)	0.055*** (0.015)	−0.119*** (0.018)	−0.047** (0.017)	−0.248*** (0.017)	0.019 (0.019)	−0.050** (0.016)	−0.876*** (0.009)	0.879*** (0.010)
CZ	−0.105*** (0.021)	−0.053*** (0.012)	0.071*** (0.014)	0.274*** (0.014)	−0.018 (0.012)	0.169*** (0.020)	0.034** (0.011)	−0.021 (0.018)	−0.036* (0.015)	−0.298*** (0.015)	0.015 (0.017)	0.003 (0.015)	−0.841*** (0.011)	0.951*** (0.011)
DE	−0.009 (0.016)	−0.058*** (0.009)	0.050*** (0.009)	0.338*** (0.010)	−0.045*** (0.011)	0.101*** (0.012)	0.032** (0.011)	−0.055*** (0.013)	−0.023 (0.012)	−0.239*** (0.012)	0.009 (0.015)	−0.050*** (0.012)	−0.869*** (0.007)	0.950*** (0.009)
DK	−0.012*** (0.000)	−0.201*** (0.002)	−0.027 (0.028)	0.254*** (0.003)	−0.154*** (0.012)	0.018*** (0.000)	−0.083*** (0.001)	−0.128*** (0.001)	−0.079*** (0.001)	−0.322*** (0.004)	−0.043*** (0.000)	−0.229*** (0.003)	−0.756*** (0.004)	0.708 (0.401)
EE	−0.058* (0.027)	0.054*** (0.015)	0.054** (0.018)	0.333*** (0.016)	−0.076*** (0.015)	0.090*** (0.020)	0.029* (0.013)	−0.085*** (0.016)	−0.004 (0.019)	−0.283*** (0.017)	0.009 (0.016)	−0.050* (0.021)	−0.700*** (0.027)	0.985*** (0.030)
ES	−0.122*** (0.013)	−0.070*** (0.008)	0.020* (0.009)	0.344*** (0.010)	−0.027*** (0.007)	0.084*** (0.010)	0.042*** (0.008)	−0.102*** (0.010)	−0.009 (0.010)	−0.269*** (0.010)	0.031** (0.010)	−0.012 (0.011)	−0.878*** (0.006)	0.905*** (0.007)
FI	0.050 (0.026)	0.017 (0.016)	0.033* (0.014)	0.326*** (0.018)	−0.063*** (0.018)	0.080*** (0.023)	0.010 (0.016)	−0.053** (0.020)	0.003 (0.021)	−0.278*** (0.021)	0.024 (0.015)	−0.076*** (0.020)	−0.819*** (0.015)	0.916*** (0.015)
FR	−0.105*** (0.023)	−0.118*** (0.013)	−0.012 (0.017)	0.261*** (0.015)	−0.072*** (0.012)	0.113*** (0.021)	−0.010 (0.016)	−0.038** (0.014)	0.002 (0.016)	−0.263*** (0.015)	−0.027 (0.019)	−0.079*** (0.016)	−0.853*** (0.010)	1.000*** (0.012)
GR	−0.147*** (0.010)	0.016** (0.006)	0.029*** (0.007)	0.219*** (0.008)	−0.066*** (0.007)	0.104*** (0.008)	0.046*** (0.006)	−0.145*** (0.007)	−0.031*** (0.007)	−0.219*** (0.007)	0.030*** (0.009)	−0.019** (0.007)	−0.891*** (0.004)	0.865*** (0.004)
HR	−0.101*** (0.020)	0.000 (0.011)	0.055*** (0.014)	0.312*** (0.014)	−0.072*** (0.013)	0.040* (0.017)	0.069*** (0.011)	−0.045*** (0.014)	−0.036* (0.014)	−0.306*** (0.014)	0.032* (0.016)	0.035* (0.014)	−0.825*** (0.009)	0.861*** (0.010)
HU	−0.218*** (0.022)	−0.015 (0.011)	0.014 (0.012)	0.305*** (0.013)	−0.097*** (0.012)	0.109*** (0.017)	0.027 (0.015)	−0.079*** (0.017)	−0.041** (0.014)	−0.343*** (0.014)	0.066*** (0.016)	−0.021 (0.013)	−0.845*** (0.010)	0.851*** (0.010)

cont. Table 2

Country	Age	Sex	Income	Health	Unmet medical needs	Retired	Student	Unemplo – yed	Monetary poverty	Material deprivation	Household size	Living alone	Negative affect	Positive affect
IE	−0.025 (0.029)	−0.064*** (0.019)	0.023 (0.017)	0.262*** (0.022)	−0.052* (0.024)	0.077*** (0.021)	−0.023 (0.024)	−0.047* (0.022)	−0.007 (0.023)	−0.341*** (0.024)	−0.011 (0.027)	−0.057* (0.023)	−0.866*** (0.015)	0.802*** (0.024)
IT	−0.139*** (0.013)	−0.024** (0.008)	0.054*** (0.008)	0.348*** (0.009)	−0.083*** (0.009)	0.084*** (0.010)	0.037*** (0.009)	−0.113*** (0.010)	−0.021* (0.010)	−0.228*** (0.010)	0.018 (0.011)	−0.022* (0.010)	−0.879*** (0.007)	0.841*** (0.007)
LT	−0.136*** (0.029)	0.004 (0.016)	0.078*** (0.020)	0.231*** (0.020)	−0.091*** (0.015)	0.106*** (0.024)	0.037* (0.017)	−0.091*** (0.019)	−0.020 (0.022)	−0.429*** (0.019)	0.043* (0.021)	0.034 (0.023)	−0.786*** (0.019)	0.906*** (0.021)
LU	−0.044 (0.030)	−0.080*** (0.020)	−0.001 (0.021)	0.264*** (0.027)	−0.053** (0.018)	0.074** (0.024)	0.026 (0.019)	−0.110** (0.033)	−0.067** (0.023)	−0.241*** (0.029)	−0.048 (0.025)	−0.104*** (0.027)	−0.888*** (0.018)	1.000*** (0.025)
LV	−0.153*** (0.028)	−0.004 (0.013)	0.061*** (0.018)	0.229*** (0.020)	−0.104*** (0.014)	0.066*** (0.020)	0.028* (0.014)	−0.120*** (0.013)	−0.056*** (0.016)	−0.361*** (0.013)	0.051* (0.021)	−0.015 (0.017)	−0.738*** (0.019)	1.000*** (0.022)
MT	−0.041 (0.022)	−0.011 (0.015)	0.052** (0.018)	0.237*** (0.017)	−0.037* (0.019)	0.074*** (0.018)	0.043** (0.014)	−0.028* (0.014)	−0.011 (0.018)	−0.339*** (0.018)	−0.008 (0.019)	0.022 (0.019)	−0.897*** (0.012)	0.866*** (0.019)
NL	0.141*** (0.018)	0.004 (0.012)	0.049*** (0.014)	0.346*** (0.015)	−0.042** (0.013)	0.043** (0.013)	0.038* (0.016)	−0.039* (0.016)	−0.010 (0.018)	−0.294*** (0.017)	0.043** (0.015)	−0.063*** (0.017)	−0.835*** (0.011)	0.903*** (0.014)
PL	−0.168*** (0.015)	−0.033*** (0.009)	0.022* (0.011)	0.200*** (0.011)	−0.079*** (0.010)	0.064*** (0.013)	0.015 (0.009)	−0.037*** (0.010)	−0.018 (0.010)	−0.325*** (0.011)	0.004 (0.012)	−0.066*** (0.012)	−0.770*** (0.009)	0.959*** (0.012)
PT	−0.207*** (0.015)	−0.149*** (0.009)	0.079*** (0.009)	0.309*** (0.010)	−0.069*** (0.009)	0.054*** (0.013)	0.019* (0.008)	−0.046*** (0.010)	−0.019 (0.010)	−0.261*** (0.011)	0.006 (0.012)	−0.012 (0.011)	−0.942*** (0.005)	0.985*** (0.007)
RO	−0.155*** (0.022)	0.008 (0.012)	0.149*** (0.014)	0.215*** (0.015)	−0.076*** (0.013)	0.037* (0.018)	0.087*** (0.013)	−0.034* (0.017)	−0.030 (0.016)	−0.242*** (0.014)	−0.026 (0.020)	−0.096*** (0.014)	−0.742*** (0.013)	0.788*** (0.015)
SE	0.131*** (0.028)	−0.023 (0.016)	0.074*** (0.016)	0.252*** (0.020)	−0.131*** (0.020)	0.035 (0.025)	0.058** (0.020)	−0.074** (0.025)	0.012 (0.023)	−0.246*** (0.022)	0.014 (0.020)	−0.145*** (0.022)	−0.869*** (0.010)	0.958*** (0.012)
SI	−0.018 (0.032)	−0.037* (0.018)	0.044* (0.018)	0.308*** (0.021)	−0.048* (0.021)	0.053 (0.028)	0.023 (0.012)	−0.010 (0.019)	−0.001 (0.022)	−0.364*** (0.022)	−0.006 (0.019)	−0.012 (0.023)	−0.845*** (0.016)	0.943*** (0.016)
SK	−0.180*** (0.022)	0.006 (0.011)	0.083*** (0.014)	0.319*** (0.015)	−0.069*** (0.012)	0.152*** (0.018)	0.064*** (0.012)	−0.145*** (0.016)	0.014 (0.015)	−0.275*** (0.014)	0.028* (0.014)	0.022 (0.013)	−0.764*** (0.013)	0.843*** (0.011)
UK	0.062*** (0.016)	−0.035*** (0.009)	0.028** (0.009)	0.334*** (0.011)	−0.089*** (0.010)	0.155*** (0.013)	0.012 (0.011)	−0.054*** (0.011)	−0.013 (0.011)	−0.264*** (0.012)	0.052*** (0.014)	−0.051*** (0.012)	−0.887*** (0.007)	0.868*** (0.010)

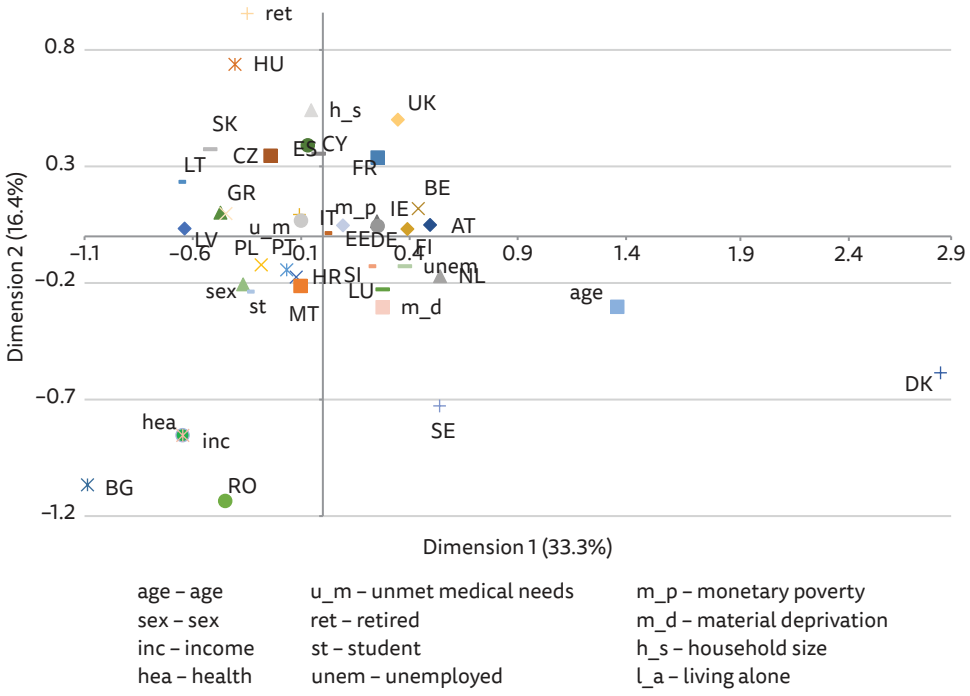
Note: table contains parameter estimates and standard errors of estimation (in parentheses: significance level, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

Source: own elaboration based on Eurostat data from EU-SILC (2018). The responsibility for all conclusions drawn from the data lies entirely with the authors.

In the context of our study, this approach enabled us to visualize how various determinants of subjective well-being (SWB) – such as age, equivalised income, and retirement status – determine levels of SWB in some countries. Factors in correspondence analysis are based on the irregularities in the dataset (called inertia), therefore, in our case it should be able to identify determinants that are specific to particular countries or groups of countries.

Figure 13 presents the resulting plot for the first two dimensions that account for 49.7 of the total inertia of the data set. On this graph the points representing equivalised income and age are approximated to a high degree. Their quality of display is 0.82 and 0.86 respectively, meaning that the differences in the values of estimated parameters are well described by the plot.

Figure 3. Configuration of points representing countries and parameter estimates from the formative part of the MIMIC models in a two-dimensional factor space. Principal normalization



Source: own elaboration based on Eurostat data from EU-SILC (2018). The responsibility for all conclusions drawn from the data lies entirely with the authors.

The primary dimension in the correspondence analysis (refer to Figure 3) is mainly associated with atypical values of the estimated parameter for age, and to a lesser

extent with subjective health assessment, unemployment, gender, retirement status, and income. The Netherlands and Sweden are positioned furthest to the right on the plot. Notably, in the Netherlands, relative to other countries, the parameter value related to age is notably high. The impact of age on SWB is atypical (refer to Figure 18), showing a tendency for SWB to increase across nearly all age ranges. This relationship is neither negative, as observed in post-Soviet countries and Central and Eastern European nations, nor U-shaped, as observed in Scandinavian and other Western European countries. Therefore, the age-SWB relationship in the Netherlands suggests a unique trend, distinct from the patterns observed in other country clusters.

On the opposite end of this dimension, we find two Balkan countries – Bulgaria and Romania, where the estimated coefficients for age are the most negative among all the models. This signifies that in these countries, the impact of age on SWB is the most strongly negative. Comparing this with Figure 4, it's evident that indeed, SWB values decline with age across the entire observed age range in these countries. This trend reflects a stark contrast to the positive relationship observed in countries like the Netherlands, underscoring the country-specific nuances in the influence of age on SWB.

The second dimension in the correspondence analysis is primarily associated with retirement status, but also with unusual values of parameters associated with income an health. As previously, Bulgaria and Romania stand out for their atypical parameter estimates. Income plays a very substantial role in these countries, which are also among the relatively poorest in the EU. This could suggest that income acts as a sort of bottleneck in shaping SWB, providing an empirical argument for the impact of absolute, not just relative, income levels on SWB.

In wealthier societies, particularly those in Western and Northern Europe, income is no longer such a significant factor in forming SWB values. In many of these countries, the estimate associated with income is statistically insignificant. This suggests that beyond a certain income threshold, increases in wealth may not necessarily translate to increases in SWB, indicating a possible saturation point.

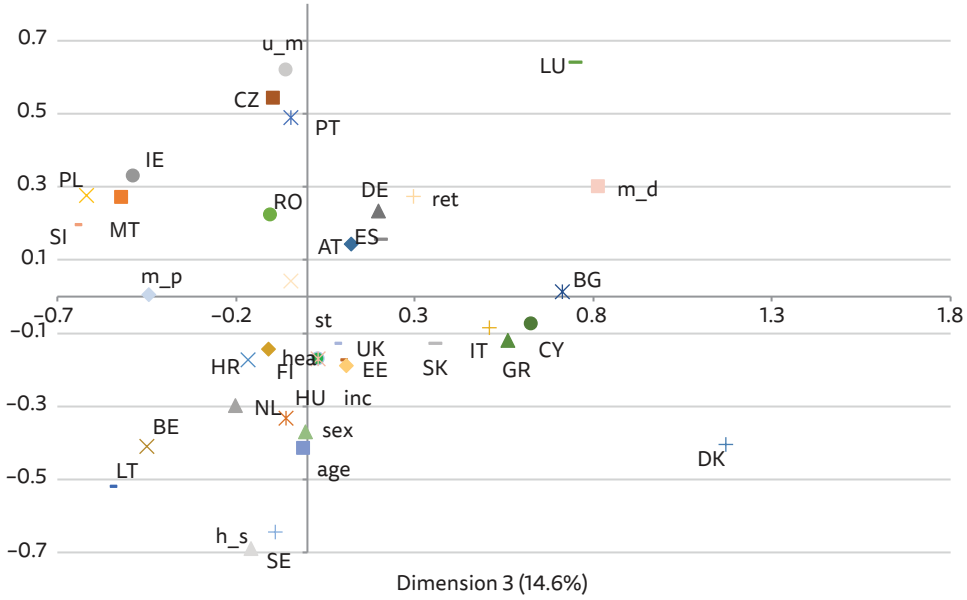
On the other hand, at the opposite side of this dimension, we find Hungary, a country that is not significantly wealthier than Bulgaria or Romania. In Hungary, the estimate associated with income was also statistically insignificant, suggesting that other factors, potentially cultural, could modify the relationship between income and SWB. This highlights the complexity of the relationship between income and SWB, which can be influenced by a range of socio-cultural and economic factors.

