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MASTER'S THESIS

SOCIOECONOMIC INEQUALITIES IN MENTAL HEALTH: AN EMPIRICAL ANALYSIS FOR 30 EUROPEAN COUNTRIES

DESIGUALDADES SOCIOECONÓMICAS EN LA SALUD MENTAL: UN ANÁLISIS EMPÍRICO PARA 30 PAÍSES EUROPEOS

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ABSTRACT

BACKGROUND: Mental health is one of the most demanding public health challenges in the European Region, as it is the leading cause of disability and the third leading cause of overall disease burden. Since it is considered a multidimensional concept, a connection can be established between these disorders and diverse socioeconomic aspects, such as financial hardships or social exclusion. These relationships have also led to disparities among individuals, shaping the socioeconomic inequality regarding mental health over the years. The urge to broaden our knowledge on these concerns and the lack of empirical studies for Europe on this subject have drawn our attention.

OBJECTIVE: To examine the link between mental health status and negative life impacts on individuals, across different socioeconomic groups in an empirical analysis for 30 European countries throughout 3 different waves.

METHODS: This study analyses data for 30 European countries from the European Quality of Life Survey (EQLS), waves 2007, 2012 and 2016. We first analyse the relationship between mental health and negative life events with an Ordered Probit regression and a Probit regression with its corresponding average and marginal effects; the negative life events are divided into financial hardships and social exclusion. Next, in order to analyse the level of socioeconomic inequality regarding mental health, we estimate different Concentration Indices: Standard, Generalised, Erreygers and Wagstaff. We also establish different country groups to study these disparities: Southern, Northern, Western, Eastern.

RESULTS: We have demonstrated that the impact of financial hardships and social exclusion on mental health status is significant, having this last one a stronger effect; respondents with higher deprivation scores are 4.37% less likely to have good or very good mental health, while those who are more socially excluded are 11.18% less likely to report that. The repercussion of these negative life events on lower socioeconomic groups creates disadvantageous mental health outcomes when compared to higher ones, generating significant mental health disparities at a population level. These inequalities have decreased over the last years but they still remain, being the Concentration Index in 2016 for Eastern countries 0.0376, for Northern Europe 0.0345, for the Southern 0.0328 and for Western ones 0.0300.

CONCLUSIONS: The present study adds negative life events into the analysis of the socioeconomic inequality of mental health for a decade across Europe. Unfortunately, we are currently experiencing a world pandemic due to the SARS-CoV-2 virus which will disrupt all the future projects that were being designed and arranged. This disease is having a profound effect on all aspects of society, especially mental health. The need for strong social protection policies is currently a demanding reality for European societies, and the scope of collaboration and partnership between countries and within government levels will be fundamental for the optimal development of the strategies.

Keywords: Socioeconomic inequality; Mental Health; Financial Hardships; Social Exclusion; European Quality of Life Survey (EQLS).

RESUMEN

ANTECEDENTES: La salud mental es uno de los desafíos de salud pública más exigentes en la Región de Europa, ya que es la principal causa de discapacidad y la tercera causa principal de carga general de morbilidad. Dado que se considera un concepto multidimensional, se puede establecer una conexión entre estos trastornos y diversos aspectos socioeconómicos, como las dificultades económicas o la exclusión social. Estas relaciones también han dado lugar a disparidades entre las personas, lo que ha dado forma a la desigualdad socioeconómica en materia de salud mental a lo largo de los años. Nos ha llamado la atención la necesidad de ampliar nuestros conocimientos sobre estas preocupaciones y la falta de estudios empíricos para Europa sobre este tema.

OBJETIVO: Examinar el vínculo entre el estado de salud mental y los acontecimientos vitales negativos para los individuos, en diferentes grupos socioeconómicos en un entorno transversal para 30 países europeos en 3 oleadas diferentes.

MÉTODOS: Este estudio analiza datos para 30 países europeos de la Encuesta Europea de Calidad de Vida (EQLS), olas 2007, 2012 y 2016. Primero analizamos la relación entre la salud mental y los eventos negativos de la vida con una regresión Probit ordenada y una regresión Probit con sus correspondientes efectos medios y marginales; dichos eventos vitales negativos los dividimos en dificultades económicas y exclusión social. A continuación, para analizar el nivel de desigualdad socioeconómica en salud mental, estimamos diferentes Índices de Concentración: Estándar, Generalizado, Erreygers y Wagstaff. También establecemos diferentes grupos de países para estudiar estas disparidades: Sur, Norte, Oeste, Este.

RESULTADOS: Hemos demostrado que el impacto de las dificultades económicas y la exclusión social en el estado de salud mental es significativo, teniendo este último un efecto más fuerte; los encuestados con puntuaciones de privación más altas tienen un 4,37% menos de probabilidades de tener una buena o muy buena salud mental, mientras que los que están más excluidos socialmente tienen un 11,18% menos de probabilidades de ello. La repercusión de estos eventos vitales negativos en los grupos socioeconómicos más bajos crea resultados de salud mental desventajosos en comparación con los más altos, lo que genera importantes disparidades de salud mental a nivel de la población. Estas desigualdades han disminuido en los últimos años pero aún se mantienen, siendo el Índice de Concentración en 2016 para los países del Este 0,0376, para el Norte de Europa 0,0345, para el Sur 0,0328 y para los Occidentales 0,0300.

CONCLUSIONES: El presente estudio añade acontecimientos vitales negativos al análisis de la desigualdad socioeconómica de la salud mental durante una década en Europa. Desafortunadamente, actualmente estamos experimentando una pandemia mundial debido al virus SARS-CoV-2 que interrumpirá todos los proyectos futuros que se estaban diseñando y organizando. Esta enfermedad está teniendo un efecto profundo en todos los aspectos de la sociedad, especialmente la salud mental. La necesidad de políticas sólidas de protección social es actualmente una realidad exigente para las sociedades europeas, y el alcance de la colaboración y asociación entre países y dentro de los niveles de gobierno será fundamental para el desarrollo óptimo de las estrategias.

Palabras clave: Desigualdad socioeconómica; Salud mental; Dificultades financieras; Exclusión social; Encuesta Europea de Calidad de Vida (EQLS).

1. INTRODUCTION

There has always been a long-standing interest in how health is related to the economy, and to what extent there is an impact of health issues on household wealth, and vice versa. Within the extensive sanitary field, a crucial element is mental health, which is shaped by social, economic and environmental factors. Mental disorders are one of the most demanding public health challenges in the European Region, as they are the leading cause of disability and the third leading cause of overall disease burden, just after cardiovascular disease and cancers. The estimated prevalence of mental disorders in 2015 in Europe was 110 million, corresponding to 12% of the whole population (WHO, 2019). According to a study published in The Lancet (Vigo et al., 2016), the global burden of mental illness accounts for 32.4% of years lived with disability (YLDs[1]) and 13.0% of disability-adjusted life-years (DALYs[2]).

Although lower socioeconomic position is associated with increased risk of mental disorders (Fryers et al., 2003), and this relationship has been consistently documented in multiple studies, there is still debate about what the determinants that affect it are and in what ways.

Some interpretations discuss that distress might be caused by exposure to stressful life experiences, so that lower status people are highly vulnerable to this kind of experience. Others consider that a far more central role is played by class differences; that means, by the fact that lower status people are more likely than middle and upper status ones to develop symptoms of distress when exposed to uncertainties in life (Kessler & Cleary, 1980). But what do we understand as social stratification and how can we measure it?

The most common way of measuring social stratification has been to assess a person's economic resources using mostly measures of personal and household income (Kessler et al., 1994) and occasionally measures of poverty at the individual, household, or neighbourhood levels. In this context, where we analyse the economic aspects of health, we understand social stratification as a multidisciplinary matter, therefore some social epidemiologists use diverse measures simultaneously, such as years of education, occupation, income, etc., due to reliance on a single measure has proven insufficient to define the effects of social inequalities on the health (Muntaner et al., 2000).

In contrast to income or poverty measures which infer exclusion from lack of resources, it is key to define *financial hardship* as well, since it directly assesses the extent to which individuals or households lack not only goods but also facilities or services are unable to engage in activities (Whelan, 1993). This factor has been analysed across different approaches to the extent that there is consistent evidence that hardship is associated with common mental disorders and psychological distress (Butterworth et al., 2004).

Financial hardship can focus on absolute or relative need, with reference to food, shelter, clothing, and medical care or consider deprivation connected to social norm. Some indicators of financial hardship used in psychiatric literature have included access to a car, household overcrowding, ownership of household appliances, difficulty paying bills or purchasing food or clothing, lack of services/or utilities, and structural housing

[1] YLDs are calculated by multiplying the prevalence of a disorder by the short- or long-term loss of health associated with that disability (the disability weight).
[2] DALYs are calculated by the sum of years of potential life lost due to premature mortality and the years of productive life lost due to disability.

problems (Lorant et al., 2007). Depending on the circumstances, some of these events may have considerable psychological impacts on the individuals involved.

As previously commented, mental disorder is a multidimensional concern that gets affected by multiple issues, not only by financial matters. One particular dimension that needs attention in mental health inequalities from a life course perspective is social exclusion, which is linked to subjective well-being as well, and is now widely used in discussions about the nature of disadvantage. Social disadvantage is both a cause and consequence of mental illness; that is, mental illness, in all its forms, is intrinsically social (Horwitz & Schied, 1999). In fact, people with long-term mental illness are among the most excluded in society (Unit, 2004), and this can be seen reflected in current efforts to promote social inclusion among those with mental health problems. In 2017, 112.8 million people in the EU lived in households at risk of poverty or social exclusion, meaning 22.4 % of the population (Eurostat, 2019). However, it is not easy to define what social exclusion is, how it has been framed in recent literature, and what role it plays in the mental health of the population; therefore, we will discuss it in further sections of this study.

Another key element, closely related to financial hardship and social exclusion, is gender inequality. Gender differentially affects the power and control men and women have over multiple socioeconomic determinants, such as their access to resources, their status, roles, options and treatment in society (WHO, 2013). Furthermore, gender significantly explains differences in susceptibility and exposure to mental health risks and in mental health outcomes, to an extent that women are nearly twice as likely as men to suffer from mental illness (Desai & Jann, 2000). In fact, gender disparities in depressive disorders are associated with a country's wealth (Yu, 2018). Therefore, in the search for effective strategies for mental disorders prevention and the reduction of its risk factors, these programs cannot be gender neutral considering the risks themselves are gender specific (Afifi, 2007).

Not only we can find mental health inequalities regarding gender, but also referring to other aspects such as age, level of education or marital status. Many mental disorders begin in childhood or adolescents, so early detection and treatment might help reduce the persistence or severity of primary disorders and prevent the secondary ones (Kessler et al., 2007). However, it is also very important the support that elderly people receive from social relationships since the reduction of loneliness dissatisfaction could be an important factor in reducing levels of mental distress (Gerino et al., 2017). On the other hand, poor mental health is significantly associated to dropout among students in vocational and higher education; in fact, males in higher education have five times the risk of dropout when reporting poor mental health (Hjorth et al., 2016). Moreover, some authors find that utility and empathy between couples exist, regardless of being a man or a woman, and the interdependence of the closest environment is relevant (Pascual-Sáez et al., 2019).

Once we have addressed and understood these concepts, we come back to our central concern. The World Health Organization has defined mental health as "*a state of wellbeing, in which an individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and is able to make a contribution to his or her community*" (WHO, 2019). According to this definition, we can observe that, with our study, we cover all the important issues regarding mental issues: the economic and financial aspects as well as the social ones.

There is a high degree of comorbidity between mental health conditions (such as depression) and other noncommunicable diseases, including cardiovascular disease, diabetes, and alcohol-use disorders. Particularly, mental disorders represent "*disturbances to a person's mental health that are often characterized by some combination of troubled thoughts, emotions, behaviour and relationships with others"*

(WHO, 2019). Some examples of this might include depression, anxiety disorder, conduct disorder, bipolar disorder, and psychosis. In fact, the most common mental disorders in the WHO European Region are depression (44.3 million) and anxiety (37.3).

In order to address this pressing situation, it is important that countries establish response mechanisms to mitigate the potential consequences of these diseases in a multi-sectoral environment. A recent survey carried out for the Mental Health Atlas (WHO, 2017), claimed that nearly all the countries in the European Region (94%) that responded to it had a stand-alone or integrated mental health policy or program. Additionally, the new agenda for the Sustainable Development Goals raises further challenges and opportunities for mental health control and governance. There has to be an eagerness to combine mental and physical health care, as well as prevention should be coordinated with elements in and beyond the government and health sector, such as social care, education, and the environment.

Despite the massive global economic burden of mental health conditions that we have just described, spending by governments in the European Region represents only 1% of total health expenditure in these countries. Besides, 69% of it was only dedicated to government mental hospitals. In terms of numbers, European governments spent on average US$ 22 per capita on mental health programmes and services in 2016; however, there is wide variation among countries (WHO, 2019).

The promotion of mental health and the prevention and treatment of mental disorders are crucial to protect and enhance the quality of life, well-being and productivity of individuals, families, workers and communities, as well as to increase the strength and resilience of society as a whole (WHO, 2015). For those reasons, different programs have been carried out in multiple countries, such as the European Mental Health Action Plan (2013-2020); this project has different objectives based on fairness, empowerment, safety and effectiveness all across Europe. Despite all these efforts, a lot remains to be done to overcome the treatment gap in mental health, improve the quality of support and care, and strengthen disease prevention and health promotion.

Therefore, this research aims to address whether the impact of financial hardships and social exclusion on mental health status is significant, as well as to what extent these life adversities contribute to the inequality in mental health status between rich and poor individuals, female and male, from a temporal point of view for 30 countries in Europe. In order to achieve our objectives, we structure this study as follows: literature review, where we will discuss what other authors have said regarding all these issues throughout the years. Methodology, where we will describe what methods will be used to help us obtain the outcomes. Results, where we will examine the numbers and figures we have got from the econometric models. Discussion, where we will argue about the consistency of our results from a critical point of view. And lastly, conclusions, where we will sum up the highlights of our study and suggest some proposals and recommendations for policymakers, so that our results have a purpose and a meaning.

2. LITERATURE REVIEW

As stated above, this study is built upon two main issues regarding mental health, financial hardships and social exclusion, in terms of socioeconomic and demographic inequalities over the years. In order to be able to acquire a wider and deeper knowledge on this topic before immersing ourselves in the empirical part of our study, in this section we seek to revise what other authors have found on this subject to help us understand the whole matter. Hence, we structure this chapter regarding those matters, attempting to find the connection between all of them.

2.1. SOCIOECONOMIC INEQUALITIES.

In recent times, social inequality has become one of the most commonly discussed topics in Europe and societies all over the world, within all its range (Marmot & Bell, 2012; Wilkinson & Pickett, 2010). It has been argued that the proliferation of social disparities affects different areas of social life, including access to education, the distribution of income, health status, and health care utilization. The socioeconomic divide has been on the rise in Europe over the past decades, and has intensified since the onset of the global financial crisis (OECD, 2017). Therefore, this increasing gap observed between socioeconomically advantaged and disadvantaged people has caused intense debates in the social sciences as well as in politics (Reiss, 2013).

Inequality can also lower social trust in institutions and cause political and social instability. For instance, the higher the level of economic inequality, the higher will be the "social barriers" between groups and the less individuals will feel comfortable with and connect to other people. It is a complex phenomenon which not only involves accumulated wealth or debts, but it also has to do with health status, driven by the quality of jobs, education, and migration background (OECD, 2017).

Socioeconomic inequalities regarding health show that individuals with a lower SES are more likely to die earlier and have a higher incidence of cardiovascular events, diabetes, obesity, and other diseases than their more advantaged counterparts (Bartley, 2004). As eliminating socioeconomic disadvantage from society is not within our reach, quantifying modifiable intermediate factors of the association between socioeconomic position and health outcomes and targeting them could have important public health benefits (Matthews et al., 2010).

Epidemiologic research has long investigated those potential factors, identifying health behaviours, environmental exposures or psychosocial factors as major mechanisms in the link between low SES and increased disease risk (Robertson et al., 2015; Stringhini et al., 2011). Health behaviours overall contribute to the association between socioeconomic status and health outcomes, but this contribution varies substantially according to geographic location, sex, age, health outcomes; the main reason for this heterogeneity might be the differential socioeconomic patterning of health behaviours in given regional and demographic contexts (Petrovic et al., 2018).

Mackenbach et al. (2008) showed that, although inequalities in health associated with socioeconomic status are present everywhere, their magnitude is highly variable, particularly for inequalities in mortality. This result implies that there is space to reduce inequalities in mortality by improving educational opportunities, income distribution, health-related behaviour, or access to health care.

Particularly regarding mental health, people living in areas of socioeconomic deprivation, who are themselves relatively socioeconomically deprived as well, are at higher risk of death by suicide, and higher risk of hospitalization following self-harm, than

those living under better circumstances (Chandler, 2020). Some studies of suicide carried out in the UK suggest that higher rates of suicide among poorer groups can be related to unemployment, job and/or housing insecurity, debts, and the impact these experiences have on mental health (Haw et al., 2015). We will discuss these issues in the forthcoming subsections.

Recently, more evidence is being provided regarding mental health inequalities, and it is shown that diagnoses have become more concentrated amongst the lowest educated individuals and the lowest income families, groups who appear to be increasingly disadvantaged (Linder et al., 2020), widening the disparities.

2.2. FINANCIAL HARDSHIPS.

Financial hardship reflects the consequences of insufficient resources without having to exactly define what an 'adequate' income is. Measures of hardship or deprivation assess whether people are excluded from minimally accepted ways of life in society due to a lack of resources (Whelan, 1993). Non-monetary indicators of deprivation are now widely used in studying poverty in Europe since they can help improve the identification of those experiencing poverty and understand different behaviours (Nolan & Whelan, 2010).

Considering individual factors that moderate the relationship between financial hardship and individual well-being, we must draw a distinction between objective and subjective aspects of economic stressors. On the one side, the objective aspects refer to *"[…] the objective inability to meet current financial needs"*, while the subjective ones relate to *"[…] the perceived inadequacy of the financial situation"* (Sinclair, 2010). Drentea and Lavrakas (2000) identified the subjective assessment of the economic situation as the most important indicator of physical impairment and mental health, while the objective amount of debt was of minor importance.

Among some examples to help us understand these terms, Reading and Reynolds (2001) found that for women with objective financial difficulties suffering from postnatal depression, the largest amount of variance of depression was accounted for worries regarding debt, that is to say, beyond the objective amount of debt and other health-related factors.

It has been proven by several studies that the experience of financial hardship plays an important role in the development and growth of depression and perpetuates existing symptoms by limiting activities to aid recovery, having a reinforcing effect on it (Butterworth et al., 2012, 2009; Lorant et al., 2003). Accordingly, mental disorders might cause profound impairment and might have an impact on educational attainment and labour participation, such as unemployment and earnings; therefore, these could be perceived as a cause of hardship themselves as well (Levinson et al., 2010).

In this context, we understand financial hardships as a deprivation issue, as well as a concept related to debt, whether people are seriously behind in payments such as their mortgage, rent or utilities. Jenkins et al. (2008) examined this last term and found that the association between mental disorders and debt was stronger than the one between income and mental disorders. In fact, the association between income and mental disorders was reduced after adjustment for debt.

