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Socioeconomic burden of mental disorders in Spain 2006-2017

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Abstract: Mental health is not only the lack of mental disorders but is considered a crucial resource for overall health and well-being (including employment and productivity). The current paper tries to shed some light on the evolution of mental well-being over a period of 15 years, including the years before, during and after the most recent economic downturn. We use data coming from the Spanish National Health Surveys of 2006/2007, 2011/2012 and 2016/2017. Mental health is proxied by two measures, doctor-diagnosed mental disorder and psychological distress (based on GHQ-12). To account for the causal relationship between the two mental health indicators, we estimate a bivariate probit model. We observe different patterns of the two mental health indicators over time. Psychological distress increased during recession years, due to major risk factors as unemployment and loss of socioeconomic status. Even though the need for mental healthcare increased during the recession, the fact that fewer people were diagnosed suggests that barriers to access to mental healthcare may be aggravated during the crisis.

JEL Codes: I10, I14, I18.

Keywords: Mental health, psychological distress, economic crisis, bivariate probit, Spain.

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Introduction

Mental health is not only the lack of mental disorders, but is considered a crucial resource for overall health and well-being (including employment and productivity). Mental disorders are among the major causes of ill-health and disability worldwide, affecting 13.2% of the world population and accounting for 8.1 percent of the overall burden of illness (in terms of DALYs) (Vigo, Thornicroft, and Atun, 2016; IHME, 2016). These are responsible for more of the global burden of disease then HIV/AIDS, tuberculosis, diabetes, or transport injuries (Whiteford, Degenhardt, and Rehm, 2013[1]). Overall mental health conditions, except for drug and alcohols use disorders, are slightly more prevalent in women than in men (Freeman and Freeman, 2015; IHME, 2018) and, in general, increase steadily with age, fall around the age of retirement, and increase again in older ages (Grundy, van den Broek, and Keenan, 2017). The prevalence of mental disorders Spanish population aged 15 and above was estimated to be 18.3% in 2016, higher than the EU28 average (17.3%), and it is believed that one out of four individuals will suffer from a mental health distress over the life course (IHME, 2018).

The economic costs, both direct (healthcare and non-medical costs) and indirect (related to reduced labour market participation and lower productivity), of mental disorders are very high (Olesen et al., 2012). According to the OECD(2014), one third of disability related expenditures can be attributed to mental conditions. Moreover, unemployment rates among those who suffer from mental disorders are around 30% higher compared to the ones of people in good mental health. The expenses generated by absenteeism (cost of sick leaves) are considerable and about half of them are due to mental illnesses. OECD/EU (2018) estimated that the total direct and indirect costs associated with mental disorders in Spain amounted to 45,058 million Euros in 2015, which represented a 4.2% of GDP. Moreover, unlike other neurological and brain disorders, with indirect costs of 17% and 33%, respectively, mental disorders were shown to be mainly driven by indirect costs (47%) (Parés-Badell et al., 2014).

In spite of the high prevalence of mental disorders and the important economic costs associated with the, , the use of adequate health care services is shown to be very limited[2] (Bebbington, Marsden, and Brewin, 1997; Alonso et al., 2004). Moreover, people in poor mental health not always receive treatment, even when they seek for it (Walker et al., 2015; Han et al., 2017; EU, 2017). Lack of appropriate care is not only a cause of inequity, exclusion and poverty, but may also adversely impact morbidity and mortality from a wide range of illness. Economic hardships may exacerbate the problems stemming from the inadequate access and provision of mental health care too and may hamper the psychological well-being of the individuals.

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[1] The finding by Whiteford et al. (2013) remains valid in 2017, according to data corresponding to the most recent GBD.
[2] Alonso et al. (2004) show that only a quarter pf Europeans with mental disorders (25.9%) consult formal health services, and among those who sought out formal case, one in five (21.2%) received no treatment.

Spain, like many countries around the world, plunged into a deep economic downturn in 2008. The economic downturn resulted in 8.1% decrease in GDP and 9.2% fall of net national disposable income between 2008 and the beginning of 2014 (INE, 2019), when the economy started to recover. Rise in unemployment, household income loss and home foreclosures emerged as some of the most worrying consequences of this situation. The unemployment rate more than doubled during the period of recession, increasing from 11.3% in 2008 to 26.1% in early 2014 (Eurostat, 2019a), exhibiting the second highest rate among the European countries. Social inequality measures have also worsened since the outburst of the crisis. For instance, during the period 2008-2014 the Gini coefficient (of equalised disposable income) rose from 32.4 in 2008 to 34.7 in 2014 (Eurostat, 2019b) and the S80/S20 income quintile share ratio[3] increased from 5.7 to 6.8 (Eurostat, 2019b). Social protection policies have probably limited the further widening of income gaps. Unfortunately, the economic hardship has resulted in major cuts of social spending, including reductions in health care activities and facilities, personnel dismissal, wage and workload reductions, delays in payments to providers (Gené-Badia et al., 2012). These together with the persistently high levels of unemployment constitute foreseeable threats of further increases in income inequality, poverty and marginalisation. Besides the (evident and expected) economic and social tolls of the ongoing crisis, major concerns have been raised about its potential threats to health.

