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Keywords: Mental health, Health Care, Unemployment, Great Recession

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The Effect of Labor Market Shocks on Mental Health Outcomes: Evidence from The Spanish Great Recession

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Abstract

This research examines the response in terms of demand for mental health care when individuals face a negative economic shock that impairs mental health. It exploits the sudden increase of the unemployment rate in Spain during the period 2007-2009 to analyze the long-run consequences of the labor market deterioration caused by the Great Recession on mental health. First, I analyze the impairment of self-evaluated mental health as a consequence of the Great Recession and if it prevails during the economic recovery. In addition, I estimate if the effect on self-reported mental health is reflected in the demand for mental health care. The results indicate that individuals displaced from their jobs are more likely to report worse mental health, to take drugs for mental illness, and to visit a mental health specialist. Using a labor market shock at the aggregate level, the findings from a differences-in-differences design show that the economic downturn increases the differences between employed and unemployed individuals in self-evaluated mental health. However, a recession reduces the prescription of mental health drugs, and the effect on medical attendance is insignificant. The opposite evidence regarding self-evaluated mental health and medical behavior might suggest the presence of a stigma associated with mental health.

Keywords: Mental health, Health Care, Unemployment, Great Recession

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1 INTRODUCTION

Mental health disorders constitute around 13 percent of the global burden of disease, surpassing cardiovascular disease and cancer (e.g. **?**). It is estimated that, in 2017, 3.76 percent of the population had an anxiety disorder, and 3.44 percent suffered from depression (e.g. Roser and Ortiz-Ospina, 2018). Among other determinants, labor market status is known to be one of the elements that affect mental health. Thus, changes in the labor market status might lead to mental health changes, mainly through two mechanisms: income variations and deviations from social norms. For instance, Baird et al. (2013) and Lachowska (2017) show a positive relationship between income changes and mental well-being. Regarding social norms, empirical evidence indicates that individuals evaluate their situation relative to their social surroundings as in Clark (2003), Ferrer-i Carbonell (2005), Luttmer (2005), or Perez-Truglia (2019). In addition, the reverse relationship is also empirically established, showing that mental health affects labor market outcomes, especially in the case of individuals with poor mental health. For instance, Biasi et al. (2018) find that those with mental health diagnoses have a higher probability of reporting zero earnings, and Frijters et al. (2014) find that mental health impairments lead to a reduction in the probability of being employed. A negative relationship between adolescent mental health and future employment status is also shown in Mousteri et al. (2019). Also Bubonya et al. (2018) find a bilateral relationship between poor mental health and job losses. Thus, those who already suffer from worse mental health are also more prone to experience adverse labor market outcomes, such as lower wages, higher temporality, or longer unemployment spells. These negative labor market outcomes may impair mental health, creating a mental health trap. Therefore, a deep understanding of the relationship between labor market status and mental health becomes crucial for an optimal policy design focused on mitigating potential problems that may arise from that relationship.

In this paper, I analyze if changes in the differences between employed and unemployed individuals regarding subjective mental health are reflected in the demand for mental health

care. In addition, I look at how persistent these differences are after the Great Recession. The design exploits a period with a massive unemployment rate and decreasing GDP per capita to compare the unemployed-employed differences in self-reported mental health before and after 2009. Then, I add to the analysis two medical outcomes related to mental health: the probability of taking or being prescribed medicines for mental health problems and the likelihood of visiting a mental health specialist to study if there are changes in medical behavior. Furthermore, I analyze the scarring effects on mental health after an economic downturn, including data from some periods after the Great Recession.

Results from the preferred specification indicate that the long-term deterioration of the economic situation increases the differences in self-evaluated mental health by 0.08 standard deviations, which corresponds to around 44 percent of the cross-differences between unemployed and employed individuals. Using a subsample of recently displaced individuals (six months or less), the increase in the gap is reduced to 0.02 standard deviations, but this coefficient is not statistically significant. However, after 2009, I find a decrease of around 1.5 percentage points in the differences of being prescribed medication for mental problems. In addition, I do not find evidence of changes in the likelihood of visiting a mental health specialist for those who become unemployed.

This paper's findings are significant for two reasons: First, I add medical outcomes related to mental health to analyze the response to a mental health impairment as consequence of the labor market deterioration. The Results are in line with those who analyzed the relationship between unemployment and mental health in Spain. Urbanos-Garrido and Lopez-Valcarcel (2015) find This relationship was also analyzed for the case of workers heavily affected by the financial downturn. Farré et al. (2018) find that unemployment negatively affects the mental health of those workers that suffer job losses in the construction sector. Bartoll et al. (2019) look at the causal effect of temporary employment on work-related stress and mental health before and during the Great Recession, finding a positive link between temporary employment and deterioration of mental health. Regarding the medical care outcome, results

are in line with those in Martínez-Jiménez and Vall Castelló (2020), who find no significant changes in the use of drugs for depression and anxiety in Catalonia during the 2010-2015 period. However, Gili et al. (2012) find that an increase in the frequency of mental health disorders among primary care attendees in Spain during 2010 compared to 2006.

In addition, I look at the scarring effects of the economic deterioration as a consequence of the Great Recession. I consider different survey waves to cover a more extended period, therefore checking the long-run effects of a period with a persistent and large unemployment rate. Charles and DeCicca (2008) remark the relevance of understanding the long-run implications of impaired labor market on mental health. In consequence, I examine the scarring effects of the Great Recession. Thus, this paper adds evidence to the literature focused on the scarring effects of the recessions (see Rothstein (2020) and Yagan (2019)). While the literature examines the scarring effects on labor market outcomes, less attention is paid to the long-run effects of a period with a large unemployment rate on health outcomes. Furthermore, I include different outcomes linked with mental health, such as whether individuals take drugs for depression or anxiety and whether individuals visited a mental health specialist, which allows the comparison between changes in self-evaluated mental health and the medical response to these potential changes.

The rest of the paper is structured as follows. In Section 2 I provide some background information on unexpected unemployment shocks and the Great Recession in Spain, while Sections 3 and 4 describe the data and the empirical strategy. Section 5 contains the main findings. Finally, Section 6 concludes.

2 MENTAL HEALTH AND LABOR MARKETS

2.1 Labor markets and mental health

Many studies examine the effects of labor market status on mental health. Regarding other European countries affected by the Great Recession, Wang and Fattore (2020) find an effect of higher unemployment rates on admissions for affective disorders in Italy. Results in Mazeikaite et al. (2019) suggest a deterioration of mental health during the period 2008-2013 in Ireland, in line with results in Drydakis (2015). Mousteri et al. (2018) find that unemployment is associated with a 0.017 standard deviations reduction in quality of life and 0.014 standard deviations decrease in life satisfaction using data at the European level. Schaller and Stevens (2015) find an association between job displacement and higher levels of anxiety or depression in the US, while results in Tefft (2011) indicate a positive relationship between the unemployment rate and Google search for depression and anxiety. Stutzer and Odermatt (2018) study the impact of a set of life events, including unemployment, finding that unemployment harms life satisfaction. Boyce et al. (2018) find that during the period 2009-2010, unemployment caused a reduction of 0.17 standard deviations in well-being. Results in Cygan-Rehm et al. (2017) indicate similar unemployment effects in Australia, the United States, and the United Kingdom, being higher than the effect found for Germany. Moreover, unemployment can also affect the spouse's mental health, as in Marcus (2013). Bangham (2019) finds that household income and labor market status are both related to subjective well-being. Moreover, Bell and Blanchflower (2018) find that underemployed individuals display a higher prevalence of mental illness. Precarious employment could also affect the probability of developing mental health problems, according to Moscone et al. (2016). Recessions might have an impact on mental health, through wealth shocks, as Schwandt (2018) shows. Ridley et al. (2020) extend the analysis to the relationship between poverty and mental health.

