DISCUSSION PAPER SERIES

IZA DP No. 8742

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

Nick Drydakis

December 2014

Forschungsinstitut
zur Zukunft der Arbeit
Institute for the Study
of Labor

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

Nick Drydakis
Anglia Ruskin University
and IZA

Discussion Paper No. 8742
December 2014

IZA

P.O. Box 7240
53072 Bonn
Germany

Phone: +49-228-3894-0
Fax: +49-228-3894-180
E-mail: iza@iza.org

Any opinions expressed here are those of the author(s) and not those of IZA. Research published in this series may include views on policy, but the institute itself takes no institutional policy positions. The IZA research network is committed to the IZA Guiding Principles of Research Integrity.

The Institute for the Study of Labor (IZA) in Bonn is a local and virtual international research center and a place of communication between science, politics and business. IZA is an independent nonprofit organization supported by Deutsche Post Foundation. The center is associated with the University of Bonn and offers a stimulating research environment through its international network, workshops and conferences, data service, project support, research visits and doctoral program. IZA engages in (i) original and internationally competitive research in all fields of labor economics, (ii) development of policy concepts, and (iii) dissemination of research results and concepts to the interested public.

IZA Discussion Papers often represent preliminary work and are circulated to encourage discussion. Citation of such a paper should account for its provisional character. A revised version may be available directly from the author.

IZA Discussion Paper No. 8742
December 2014

ABSTRACT

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

The current study uses six annual waves of the Longitudinal Labor Market Study (LLMS) covering the 2008-2013 period to obtain longitudinal estimations suggesting statistically significant negative effects from unemployment on self-reported health and mental health in Greece. The specifications suggest that unemployment results in lower health and the deterioration of mental health during the 2008-2009 period compared with the 2010-2013 period, i.e., a period in which the country's unemployment doubled as a consequence of the financial crisis. Unemployment seems to be more detrimental to health/mental health in periods of high unemployment, suggesting that the unemployment crisis in Greece is more devastating as it concerns more people. Importantly, in all specifications, comparable qualitative patterns are found by controlling for unemployment due to firm closure, which allows us to minimize potential bias due to unemployment-health related reverse causality. Moreover, in all cases, women are more negatively affected by unemployment in relation to their health and mental health statuses than are men. Greece has been more deeply affected by the financial crisis than any other EU country, and this study contributes by offering estimates for before and during the financial crisis and considering causality issues. Because health and mental health indicators increase more rapidly in a context of higher surrounding unemployment, policy action must place greater emphasis on unemployment reduction and supporting women's employment.

JEL Classification: C23, C33, E24, I12

Keywords: self-reported health, self-reported mental health, unemployment, financial crisis

Corresponding author:

Nick Drydakis
Lord Ashcroft International Business School
Anglia Ruskin University
East Road
Cambridge, BB1 1PT
United Kingdom
E-mail: nick.drydakis@anglia.ac.uk

1. Introduction

The current study examines the effects of unemployment on self-reported health and mental health status in Greece using the Longitudinal Labor Market Study (LLMS), a unique longitudinal data set covering the 2008-2013 period. The 2008-2013 LLMS data set contains sequential annual observations for a great many individuals and information about labor market status, personal income, per capita household income, and health and mental status in six subintervals of these individuals' life cycles. These data provide us with a unique opportunity to formulate hypotheses and establish temporal relationships between unemployment and health/mental health.

The current study has several strengths. First, by focusing on the 2008-2009 and 2010-2013 periods, we examine how health and mental health were affected by unemployment during a period in which unemployment doubled as a consequence of the financial crisis. We are particularly interested in examining whether unemployment has a greater negative impact on health/mental health at a time when the economy is experiencing higher unemployment generally. Given that Greece has experienced the highest levels of unemployment and income loss among the countries of the EU region and OECD during the current financial crisis (OECD, 2014), it is important from an international perspective to examine how a severe increase in unemployment experienced by an EU member state can affect self-rated health and mental health and to suggest evaluations and policy implications. Second, the findings are based on two measures of self-reported well-being, health and mental health status, which are perceived to be reliable predictors of clinical outcomes and mortality (Bowling, 2004; Franzini et al., 2005; Johansen, et al., 2006) and will allow us to offer well-informed estimations on the relationships under consideration. Third, by utilizing valuable information regarding involuntary unemployment, we are able to address unemployment-health related reverse causality and offer firm estimations on the relationship between unemployment and health/mental before and during the financial crisis. Finally, we provide Greek fixed effect estimates on the effect of unemployment on individuals' health and mental health status before and during the financial crisis, estimates that are not currently available in Greece.