Being a retiree, also associated with the second dimension of the analysis, is a significant factor shaping SWB in countries represented by points lying in the upper part of the plot, such as the Czechia, Hungary, the UK, and Slovakia. This could reflect the pension replacement rate, impact of social security systems, quality of healthcare,

or societal attitudes towards the elderly in these countries, all of which can significantly influence retirees' well-being.

On the other hand, Bulgaria and Romania again stand out, where being a retiree does not constitute such an important (though still statistically significant) factor in shaping SWB values. Slovenia and Sweden were the only two countries in the analyzed group where being a retiree was not a significant factor in shaping SWB values. This could suggest that retirement in these countries does not bring about the same level of lifestyle improvement or societal respect as it might in other countries, potentially due to factors such as lower retirement benefits or less comprehensive elder care services. This underlines the importance of societal and economic contexts in determining how life circumstances, like retirement, affect SWB.

Figure 4. Configuration of points representing countries and parameter estimates from the formative part of the MIMIC models in a two-dimensional factor space. Symmetric, canonical normalization



age – age
sex – sex
inc – income
hea – health

u_m – unmet medical needs
ret – retired
st – student
unem – unemployed

m_p – monetary poverty
m_d – material deprivation
h_s – household size
l_a – living alone

Source: own elaboration based on Eurostat data from EU-SILC (2018). The responsibility for all conclusions drawn from the data lies entirely with the authors.

Figure 4 presents two additional dimensions in the correspondence analysis, which together account for 25 of the variability in parameter estimates across the group of countries studied. The third dimension is primarily associated with material deprivation, unemployment, and monetary poverty.

Denmark stands out as the country situated furthest to the right in this factor layout. It is characterized by strongly negative estimates for all three variables compared to the rest of the countries. This means that in Denmark, being unemployed, materially deprived, or impoverished constitutes a significantly influential factor in lowering SWB values compared to other European countries. A similar situation, albeit to a lesser extent, applies to countries such as Bulgaria, Cyprus, Greece, Luxembourg, and Slovakia.

On the other end of the spectrum, we find Belgium, Ireland, Lithuania, Malta, Poland, and Slovenia. In these countries, the parameter estimate associated with monetary poverty proved statistically insignificant, and the influence of unemployment and material deprivation, though statistically significant, is relatively weaker compared to the group. This may suggest a varying degree of social and economic resilience in different nations, potentially influenced by national policies, societal norms, and economic conditions.

The fourth dimension, representing 10 of the variability, is primarily associated with two variables whose impact on SWB appears to be somehow interconnected. These variables are household size and unmet medical needs. To a lesser extent, this dimension is related to age and gender, which might modulate the influence of the first two factors on SWB.

Countries such as the Czechia, France, Luxembourg, and Portugal are positioned at the top of the plot. In these countries, the influence of household size on happiness turned out to be statistically insignificant or even negative. Conversely, in some countries represented by points located in the lower half of the plot, such as Greece, Latvia, and the UK, the effect of living in a larger household on happiness is positive. This might indicate cultural, demographic, or housing-related factors that may shape the relationship between household size and SWB.

For instance, in cultures where extended family living is commonplace and socially supported, larger household sizes may contribute positively to SWB. On the other hand, in societies where nuclear family structures are more common, the presence of more household members could be perceived as a burden or source of stress, potentially negatively impacting SWB. Additionally, unmet medical needs may factor differently into SWB depending on a country's healthcare infrastructure and social safety nets, adding another layer of complexity to these relationships.

The data points representing estimates for parameters such as being a student, living alone and sex lie at the centre of both correspondence analysis plots. This indicates

that individual countries did not significantly differ in the estimated values of these parameters. In other words, these factors play a similar role across all the analyzed countries in shaping the SWB values.

This implies a universal aspect to these variables in their effect on SWB, regardless of the country-specific contexts or disparities in national wealth or socio-economic policies. For example, regardless of whether one is in a wealthier Western European nation or a less affluent Eastern European country, being a student seems to have a comparable impact on one's perceived well-being.

Table 3 contains estimates of the reflective part of the MIMIC model. In other words, it contains estimates of regression model parameters for particular symptoms (realised functionings) of the latent SWB variable. Each equation contains a single explanatory variable (SWB) and a constant term. In all analysed countries latent variables explain variability of all proposed symptoms in a statistically significant manner.

Table 3. Estimates of the reflective (measurement) part of the MIMIC model

	Overall_life_satisfaction	Nervous	Down_in_the_dumps	Depressed	Calm	Happy
AT	0,654 (0,013)	0,657 (0,012)	0,782 (0,009)	0,753 (0,010)	0,643 (0,013)	0,703 (0,013)
BE	0,683 (0,013)	0,550 (0,011)	0,826 (0,007)	0,825 (0,007)	0,597 (0,012)	0,761 (0,012)
BG	0,860 (0,007)	0,654 (0,010)	0,880 (0,007)	0,827 (0,007)	0,836 (0,007)	0,922 (0,006)
CY	0,702 (0,012)	0,731 (0,010)	0,863 (0,006)	0,829 (0,008)	0,785 (0,011)	0,788 (0,010)
CZ	0,674 (0,012)	0,734 (0,008)	0,783 (0,007)	0,684 (0,009)	0,748 (0,011)	0,696 (0,010)
DE	0,737 (0,008)	0,628 (0,007)	0,837 (0,005)	0,780 (0,006)	0,665 (0,009)	0,737 (0,009)
DK	0,871 (0,015)	0,804 (0,004)	1,000 (0,000)	1,000 (0,000)	0,841 (0,07,)	0,867 (0,172)
EE	0,661 (0,022)	0,712 (0,012)	0,730 (0,010)	0,673 (0,012)	0,511 (0,021)	0,660 (0,019)
ES	0,628 (0,008)	0,718 (0,006)	0,920 (0,003)	0,864 (0,005)	0,680 (0,009)	0,784 (0,007)
FI	0,724 (0,016)	0,592 (0,014)	0,818 (0,009)	0,818 (0,01)	0,657 (0,015)	0,780 (0,014)
FR	0,643 (0,012)	0,622 (0,010)	0,791 (0,007)	0,767 (0,007)	0,642 (0,011)	0,716 (0,010)
GR	0,701 (0,005)	0,726 (0,004)	0,912 (0,002)	0,783 (0,004)	0,774 (0,004)	0,810 (0,004)
HR	0,801 (0,008)	0,761 (0,008)	0,864 (0,006)	0,758 (0,008)	0,739 (0,010)	0,834 (0,008)

cont. Table 3

	Overall_life_satisfaction	Nervous	Down_in_the_dumps	Depressed	Calm	Happy
HU	0,750 (0,009)	0,579 (0,012)	0,844 (0,008)	0,769 (0,008)	0,692 (0,011)	0,846 (0,009)
IE	0,702 (0,017)	0,580 (0,017)	0,815 (0,011)	0,812 (0,014)	0,607 (0,024)	0,848 (0,015)
IT	0,569 (0,008)	0,805 (0,005)	0,894 (0,004)	0,806 (0,005)	0,832 (0,006)	0,791 (0,006)
LT	0,757 (0,015)	0,723 (0,014)	0,842 (0,012)	0,718 (0,014)	0,566 (0,019)	0,797 (0,017)
LU	0,671 (0,02)	0,612 (0,015)	0,730 (0,015)	0,773 (0,015)	0,578 (0,021)	0,653 (0,022)
LV	0,747 (0,014)	0,755 (0,009)	0,854 (0,008)	0,681 (0,01)	0,533 (0,016)	0,650 (0,015)
MT	0,620 (0,014)	0,579 (0,013)	0,792 (0,010)	0,754 (0,012)	0,669 (0,013)	0,770 (0,013)
NL	0,783 (0,013)	0,604 (0,011)	0,833 (0,007)	0,809 (0,007)	0,555 (0,016)	0,820 (0,012)
PL	0,671 (0,008)	0,551 (0,009)	0,756 (0,007)	0,783 (0,007)	0,476 (0,011)	0,766 (0,010)
PT	0,637 (0,008)	0,731 (0,007)	0,858 (0,004)	0,837 (0,005)	0,728 (0,008)	0,761 (0,007)
RO	0,752 (0,010)	0,638 (0,010)	0,833 (0,008)	0,718 (0,010)	0,665 (0,012)	0,724 (0,014)
SE	0,709 (0,016)	0,665 (0,014)	0,883 (0,007)	0,844 (0,008)	0,779 (0,013)	0,789 (0,011)
SI	0,674 (0,017)	0,654 (0,014)	0,836 (0,009)	0,716 (0,013)	0,717 (0,015)	0,723 (0,014)
SK	0,729 (0,012)	0,572 (0,01)	0,828 (0,008)	0,762 (0,009)	0,772 (0,011)	0,773 (0,009)
UK	0,706 (0,008)	0,615 (0,008)	0,864 (0,004)	0,848 (0,005)	0,660 (0,009)	0,812 (0,008)

Note: table contains parameter estimates and standard errors of estimation (in parentheses: significance level, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$)

Source: own elaboration based on Eurostat data from EU-SILC (2018). The responsibility for all conclusions drawn from the data lies entirely with the authors.

It is generally recommended that measurement models are assessed using average variance extracted (AVE) and the coefficient of variation (CV) (Fornell and Larcker, 1981; Ullman and Bentler, 2012). In our opinion, it would be inappropriate to use these indicators in the context of our study, as their values tend to be high when the correlations among selected indicators are high. Their use is justified when a SEM model is used to capture common factors underlying a set of correlated observables. In the case of measuring SWB, we preferred to use a set of observable indicators that represent different aspects of a given domain of SWB, and, consequently, are

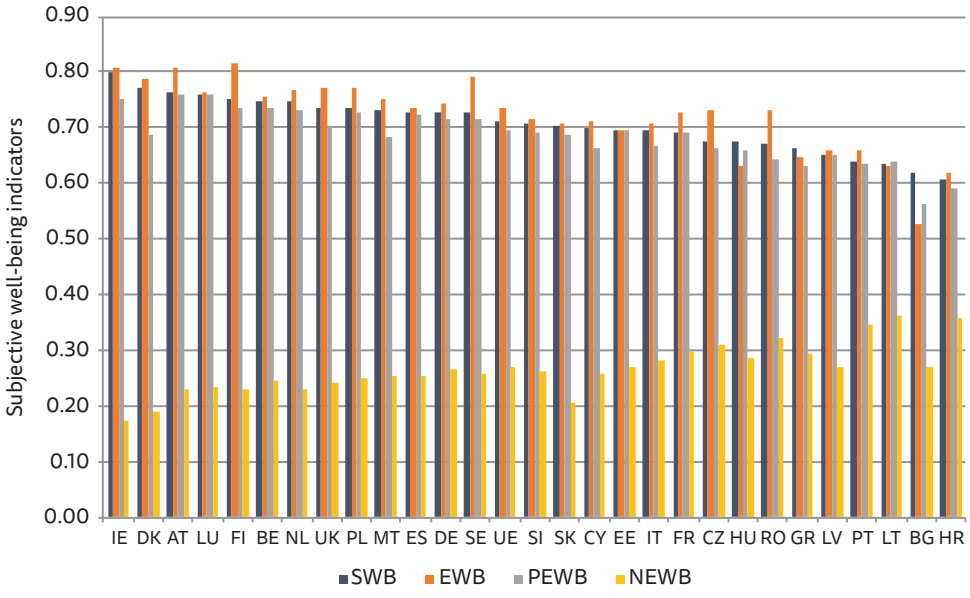
not strongly correlated. For this reason, we chose to focus our assessment on the statistical significance of factor loadings in the measurement sub-models. Significant factor loadings suggest that the latent capabilities are well captured by the proposed symptoms (Krishnakumor and Ballon, 2008).

Higher values of SWB were, on average, associated with higher values of variables such as being happy, being calm and overall life satisfaction. At the same time higher values of SWB were associated with lower values of the three variables describing symptom of low mood, namely: being sad, being depressed and being nervous.

10. Subjective well-being in the EU countries

As depicted in the illustrative Figures 5 and 6 the data analyses generated mean values of subjective well-being (SWB) and its associated facets across the countries of the European Union for 2018. The geographical distribution of these findings reveals a clear trend: generally, nations in the Northern and Western regions of Europe reported higher SWB levels than those in the Southern and Eastern regions.

Figure 5. Subjective well-being in the EU countries in 2018

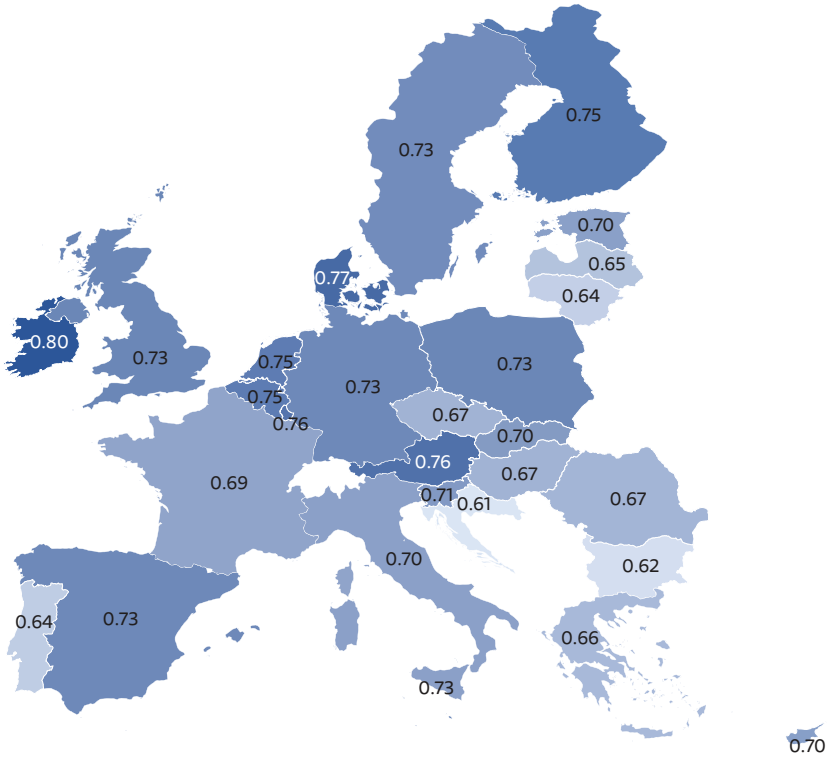


Source: own elaboration based on data in Table A2 in the Appendix and on Eurostat data from EU-SILC (2018). The responsibility for all conclusions drawn from the data lies entirely with the authors.

Austria, Belgium, Denmark, Finland, Ireland, and the Netherlands distinguished themselves as the forerunners in high SWB, each demonstrating values above 0.75. A noteworthy observation was that among the cohort of nations that acceded to the European Union during the year 2004, both Poland and Romania registered relatively high SWB figures, measured at 0.73 and 0.71 respectively. On the other hand, Croatia, Bulgaria, Lithuania, and Portugal were predominantly at the lower end of the SWB spectrum, with measurements of 0.61, 0.62, 0.64, and 0.64 respectively.

Shifting focus to evaluative well-being, which represents overall life satisfaction, in 2018, Finland, Ireland, and Austria were at the forefront, with respective average scores of 0.82, 0.81, and 0.81. Within the array of new EU member states, nations such as Poland, Czechia, and Romania displayed a relatively superior average level of life satisfaction, boasting scores of 0.77, 0.73, and 0.73 respectively. At the other end of the spectrum, Bulgaria reported the lowest evaluative well-being with an average score of 0.53. Other nations such as Croatia, Lithuania, Hungary, and Greece also reported somewhat depressed mean ratings, with respective values of 0.62, 0.63, 0.63, and 0.65.

Figure 6. Subjective well-being in the EU countries in 2018



Source: own elaboration based on data in Table A2 in the Appendix and on Eurostat data from EU-SILC (2018). The responsibility for all conclusions drawn from the data lies entirely with the authors.

Focusing on the domain of positive experienced well-being, the triumvirate of Austria, Luxembourg, and Ireland emerged as the superior performers, each registering robust scores of 0.76, 0.76, and 0.75 correspondingly. Conversely, the nations of Bulgaria, Croatia, and Greece found themselves languishing at the lower extremities of this measure with respective scores of 0.56, 0.59, and 0.63. Among the more recent EU member nations, Poland, Estonia, and Slovenia showcased the highest values of positive experienced well-being, with mean values of 0.73, 0.69, and 0.69 respectively.