2.2 The Great Recession in Spain

The Great Recession was incredibly hard in Spain. In Figure 1, I show the evolution of Spanish GDP per capita and the unemployment rate. In 2008, when the unemployment rate was already increasing, GDP per capita was at its peak. Five years later, in 2013, GDP per capita hit its lowest point in this period, whereas the unemployment rate was over 25 percent. By the end of 2016, GDP per capita had almost recovered, but the unemployment rate was still around 20 percent. The above statistics make the Spanish case a very interesting one. The deterioration of the labor market allows the analysis of the effects of a prolonged period with large unemployment in the employed-unemployed differences. Furthermore, it is interesting to notice that the unemployment shock affected a fairly heterogeneous population. Figure 2 shows that unemployment affected males and females, individuals at all educational attainment levels, and all working-age groups. Therefore, the treated group is heterogeneous and not a selected subsample. Finally, the unemployment shock had a remarkable impact on income. Kawano and LaLumia (2017) find that household income declined by about 17 percent using data from the USA. Gardeazabal and Polo-Muro (2021) find that unemployment could reduce the monthly family income by around 400€.

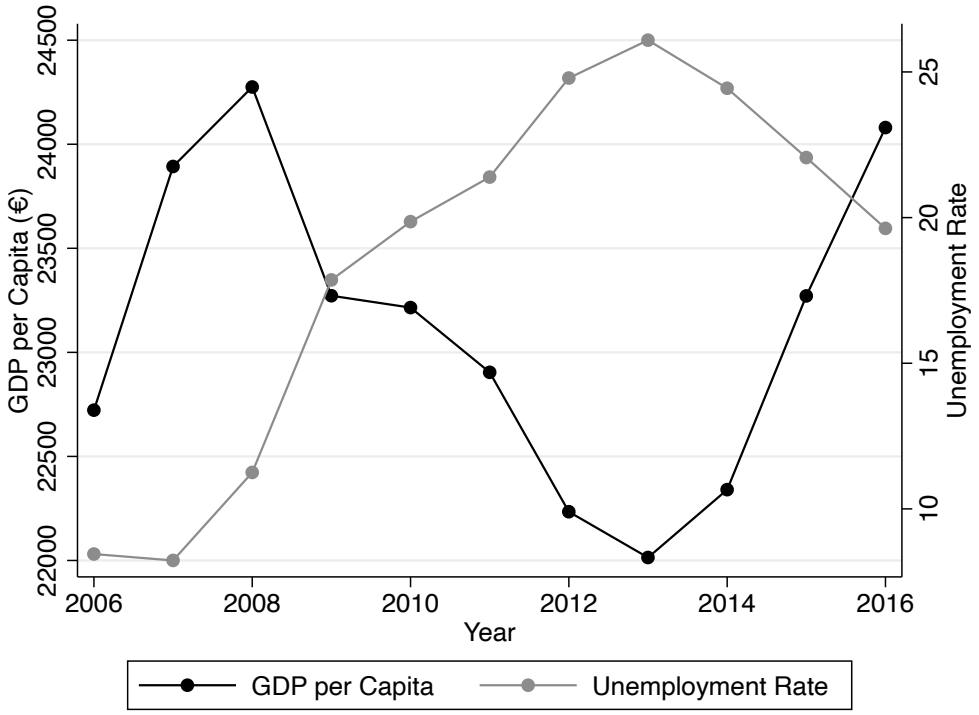

Figure 1: Spanish GDP per Capita and Unemployment Rate

Source: Survey of active population from Spanish National Bureau of Statistics.

Notes: Figure shows Spanish unemployment rate and GDP per capita during the period 2006-2016.

Therefore, these side effects caused by the deterioration of the labor market might be mitigated by an optimal welfare state design. There is evidence in favor of a relationship between mental health and welfare policies such as Earned Income Tax Credit (EITC) (see Gangopadhyaya et al. (2019)). In this sense, Hoynes and Rothstein (2019) start to evaluate the Universal Basic Income (UBI) as an alternative to mitigate the negative externalities that arise from automatization. Preliminary results from the UBI experiment in Finland show a positive effect of the unconditional income transfer on self-reported well-being. Other authors, as Andersen and Svarer (2010), propose unemployment insurance that depends on the business cycle. Kuka (2020) find that UI is an important tool for reducing the negative impact of unemployment on health outcomes. Furthermore, the results suggest that the effect of unemployment shock on mental illness is heterogeneous. Therefore, as Ridley et al. (2020) remark, effective

policy design to mitigate externalities caused by layoffs requires evidence about the consequences that these job displacements may cause.

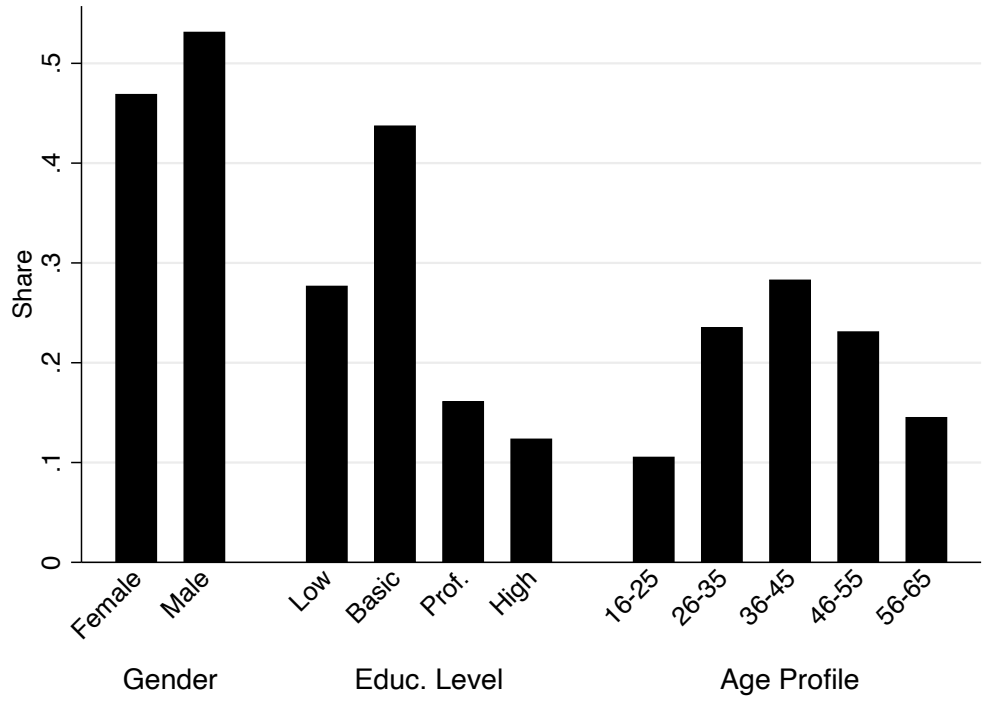

Figure 2: Unemployed Profile

Notes: Figure shows the share of unemployed individuals in each bin among each category.