Empirical evidence linking economic contractions and health emphasises the ambiguity of the potential impacts (Catalano et al., 2011; Frasquilho et al., 2016, Bellés-Obrero and Vall, 2018). Attempts to disentangle the associations among macroeconomic fluctuations and physical health, morbidity, health-related behaviours, and mortality, have produced controversial results (Tapia-Granados, 2005; Urbanos-Garrido and González López-Valcárcel, 2015; Lam and Piérard, 2017). The only well-established finding is that mental health deteriorates during economic downturn. Job loss and lower income are generally shown to increase the risk of psychological disorders (Paul and Moser, 2009; Goldman-Mellor et al., 2010; Gili et al., 2013; Bartoll et al., 2014) and self-destructive behaviours (Stuckler et al., 2009; Lopez Bernal et al., 2013, Córdoba-Doña et al., 2014; Almeda-Palacios et al., 2014, Toffolutti and Suhrcke, 2014). There are only a few studies that find no relationship between mental health and the economic performance (Tekin, McClellan, and Minyard, 2013; Pascual and Rodríguez, 2013).

There is a growing body of research the impact of economic downturns on mental disorders and psychological well-being for the Spanish case (MSCBS, 2018; Moreno-Küstner and Gutierrez, 2017). Gili et al. (2013), comparing data collected from patients consulting primary care physicians in 2006/2007 and 2010/2011, found significant increases in mental health disorders (major depression, anxiety, and somatoform) and in alcohol dependence during the studied period. The impact was higher for unemployed and for those experiencing mortgage repayment difficulties. A second study led by Gili et al. (2016) examine the gender differences in specific mental illnesses

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[3] The S80/S20 ratio measures the total income of the richest 20 percent of the population to that of the poorest 20 percent.

during the crisis and analyse how unemployment affected the link between mental health and gender. They observe significant increase in the prevalence of all mental disorders analysed, especially in men, which are claimed to be more sensitive to economic downturns and their impact on employment than women. Most of the recently published articles on the subject use data from the Spanish National Health Survey (Bartoll et al., 2014; Urbanos-Garrido and González López-Valcárcel, 2015; Basterra, 2016; Ruiz-Pérez, Bermúdez-Tamayo, and Rodríguez-Barranco, 2017). These studies employ varying methods to assess the impact of the economic collapse on mental health using the SNHS, but all of them compare the pre-crisis period (2006/2007) to the crisis period (2011/2012). Bartoll et al. (2014) analyse the change in mental health and socioeconomic inequalities, restricting the sample to individuals aged 16-64. The authors reported that mental health deteriorated for men, and slight improved for women. Socioeconomic inequalities increased only for men. Urbano-Garrido and González López-Valcárcel (2015) focus on the impact of unemployment on overall and mental health of working-age population. Their main finding pointed to the significant negative impact of unemployment on psychological well-being, impact that was shown to be particularly high for long-term unemployed. Similar to Bartoll et al. (2015) is the study by Basterra (2016). The risk of psychiatric morbidity is assessed, using the whole sample of adults. Important gender differences are reported, with men in working age being the most vulnerable, in terms of being at higher risk of psychiatric morbidity, population group. An interesting element of the study by Ruiz-Pérez et al. (2017) is the analysis of the impact of some macroeconomic determinants on mental health. Regional data is added from other official sources. Only two of the contextual variables are found to significantly increase poor mental health. These are regional health expenditure per capita for women and the share of temporary employment for men.

The current paper work tries to shed some light on the evolution of mental well-being over a period of 15 years, paying special attention on the impact of the most recent economic downturn, in Spain. We employ two self-reported measures of mental health status, namely, doctor diagnosed mental health disorder and self-perceived phycological distress. The first one is a measure indicating that the respondent have been diagnosed by a doctor with a mental health condition (depression, anxiety or other mental problems) over the past 12 months. The second one is derived from the 12-item version of the General Health Questionnaire (GHQ-12) (Goldberg, 1997), a widely used screening tool for identifying anxiety and depressive symptoms. While it is suitable as a proxy measure of anxiety and mood disorders in applied research, the GHQ-12 indicator cannot be used to detect chronic psychological illness in clinical settings. Thus, our two mental health indicators capture different dimensions of phycological (ill)health and are used here as complements.

This study contributes to the existing literature in several ways. It provides a systematic and comparative analysis of the above mentioned alternative mental health measures. Noticeably, our multiple regression approach accounts for confounding factors. We also used a short timeframe (12 months, past weeks), which allows to reduce recall bias, and provides more accurate information related to the experience of mental health

problems. To the best of our knowledge, this is also the first paper to investigate simultaneously the evolution of two indicators of mental health status during a longer time period encompassing the years before, during and after the most recent economic slowdown, that faced severe budgetary adjustments that affected especially health and social sector.

The rest of the paper is structured as follows. In section 2 we present the empirical strategy. Section 3 describes the data and defines the variables relevant for the study. Results are presented and discussed in sections 4 and 5. Finally, section 6 concludes.

Empirical framework

The evolution of the probability of being diagnosed with a mental disorder or experiencing psychological distress can be estimated separately using a basic discrete choice (logit or probit) model. However, the two measures of mental health are not independent. To account for the causal relationship between the main variables considered in the analysis, we employed a bivariate probit model (biprobit) (Heckman, 1978).

The biprobit model has been employed in a varying areas of health economics research. For example, to study the impact of a personal income tax reform on the demand for private health insurance (Rodríguez and Stoyanova, 2008) or in hospitalized cardiac patients, to assess the probability of hospitalised cardiac patients to experience anxiety or depression (Giammanco and Gitto, 2016).