The analysis of negative experienced well-being in 2018 revealed Ireland and Germany as having the least mean scores, at 0.18 and 0.19 respectively. Interestingly, among the newer EU member states, Slovakia and Poland reported the lowest average values of negative experienced well-being, at 0.21 and 0.25 respectively. In contrast, Lithuania, Croatia, Portugal, and Romania registered the highest mean scores of negative experienced well-being, with respective scores of 0.36, 0.36, 0.34, and 0.32.

11. Distribution of SWB in the populations of the EU countries

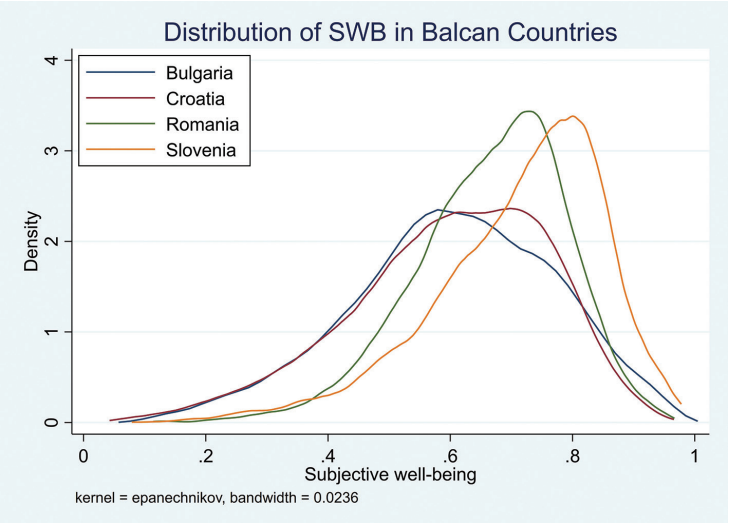
Since subjective well-being (SWB) values were estimated for every individual in the dataset and then standardised across all countries, a solid foundation was established for a comprehensive comparative examination of SWB. To facilitate this analysis, we conducted a series of kernel density estimates, assessing SWB across the populations of the countries under examination. These findings are documented in the ensuing series of visual presentations (Figures 7–11). To enhance clarity and coherence, the countries have been arranged in accordance with their geographical contiguity.

Upon examination, it was clear that SWB distributions showed a left-skewed tendency in every country analysed. This left-leaning skewness signifies that, in each of these nations, the majority of the population tends to experience relatively elevated levels of SWB. However, a minority portion of the population, located in the 'tail' of the distribution, is confronted with considerably lower levels of SWB. This consistent trend across the varied nations analysed emphasises the prevailing pattern: while most individuals experience a significant degree of subjective well-being, a smaller segment of the population faces troublingly low levels of well-being.

Figure 7 depicts the distributions of subjective well-being (SWB) across four Balkan nations. Upon examination, it becomes evident that the populations of Slovenia and Romania exhibit higher mean values of SWB compared to those in Bulgaria and Croatia. Furthermore, a noteworthy feature is the greater dispersion or variance and almost symmetrical pattern characterising the distributions in Bulgaria and Croatia. This is

in contrast to the predominantly positively skewed distributions observed across the other nations analysed.

Figure 7. **Kernel density estimation of SWB in the populations of the EU countries in the Balkans**



Source: own elaboration based on Eurostat data from EU-SILC (2018). The responsibility for all conclusions drawn from the data lies entirely with the authors.

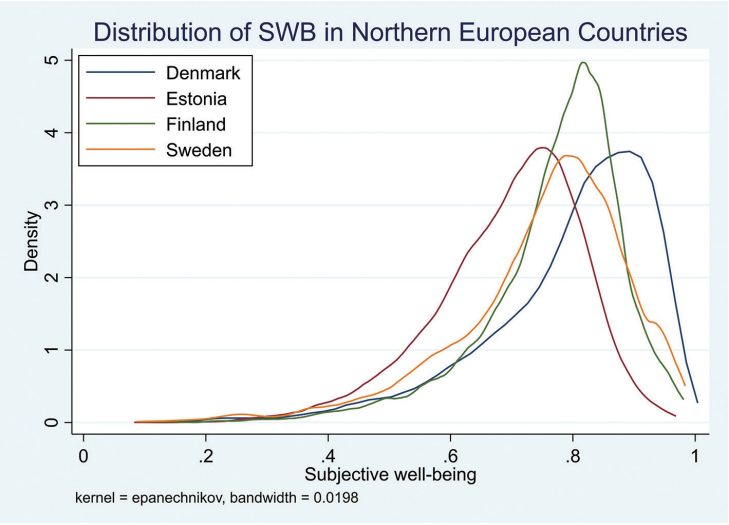
This significant distinction suggests a more equal distribution of SWB, despite lower mean values, among the populations in Bulgaria and Croatia, encompassing a broader range of experiences. Conversely, the positive skewness evident in the SWB distributions of most other nations suggests a more unequal dispersion of well-being, with the bulk of the population reporting relatively high levels of SWB and a smaller proportion experiencing much lower levels. This observation might highlight potential variations in socio-economic conditions, cultural factors, or public policy between these groups of countries, warranting further, more detailed exploration.

Figure 8 illustrates the distributions of subjective well-being (SWB) across four Northern European nations. It is clear that Denmark boasts the highest levels of SWB, while Estonia appears to have the lowest. Intriguingly, the distribution of SWB within Finland exhibits a greater degree of symmetry and lower dispersion, a pattern that markedly distinguishes it from the other triad of northern nations under consideration.

The symmetrical nature of the Finnish distribution suggests a more egalitarian spread of SWB among its population, in stark contrast to the positively skewed patterns often observed. The comparatively higher mean values of SWB in Denmark might be

indicative of the country's well-known strong social support system, high quality of life, and progressive social policies.

Figure 8. Kernel density estimation of SWB in the populations of EU countries in Northern Europe



Source: own elaboration based on Eurostat data from EU-SILC (2018). The responsibility for all conclusions drawn from the data lies entirely with the authors.

Estonia's lower SWB, on the other hand, might be indicative of differing socio-economic realities, policy implications, or cultural perspectives that affect the population's perception of well-being. However, to establish these postulations, a more profound investigation of these potential determinants would be necessitated.

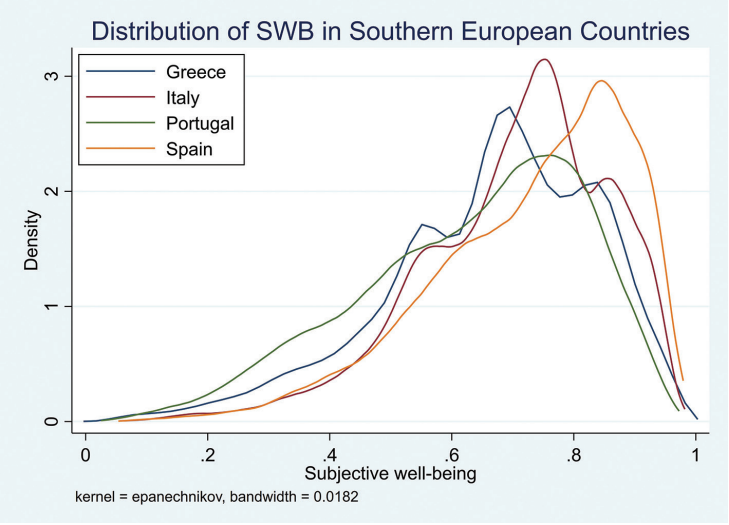
Moreover, the unique distribution of SWB in Finland, which is more symmetrical and clustered around the average values, raises interesting questions about potential unique socio-cultural or policy mechanisms that could be shaping this pattern. This insight could provide valuable directions for further research into the differential impacts of varying factors on SWB across various nations.

As depicted in Figure 9, an exploration of the subjective well-being (SWB) distributions in the quartet of Southern European nations within the European Union reveals intriguing patterns. While the overall shapes of these distributions are strikingly similar, closer inspection reveals clear differences in the left tail regions of these patterns.

Interestingly, Portugal and Greece show a more pronounced segment of their populations struggling in the lower echelons of SWB compared to their Italian and

Spanish counterparts. This can be understood as a larger segment of the populations in Portugal and Greece encountering less favourable levels of SWB, thus forming more pronounced, heavier left tails in their respective distributions.

Figure 9. **Kernel density estimation of SWB in the populations of EU countries in Southern Europe**



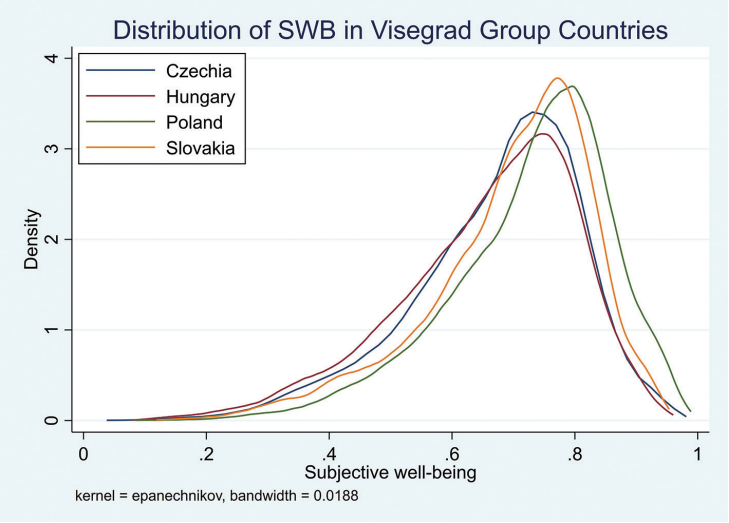
Source: own elaboration based on Eurostat data from EU-SILC (2018). The responsibility for all conclusions drawn from the data lies entirely with the authors.

This discrepancy prompts thoughtful questions regarding the differential socio-economic conditions, policy landscapes, and cultural nuances that may influence these disparities. In Greece and Portugal, for instance, these observations might point towards more significant socio-economic challenges or lesser effectiveness of social policies in promoting well-being compared to Italy and Spain.

Conversely, the less pronounced left tails in the SWB distributions for Italy and Spain could suggest more favourable conditions or effective policies that bolster the well-being of their citizen. However, these are preliminary observations and would require further, in-depth investigation to fully comprehend the underpinning factors contributing to these variations in the patterns of SWB across these Southern European nations.

Figure 10 presents SWB distributions amongst the nations comprising the Visegrad Group. Despite the predominant similarity characterising these distributions, some contrasts become apparent upon a more detailed examination.

Figure 10. **Kernel density estimation of SWB in the populations of the Visegrad group countries**



Source: own elaboration based on Eurostat data from EU-SILC (2018). The responsibility for all conclusions drawn from the data lies entirely with the authors.

Primarily, Slovakia and Poland stand out as the countries with the highest average values, while Czechia and Hungary lag with lower averages. Moreover, distributions in Poland and Slovakia have less dispersion. This divergence in SWB can be attributed to various sociopolitical, economic, and cultural factors inherent in these nations.

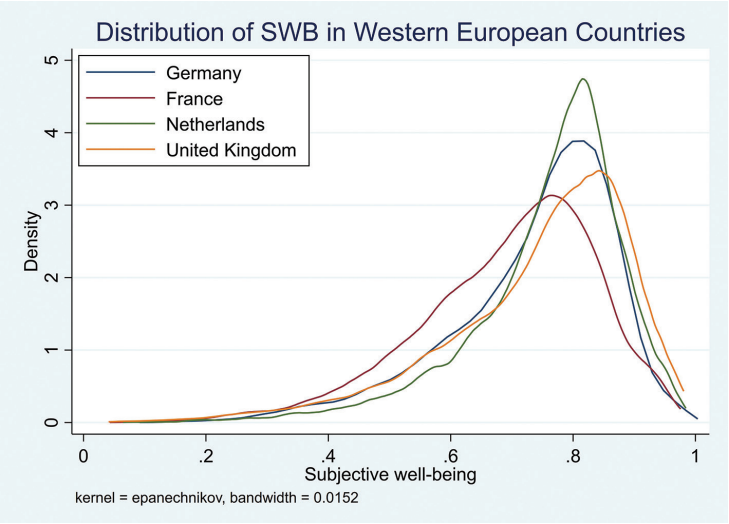
It's worth noting that while these distributions provide a valuable snapshot of SWB across the Visegrad nations, they should serve as a starting point for more in-depth analyses. They provide an impetus to delve deeper into the underlying factors shaping these distributions, to gain a richer understanding of the conditions that foster or hinder well-being across these nations.

Figure 11 depicts distribution dynamics of subjective well-being across four quintessential Western European nations, namely, France, Germany, the Netherlands and Great Britain. The patterns predominantly reveal a marked similarity, illustrating the shared societal frameworks and aspects of Western culture that influence the perception of well-being. Nonetheless, subtle differences do emerge, further accentuating the unique socio-cultural tapestry of each nation.

Interestingly, the distribution related to France exhibits less of a left skew compared to its counterparts. This statistical anomaly reveals a somewhat disconcerting reality – a significant portion of the French population struggles with relatively lower levels of subjective well-being. This divergence from the norm could be symptomatic of

a multitude of underlying factors, ranging from socio-economic challenges to health disparities or even socio-cultural aspects unique to French society.

Figure 11. **Kernel density estimation of SWB in the populations of EU countries in Western Europe**



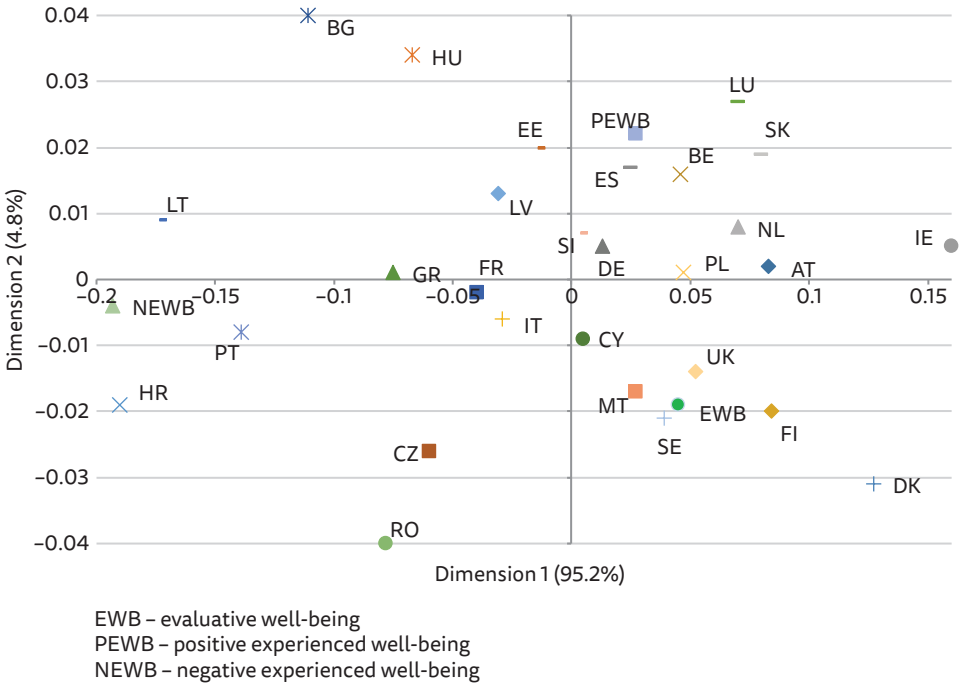
Source: own elaboration based on Eurostat data from EU-SILC (2018). The responsibility for all conclusions drawn from the data lies entirely with the authors.

While Germany and Great Britain closely resemble each other in their SWB distributions, representing a shared level of societal well-being, the slight difference exhibited by France underscores the importance of considering each country as a unique entity with its own challenges and opportunities.

12. Profiles of subjective well-being in the EU countries

A correspondence analysis was conducted to assess the differences in the structure of three components of SWB, namely evaluative well-being, negative experienced well-being, and positive experienced well-being, across analysed countries. The first two factors determined in the correspondence analysis (self-perceived health and material deprivation) account for 100 of the total inertia of the data set, with the first factor (dimension) explaining 95.2 of the variance in the data, as shown in Table A.3.

Figure 12. Configuration of points representing countries and subjective well-being components in two-dimensional factor space. Principal normalization



EWB – evaluative well-being
PEWB – positive experienced well-being
NEWB – negative experienced well-being

Source: own elaboration based on Eurostat data from EU-SILC (2018). The responsibility for all conclusions drawn from the data lies entirely with the authors.