From a policy perspective, it is essential to evaluate whether unemployment has negatively or positively affected health and mental health in countries where unemployment increased during the financial crisis. If unemployment exerts positive rather than negative effects on health and mental health status, social policy should be well informed before establishing strategic plans. Thus, if the social cost of unemployment is lower than typically assumed, social planners should be aware; if unemployment causes a greater deterioration in individuals' health during periods of financial crisis, policy makers should work even harder to return the unemployed to the labor market. A clear understanding of the relationship between unemployment and health/mental health is vital for policy design aimed at improving general health and narrowing social inequality.

The remainder of the paper is organized as follows. The next section presents the research hypotheses. Section 3 describes the data set and variables, and Section 4 presents the descriptive statistics. Section 5 presents the estimation framework and results, and is followed by a discussion and conclusions.

2. Theoretical framework

International studies demonstrate that unemployment can have a serious negative impact on health and mental health indicators. In a meta-analysis of 237 cross-sectional and 87 longitudinal studies, Paul and Moser (2009) estimate that unemployed persons exhibit greater distress than employed persons. Additionally, Goldman (2001) and Kawachi and Wamala (2006), in their seminal social epidemiology reviews, demonstrate a strong negative correlation between individual health and the experience of unemployment. Similarly, Bramba and Eikemo (2009) utilize EU cross section data for 23 countries for the period 2000-2002 and find a consistent relationship between unemployment and poor self-reported health. Based on the most well-known theories that have been applied to the problem of unemployment, there is agreement that unemployment can be detrimental to an individual's well-being (Kawachi and Wamala, 2006). The absolute income effect hypothesis suggests that income loss due to unemployment decreases investments in health-enhancing goods and results in health and mental health deterioration (Grossman, 1972, 2000; Kawachi, and Berkman, 2000). Job loss is found to be related to restricted access to medical health care and higher mortality rates (Kawachi and Wamala, 2006).

In addition, the stress vulnerability model suggests that high-risk lifestyle behaviors – such as growth in unhealthy eating habits, smoking and alcohol use – are related to health status deterioration accompanying unemployment (Brackbill et al., 1995; Laitinen et al., 2002; Kawachi and Wamala, 2006). Adopting a negative health behavior after a job loss is perceived to be a method of coping with the stress of being stripped of a social role and social networks (Kawachi and Wamala, 2006). Indeed, the deprivation model and the vitamin model – which are primarily concerned with the psychosocial consequences of unemployment – suggest that unemployment severely frustrates the human desire for agency and self-directedness (Jahoba, 1981; 1982, Warr, 1987; 2007). Several studies have demonstrated that unemployment can result in mental health deterioration because unemployed individuals are stripped of certain functions of employment, including time structure, social contact, a collective purpose, status, activity, goals, physical security, and valued social position (Jahoba, 1981; 1982, Warr, 1987; 2007; Fryer and Payne, 1986; Kawachi and Wamala, 2006; Tefft, 2011). Simultaneously, it has been suggested that acute and chronic stressors follow the unemployed because decreases in economic resources can be stressful for the unemployed individual and his/her family; moreover, such stressors have been found to relate to changes in physiological regulation, which leads to poor health (Kawachi and Wamala, 2006). Consistent with prior theoretical considerations and empirical results, we formulate the following as the first hypothesis related to unemployment and health/mental health status:

Hypothesis 1.a (1.b)*: Unemployment may result in lower health (mental health) status.*

Our data set covering the 2008-2013 period also enables us to examine whether the effects of unemployment on health and mental health status during the 2008-2009 period are different from those of the 2010-2013 period. The rationale is to examine whether health and mental health deteriorated more rapidly among the unemployed in the 2010-2013 period, when the unemployment level was higher than in

the 2008-2009 period. In 2010, Greece entered one of the most serious economic downturns in its modern history (Eurostat, 2011a). In 2008, Greece was ranked as the 27th largest economy in the world (Eurostat, 2011a); however, when the international financial crisis struck, Greece began to face socioeconomic turmoil (European Central Bank, 2011; International Monetary Fund, 2013). In 2009, the crisis had not yet become part of the everyday life of the Greek population (European Central Bank, 2011; Eurostat, 2011b). In 2010, however, the country was placed under the supervision of the European Commission, the European Bank and the International Monetary Fund, and its leaders signed a series of economic adjustment programs to avoid sovereign default (European Central Bank, 2011).