The system of equations to be estimated is the following:

$$y_{1i}^* = X_i\beta_1 + u_{1i}$$
$$y_{2i}^* = X_i\beta_2 + u_{2i}$$

(1)

for individual i, $i = 1, \ldots N$. The y_{1i}^* and y_{2i}^* are unobserved latent variables indicating, in this case, the probability of being diagnosed with a mental disease disorder and the probability of experiencing psychological distress, respectively. The X_i denote the vector of explanatory variables.

The remaining terms in the system of equations (1) are the two vectors of parameters to be estimated, β_1 and β_2; the random error terms, u_{1i} and u_{2i}; where $(u_{1i}, u_{2i}) \sim BVN(0,0,1,1,\rho)$; and the correlation coefficient, $\rho = corr(u_{1i}, u_{2i})$.

The interpretation of the coefficients in biprobit regression is not as straightforward as the interpretations of coefficients in linear regression or logit regression. The coefficients represent only the effect of changes in the values of the explanatory variables on these probabilities. In particular, a positive (negative) coefficient means that an increase (decrease) in the value of this variable leads to an increase (decrease) in the predicted probability of the dependent variable. The sign of the coefficient gives

the direction of the effect, but not the marginal effect, therefore, Marginal Effects are calculated at the means (MEMS) both for discrete (e.g., social class) and continuous (e.g. natural log of household monthly disposable income) independent variables.

For the purpose of describing the evolution of the probabilities of being diagnosed with a mental disorder or experiencing serious psychological distress, we show the estimates for each social class group and for all years included in the analyses.

Estimations were carried out using the software package Stata 15.1 (StataCorp, 2017). All the analyses are conducted using a survey weight variable. The descriptive analysis as well as regression models are estimated using the *svy* survey data module. In the text, 5% was used as the level of statistical significance.

Data and variable definition

Spanish National Health Survey

The data comes from the Spanish National Health Survey (SNHS) (INE, 2018), corresponding to the years 2006/2007, 2011/2012 and 2016/2017. SNHS is a cross-sectional survey conducted by Spanish's National Statistical Institute (Instituto Nacional de Estadística, INE) under the aegis of the Spanish Ministry of Health and Consumer Affairs. The SNHS covers a nationwide, representative sample of non-institutionalized Spanish population. Its main purpose is to collect information on individuals' health status and its determinants, morbidity, use of healthcare and a range of socioeconomic characteristics (referring both to the respondent and to the head of household). In each year, between 24,000 and 37,500 households, distributed among 2,000 and 2,500 census sections, were surveyed. The sampling of the data follows a three-stage stratified design[4]. Individual weights, which are contained in each release of the dataset, are applied in all computations in order to make the results representative of the Spanish population and to get more consistent estimates (Solon et al., 2015).

The surveys contain separate samples for adults and children. For the purpose of the present study only data from the adult (aged 16 years and above) sample is used in the analyses.

The choice of years obeys the primary objective of the study, namely, to trace the evolution of mental health before, during and after the economic downturn.

Variables

In our analysis we consider two alternative measures of mental health status: mental disorder diagnosed by a doctor and psychological distress. The first one is dummy

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[4] The first-stage units are the census sections. The units of the second stage are the households. Within each household, an adult is selected to respond to all the questionnaires.

variable that takes the value of one for the individuals who report to have been diagnosed with a chronic mental condition, such as depression, anxiety or other mental problem, by a health professional during the 12 months prior to the survey. Although self-reported, given the relatively short recall period, this measure is seen as a good proxy for assessing psychological well-being in a more objective manner.

Our second mental health measure, psychological distress, is derived from the 12-item version of the General Health Questionnaire (GHQ-12), one of the most popular and extensively used screening tools for detecting risk of anxiety and depression symptoms in the general population. The reliability and validity of the GHQ-12 instrument have been appraised in different population strata and across a number of countries, among them Spain (Sanchez-López and Dresh, 2008). The GHQ-12 is scored using the two-point scoring method that gives a value of 1 if the problem is present, and 0 otherwise. The total score ranges between 0 (good mental health) and 12 (poor mental health). Following existing evidence (Bartoll et al., 2014) and the Spanish Ministry of Health, Consumer Affairs and Social Welfare approach in defining "risk of psychological morbidity"[5], we classify individuals with a GHQ-12 score of 3 or above as having psychological distress[6].

The independent variables included in our analyses follow previous research on the main determinants of mental health. Demographic variables include age, gender and marital status. Age is, undoubtedly, a major predictor for psychological well-being over the life course. To account for the non-linear relation between age and mental health, we employ age and its square are considered in our estimations. To capture gender differences in mental well-being, we include a gender variable that takes the value of 1 if the respondent is a female. Evidence generally suggests that stronger family ties and support exert protective effects on mental health (Ryan et al., 2007; Kawachi and Berkman, 2001, Santini et al., 2015), so we have added an indicator of whether the respondent lives with a partner in our study. It takes the value of one for all individuals who are either married or cohabiting, and cero otherwise.

A different strand of literature on long-term care reveals a significant negative impact of long-term caregiving on the health of the informal carer[7]. The SNHS contains information that allows to define an indicator of the provision of informal care to a disabled person, so we have included it in our estimations.