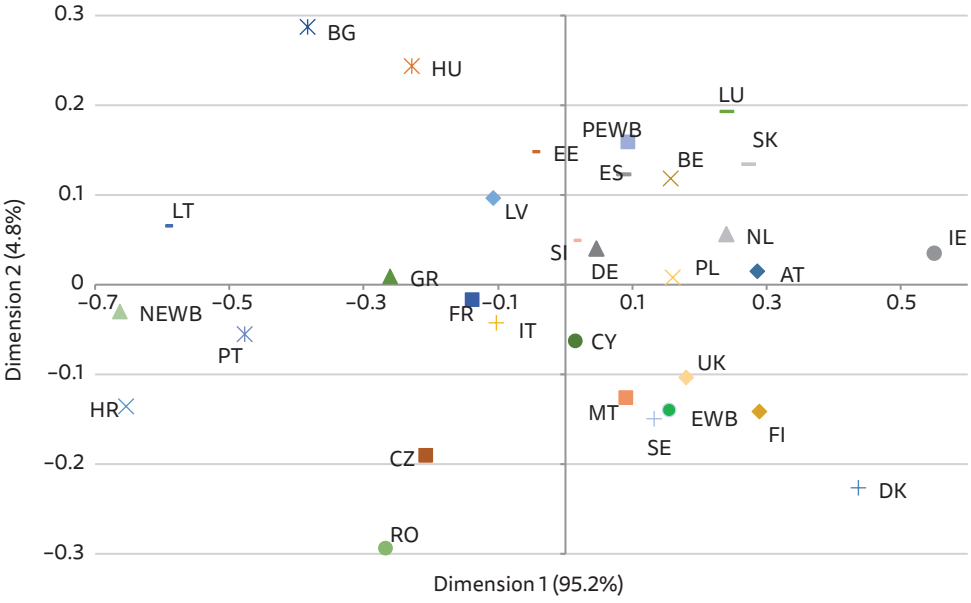
We start the analysis of Figure 12 by interpreting the points representing countries separately from those representing SWB components. In 2018, Luxemburg and Slovakia (upper-right quadrant), Denmark (bottom-right quadrant), Croatia and Romania (bottom-left quadrant), Bulgaria and Hungary (upper-left quadrant) had the most unusual profiles of subjective well-being (the most untypical structure of its components). Their points lie relatively far from the origin (the centroid). In relative terms, countries with the most typical structure of subjective well-being include Slovenia, Germany and Italy (their points are relatively close to the origin). The point representing Poland is relatively near the origin, so the structure of subjective well-being in Poland did not differ significantly from the average SWB structure in all the countries surveyed.

The biggest relative differences between the countries are due to the value of the component of negative experienced well-being (its point is relatively far the origin). In contrast, the components of positive experienced well-being and evaluative well-being differentiate the countries to a much lesser extent (their points are relatively near

from the origin). Moreover, each of these two components is located on the opposite side of the origin, which indicates that they are negatively correlated.

When analyzing the distances between the points that represent countries and the components of subjective well-being, and considering the entire configuration of these points, distinctive patterns of subjective well-being emerge for these countries. These patterns reflect components whose values substantially deviate from the average values computed for all nations (denoted by the origin). Sweden, the United Kingdom, Malta, and Finland stand apart due to their unusually high values for evaluative well-being indicators when compared to the other two components (refer to Table A2). Portugal, Croatia, and Lithuania are distinguished by the values of their negative experienced well-being component, with Bulgaria and Romania also showing variation, though to a lesser degree. Belgium, Spain, Estonia, and Luxembourg are marked by their atypically high values for the positive experienced well-being component.

Figure 13. Configuration of points representing countries and subjective well-being components in two-dimensional factor space. Symmetric, canonical normalization



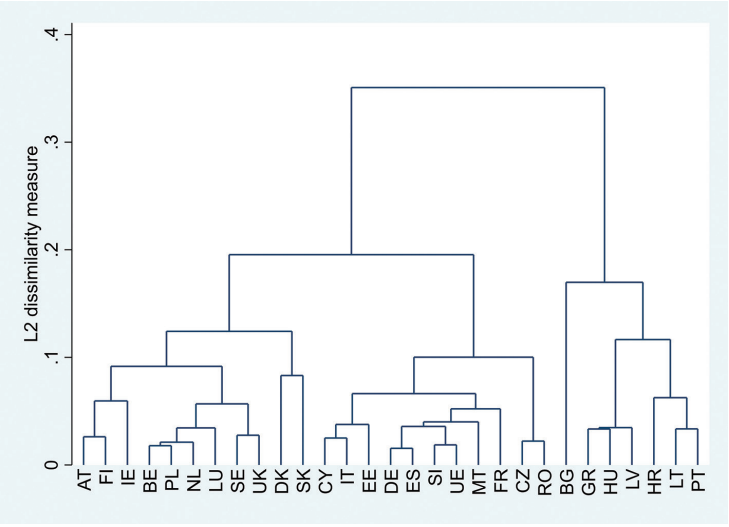
EWB – evaluative well-being
PEWB – positive experienced well-being
NEWB – negative experienced well-being

Source: own elaboration based on Eurostat data from EU-SILC (2018). The responsibility for all conclusions drawn from the data lies entirely with the authors.

13. Classification of the EU member states depending on the similarity of the structure of subjective well-being

In order to create groups of countries with a similar structure of the three SWB components, a dendrogram clustering was performed, as illustrated in Figure 14. Based on the evaluation of the dendrogram structure and the graphical results of the correspondence analysis (Figure 4), it was determined that the most appropriate agglomeration distance of the cut-off level would be 0.15.

Figure 14. Dendrogram showing the hierarchical clustering of the UE-28 countries



Source: own elaboration based on Eurostat data from EU-SILC (2018). The responsibility for all conclusions drawn from the data lies entirely with the authors.

This creates four clusters of countries (Table 4).

Table 4. The composition of the four clusters identified by agglomerative hierarchical clustering

Country	Cluster
Luxembourg	1
Netherlands	1
Ireland	1
Austria	1
United Kingdom	1

cont. Table 4

Country	Cluster
Finland	1
Slovakia	1
Belgium	1
Denmark	1
Poland	1
Sweden	1
Malta	2
Estonia	2
Czechia	2
Italy	2
Romania	2
Slovenia	2
Cyprus	2
France	2
Spain	2
Germany	2
Bulgaria	3
Greece	4
Latvia	4
Hungary	4
Lithuania	4
Portugal	4
Croatia	4

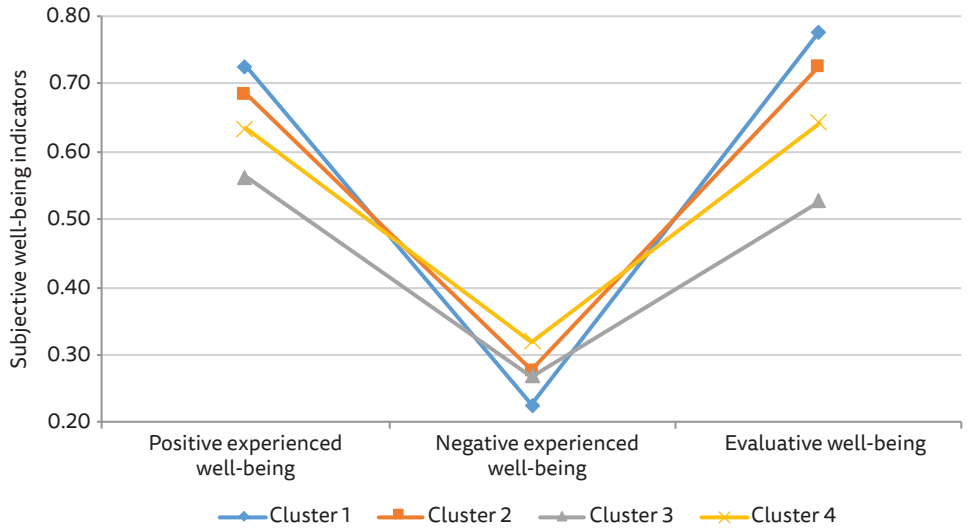
Source: own elaboration based on Figure 11. The responsibility for all conclusions drawn from the data lies entirely with the authors.

Looking from the left side of the dendrogram, the first cluster includes eleven countries: Luxembourg, the Netherlands, Ireland, Austria, the United Kingdom, Finland, Slovakia, Belgium, Denmark, Poland and Sweden. The second one contains ten countries: Malta, Estonia, Czechia, Italy, Romania, Slovenia, Cyprus, France, Spain and Germany. The third cluster covers only one country, namely Bulgaria. The fourth cluster contains six countries: Greece, Latvia, Hungary, Lithuania, Portugal and Croatia. Cluster analysis clearly indicates specific groups of EU countries. Each cluster not only showcases their economic and political ties but also their deeply rooted historical, cultural, and shared political interventions, as well as the policies they've adopted over the years.

The first cluster is made up of countries with the highest levels of subjective well-being, as evidenced by the highest average values of evaluative well-being and positive experienced well-being and the lowest average values of negative experienced

well-being (Figure 15). These predominantly northwestern European countries have historically been connected through trade, politics, and cultural exchanges. The Low Countries, namely Luxembourg, the Netherlands, and Belgium, share a history that spans centuries. Austria and the Netherlands, at one point, played pivotal roles in the Holy Roman Empire. Nordic countries such as Sweden, Finland, and Denmark share a Viking heritage. The British Isles, comprising Ireland and the United Kingdom, have a deeply intertwined history. Poland and Slovakia, both once parts of larger empires and historic monarchies, faced similar challenges in recent times. Apart from the high levels of subjective well-being, these countries are characterized by strong economies, stable democratic institutions, and a high level of economic integration.

Figure 15. Average values of subjective well-being indicators in the four country clusters



Source: own elaboration based on data in Table A3 in the Appendix. The responsibility for all conclusions drawn from the data lies entirely with the authors.

Countries belonging to the second cluster have the second largest average values of all partial indicators of subjective well-being. They can therefore be classified as countries with a relatively high level of subjective well-being. These countries have the second-largest average values of all subjective well-being indicators. This is a diverse group where founding EU countries such as France, Spain, Germany, and Italy showcase historical Roman and medieval ties. Meanwhile, Estonia, the Czech Republic, Romania, and Slovenia share a common experience of life behind the Iron Curtain and post-1989 democratization. Malta and Cyprus, strategically located island nations, have

histories marked by multiple colonial rulers. In addition to the second-highest average subjective well-being indicators, these countries share a common drive for European integration and mutual cooperation, both within the EU framework and on other international stages. Many of them also had similar experiences with democratization processes in the 20th century.

Bulgaria stands alone, indicating its distinct cultural and historical path. Historically bridging the East and West, it was influenced by interactions with the Byzantine and Ottoman empires. Its level of subjective well-being is the lowest in the EU-28, although its level of negative experienced well-being is the second lowest among the four clusters.

The fourth cluster consists of countries with the second lowest average values of evaluative and positive experienced well-being and the highest average levels of negative experienced well-being. The level of subjective well-being in these countries can therefore be described as relatively low. Although these countries can boast diverse historical backgrounds, they face similar contemporary challenges. Greece, the cradle of ancient Western civilization, has left its mark on many European cultures. Latvia and Lithuania, the Baltic states, underwent significant political transformations in the 20th century, transitioning from Soviet domination to independence. Portugal, associated with the Age of Discovery, shares a maritime heritage with Croatia, which has a rich Adriatic history. Despite their cultural and historical diversity, these countries often experienced economic and political instability in the 20th century.

14. The relationship between subjective well-being and determinants

14.1. The relationship between subjective well-being and age

In our study, age proved to be one of the major factors influencing values of SWB in the analysed countries. A series of comparative analyses were conducted to dissect the interplay between subjective well-being (SWB) and age, a dynamic that has intrigued scholars for years. The findings are encapsulated in Figures 16–20, where kernel regressions of SWB as a function of age are outlined for certain European Union nations, as before, grouped in fours based on their geographical proximity to ensure a lucid presentation of data. Finally, mean values of SWB in four distinct age groups are summarized in table 5 for all countries analysed in our study.

Strikingly, the data suggests an intricate mosaic of SWB-age relationships that mirror the socio-cultural and socio-economic nuances inherent to each region. Western European nations (as depicted in Figure 18) appear to maintain a relatively stable SWB

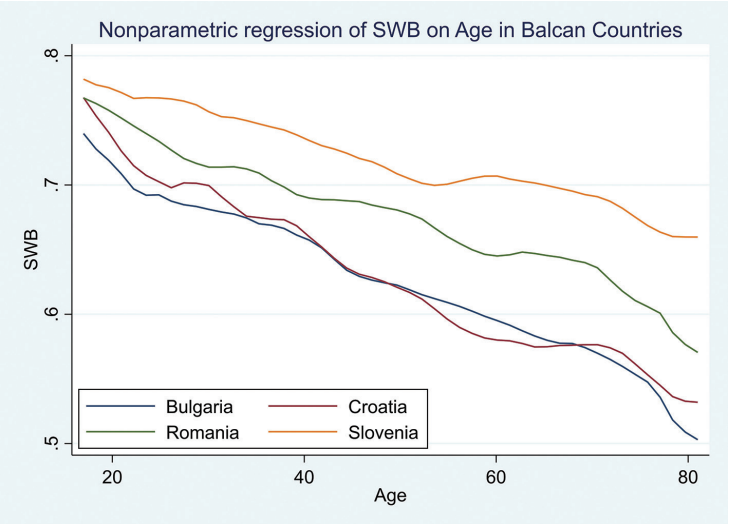
across different age cohorts, potentially reflecting the region's comprehensive social support systems, consistent economic stability, and an extensive network of public services that cater to citizens of all age.

Contrastingly, a different narrative unfolds in the nations of the Visegrad Group and Southern Europe (as delineated in Figures 19 and 18, respectively). Here, a declining trend of SWB with age is discerned, suggesting the possibility of aging-related challenges or inadequate social support for the elderly in these regions.

Intriguingly, Northern European nations present an exceptional case, as captured in Figure 17. Here, subjective well-being showcases a positive correlation with age, a rare phenomenon that might be reflective of the highly praised Nordic welfare model, which ensures a high standard of living and robust social support for individuals across all age groups.

These broad patterns underscore the importance of regional disparities, cultural norms, societal expectations, and structural systems in shaping the contours of subjective well-being as a function of age. These findings prompt further exploration to elucidate the specific mechanisms underlying these relationships and craft nuanced policies that can optimally address the unique challenges faced by various age groups in different regional contexts.

Figure 16. Kernel regression of SWB on age in the EU countries in the Balkans



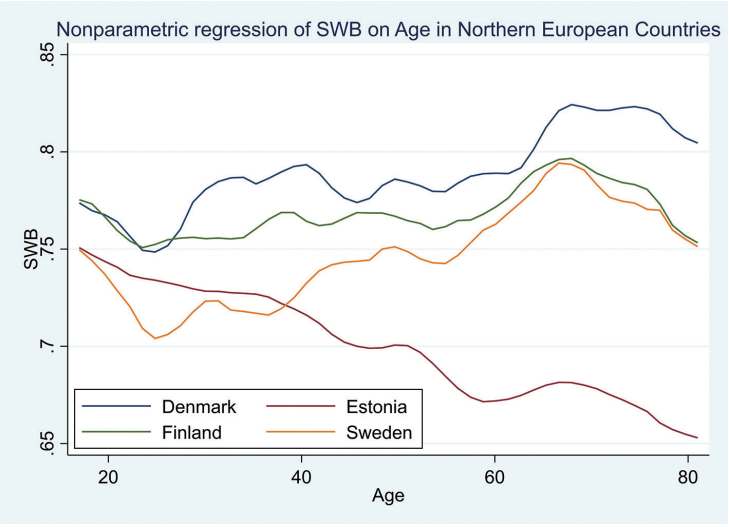
Source: own elaboration based on Eurostat data from EU-SILC (2018). The responsibility for all conclusions drawn from the data lies entirely with the authors.

In the case of the four European Union countries located in the Balkans, a striking trend emerges suggesting a near-linear decline of subjective well-being (SWB) with age.

Scrutinizing the data further, a slight aberration is noticed around the age of retirement (65 years) in Croatia and Slovenia, marked by either a subtle uptick or deceleration in the decrease of SWB values. However, this transient reprieve is short-lived, with a more pronounced downward trajectory emerging as the population ages further (75+ years). This phenomenon could potentially be ascribed to the initial economic security or change in lifestyle associated with retirement, followed by the challenges presented by advanced age and diminishing health.

Contrastingly, in Bulgaria and Romania, the SWB's descent seems to be impervious to retirement age, persisting in a steady decline. This suggests that the socio-economic benefits of retirement in these countries may not be as pronounced or as positively perceived as in other EU countries. These deviating patterns from the aforementioned countries align with the analysis of coefficients presented in the formative part of the MIMIC model with respect to the significance of parameters pertaining to retirement in the analysed countries (compare: Table 2). These findings further underscore the influence of socio-economic factors, retirement benefits, health policies, and social support on the well-being of individuals as they progress through the later stages of life.