The financial crisis had its strongest impact on the labor market, where unemployment reached the unprecedented rate of 21% in 2010-2013, compared with 9.7% in 2008-2009 and 9.5% during the 2000-2007 period (International Monetary Fund, 2013). Long-run unemployment (i.e., more than 12 months of continued unemployment) doubled from approximately 8% in 2008-2009 to 16% in 2010-2013 (International Monetary Fund, 2013). Minimum wages were cut by over 20%, and real GDP contracted 24% in 2010-2013, making this peacetime recession one of the deepest ever in an industrialized economy (International Monetary Fund, 2013; Kentikelenis et al., 2014). The financial crisis in Greece was accompanied by lowered labor demand, reduced family incomes, higher debt, significant cuts in the funding of health-care systems, and tightened access to health-care services (International Monetary Fund, 2013; Kentikelenis et al., 2014). Public spending on health was reduced by 24.3% in real terms (OECD, 2013), and hospital budgets were cut by more than 40%, whereas demand increased by approximately 25% (Kentikelenis et al., 2011). The percentage of the population living on or below the poverty line has increased by 25% during the period 2010-2013, and the unemployed comprised a large proportion of the groups at high risk of poverty (Bank of Greece, 2014). In addition, during the period 2010-2013, the share of Greek people saying that they could not afford basic needs (food and medicine) doubled compared with the pre-crisis period (OECD, 2014), and the unemployed faced the risk of social exclusion due to severe income reductions (Bank of Greece, 2014).

Reflecting on the absolute income effect hypothesis (Grossman, 1972, 2000), vulnerability model (Brackbill et al., 1995), deprivation model (Jahoba, 1981; 1982) and vitamin model (Warr, 1987; 2007) it could be ventured that higher unemployment during the 2010-2013 period may lead to poorer health and mental health compared with the 2008-2009 period. The psychosocial burden of the unemployed may be greater during the financial crisis than before because increased unemployment reduced their chances of finding a job, putting them at much greater risk of long-term unemployment, a situation that entails higher uncertainty, insecurity, loss of self-esteem, and economic struggles to survive (OECD, 2014). Particularly in Greece, where the unemployed are only eligible to receive unemployment benefits for one year and where long-term unemployment doubled during the 2010-2013 period compared with the 2008-2009 period (International Monetary Fund, 2013), a greater number of unemployed people during the 2010-2013 period faced income reductions due to the discontinuation of their unemployment benefits before finding a new job. In addition, the reduced spending on national support health services during the 2010-2013 period (OECD, 2013) may have had a greater negative impact on unemployed people's well-being. During the 2010-2013

period, an increased number of unemployed people tended to rely more on the reduced public health resources, which affected the quantity and quality of health services provided with a potential direct adverse effect on unemployed people's well-being (International Monetary Fund, 2013; OECD, 2014; OECD, 2013; Simou and Koutsogeorgou, 2014). Austerity measures that reduced public spending on health (OECD, 2013) combined with harder economic struggles due to increased long-term unemployment on the individual level (OECD, 2014) may have resulted in the increased deterioration of well-being for the unemployed during the 2010-2013 period.

Indeed, several international studies suggest that various well-being indicators and health behaviors are negatively affect by economic recessions. Using a fixed effect model for a panel sample of 13 EU countries for the period 1977-1996, Economou et al. (2008) estimate that unemployment positively affects mortality rates during a recession. In Germany, Chadi (2011) uses a fixed effect model to estimate that for the period 1999-2009, unemployment seems to be more hurtful to life-satisfaction when economic hardships and unemployment are higher. A recent longitudinal study conducted in the US by Kalousova and Burgard (2014) estimates that for the period 2009-2011, unemployment experience is associated with increased hazards of beginning marijuana use. Similarly, review studies by Goldman-Mellor et al (2010), Catalano et al. (2011) and Henkel (2011) suggest that economic decline increases the risk of psychological and behavioral morbidity and mental health problems, including depression, and that the consumption of alcohol and drugs is higher among those who experience unemployment during poor economic conditions. At the same time, long-term exposure to unhealthy diets and the consumption of alcohol/drugs is related to the development of chronic diseases, mental health deterioration and increased mortality (Kawachi and Wamala, 2006). Consistent with prior theoretical considerations and empirical results, we formulate the following as the second hypothesis related to unemployment and health/mental health status based on different time periods:

Hypothesis 2.a (2.b): During the 2010-2013 period, unemployment may result in higher deterioration of health (mental health) status compared with the 2008-2009 period.