To assess the disparities in mental disorders due to greater exposure and vulnerability to unfavourable socioeconomic circumstances, a set of determinants referring to the individual (education, employment status and size of the town of residence), the head

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[5] One of the key indicators of the Spanish Health System is the "risk of psychiatric morbidity" based on GHQ-12. The threshold for considering an adult in risk of mental problems is having a total GHQ-12 score of at least 3.

[6] We also constructed alternative indicators of psychological distress, namely GHQ-12≥5 and GHQ-12 ≥8, which we used as robustness checks. All the results remain unchanged.

[7] Informal care usually delivered by family (mainly spouses and children), friends or relatives, who are not getting paid for it.

of the household (social class) and the household (income and autonomous region of residence) is considered. For education, we have defined four levels: incomplete primary studies or illiterate, primary studies, secondary and post-secondary studies, and university degree. Being unemployed, especially for a longer period, significantly hampers individuals' psychological well-being (Urbanos-Garrido and González Lopéz-Valcárcel, 2015). Therefore, employment status is identified by a dummy variable taking the value of 1 for those individuals who classified themselves as unemployed. The size of the town of residence, is identified by a dummy variable that equals 1 if the respondent lives in a municipality with less than 50,000 inhabitants.

A commonly used measure of socioeconomic position in the social class of the household. For the purpose of the present study, we employ four dummy variables indicating the occupation of the head of household (defined as the main income earner): managers, intermediary staff or self-employed, supervisors, qualified or semi-qualified workers, and non-qualified workers. However, the use of the social class of the head of the household, as defined in the SNHS, as a main social stratification indicator raises concerns among researcher (Connelly, Gayle, and Lambert, 2016). For this reason, we have chosen to use an alternative measure, household disposable income.

Given that income is measured as a category variable with eight possible levels of income that correspond to an estimate of the monthly household disposable income from all sources. Because of the high proportion of missing values for income (11% in 2006/2007, 25% in 2011/2012 and 24% in 2016/2017) and in order to obtain a continuous measure, we have imputed household income using a wide set of explanatory variables referring both to the respondent and the head of the household. These variables include, among others, age and gender of the head of the household, education of head of household, occupation of head of household, employment status of head of household and regional dummies. The equivalent income is computed by using the Oxford scale (OECD, 1982) (assigning a weight of 1.0 to the first adult, 0.7 to the second and each subsequent adult, and 0.5 to each child in the household) and its natural logarithm is included in the estimations.

Finally, we have included a set of dummy variables indicating the autonomous region of residence of the household. Regional factors may capture cultural and geographical variations in the availability of healthcare resources or differences in health and social public policy-making among Spanish regions.

Table 1. Variable definition and descriptive statistics

Variable	Spanish National Health Survey 2006/2007	Spanish National Health Survey 2011/2012	Spanish National Health Survey 2016/2017
	Mean (Linearized standard error) or %		
Diagnosed mental disorder (1 yes; 0 no)	11.48%	9.69%	10.90%
Missing values (%)	0.09%	-	-
Psychological distress (1 yes; 0 no)	19.75%	20.19%	17.89%
Missing values (%)	7.31%	1.48%	1.26%
Age (years)	46.03 (0.15)	47.34 (0.16)	49.04 (0.15)
Gender (1 female; 0 male)	50.95%	51.52%	51.38%
Married/cohabiting (1 yes; 0 no)	63.21%	66.91%	60.99%
Living in a municipality with less than 50,000 inhabitants (1 yes; 0 no)	47.27%	47.47%	47.16%
Unemployed (1 yes; 0 no)	7.13%	14.30%	12.03%
Missing values (%)	0.08%	0.14%	0.11%
Spend some hours a week caring for someone with disability (1 yes; 0 no)	1.98%	2.89%	1.28%
Education			
Incomplete primary/illiterate	11.19%	11.51%	9.97%
Primary	30.30%	11.00%	16.23%
Secondary and post-secondary	40.73%	61.53%	54.63%
University	16.86%	15.87%	19.16%
Missing values (%)	0.91%	0.09%	<0.01%
Social class (based on head of household occupation)	13.51%	14.72%	14.00%
Non-qualified	41.19%	46.88%	46.79%
Supervisors, qualified and semi-qualified	23.34%	17.75%	18.68%
Intermediary and self-employed	19.60%	17.95%	18.67%
Managers	2.36%	2.69%	1.85%
Missing values (%)			
Natural log of household monthly disposable income in € 2016 (Oxford scale)	6.26 (0.01)	6.47 (0.01)	6.60 (0.01)
Missing values (%)	11.05%	24.65%	24.27%
Natural log of imputed household monthly disposable income in € 2016 (Oxford scale)	6.42 (0.01)	6.49 (0.01)	6.58 (0.01)
Missing values (%)	0.94%	5.13%	6.31%
Number of observations	28,954	20,441	22,372
Population size	37,321,985	38,383,057	38,431,930

Note: All samples include individuals aged 16 and above.

Results

Table 1 presents descriptive statistics for all variables included in the analyses for the whole sample corresponding to the three editions of the SNHS. A bit more than half of the respondents are women and above predominantly living with a partner (61-67%). The composition of the three samples by age and education differs. The mean age of the respondents ranges from 46 years in 2006/2007 to 49 years in 2016/2017. The increase in the age of the participants in the survey reflects the aging of the Spanish population. As for education, the most significant difference between the pre-crisis and during the crisis periods is the drop in the percentage of people with only primary studies (from 30.3% to 11.0%), paired with a significant increase in those with completed secondary education (from 40.7% to 61.5%). It might be explained by the fact that during the first years of the recession, many people, previously employed in the construction sector, lost their jobs and opted for returning back to education. In the post-crisis period, the share of those with very low education fell, while the proportions of people with primary education and university graduates increased.