Figure 17. Kernel regression of SWB on age in the EU countries of Northern Europe



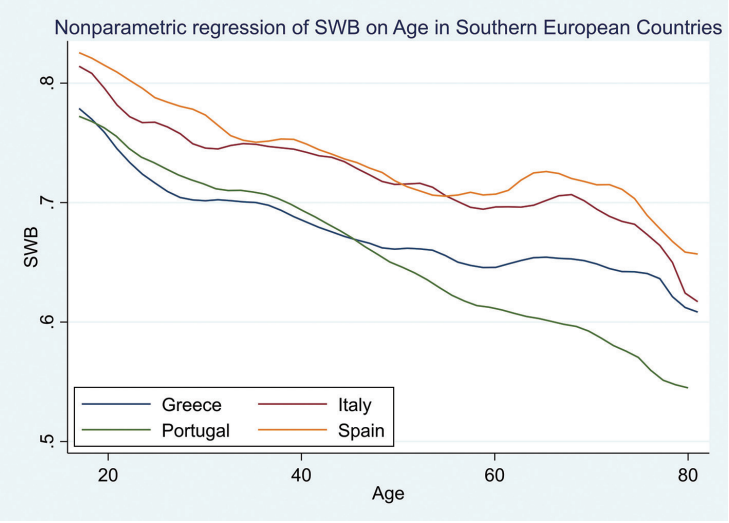
Source: own elaboration based on Eurostat data from EU-SILC (2018). The responsibility for all conclusions drawn from the data lies entirely with the authors.

The intriguing pattern displayed in Figure 17 introduces a potentially novel construct –could we refer to it as a "Nordic Paradox"? In stark contrast to common global trends, Denmark, Sweden, and Finland demonstrate a generally upward trajectory in the values of subjective well-being (SWB) with advancing age. This pattern, nonetheless, is punctuated by a slight dip around the age of 20 and another at approximately 70 years of age. These instances of decline can be attributed to transitional periods in life, such as the onset of early adulthood or the entry into advanced old age, which may be associated with an array of challenges that temporarily affect well-being.

The apparent resilience of well-being in the face of aging in these Nordic countries could be a testament to their comprehensive social support systems, high living standards, and successful public health initiatives. This might illuminate the significance of societal factors in preserving and even enhancing well-being as individuals navigate through different stages of their life.

On the contrary, Estonia exhibits a pattern more akin to the one observed in the Visegrad group or Balcan countries (refer to Figure 19 and 16). In these countries, including Estonia, there is a nearly linear decline in SWB as age progresses with a significant temporary uptake around retirement age. This finding provides compelling evidence that the demographic, economic, and sociopolitical contexts of countries significantly affect how SWB evolves over an individual's lifespan.

Figure 18. **Kernel regression of SWB on age in the EU countries of Southern Europe**



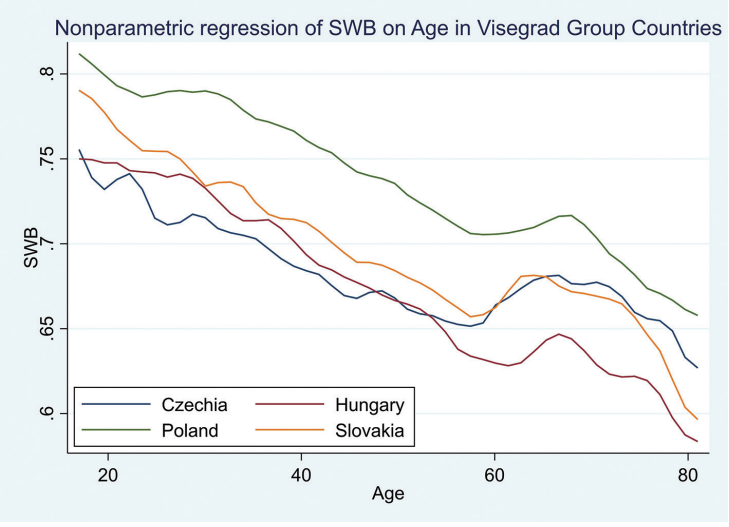
Source: own elaboration based on Eurostat data from EU-SILC (2018). The responsibility for all conclusions drawn from the data lies entirely with the authors.

Shifting our gaze to the four nations of Southern Europe, as depicted in Figure 18, a generally declining trend of subjective well-being (SWB) values with increasing age is discernible. Yet, in a striking departure from this trend, similarly to certain Balcan and Visegrad group countries, an upswing in SWB is witnessed around the conventional age of retirement in Greece, Italy, and Spain. This elevation of SWB among retirees might be associated with several factors, such as the alleviation of work-related stress, the opportunity to engage more fully in leisure activities, and potentially an increased availability of time for social connections.

However, Portugal conspicuously diverges from this pattern. Instead of observing an increase, we find that the SWB of older individuals in Portugal is, in fact, comparatively the lowest among the countries under consideration. This peculiarity raises important questions about the variables that may be influencing this trend, whether it be economic instability, inadequate pension provisions, or perhaps issues related to healthcare accessibility or quality.

This disparate trend in Portugal vis-à-vis its Southern European counterparts underscores the complexity of aging and well-being. It further highlights the necessity of adopting a nuanced perspective that accounts for country-specific contextual factors when examining the relationship between age and subjective well-being. It is incumbent upon researchers and policymakers alike to probe these intriguing differences and to strategize interventions that can effectively enhance well-being across all stages of life.

Figure 19. Kernel regression of SWB on age in the Visegrad group countries

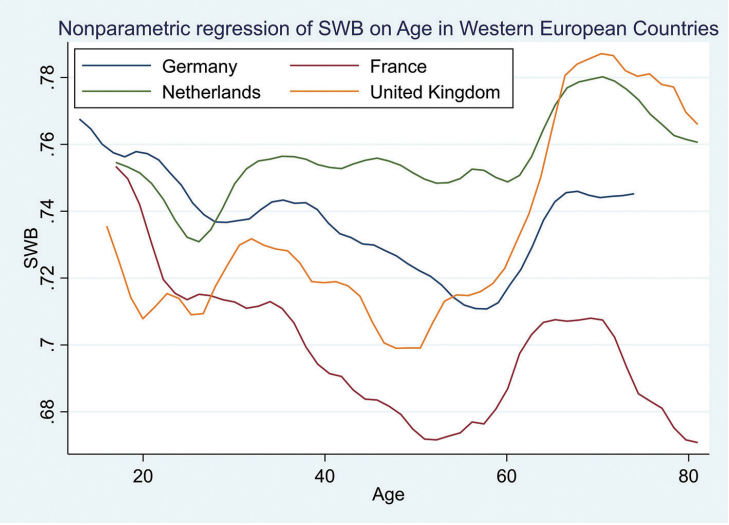


Source: own elaboration based on Eurostat data from EU-SILC (2018). The responsibility for all conclusions drawn from the data lies entirely with the authors.

When we observe the nations of the Visegrad Group, as depicted in Figure 19, a pattern similar to that of Southern Europe comes to light. The SWB levels in these countries, encompassing Poland, Hungary, **Czechia**, and Slovakia, similarly exhibit a generally declining trend with age. However, an exception to this overarching trend is the palpable uptick around the conventional age of retirement (60–65 years), a phenomenon that seems to cut across many countries in our study.

Yet, within this shared pattern, interesting country-specific variations also emerge. For instance, in Poland, the highest levels of SWB are registered throughout the life span, indicating perhaps a broader socio-cultural or economic environment that is conducive to well-being. Conversely, in Hungary, we find the distinctly lowest levels of SWB among the older populace. This stark contrast, however, is tempered among the younger demographic, where SWB is observed to be higher than in the Czechia.

Figure 20. Kernel regression of SWB on age in the EU countries of Western Europe



Source: own elaboration based on Eurostat data from EU-SILC (2018). The responsibility for all conclusions drawn from the data lies entirely with the authors.

Analyzing the regression outcomes for Western European countries (Figure 18) brings to light interesting patterns. The trajectories of SWB in the Netherlands and the United Kingdom echo the trends observed in their Scandinavian counterparts (Figure 17), where SWB exhibits an increasing trend with age. Both countries report an elevation in the level of SWB around the customary retirement age of 60+ years.

However, the ascent is markedly more prominent for the UK, a compelling indication that individuals experiencing lower levels of SWB during their economically

productive years fare comparatively better during their retirement years than their Dutch counterparts. This may signal the efficacy of social security measures and retirement schemes in the UK, or perhaps hint at cultural factors that enable the older population to experience a higher quality of life. On the other hand, the Netherlands stands out among all the countries studied due to the monotonic increase in SWB with age across almost the entire age range (with the exception of the youngest individuals).

Conversely, in France and Germany, SWB follows a descending trajectory with age, a trend that diverges from the ascending pattern seen in the Netherlands and the UK. Nonetheless, even within this overall declining trend, a pronounced increase around the retirement age is discernible. This inflection point may be attributed to various factors such as the culmination of working life, onset of pension benefits, or increased time for personal leisure and pursuits.

In all four countries the values of SWB exhibits an increasing trend with age from around 50 years up until around 70–75, after which it begins to decline. This inflection point may be attributed to various factors such as the culmination of working life, onset of pension benefits, or increased time for personal leisure and pursuits, but this uptick is not maintained beyond the age of around 75.

Table 5. Average values of SWB in age groups by country

Country	Average values of SWB			
	Age group			
	<20	20–39	39–60	60+
AT	0.790	0.782	0.769	0.754
BE	0.782	0.756	0.734	0.748
BG	0.744	0.679	0.623	0.558
CY	0.774	0.722	0.691	0.691
CZ	0.750	0.707	0.666	0.663
DE	0.760	0.743	0.722	0.740
DK	0.772	0.774	0.784	0.812
EE	0.755	0.730	0.695	0.669
EL	0.778	0.708	0.663	0.637
ES	0.824	0.773	0.722	0.698
FI	0.776	0.759	0.765	0.781
FR	0.752	0.711	0.679	0.695
HR	0.770	0.688	0.615	0.564
HU	0.752	0.729	0.664	0.622
IE	0.817	0.796	0.787	0.805
IT	0.809	0.754	0.718	0.670

Country	Average values of SWB			
	Age group			
	<20	20–39	39–60	60+
LT	0.736	0.699	0.634	0.596
LU	0.785	0.767	0.754	0.773
LV	0.754	0.715	0.642	0.597
MT	0.761	0.741	0.716	0.717
NL	0.757	0.748	0.753	0.767
PL	0.807	0.783	0.731	0.696
PT	0.774	0.717	0.650	0.580
RO	0.768	0.719	0.676	0.622
SE	0.750	0.716	0.746	0.774
SI	0.785	0.754	0.713	0.685
SK	0.789	0.742	0.683	0.659
UK	0.726	0.722	0.710	0.770
Average	0.771	0.737	0.704	0.691
Standard deviation	0.024	0.030	0.048	0.073

Source: own elaboration based on Eurostat data from EU-SILC (2018). The responsibility for all conclusions drawn from the data lies entirely with the authors.

Table 5 encapsulates the variances in SWB among four distinct age brackets across all countries analysed in our study. The two concluding rows provide the mean SWB values and their corresponding standard deviations for each age category. As a general trend, average SWB values seem to decline with advancing age. However, the associated standard deviations increase in the older age cohorts, implying that disparities among the countries become more pronounced with age.

This pattern is primarily attributable to the contrast between the Northern and Western European nations and the remaining ones. The trajectory of SWB values in these Northern and Western European nations does not mirror the descending pattern observed in their Eastern and Southern counterparts. Instead, these countries exhibit a steady or even increasing trend of SWB with age, a characteristic that amplifies the overall variability within the older age groups.

This observation underscores the disparities in socio-economic conditions, healthcare systems, social policies, and societal attitudes towards aging across the European continent. Countries that successfully maintain or improve SWB with age typically have strong social safety nets, universal healthcare systems, and active measures to involve older adults in society. On the other hand, countries where SWB decreases with age may face challenges such as economic instability, underfunded healthcare, or societal attitudes that marginalize older adults.

Addressing these issues could improve the quality of life for older adults and reduce disparities in SWB across age groups. Policymakers should take these findings into account when designing social programs and initiatives aimed at enhancing SWB. The successful models employed by the Northern and Western European countries offer valuable insights that can guide the design of these programs.

14.2. Relation between subjective well-being and income

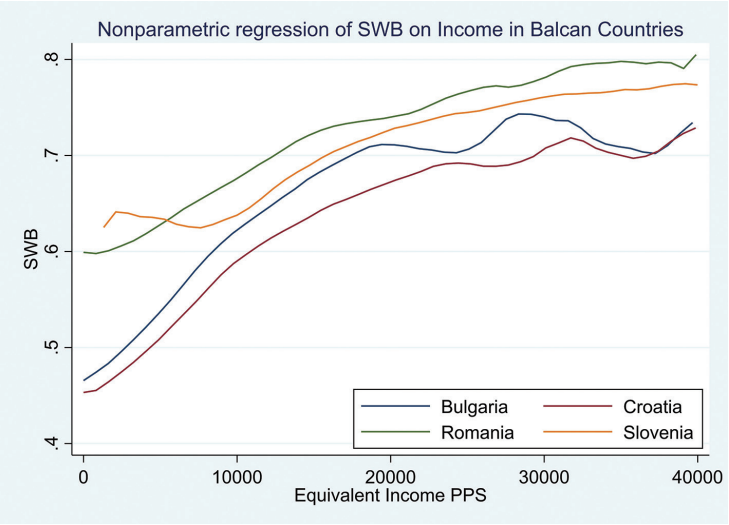
In general, the most developed and wealthy countries of Western and Northern Europe exhibited higher levels of SWB. However, SWB is a multifaceted phenomenon, and income alone cannot fully account for the observed differences. This is exemplified by countries such as France, Cyprus and Italy which, despite belonging to the group of richer nations, are characterised by values of the SWBI below the average for the EU-28 countries. Conversely, values of the SWBI for Poland and Spain, which are generally regarded as poorer nations, are higher than the EU-28 average.

Figures 21 through 25 illustrate kernel regressions that delineate the relationship between subjective well-being (SWB) and equivalised income. The data across these figures indicates a generally positive correlation between SWB and equivalised income, underscoring that individuals' perceived life satisfaction tends to ameliorate as their financial resources increase. This result is in line with intuitive expectations and reinforces the established perspective in the literature that financial resources are significant in shaping individuals' well-being, primarily because it facilitates access to various life-enhancing goods and services.

However, the regression plots also reveal an intriguing trend: the rate of increase in SWB appears to decelerate as income levels rise across all analysed countries. This phenomenon, often described as diminishing marginal returns on income, suggests that each additional unit of income yields a progressively smaller increment in SWB. This diminishing effect can be attributed to a number of factors. One is the principle of diminishing marginal utility, where beyond a certain income threshold, basic needs are met, and additional income contributes less to well-being. Another consideration could be relative income effects, where individuals derive satisfaction not just from their absolute income level but how it compares to others in their social reference group.

An analysis of the data presented in Figure 21 portrays an interesting picture for the four Balkan countries, where subjective well-being (SWB) rises with an increase in income, albeit at a diminishing rate. This pattern encapsulates the well-established principle of diminishing marginal utility in economics, implying that each additional unit of income contributes less to SWB than the preceding one.

Figure 21. Kernel regression of SWB on income in the EU countries in the Balkans



Source: own elaboration based on Eurostat data from EU-SILC (2018). The responsibility for all conclusions drawn from the data lies entirely with the authors.

Furthermore, this illustration reveals discernible country-specific differences, especially among the lower-income groups. In particular, Romania and Slovenia display higher average SWB values compared to Bulgaria and Croatia, suggesting a more beneficial well-being landscape for individuals with fewer economic resources in the former countries.

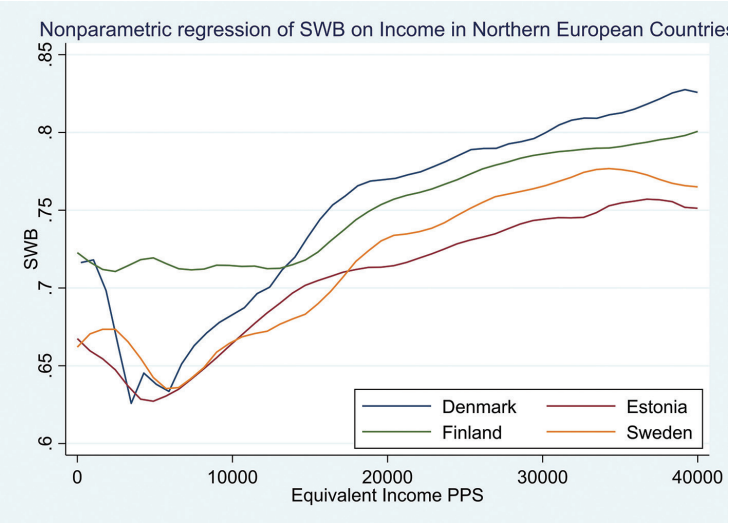
This marked disparity among countries with lower-income population is particularly intriguing. While the precise reasons behind this difference are beyond the scope of this dataset, several plausible explanations could be proposed. For instance, it could be attributed to more robust social safety nets in Romania and Slovenia that might cushion the adverse effects of poverty or low income on well-being.