3 Data and Descriptive Statistics

3.1 Spanish Health surveys

I use data from the Spanish Health Survey (SHS) and the European Health Survey (EHS). These surveys consist of a two-part questionnaire: one focused on a randomly selected individual in each household, and another questionnaire covering the characteristics of the other

household members. The former reports rich socioeconomic information, including age, gender, education, marital status region, size of the town of residence, and household size. Labor market covariates are also included, such as status, occupation, and contract type. The health questionnaire includes an instrument to measure psychological well-being. Questions about past health status are included as well. The inhabitant's questionnaire covers detailed information about age, education, and labor market status. The SHS is conducted by the Spanish Health Ministry every five years. This survey is a nationally representative sample of around 20,000 men and women. I use the available waves for 2006, 2011/12 (2011 henceforth), and 2016/17 (2016, henceforth). Eurostat conducts the EHS, and the actual data collection for Spain is carried out by the Spanish Statistical Bureau (INE). Comparing both surveys, the SHS covers a wider range of data than the EHS. For instance, data for the year 2009 does not specify the length of time unemployed for those who are unemployed. EHS for Spain are used to cover periods 2009 and 2014.

3.2 Mental Health measures

This paper uses two types of measures for mental health status. First, it uses self-reported mental health to measure how the recession period affected mental well-being. Second, the demand for mental health care is measured using questions about if the observed individual reports being prescribed or taking drugs for mental health problems or whether a mental health specialist is visited.

As I use different waves from different providers, I have different instruments to measure self-evaluated mental health. For 2006, 2011, and 2016, the SHS uses the General Health Questionnaire (GHQ). The GHQ was developed to detect individuals with a mental disorder (see Goldberg and Hillier (1979); Goldberg and Williams (1988)). The original questionnaire had 60 items (GHQ 60) from which shorter versions of 12 items (GHQ 12) have been constructed. The GHQ-12 has been used in several studies as in Apouey and E.Clark (2014),

Baird et al. (2013), Farré et al. (2018), Lindqvist et al. (2018), or Urbanos-Garrido and Lopez-Valcarcel (2015), for instance. The European Health Interview Survey (2009) covers nine questions regarding the mental health dimension, the SF36 mental health score developed by RAND Corporation. For the 2014 wave, they use the Patient Health Questionnaire (PHQ-8).

Regarding the measured outcome, and to create a mental health index, I aggregate questions from the instrument for each wave. Those observations with at least one question unanswered are dropped, which means that only those observations with non-missing information from the mental health measurement instrument are included. The score of the questionnaire is then standardized. In addition, these surveys cover various questions regarding the use of medicine. I create a binary outcome that takes value equal to one of the individual reports being prescribed or is taking medicines for mental illness (I refer to this outcome as a prescription or use of mental illness medicine indistinctly), and a binary outcome if the individual reports at least one visit in the last 12 months to any mental health specialist. As European and Spanish surveys use different instruments to measure mental health, a potential concern might be if the mental health index is comparable across surveys. Appendix A provides visual evidence of the mental health distribution by labor market status separately for each wave.

3.3 Descriptive statistics

In order to use comparable individuals, I restrict the analysis to respondents whose surveys cover various questions regarding the use of medicine. Table 1 displays summary statistics for the restricted sample using the five waves included in the analysis. Health Survey respondents are between 16 and 86 years old, with a mean age of 42 years. Half of the restricted sample are males, and the most reported educational level is elementary education, the level attained by more than a third of surveyed individuals. The share of Spanish citizens is equal to 88 percent. Single or married individuals are nearly 0.9 of the restricted sample. Panel C shows that the

share of paid workers or company owners is almost 90 percent. Low skill services account for 41 percent of the sample. Panel E to H report the mean number of other household members in each category. Six out of ten other household members are employed. On average, there is slightly more than one individual within the two lowest educational attainment levels. Finally, households with two or three members represent 51 percent of the sample. Appendix B displays the normalized differences in characteristics between employed and unemployed individuals.

Table 1: DESCRIPTIVE STATISTICS

	(1) Mean	(2) Std. Dev.	(3) Min.	(4) Max.
Panel A: Socioeconomic covariates				
Age	42.40	10.97	16	86
Gender	0.51	0.50	0	1
Education (low)	0.20	0.40	0	1
Education (medium)	0.37	0.48	0	1
Education (vocational)	0.19	0.39	0	1
Education (tertiary)	0.24	0.43	0	1
Panel B: Marital status				
Single	0.32	0.46	0	1
Married	0.58	0.49	0	1
Widow	0.02	0.14	0	1
Divorced	0.09	0.28	0	1
Panel C: Occupation				
Military	0.01	0.08	0	1
White collars	0.06	0.23	0	1
Technician (high skilled)	0.13	0.34	0	1
Technician (medium skilled)	0.10	0.30	0	1
Technician (low skilled)	0.10	0.30	0	1
Services	0.20	0.40	0	1
Primary sector	0.03	0.17	0	1
Artisans	0.13	0.33	0	1
Operators	0.08	0.26	0	1
Non-skilled	0.16	0.36	0	1
Panel D: Household Members Labor Market Status				
Employed	0.61	0.62	0	8
Unemployed	0.16	0.43	0	7
Student	0.47	0.78	0	7
Retired	0.09	0.32	0	3
Others	0.51	0.85	0	10
Panel E: Household Members Age				
From 0 to 25	0.83	0.95	0	8
From 26 to 35	0.25	0.48	0	6
From 36 to 45	0.28	0.47	0	4
From 46 to 55	0.25	0.48	0	4
From 56 to 65	0.16	0.41	0	4
65 or older	0.10	0.35	0	4

4 EMPIRICAL STRATEGY

The main goal of this paper is to analyze if an impairment of self-evaluated mental health leads to a higher probability of demanding mental health care. Therefore, it exploits the economic shock of 2007-2009, where the unemployment rate increased rapidly. Because of the relationship between the economic situation and mental health status, a deterioration of the labor market should negatively affect mental health, especially to those individuals displaced from their jobs. Thus, I compare the differences in mental health outcomes between employed and unemployed individuals before and after 2009. This identification allows me to estimate if mental health impairments caused by the Great Recession are reflected in changes in demand for mental health care. As the Great Recession was dated in 2007-2009, I define the periods after 2009 as post-treatment periods to analyze the long-term scarring effects of the Great Recession.

As unemployed individuals, I select those that report being unemployed. However, the number of long-term unemployed individuals increases during the recession, and consequently, the duration of the unemployment spell might differ before and after 2009. Therefore, the sample is restricted to those unemployed for less than two years (henceforth, the restricted sample) to avoid capturing a compositional effect. Consequently, the differences between unemployed individuals before and after 2009 could be affected by differences in unemployment spell length. As the data from 2009 does not include the unemployment length, I use those unemployed that report being receiving unemployment benefits (the duration of the unemployment benefits in Spain are up to 24 months. Thus, if one individual is receiving unemployment benefits, it must be unemployed for less than two years). Nonetheless, I also show the results after including all the unemployed individuals (henceforth, the unrestricted sample).

4.1 Difference-in-differences Estimate

I start by estimating a cross-section difference-in-differences design. To do so, I pool together all waves of the two surveys and I exploit the large increase in the unemployment rate in Spain during the Great Recession

$$y_{itr} = \gamma + \gamma_1 * unemp_{itr} + \gamma_2 * post_i + \gamma_3 * (unemp_{itr} * post_{itr}) + \gamma_4 * X'_{itr} + \lambda_t + \zeta_r + \varepsilon_{itr} \quad (1)$$

where y_i is the mental health outcome of interest of individual i in region r and year t. X_i is a vector of covariates for individual i, that include age, gender, education, marital status, and a set of occupational dummies labor market controls, $unemp_{itr}$ is a dummy variable for whether individual i in region r and year t is unemployed, $post_{itr}$ indicates whether the survey was completed after the economic downturn (years 2011, 2014, and 2016). λ_t and ζ_r are calendar year and regional fixed effects, respectively. Parameter γ_3 is the coefficient of interest, which captures the differences between employed and unemployed individuals on mental health outcomes after an economic downturn with respect to the period before it. As data comes from different sources, there are changes between which covariates are included in each wave. Thus, I decided to include only the set of homogeneous covariates featured in all waves. Nonetheless, results are robust to the addition of other covariates.