Another indicator worth mentioning is the one related to informal caregiving. Less than 2% of our sample declared acting as carers to disabled family member in 2006/2007, the share grew to almost 3% during the crisis, and sharply dropped to 1.3% during the recovery period. This may be due to the fact that social services and support to dependent people were suffered most from the economic restrictions implemented by decision-makers who acted under strict budgetary discipline.

Now, turning the main variables of interest for our study, it is worth nothing that the share of individuals diagnosed with mental disorders has highest in 2006/2007 (11.5%), significantly fell during the peak years of the economic crisis (9.7%), and increased again in the years after (10.9%), remaining slightly below the rate in the initial period. Interestingly, self-assessed psychological distress showed the opposite pattern. One in five individuals reported experiencing psychological distress before and during the crisis (19.8% and 20.2%, respectively), but fewer would recognise discomfort associated to mental conditions in 2016/2017.

Table 2 shows the estimates for 2006/2007, 2011/2012 and 2016/2017 of the bivariate probit model of the probability of being diagnosed with mental disorder and of the probability of experiencing psychological distress. The estimated correlation coefficient ρ is high ($\rho \sim 0.6$) and significant, which denotes a close relationship between the two mental health measures and justifies our choice of bivariate regression model. Turning the results, most of the determinants potentially influencing both probabilities appear to be significant. In general, a non-linear association between mental health and age is observed. Mental distress tends to reach a maximum in middle adulthood. The effect is stronger for diagnosed mental disorder than for psychological distress. Women are both diagnosed more often and tend to feel psychological discomfort more than men.

Table 2 Bivariate probit models for diagnosed mental disease and psychological distress

	Spanish National Health Survey 2006/2007		Spanish National Health Survey 2011/2012		Spanish National Health Survey 2016/2017	
	Diagnosed mental disorder	Psychological distress	Diagnosed mental disorder	Psychological distress	Diagnosed mental disorder	Psychological distress
Variable	Coefficient (Robust standard error)		Coefficient (Robust standard error)		Coefficient (Robust standard error)	
Age (year)	0.058 (.005)***	0.007 (.004)	0.054 (.005)***	0.018 (.004)***	0.046 (.005)***	0.013 (.004)***
Age^2	-0.0004 (<.0001)***	-.00001 (<.0001)	-.0004 (<.0001)***	-.0001 (<.0001)***	-.0003 (<.0001)***	-.0001 (<.0001)
Gender (0=male; 1=female)	0.497 (.029)***	0.371 (.025)***	0.439 (.033)***	0.249 (.026)***	0.369 (.029)***	0.285 (.025)***
Married/cohabiting (1 yes; 0 no)	-0.145 (.031)***	-0.104 (.028)***	-0.185 (.033)***	-0.171 (.028)***	-0.283 (.030)***	-0.167 (.027)***
Living in a municipality with less than 50,000 inhabitants (1 yes; 0 no)	-0.064 (.029)**	-0.017 (.025)	-0.004 (.032)	0.004 (.027)	-0.038 (.029)	-0.057 (.026)**
Unemployed (1 yes; 0 no)	0.145 (.058)**	0.308 (.048)***	0.141 (.047)***	0.396 (.038)***	0.230 (.043)***	0.371 (.038)***
Spend some hours a week caring for someone with disability (1 yes; 0 no)	0.253 (.078)***	0.482 (.071)***	0.126 (.080)	0.198 (.072)***	0.185 (.041)***	0.195 (.037)***
Education						
Incomplete primary and illiterate (Ref.)						
Primary	-0.131 (.042)***	-0.202 (.038)***	-0.018 (.055)	-0.079 (.049)	-0.142 (.049)***	-0.162 (.044)***
Secondary and higher secondary	-0.216 (.049)***	-0.241 (.043)***	-0.248 (.054)***	-0.208 (.044)***	-0.333 (.053)***	-0.226 (.046)***
University	-0.344 (.064)***	-0.373 (.054)***	-0.443 (.080)***	-0.314 (.059)***	-0.606 (.069)***	-0.322 (.059)***
Social class (based on head of household occupation)						
Non-qualified (Ref.)	0.058 (.042)	-0.079 (.037)**	-0.121 (.044)***	-0.056 (.038)	0.005 (.040)	-0.038 (.036)
Supervisors, qualified and semi-qualified	0.017 (.046)	-0.073 (.042)	-0.181 (.053)***	-0.091 (.045)**	-0.022 (.049)	-0.115 (.044)***
Intermediary and self-employed	-0.018 (.052)	-0.147 (.048)***	-0.129 (.062)***	-0.172 (.050)***	-0.082 (.058)	-0.192 (.050)***
Managers						
Intercept	-2.816 (.135)	-1.056 (.108)	-2.777 (.161)	-1.197 (.109)	-2.3461 (.135)	-0.962 (.104)
Number of observations	27,116		19,441		21,539	
Log pseudolikelihood	-26,082,022		-26,454,747		-26,291,692	
Wald X^2 (58); Prob > X^2	1,543.75; 0.0000		1,612.71; 0.0000		1,574.29; 0.0000	
Ath ρ	0.684 (.020)***		0.680 (.022)***		0.731 (.022)***	
ρ	0.594 (.013)		0.592 (.015)		0.624 (.013)	
Wald test of ρ=0: X^2 (1); Prob > X^2	1,131.05; 0.0000		925.61; 0.0000		1,136.36; 0.0000	

Note: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$ Control variables, not shown here, are regions.