Alternatively, cultural factors might also be at play. The communities in Romania and Slovenia might have developed more resilient coping mechanisms to deal with economic adversities, such as stronger family ties or community support networks. Finally, the observed disparity could also be a result of variations in factors like the cost of living, income inequality, access to healthcare, or quality of public services across these countries.

This analysis highlights the complex, nuanced relationship between income and SWB. It underscores the need for comprehensive, context-specific investigations to better understand the factors underpinning SWB and formulate targeted, effective policies

that can foster higher levels of well-being, especially among the most economically vulnerable groups.

Figure 22. Kernel regression of SWB on incomes in the EU countries of Northern Europe



Source: own elaboration based on Eurostat data from EU-SILC (2018). The responsibility for all conclusions drawn from the data lies entirely with the authors..

Figure 22 presentation of the relationship between SWB and equivalised incomes in the four Northern European EU countries underscores the foundational role of economic prosperity in fostering overall well-being. However, individual country data elucidates specific trends that offer further intriguing insights.

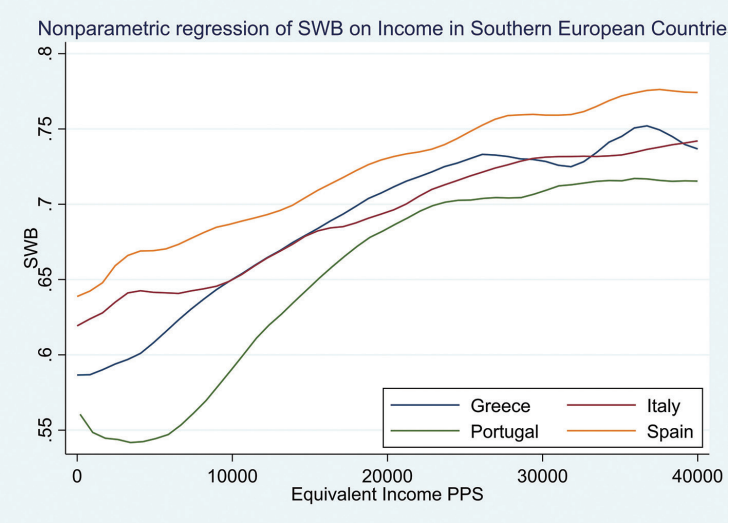
For example, in Finland, the SWB values of individuals from lower-income groups stand out as remarkably high compared to other countries within the group. This underlines the possibility that the Finnish societal fabric, policy measures, or cultural factors may create conditions for a decent baseline level of well-being even among those with lower incomes.

Furthermore, the Finnish data unveils an intriguing phenomenon where the SWB of individuals with income brackets from 0 to 15 000 PPS (about 10 of the population) remains static, indicating that an increase in income within this range does not necessarily equate to an enhanced SWB. This could be reflective of the non-materialistic determinants of well-being coming into play, such as strong social support systems, high-quality public services, or societal stability, rendering income increases less influential in this context.

As incomes rise above this range, however, the picture alters. Denmark overtakes Finland, demonstrating the highest SWB among the higher-income groups, while Estonia exhibits the lowest. This divergence could be indicative of differing levels of income sensitivity across these countries. Denmark's high SWB at higher income levels might be a testament to the successful integration of economic prosperity with other aspects of well-being, including social welfare, healthcare, and environmental sustainability.

Meanwhile, the lower SWB values at these income levels in Estonia might indicate persisting challenges. These could be related to income distribution, the effectiveness of social security systems, or other non-economic determinants of SWB that warrant further research.

Figure 23. **Kernel regression of SWB on incomes in Southern European countries**



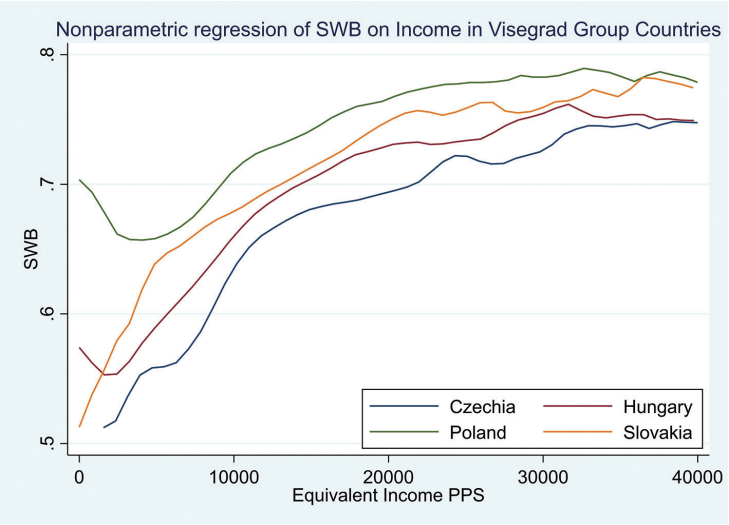
Source: own elaboration based on Eurostat data from EU-SILC (2018). The responsibility for all conclusions drawn from the data lies entirely with the authors..

Focusing on the Southern European nations, as depicted in Figure 23, there is a discernible trend wherein subjective well-being (SWB) scores rise correspondingly with an increase in income. This pattern is especially prominent in Spain, which consistently exhibited the highest average SWB scores across the entire income spectrum, outperforming its regional peers.

However, this linear relationship between income and SWB is not uniform across all income groups. Remarkably, the correlation is most pronounced among individuals in the lowest income bracket, where differences in SWB scores are the most distinct. This divergence implies that the impact of income on subjective well-being is potentially

more substantial for individuals grappling with financial constraints, suggesting that policies targeting poverty reduction or income augmentation could lead to substantial improvements in subjective well-being for this segment of the population.

Figure 24. Kernel regression of SWB on incomes in the Visegrad Group countries



Source: own elaboration based on Eurostat data from EU-SILC (2018). The responsibility for all conclusions drawn from the data lies entirely with the authors..

When we shift our attention to the Visegrad group, depicted in Figure 24, the general relationship between income and subjective well-being (SWB) mirrors the trends identified earlier for Southern Europe – with SWB rising in tandem with increasing income. However, a striking exception to this trend is observed in Poland, which presents an intriguing anomaly.

In the case of Poland, individuals in the lowest income category showcase the highest average SWB scores within the group, a phenomenon that deviates from the typical pattern observed across other countries. This particular observation invites speculation about the possible contributing factors. It might hint at the effectiveness of the Polish social assistance systems, cultural resilience, or other non-material factors, which appear to insulate the well-being of low-income individuals against financial adversity, at least to a certain extent.

This unique finding underscores the idea that while income is an important determinant of SWB, it is not the sole driver. Non-material factors, social policies, cultural norms, and perhaps even a nation's collective resilience and coping mechanisms can significantly influence the subjective well-being of its citizens. Therefore, it necessitates

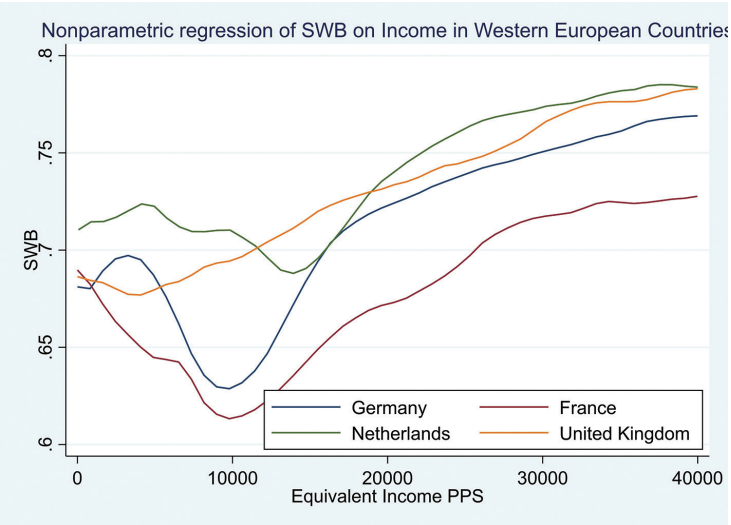
a broader, more nuanced approach to understanding and improving SWB that goes beyond just improving the economic conditions.

Upon evaluating the findings for Western European countries, as displayed in Figure 25, the overall trend remains consistent with the previously discussed geographical groups, indicating a general rise in subjective well-being (SWB) corresponding with increasing income. However, an interesting deviation is noted in the case of France and Germany In these nations, a notable decline in SWB is observed among individuals within the lower-income brackets, specifically below the 10 000 Purchasing Power Standard (PPS) range.

This distinct trend of declining SWB among lower-income groups in France and Germany suggests the presence of unique socioeconomic or policy-related factors at play in these countries. For instance, the influence of social security systems, work-life balance, employment conditions, or other quality of life factors may be more pronounced in these nations and, consequently, have a more substantial bearing on SWB than in other countries. It could also hint towards potentially less-effective social support systems for low-income individuals or other societal stressors disproportionately affecting these groups.

The paradoxical drop in SWB among lower-income individuals in these economically advanced nations underscores the complexity of SWB as a construct and the multitude of factors influencing it.

Figure 25. **Kernel regression of SWB on incomes in Western European countries**



Source: own elaboration based on Eurostat data from EU-SILC (2018). The responsibility for all conclusions drawn from the data lies entirely with the authors..

Table 6. Average values of subjective well-being for income quartile groups

Country	Average values of SWB			
	First income quartile	Second income quartile	Third income quartile	Fourth income quartile
AT	0.723	0.758	0.783	0.803
BE	0.681	0.742	0.775	0.794
BG	0.507	0.584	0.636	0.704
CY	0.636	0.697	0.724	0.745
CZ	0.621	0.673	0.689	0.722
DE	0.678	0.730	0.749	0.773
DK	0.741	0.779	0.801	0.829
EE	0.641	0.687	0.715	0.745
EL	0.612	0.651	0.678	0.718
ES	0.679	0.716	0.744	0.773
FI	0.716	0.753	0.778	0.799
FR	0.645	0.682	0.715	0.729
HR	0.510	0.593	0.638	0.684
HU	0.593	0.649	0.690	0.722
IE	0.741	0.789	0.821	0.844
IT	0.652	0.687	0.719	0.743
LT	0.543	0.605	0.649	0.711
LU	0.709	0.759	0.780	0.797
LV	0.556	0.624	0.677	0.721
MT	0.688	0.723	0.739	0.760
NL	0.703	0.747	0.772	0.795
PL	0.676	0.724	0.748	0.776
PT	0.555	0.616	0.662	0.711
RO	0.605	0.645	0.677	0.731
SE	0.676	0.730	0.763	0.786
SI	0.638	0.698	0.731	0.760
SK	0.647	0.689	0.709	0.741
UK	0.701	0.731	0.756	0.782
Average	0.645	0.695	0.726	0.757
Standard deviation	0.065	0.056	0.049	0.039

Source: own elaboration based on Eurostat data from EU-SILC (2018). The responsibility for all conclusions drawn from the data lies entirely with the authors.

Table 6 summarizes the differences in SWB between four income quartile groups. The two bottom rows contain the mean SWB values and their standard deviations for

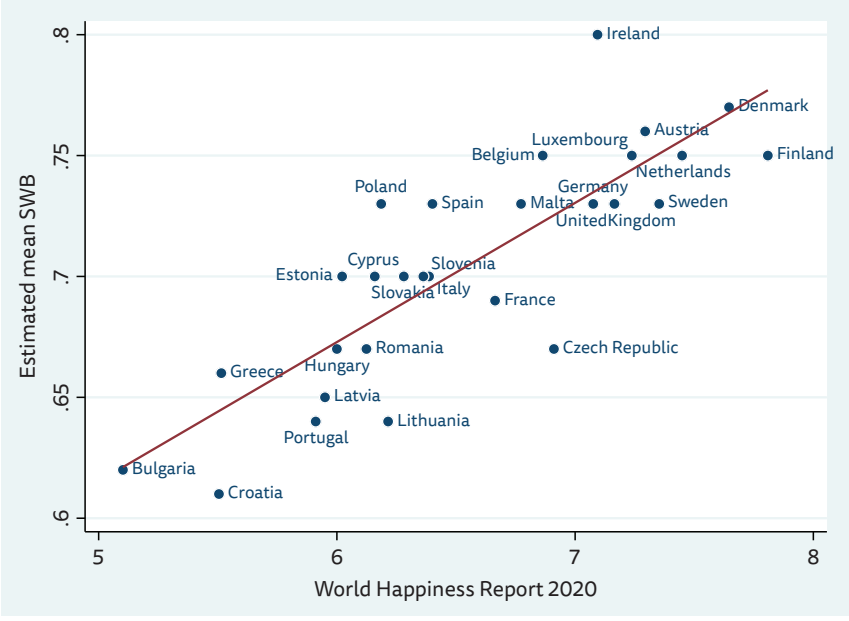
each income quartile group. It is worth noting that the value of standard deviation is the highest in the lower income groups, which means that the differences between the countries are relatively bigger for people from lower income groups.

15. Contrasting and Comparing Level and Determinants of Subjective Well-being Across the EU: A Study in Light of Existing Literature

15.1. Distribution of SWB in European countries

The proposed method of measuring SWB allowed us to compare results across all 28 EU countries. Firstly, we compared general levels of SWB in the populations of the analysed countries. The results present a detailed portrait of subjective well-being (SWB) across different European Union (EU) countries, revealing variations not only in overall SWB but also in its distinct components: evaluative well-being, positive experienced well-being, and negative experienced well-being.

Figure 26. Comparison of mean estimated SWB values by country with World Happiness Report composite index



Source: own elaboration based on authors' estimates and World Happiness Report (Helliwell et al., 2020).

In general, our results corroborate the broad trend noted in the literature that higher levels of SWB tend to be found in Northern and Western Europe compared to Eastern and Southern Europe. We contrast the obtained mean values of SWB for countries with those presented in the World Happiness Report (hereafter referred to as WHR) (Helliwell et al., 2020, refer figure 26). Countries like Austria, Denmark, Ireland and Finland report particularly high SWB levels, which is in line with their regular high rankings in the WHR. On the other hand, Bulgaria, Croatia, Greece, and Portugal scored low in both the WHR and our estimated SWB values.

Interestingly, Belgium, Estonia, Ireland, Poland and Spain displayed relatively high SWB values in our study as compared to WHR.

Areas of potential concern are highlighted by the comparatively lower SWB values in Croatia, Bulgaria, Lithuania, and Portugal. These results invite further investigation into the socio-economic and political factors contributing to lower SWB in these regions.

Examining the specific components of SWB, Finland, Ireland, and Austria exhibit the highest levels of evaluative well-being, reflecting overall life satisfaction. This is in line with observations made by Diener et al. (2015), which suggest that nations with higher income levels and social support often have higher life evaluations. Notably, Poland, Czechia, and Romania also report above-average life satisfaction, suggesting a more positive evaluation of life conditions in these countries.

With regard to positive experienced well-being, Austria, Luxembourg, and Ireland lead the rankings. This might reflect cultural factors, societal norms, or governmental policies that encourage positive emotions. The lowest scores were observed in Bulgaria, Croatia, and Greece, indicating that these countries might be facing challenges in fostering environments that promote positive emotional experiences.

The results on negative experienced well-being reveal that Ireland and Germany have the lowest mean scores, which could be reflective of their strong social support systems, high-quality health care, and robust economies. Lithuania, Croatia, Portugal, and Romania, on the other hand, report the highest mean scores, indicating potential areas of stress or dissatisfaction.

These results highlight the complexity of SWB and its multiple dimensions. They underscore the need to consider different aspects of SWB when designing and implementing policies to enhance well-being. Additionally, they emphasize the importance of tailoring such policies to specific country contexts, given the diverse range of SWB levels and components across the EU.

15.2. SWB and health

The influence of health on subjective well-being (SWB) cannot be overstated, particularly as individuals and societies advance in age. Aging often brings with it increased health challenges, which may negatively impact a person's quality of life and, consequently, their perception of their overall well-being.

According to many studies, including those by Steptoe and Deaton (2015), there is a clear link between physical health and SWB. For instance, chronic conditions such as heart disease, arthritis, diabetes, and others that are more prevalent in older populations can significantly impact daily activities and independence, thus contributing to a decline in SWB.

Furthermore, mental health is also critically important when discussing SWB. Mental health disorders such as depression and anxiety can significantly diminish a person's SWB. As highlighted by Wulsin and Vaillant (1999), the presence of mental health disorders has a much more pronounced negative effect on SWB than many physical health conditions.

Another important health-related factor is disability, as it can severely limit an individual's ability to engage in social activities and hinder their independence, leading to a decreased sense of well-being.