4.2 Event study design

In addition to the difference-in-differences model, I include an event-study design. It allows the estimation of how the gap changes over time and also uses of the period before 2009 as a placebo test. Specifically, the event-study design takes the following form

$$y_{irt} = \alpha_0 + \alpha_1 U_{iprt} + \sum_{j=2006, j\neq 2009}^{j=2016} \alpha_j U_{irt} 1(t=j) + \eta X'_{irt} + \zeta_r + \lambda_t + \upsilon_{irt} \quad (2)$$

where coefficients α_j capture the dynamics of the differences between employed and unemployed individuals one period before the end of the Great Recession and the scarring effects in three different periods after 2009.

5 Results

5.1 Difference-in-differences results

Table 2 presents the estimated coefficients from equation 1. Columns 1 and 2 shows the results for the restricted sample of individuals unemployed for less than two years and for the unrestricted sample, respectively. In column 3, I focus on the effect on short-run unemployment. Results in Panel A indicate that unemployed individuals report worse mental health in comparison with employed individuals (around 0.18 standard deviation). After 2009, compared to the period before, these differences increase by 0.08 standard deviations for the restricted sample and 0.15 standard deviations for the unrestricted sample. These results range from 44 percent to 83 percent of the cross-section differences between individuals displaced from their jobs and those who remained employed. Results in column 3 indicate that the differences between employed and recently displaced individuals are slightly lower (0.15 standard deviation) and they do not suggest an increase in the mental health gap between employed and these particular unemployed group.

Table 2: Effects on Mental Health Outcomes

	(1) Restricted	(2) Unrestricted	(3) Short-term
Panel A: Subjective mental health			
Unemp*Post	0.0807***	0.1527***	0.0182
	(0.0272)	(0.0200)	(0.0383)
Unemployment	0.17982***	0.1805***	0.1568***
	(0.0212)	(0.0193)	(0.0225)
Panel B: Mental health Medicines			
Unemp*Post	-0.0156**	-0.0026	-0.0256**
	(0.0062)	(0.0058)	(0.0092)
Unemployment	0.0287***	0.0319***	0.0306***
	(0.0047)	(0.0038)	(0.0050)
Panel C: Medical attendance			
Unemp*Post	0.0049	0.0139**	-0.0031
	(0.0069)	(0.0064)	(0.0068)
Unemployment	0.0135***	0.0132***	0.0174***
	(0.0044)	(0.0039)	(0.0049)
Observations	57,164	61,697	19,315

Notes: All regressions include region and year fixed effects. At regional level clustered standard errors in parentheses. One, two and three starts indicate significance at ten, five and one per cent.

Turning to medical outcomes, unemployed individuals are around 3 percentage points more prone to taking drugs to deal with mental problems. Nonetheless, after the recession, these differences seem to decrease by almost 1.5 percentage points for the preferred specification and 2.5 percentage points for short-term unemployed individuals. These results are surprising, considering that (i) those who lost their jobs report worse mental health, and (ii) The Great Recession increases mental health differences between treated and untreated individu-

als. Therefore, I might expect that an increase in the differences in mental health would lead to an increase in the probability of being medicated for mental illness. Finally, even though those who lose their jobs are more prone to visit a mental health specialist (the differences ranges from 1 to 2 percentage points), results indicate that after the recession, only the analysis from the unrestricted sample shows an increase of 1.4 percentage points in the likelihood of visiting these above specialists.

5.2 Robustness checks

This subsection presents robustness analysis for the restricted and the unrestricted sample. First, based on the observed characteristics, I match employed and unemployed individuals using a propensity score the matching estimator developed by Abadie and Imbens (2011). Then, I repeat the difference-in-differences estimation over the matched sample. An advantage of this approach is that it only includes those employed observations similar to unemployed observations. In Table 3 I show the differences between employed and unemployed individuals before and after the matching. In addition, following Barbaresco et al. (2015), Cohodes et al. (2016), or Engelhardt et al. (2005), I collapse the data into a unique age-education-gender-occupation cell by employment status, region and year. Then, I repeat the difference-in-differences estimation at cell level. Columns 1 and 2 in Table 4 show the results for a difference-in-differences matching estimator, while in Columns 3 and 4 I display the results for the cell-level analysis. Results in Panel A, B, and C are in line with those obtained in Table 2.

Table 3: EMPLOYED-UNEMPLOYED DIFFERENCES

	(1)	(2)	(3)	(4)
	Raw		Matched	
	Mean	Std.Dev.	Mean	Std.Dev.
Panel A: Socioeconomic covariates				
Age	-2.53***	(0.14)	-0.93***	(0.16)
Gender	-0.03***	(0.01)	-0.01	(0.01)
Education (low)	0.08***	(0.00)	0.04***	(0.01)
Education (medium)	0.09***	(0.01)	0.02***	(0.01)
Education (vocational)	-0.03***	(0.01)	-0.02***	(0.01)
Education (tertiary)	-0.14***	(0.01)	-0.03***	(0.01)
Panel B: Marital status				
Single	0.10***	(0.01)	0.03***	(0.01)
Married	-0.11***	(0.01)	-0.03***	(0.01)
Widow	-0.00	(0.00)	-0.00	(0.00)
Divorced	0.02***	(0.00)	-0.00	(0.00)
Panel C: Occupation				
Military	-0.01***	(0.00)	-0.00	(0.00)
White collars	-0.05***	(0.00)	-0.01***	(0.00)
Technician (high skilled)	-0.10***	(0.00)	-0.02***	(0.00)
Technician (medium skilled)	-0.05***	(0.00)	-0.02***	(0.00)
Technician (low skilled)	-0.01***	(0.00)	-0.01***	(0.00)
Services	0.03***	(0.01)	-0.00	(0.01)
Primary sector	-0.01***	(0.00)	-0.00*	(0.00)
Artisans	0.05***	(0.00)	0.01	(0.01)
Operators	-0.00	(0.00)	-0.00	(0.00)
Non-skilled	0.13***	(0.00)	0.05***	(0.01)
Panel D: Household Members Labor Market Status				
Employed	-0.18***	(0.01)	-0.06***	(0.01)
Unemployed	0.24***	(0.00)	0.13***	(0.01)
Student	-0.00	(0.01)	0.01	(0.01)
Retired	0.03***	(0.00)	0.01*	(0.00)
Others	-0.10***	(0.01)	-0.04***	(0.01)
Panel E: Household Members Age				
From 0 to 25	-0.03***	(0.01)	0.01	(0.01)
From 26 to 35	0.02***	(0.01)	0.02***	(0.01)
From 36 to 45	-0.02***	(0.01)	0.01	(0.01)
From 46 to 55	-0.01	(0.01)	0.01*	(0.01)
From 56 to 65	0.01***	(0.01)	0.01	(0.01)
65 or older	-0.01***	(0.00)	0.01	(0.01)

Notes: One, two and three starts indicate significance at ten, five and one per cent.