As expected, providing informal care to a disabled family member is a stressful experience and may be hazardous to the mental health of the caregiver. The protective impact of better education is also clear in all estimations, while joblessness significantly hampers psychological well-being. Living in a small municipality, which may indicate insufficient access to healthcare services or stigma, significantly reduces the probability of being diagnosed with mental disorder, but only in the years before the crisis.

The most interesting result is the impact of the social class indicators on the probability of being diagnosed with mental disorder. These are only significant in 2011/2012, the peak of the crisis period. Individuals belonging the highest social classes are found to experience less psychological distress independently of the study period.

Table 3 contains the conditional marginal effects for both measures of mental health by social class. For diagnosed mental disorder, only the results corresponding the 2011/2012 are significant and are read as follows (panel A). For the average person belonging to the higher social class (managers) reduces the probability of being diagnosed with mental disorder by 0.018 points compared to those unqualified. Panel B of Table 3 tells a different story. Belonging to higher social classes acted as buffer against phycological discomfort during the whole study period. The probability of being at risk of mental distress is between 0.04 and 0.05 for those living in a household where the main wage earner is manager, and around 0.03 if he/she is self-employed or has an intermediate rank.

Table 3. Conditional marginal effects for diagnosed mental disorder by social class

	Spanish National Health Survey 2006/2007	Spanish National Health Survey 2011/2012	Spanish National Health Survey 2016/2017
A	**Diagnosed mental disorder** dy/dx [95% Conf. Interval]		
Social class (based on head of household occupation) Non-qualified (Ref.)			
Supervisors, qualified and semi-qualified	0.010 [-.004; .023]	-0.018 [-.031; .004]***	0.001 [-.012; .013]
Intermediary and self-employed	0.003 [-.012; .018]	-0.025 [-.040; .010]***	-0.003 [-.019; .012]
Managers	-0.003 [-.019;.014]	-0.019 [-.036; .001]**	-0.012 [-.030; .005]
B	**Psychological distress** dy/dx [95% Conf. Interval]		
Social class (based on head of household occupation) Non-qualified (Ref.)			
Supervisors, qualified and semi-qualified	-0.023[-.046;-.001]*	-0.016[-.037; -.006]	-0.010[-.028; .009]
Intermediary and self-employed	-0.021[-.012; .003]	-0.026[-.051;-.001]**	-0.029[-.051;-.007]***
Managers	-0.041[-.068;-.015]**	-0.047[-.073;-.020]***	-0.047[-.071;-.023]***

Note: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$
dy/dx is the discrete change from the reference level

The conditional marginal effects for both indicators by household disposable income are shown in Table 4. Income exerts a protective effect on mental health, more for self-assessed psychological well-being. Thereof, an increase in 1 in the logarithm of household disposable income is associated with a decrease of between 0.200 and 0.031 in expected probability of being diagnosed with mental disorder. The fall in the expected probability of experiencing psychological distress is bigger, from 0.047 to 0.090.

Table 4. Conditional marginal effects for diagnosed mental disorder and psychological distress by household disposable income

A	Spanish National Health Survey 2006/2007	Spanish National Health Survey 2011/2012	Spanish National Health Survey 2016/2017
	Diagnosed mental disorder dy/dx [95% Conf. Interval]		
Natural log of household monthly disposable income in € 2016 (Oxford scale)	-0.020 [-.030;-.011]***	-0.028 [-.037;-.018]***	-0.031 [-.041;-.020]***
B	**Psychological distress** dy/dx [95% Conf. Interval]		
Natural log of household monthly disposable income in € 2016 (Oxford scale)	-0.047 [-.061;-.033]***	-0.086 [-.103;-.070]***	-0.090 [-.105;-.076]***

Note: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

To disentangle the puzzling result regarding the differential impact of social class on diagnosed mental disorder and mental health risk (GHQ-12) across the studied periods, Figure 1 plots the GHQ-12 score[8] against diagnosed mental disorder during the past 12 months. A simple look at the plot reveals that the average shares of diagnosed mental health disorders are quite different in 2011/2012 as compared to the other two periods. If we look at the GHQ-12 scores below 3, there is no gap between the two indicators and across periods. While, if we look at GHQ-12 scores above 5, and especially above 8, the gap between being diagnosed in 2011 and the periods pre- and post-crisis is huge. What's behind this gap?

To quantify this gap and determine if social class plays a significant role, we have calculated the predicted probabilities of diagnosed mental disorder and of psychological distress, assuming that every person in the data has the mean value of each confounder. As Table 5 panel A shows there are differences in the probabilities for being diagnosed with mental disorder by social class in the years of the crisis, while a relative

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[8] Recall that we classified individuals as experiencing phycological distress if their GHQ-12 score was 3 or above. In Figure 1 we use the original GHQ-12 variables, before transformation.

homogeneity is observed for 2006/2007 and 2016/2017. This explains the drop of the green line in Figure 1 for GHQ-12 of 5 and above.