In our study, the significance of self-perceived health as an individual determinant of subjective well-being (SWB) has been widely identified in nearly all countries, as indicated by the coefficients in the formative part of the MIMIC models (refer to Table 2). Our study was observational in nature and relied on a questionnaire, hence it was bound to incorporate only self-perceived health assessments. Despite the limitations that come with this method, and in light of existing literature, this approach seems justifiable and sufficient.

For instance, Okun and George (1984) executed a comprehensive, prospective study in which they monitored individuals over a decade, scrutinizing both health and SWB indicators at two-year intervals. Their examination encompassed the relationship over time between health, personality traits, and subjective well-being (SWB). The indicators they employed encompassed both objective and subjective measures of health. Objective health measures were established via evaluations conducted by physicians, while subjective health measures were gathered from the self-assessments provided by the study's participants.

Subjective well-being was assessed through an array of questions centering on life satisfaction, and the presence of positive and negative emotional states. The findings drawn from their research suggest that an increase in health problems over time correlated with subsequent downturns in SWB. Conversely, enhancements in health

coincided with upswings in SWB. These trends held similarly true for both self-reported and physician-assessed health measures, which suggests that individuals' perceptions of their health status exerted as substantial an influence on their well-being as did objective evaluations conducted by healthcare professionals.

Reinforcing the argument made by Okun and George, several other studies have also documented the validity of self-perceived health as a general health indicator. For instance, DeSalvo, Bloser, Reynolds, He, and Muntner (2006) conducted a meta-analysis of prospective community-based cohort studies to investigate the predictive validity of self-rated health for mortality, both overall and cause-specific. Their results confirmed that self-rated health is a robust independent predictor of mortality even when controlled for observed co-morbidities, suggesting that individuals' subjective assessments of their health status accurately reflect their overall health condition and future health trajectory.

Jylhä (2009) investigated the link between self-rated health and mortality. She proposed a theoretical model to show how individuals assess their health, using different types of information and contexts. This model helps to explain why self-ratings of health may change with age or cultural background, yet still provide a valid health status measure.

On the other hand, while the authors agreed that good health is a strong factor in high levels of SWB, they also suggested that the reverse might be true – high levels of SWB could lead to better health. This idea brings a new aspect to our understanding of the relationship between health and SWB and has implications for potential endogeneity issues.

Fayers and Sprangers (2002) argued that self-perceived health is influenced by various factors, including one's mental and emotional state, expectations, values, and experiences. So, it's possible that subjective well-being might influence self-perceived health, leading to an endogeneity problem in studies looking at the relationship between these two elements.

Likewise, Diener and Chan (2011) discussed the idea of reverse causality in their paper "Happy People Live Longer: subjective well-being Contributes to Health and Longevity," emphasizing SWB's impact on health. They suggested that people with high SWB tend to have healthier and longer lives, supporting the idea that health could be significantly influenced by one's SWB and vice versa. They used seven different types of evidence, including prospective studies, observational studies, and experimental research, which makes their argument convincing.

Similarly, Veenhoven's (2008) meta-analysis of 30 empirical papers supports a reciprocal of the relationship between happiness or subjective well-being (SWB) and health. According to the findings, happiness does not cure existing illnesses but

protects against becoming ill and in this way contributes to better health. Thus, happier individuals tend to live longer and in better health.

Endogeneity refers to a situation in statistics where an explanatory variable is correlated with the error term. In this context, if SWB influences self-perceived health, then it could cause inaccurate and inconsistent estimates in the model looking at health's impact on SWB. If self-perceived health, which is supposed to be an independent variable, is influenced by the dependent variable (SWB), then this could be a clear case of endogeneity.

If SWB has a significant influence on self-perceived health, then there could be a reciprocal relationship where SWB affects self-perceived health and vice versa. This is a type of endogeneity known as simultaneity or reverse causality because the cause and effect between the two variables could go both ways. Consequently, in a simple MIMIC model like ours, the parameters representing the impact of self-perceived health on SWB would likely be overestimated. Employing sophisticated statistical methodologies such as instrumental variable methods (assuming a suitable instrument for self-perceived health is available in this context) or panel data models may be essential to properly address this issue.

However, even while acknowledging this possibility of a feedback loop, the broad conclusion remains that health status is a significant determinant of SWB, a point on which the majority of literature agrees.

In their exhaustive meta-analysis on the determinants of SWB, Dolan, Peasgood, and White (2008) found a robust positive relationship between health and SWB, as seen across multiple empirical studies. Their findings solidify the idea that health is a key determinant of SWB. Furthermore, they argue that the influence of health on SWB is both direct and indirect, as it can affect other significant life domains, such as employment and interpersonal relationships, thereby impacting SWB.

Their research accentuates the interconnected nature of psychological health and SWB. Numerous studies find that psychological health have a stronger impact on SWB than physical health. This relationship seems logical given the influential role the psychological state plays in our perceptions of life satisfaction and well-being.

However, it's necessary to delineate between correlation and causation in this context. The mutual influence between well-being and health is evident, yet determining the magnitude and direction of this influence can be complex. Additionally, they found that specific health conditions, such as heart attacks and strokes, unambiguously lead to reduced well-being. Here, the causal relationship likely originates from the health condition and leads to decreased SWB, underscoring the pivotal role that health status plays in molding our subjective well-being experience.

Finally, a portion of literature question a direct, fully measurable effect of self-perceived health on SWB. For instance Steptoe, Deaton, and Stone (2014) explore the relationship between age and SWB, along with their interplay with health status. Interestingly, they found that chronic diseases did not drastically reduce subjective well-being specifically among older adults, suggesting that individuals might adapt to health-related changes and maintain their SWB.

Authors also emphasis the role of subjective perspectives in assessing health in older age. They argue that while the objective health declines with age, it does not necessarily lead to a decline in subjective well-being. Older adults tend to have lower expectations about health, which could result in better self-perceived health and, therefore, better SWB.

Similarly, Albrecht and Devlieger (1999) illustrate how individuals often exhibit considerable resilience and adaptability when confronted with health problems. Adaptation, in this context, refers to the individual's psychological or behavioural adjustments to a new health condition. This may include cognitive restructuring, emotional regulation, acceptance of the new health state, and other coping strategies that enable the individual to maintain a sense of well-being despite their physical limitations. Their resilience can counterbalance the potential negative impact of these health issues on SWB.

This perspective was called "disability paradox," which shows that individuals with chronic and severe disabilities often report good or even excellent quality of life, notwithstanding their physical or mental constraints. Thus, despite the challenges brought on by poor health, individuals can maintain, and in some cases even enhance, their subjective well-being. The study by Oswald and Powdthavee (2006) offers empirical insights into the relationship between disability and SWB, proving that individuals adapt to some extent to their disability over time. This adaptation manifests as a reduced negative impact of the disability on life satisfaction as the duration of the disability increases. However, the adaptation is not absolute. The negative influence of disability on SWB persists even years after the onset of the disability, though it lessens progressively over time.

15.3. SWB and wealth

The relationship between income and subjective well-being (SWB) is a complex and intriguing area of study, with several key pieces of literature exploring the various facets of this interaction. At the individual level, a positive correlation between income and SWB has been consistently documented. In his well-known work, Easterlin (1974)

posits that, within a given society, wealthier individuals generally exhibit higher SWB than their less affluent counterparts.

However, when comparisons are made between different countries, the relationship becomes less clear. This observation forms the basis of the "Easterlin Paradox" (Easterlin, 1974), where wealthier societies do not necessarily exhibit higher average SWB than less affluent societies. Similarly, changes in overall wealth over time do not lead to greater overall SWB within the country (Easterlin 1974; Diener et al., 1995; Boyce et al., 2010; Jebb et al., 2018). This paradox has sparked considerable debate among scholars.

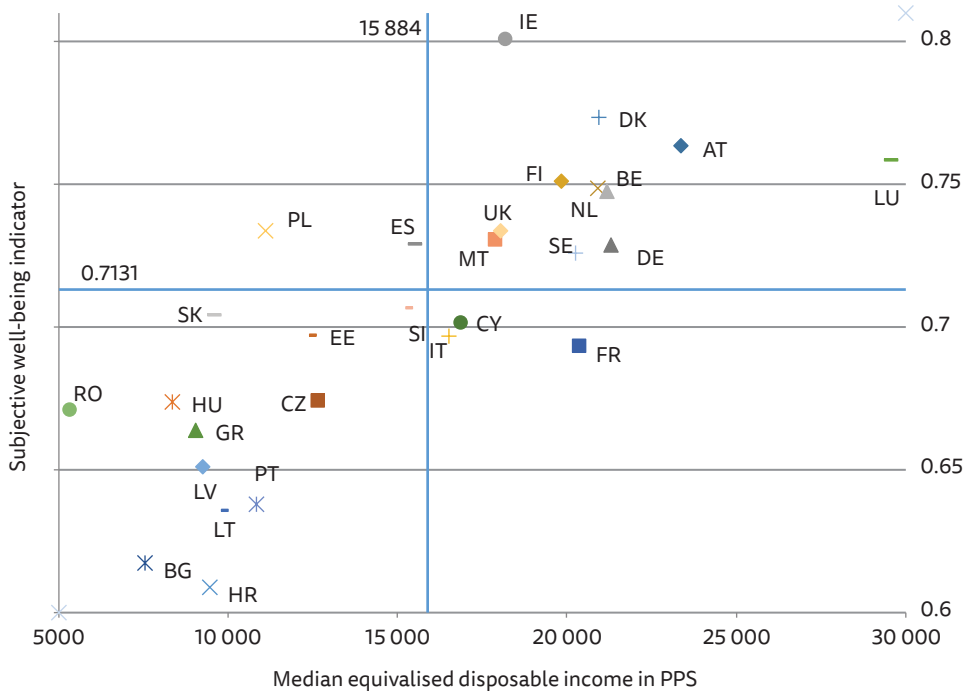
More recently some researchers, like Stevenson and Wolfers (2008) contested this paradox, arguing that there is a clear positive relationship between income and happiness across nations. In their analysis, Stevenson and Wolfers (2008) utilized data from a broad range of countries and established a clear positive correlation between average levels of SWB and GDP per capita. Moreover, they found no evidence of a saturation point where increases in income no longer correlate with increases in SWB. This suggests that the benefits of income on SWB are not limited to relative income comparisons within a specific societal context but extend to absolute income levels.

Moreover, their longitudinal examination within countries over time showed that economic growth correlates with increasing levels of happiness. This might suggest that not only does a higher level of societal organization, typically found in more developed countries, influence SWB, but the rise in absolute incomes itself also plays a significant role in enhancing happiness.

Our study somehow contradicts the Easterlin Paradox. Figure 27 illustrates the relationship between the mean of subjective well-being (SWBI) estimated in our study and median of equivalised disposable income distribution of households in the EU-28 countries in 2018. This form of income has been normalized to account for variations in household size and composition, rendering it a more accurate indicator of financial resources available to each individual. In these figures, income is presented in Purchasing Power Standards (PPS), an artificial currency unit that accounts for differences in price levels across countries. The two blue lines represent average values of SWB and equivalent incomes for the whole EU. The relationship appears not only to be evident, but also linear in nature, suggesting that there are no diminishing returns to well-being from increased income at countries level.

Countries that occupy the upper-right quadrant are distinguished by relatively high median income levels and SWBI values that surpass the overall averages. This region is predominantly occupied by the long-established members of the EU, a category that includes Nordic countries, West Continental countries, and countries on the British Isles. The only country in this quadrant that joined the EU in 2004 is Malta.

Figure 27. The relationship between subjective well-being and the median equivalised disposable income in the EU-28 countries in 2018



Source: own elaboration based on data in Table A2 in the Appendix. The responsibility for all conclusions drawn from the data lies entirely with the authors.

However, it is worth noting that a high income does not invariably equate to elevated levels of subjective well-being. France, Cyprus, and Italy serve as cases in point. Although these countries belong to the cohort of wealthier nations, their SWBI values languish beneath the average of the EU-28, thus situating them in the upper-left quadrant.

The intriguing phenomenon of countries with lower income levels nevertheless reporting SWBI values higher than the EU-28 average is represented in the bottom-right quadrant. In 2018, Poland and Spain were the sole countries in the group of less affluent nations that managed to rise above the EU-28 SWBI average.

Finally, the bottom-left quadrant is characterized by countries that not only are members of the less prosperous group but also manifest SWBI values below the average observed in the EU-28 countries. This group, in 2018, included all new EU member countries, except Poland, and was further extended to include Portugal and Greece. This collection of countries is thus grappling with the twofold challenge of lower wealth levels and reduced subjective well-being.

On the societal level, not just the amount, but the distribution of income matters. High levels of income inequality can negatively impact SWB. Alesina et al. (2004) show that people in societies with greater income inequality tend to report lower life satisfaction, possibly due to increased social tensions and perceptions of unfairness, however, cultural context matter, as the poor in the US tend not to react negatively to inequality, whereas the poor in EU countries exhibit certain sensitivity in their happiness to rising inequality.

Our empirical research confirms that, for the most part, a linear correlation between incomes and SWB does not exist within the societies. The concept of diminishing marginal utility of income suggests that beyond a certain threshold, increases in income no longer significantly contribute to well-being (Jebb et al., 2018).

Another significant observation from our research pertains to the impact of material deprivation on SWB. Material deprivation primarily pertains to the absence of basic necessities like nutritious food, adequate shelter, clothing, and access to essential services such as healthcare and education. These elements form the foundation of Maslow's hierarchy of needs, a widely recognized psychological theory that posits that the fulfilment of such basic needs precedes other forms of psychological and emotional satisfaction (Maslow, 1943).

Material resources provide a sense of security and stability, which can contribute to well-being. Income, on the other hand, can be volatile and subject to change, particularly in cases of job loss or economic instability. Therefore, the assurance of having basic needs met might contribute more to SWB than income. These findings align with the empirical analysis conducted by Ravallion and Lokshin (2001).

Our research underscores the wider literature on the detrimental impact of poverty on well-being (Ravallion and Lokshin, 2001; Clark et al., 2016). The impact of material deprivation on SWB serves as a reminder that while income is not the sole determinant of SWB, a minimum level of resources is vital to maintain a basic level of well-being.

The relationship between SWB and income reveals intriguing patterns. In all analysed countries, SWB tends to increase as income grows, however, the rate of increase is lower for wealthier individuals and in more developed countries. Notably, income emerged as a significant determinant of SWB in the least developed and poorest countries (Bulgaria, Romania).

Greater differences in SWB levels between countries were observed among individuals in lower income groups. Specifically, in some countries the level of SWB did not fall below a certain value even at zero income, as was the case for Poland that differed from similar Visegrad group countries (Figure 27). In Slovakia, SWB levels were relatively low at zero income (about 0.5) and increased rapidly with rising incomes. However, in Poland, average SWB never dropped below 0.65. This could be

attributed to a more effective social assistance system in Poland, cultural differences, or a combination of both, necessitating further investigation.

In certain Western European countries (France, Germany), a reverse relationship between SWB and income can be observed for individuals with lower incomes (those earning less than 10 000 PPS, as shown in Figure 27). This again can be due to a well-developed social security system, which provides for basic needs and allows (apparently unemployed) individuals with very low incomes to benefit more from their free time in comparison with working individuals earning the lowest wages.

The initial increase in SWB with growing income, followed by a gradual flattening out, corresponds to the concept of 'diminishing marginal utility of income' proposed by economists. Layard et al. found on the basis of four cross-sectional survey and two panel studies conducted for 50 different countries that the marginal utility of income declines faster than in proportion to the rise in income from the point of view of subjective happiness (Layard et al., 2008). Moreover, our results bear some similarities to Diener and Seligman's (2004) study which found that for wealthy societies living in developed economies, increases in individual wealth have a limited impact on SWB, suggesting the role of other factors such as social support or cultural values.

On the other hand, our results contradict the conclusion drawn by Aknin et al. (2009), who found a weaker correlation between SWB and income for poorer individuals, thus illustrating the complexity of these dynamics.

In conclusion, while income can enable individuals to access material resources, it does not necessarily guarantee a better quality of life or happiness. Material deprivation is a more direct measure of whether individuals have their basic needs met, which may explain why it exhibits a stronger correlation with SWB than income does in the MIMIC models. Understanding the link between material deprivation and SWB can help policymakers in formulating strategies that aim not merely to increase income but to decrease deprivation and increase access to essential resources.

The nuanced relationship between income and SWB has several implications for both economic and social policy. It highlights the potential for diminishing returns on policies aimed at increasing income levels, especially among those already well-off. Simultaneously, it underscores the possible value of policies aimed at addressing income disparities and ensuring a minimum level of income sufficient to meet basic needs. The insights derived from these figures also emphasize the importance of considering non-monetary factors in policy-making aimed at enhancing well-being, such as social cohesion, physical health, mental well-being, quality of work and life, among others.