In the current study, after estimating the magnitude of the unemployment effect on health/mental health during the period of the financial crisis (2010-2013) compared with the pre-crisis period (2008-2009), we reflect on the corresponding theoretical frameworks that can evaluate our study's outcomes and provide links between existing studies and offer policy implications driven by the estimated patterns.

3. Data set

The current research was administered as part of the Longitudinal Labor Market Study (LLMS) conducted via telephone by Anglia Ruskin University in the UK and the University of Piraeus in Greece. The LLMS is an ongoing longitudinal yearly data set beginning in 2008. The data set includes several demographic and health questions. During the sample period (2008-2013), surveyed individuals hung up immediately in 2,979 cases (10.68%); refused to be interviewed in 1,261 cases (4.52%); and did not

complete interviews (i.e., missing data) in 2,040 cases (7.31%). Thus, there were 21,609 cases (77.48%) of successfully completed interviews, which yielded a valid sample. The response rate wave by wave and across waves did not vary in a statistically significant way. The maximum deviation from the mean was between -2.09% and 1.69%. As in all studies of this type, we excluded self-employed individuals from the sample, reducing it by 2,968 observations (or 13.73%). The total valid base sample size excluding the self-employed was an unbalanced panel of approximately 8,557 men (48.30%) and 9,156 women (51.69%). This total corresponded to subsamples for each wave of between 1,418 and 1,447 men and between 1,553 and 1,510 women.

To measure health status, the classic self-rated health condition was used, which asks respondents to rate their health as excellent, very good, good, fair, or poor (Bowling, 2004). The possible range of scores is 1 to 5, with higher scores (5) indicating poor health. A substantial body of international research has reported this item to be significantly and independently associated with specific health problems, use of health services, changes in functional status, recovery from episodes of ill health, mortality and respondents' socio-demographic characteristics (Bowling, 2005; Johansen, et al., 2006; Schmitz, 2011). Indeed, Franzini et al. (2005, p.789) claim that 'Twenty years of empirical evidence indicates that self-rated health condition is a powerful and reliable predictor of clinical outcomes and mortality.' Mental health was measured using the CES-D scale (20 items), which is defined by the Centre for Epidemiologic Studies and measures the existence of depressive mental health symptoms for the previous week (e.g., depressed, everything an effort, restless sleep, not happy, lonely, sad, could not get going, and did not enjoy life). The possible range of scores is zero to 60, with higher scores indicating the presence of more depressive symptoms. Over a period of 35 years, studies have confirmed the validity and reliability of this score as a screening instrument for evaluating major depression, subjective well-being, and disposition (Meads et al., 2006; Stanbury et al., 2006).

The independent variables used to explain the formation of health status and mental health are those most frequently used in socioeconomic studies (Fuchs, 2004; Lemieux, 2006), which include an individual's age and level of higher education. In addition, an individual's employment status, personal income (net/monthly), per capita household income (net/monthly), region (capital city) and year/period dummies are used. In the case of a job termination, the 2008-2013 LLMS asks for the reason. The possible reasons include firm closure, resignation, dismissal, and end of a temporary job. Finally, in the case of annual changes in income (personal and per capita household), the 2008-2013 LMS asks about the actual amount of income change due to the financial crisis. The variable '*annual change in personal income due to the financial crisis*', and '*annual change in per capita household income due to the financial crisis*' are continuous variables that take negative values in the case of negative changes (actual income loss) and positive values in the case of positive changes (actual income gain).