Figure 1. Annual prevalence of mental disease against the GHQ-12 score by social class (based on head of household occupation)
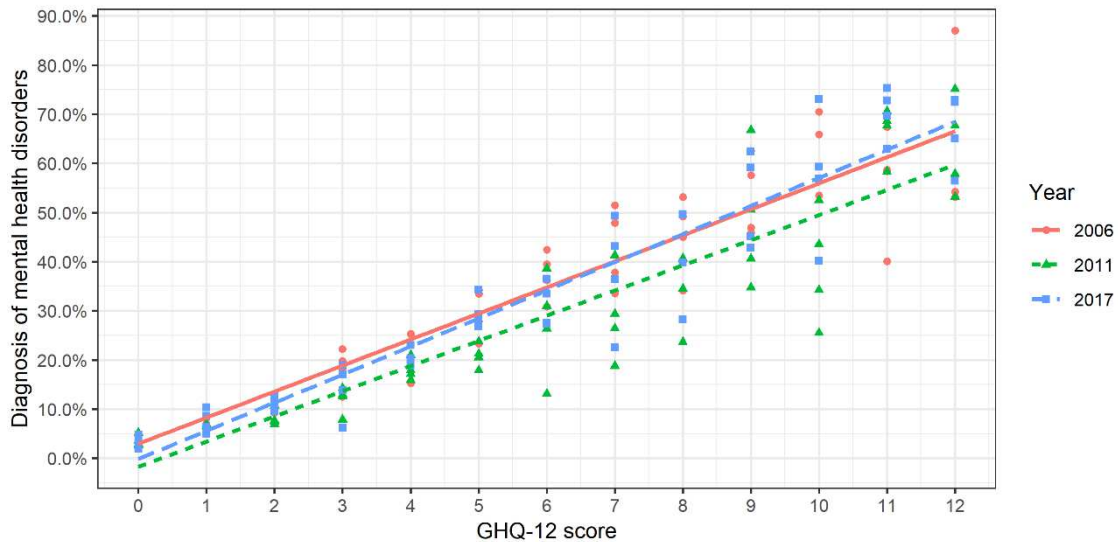
Panel B of Table 5 depicts the predicted probabilities of being in high risk of mental health by social class. Unlike the diagnosed mental illnesses, self-assessed psychological well-being improves as time passes and for all occupational categories in a similar manner.

Discussion

This study adds to a growing body of research on the evolution of mental health in times of economic change (Wahlbeck and McDaid, 2012; Frasquilho et al., 2016). Our main findings are, in general, aligned with most recent work using Spanish data to identify the main determinants of mental well-being and the negative consequences of recessions. However, there are some differences that are worth further consideration.

Women are, in general, more prone to suffer from psychological discomfort and to seek care than men[9]. Our results corroborate that and are in accordance to finding from Iceland (Hauksdottir, 2013) or Greece (Economou et al., 2016).

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[9] Gender differences in mental health research are well documented, but whether the burden of illness is more concentrated among women or men depends on the measurement of mental health, which is quite challenging.

Table 5. Predicted probabilities for diagnosed mental disorder and psychological distress by social class

	Spanish National Health Survey 2006/2007	Spanish National Health Survey 2011/2012	Spanish National Health Survey 2016/2017
A	**Diagnosed mental disorder**		
	Predicted probability [95% Conf. Interval]		
Social class (based on head of household occupation)			
Non-qualified	0.090 [.078;.102]***	0.087 [.074; .100]***	0.089 [.077;.100]***
Supervisors, qualified and semi-qualified	0.100 [.092;.108]***	0.069 [.063; .076]***	0.090 [.082;.097]***
Intermediary and self-employed	0.093 [.083;.102]***	0.062 [.053;.070]***	0.085 [.075;.096]***
Managers	0.087 [.076;.098]***	0.068 [.057;.079]***	0.076 [.065;.088]***
B	**Psychological distress**		
	Predicted probability [95% Conf. Interval]		
Social class (based on head of household occupation)			
Non-qualified	0.223 [.203;.243]***	0.214 [.196;.233]***	0.185 [.168;.201]***
Supervisors, qualified and semi-qualified	0.200 [.199;.211]***	0.198 [.188;.209]***	0.175 [.165;.184]***
Intermediary and self-employed	0.202 [.188;.216]***	0.188 [.173;.204]***	0.156 [.142;.169]***
Managers	0.182 [.163;.198]***	0.167 [.151;.184]***	0.138 [.123;.153]***

Note: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Given that diagnosis of mental disorders are correlated with utilisation of healthcare, our findings are also supported by evidence showing that women use mental healthcare, such as access to outpatient visits, emergency department, prescription drugs and hospitalisation, more than men during the crisis (Buffel, van de Straat, and Bracke, 2015; Chen and Dagher, 2016, Sicras-Mainar et al., 2016).

That health deteriorates with age is a common wisdom. But, does it hold for psychological well-being? Unlike most evidence from Spain[10], we observe a quadratic relationship, meaning that mental distress reaches its peak in middle adulthood. Similar results are found by Blanchflower and Oswald (2008). Previous research shows that mental health improves around the age of retirement, to start declining again in the latest life-stages (Steptoe et al., 2014). The most plausible reason being the fact that older ages are related to cognitive decline and dementia. Elderly are also a vulnerable group as they are at higher risk of social and family isolation, which may explain anxiety and depression in older age (Djernes, 2006). Feelings of isolation can come about because of retirement (which is usually associated with receiving lower or less stable income) or due to the loss of a partner or friends to illness. Nevertheless, there is also

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[10] Studies using Spanish data report a positive relation between prevalence of mental problems and age is observed (Gili et al., 2016; Bartoll et al., 2014; Basterra, 2017).

evidence on improvements of mental health in the later adulthood (Fiske, Wetherell, and Gatz, 2009).