Unlike many other measures of social position that are relatively stable across the life course, the experience of hardship may fluctuate over the years. For instance, low socioeconomic status (SES) is associated with a higher prevalence of depression, but also a change in socio-economic status leads to a change in rates of depression (Lorant, 2007). Researchers in this area suggest that one's assessment of their relative

position in the socioeconomic hierarchy of society is an important predictor of mental health above objective factors (Demakakos, 2008). This is linked to the concept known as Subjective Social Status (SSS), which is expected to add an element of social significance to the association between SES and health (Nock & Rossi, 1979) by incorporating people's assessments of their experiences of deprivation and own perceptions.

Frankham et al. (2020) systematically reviewed the literature which has explored the influence of psychological variables in the context of financial hardship and mental health; one of the factors that is most consistently and reliably implicated is personal agency, which has an important role to play in this relationship. They also analysed other aspects such as self-esteem, managing difficulties or personality traits, among others.

In relation to this unsteady character of deprivation, it is pertinent to address economic recessions and crises, which have a context-dependent negative impact on mental health disorders, and might specially affect vulnerable groups such as women, elderly people or low-income families (Uutela, 2010). Economic crises seem inevitably linked to an increase in unemployment and in private debt, leading to a rise in mental health problems in the general population (Chatterjee, 2009; Stuckler, 2009). Catalano et al. (2011) found, in times of economic adversity, a significant increase in psychological disorder symptoms, the use of mental health services, and the incidence of seeking help for psychological disorders and distress. In contrast, Ruhm (2003) argues that times of economic crisis may improve health outcomes through the promotion of healthy lifestyles and behaviours.

Nonetheless, there is a lack of investigation regarding the role that sex and age play in the relationship between financial hardship and mental health. Some authors have stated that the prevalence of hardship differs across the life course (Mirowsky and Ross, 2001) and by sex (Butterworth et al., 2009). However, there is mixed evidence in the literature regarding this topic, thus, the role of age and sex requires further clarification. Spivak et al. (2019) found that patients with financial hardship were more likely to be female, to experience self-stigma, to experience medical care delays, and to use emergency services.

In fact, few studies have examined the relationship between hardship and depression over time (Lorant et al., 2007; Butterworth et al., 2009), and most of the existing research has only analysed two waves of data. Lorant et al. (2007) found no significant independent effect of previous depression, suggesting that hardship has an impact on current mental health but prior hardship is not associated with depression above the effect of current hardship. What is more, Mirowsky and Ross (2001) concluded that the effect of hardship lessens with time. These contradictory findings about hardship being associated with fluctuations over time in depression may simply be a consequence of the multiple analytic approaches used across the multiple studies.

2.3. SOCIAL EXCLUSION AND WELL-BEING.

According to the World Health Organization (WHO), social exclusion (SE) is one of the driving forces of health inequalities, preventing people from fundamental human needs and threatening mental health and wellbeing (Van Bergen et al., 2019). Despite having different meanings depending on the context in which it is framed, the lack of participation in mainstream social, cultural, economic and political activities is the primary element at the core of most definitions (Morgan, 2007). Therefore, we can agree that social exclusion is multidimensional matter, which has been of considerable debate, not least because it is similar to, and has overlaps with, other social concepts (Secker, 2009). It has been increasingly used to capture the consequences of material deprivation in

terms of restricted opportunities to participate in wider social and cultural activities (Pantazis et al., 2006), which might be the meaning which best suits our study.

Research studies have recognized the effects of social exclusion on the health and well-being of the aging population (Wilson, 2007). Sayce (2001) argued that, for mental illness, social exclusion has more explanatory power than others of a purely economic nature, such as poverty or related concepts, since it focuses on the non-material disadvantages that result from the discriminatory responses of others and institutions. The financial hardships that we discussed in the previous section are closely linked to this concept since the material deprivation that many people experience prevents them from engaging in common social activities (Pantazis, 2006).

Some researchers have argued that these two elements, poverty and social exclusion, are not that closely related. Room (1995) understands that poverty is mainly focused on distributional issues, such as the lack of resources, while social exclusion aims attention primarily on relational issues, such the lack of social bonds with the family, friends, local community, public services and institutions, or more widely to the society to which an individual belongs.

However, the social problems associated with exclusion are partly income-determined (infant mortality, education, literacy…). Social relations and structure of property rights determine the distribution of wealth and income assets in a society. In addition, social relations are influenced in turn by such economic factors as income inequalities (Bhalla & Lapeyre, 1997). For instance, Singer (1997) found for Brazil that a vast majority of the socially excluded is made up of people excluded from the main sources of income. Moreover, due to their incomes and assets, the higher-income people are much more powerful and influential than the lower-income ones who, for lack of economic means, education, and so on, are poorly organized. Therefore, we can also consider that economic resources enable access not only to economic goods and services but also to political goods like freedom and the ability to influence economic policies, in favour of their interests (Bhalla & Lapeyre, 1997).

According to them, three main types of relations may be relevant in different degrees: relationships within families and extended households; communal relationships; relationships between the citizen and the state. The first two kinds are governed by social norms, religious guidelines or cultural factors, while the last one requires state action.

In addition, Burchardt and Le Grand (2002) stated as well that there are three central features to social exclusion: relativity, agency and dynamics. The first one meaning that exclusion is not absolute and can be considered as a matter of degree; the second concept referring to the fact that someone or something is doing the exclusion; and finally the third one considering exclusion as a dynamic process that operates across time, and potentially across generations.

However, this is a two-way relationship since many mental health service users do experience deep social exclusion and this often has a number of negative consequences for individuals and communities, aggravating the situation (Rankin, 2005). There is compelling evidence that people with mental health problems are at risk of exclusion and it applies across people with all types of mental disorders and across all age groups (Boardman, 2011). Assuming that mental health problems are not a homogeneous group and have a range of incapacities and experiences of exclusion, we can establish different groups regarding multiple aspects and ways of exclusion: exclusion from material resources, from productive activity, from social relations and neighbourhoods, from civic participation, from health and health services.

We have already discussed the first category in the previous section when talking about deprivation, and now we are focusing on the social sphere of this issue, which has to do more with the rest of the matters on the list. Accordingly, Boardman (2011) stated that people with mental health problems are more likely to be socially isolated than others, leading to low interactions with others and low access to opportunities and facilities in their communities. Overall, less affluent people are less likely to take part in active leisure activities than those better off. In terms of civic participation, there is a lack of studies about the involvement of people with any sort of mental health problems in local or national decision making, such as having a voice, choice and control. Thornicroft (2006) did find some evidence about limitations on citizenship, political and human rights for people with mental illness.

Pohlan (2019) found that job loss has particularly detrimental effects on this subjective perception of social integration, as well as on life satisfaction, the access to economic resources and mental health. He states that becoming unemployed hampers the achievement of psychosocial needs that are typically associated with employment, such as social status and higher self-efficacy; these effects are long-lasting and grow deeper the longer the duration of unemployment and might still be present even if the individual finds a new job. Evidence shows how income inequality, discrimination and other forms of social exclusion such as unemployment and underemployment, adverse childhood experiences, food insecurity, and adverse features of the environment can all lead to poor health outcomes (Shim & Compton, 2020).

Moreover, it is a fact that people with any form of significant mental health issues are at increased risk of premature death from natural and from unnatural causes and they experience the so-called “triple danger”: they are more likely to get heart disease, diabetes and some cancers, especially when young and, once diagnosed are more likely to die within five years (Merrick & Merrick, 2007) In addition, they experience poorer quality healthcare than people without mental health problems. People with a diagnosis of schizophrenia, bipolar disorder or depression die younger than other people; they have significantly higher rates of obesity, smoking, heart disease, hypertension, respiratory disease, diabetes and stroke and breast cancer than other citizens. (Harris & Barraclough, 1998).

Regarding gender, as we previously discussed in the financial hardships section, Hwang and Mattila (2019) found that gender moderates the impact of social exclusion on negative emotions and sense of control, being more pronounced for females. Dahlberg et al. (2020) showed that women experience higher levels of exclusion from material resources than men, and considering civic participation, men present lower levels of exclusion. Millar (2003) highlights the use of a multidimensional approach that has the potential to explore these differences from an autonomy and dependency point of view.

Furthermore, age is also a key element since social exclusion is a critical aspect of peer relations in youth and aggravates during adolescence, a time when social anxiety disorders are usually emergent. Another critical moment is the old age, in which the brain goes into cognitive decline with the relative loss of many higher cognitive functions (Morese et al., 2019). Walsh et al. (2017) found evidence on the exclusion of older people across topic areas and disciplines such as civic participation, socio-cultural aspects of society and mobility. Van Regenmortel et al. (2018) revealed that older adults are mainly digitally excluded, a new way of social exclusion that is rising. In fact, their analysis showed four categories of old-age exclusion: those at “low risk”, “the non-participating financially excluded”, “the environmentally excluded” and the “severely excluded”.

Table 2.1. Overview of the literature review[3].

AUTHORS	YEARS	COUNTRIES	TOPIC ANALYSED	DATA SOURCE	CONCLUSIONS
Dahlberg et al. (2020)	1992, 2002, 2011	Sweden	Trends and gender associations in social exclusion in older adults.	Swedish Panel Study of Living Conditions of the Oldest Old (SWEOLD)	The analyses of trends found significant reductions in exclusion in the domains of material resources and services. Higher levels of exclusion from material resources and civic participation were found in women than men.
Linder et al. (2020)	1994-2011	Sweden	Education, Immigration and Rising Mental Health Inequality	Swedish Interdisciplinary Panel (SIP)	Diagnoses (regarding mental health) have become more concentrated amongst the lowest educated individuals and the lowest income families, groups who appear to be increasingly disadvantaged.
Hwang & Mattila (2019)	2019	United States	The interactive effect of social exclusion and gender on brand attitude.	Own quasi-experimental design via Amazon Mechanical Turk (MTurk).	The effect of social exclusion on negative emotions and sense of control is more pronounced among females (vs. males). Negative emotions and sense of control are the underlying mechanisms for the impact of social exclusion among females.
Pohlan (2019)	2007-2015	Germany	Unemployment and social exclusion.	German Federal Employment Agency	Job loss has particularly detrimental effects on the subjective perception of social integration, life satisfaction, the access to economic resources and mental health. Becoming unemployed hinders the fulfilment of psychosocial needs of employment.
Spivak et al. (2019)	2008-2012	United States	Financial hardship among individuals with serious mental illness.	National Health Interview Survey (NHIS sample)	In this study nearly sixty percent of adults with serious mental illness experienced financial hardship. Hardship is more common in women with serious mental illness and is associated with higher stigma and higher psychiatric symptom burden.
Van Regenmortel et al. (2018)	2008-2014	Belgium	Accumulation of Disadvantages: Prevalence and Categories of Old-Age Social Exclusion.	Belgian Ageing Studies data	Older adults are mainly digitally excluded and excluded from the neighbourhood, civic participation, and social relations. More than 60% older adults experience exclusion in two or more dimensions.
OECD (2017)	2007-2016	OECD countries[4]	Understanding the socioeconomic divide in Europe.	OECD database	The socio-economic divide is not only about juxtaposing “the rich” and “the poor” in terms of wages or incomes. It also has to do with health status, which is also driven by the quality of jobs, education, and migration background.

[3] Studies that are themselves based on literature review are excluded from this table.
[4] Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

Robertson et al. (2015)	1987-2007	Scotland	The role of material, psychosocial and behavioural factors in the association between socioeconomic position and allostatic load	West of Scotland Twenty-07 Study	Lower socioeconomic position is associated with higher cumulative physiological burden. Material factors completely attenuated the association. Smoking attenuated the association by approximately one third. Alcohol, physical activity and diet had no attenuation impact.
Butterworth et al. (2012)	2007	Australia	The role of hardship in the association between socio-economic position and depression.	Australia's 2007 National Survey of Mental Health and Wellbeing	Financial hardship was more strongly associated with depression than other socio-economic variables. Hardship was more strongly associated with current depression than with prior history of depression. The absolute effect of hardship was greatest in middle age.
Marmot & Bell (2012)	2000-2010	United Kingdom	Fair society, healthy lives.	World Health Organization Commission on the Social Determinants of Health (CSDH)	There is increasing recognition that disadvantage accumulates over a person's lifetime. By focussing on the need for action across the gradient in health inequity, which runs from top to bottom of the socio-economic spectrum, a new range of policy options is revealed.
Boardman (2011)	2010	United Kingdom	Social exclusion and mental health – how people with mental health problems are disadvantaged.	Royal College of Psychiatrists Scoping Group on Social Exclusion and Mental Health	People with mental health problems, particularly those with long-term psychoses, are among the most excluded: from material resources, from socially valued productive activity, from social relations and neighbourhoods, from civic participation and from health services.
Stringhini et al. (2011)	1989-2010	England and France	Health Behaviours, Socioeconomic Status, and Mortality.	Whitehall II study GAZEL study	Health behaviours were strong predictors of mortality. Health behaviours are likely to be major contributors of socioeconomic differences in health only in contexts with a marked social characterisation of health behaviours.
Levinson et al. (2010)	2001-2003	10 high-income and 9 low- and middle-income countries[5]	Associations of serious mental illness with earnings.	World Health Organization (WHO) World Mental Health (WMH) Surveys.	Respondents with serious mental illness earned on average a third less than median earnings, with no significant between-country differences. These losses are equivalent to 0.3–0.8% of total national earnings. Reduced earnings among those with earnings and the increased probability of not earning are both important components.
Sinclair (2010)	2010	United States	A multilevel model of economic stress and employee well-being.	Bureau of Labour Statistics	The development of a multilevel model that describes the relationship between economic stress and well-being, as well as several moderators of the effects of antecedents and propose a multilevel framework for conceptualizing economic stress interventions.

[5] Brazil, Colombia, Mexico, United States, Belgium, Bulgaria, France, Germany, Italy, The Netherlands, Spain, Israel, Lebanon, Nigeria, South Africa, Japan, China, India, New Zealand.

Butterworth et al. (2009)	1999-2001	Australia	Financial hardship, socio-economic position and depression.	PATH Through Life Study	Current financial hardship was strongly and independently associated with depression, above the effects of other measures of socio-economic position and demographic characteristics. The effect of prior financial difficulty was explained by baseline depression symptoms.
Secker (2009)	2004-2009	United Kingdom	Mental health, social exclusion and social inclusion.	Social Exclusion Unit report	A need for policy initiatives to focus on tackling the structural barriers that work to exclude people with mental health needs, as well as on challenging the deep-rooted prejudice and stigmatisation that reinforce those barriers.
Stuckler (2009)	1970-2007	26 European Union (EU)[6]	The public health effect of economic crises and alternative policy responses in Europe: an empirical analysis.	WHO European Health for All database	Rises in unemployment are associated with significant short-term increases in premature deaths from intentional violence. Active labour market programmes that keep and reintegrate workers in jobs could mitigate some adverse health effects of economic downturns.
Demakokos (2008)	2004-2005	England	Socioeconomic status and health: The role of subjective social status.	English Longitudinal Study of Ageing	It was found that, independently of a range of covariates, SSS was significantly related to self-rated health, depression, and long-standing illness or disability in both men and women and to diabetes and HDL-cholesterol in women.
Jenkins et al. (2008)	2000	United Kingdom	Debt, income and mental disorder in the general population.	The second British National Survey of Psychiatric Morbidity	Both low income and debt are associated with mental illness, but the effect of income appears to be mediated largely by debt.
Mackenbach et al. (2008)	1994-2002	22 European Countries[7]	Socioeconomic Inequalities in Health.	Office for National Statistics Longitudinal Study	There is a variation across Europe in the magnitude of inequalities in health associated with socioeconomic status. These inequalities might be reduced by improving educational opportunities, income distribution, health-related behaviour, or access to health care.
Lorant et al. (2007)	1992-1999	Belgium	Depression and socio-economic risk factors.	Belgian Household Panel Survey	A lowering in material standard of living between annual waves was associated with increases in depressive symptoms and caseness of major depression. Life circumstances also influenced depression.
Merrick & Merrick (2007)	2000-2007	England & Wales	Physical Health Inequalities Experienced by People with Mental Health Problems.	Own survey	People with learning disabilities and people with mental health problems are much more likely to have significant health risks and major health problems. These include obesity, smoking, heart disease, high blood pressure, respiratory disease, diabetes and stroke.

[6] Austria, Belgium, Croatia, Republic of Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden.

[7] Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, United Kingdom.

Wilson (2007)	2004	United Kingdom	Depressive symptoms in the very old living alone: prevalence, incidence and risk factors.	Own survey	Risk factors associated with depression include not living close to friends and family, poor satisfaction with living accommodation and poor satisfaction with finances. Development of clinically depressive symptoms was associated with increased scores in depression.
Pantazis et al. (2006	1999	United Kingdom	The concept and measurement of social exclusion.	Poverty and Social Exclusion survey	Indicators of social inclusion need routinely to include some that directly address the fabric of social life. There is a need for more research to explore the impact of poverty and worklessness on social relations.
Ruhm (2003)	1972-1981	United States	How health status and medical care utilization fluctuate with state macroeconomic conditions.	National Health Interview Surveys (NHIS)	There is a counter-cyclical variation in physical health that is especially pronounced for individuals of prime-working age, employed persons, and males. The negative health effects of economic expansions persist or accumulate over time. Mental health may be procyclical.
Burchardt & Le Grand (2002)	1990-2000	United Kingdom	Degrees of Exclusion: Developing a Dynamic, Multidimensional.	British Household Panel Survey (BHPS)	Social exclusion is more than poverty or other economic outcomes. Not all problems can be solved and many of the approaches and partial solutions outlined here are interim or partial steps along the way.
Mirowsky & Ross (2001)	1995-1998	United States	Age and the Effect of Economic Hardship on Depression.	Telephone Survey of Ageing	The amount of depression associated with economic hardships decreases with older age. Not having household wage income or having a disabling or life-threatening chronic disease increases the depression associated with economic hardship.
Reading & Reynolds (2001)	1997-1998	Scotland	Debt, social disadvantage and maternal depression.	Own sample from six urban general practices in Norwich, UK	Although debt has not been shown to be an independent prospective predictor of depression, results suggest it has a central place in the association between socioeconomic hardship and maternal depression.
Drentea & Lavrakas (2000)	1997	United States	The association among health, race and debt.	Own survey with the Centre for Survey Research of the Ohio State University College of Social and Behavioural Sciences	Both credit card debt and stress regarding debt are associated with health. In addition, health behaviours and risks explain part of this association.
Room (1995)	1990-1995	European Countries[8]	Poverty in Europe: competing paradigms of analysis.	European social policy and the European poverty research agenda	A substantial reconfiguration of the European poverty discussion is now under way, involving redirection of the research agenda towards wider issues of social stratification and political order.

Author's elaboration from the studies collected in the literature review section.

[8] Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom.