Table 4: Robustness Checks of the Effect of Unemployment on Subjective Mental Health

	(2)		(3)	(4)
	Matching Did		Cell	
	Restricted	Unrestricted	Restricted	Unrestricted
Panel A: Subjective mental health				
Unemp*Post	0.0983***	0.1714***	0.0939***	0.1628***
	(0.0313)	(0.0256)	(0.0290)	(0.0218)
Panel B: **Mental health Medicines**				
Unemp*Post	-0.0137*	-0.0058	-0.0139**	-0.0005
	(0.0076)	(0.0060)	(0.00864)	(0.00659)
Panel C: Medical attendance				
Unemp*Post	0.0037	0.0162**	0.0053	0.0150**
	(0.0070)	(0.0071)	(0.0071)	(0.0060)
.				
Observations	21,390	23,173	45,008	48,901

Notes: All regressions include region and year fixed effects. At regional level clustered standard errors in parentheses. One, two and three starts indicate significance at ten, five and one per cent.

5.3 Event study results

In this section, I provide treatment effect dynamics from equation 2, which includes one lead indicator and three lag indicators. Lead indicator acts as a pre-recession trends test and is especially important to lend credibility to the parallel trends assumption. Failing to pass the test could suppose that the effects captured by the difference-in-differences design are not causal and is just reflecting differences in trends before 2009 between those who lose their jobs and those who do not. Thus, I consider a pre-recession trends test for the period 2006-2009, before the Great Recession. Ideally, I would like to cover more waves

before the Great Recession. However, the 2006 wave was the first to include an instrument to measure subjective mental health. Besides, lag indicators show how the differences between employed and unemployed individuals evolve during the period after 2009, allowing me to see the persistence of the scarring effects.

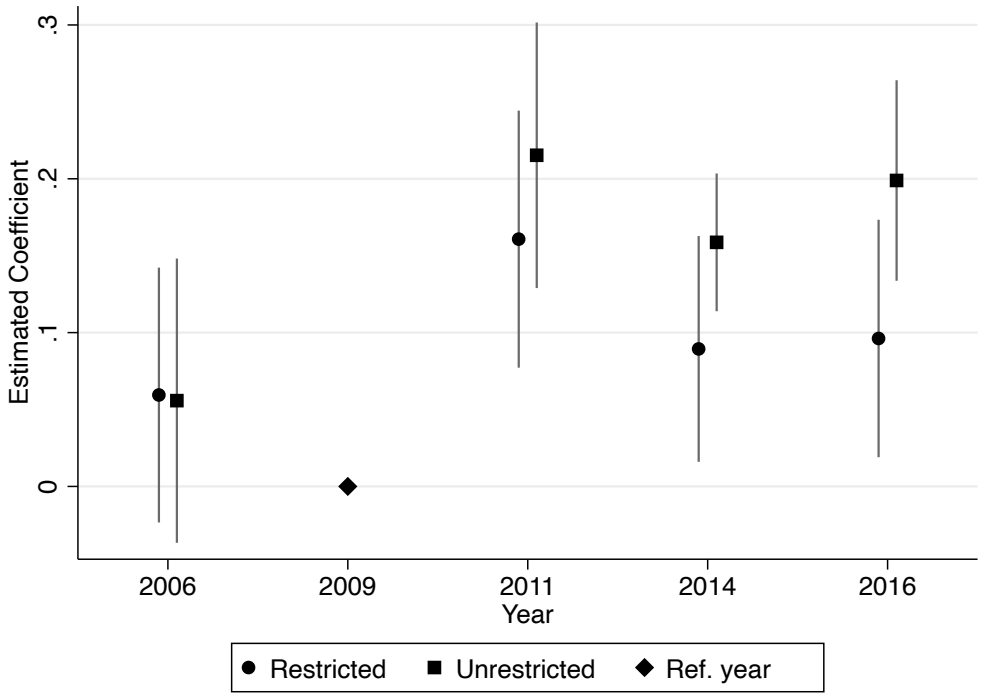

Figure 3: Event Study Coefficients (Subjective Mental Health)
Notes: Figure shows estimated coefficients from equation 2 with 90 percent confidence intervals.

I present the results from the event study for subjective mental health in Figure 3. There is no evidence that the differences in subjective mental health increase in the period 2006-2009. However, during the post-recession period, differences become larger than before the end of the Great Recession, especially in 2011. During the period 2014-2016, the gap shows a reduction in comparison to 2011, but the differences are still larger than before 2009, particularly for the unrestricted sample. Figure 4 exhibits the results for the probability of

consuming medication for mental health. The differences are constant during the period 2006-2009, and they present a decrease during the period 2011-2016 when the analysis focus on the restricted sample. For the unrestricted, the reduction only happens in 2011, and then the differences are almost equal in the period before 2009. Finally, regarding the demand for mental health specialists, in Figure 5 I present the results, where findings indicate an increase in the differences after 2009, probably reflecting natural trends observed during the period 2006-2009

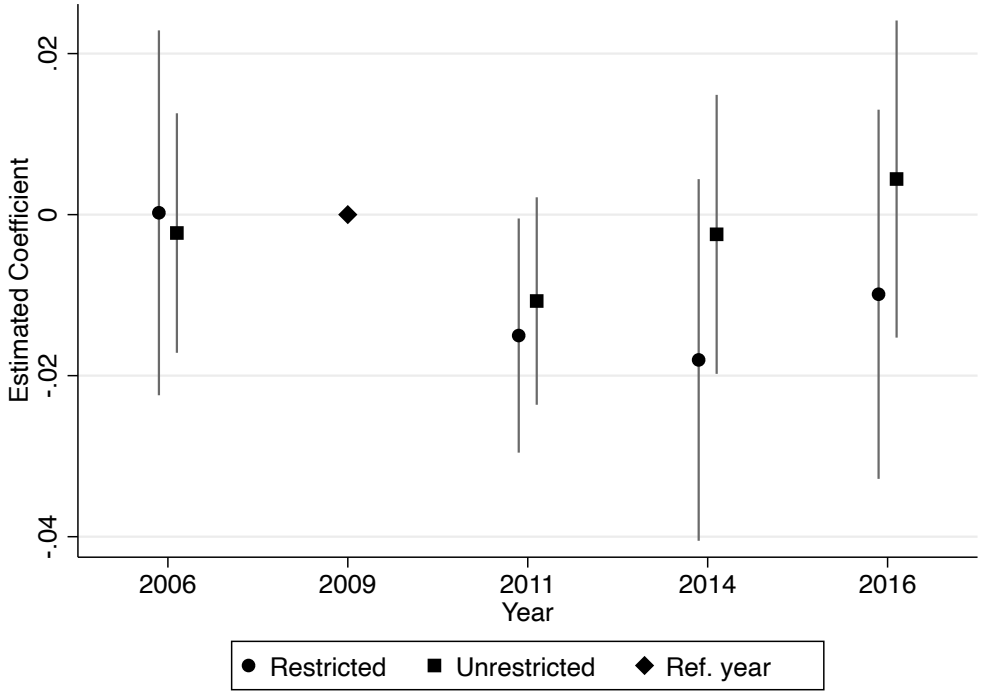

Figure 4: Event Study Coefficients (Mental Health Medicines)
Notes: Figure shows estimated coefficients from equation 2 with 90 percent confidence intervals.