What's behind this gap? It may be that in times of recessions individuals see some, otherwise relevant, stressful circumstances as minor. Another plausible explanation may be the lack of sufficient resources in health care, a question that needs to be studies further.

The unadjusted analysis shows a notable gap in 2011/2012 (the peak years of the economic recession), with respect to 2006/2007 and 2016/2017, in the evolution of the diagnosis of mental disorder by GHQ-12 score. It is worth noting that the predicted probabilities of diagnosed mental disorders and that of psychological distress exhibit different pattern. Regarding the diagnosis with mental disorder, the predicted probabilities follow a U-shaped time trajectory, greater probability in the years before and after the crisis and lower probabilities in 2011/2012, with more marked differences in the middle social classes. The predicted probability of suffering psychological stress gradually decrease over time in all estimations, as higher social classes tend to declare lower propensity to psychological distress than lower ones.

The probability of being diagnosed with mental disorder decreased in 2011/2012 for all social classes with respect to the non-qualified workers, the lowest social class. Our results may suggest that in periods of economic recession, individuals from middle social classes "get used" to the (higher) levels of psychological distress, thus, seeing them as normal and not seeking formal treatment. Individuals could accept their stress because they consider it justified in harder times.

Several limitations to this study need to be recognised. First, cross-sectional data do not allow for exploration of causal impacts, longitudinal study designs are better suited for this aim. Nevertheless, the present study is the first to offer a more comprehensive evidence on the extension and duration of the impacts of the recession on mental health over a longer period, including the years before, during and after the crisis. Moreover, sample sizes are sufficiently large and representative for the whole population. Survey design characteristics are accounted for by using sample weights in all calculations, so that we avoid any inaccuracy in point estimates and/or standard errors.

Second, our indicators of mental health are constructed from self-reported survey questions, which may be subject to recall bias. We are less concerned with this limitation as the recall periods in our study are relatively short, past 12 months in the case of doctor-diagnosed disorder and the last few weeks for GHQ-12.

Third, we do not include indicators for availability of public health resources for diagnosis and treatment of mental health problems nor we accounted for specific policies regarding mental health implemented by regional health authorities, which would have allowed to control for geographical variations across autonomous regions. There is a study (Ruiz-Pérez et al., 2017) that aims to quantify the impact of macroeconomic conditions on mental health in Spain. Only two of the contextual variables are shown to significantly hamper mental health, lower healthcare spending

per capita (for women) and higher share of temporary workers (for men). Although interesting, the indicators used in the multilevel analysis by Ruiz-Pérez, Bermúdez-Tamayo, and Rodríguez-Barranco (2017), these are not necessarily linked to more or less (better/worse) healthcare resources. Including data on healthcare resources, better even on mental health resources[11], would enrich the analyses, however, such information is not readily available for all regions and all periods in our study.

Finally, we should bear in mind that the present study focuses only on diagnosed mental health disorders and psychological well-being of people living at their homes. We do not have data on institutionalised population[12], which may also bias our results. Suicides, violent behaviour or substance use and abuse are among the major mental health risks that appear in time of economic hardships. In order to depict the whole picture of the evolution of mental health burden, these risk factors should also be further analysed.

Conclusions

Our study is the first to simultaneously analyse self-assessed psychological distress and diagnosed mental disorders over a longer period of time encompassing the years before, during and after the economic recession that started in 2008. We show, as expected, that psychological distress among Spaniards increased during the peak years of the crisis due to major risk factors such as unemployment and loss of socioeconomic status. However, we also observe a huge improvement in mental health well-being shortly after the end of the economic turmoil. On the contrary, diagnosed mental disorders fell during the recession and slightly increased after it[13], remaining way below the pre-2008 level. Therefore, even though the need for mental healthcare increased during the recession, the fact that less people were diagnosed suggests that barriers to access to mental healthcare may be aggravated during the crisis. The most probable explanations for that are likely related to changes in the availability (e.g., cuts in human resources) and reduced affordability (e.g., out-of- pocket payments for psychologists) of services (Wahlbeck and McDaid, 2012; Silva et al., 2018). The widening treatment-need gap in mental health in times of economic recessions is reviewed by Martin-Carrasco et al. (2016). Among the reasons behind it, the authors outline the austerity measures, the lack of access to healthcare and the increased stigma.

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[11] Best suited for our analyses would be public mental healthcare spending, number of psychiatrists or psychology, or an indicator of the share of patients with mental problems attended by general practitioners.

[12] There are two main groups of individuals who are not accounted for in our sample. The first group consist of people with severe mental disorders are likely to be hospitalised. The second one includes many oldest elderly living in long-term care facilities.

[13] Iglesias García et al. (2014) also found that GDP increase was strongly associated with an increased demand for mental health care.

The finding that socioeconomic status is determining for obtaining needed care in times of crisis, but not when the economy is doing well, is related to another major health policy concern, namely, the existence of inequalities in access to care. During economic hardships, social inequalities in health can widen (Urbanos-Garrido and Puig-Junoy, 2014). Those who are harder struck by the crisis are usually the most vulnerable ones, among them those who lose jobs, income or housing and their families. Even more worrying is the finding that these inequalities persist after the economy starts to recover.

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