3. DATA

3.1. DATABASE AND SAMPLE.

This study assembles and analyses data from the European Quality of Life Surveys (EQLS), carried out every four years (European Foundation for the Improvement of Living and Working Conditions, 2020). As it is run regularly, it allows us to track key trends in the quality of people's lives over time; therefore, we focus on three different waves: 2007, 2012, 2016, which means, before, during and after the financial and economic crisis. In each wave a sample of adult was selected randomly for a face to face interview. This survey examines both the objective circumstances of European citizens' lives and how they feel about those circumstances and their lives in general. Accordingly, it looks at a range of issues, such as employment, income, education, housing, family, health and work-life balance. It also looks at subjective topics, such as people's levels of happiness, how satisfied they are with their lives, and how they perceive the quality of their societies.

Depending on country size and national arrangements, the sample ranged from 1,000 to 2,000 people per country. In each country the register covers at least 95% of the target population, aiming to draw samples that are large enough to give valid results on the level of individual countries and that reflect the distribution of the European population well enough to enable generalisations to Europe as a whole. The individuals interviewed change between waves, therefore it is a random, multistage and stratified sample in each country, so it is a periodic survey. The sample of each wave is: 36,908 in 2016; 43,636 in 2012; 35,634 in 2007.

Other authors have also used this survey to carry out their research. For instance, Dimitrova & Dzhambov (2017) work with the EQLS to test the hypothesis that better access to recreational/green areas modifies the adverse effects of neighbourhood noise and air quality on health. Shucksmith et al. (2009) explored urban–rural differences in income, deprivation, and other life domains. Baños-Martinez (2017) analysed the quality of life of a group of older university students at the University of Burgos, regarding the quality of life from a subjective point of view without forgetting that it involves multiple dimensions that range from health and public services to social exclusion.

As previously stated, we are going to focus on two topics related to mental health, financial hardships and social exclusion and well-being, for 30 countries in Europe: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Germany, Denmark, Estonia, Greece, Spain, Finland, France, Croatia, Hungary, Ireland, Italy, Lithuania, Luxembourg, Latvia, Malta, Netherlands, Poland, Portugal, Romania, Sweden, Slovenia, Slovakia, United Kingdom, North Macedonia, Turkey.

3.2. VARIABLES.

Firstly, this study uses the WHO-5 Well-Being Index, a widely validated and reliable mental health measure (Topp et al., 2015; Krieger et al., 2014). This index is based on a questionnaire that measures current self-reported mental well-being through five questions that use only positively phrased sentences to avoid symptom-related language (WHO, 2020a). The scale has adequate validity both as a screening tool for

depression and as an outcome measure in clinical trials and has been applied successfully across a wide range of study fields (Topp et al., 2015).

The scale is constructed from five items: I have felt cheerful and in good spirits, I have felt calm and relaxed, I have felt active and vigorous, I woke up feeling fresh and rested, my daily life has been filled with things that interest me. Respondents rate those statements according to the following scale (in relation to the past two weeks): all of the time, most of the time, more than half of the time, less than half of the time, some of the time, at no time. The total raw score, ranging from 0 to 25, is multiplied by 4 to give the final score, with 0 representing the worst imaginable well-being and 100 representing the best imaginable well-being.

In order to measure how negative life events affect mental health, we selected a series of questions from the EQLS and we structured them into two groups. On the one hand, we examine financial hardships, when individuals experience adverse economic shocks or circumstances; here, we consider living standards and deprivation in terms of affordability, such as being in arrears for bills or not being able to pay for a week's annual holiday away from home or to keep your hose adequately warm. On the other hand, we select variables related to social exclusion and subjective well-being. In this case, we select items such as the Social Exclusion Index or satisfaction with family life, present job or accommodation and more. In addition, we have information about sex, age, education level, work activity and income of the respondents, which comprises one of the key points in our study.

Here below, in Table 3.1, we collect the variables that we will use in our study with the corresponding name to identify them later on, as well as how we measure them and the expected sign. The selection of these variables has been characterized by the review of the literature drafted in the previous section and by the updated information available (Hashmi et al., 2020; Richter & Hoffmann, 2019; Arslan, 2018; Hajizadeh et al., 2018); those that most adequately represented each group that we have previously defined have been chosen.

Table 3.1. Description of the variables.

NAME	VARIABLE	DESCRIPTION
mentalhealth	WHO-5 mental well-being scale	Scale from 0 to 100. Higher scores imply higher levels of mental health.
	LIVING STANDARDS AND DEPRIVATION	
deprivation	Deprivation Index: number of items household cannot afford	Scale from 0 to 6. Higher scores imply higher levels of deprivation.
endsmeet	Is your household able to make ends meet?	1 if very easily, easily or fairly easily, 0 otherwise
homewarm	Can you afford to keep your home adequately warm?	1 if yes, can afford it, 0 otherwise
holiday	Can you afford to pay for a week's annual holiday away from home?	1 if yes, can afford it, 0 otherwise
furniture	Can you afford to replace any worn-out furniture?	1 if yes, can afford it, 0 otherwise
meals	Can your household afford a meal with meat, chicken or fish every second day (if you wanted it)?	1 if yes, can afford it, 0 otherwise

clothes	Can members of your household afford to buy new, rather than second-hand clothes?	1 if yes, can afford it, 0 otherwise
drinks	Can your household afford to have friends or family for a drink or meal at least once a month?	1 if yes, can afford it, 0 otherwise
bills	Has your household been in arrears for utility bills in the last 12 months?	1 if yes, can afford it, 0 otherwise
	SOCIAL EXCLUSION AND WELL-BEING	
socialexclusion	Social Exclusion Index	Scale from 1 to 5. Higher scores imply higher levels of social exclusion.
outsociety	I feel out of society	1 if agree or strongly agree, 0 otherwise
recognition	I feel that the value of what I do is not recognised by others	1 if agree or strongly agree, 0 otherwise
lookdown	Some people look down on me because of my job situation or income	1 if agree or strongly agree, 0 otherwise
lifecomplex	Life has become so complicated today that I almost cannot find my way	1 if agree or strongly agree, 0 otherwise
satfam	Satisfaction with family life	Scale from 1 to 10. Higher scores imply higher levels of satisfaction.
sateduc	Satisfaction with education	Scale from 1 to 10. Higher scores imply higher levels of satisfaction.
satliving	Satisfaction with standard of living	Scale from 1 to 10. Higher scores imply higher levels of satisfaction.
sataccom	Satisfaction with accommodation	Scale from 1 to 10. Higher scores imply higher levels of satisfaction.
satjob	Satisfaction with present job	Scale from 1 to 10. Higher scores imply higher levels of satisfaction.
	SOCIOECONOMIC AND DEMOGRAPHIC VARIABLES	
female	Gender of the respondents: female	1 if the individual is female, 0 otherwise
Q1	Percentile Group of Income Equivalised: lowest quartile	1 if the individual belongs to the first income quartile, 0 otherwise
Q2	Percentile Group of Income Equivalised: second quartile	1 if the individual belongs to the second income quartile, 0 otherwise
Q3	Percentile Group of Income Equivalised: third quartile	1 if the individual belongs to the third income quartile, 0 otherwise
Q4	Percentile Group of Income Equivalised: highest quartile	1 if the individual belongs to the fourth income quartile, 0 otherwise
loweduc	Respondents with low education	1 if the individual has low education, 0 otherwise
higheduc	Respondents with high education	1 if the individual has high education, 0 otherwise
unemployed	Respondents who are unemployed	1 if the individual is unemployed, 0 otherwise
unable	Respondents who are unable to work due to illness or disability	1 if the individual is unable to work, 0 otherwise
age1	Respondents whose age is between 18-34 years old	1 if the individual's age is between 18-34, 0 otherwise

age2	Respondents whose age is between 35-64 years old	1 if the individual's age is between 35-64, 0 otherwise
age3	Respondents whose age is +65 years old	1 if the individual's age is +65, 0 otherwise

Author's elaboration from the data provided by the EQLS.

As explained above, our dependent variable will be the WHO-5 mental well-being scale measured as a value from 0 to 100; higher scores imply higher levels of mental health. Therefore, our independent variables will be the ones remaining on our list.

Starting with the living standards and deprivation group, we have the Deprivation Index which measures the number of items that cannot be afforded by the household, measured in a scale from 0 to 6. When asked "is your household able to make ends meet?", we create a dummy variable where 1 represents the answers "very easily, easily or fairly easily" and 0 if otherwise; it is overall measured as a percentage of the people that responded. For the affordability variables, the dummy variable represents "yes, can afford it" if 1, and "no, cannot afford it" when 0; they are finally measured as a percentage of the people that responded. Lastly, for the "bills" variable, the answers "yes" are represented as 1 and "no" as 0.

Moving on to the social exclusion and well-being group, we chose the Social Exclusion Index measured as a mean value from 1 to 5, an index constructed on the basis of four items; higher scores imply higher levels of exclusion. Those four items that we just mentioned are variables "society", "recognition", "lookdown" and "lifecomplex", whose answers are represented as 1 for "strongly agree or agree" and 0 for otherwise; they are evaluated as percentages of the people that responded. Finally, for satisfaction variables are expressed as mean value of the people from 1 to 10, meaning greater satisfaction when this number increases.

Regarding the control variables, such as the demographic ones, we chose "female", which means the respondents' gender is female when the dummy is 1 and male when is 0. For the percentile Group of Income Equivalised we have the lowest one when Q1 is 1 and 0 otherwise; the second one when Q2 is 1 and 0 otherwise; the third one when Q3 is 1 and 0 otherwise; the highest one when Q4 is 1 and 0 otherwise. Later on, we will choose Q4 as our reference variable for estimating. It is important to know the existence of a variable for the missing income information for those who did not want to give that information. For the education variables, we have low education when "loweduc" is equal to 1 and 0 if otherwise, and high education for when "higheduc" is 1 and 0 if otherwise. We also collect information about employment status with "unemployed", which means the respondent is unemployed when the variable is 1 and 0 if otherwise; also if the respondent is unable to work due to illness or disability the variable "unable" is equal to 1 and 0 otherwise. Lastly, we have three age groups for ages 18-34 if "age1" is equal to 1, ages 35-64 if "age2" is equal to 1 and ages +65 if "age3" is equal to 1; 0 if otherwise.

3.3. DESCRIPTIVE STATISTICS.

In Table 3.2 we collected the set of all the previous variables used in the econometric model, which provides some elementary descriptive statistical data for each wave: mean and standard deviation.

Table 3.2. Descriptive statistics for all variables. 2007, 2012 and 2016 waves.

VARIABLES	WAVE 2007		WAVE 2012		WAVE 2016	
	Mean	SD	Mean	SD	Mean	SD
mentalhealth	59.6777	21.5449	61.6221	21.4977	62.5762	21.3522
deprivation	1.3701	1.8052	1.5526	1.8590	1.4791	1.8754
endsmeet	0.4353	0.4958	0.4799	0.4996	0.4476	0.4973
homewarm	0.8567	0.3504	0.8417	0.3650	0.8701	0.3362
holiday	0.6091	0.4879	0.5553	0.4969	0.5835	0.4930
furniture	0.6034	0.4892	0.5397	0.4984	0.5744	0.4944
meals	0.8565	0.3506	0.8429	0.3639	0.8463	0.3607
clothes	0.8067	0.3949	0.7621	0.4258	0.7671	0.4227
drinks	0.8171	0.3866	0.7897	0.4075	0.8047	0.3965
bills	0.1336	0.3402	0.1721	0.3775	0.1346	0.3413
socialexclusion	2.2041	0.8399	2.2367	0.8488	2.2154	0.8746
outsociety	0.1001	0.3001	0.1094	0.3121	0.1012	0.3016
recognition	0.1873	0.3901	0.1953	0.3965	0.1979	0.3984
lookdown	0.1421	0.3483	0.1475	0.3546	0.1439	0.3510
lifecomplex	0.2226	0.4159	0.2301	0.4209	0.2039	0.4029
satfam	7.7388	2.1690	7.9612	2.1290	7.8394	2.1258
sateduc	6.7785	2.4917	7.0996	2.4056	7.1644	2.2662
satliving	6.6543	2.3316	6.7100	2.3466	6.7157	2.2536
sataccom	7.4186	2.1988	7.6619	2.1458	7.5697	2.0835
satjob	7.1469	2.1525	7.4621	2.1078	7.3878	2.0790
female	0.5689	0.4952	0.5694	0.4952	0.5656	0.4957
Q1	0.1747	0.3797	0.1872	0.3901	0.2034	0.4026
Q2	0.1939	0.3791	0.1883	0.3909	0.2052	0.4038
Q3	0.1758	0.3807	0.1879	0.3907	0.2044	0.4033
Q4	0.1745	0.3795	0.1887	0.3913	0.2053	0.4039
loweduc	0.3384	0.4732	0.3243	0.46812	0.3006	0.4585

higheduc	0.1887	0.3913	0.2356	0.4243	0.2646	0.4411
unemployed	0.0515	0.2210	0.0811	0.2730	0.0716	0.2578
unable	0.0231	0.1502	0.0205	0.1419	0.0191	0.1370
age1	0.2486	0.4322	0.2474	0.4315	0.2183	0.4131
age2	0.5315	0.4990	0.5143	0.4998	0.5251	0.4994
age3	0.2199	0.4141	0.2383	0.4260	0.2565	0.4367

Author's elaboration from the data provided by the EQLS.
n_{2007} = 35,634 ; n_{2012} = 43,636 ; n_{2016} = 36,908

Starting off with our dependent variable, we find that the mean value for the Mental Health Index is 59.67 in the 2007 wave, and it gets better within time, up to 62.58 in 2016. In terms of the Deprivation Index, the average number of items that the respondents cannot afford is 1.37 in 2007; it increases for the 2012 wave (1.55) but then it slightly goes down in 2016 to 1.48. Moreover, just 55.52% of respondents in 2007 found easily, very easily or fairly easily to make their ends meet; a percentage that has been decreasing through waves, especially in 2012 (50.65%). Regarding affordability, when asked if they can afford to keep their home adequately warm, 85.67% of the respondents replied affirmatively; yet again, this number declines in the 2012 wave but bounces back in 2016. Only 60.34% of the people can afford to replace any worn-out furniture, and even worse in 2012 with just a percentage of 53.97%. When asked if their household can afford a meal with meat, chicken or fish every second day (if they wanted it) or if members of their household can afford to buy new, rather than second-hand clothes, 85.65% of the respondents replied yes in the first case and 80.67% in the second one, for our first wave. Once again, we can observe the same trend as before, where the numbers decrease in 2012 and slightly increase in 2016 (84.63% and 76.71% respectively). 81.71% of the respondents can afford to have friends or family for a drink or meal at least once a month in 2007, similar to 2016 with 80.47%. Regarding having their household in arrears for utility bills in the last 12 months, 13.36% replied affirmatively in 2007, 17.21% in 2012 and 13.46% in the last wave.

Moving on to the social exclusion and well-being group, we observe a tiny increase in the Social Exclusion Index, from 2.20 in 2007 to 2.21 in 2016. In the first wave, 10.01% of the respondents felt out of society, a number maintained through waves, with a 10.12% in 2016. In 2007, 18.73% of the respondents felt that the value of what they do is not recognised by others, increasing up to 19.79% in 2016. Similar to feeling that some people look down on them because of their job situation or income, slightly growing from 14.21% in 2007 to 14.39%. Focusing now on satisfactions, the biggest percentages correspond to family life, with 7.96 in 2012, even though it decreased to 7.84 in 2016. Then we have satisfaction with accommodation, which changed from 7.42 in 2007 to 7.57 in 2016; satisfaction with job comes afterwards, with 7.15 in 2007 to 7.39 in 2016. Satisfaction with educations is the one who has increased the most of them all over the years, with 6.78 points in 2007 to 7.16 in 2016. Finally, satisfaction with standard of living is the lowest of the satisfactions in all three waves: 6.65 in 2007, 6.71 in 2012, 6.72 in 2016.

Regarding the control variables, we observe that the percentage of females stays similar in time, around 56%. The percentage of people in the first quartile increases from 17.47% to 20.34%, as well as with the second one from 19.39% to 20.52%- The third and the fourth quartiles also grow with time, from 17.58% to 20.44% and 17.45% to 20.53%, respectively. This phenomenon can be explained with the missing income information variable, which decreases from 2007 to 2016 in 12 points (until 18.17%). In

2007, 33.84% of the respondents had low education while in 2016 changed to 30.06%; on the other hand, high education increased from 18.87% to 26.46%. Also, 5.15% were unemployed respondents in 2007, up to 7.16% in 2016; unable workers represented 2.31% in the first wave and decreased to 1.91% in 2016. Finally, age groups stay similar through the years, with 21.83% of respondents between 18 and 34 years, 52.51% between 35 and 64, and 25.65% over 65 years old in 2016.

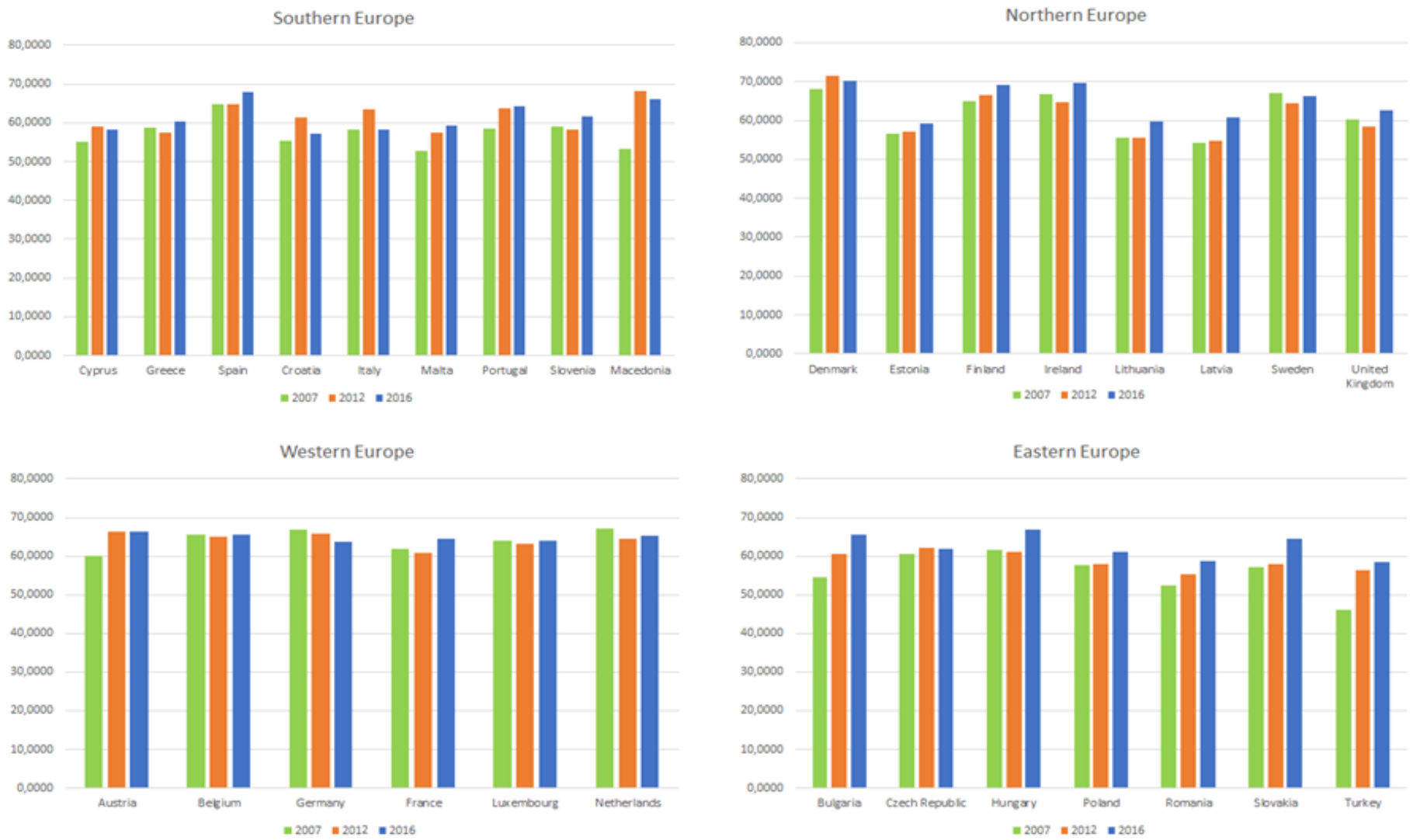
Moreover, some of our analyses will be carried out in country groups. These categories have been established according to the geographical area where each country is located; we chose this classification because the primary dimension of regional income disparities in the European countries remains East-West, with a weaker North-South dynamic and core-periphery pattern at both EU and national levels (Commission of the European Communities, 2008). Our groups are: Southern Europe (Cyprus, Greece, Spain, Croatia, Italy, Malta, Portugal, Slovenia, Macedonia); Northern Europe (Denmark, Estonia, Finland, Ireland, Lithuania, Latvia, Sweden, United Kingdom); Western Europe (Austria, Belgium, Germany, France, Luxembourg, Netherlands); Eastern Europe (Bulgaria, Czech Republic, Hungary, Poland, Romania, Slovakia, Turkey).