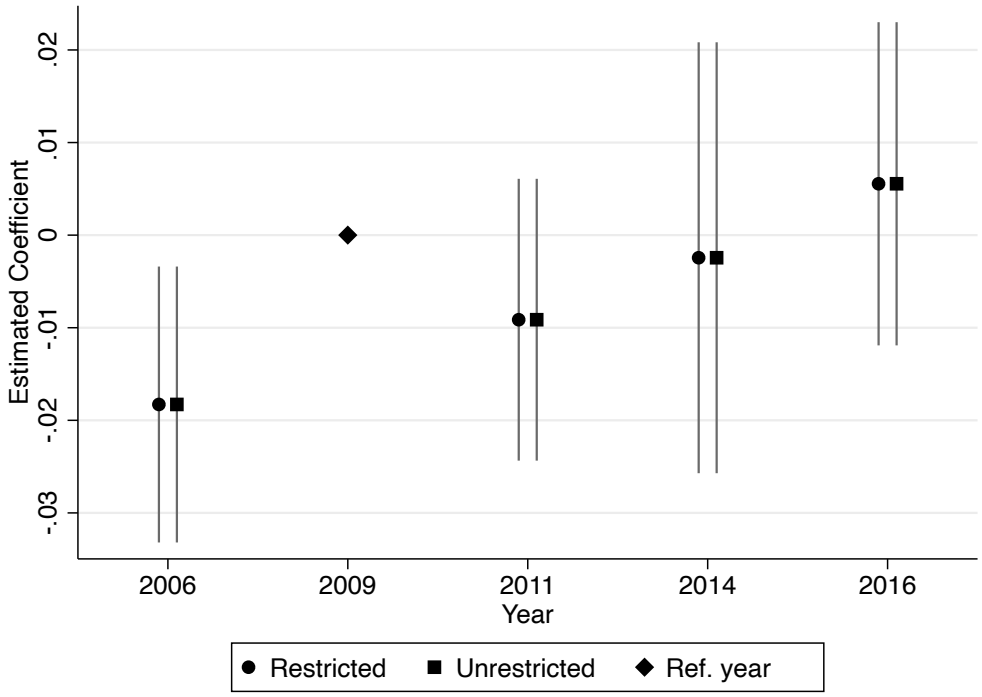

Figure 5: Event Study Coefficients (Medical Attendance)
Notes: Figure shows estimated coefficients from equation 2 with 90 percent confidence intervals.

6 Conclusion

This paper examines the relationship between labor market status and mental health after the Great Recession. Having provide evidence on how unemployed individuals report worse mental health compared to employed individuals, the results indicate that after 2009 the differences become even higher than in the period 2006-2009. More precisely, the estimated coefficients indicate that, after 2009, the mental health gap between employed and unemployed individuals increased by around 0.08 standard deviations, which accounts for 44 percent of the cross-sectional differences between both groups. However, despite unemployed individuals demand mental health care more often, findings suggest that, even when self-reported

mental health is affected by the deterioration of the labor market, there is no response in medical behavior. In contrast, unemployment may reduce the probability of being prescribed or taking medicines for mental illness and the odds of visiting a specialist for mental illness.

I entertain two potential explanations for these results. First, individuals might under-report their medical care for mental health problems. A second potential explanation is that individuals effectively do not ask for diagnoses more often, even when they are facing an impairment of mental health. Both explanations could be related to mental health stigma. Individuals might avoid asking for a diagnosis or even do not recognize that they asked for a diagnosis to avoid being stigmatized. These results aligned with those in Bharadwaj et al. (2017), who find that individuals under-report the diagnoses and drugs prescriptions regarding mental health. Finally, the scarring effects might affect only the extensive margin. Thus, results are capturing a mental health impairment of those individuals who are already medically attended.

These results are reliable for policymakers. Empirical evidence favors the idea that those who have the worst mental health are more prone to lose their job. After a recession, differences in mental health are even larger, affecting the opportunities to find a job, and consequently creating an unemployment trap. Mental health screening and early detection of psychological distress might be a potential policy-oriented to reducing unemployment.

References

Abadie, A. and Imbens, G. W. (2011). Bias-corrected matching estimators for average treatment effects. *Journal of Business & Economic Statistics*, 29(1):1–11.

Andersen, T. M. and Svarer, M. (2010). Business cycle dependent unemployment insurance. *IZA Discussion Paper No. 5196*.

Apouey, B. and E.Clark, A. (2014). Winning big but feeling no better? the effect of lottery prizes on physical and mental health. *Health Economics*, 24(5):516–538.

Baird, S., de Hoop, J., and Özler, B. (2013). Income shocks and adolescent mental health. *Journal of Human Resources*, 48(2):370–403.

Bangham, G. (2019). Happy now? lessons for economic policy makers from a focus on subjective well-being. Technical report, Resolution Foundation.

Barbaresco, S., Courtemanche, C. J., and Qi, Y. (2015). Impacts of the affordable care act dependent coverage provision on health-related outcomes of young adults. *Journal of Health Economics*, 40:54 – 68.

Bartoll, X., Gil, J., and Ramos, R. (2019). Has the economic crisis worsened the work-related stress and mental health of temporary workers in spain? *IZA discussion papers*, International Archives of Occupational and Environmental Health, 2019, 92 (7), 1047-1059.

Bell, D. N. and Blanchflower, D. G. (2018). The well-being of the overemployed and the underemployed and the rise in depression in the uk. Working Paper 24840, National Bureau of Economic Research.

Bharadwaj, P., Pai, M. M., and Suziedelyte, A. (2017). Mental health stigma. *Economics Letters*, 159:57 – 60.

Biasi, B., Dahl, M. S., and Moser, P. (2018). Career effects on mental health. *Available at SSRN: https://ssrn.com/abstract=2544251 or http://dx.doi.org/10.2139/ssrn.2544251*.

Boyce, C. J., Delaney, L., and Wood, A. M. (2018). The great recession and subjective well-being: How did the life satisfaction of people living in the united kingdom change following the financial crisis? *PLOS ONE*, 13(8):1–17.

Bubonya, M., Cobb-Clark, D. A., and Ribar, D. C. (2018). The bilateral relationship between depressive symptoms and employment status. *Life Course Centre Working Paper Series N 2017-07*.

Charles, K. K. and DeCicca, P. (2008). Local labor market fluctuations and health: Is there a connection and for whom? *Journal of Health Economics*, 27(6):1532 – 1550.

Clark, A. E. (2003). Unemployment as a social norm: Psychological evidence from panel data. *Journal of Labor Economics*, 21(2):323–351.

Cohodes, S. R., Grossman, D. S., Kleiner, S. A., and Lovenheim, M. F. (2016). The effect of child health insurance access on schooling: Evidence from public insurance expansions. *Journal of Human Resources*, 51(3):727–759.

Cygan-Rehm, K., Kuehnle, D., and Oberfichtner, M. (2017). Bounding the causal effect of unemployment on mental health: Nonparametric evidence from four countries. *Health Economics*, 26(12):1844–1861.

Drydakis, N. (2015). The effect of unemployment on self-reported health and mental health in greece from 2008 to 2013: A longitudinal study before and during the financial crisis. *Social Science I& Medicine*, 128:43 – 51.

Engelhardt, G. V., Gruber, J., and Perry, C. D. (2005). Social security and elderly living arrangements: Evidence from the social security notch. *Journal of Human Resources*, XL(2):354–372.

Farré, L., Fasani, F., and Mueller, H. (2018). Feeling useless: the effect of unemployment on mental health in the great recession. *IZA Journal of Labor Economics. Sep 27;7(1):8*.

Ferrer-i Carbonell, A. (2005). Income and well-being: an empirical analysis of the comparison income effect. *Journal of Public Economics*, 89(5):997 – 1019.

Frijters, P., Johnston, D. W., and Shields, M. A. (2014). The effect of mental health on employment: Evidence from australian panel data. *Health Economics*, 23(9):1058–1071.

Gangopadhyaya, A., Blavin, F., Gates, J., and Braga, B. (2019). Credit where it's due: Investigating pathways from eitc expansion to maternal mental health. *IZA Discussion Paper No. 12233*.

Gardeazabal, J. and Polo-Muro, E. (2021). Cultural expenditure of those who enter (or exit) unemployment. *Technical report, University of the Basque Country.*

Gili, M., Roca, M., Basu, S., McKee, M., and Stuckler, D. (2012). The mental health risks of economic crisis in Spain: evidence from primary care centres, 2006 and 2010. *European Journal of Public Health*, 23(1):103–108.