15.4. SWB and age

A segment of our study analyzed the correlations between SWB and age. The analysis was conducted using non-parametric kernel regression techniques within groups of four geographically and culturally proximate countries. An interesting divergence in the patterns of correlations between SWB and age was identified.

In particular, the decline in SWB with increasing age in Eastern and Southern European countries concurred with our hypotheses. With the progression of age, individuals usually experience an overall deterioration in their health status. Concurrently, their relative positioning within the labour market tends to degrade over time, a consequence of diminishing health and structural transformations within the marketplace.

Contrastingly, in the Northern and some Western European countries, the SWB metrics exhibited an upward trend with age, reaching a pinnacle subsequent to retirement. This implies that in countries such as Denmark, Finland, and the Netherlands, individuals of advanced age and retired status relish higher SWB values compared to their younger adult counterparts.

These disparities across countries may be attributed to varying levels of healthcare provision, differences in pension systems, as well as cultural differences. These aspects necessitate comprehensive future exploration. However, our findings demonstrate coherence with other empirical analyses that can be found in existing literature, thus providing validation to our study results.

For instance, Steptoe, Deaton, and Stone (2014) focused on different components of SWB, including evaluative well-being, hedonic well-being, and eudemonic well-being, and examine how each of these aspects of SWB changes across different age groups. Their findings indicate that age does not show a straightforward relationship with SWB. In general, evaluative well-being tends to improve with age, while hedonic well-being exhibits a U-shaped curve, being lower in midlife and higher in younger and older ages.

The researchers employed extensive cross-national data from the Gallup World Poll, a continuing survey conducted in over 160 countries, which allowed them to compare the age trajectories of SWB across a wide range of countries. Their analyses revealed considerable variability in these trajectories, implying that the effect of age on SWB is indeed mediated by the cultural and socio-economic conditions present in different countries.

In economically prosperous Western nations, the trajectory of subjective well-being (SWB) over the life course often embodies a U-shaped pattern. The lowest point of this curve typically occurs during midlife, specifically between the ages of 45 and

54, whilst the zeniths are observed during youth and advanced age. Contrarily, this pattern is less pronounced or in certain cases, non-existent in nations with less affluence or societal stability.

In particular, post-Soviet and Eastern-European nations exhibit a considerable and progressive diminution in well-being concomitant with ageing. This declining trend in well-being with age is also evident amongst respondents from Latin American countries. In contrast, the SWB of individuals from sub-Saharan Africa demonstrates negligible variance with ageing.

The authors of the study postulate that the economic prosperity and societal stability that can be attributed to wealthier nations potentially facilitates a more favourable ageing process. This, in turn, might cause an enhancement in SWB during the latter stages of life. Furthermore, the authors noted that even though poorer health is typically associated with older age, the fact that older individuals in many countries reported better SWB than their younger counterparts may result from psychological and social adaptations that often occur with ageing, such as adjusting expectations about health and focusing more on positive experiences.

Similarly, the positive relationship between age and SWB in Nordic countries was reported by Hansen et al. (2022) who studied relationship between SWB and age in Norway. Authors find that life satisfaction and negative affect SWB tend to improve substantially from midlife to early old age, peaking around the age of 70–75, before seeing a gradual decline. These results are robust to the inclusion of controlling variables such as health. Contrary to previous suggestions, the researchers find that the increase in SWB in old age is not confined to its cognitive component but extends to affective and eudaimonic dimensions as well. These findings challenge the existing literature and underscore the complexity and multidimensionality of SWB.

An interesting finding pertains to gender differences. Women reported higher levels of negative affect and engagement compared to men, with these differences increasing with age. This could potentially be due to women's greater involvement in social network members and caregiving roles, a hypothesis that warrants further investigation.

The observed decline in subjective well-being (SWB) in later life stages could be attributed to the accumulation of psychosocial stressors that potentially outpace the coping resources of individuals, as well as the conditions created by the environment. This highlights the need for targeted support and interventions for this age group. In our study, we had a relatively small number of individuals aged 75 and above in the sample, thus making conclusions about this group quite challenging. However, even in countries with high social support like the Scandinavian nations or affluent Western European countries, our study observed a decline in SWB after the age of 75. This finding aligns coherently and notably with the work of Hansen et al.

The age-related patterns of SWB, as demonstrated both in our study and in the research by Hansen et al. (2022), remain consistent irrespective of the introduction of control variables such as physical health, partnership status, and so on. This may suggest the presence of additional, currently unaccounted for, age-related factors that might be influencing SWB. Future studies could explore other potential social, psychological, or health-related determinants of SWB in older age.

One such factor worthy of investigation is retirement status. Our study reveals that, even when controlling for variables such as age, income, and others, retirement status holds significant influence over SWB in some countries but not in others. Generally, being retired was associated with increased levels of SWB. However, in Bulgaria and Romania, retirement does not, on average, result in an improvement in SWB. This divergence could be due to the variance in the social and economic structures of these nations, highlighting the complex interplay between socio-economic circumstances and subjective well-being in later life.

Conclusions

The study introduces a novel methodology for calculating the indices of subjective well-being, a method that draws inspiration from the European Union's recent guidelines on measuring quality of life, as well as the capabilities approach advanced by Amartya Sen. This innovative approach, deeply rooted in the realm of contemporary social sciences, showcases a new frontier in the quantification and understanding of subjective well-being.

Fundamentally, our methodology is underpinned by the Multiple Indicators Multiple Causes (MIMIC) model. This particular model is an exemplary instance of the larger family of structural equation modelling. With its unique mathematical underpinnings, it offers the capacity to gauge and quantify subjective well-being using survey data.

The key strengths of this model is its multifaceted applicability and comparative functionality. The method is designed to facilitate a comparative analysis across distinct geographical units, offering researchers a fresh perspective on regional variances in subjective well-being. Its utility is further elevated by the temporal comparability it provides, enabling an examination of shifts in subjective well-being over time, thereby shedding light on the dynamic nature of happiness and satisfaction. Furthermore, the MIMIC-based approach can be extended to enable a comparative study across disparate surveys, thus offering researchers the capacity to draw insights from a multitude of sources and navigate the often-encountered issues of data inconsistency and heterogeneity.

In essence, the method proposed in this study is not merely a numerical tool, but a transformative approach to understanding subjective well-being. It promises to open new horizons in this field of study by offering a more nuanced, sophisticated, and comprehensive way of examining the many facets of human happiness and satisfaction. Continuing our exploration into this area, the empirical part of our study leveraged the proposed methodology to calculate subjective well-being for all 28 member states of the European Union. As anticipated, the analysis revealed a distinct geographical pattern. Countries nestled in the Northern and Western regions of Europe generally demonstrated a higher level of subjective well-being compared to their counterparts

in Eastern and Southern Europe. In particular, Ireland, Germany, Austria, and Finland emerged as the top performers in terms of subjective well-being.

Among the countries that joined the EU in 2004, both Poland and Romania demonstrated surprisingly high subjective well-being scores. The findings contrast sharply with the lower values recorded for Croatia, Bulgaria, Lithuania, and Portugal, which underscore the vast disparities in subjective well-being across the European Union.

A critical component of this analysis was the discernment of the two most salient exogenous determinants impacting subjective well-being across the majority of nations: self-perceived health and material deprivation. This relationship illuminated by our analysis offers profound implications for social policy. If the goal is the enhancement of subjective well-being among the population, policymakers should focus their attention and resources on alleviating material deprivation and promoting the availability of health services. Policies promoting healthier lifestyles could also play an integral part in increasing subjective well-being over the long term.

In essence, the findings of this study offer a road map for policymakers: to elevate subjective well-being, direct actions towards mitigating the constraints of material deprivation and prioritise the improvement of health. These concerted efforts could pave the way for a long-term, sustainable upliftment in the levels of subjective well-being across the European Union, thereby fostering a happier, more contented populace.

Extending the analysis further, our study also explored the distribution of subjective well-being across all the nations in the dataset. An interesting pattern of left-skewness and leptokurtosis emerged from this examination, highlighting an unusual concentration of lower subjective well-being scores. This phenomenon could potentially be attributed to a subgroup of individuals who, despite the absence of tangible, objective factors that could impair their subjective well-being, consistently report lower states of well-being, often associated with feelings of depression or general discontent.

Delving into the effect of age on subjective well-being, we found a relatively strong, almost linear, inverse relationship in most countries. Interestingly, this negative correlation between age and subjective well-being is not universal. In more affluent and developed EU nations, this negative effect of aging on subjective well-being appears to be significantly mitigated. Notably, in the Scandinavian countries, retired individuals – typically older in age – reported higher levels of subjective well-being compared to their younger counterparts, reversing the conventional trend.

Another critical determinant of subjective well-being as revealed by our analysis is material wealth, specifically in the form of equalised income. Subjective well-being exhibited a steep increase with a rise in income, particularly for individuals in lower and middle income brackets. However, an intriguing deviation is noted for individuals in the upper echelons of the income spectrum. For these individuals, subjective well-

being does not seem to correlate significantly with income, a finding that is in stark contrast with Aknin et al.'s (2009) observation that subjective well-being primarily hinges on income for higher income groups.

In summary, the intricate interplay of factors such as age, income, and personal perceptions of well-being contribute to the complex landscape of subjective well-being across the EU. The findings shed light on significant demographic and socio-economic determinants of subjective well-being, offering critical insights for policymakers aiming to enhance the quality of life of their citizens.

Overall, our research not only supports but also extends previous work by emphasizing the complex interplay of numerous factors affecting SWB, including, but not limited to, income, health, age, and societal support systems. The findings underscore the necessity of considering socio-economic and cultural contexts to better understand and measure SWB. Furthermore, the unique patterns and disparities identified across the different EU countries serve as a reminder that while global or regional trends can provide broad guidance, the key to understanding and improving SWB lies in acknowledging and addressing the specificities of local contexts. Further research investigating these nuances will undoubtedly contribute to this growing body of knowledge.

Appendix

Table A1. Goodness of fit measures for MIMIC models

Country	RMSEA	CFI	NNFI
AT	0.058	0.906	0.877
BE	0.065	0.886	0.853
BG	0.041	0.968	0.959
CY	0.058	0.931	0.911
CZ	0.059	0.906	0.878
DE	0.057	0.920	0.896
DK	0.058	0.911	0.885
EE	0.063	0.852	0.806
ES	0.063	0.921	0.898
FI	0.061	0.897	0.866
FR	0.072	0.857	0.814
GR	0.057	0.934	0.914
HR	0.055	0.940	0.923
HU	0.067	0.900	0.870
IE	0.042	0.953	0.939
IT	0.041	0.965	0.955
LT	0.063	0.904	0.875
LU	0.070	0.838	0.790
LV	0.065	0.891	0.859
MT	0.056	0.901	0.872
NL	0.048	0.939	0.920
PL	0.052	0.907	0.879
PT	0.067	0.916	0.891
RO	0.043	0.940	0.922
SE	0.044	0.957	0.944
SI	0.065	0.886	0.852
SK	0.054	0.924	0.901
UK	0.045	0.953	0.939

Source: own elaboration based on Eurostat data from EU-SILC, 2018. The responsibility for all conclusions drawn from the data lies entirely with the authors.

Table A2. Subjective well-being in the EU countries in 2018

Country	Subjective well-being	Evaluative well-being	Experienced well-being	Negative experienced well-being
Austria	0.763	0.806	0.758	0.231
Belgium	0.749	0.755	0.737	0.247
Bulgaria	0.617	0.526	0.562	0.269
Cyprus	0.701	0.711	0.663	0.257
Czechia	0.674	0.732	0.665	0.311
Denmark	0.729	0.744	0.715	0.266
Germany	0.773	0.788	0.685	0.190
Estonia	0.697	0.697	0.695	0.272
Spain	0.729	0.735	0.722	0.256
Finland	0.751	0.817	0.734	0.230
France	0.693	0.726	0.693	0.298
Greece	0.664	0.649	0.629	0.293
Croatia	0.609	0.620	0.590	0.359
Hungary	0.674	0.632	0.657	0.287
Ireland	0.800	0.806	0.751	0.175
Italy	0.698	0.706	0.668	0.282
Lithuania	0.636	0.631	0.637	0.361
Luxembourg	0.758	0.764	0.758	0.233
Latvia	0.651	0.660	0.651	0.269
Malta	0.730	0.752	0.685	0.254
Netherlands	0.747	0.769	0.733	0.231
Poland	0.734	0.771	0.728	0.248
Portugal	0.638	0.659	0.636	0.344
Romania	0.671	0.730	0.645	0.320
Sweden	0.726	0.790	0.714	0.257
Slovenia	0.707	0.717	0.692	0.263
Slovakia	0.704	0.707	0.688	0.207
United Kingdom	0.734	0.770	0.703	0.241

Source: own elaboration based on data from Eurostat, EU-SILC, 2018. The responsibility for all conclusions drawn from the data lies entirely with the authors.

Table A3. Average values of subjective well-being indicators in the cluster of countries

Indicator	Average values of SWB			
	Custer 1	Custer 2	Custer 3	Custer 4
Positive experienced well-being	0.726	0.684	0.562	0.633
Negative experienced well-being	0.226	0.278	0.269	0.319
Evaluative well-being	0.777	0.725	0.526	0.642

Source: own elaboration based on data from Eurostat and EU-SILC, 2018. The responsibility for all conclusions drawn from the data lies entirely with the authors.

Table A4. Abbreviation of the EU-28 Member States

Country	Abbreviation
EU (27 countries)	EU
Belgium	BE
Bulgaria	BG
Czechia	CZ
Denmark	DK
Germany	DE
Estonia	EE
Ireland	IE
Greece	EL
Spain	ES
France	FR
Croatia	HR
Italy	IT
Cyprus	CY
Latvia	LV
Lithuania	LT
Luxembourg	LU
Hungary	HU
Malta	MT
Netherlands	NL
Austria	AT
Poland	PL
Portugal	PT
Romania	RO
Slovenia	SI
Slovakia	SK

cont. Table A4

Country	Abbreviation
Finland	FI
Sweden	SE
United Kingdom	UK

Source: own elaboration

Definitions of potential determinants of subjective well-being

The proposed MIMIC model utilises a set of determinants of SWB. These determinants were proposed taking into account the criterion of content validity the criterion of suitability. The variables included in the EU-SILC survey were analysed as potential determinants of SWB. The following determinants were used in the final MIMIC model:

- Age – a person's age at the time of the interview.
- Sex – a binary variable equal to 1 for females and 0 for males.

Income – total household disposable income divided by the OECD modified equivalence scale (household equivalised income). The OECD modified scale assigns a value of 1 to the household head, of 0.5 to each additional adult member and of 0.3 to each child.

Monetary poverty – a binary indicator equal 1 for individuals who lived in households with total equivalised disposable income below 0.6 of median equivalised income.

Material deprivation – the number of symptoms of material deprivation proposed in the Eurostat recommendations regarding the measurement of the phenomena. It contains information provided in answers to nine questions from the EU-SILC survey, which assess whether individuals are unable to afford:

- to pay their rent, mortgage or utility bills;
- to keep their home adequately warm;
- to face unexpected expenses;
- to eat meat or proteins regularly;
- to go on holiday;
- a television set;
- a washing machine;
- a car;
- a telephone.

Household size – the number of individuals living in the household.

Living alone – a binary variable equal to 1 if a person lives alone and 0 otherwise.

Unemployed – a binary variable equal to 1 if a person was unemployed at the time of the interview and 0 otherwise.

Retired – a binary variable equal to 1 if a person was retired at the time of the interview and 0 otherwise.

Student – a binary variable equal to 1 if the person's main activity during the period predeceasing the interview was full-time education and 0 otherwise.

Self-perceived health – a categorical variable containing a subjective assessment of the respondent's health status based on EU-SILC question on self-perceived health ('How is your health in general?'), which contains five answering categories; 1) very good, 2) good, 3) fair, 4) bad, 5) very bad.

Unmet medical needs – a binary variable equal to 1 if a person had unmet medical or dental needs.

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This book presents a new way to measure subjective well-being (SWB), combining the latest European Union recommendations for quality of life measurement with the capabilities approach developed by Amartya Sen. By using the MIMIC model, a type of structural equation modeling, we can now measure SWB with any survey data and compare results across different places and times.

Our study, covering 28 European countries, reveals that subjective well-being (SWB) is primarily influenced by two factors: individuals' health perceptions and their material resources. Additionally, we examined how SWB correlates with variables like age and income across different nations. We found that in most countries, people's happiness tends to decrease as they get older. However, in wealthier and more developed European countries, especially in Scandinavia, older adults are actually happier than younger ones. Another interesting discovery is that happiness increases with income up to a certain point, but this does not apply to the very wealthy, challenging some previous research

Subjective Well-Being in European Union Countries offers a straightforward look at what influences happiness in Europe and suggests how policy changes can make a difference. It's a guide for anyone interested in how health, wealth, age and other factors impact well-being across the continent.

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