In figure 3.1. we can observe the evolution of the Mental Health Index for the different analysed countries by groups through waves. The highest score is held by Denmark in the 2012 wave with 71.39 points; even though it slightly decreased in 2016, it is still the country with the highest score. Ireland comes second with 69.66 points, followed by Finland with 69.37.

On the other hand, the one with the lowest score is Turkey in 2007, with 46.03 points; fortunately, this index increased through the years, up to 58.43 in 2016; however, it is still one of the countries with the lower punctuation, just above Croatia (57.18), Cyprus (58.30) and Italy (58.31).

Overall, we can observe a general increasing pattern over the years; exceptions are Germany (from 66.98 to 63.59), Netherlands (from 67.07 to 65.29) and Sweden (from 67.03 to 66.17). Examples like Luxembourg show no significant change through waves (63.92), as well as Belgium (around 65.50).

Figure 3.1. Mental Health Index by country group and wave.



Author's elaboration from the data provided by the EQLS. Abscissa axis: European countries. Ordinate axis: Mental Health Index.

4. METHODOLOGY

Firstly, we start off by running a Robust Ordinary Least Squares (OLS) regression with the software Stata 15.1. As this method is very basic, we have not added those results in this document, but they are available for anyone who would ask for them. We established different analysis groups considering the characteristics of our independent variables. Therefore, we find five categories: affordability, debts, social exclusion, satisfactions, main indices. Once we have an initial idea from these first results, we move onto the next step: Ordered Probit regression (Wooldridge, 2010).

In order to be able to run this model, we need to transform our dependent variable, the Mental Health Index, into a categorical one, that is to say, we divide it in different sections. Therefore, we create a new variable called "mentalhealthGROUPS", which takes the value 1 when the index is between 0 a 20 in our mental health scale (y=1), 2 if it is between 21 and 40 (y=2), 3 if between 41 and 60 (y=3), 4 if between 61 and 80 (y=4), and finally 5 if it is between 81 and 100 (y=5). We can label them as: very bad mental health, bad mental health, fair mental health, good mental health and very good mental health, respectively. The descriptive statistics of this new variable are presented here:

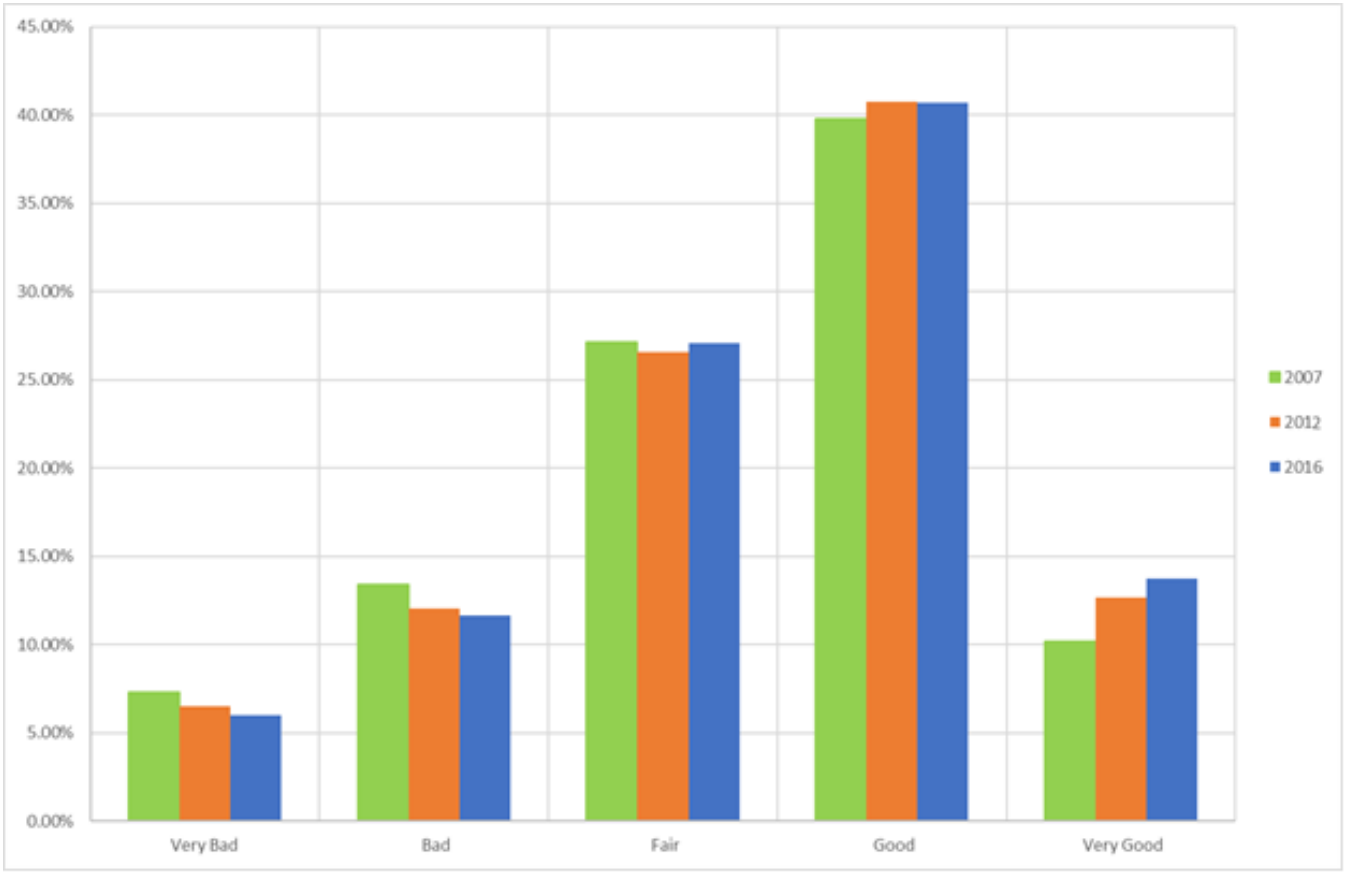
Table 3.3. Descriptive statistics for the variable *mentalhealthGROUPS*. 2007, 2012 and 2016 waves.

2016		
mentalhealthGROUPS	**Mean**	**Std. Dev.**
Very Bad	0.0601	0.2376
Bad	0.1163	0.3206
Fair	0.2707	0.4443
Good	0.4071	0.4913
Very Good	0.1372	0.3440
2012		
mentalhealthGROUPS	**Mean**	**Std. Dev.**
Very Bad	0.0653	0.2470
Bad	0.1207	0.3258
Fair	0.2657	0.4417
Good	0.4076	0.4914
Very Good	0.1267	0.3326
2007		
mentalhealthGROUPS	**Mean**	**Std. Dev.**
Very Bad	0.0729	0.2600
Bad	0.1342	0.3408
Fair	0.2713	0.4446
Good	0.3978	0.4894
Very Good	0.1020	0.3026

Author's elaboration from the data provided by the EQLS.

In table 3.3., we can observe that the majority of respondents consider that their mental health is good (around 40.71% in 2016), and only a few people would say it is very bad (6.01%) or very bad (11.63%). The percentages for very good mental health have increased through waves, in the same way that very bad mental health scores have decreased over the years. We also represent these descriptive statistics in the following graph (figure 3.2.):

Figure 3.2. Percentages of people with different levels of mental health. 2007, 2012 and 2016 waves.



Author's elaboration from the data provided by the EQLS. Abscissa axis: mental health groups. Ordinate axis: percentage of people.

Henceforth, this will be our new dependent variable for our new models, since the Ordered Probit regressions need a dependent variable that is ordered in categories. As we have 5 different categories, there will be one set of coefficients with four intercepts and four sets of marginal effects, one for each category. We will use the groups established in the previous OLS regression as well.

The ordered probit model is based on an index model for a single latent variable[9] *y** (which is unobservable, we only know when it crosses thresholds).

$$y_i^* = \boldsymbol{x}'_i \beta + u_i \quad (1)$$

$$u_i \sim N(0,1), \forall\ I = 1, \dots, n. \quad (2)$$

$$y_i = j \text{ if } \alpha_{j-1} < y_i^* \leq \alpha_j \quad (3)$$

The probability that observation *i* will select alternative *j* is:

$$p_{ij} = p\ (y_i = j\ ) = p\ (\alpha_{j-1} < y_i^* < \alpha_j) = F\ (\alpha_j - \boldsymbol{x}_i' \beta) - F\ (\alpha_{j-1} - \boldsymbol{x}_i' \beta) \quad (4)$$

where *i* is the respondent *i, i* = 1, … ,n, where n is the sample size; y_i is the individual *i*'s response to the survey question, and we assume that this can take one of the integer values 1,2, … , J; x_i is a vector of characteristics relevant in explaining the attitude of a respondent. For the ordered probit, *F* is the standard normal cumulative distribution function[10]. As we said before, the ordered probit model with j alternatives will have one set of coefficients with (*j-1*) intercepts; that is why we have four. An ordered choice model can be recognised by the multiple intercepts. Therefore, the parameter α_{j-1} is known as "cut-points", or also "threshold parameters".

As the ordered probit coefficients differ by a scale factor, we cannot interpret the magnitude of them, we can only obtain qualitative results. Therefore, in order to get quantitative ones, we also run a probit regression and its corresponding average and marginal effects (Wooldridge, 2016). For this model, we need a binary variable as the dependent variable, so we transform the Mental Health Index into a dichotomous variable called *mentalhealthdummy*: it takes the value 1 if the index's score is between 61 and 100 (y=1), that is to say, if the respondent has very good or good mental health, and 0 if otherwise (y=0).

In Figure 3.3., we represent this new variable for each country and each wave. As we can observe, the percentage of people with good or very good mental health has increased through waves for almost all countries. However, we can find some exceptions: Germany, Netherlands and Sweden have lower percentages from 2007 to 2016, while Italy and Luxembourg remain similar over the years. The biggest numbers in 2016 correspond to Denmark with 70.22%, Ireland with 69.66% and Finland with 69.27%. On the other hand, the smallest numbers are for Croatia with 57.18%, Cyprus and Italy, with both 58.31%.

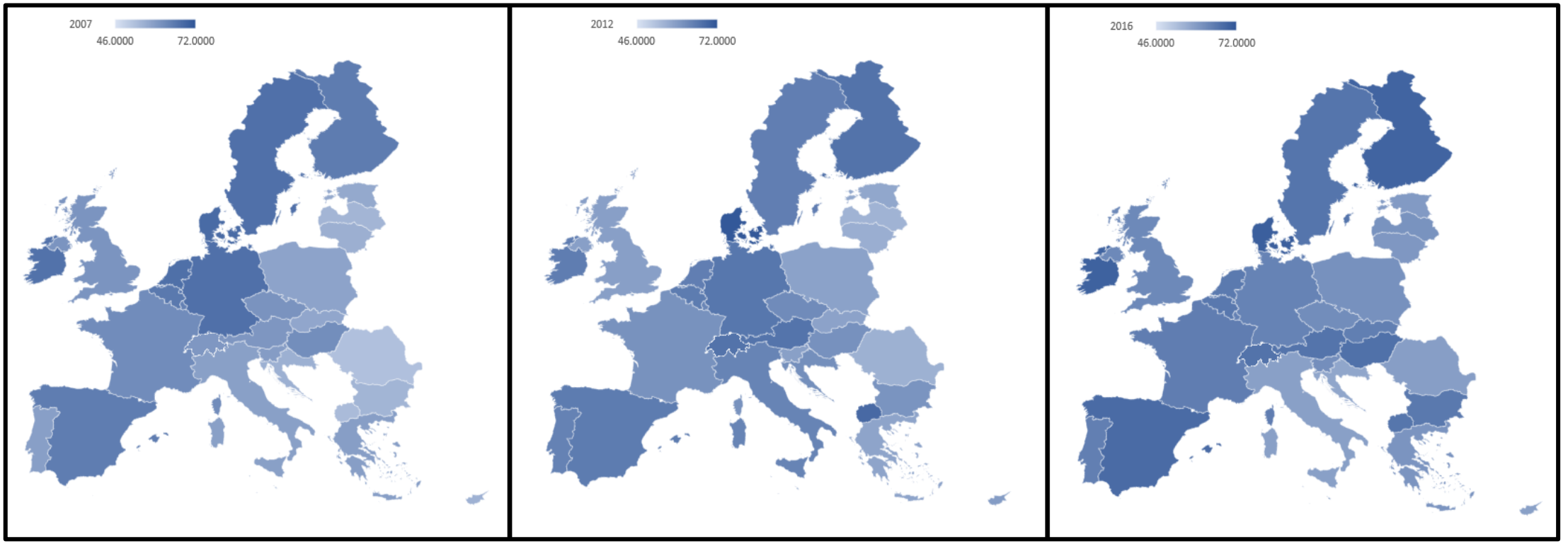
[9] A latent variable is a variable that is inferred using models from observed data; that is to say, latent refers to the fact that even though these variables were not measured directly in the research design, they are the ultimate goal of the project.

[10] The (cumulative) distribution function of a random variable X, evaluated at x, is the probability that X will take a value less than or equal to x.

$F(x) = P(X \leq x)$

In the case of a continuous distribution (like the normal distribution) it is the area under the probability density function (the 'bell curve') from the negative left (minus infinity) to x.

Figure 3.3. Percentage of respondents who present good or very good mental health by country. 2007, 2012 and 2016 waves.



Author's elaboration from the data provided by the EQLS.

In probit regression, the cumulative standard normal distribution function $\phi(\cdot)$ is used to model the regression function when the dependent variable is binary, that is, we assume:

$$E(Y \mid X) = P(Y = 1 \mid X) = \phi(\beta X) \quad (5)$$

where β plays the role of a quantile z: $\phi(z) = P(Z \leq z)$, $Z \sim N(0,1)$

The probit coefficient β is the change in z associated with a one-unit change in X. Although the effect on z of a change in X is linear, the link between z and the dependent variable Y is nonlinear since ϕ is a nonlinear function of X. So, as we have been saying, for this model, $F(\boldsymbol{x}'\beta)$ is the cumulative distribution function of the standard normal distribution:

$$F(\boldsymbol{x}'\beta) = \Phi(\boldsymbol{x}'\beta) = \int_{-\infty}^{x'\beta} \phi(z)dz \quad (6)$$

The predicted probabilities are limited between 0 and 1 and the probit model is estimated using the maximum likelihood method[11]. Since the dependent variable is a nonlinear function of the regressors, the coefficient on X has no direct interpretation, therefore, so far, we have not obtained the quantitative results that we aimed for. In order to get them, we also estimate the average and marginal effects, since they reflect the change in the probability of y=1 given a one-unit change in an independent variable x. They are calculated as:

$$\frac{\partial p}{\partial x_j} = F'(x'\beta)\,\beta_j \quad (7)$$

In our particular case:

$$\frac{\partial p}{\partial x_j} = \phi(x'\beta)\,\beta_j \quad (8)$$

Finally, our last step consists of carrying out different Concentration Indices (CI), which measure inequality in one variable over the distribution of another variable (Kakwani, 1977). The main reason for choosing this approach is that those indices are a particularly popular choice for the measurement of socioeconomic-related health inequality (O'Donnell et al., 2007), since it captures to which extent health differs across individuals ranked by some indicator of socioeconomic status. In order to address this concept, the *CONINDEX* command of STATA 15.1 software is used for all calculations (O'Donnell et al., 2016). The four indices that we will use are: the Standard Concentration Index (C), the Generalized Concentration Index (GC), the Erreygers Index (E), the Wagstaff index (W).

The Standard Concentration Index (C) is represented by the concentration curve, which is the bivariate analogue of the Lorenz curve, that is to say, it plots the cumulative proportion of one variable against the cumulative proportion of another variable.

[11] Maximum Likelihood Estimation is a probabilistic framework for solving the problem of density estimation. It involves maximizing a likelihood function in order to find the probability distribution and parameters that best explain the observed data. It also provides a framework for predictive modelling in machine learning where finding model parameters can be framed as an optimization problem.

Therefore, this index measures relative inequality and is invariant to equiproportionate changes in the variable of interest (mental health for us). It is defined as:

$$C\,(h/y) = \frac{2cov\,(h_i, R_i)}{\bar{h}} = \frac{1}{n}\sum_{i=1}^{n}\left\{\frac{h_i}{\bar{h}}\,(2R_i - 1)\right\} \qquad (9)$$

where h_i is the health variable in which inequality is measured, in our case, mental health. C ranges from *(1 - n) / n*, maximal pro-poor inequality (that is, all health is concentrated on the poorest individual), to *(n - 1) / n*, maximal pro-rich inequality.

On the other hand, if we want to study absolute invariance, then we have the Generalized Concentration Index (GC), which corresponds to an inequality measure that is invariant to equal additions to health. This measure can be obtained through multiplication of the Standard Concentration Index by the mean mental health (Wagstaff et al, 1991). When two distributions display the same level of relative inequality, the one with the higher mean will correspond to greater absolute inequality. The Generalized Concentration Index can be expressed as:

$$CG\,(h/y) = \frac{1}{n}\sum_{i=1}^{n}\left\{\frac{h_i}{\bar{h}}\,(2R_i - 1)\right\} \qquad (10)$$

and it ranges between $\bar{h}$ *{(1 - n) / n}*, maximal pro-poor, and $\bar{h}$ *{(n - 1) / n}*, maximal pro-rich.