Goldberg, D. and Williams, P. (1988). A userís guide to the general health questionnaire. *NFER-Nelson*.

Goldberg, D. P. and Hillier, V. F. (1979). A scaled version of the general health questionnaire. *Psychological Medicine*, 9(1):139–145.

Hoynes, H. W. and Rothstein, J. (2019). Universal basic income in the us and advanced countries. Working Paper 25538, National Bureau of Economic Research.

Kawano, L. and LaLumia, S. (2017). How income changes during unemployment: Evidence from tax return data. *Journal of Human Resources*, 52(2):418–456.

Kuka, E. (2020). Quantifying the benefits of social insurance: Unemployment insurance and health. *The Review of Economics and Statistics*, 102(3):490–505.

Lachowska, M. (2017). The effect of income on subjective well-being: Evidence from the 2008 economic stimulus tax rebates. *Journal of Human Resources*, 52(2):374–417.

Lindqvist, E., Östling, R., and Cesarini, D. (2018). Long-run effects of lottery wealth on psychological well-being. Working Paper 24667, National Bureau of Economic Research.

Luttmer, E. F. P. (2005). Neighbors as Negatives: Relative Earnings and Well-Being*. *The Quarterly Journal of Economics*, 120(3):963–1002.

Marcus, J. (2013). The effect of unemployment on the mental health of spouses – evidence from plant closures in germany. *Journal of Health Economics*, 32(3):546 – 558.

Martínez-Jiménez, M. and Vall Castelló, J. (2020). Effects of macroeconomic fluctuations on mental health and psychotropic medicine consumption. *International Journal of Health Economics and Management*, 20(3):277–297.

Mazeikaite, G., O'Donoghue, C., and Sologon, D. M. (2019). The great recession, financial strain and self-assessed health in ireland. *The European Journal of Health Economics*, 20(4):579–596.

Moscone, F., Tosetti, E., and Vittadini, G. (2016). The impact of precarious employment on mental health: The case of italy. *Social Science I& Medicine*, 158:86 – 95.

Mousteri, V., Daly, M., and Delaney, L. (2018). The scarring effect of unemployment on psychological well-being across europe. *Social Science Research*, 72:146 – 169.

Mousteri, V., Daly, M., Delaney, L., Tynelius, P., and Rasmussen, F. (2019). Adolescent mental health and unemployment over the lifespan: Population evidence from sweden. *Social Science I& Medicine*, 222:305 – 314.

Perez-Truglia, R. (2019). The effects of income transparency on well-being evidence from a natural experiment. *(Forthcoming)*.

Ridley, M. W., Rao, G., Schilbach, F., and Patel, V. H. (2020). Poverty, depression, and anxiety: Causal evidence and mechanisms. Working Paper 27157, National Bureau of Economic Research.

Roser, M. and Ortiz-Ospina, E. (2018). "mental health". *Published online at OurWorldInData.org*.

Rothstein, J. (2020). The lost generation? labor market outcomes for post great recession entrants. Working Paper 27516, National Bureau of Economic Research.

Schaller, J. and Stevens, A. H. (2015). Short-run effects of job loss on health conditions, health insurance, and health care utilization. *Journal of Health Economics*, 43:190 – 203.

Schwandt, H. (2018). Wealth shocks and health outcomes: Evidence from stock market fluctuations. *American Economic Journal: Applied Economics*, 10(4):349–77.

Stutzer, A. and Odermatt, R. (2018). (Mis-)Predicted Subjective Well-Being Following Life Events. *Journal of the European Economic Association*, 17(1):245–283.

Tefft, N. (2011). Insights on unemployment, unemployment insurance, and mental health. *J Health Econ*, 30(2):258–264.

Urbanos-Garrido, R. M. and Lopez-Valcarcel, B. G. (2015). The influence of the economic crisis on the association between unemployment and health: an empirical analysis for spain. *The European Journal of Health Economics*, 16(2):175–184.

Wang, Y. and Fattore, G. (2020). The impact of the great economic crisis on mental health care in italy. *The European Journal of Health Economics*, 21(8):1259–1272.

Yagan, D. (2019). Employment hysteresis from the great recession. *Journal of Political Economy*, 127(5):2505–2558.

Figures

Tables

Appendix A. Mental Health Distribution

In the event study analysis, I use different health surveys which provides information regarding a set of questions related to mental health. I use these questions to construct the SMH index. As preliminary evidence of differences in SMH index between employees and unemployed members, I present the outcome distribution for both control and treated members. I use a Kernel density estimation. Figure A1 shows that the shape of the SMH index distribution changes according to the instrument used to measure subjective mental health. Waves from 2006, 2011 and 2016 appear to be bimodal distribution and positive Skew. Wave from 2009 is similar to normal distribution with positive skew. However, the wave from 2014 is similar to Poisson distribution with $\lambda = 1$. The particularity of the 2014 dataset is that a lot of individuals report the lowest value for the SMH index (i.e. highest mental quality).

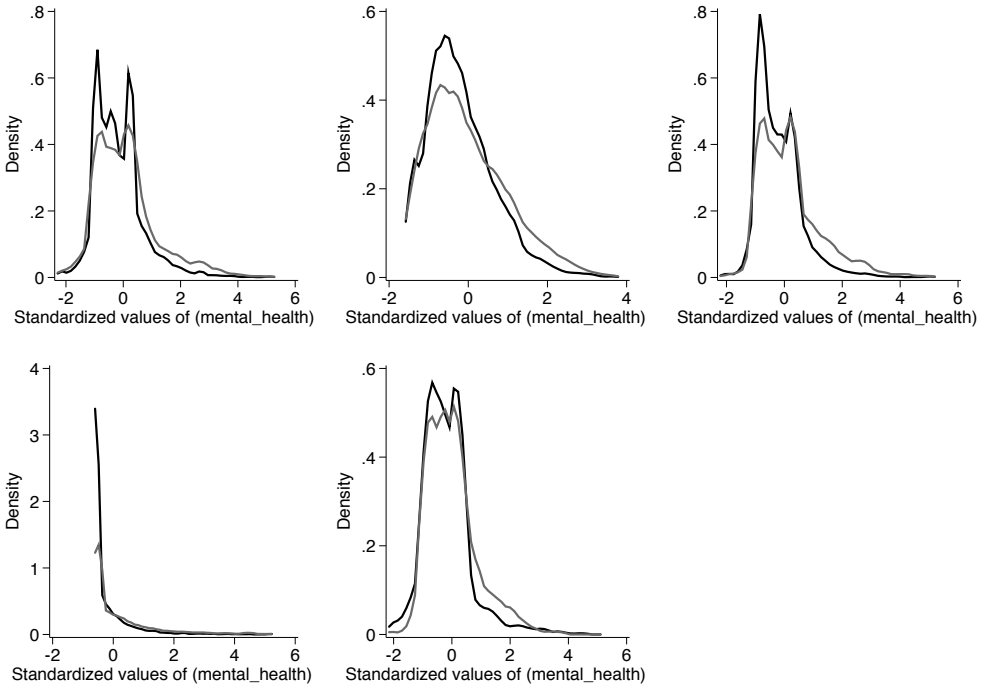

Figure A1: Mental Health Distribution

Appendix B: Graphical evidence

Figure 6 displays the evolution of the mental health index for four different groups. Apart of employed and unemployed individuals, it also includes retired and those individuals classified as others. It displays an stable path in the period 2006-2016 for employed, retired, and others, while unemployed individuals exhibit an impairment after 2009. Figures 7 and 8 show the evolution for drugs prescription and visits to a specialist. The former show an increase in 2009, followed by a reduction in 2011, while the latter exhibit a positive and constant path for employed, retired and others, while unemployed individuals, increased their probabilities of visit a mental health specialist in 2009. These results are compatible with a persistent effect for self-evaluated mental health, and a short-run impact on medical outcomes that vanish after the initial shock.