The Standard and Generalized Concentration indices are not necessarily invariant, or equivariant, under transformations of the variable of interest that are permissible for the level of measurement (that is, nominal, ordinal, cardinal, ratio, or fixed scale). Therefore, we can address this by using the Erreygers Index (E), proposed by Erreygers (2011) as a modification of the Generalized Concentration Index that corrects those deficiencies:

$$E\,(a/y) = \frac{1}{n}\sum_{i=1}^{n}\left\{\frac{4a_i}{a^{max} - a^{min}}\,(2R_i - 1)\right\} = -\,E\,(s/y) \qquad (11)$$

and this index ranges between −1 and +1. Erreygers introduced the “mirror” property, which requires that the magnitude of measured inequality represented by the absolute value of an index should not depend on whether the index is computed over attainments or shortfalls ($a_i \in [a^{min}, a^{max}]$).

Moreover, Wagstaff (2005) noted that the range of the Standard Concentration Index depends on the mean of the bounded variable and suggested rescaling the C Index to ensure that it always lies in the range [−1, 1] as well:

$$W\,(a/y) = \frac{1}{n}\sum_{i=1}^{n}\left\{\frac{(a^{max} - a^{min})a_i}{(a^{max} - \bar{a})\,(\bar{a} - a^{min})}\,(2R_i - 1)\right\} = -\,W\,(s/y) \qquad (12)$$

this index satisfies the mirror condition and so cannot be in line with the relative invariance criterion. Neither does it satisfy an absolute invariance criterion.

However, if we realise that that any bounded variable can be retransformed into an indicator of the proportional deviation from the minimum value, $b_i = (\bar{a} - a^{min}) / (a^{max} - a^{min})$, we see that this lies on the range [0, 1] and records only “real” changes in the underlying attribute, not “nominal” ones due to the choice of measurement scale. Under this transformation, the Erreygers and Wagstaff indices simplify, respectively, to:

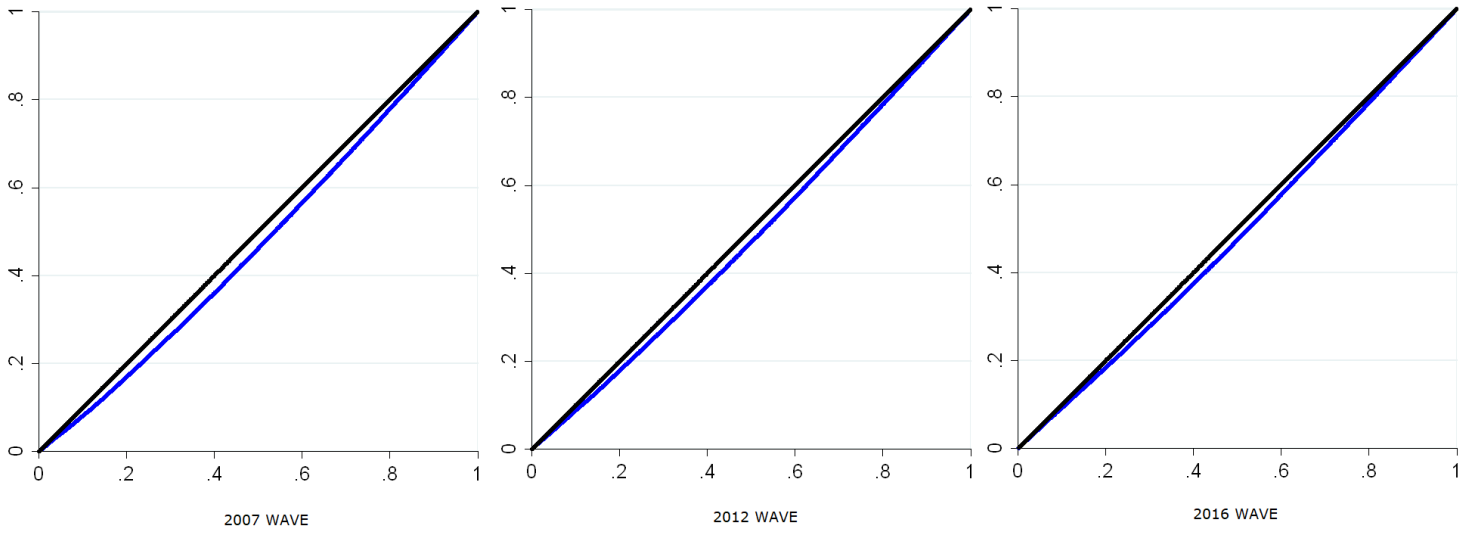
$$E\,(b/y) = \frac{1}{n}\sum_{i=1}^{n}\{4b_i(2R_i - 1)\} \qquad (13)$$

and

$$W\,(b/y) = \frac{1}{n}\sum_{i=1}^{n}[\left\{\frac{b_i}{(1-\bar{b})}\right\}\bar{b}(2R_i - 1)] \qquad (14)$$

Before starting, we represent the Concentration Curve for Mental Health Index against Equivalised monthly household income in PPP euros in Europe, 2016, 2012 and 2007 waves. The concentration curve always lies below the diagonal, which indicates greater mental health scores by those ranked higher according to the household income.

Figure 3.4. Concentration Curve for Mental Health Index against Equivalised monthly household income in PPP euros in Europe. 2007, 2012 and 2016 waves.

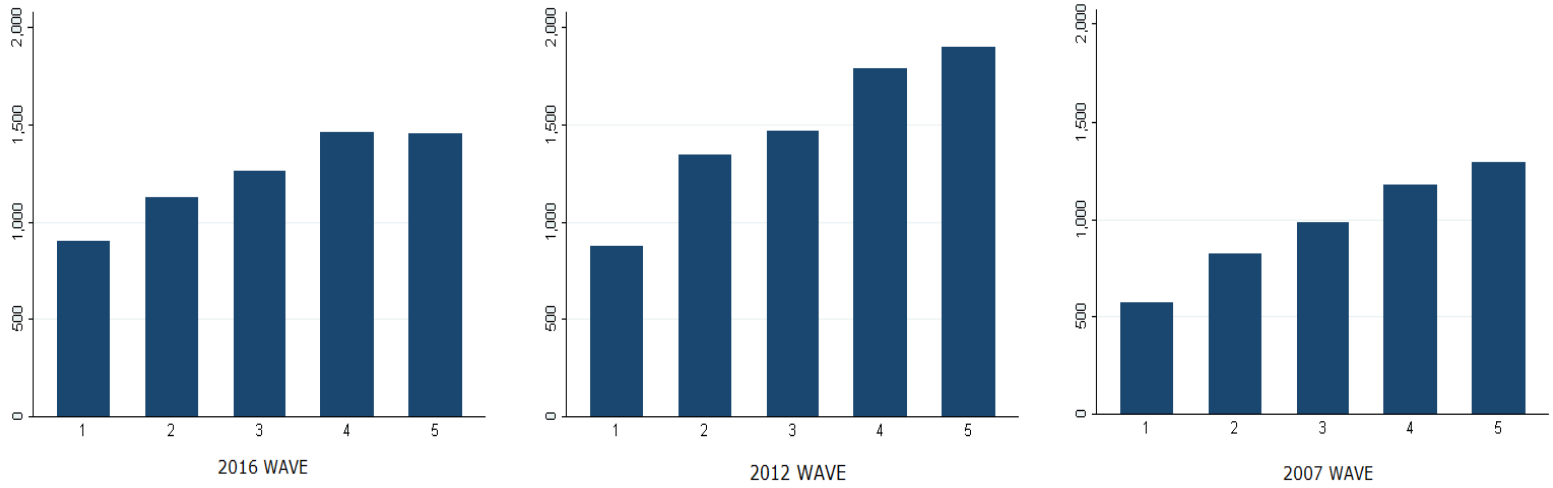


Author's elaboration from the data provided by the EQLS. Abscissa axis: Rank of equivalised monthly household income in PPP euros (0-1). Ordinate axis: Cumulative Share of Mental Health Index (0-1).

In Figure 3.3. we can observe how the Concentration Curve gets closer to the 45º line, meaning the inequality has decreased through waves. This is just a first look, but we will dive into it with the different Concentration Indices later on.

Now, moving on to the empirical approach, for the first two indices, Standard and Generalized Concentration Indices, we need an unbounded variable with a ratio scale, which in our case will be the *Equivalised monthly household income in PPP euros* (whose mean is 1206.09) provided by our database, and also the Mental Health Index, that we have previously defined.

Figure 3.5. Equivalised monthly household income in PPP euros over Mental Health quartiles in Europe. 2007, 2012 and 2016 waves.

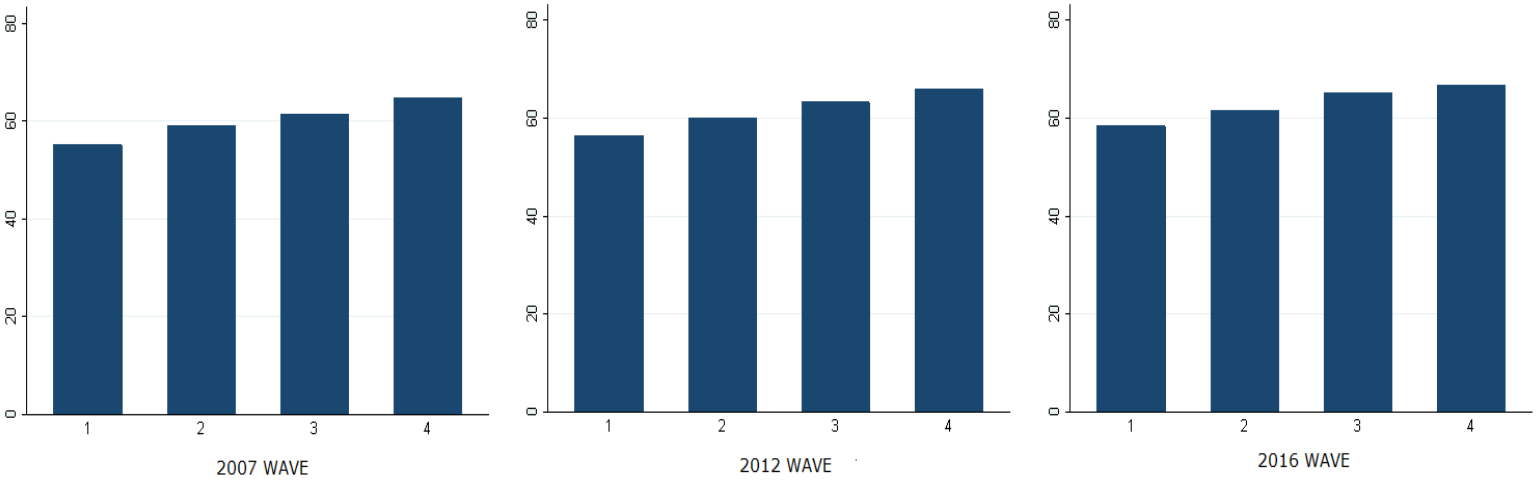


Author's elaboration from the data provided by the EQLS. Abscissa axis: mental health quartiles (1-5). Ordinate axis: equivalised monthly household income in PPP euros (0-2000).

In Figure 3.5. we can observe that the equivalised monthly household income rises from below 1000€ in the lowest mental health quartile to almost 1500€ in the top group in 2016. In 2012 these differences were even bigger, with a gap of around 1000€ between the "very bad" mental health and the "very good" mental health. Compared to the first wave, in 2016 the fourth and fifth quartile of mental health are more alike, and the inequalities have decreased. In the next section we will obtain the exact numbers thanks to the *conindex* command.

For the other two indices (E and W), we will use our binary variables for each income quartile, in order to get more detailed information, as well as the binary variables for each category from the Mental Health Groups. In Figure 3.6. we can observe a similar pattern as before: higher income quartiles have better mental health scores through all waves. We can see that, at first sight, these differences have decreased, since the first income quartile is closer to the point 60 than in previous years, while the highest quartile stays similar.

Figure 3.6. Mental Health Index over Income Quartiles in Europe. 2007, 2012 and 2016 waves.



Author's elaboration from the data provided by the EQLS. Abscissa axis: income quartiles (1-4). Ordinate axis: Mental Health Index (0-80).

5. RESULTS

In this section, we can observe the tables which collect all the results we gathered from the models that we have previously explained, along with their corresponding comments about it. Starting off with the ordered probit regression, here below we show what we found:

Table 5.1. Ordered Probit regression[12] for the Affordability model. Dependent variable: *mentalhealth*. 2007, 2012, 2016 waves.

	2016		2012		2007	
Variables	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**
cut1	-1.3427	0.0265	-1.2650	0.0234	-0.9653	0.0267
cut2	-0.6579	0.0256	-0.5810	0.0227	-0.2370	0.0261
cut3	0.2046	0.0255	0.2607	0.0227	0.6155	0.0262
cut4	1.4703	0.0261	1.5627	0.0233	1.9787	0.0273
home	0.1075 ***	0.0191	0.1675 ***	0.0162	0.1420 ***	0.0190
holiday	0.2441 ***	0.0161	0.2435 ***	0.0143	0.2559 ***	0.0170
furniture	0.1801***	0.0161	0.1511 ***	0.0142	0.2299 ***	0.0168
meals	0.0598 ***	0.0198	0.0672 ***	0.0175	0.2183 ***	0.0209
clothes	0.1275 ***	0.0183	0.1339 ***	0.0162	0.1293 ***	0.0198
drinks	0.1182 ***	0.0183	0.1704 ***	0.0159	0.1626 ***	0.0189
female	-0.1270 ***	0.0113	-0.1272 ***	0.0105	-0.1468 ***	0.0117
Q1	-0.0593 **	0.0165	-0.0810 ***	0.0152	-0.0309 *	0.0173
Q2	-0.0346 **	0.0157	-0.0381 ***	0.0145	0.0249	0.0165
Q3	0.0099	0.0153	-0.0327 **	0.0142	0.0051	0.0160
loweduc	-0.0886 ***	0.0139	-0.1114 ***	0.0125	-0.0686 ***	0.0136
higheduc	0.0294 **	0.0141	-0.0173	0.0133	0.0815 ***	0.0159
unemployed	0.0405 *	0.0225	0.0337 *	0.0196	-0.0396	0.0267
unable	-0.5146 ***	0.0412	-0.5106 ***	0.0368	-0.5359 ***	0.0387
age2	-0.1802 ***	0.0143	-0.1855 ***	0.0127	-0.1442 ***	0.0140
age3	-0.2081 ***	0.0171	-0.2137 ***	0.0157	-0.1581 ***	0.0178

Author's elaboration from the data provided by the EQLS, run with Stata.
n_{2007} = 34,272 ; n_{2012} = 42,756 ; n_{2016} = 36,413

First of all, when analysing the ordered probit models, it is important to keep in mind that coefficients differ by a scale factor, and therefore, we cannot interpret the magnitude of the coefficients, so in this part, we will just discuss the qualitative outcomes.

In Table 5.1. we can observe that the mental health index is better (from very bad, to bad, to fair, to good, to very good) if respondents can afford to keep their home adequately warm, if they can afford to pay for a week's annual holiday away from home, if they can afford to replace any worn-out furniture, if the household can afford a meal with meat, chicken or fish every second day (if wanted), if members of the household can afford to buy new, rather than second-hand clothes, and if the household can afford to have friends or family for a drink or meal at least once a month.

[12] *** p < 0.01, ** p < 0.05, and * p < 0.1

Regarding the demographic variables, they show that the mental health index is better if you are not a female, and if you do not belong to the first and second income quartiles compared to the highest one. The third quartile is positive for 2016 but the significance is not high; in 2012 the impact is negative. We can also observe that the mental health index is better if you do not have a low education level, and if you do have a higher one, in comparison to the middle level category. Unemployment does not affect negatively, but it does be unable to work. Finally, the mental health index gets worse with age.

Table 5.2. Ordered Probit Regression for the Debts model. Dependent variable: *mentalhealth*. 2007, 2012, 2016 waves.

	2016		2012		2007	
Variables	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**
cut1	-1.7275	0.0212	-1.7297	0.0185	-1.5544	0.0200
cut2	-1.0492	0.0197	-1.0582	0.0171	-0.8446	0.0186
cut3	-0.1889	0.0192	-0.2234	0.0166	-0.0012	0.0182
cut4	1.0800	0.0198	1.0783	0.0172	1.3597	0.0194
endsmeet	0.4684 ***	0.0125	0.4975 ***	0.0112	0.5628 ***	0.0128
bills	-0.2609 ***	0.0173	-0.1752 ***	0.0142	-0.2548 ***	0.0178
female	-0.1315 ***	0.0113	-0.1378 ***	0.0104	-0.1552 ***	0.0116
Q1	-0.0833 ***	0.0164	-0.1154 ***	0.0151	-0.0708 ***	0.0172
Q2	-0.0355 **	0.0157	-0.0424 ***	0.0145	0.0118	0.0165
Q3	0.0084	0.0152	-0.0284 **	0.0142	0.0041	0.0160
loweduc	-0.1158 ***	0.0138	-0.1580 ***	0.0124	-0.1239 ***	0.0135
higheduc	0.0397 ***	0.0140	-0.0124	0.0133	0.0920 ***	0.0159
unemployed	0.0304	0.0225	0.0048	0.0196	-0.0714 ***	0.0266
unable	-0.5524 ***	0.0411	-0.5589 ***	0.0368	-0.5421 ***	0.0387
age2	-0.1749 ***	0.0143	-0.1908 ***	0.0127	-0.1442 ***	0.0140
age3	-0.2616 ***	0.0171	-0.2860 ***	0.0157	-0.2215 ***	0.0178

Author's elaboration from the data provided by the EQLS, run with Stata.
n_{2007} = 34,272 ; n_{2012} = 42,756 ; n_{2016} = 36,413

In table 5.2. we find that the mental health index is better (from very bad, to bad, to fair, to good, to very good) if respondents are able to make their ends meet but it is not the case if their household has been in arrears for utility bills in the last 12 months. Considering the other variables, we observe the same as previously, the Mental Health Index gets better if you are not a female and if you are not from the first three income quartiles (compared to the highest one). Lower education level has a negative impact, unlike the higher level one. Unemployment is negative for the 2007 wave with, as well as unable to work for the three waves. Finally, the mental health index gets worse with age.

Table 5.3. Ordered Probit Regression for the Social Exclusion model. Dependent variable: *mentalhealth*. 2007, 2012, 2016 waves.

	2016		2012		2007	
Variables	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**
cut1	-2.1122	0.0199	-2.1032	0.0175	-1.9844	0.0188
cut2	-1.4296	0.0180	-1.4316	0.0158	-1.2841	0.0169
cut3	-0.5755	0.0170	-0.6052	0.0149	-0.4563	0.0160
cut4	0.6768	0.0173	0.6782	0.0152	0.8797	0.0167
outsociety	-0.2637 ***	0.0208	-0.1965 ***	0.0179	-0.2187 ***	0.0213
recognition	-0.1596 ***	0.0157	-0.1488 ***	0.0142	-0.1095 ***	0.0162
lookdown	-0.0590 ***	0.0176	-0.1139 ***	0.0157	-0.1099 ***	0.0180
lifecomplex	-0.3457 ***	0.0159	-0.3419 ***	0.0135	-0.3971 ***	0.0154
female	-0.1584 ***	0.0113	-0.1566 ***	0.0104	-0.1730 ***	0.0116
Q1	-0.1776 ***	0.0161	-0.1992 ***	0.0148	-0.1853 ***	0.0168
Q2	-0.1103 ***	0.0155	-0.1030 ***	0.0144	-0.0722 ***	0.0163
Q3	-0.0051	0.0152	-0.0476 ***	0.0141	-0.0355 **	0.0159
loweduc	-0.0967 ***	0.0138	-0.1462 ***	0.0124	-0.1507 ***	0.0134
higheduc	0.0940 ***	0.0139	0.0259 *	0.0132	0.1498 ***	0.0157
unemployed	-0.0034	0.0224	-0.0328 *	0.0195	-0.0961 ***	0.0266
unable	-0.5102 ***	0.0412	-0.5369 ***	0.0369	-0.5119 ***	0.0388
age2	-0.1912 ***	0.0143	-0.1864 ***	0.0127	-0.1317 ***	0.0140
age3	-0.2337 ***	0.0171	-0.2354 ***	0.0156	-0.1548 ***	0.0177

Author's elaboration from the data provided by the EQLS, run with Stata.
n_{2007} = 34,272 ; n_{2012} = 42,756 ; n_{2016} = 36,413

In table 5.3. we find that the mental health index is better (from very bad, to bad, to fair, to good, to very good) if you do not feel out of society, nor feel that the value of what you do is not recognised by others, nor some people look down on you because of your job situation or income, nor life has become so complicated today that you almost cannot find your way. Regarding the demographic variables, we observe the same pattern as in previous tables; negative impact for being a female, for being in the lowest, second and third income quartile (compared to the highest one), and for both of our age categories. Level of education and employment status are not estimated in this model because of the high correlation with job and education satisfaction.

Table 5.4. Ordered Probit Regression for the Satisfactions model. Dependent variable: *mentalhealth*. 2007, 2012, 2016 waves.

	2016		2012		2007	
mentalhealth	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**
cut1	-0.3043	0.0494	-0.2079	0.0462	-0.2987	0.0454
cut2	0.4458	0.0480	0.5620	0.0452	0.4999	0.0444
cut3	1.4286	0.0486	1.5212	0.0459	1.4785	0.0452
cut4	2.8528	0.0509	2.9997	0.0483	3.0159	0.0481
satfam	0.0675 ***	0.0050	0.0721 ***	0.0046	0.0566 ***	0.0050
sateduc	0.0109 **	0.0048	0.0154 ***	0.0041	0.0173 ***	0.0043
satliving	0.0624 ***	0.0059	0.0950 ***	0.0051	0.1007 ***	0.0060

sataccoom	0.0256 ***	0.0055	0.0108 **	0.0049	-0.0021	0.0055
satjob	0.0805 ***	0.0051	0.0681 ***	0.0047	0.0767 ***	0.0052
female	-0.1512 ***	0.0163	-0.1898 ***	0.0157	-0.1318 ***	0.0169
Q1	-0.0794 ***	0.0271	-0.0678 **	0.0267	-0.0841 ***	0.0301
Q2	-0.0443 *	0.0235	-0.0028	0.0229	0.0082	0.0253
Q3	-0.0109	0.0202	-0.0063	0.0199	-0.0245	0.0216
age2	-0.1192 ***	0.0185	-0.1372 ***	0.0173	-0.1251 ***	0.0184
age3	-0.0086	0.0600	-0.0637	0.0739	-0.0248	0.0818

Author's elaboration from the data provided by the EQLS, run with Stata.
n_{2007} = 34,272 ; n_{2012} = 42,756 ; n_{2016} = 36,413

In table 5.4. we find that the mental health index is better (from very bad, to bad, to fair, to good, to very good) if respondents' satisfaction with life, education, standard of living, accommodation and job gets higher. Once again, we observe a negative impact for being a female and the age groups show negative signs as well, even though the older age group is not significant in this case. Education and employment variables are omitted in this case, because of the correlation between these variables and the job and education satisfaction.

Table 5.5. Ordered Probit Regression for the Main Indices model. Dependent variable: *mentalhealth*. 2007, 2012, 2016 waves.

	2016		**2012**		**2007**	
Variables	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**
cut1	-2.8402	0.0268	-2.8322	0.0246	-2.6719	0.0261
cut2	-2.1359	0.0247	-2.1197	0.0228	-1.9233	0.0241
cut3	-1.2380	0.0234	-1.2483	0.0215	-1.0438	0.0229
cut4	0.0671	0.0230	0.0975	0.0211	0.3532	0.0228
deprivation	-0.0975 ***	0.0037	-0.1247 ***	0.0034	-0.1565 ***	0.0040
socialexclusion	-0.3126 ***	0.0075	-0.2929 ***	0.0071	-0.2761 ***	0.0078
female	-0.1408 ***	0.0118	-0.1344 ***	0.0111	-0.1520 ***	0.0120
Q1	-0.0476 ***	0.0174	-0.0569 ***	0.0163	0.0056	0.0180
Q2	-0.0428 ***	0.0164	-0.0326 **	0.0154	0.0269	0.0171
Q3	0.0031	0.0158	-0.0368 **	0.0149	0.0065	0.0164
loweduc	-0.0540 ***	0.0145	-0.0936 ***	0.0133	-0.0648 ***	0.0141
higheduc	0.0056	0.0146	-0.0420 ***	0.0140	0.0497 ***	0.0162
unemployed	0.1053 ***	0.0236	0.1063 ***	0.0211	0.0425	0.0280
unable	-0.4321 ***	0.0435	-0.4258 ***	0.0395	-0.4357 ***	0.0405
age2	-0.1917 ***	0.0148	-0.1833 ***	0.0134	-0.1345 ***	0.0144
age3	-0.2268 ***	0.0179	-0.2212 ***	0.0168	-0.1437 ***	0.0184

Author's elaboration from the data provided by the EQLS, run with Stata.
n_{2007} = 34,272 ; n_{2012} = 42,756 ; n_{2016} = 36,413

In table 5.5. we find that the mental health index is better (from very bad, to bad, to fair, to good, to very good) when the Deprivation Index is lower, as well as with the Social Exclusion Index. Finally, we observe again a negative impact for being a female, for being in the lowest, second and third income quartile (compared to the highest one), for having a low education level, for being unemployed or unable to work, and for both of our age categories. Higher education still has a positive sign, even though not in 2012.

Secondly, we show the results from our probit regressions and the average and marginal effects down here:

Table 5.6. Probit Regression for the Affordability model. Average and Marginal Effects. Dependent variable: *mentalhealthdummy*. 2007, 2012, 2016 waves.

	2016				2012				2007			
Variables	**Coef.**	**Std. Err.**	**dF/dx**	**Std. Err.**	**Coef.**	**Std. Err.**	**dF/dx**	**Std. Err.**	**Coef.**	**Std. Err.**	**dF/dx**	**Std. Err.**
home	0.0582 **	0.0233	0.0398 ***	0.0047	0.1470 ***	0.0198	0.0399 ***	0.0047	0.0916 ***	0.0236	0.0398 ***	0.0047
holiday	0.2998 ***	0.0193	0.1050 ***	0.0040	0.2811 ***	0.0170	0.1053 ***	0.0040	0.2743 ***	0.0203	0.1050 ***	0.0040
furniture	0.2141 ***	0.0193	0.0800 ***	0.0040	0.1796 ***	0.0170	0.0802 ***	0.0040	0.2746 ***	0.0201	0.0800 ***	0.0040
meals	0.0541 **	0.0241	0.0280 ***	0.0050	0.0450 **	0.0214	0.0281 ***	0.0050	0.1466 ***	0.0260	0.0280 ***	0.0050
clothes	0.1235 ***	0.0221	0.0432 ***	0.0046	0.1246 ***	0.0196	0.0433 ***	0.0047	0.1280 ***	0.0244	0.0432 ***	0.0046
drinks	0.0854 ***	0.0222	0.0436 ***	0.0046	0.1396 ***	0.0193	0.0437 ***	0.0046	0.1220 ***	0.0233	0.0436 ***	0.0046
female	-0.1357 ***	0.0137	-0.0533 ***	0.0029	-0.1368 ***	0.0127	-0.0534 ***	0.0029	-0.1558 ***	0.0141	-0.0533 ***	0.0029
Q1	-0.0511 **	0.0201	-0.0162 **	0.0042	-0.0666 ***	0.0184	-0.0163 ***	0.0042	-0.0337	0.0211	-0.0162 ***	0.0042
Q2	-0.0585 ***	0.0191	-0.0094 **	0.0040	-0.0398 **	0.0176	-0.0095 **	0.0040	0.0086	0.0201	-0.0094 **	0.0040
Q3	-0.0107	0.0185	-0.0031	0.0039	-0.0349 **	0.0172	-0.0031	0.0039	0.0071	0.0194	-0.0031	0.0039
loweduc	-0.0644 ***	0.0168	-0.0270 ***	0.0034	-0.0960 ***	0.0152	-0.0271 ***	0.0034	-0.0403 ***	0.0166	-0.0270 ***	0.0034
higheduc	0.0284 *	0.0171	0.0160 ***	0.0037	-0.0148	0.0162	0.0161 ***	0.0037	0.1005 ***	0.0192	0.0160 ***	0.0037
unemployed	0.0487 *	0.0273	0.0046	0.0058	-0.0153	0.0237	0.0046	0.0058	-0.0423	0.0327	0.0046	0.0058
unable	-0.4989 ***	0.0529	-0.2012 ***	0.0107	-0.5765 ***	0.0478	-0.2016 ***	0.0107	-0.5328 ***	0.0507	-0.2011 ***	0.0107
age2	-0.1722 ***	0.0173	-0.0602 ***	0.0035	-0.1689 ***	0.0154	-0.0603 ***	0.0035	-0.1556 ***	0.0170	-0.0602 ***	0.0035
age3	-0.2000 ***	0.0208	-0.0717 ***	0.0043	-0.2267 ***	0.0190	-0.0718 ***	0.0043	-0.1711 ***	0.0216	-0.0716 ***	0.0043

Author's elaboration from the data provided by the EQLS, run with Stata.

n_{2007} = 34,272 ; n_{2012} = 42,756 ; n_{2016} = 36,413

Table 5.7. Probit Regression for the Debts model. Average and Marginal Effects. Dependent variable: *mentalhealthdummy*. 2007, 2012, 2016 waves.

	2016				2012				2007			
Variables	**Coef.**	**Std. Err.**	**dF/dx**	**Std. Err.**	**Coef.**	**Std. Err.**	**dF/dx**	**Std. Err.**	**Coef.**	**Std. Err.**	**dF/dx**	**Std. Err.**
endsmeet	0.5152 ***	0.0149	0.2030 ***	0.0029	0.5450 ***	0.0134	0.2039 ***	0.0029	0.5956 ***	0.0153	0.2030 ***	0.0029
bills	-0.2857 ***	0.0212	-0.0816 ***	0.0042	-0.1762 ***	0.0172	-0.0820 ***	0.0042	-0.2441 ***	0.0221	-0.0816 ***	0.0042
female	-0.1416 ***	0.0137	-0.0562 ***	0.0029	-0.1476 ***	0.0127	-0.0564 ***	0.0029	-0.1642 ***	0.0141	-0.0562 ***	0.0029
Q1	-0.0716 **	0.0199	-0.0254 **	0.0042	-0.0930 **	0.0183	-0.0255 ***	0.0042	-0.0576 ***	0.0210	-0.0254 ***	0.0042
Q2	-0.0610 ***	0.0190	-0.0105 ***	0.0040	-0.0405 **	0.0176	-0.0106 ***	0.0040	0.0031	0.0200	-0.0105 ***	0.0040
Q3	-0.0141	0.0185	-0.0033	0.0039	-0.0312 *	0.0172	-0.0033	0.0039	0.0076	0.0194	-0.0033	0.0039
loweduc	-0.0912 ***	0.0167	-0.0414 ***	0.0034	-0.1416 ***	0.0150	-0.0415 ***	0.0034	-0.0886 ***	0.0164	-0.0414 ***	0.0034
higheduc	0.0402 **	0.0171	0.0185 ***	0.0037	-0.0109 *	0.0162	0.0186 ***	0.0037	0.1079 ***	0.0192	0.0185 ***	0.0037
unemployed	0.0421	0.0273	-0.0026	0.0058	-0.0396 **	0.0237	-0.0026	0.0058	-0.0682 ***	0.0325	-0.0026	0.0058
unable	-0.5387 ***	0.0528	-0.2114 ***	0.0107	-0.6174 ***	0.0476	-0.2123 ***	0.0107	-0.5372 **	0.0505	-0.2114 ***	0.0107
age2	-0.1650 ***	0.0173	-0.0599 ***	0.0035	-0.1722 ***	0.0154	-0.0602 ***	0.0035	-0.1557 ***	0.0170	-0.0599 ***	0.0035
age3	-0.2565 ***	0.0208	-0.0958 ***	0.0043	-0.3012 ***	0.0190	-0.0963 ***	0.0043	-0.2364 ***	0.0216	-0.0959 ***	0.0043

Author's elaboration from the data provided by the EQLS, run with Stata.
n_{2007} = 34,272 ; n_{2012} = 42,756 ; n_{2016} = 36,413

Table 5.8. Probit Regression for the Social Exclusion model. Average and Marginal Effects. Dependent variable: *mentalhealthdummy*. 2007, 2012, 2016 waves.

	2016				2012				2007			
Variables	**Coef.**	**Std. Err.**	**dF/dx**	**Std. Err.**	**Coef.**	**Std. Err.**	**dF/dx**	**Std. Err.**	**Coef.**	**Std. Err.**	**dF/dx**	**Std. Err.**
outsociety	-0.2074 **	0.0255	-0.0633 **	0.0053	-0.1539 ***	0.0219	-0.0634 ***	0.0053	-0.1504 ***	0.0264	-0.0634 ***	0.0053
recognition	-0.1753 ***	0.0190	-0.0596 ***	0.0040	-0.1640 ***	0.0172	-0.0597 ***	0.0040	-0.1388 ***	0.0197	-0.0597 ***	0.0040
lookdown	-0.0773 ***	0.0214	-0.0442 ***	0.0045	-0.1408 ***	0.0190	-0.0442 ***	0.0045	-0.1297 ***	0.0220	-0.0442 ***	0.0045
lifecomplex	-0.3649 **	0.0191	-0.1414 **	0.0038	-0.3455 ***	0.0163	-0.1416 ***	0.0038	-0.4209 ***	0.0187	-0.1417 ***	0.0038
female	-0.1709 ***	0.0136	-0.0658 ***	0.0029	-0.1687 ***	0.0126	-0.0660 ***	0.0029	-0.1837 ***	0.0140	-0.0660 ***	0.0029
Q1	-0.1836 ***	0.0195	-0.0673 ***	0.0041	-0.1931 ***	0.0179	-0.0674 ***	0.0041	-0.1852 ***	0.0204	-0.0674 ***	0.0041
Q2	-0.1464 ***	0.0187	-0.0413 ***	0.0040	-0.1108 ***	0.0173	-0.0413 ***	0.0040	-0.0890 ***	0.0196	-0.0413 ***	0.0040
Q3	-0.0295	0.0184	-0.0129 ***	0.0039	-0.0535 ***	0.0171	-0.0129 ***	0.0039	-0.0352	0.0192	-0.0129 ***	0.0039
loweduc	-0.0755 ***	0.0167	-0.0419 ***	0.0034	-0.1306 ***	0.0150	-0.0420 ***	0.0035	-0.1173 ***	0.0162	-0.0420 ***	0.0035
higheduc	0.1024 ***	0.0169	0.0385 ***	0.0037	0.0340 **	0.0160	0.0386 ***	0.0037	0.1699 ***	0.0190	0.0386 ***	0.0037
unemployed	-0.0070	0.0272	-0.0209 ***	0.0059	-0.0900 ***	0.0236	-0.0210 ***	0.0059	-0.1032 ***	0.0325	-0.0210 ***	0.0059
unable	-0.5052 ***	0.0527	-0.2086 ***	0.0109	-0.6142 ***	0.0478	-0.2089 ***	0.0109	-0.5206 ***	0.0505	-0.2089 ***	0.0109
age2	-0.1830 ***	0.0173	-0.0613 ***	0.0036	-0.1700 ***	0.0153	-0.0614 ***	0.0036	-0.1443 ***	0.0169	-0.0614 ***	0.0036
age3	-0.2275 ***	0.0207	-0.0795 ***	0.0044	-0.2483 ***	0.0189	-0.0796 ***	0.0044	-0.1691 ***	0.0214	-0.0796 ***	0.0044

Author's elaboration from the data provided by the EQLS, run with Stata.
n_{2007} = 34,272 ; n_{2012} = 42,756 ; n_{2016} = 36,413

Table 5.9. Probit Regression for the Satisfactions model. Average and Marginal Effects. Dependent variable: *mentalhealthdummy*. 2007, 2012, 2016 waves.

	2016				2012				2007			
Variables	**Coef.**	**Std. Err.**	**dF/dx**	**Std. Err.**	**Coef.**	**Std. Err.**	**dF/dx**	**Std. Err.**	**Coef.**	**Std. Err.**	**dF/dx**	**Std. Err.**
satfam	0.0661 **	0.0061	0.0234 **	0.0012	0.0709 ***	0.0056	0.0233 ***	0.0012	0.0584 ***	0.0061	0.0234 ***	0.0012
sateduc	0.0091	0.0058	0.0049 ***	0.0011	0.0165 ***	0.0050	0.0048 ***	0.0011	0.0118 **	0.0052	0.0049 ***	0.0011
satliving	0.0601 ***	0.0071	0.0320 ***	0.0014	0.0983 ***	0.0062	0.0319 ***	0.0014	0.1090 ***	0.0073	0.0320 ***	0.0014
sataccom	0.0315 **	0.0066	0.0050 ***	0.0013	0.0174 ***	0.0060	0.0050 ***	0.0013	-0.0080	0.0067	0.0050 ***	0.0013
satjob	0.0850 ***	0.0062	0.0267 ***	0.0012	0.0662 ***	0.0058	0.0266 ***	0.0012	0.0745 ***	0.0063	0.0267 ***	0.0012
female	-0.1560 ***	0.0198	-0.0615 ***	0.0041	-0.2082 ***	0.0191	-0.0612 ***	0.0040	-0.1478 ***	0.0204	-0.0615 ***	0.0041
Q1	-0.0704 **	0.0329	-0.0264 **	0.0070	-0.0636 *	0.0325	-0.0263 ***	0.0070	-0.1055 ***	0.0367	-0.0264 ***	0.0070
Q2	-0.0805 ***	0.0285	-0.0102 *	0.0060	-0.0059	0.0280	-0.0102 *	0.0060	-0.0040	0.0307	-0.0102 *	0.0060
Q3	-0.0342	0.0245	-0.0106 **	0.0051	-0.0263	0.0242	-0.0105 **	0.0051	-0.0376	0.0262	-0.0105 **	0.0051
age2	-0.1119 ***	0.0225	-0.0410 ***	0.0045	-0.1148 **	0.0211	-0.0408 ***	0.0045	-0.1215 ***	0.0222	-0.0410 ***	0.0045
age3	0.0515	0.0750	0.0020	0.0181	-0.1268	0.0915	0.0020	0.0180	0.0468	0.1025	0.0020	0.0181

Author's elaboration from the data provided by the EQLS, run with Stata.
n_{2007} = 34,272 ; n_{2012} = 42,756 ; n_{2016} = 36,413

Table 5.10. Probit Regression for the Main Indices model. Average and Marginal Effects. Dependent variable: *mentalhealthdummy*. 2007, 2012, 2016 waves.