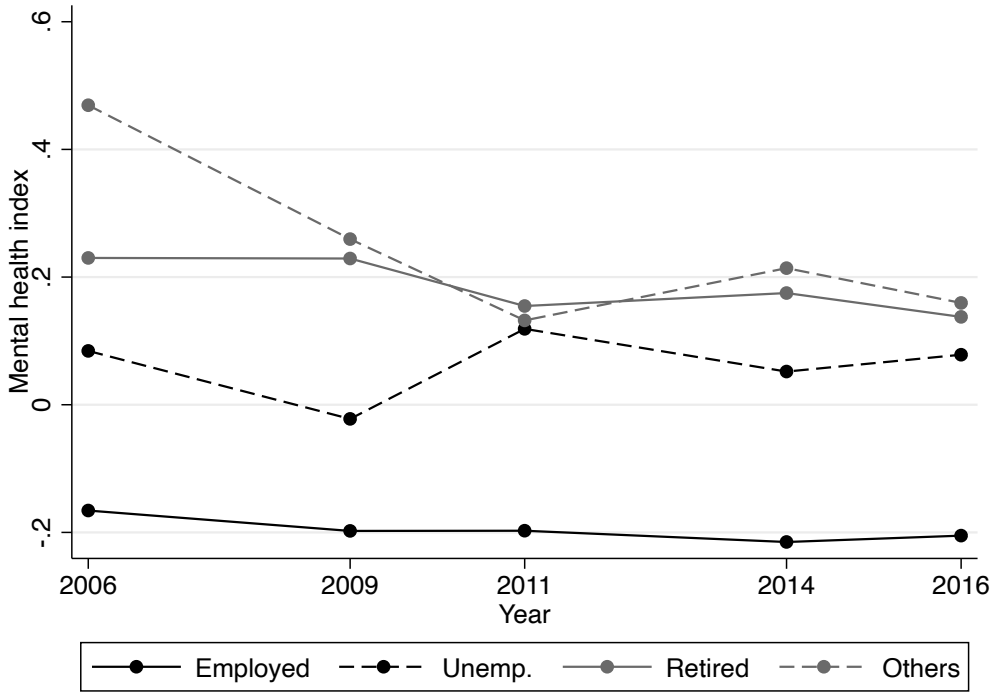

Figure 6: Trends in Subjective Mental Health

Notes: Figure shows trends in subjective mental health for four different groups: employees, unemployeds, retired people, and others. Subjective mental health is measured in standard deviations.

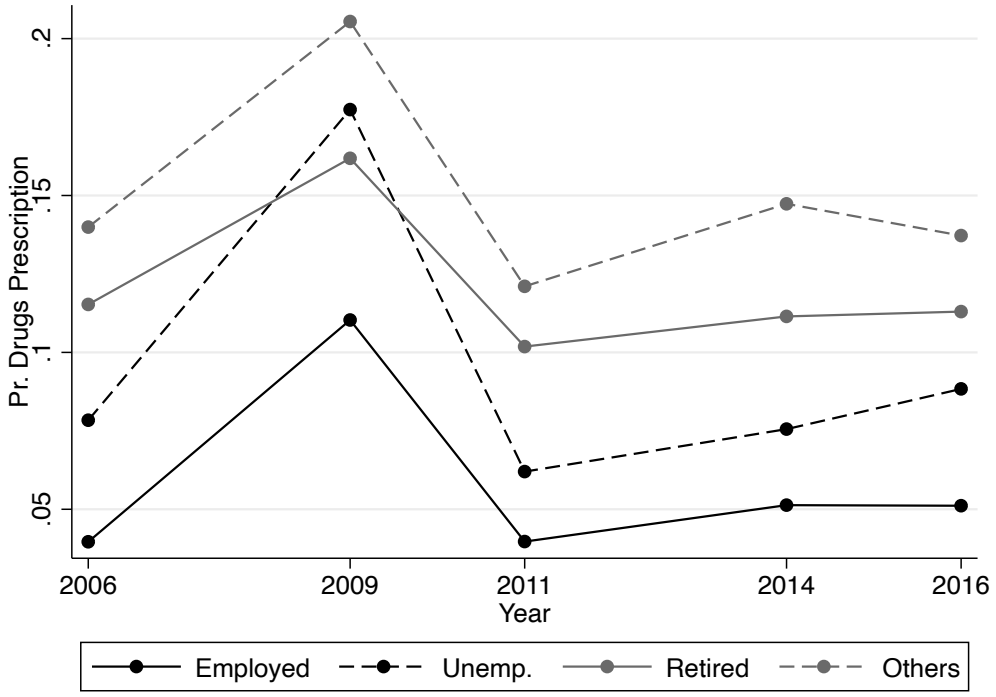

Figure 7: Trends in Mental Health Medicines

Notes: Figure shows the fraction of individuals in each category being prescribed or taking drugs for mental illness.

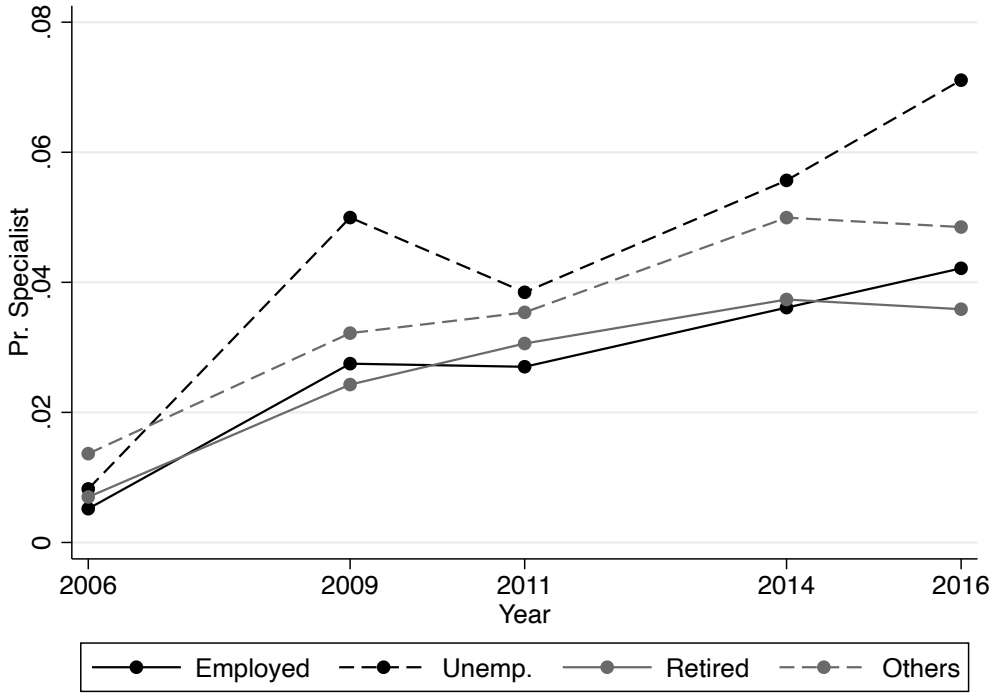

Figure 8: Trends in Medical Attendance

Notes: Figure shows the fraction of individuals in each category visiting a mental health specialist.