	2016				2012				2007			
Variables	**Coef.**	**Std. Err.**	**dF/dx**	**Std. Err.**	**Coef.**	**Std. Err.**	**dF/dx**	**Std. Err.**	**Coef.**	**Std. Err.**	**dF/dx**	**Std. Err.**
deprivation	-0.1023 ***	0.0045	-0.0437 ***	0.0009	-0.1249 ***	0.0042	-0.0440 ***	0.0009	-0.1468 ***	0.0048	-0.0437 ***	0.0009
socialexclusion	-0.3258 ***	0.0092	-0.1118 ***	0.0018	-0.3083 ***	0.0086	-0.1126 ***	0.0018	-0.2998 ***	0.0096	-0.1118 ***	0.0018
female	-0.1541 ***	0.0144	-0.0559 ***	0.0029	-0.1445 ***	0.0136	-0.0563 ***	0.0029	-0.1662 ***	0.0147	-0.0559 ***	0.0029
Q1	-0.0453 **	0.0213	-0.0091 **	0.0044	-0.0511 ***	0.0200	-0.0091 **	0.0044	-0.0063	0.0221	-0.0091	0.0044
Q2	-0.0773 ***	0.0200	-0.0104 **	0.0041	-0.0385 **	0.0189	-0.0105 **	0.0041	0.0077	0.0209	-0.0104	0.0041
Q3	-0.0224	0.0193	-0.0051	0.0040	-0.0437 **	0.0182	-0.0051	0.0040	0.0060	0.0199	-0.0051	0.0040
loweduc	-0.0297 *	0.0178	-0.0191 ***	0.0035	-0.0758 ***	0.0163	-0.0192 ***	0.0036	-0.0368 **	0.0172	-0.0191 **	0.0035
higheduc	0.0065	0.0178	0.0078	0.0037	-0.0314 *	0.0172	0.0079 **	0.0038	0.0687 ***	0.0197	0.0078 **	0.0037
unemployed	0.1154 ***	0.0289	0.0313 ***	0.0060	0.0548 **	0.0258	0.0315 **	0.0061	0.0456	0.0346	0.0313	0.0060
unable	-0.4074 ***	0.0563	-0.1617 ***	0.0111	-0.4916 **	0.0517	-0.1628 **	0.0112	-0.4295 ***	0.0531	-0.1617 ***	0.0111
age2	-0.1823 ***	0.0181	-0.0575 ***	0.0036	-0.1646 ***	0.0164	-0.0579 ***	0.0036	-0.1474 ***	0.0175	-0.0575 ***	0.0036
age3	-0.2179 ***	0.0219	-0.0709 ***	0.0045	-0.2360 ***	0.0205	-0.0714 ***	0.0045	-0.1607 ***	0.0225	-0.0709 ***	0.0045

Author's elaboration from the data provided by the EQLS, run with Stata.
n_{2007} = 34,272 ; n_{2012} = 42,756 ; n_{2016} = 36,413

In Table 5.6., we find that those respondents who can afford to keep their home adequately warm are 3.98% more likely to have good or very good mental health than those who cannot; those who can afford to pay for a week's annual holiday away from home are 10.50% more likely to have good or very good mental health than the ones who cannot; those who can afford to replace any worn-out furniture are 8% more likely than the ones who cannot; respondents who can afford a meal with meat, chicken or fish every second day (if wanted) are 2.80% more likely than the ones who cannot; those who can afford to buy new, rather than second-hand clothes are 4.32% more likely than the ones who cannot; those who can afford to have friends or family for a drink or meal at least once a month are 4.36% more likely to have good or very good mental health than the ones who cannot; these numbers are similar through all waves, as well as significant.

Females are 5.33% less likely to have good or very good mental health, compared to males. Respondents from the lowest income quartile are 1.62% less likely than the ones from the highest quartile; those from the second quartile are 0.94% less likely; the ones in the third quartile are not significant in this table so we will comment it further on. Those who have lower education are 2.70% less likely as well, unlike the ones with higher education levels, who are 1.60% more likely compared to the ones with middle education level. Being unemployed also has low significance, so we will comment it in further tables, but being unable to work means being 20.12% less likely to have good or very good health. The 35-64 age group are 6.02% less likely than the younger one, and those who are 65 or older are 7.17% less likely.

In Table 5.7., we can observe that those who can easily make ends meet are 20.30% more likely to have good or very good mental health than the ones who cannot. Those whose household has been in arrears for utility bills in the last 12 months are 8.16% less likely than the ones who do not. The other demographic and socioeconomic variables have similar numbers than in the previous table, with all the same signs.

In Table 5.8., we can see that those who feel out of society are 6.33% less likely to have good or very good mental health than the ones who do not; those who feel that the value of what they do is not recognised by others are 5.96% less likely; respondents who feel that some people look down on them because of their job situation or income are 4.42% less likely; those who feel that life has become so complicated today that they almost cannot find their way are 14.14% less likely to have good or very good mental health than the ones who do not.

Regarding the other variables, the trends are all the same, but the numbers have slightly increased: for example, in this case, females are 6.58% less likely to have good or very good mental health than males; being from the lowest income quartile means being 6.73% likely to have good or very good mental health compared to the ones in the highest quartile; being from the second one means being 4.13% less likely, and being from the third one means being just 1.29% less likely. Those with lower education lower are 4.19% less likely than the ones with middle level, and those with higher levels are 2.09& more likely. Unemployed respondents are 2.09% less likely to have good or very good mental health than the ones who are not, and unable to work ones are 20.86% less likely. The older age groups are also less likely than the younger ones, 6.13% and 7.95%, respectively.

In Table 5.9., we identify that for each additional point for family life satisfaction, individuals are 2.34% more likely to have good or very good mental health; same situation with the other satisfactions. Regarding education satisfaction, they are 0.49% more likely; satisfaction with standard of living 3.20%; satisfaction with accommodation 0.50%; and satisfaction with job 2.67%. The rest of the variables have similar figures compared to the other tables, as well as the same signs. In this case, we have positive signs for the older age group, but these results are not significant.

Finally, in table 5.10., we can examine that for each additional point for Deprivation Index, respondents are 4.37% less likely to have good or very good mental health; same trend with the Social Exclusion Index but they are 11.18% less likely. Once again, the rest of the demographic and socioeconomic variables are similar as before; the only exception this time is that being unemployed has positive sign, meaning that unemployed respondents are 3.13% more likely to have good or very good health than the ones who are not. We have already seen these mixed results in the previous regression, so we will discuss it in the next section of the study.

Lastly, we obtain the results from our Concentration Index section, that we have previously explained.

Table 5.11 Standard Concentration Index (C) between the Mental Health Index over the equivalised monthly household income in PPP euros in 2016, 2012 and 2007 waves, by country group.

	WAVE	2016	2012	2007
SOUTHERN EUROPE	Index value	0.0328 ***	0.0364 ***	0.0439 ***
	Std. error	0.0010	0.0009	0.0010
NORTHERN EUROPE	Index value	0.0345 ***	0.0382 ***	0.0482 ***
	Std. error	0.0009	0.0009	0.0010
WESTERN EUROPE	Index value	0.0300 ***	0.0365 ***	0.0457 ***
	Std. error	0.0009	0.0009	0.0010
EASTERN EUROPE	Index value	0.0376 ***	0.0385 ***	0.0502 ***
	Std. error	0.0010	0.0010	0.0011

Author's elaboration from the data provided by the EQLS, run with Stata.

This table confirms that higher scores of the Mental Health Index are concentrated among better-off sample households, identified by a higher position in the equivalised monthly household income. However, this pattern has decreased through waves; therefore the inequality has lowered since 2007 to 2016.

This Standard Concentration Index has diminished the most in Eastern Europe, where we can observe a reduction from 0.0502 to 0.0376. The geographical area where this inequality is the lowest corresponds to Western Europe, with a CI of 0.0300; followed by Southern Europe with 0.0328; then Northern Europe with 0.0345 and finally Eastern.

If one prefers that the measure of inequality in mental health respect absolute invariance rather than relative invariance, then the generalized concentration index can be requested.

Table 5.12. Generalized Concentration Index (G) between the Mental Health Index over the equivalised monthly household income in PPP euros in 2016, 2012 and 2007 waves, by country group.

	WAVE	2016	2012	2007
SOUTHERN EUROPE	Index value	2.0371 ***	2.2217 ***	2.6525 ***
	Std. error	0.0593	0.0575	0.0611
NORTHERN EUROPE	Index value	2.1561 ***	2.3721 ***	2.9431 ***
	Std. error	0.0560	0.0556	0.0589

WESTERN EUROPE	**Index value**	1.8947 ***	2.2736 ***	2.8167 ***
	Std. error	0.0566	0.0569	0.0598
EASTERN EUROPE	**Index value**	2.3316 ***	2.3672 ***	3.0381 ***
	Std. error	0.0603	0.0604	0.0648

Author's elaboration from the data provided by the EQLS, run with Stata.

This gives an estimate of around 2.04 points in Southern Europe in 2016, 2.16 in Northern Europe, 1.89 in Western and 2.33 in Eastern, which shows the same pattern as in the previous estimations but now it is sensitive to the proportionality factor; this cannot be used directly to compare inequality across countries with different currencies, but this is not the case.

The Generalized Concentration Index satisfies the mirror condition when it is applied to a binary variable. This is because the Generalized Concentration Index for a binary variable equals one-fourth of the Erreygers Index, which possesses the mirror property. But the Generalized Concentration Index does not satisfy this condition in general. Therefore, now we use our five Mental Health groups as binary variables to run the following indices:

Table 5.13. Erreygers Index (E) between Mental Health Groups over the equivalised monthly household income in PPP euros in 2016, 2012 and 2007 waves, by country group.

		SOUTHERN EUROPE		NORTHERN EUROPE		WESTERN EUROPE		EASTERN EUROPE	
		Index Value	Std. Error	Index Value	Std. Error	Index Value	Std. Error	Index Value	Std. Error
Very Bad Mental Health	2016	-0.0609 ***	0.0024	-0.0556 ***	0.0022	-0.0594 ***	0.0022	-0.0627 ***	0.0024
	2012	-0.0790 ***	0.0025	-0.0684 ***	0.0022	-0.0761 ***	0.0023	-0.0681 ***	0.0025
	2007	-0.0916 ***	0.0027	-0.0830 ***	0.0024	-0.0877 ***	0.0025	-0.0843 ***	0.0027
Bad Mental Health	2016	-0.0563 ***	0.0034	-0.0579 ***	0.0031	-0.0603 ***	0.0032	-0.0449 ***	0.0033
	2012	-0.0638 ***	0.0033	-0.0646 ***	0.0031	-0.0738 ***	0.0032	-0.0430 ***	0.0033
	2007	-0.0707 ***	0.0035	-0.0742 ***	0.0033	-0.0839 ***	0.0034	-0.0530 ***	0.0035
Fair Mental Health	2016	-0.0174 ***	0.0047	-0.0234 ***	0.0044	-0.0372 ***	0.0046	0.0265 ***	0.0045
	2012	-0.0013	0.0045	-0.0139 ***	0.0043	-0.0278 ***	0.0045	0.0344 ***	0.0045
	2007	-0.0054	0.0048	-0.0167 ***	0.0046	-0.0341 ***	0.0048	0.0360 ***	0.0048
Good Mental Health	2016	0.1576 ***	0.0052	0.1697 ***	0.0049	0.1324 ***	0.0052	0.2237 ***	0.0050
	2012	0.1500 ***	0.0049	0.1674 ***	0.0048	0.1337 ***	0.0051	0.2172 ***	0.0050
	2007	0.1660 ***	0.0053	0.1788 ***	0.0051	0.1513 ***	0.0054	0.2416 ***	0.0053
Very Good Mental Health	2016	0.0297 ***	0.0035	0.0374 ***	0.0032	0.0232 ***	0.0035	0.0528 ***	0.0034
	2012	0.0276 ***	0.0033	0.0406 ***	0.0032	0.0297 ***	0.0034	0.0581 ***	0.0033
	2007	0.0367 ***	0.0034	0.0587 ***	0.0032	0.0492 ***	0.0034	0.0672 ***	0.0034

Author's elaboration from the data provided by the EQLS, run with Stata.

In table 5.13, we can observe that respondents who answered having a very bad mental health are concentrated among those who have the lowest household income, as they all have negative signs. Even though this gap has been reduced over the years for all country groups, it is very remarkable for Southern Europe, where it was -0.0916 in 2007 and -0.0609 in 2016. In this case, the smallest difference is seen in Northern Europe with -0.0556, followed by Western Europe with -0.0594, then Southern and finally Eastern with -0.0627.

Regarding the bad mental health, we can still see a negative pattern, meaning that respondents who answered having a bad mental health are concentrated among those who have the lowest household income as well. Although the inequality has been reduced through waves, it still exists. In this case, Eastern Europe is the one with the lowest index, -0.0449, followed by Southern Europe with -0.0563, then Northern with -0.0579 and finally Western with -0.0603. The reason for this could be that, instead of concentrating most of the household income in the very bad mental health group, in Northern and Western Europe this income is concentrated in the very bad one, meaning less inequality.

For fair mental health, we can observe an increasing pattern over the years except for Eastern Europe; moreover, it is the only group which shows positive signs, which means that respondents who answered having fair mental health are concentrated among those who have a higher household income. In the rest of the countries, having fair mental health still corresponds to the lower quartiles of income, but with smaller indices than in previous tables. Surprisingly, Western Europe is the furthest to 0 with a -0.0372 index, followed by Northern Europe -0.0234 and then Southern with -0.0174.

Considering good mental health, we can identify all positive signs, meaning that respondents who answered having good mental health are concentrated among those who have a higher household income. For all country groups this has decreased through waves, reducing the inequality. Eastern Europe has the biggest gap with a 2.2237 index, followed by Northern Europe with 0.1697, then Southern Europe with 0.1576 and finally Western with 0.1324.

We still observe positive signs for very good mental health and even bigger indices for all country groups, even though they have decreased over the years; therefore, respondents who answered having very good mental health are concentrated among those who have a higher household income, even more than those who reported having just good mental health. The biggest inequality is for Eastern Europe with an index of 0.0528, followed by Northern Europe with 0.0374, then Southern with 0.0297, and finally Western with 0.0232.

Finally, the Wagstaff Index, which as explained above has different normative underpinnings, has a value close to that of the Standard Concentration Index, because the index places greater weight on relative invariance with respect to presence of the characteristic and so comes closer to the normative principle imposed by the Standard Concentration Index. In this case, we are just going to focus on the 2016 wave but we are making a specific distinction between the fourth of our income quartiles (Q1, Q2, Q3, Q4).

Table 5.14. Wagstaff Index (W) between Mental Health Groups over the percentile group of equivalised income (quartiles) in 2016, by country group.

		SOUTHERN EUROPE		NORTHERN EUROPE		WESTERN EUROPE		EASTERN EUROPE	
	INCOME QUARTILE	Index Value	Std. Error	Index Value	Std. Error	Index Value	Std. Error	Index Value	Std. Error
Very Bad Mental Health	Q1	0.1662 ***	0.0071	0.1836 ***	0.0078	0.1984 ***	0.0080	0.1807 ***	0.0074
	Q2	0.0213 ***	0.0070	0.0328 ***	0.0076	0.0242 ***	0.0078	0.0334 ***	0.0071
	Q3	-0.0644 ***	0.0071	-0.0725 ***	0.0078	-0.0730 ***	0.0080	-0.0709 ***	0.0073
	Q4	-0.0851 ***	0.0071	-0.1030 ***	0.0078	-0.0900 ***	0.0080	-0.1039 ***	0.0073
Bad Mental Health	Q1	0.0726 ***	0.0051	0.0674 ***	0.0053	0.0817 ***	0.0056	0.0704 ***	0.0054
	Q2	0.0260 ***	0.0050	0.0244 ***	0.0052	0.0223 ***	0.0054	0.0361 ***	0.0052
	Q3	-0.0150 ***	0.0051	-0.0264 ***	0.0053	-0.0253 ***	0.0055	-0.0274 ***	0.0053
	Q4	-0.0475 ***	0.0051	-0.0538 ***	0.0053	-0.0531 ***	0.0055	-0.0590 ***	0.0053
Fair Mental Health	Q1	0.0029	0.0036	0.0075 ***	0.0038	0.0095 ***	0.0038	0.0043	0.0039
	Q2	0.0194 ***	0.0035	0.0089 ***	0.0037	0.0192 ***	0.0037	0.0178 ***	0.0038
	Q3	0.0047	0.0036	0.0019	0.0038	0.0052	0.0038	0.0018	0.0038
	Q4	-0.0142 ***	0.0036	-0.0142 ***	0.0038	-0.0202 ***	0.0038	-0.0234 ***	0.0039
Good Mental Health	Q1	-0.0461 ***	0.0033	-0.0496 ***	0.0033	-0.0454 ***	0.0034	-0.0595 ***	0.0034
	Q2	-0.0151 ***	0.0032	-0.0182 ***	0.0032	-0.0188 ***	0.0033	-0.0193 ***	0.0033
	Q3	0.0196 ***	0.0032	0.0121 ***	0.0033	0.0228 ***	0.0033	0.0118 ***	0.0034
	Q4	0.0471 ***	0.0032	0.0429 ***	0.0033	0.0432 ***	0.0033	0.0503 ***	0.0034
Very Good Mental Health	Q1	-0.0260 ***	0.0049	-0.0282 ***	0.0051	-0.0374 ***	0.0050	-0.0411 ***	0.0051
	Q2	-0.0189 ***	0.0048	-0.0176 ***	0.0049	-0.0110 **	0.0048	-0.0214 ***	0.0050
	Q3	0.0177 ***	0.0049	0.0091 *	0.0050	0.0075	0.0049	0.0122 ***	0.0051
	Q4	0.0297 ***	0.0048	0.0192 ***	0.0051	0.0334 ***	0.0049	0.0312 ***	0.0051

Author's elaboration from the data provided by the EQLS, run with Stata.

In table 5.14, we can observe that for all country groups, respondents who reported having very bad health are concentrated in the lower income quartiles (Q1 and Q2), since the signs are positive, especially for the lowest one. The biggest index is for Western Europe with 0.1984 in the first quartile, followed by Northern Europe with 0.1836, then Eastern Europe with 0.1807 and finally Southern Europe with 0.1662.

Analysing the bad mental health group, we see the same pattern, where respondents with worse mental health scores are among the lower income quartiles. This time, the biggest index is for Western Europe with 0.0817 in the first quartile, then Southern Europe with 0.0726, Eastern Europe with 0.0704 and finally Northern with 0.0674.

Regarding the fair mental health group, we lose a bit of significance in some quartiles for some regions. For Southern Europe we can say that respondents with fair mental health are not concentrated in the highest income quartile, and same pattern for the other groups. Therefore, they are distributed among the lowest, second and third income quartiles.

We also find that respondents who reported having a good mental health are concentrated in the higher income quartiles (Q3 and Q4). The biggest index is for Eastern Europe with 0.0503 in the fourth quartile, followed by Southern Europe with 0.0471, then Western with 0.0432 and finally Eastern with 0.0429

Finally, as in the previous category, very good mental health scores correspond to those respondents who are in the higher income quartiles. The biggest index is for Western Europe with 0.0334, followed by Eastern Europe with 0.0312, then Southern Europe with 0.0297, and finally, Northern Europe with 0.0192.

6. DISCUSSION

In this study, the impact of financial hardships and social exclusion on mental health disparities among different socioeconomic groups in Europe was examined, using the European Quality of Life Survey (EQLS). We will now discuss the results we obtained. So far, no one has ever studied this relationship from a socioeconomic inequality point of view for the whole Europe, specially from a deprivation and social exclusion perspective and with different methodological approaches.

Firstly, we run our Robust OLS regressions, where we found that both financial hardships and social exclusion affected negatively to mental health, but to a different extent: social exclusion index presents worse scores compared to the deprivation index, but both are negative. The Ordered Probit regressions also confirmed thay¡t pattern, but from a different perspective, since we divided our mental health index into five different groups, attending to a progressive scale. Therefore, we found that the mental health index is better (from very bad, to bad, to fair, to good, to very good) when respondents can afford different necessities, if they do not have debts, if they feel part of a society and if their satisfactions get higher. It is better as well if you are not a female, if you are from the higher income quartiles, if you have a higher education level, if you are employed and the younger you are. That is to say, similar conclusions as with the OLS Regression, but now more detailed-based results. In this line, Carod-Artal (2017) stated that poverty, low educational level, gender discrimination, unhealthy lifestyle, violence, physical ill-health, unemployment, social exclusion and human rights violations are recognized factors associated with poor mental health. That is to say, most of the variables that we studied.

Afterwards, we estimated our Probit regressions and the corresponding average and marginal effects, where we found more specific results, so we will discuss these outcomes in more detail. In terms of affordability, being able to afford to pay for a week's annual holiday away from home or to afford to replace any worn-out furniture play an important role on mental health. Regarding debts, those households that are able to make ends meet are more likely to have good or very good mental health (20.30%), than those who cannot; also people whose household has been in arrears for utility bills in the last 12 months are less likely than those who do not (8.16%). These results are in line with those found by Singh et al. (2019), who reported a negative mental health effect of unaffordable housing, largely mediated through increased financial hardship. Marshall et al. (2020) found that indicators of financial hardship and medical debt were associated with depressive symptoms and anxiety in a cohort of older adults.

Considering social exclusion, those who feel like life has become so complicated today that they almost cannot find their way are less likely to have good or very good mental health than the rest, as well as those who feel out of society or who feel like others look down on them. Heinz et al. (2020) also showed that income inequality may cause so-called status anxiety, and a low self-perception of one’s own social status was associated with health-associated problems, including increased mortality.

When analysing satisfactions, the one related to living standards is the one that affects mental health the most, followed by satisfaction with job and family life. Guzmán et al. (2019) also found this relationship since their main results indicated that overall life satisfaction significantly mediated the relationship between mental health risks and perceptions of academic functioning and social functioning. Allan et al. (2018) showed that job satisfaction negatively predicted depression and stress. They state that, although having meaningful work facilitates personal growth, and contributes to the greater good,

and is linked to better mental health, people's work might also need to be satisfying or enjoyable to improve outcomes.

Overall, the Deprivation Index affects negatively mental health (-1.95% with the Robust OLS regression) meaning that the higher the deprivation from different items, the worse the mental health index; respondents are 4.37% less likely to have good or very good mental health. Same pattern with the Social Exclusion Index, but, in this case, it is more pronounced, with -11.18 less likely. Chung et al. (2018) stated that income does not capture all aspects of poverty that are associated with adverse health outcomes; therefore, deprivation of non-monetary resources has an independent effect on general health above and beyond the effect of income poverty. They found that being deprived was significantly associated with worse mental health, as well as being income poor. Kumar et al. (2017) also found that social rejection is a critical risk factor for depression and it increases interpersonal stress and thereby impairing social functioning.

Regarding the demographic and socioeconomic variables, we found in all tables that being a female means being less likely to have good or very good mental health, compared to being a male. Harnois et al. (2018) explained that gender discrimination partially explains the gender gap in self-reported mental health. Thomson et al. (2018) also found that gender inequalities in poor mental health narrowed following the Great Recession but widened during austerity, creating the widest gender gap since 1994. Eek & Axmon (2015) showed that women living in relationships with perceived more unequal distribution of responsibility for household duties showed significantly higher levels of perceived stress, fatigue, physical/psychosomatic symptoms, and work family conflict compared with women living in more equal relationships. Therefore, although an increasing employment rate among women is valuable and important for both society and individuals, it is also relevant to work towards greater gender equality at home, to allow the optimal development of women's health and well-being.

Moreover, the lowest, second and third income quartile present smaller mental health scores than those from the highest quartile, progressively, as the Robust OLS Regression shows. Patel et al. (2018) carried out a systematic review of income inequality and depression, demonstrating greater risk of depression in populations with higher income inequality relative to populations with lower inequality; multiple studies reported subgroup effects, including greater impacts of income inequality among women and low-income populations. Burns (2015) studied the poverty, inequality and the political economy of mental health, stating that although income inequality is a powerful driver of poor physical and mental health outcomes, it features rarely in research and discourse on social determinants of mental health. He showed that the poverty–mental health relationship can only be completely understood by integrating the concepts of income and economic inequality into the research, since inequality is a powerful and harmful driver of poverty, social fragmentation and human physical and mental suffering.

Lower education levels are less likely to have good or very good mental health than those with middle levels, but those with higher levels are more likely. Domènech-Abella et al. (2019) showed that older Spanish adults who experienced a poor childhood financial situation were nine times more likely to obtain a lower level of education than those with a good childhood financial situation, and about three times more likely to suffer from depression. Barr et al. (2015) also found that the trend in the prevalence of people reporting mental health problems increased significantly between 2009 and 2013 compared to the previous trends in England; this increase was greatest amongst people with low levels of education and inequalities widened.

For unemployment, we struggled with significance with this variable, and we observed mixed results, sometimes negative signs and other times positive. However, people who are unable to work are less likely to have good or very good mental health. Farré et al. (2018) found for the case of Spain that an increase of the unemployment rate

by 10 percentage points due to the breakdown in construction raised reported poor health and mental disorders in the affected population by 3 percentage points, respectively. They show that this led to long unemployment spells, stress, hopelessness, and feelings of uselessness. These effects point towards a potential channel for unemployment hysteresis. Cygan-Rehm et al. (2017) also revealed that unemployment has a significant negative effect on mental health in different countries, such as Germany and the United Kingdom. Regarding the inability to work, Sammicheli & Scaglione (2019) stated that progress in medicine and workplace adjustments may enable employees with disabilities to come back work; this might lead to an improvement of their daily lives reducing multiple mental health disorders. However, regarding the positive sign for unemployment that we find in some tables, Ruhm (2003) argues that unemployment, linked to times of economic crisis, may improve health outcomes through the promotion of healthy lifestyles and behaviours, so that might be an explanation.

Finally, ageing also influences mental health in a negative way, since the older groups are less likely to have good or very good mental health than those who are younger. Lorem et al. (2017) also found that ageing had a negative impact on self-reported health, on both physical illness and mental health symptoms. Puvill et al. (2016) showed that poor mental health was strongly related to lower life satisfaction at old age, revealing as well that mental health has a greater impact than physical health, and that physical health is less relevant for a satisfactory old age. One of the mean reasons for this might be loneliness and depressive symptoms, which are closely related, and both are indicators of reduced physical and mental well-being in old age (Bodner & Bergman, 2016).

Lastly, our results regarding the multiple Concentration Indices for different country groups show that socioeconomic inequality regarding mental health has decreased through waves, even in 2012 when the economic crisis was still going; however, this inequality still remains in our societies. Reibling et al. (2017) also saw this trend, stating that in the majority of Europe, people have felt less depressed over the course of the recession; health inequalities have persisted in most countries during this time but with little influence of the recession. Balaj et al. (2017) found absolute and relative inequalities in self-reported health in European countries; occupational and living conditions factors emerged as the leading causes of inequalities across most of the countries, contributing both independently and jointly with behavioural factors.

We confirm that higher scores of the Mental Health Index are concentrated among better-off sample households, identified by a higher position in the equivalised monthly household income. Hasmi et al. (2020) also found for Australia that individuals in lower socioeconomic groups are more vulnerable to life shocks than the higher socioeconomic groups and this itself is generating mental health inequality. Kino et al. (2017) showed for Europe that individuals with the lowest socioeconomic position were more likely to have risky and moderate clusters than healthy cluster compared to those with the highest socioeconomic position. Veisani & Delpisheh (2015) also revealed that socioeconomic inequalities exist in mental health into female-headed households and mental health problems more prevalent in women with lower socioeconomic status.

The Standard Concentration Index showed that the inequality diminished the most in Eastern Europe, where we can observe a reduction from 0.0502 to 0.0376. The geographical area where this inequality is the lowest corresponds to Western Europe, with a CI of 0.0300; followed by Southern Europe with 0.0328; then Northern Europe with 0.0345 and finally Eastern. Ballas et al. (2017) studied social and spatial disparities in Europe, revealing many economic inequalities that call strongly for socially and environmentally sustainable action, as well as the real differences in the quality of life and the types of challenges and problems faced by Europe's populations. The interesting conclusions they found showed that differences are not found across national borders

but between regions within countries, between villages and cities or between rich and poor quarters of a town. And the rich quarters of Europe are all more similar to each other than to the poorer areas that are nearer to them. However, overall, Northern and Western countries reveal less poverty rates than Southern and Eastern ones.

Moreover, we found that respondents who answered having a very bad mental health are concentrated among those who have the lowest household income. This gap has been reduced over the years for all country groups, but it is very remarkable for Southern Europe, where it was -0.0916 in 2007 and -0.0609 in 2016. In this case, the smallest difference is seen in Northern Europe, followed by Western Europe with, then Southern and finally Eastern. One of the reasons for this could be that in eastern countries stigma regarding mental disorders seems to be higher than in other European regions, but consideration of human rights and user involvement are increasing (Winkler et al., 2017). Krupchanka and Winkler (2016) also found that despite the slight progress in some Eastern European countries, the development of mental healthcare in the region remains slow and not very effective. Brenna and Di Novi (2016) also found a clear North–South gradient: the provision of informal care has a negative and significant impact on daughters' mental health in the Mediterranean countries only, where the amount of resources allocated to the long-term care is minimal and the local system of health and social services for the elderly lacks the necessary structures to meet the increasing demand for eldercare.

Overall, people who report having very bad or bad mental health are among the lower income quartiles, while those who report good or very good mental health are located in the higher income quartiles. Linder et al. (2020) also found that diagnoses regarding mental health have become more concentrated amongst the lowest educated individuals and the lowest income families, groups who appear to be increasingly disadvantaged. Cummins (2018) stated that more unequal societies create greater levels of distress; people with health problems including mental problems are overrepresented in the group of people living in poverty. Moreover, Lee and Kawachi (2017) revealed that socialising with higher-status people is positively associated with depressive symptoms; there is no significant difference between those socialising with equivalent-status or with lower-status alters. Therefore, socialising with higher-income people can be detriment for mental wellbeing by increasing stress or frustration, or decreasing psychological resources such as self-esteem.

We also addressed the financial and economic crisis issue, since we gathered information from before the recession, during it and after it. For some variables we did see the influence of this crisis, such as in debts or the Deprivation Index, which affected more negatively than in 2016; people who felt like others looked down on them because of their job situation or income had worse mental health scores. However, some variables did not show this pattern, such as satisfactions, which stayed similar to other waves or even better. Economou et al. (2019) studied the association of economic hardship with depression and suicidality in times of recession in Greece and found that financial difficulties influence depression but not suicidality, but also an impact of economic hardship on mental health outcomes in times of enduring recession. Antunes et al. (2019) also found for Portugal that the economic recession may have contributed to wider social inequalities between people with and without mental disorders. However, Martin-Carrasco et al. (2016) stated that there is a broad consensus about the deleterious consequences of economic crises on mental health, particularly on psychological well-being, depression, anxiety disorders, insomnia, alcohol abuse, and suicidal behaviour. Unemployment, indebtedness, precarious working conditions, inequalities, lack of social connectedness, and housing instability emerge as main risk factors according to these authors. Moreover, attending the country groups division that we commented before, there is evidence that the severe economic crisis and austerity measures have led in

many cases to an enhancement of poverty in Southern and Eastern Europe (Ballas et al., 2017), widening the gap with the Northern and Western countries.

Our study also presents some limitations that cannot be controlled but that should be taken into account when understanding the outcomes. One of the most relevant ones is that all our variables are based on self-reported answers from different individuals; that is to say, there might be a bias between reality and what they report. Also, the panel of respondents change through waves, so the answers of each year do not constitute a longitudinal setting. We also did not investigate health selection reverse causality, meaning the impact of mental health leading to lower socioeconomic status. These issues are precisely the future research avenues this study suggest and are worthy of consideration. Accordingly, it is important to look ahead and consider further approaches for our study in order to have a deeper and wider knowledge on the topic. As we have studied disparities between countries, an interesting methodology, and increasingly used, is spatial econometrics: these models allow us to account for dependence between observations, which often arises when observations are collected from points or regions located in space. This is also linked to convergence between such countries, despite their heterogeneities. These two concepts can be studied together as well, considering the empirical analysis of regional convergence at smaller spatial scales (Dapaena et al., 2016). In the next section, we will briefly address the new situation regarding the coronavirus illness, and how it will affect further research in terms of mental health.

7. CONCLUSIONS

The present study adds negative life events into the analysis of the socioeconomic inequality of mental health for a decade across Europe. This study has demonstrated that the impact of financial hardships and social exclusion on mental health status is significant; also that the impact of these negative life events on lower socioeconomic groups creates disadvantageous mental health outcomes when compared to higher ones, generating significant mental health disparities at a population level. Moreover, we found that social exclusion might even play a stronger role than deprivation when it comes to mental distress. However the case, these findings highlight the need for multidisciplinary interventions in order to better serve this vulnerable population.

Investing in improving the mental health of populations by widening coverage of cost-effective interventions to provide support and treatment to people with mental health disorders, helps preventing these mental health problems plus it results in a broad range of impacts across different sectors enhancing social cohesion, economic progress and sustainable development in the EU (European Commission, 2016). Therefore, most countries now have mental health policies and legislation, and many are making progress with the application of community-based mental health services. Nonetheless, capacity and quality of services and workforce are very diverse across the contrasting regions, regarding number of beds, coverage of community services, number of psychiatrists, nurses or investment, among others (WHO, 2015).

Unfortunately, we are currently experiencing a world pandemic due to the SARS-CoV-2 virus (coronavirus) which will disrupt all the future projects that were being designed and arranged. This disease is having a profound effect on all aspects of society, including mental health and physical health (Holmes et al., 2020).

Some groups might be more vulnerable than others to the psychosocial effects of pandemics. In particular, people who contract the disease or those at higher risk for it, such as the elderly, people with compromised immune function, and those living or receiving care in congregate settings; also people with pre-existing medical or psychiatric problems, as well as health care providers, who have to make critical decisions under big pressures, working for longer shifts with distressing equipment and directly exposing themselves to the virus (Pfefferbaum, & North, 2020).

The economic and policy response to COVID-19 has created specific gradients in both exposure to the disease itself and to the economic impact of the diverse lockdowns. Consequently, these circumstances might lead to an increase of inequality regarding mental health (Davillas & Jones, 2020). For instance, Oreffice & Quintana-Domeque (2020) found that women are more likely to have lost their job because of the pandemic, and working women are more likely to hold more coronavirus-risky jobs than men. Moreover, between February and June 2020 women have decreased their work hours, but increased housework and childcare much more than men.

This pandemic is also increasing digital inequalities, since the status of digital spaces is switching from an amenity to a necessity in the current modern societies, becoming not only the main way to access information and services, but also one of the only remaining source for economic, educational, and leisure activities as well as for social interactions to take place (Beaunoyer et al., 2020). Digital inequalities were already existing, yet the COVID-19 crisis is exacerbating them dramatically, affecting mental health as well. For instance, the use of the internet and technology protects older adults in poor health from social exclusion; age-friendly hardware and software design might have public health benefits and improve mental health status (Sacker et al., 2019).

Moreover, many studies have shown the benefit of coordinated and collaborative care through the use of technology, providing easier patient access to mental health care and improving communication between caregiver and patient, especially in cases where geographic location or distance is a challenge (Falconer et al., 2018).

Whatever the case, the World Health Organization (WHO, 2020b) has already stated that new measures such as self-isolation and quarantine have affected usual activities, routines, and livelihoods of people that may lead to an increase in loneliness, anxiety, depression, insomnia, harmful alcohol, and drug use, and self-harm or suicidal behaviour. Therefore, they highlight the importance of raising awareness about the consequences of prolonged stress, insecurity and uncertainty, as well as ensuring accessibility of mental health services via online digital platforms.

Greater investment in social protection may act to reduce inequalities in depressive symptoms; evidence shows that reductions in spending levels or increased conditionality may adversely affect the mental health of disadvantaged social groups (Niedzwiedz et al., 2016). It was found that higher spending on active labour market programmes was related to narrower inequality in depressive symptoms by education level across Europe. Moreover, living in large cities or close to metropolitan areas increases the possibilities of being employed (Viñuela et al., 2014).

Stucker et al. (2017) revealed that austerity measures, such as reducing social spending and increasing taxation, hurts deprived groups the most, worsening mental health and, as a consequence, increasing suicides. They understand that this was not inevitable, and those countries with strong social protection systems, such as Iceland and Germany, escaped the worst of the 2008 economic crisis, compared with those with relatively weaker systems, such as Greece.

In conclusion, the need for strong social protection policies is currently a demanding reality for European societies; social protection spending has been found to be a key mitigating factor during times of economic downturn and episodes of austerity, especially for the most vulnerable ones (Copeland et al., 2015), thus between-country differences in health inequalities are related to variations in the provision of welfare (Ruckert & Labonté, 2017). Economic evaluation can contribute evidence to inform the development of mental health policy strategies, and to identify some consequences at the treatment or care level that are of relevance to service providers and funding bodies (Knapp & Wong, 2020). As the Roadmap for Mental health Research in Europe (ROAMER) project aims for, policymakers should focus on six key aspects to work on: infrastructures and capacity building, biomedicine, psychological research and treatments, social and economic issues, public health and well-being (Haro et al., 2014). The scope of collaboration and partnership between countries and within government levels will be fundamental for the optimal development of the strategies.

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