4. Descriptive statistics

Table 1 presents the descriptive statistics for the 2008-2013 period. Panel I offers descriptive statistics for men, Panel II offers the same statistics for women, and Panel III presents these same statistics

for both men and women. The sample composition was weighted in accordance with the gender, age and place of residence distributions to match the 2011 population census. With a 95% confidence level, the maximum sampling error was between -1.13% and 2.03%. Qualitatively (in terms of statistical significance), the descriptive statistics, correlation matrix and regression outcomes are comparable with or without weighting. If we focus on Panel III, 48.30% are men, the mean age is 39.41 years, the personal monthly income (net) is €884.83 and the per capita monthly household income (net) is €422.19. In addition, 62.18% of the respondents are employed, and 21.04% are unemployed. The remaining percentage consists of inactive or retired persons and students. A total of 36.03% of respondents live in Athens, the capital of Greece. Importantly, during the 2008-2013 period, individual personal monthly income sank (income loss) by €301.37, and per capita monthly household income was reduced by €147.72 during the same period.

[Table 1]

Table 2 presents employed and unemployed individuals' health statuses for the 2008-2013 period (Panel I), 2008-2009 period (Panel II) and 2010-2013 period (Panel III). For the 2008-2013 period, our results show that unemployed people face more impaired health than do employed people (3.21 versus 2.48, t=8.34, p=0.00). In addition, unemployed people face more negative mental health symptoms than do employed people (12.67 versus 9.39, t=12.28, p=0.00). Importantly, the health difference between unemployed and employed individuals is smaller (2.97-2.28=0.69) in the 2008-2009 period than for the same group of individuals during the 2010-2013 period (3.48-2.52=0.96). The assigned difference between the periods is statistically significant (t=10.14, p=0.00). To gain insights into this pattern, the same table shows that in the former period, the unemployment rate is 11.84%, whereas in the latter period, the unemployment rate is 25.18% (Z=36.15, p=0.00). Over the former period, individuals' monthly personal income loss equals €10.57 (t=0.416, p=0.16) or 0.78% (Z=1.01, p=0.138), whereas over the latter period, the monthly personal income loss equals €255.65 (t=65.53, p=0.00) or 26.83% (Z=36.42, p=0.00). Comparable patterns are observed if we compare individuals' mental health between the periods. There appear to be positive relationships among unemployment, income loss and health/mental health deterioration.

[Table 2]

To examine these considerations, we present a 6x6 longitudinal correlation matrix in Table 3 (Maadooliat et al., 2013). The results suggest that unemployment is positively correlated with impaired health (r=0.73, p=0.00) and deteriorated mental health (r=0.68, p=0.00). Further, unemployment is negatively correlated with personal income (r=-0.84, p=0.00) and per capita household income (r=-0.67, p=0.00). Additionally, there is a negative correlation between personal income and impaired health (r=-0.65, p=0.00) and between personal income and deteriorated mental health (r=-0.71, p=0.00). Comparable patterns hold between per capita household income and deteriorated health/mental health. Furthermore, impaired health is positively correlated with deteriorated mental health (r=0.51, p=0.00). It is also observed that unemployment (r=0.73, p=0.00), health deterioration (r=0.62, p=0.00) and mental health deterioration (r=0.82, p=0.00) are positively correlated with the 2010-2013 time trend. Moreover, a negative correlation holds for personal income (r=-0.61, p=0.00), per capita household income (r=-0.58, p=0.00) and the 2010-2013 time trend. A multivariate analysis that considers and minimizes heterogeneities and causalities is

important for estimating the relationship between unemployment and health/mental health status and for providing answers to this study's hypotheses.

[Table 3]

5. Estimation strategy

The regression sample is restricted to interviewees between 18-65 years old who belong in the labor force. To be included in the sample, an individual must be unemployed or have been employed at least once over the 2008-2013 period. Individuals who are out of the labor force are dropped from the regression sample at the time that they leave the labor force. Individuals who return to the labor force after having left it re-enter the sample. The 2008-2013 Longitudinal Labor Market Study data set enables us to use an ordered logit fixed effect model, as used by Ferrer-i-Carbonell and Frijters (2004) and applied in Frijters et al. (2004a, b), to address unobserved heterogeneity and provide an indication of the relationships under consideration. Because health deteriorations are a likely consequence of unemployment, fixed effect models considering several periods can capture and control whether changes in workforce status and wealth coincide with changes in health (Ferrer-i-Carbonell and Frijters; 2004; Schmitz, 2011). Although a random effects model is a possible alternative specification, a Hausman test revealed that this alternative is not supported by the data and that a fixed effect model is therefore preferred.

To test the effect of unemployment on health the fixed effect ordered logit model is given by

$$HS_{it} = U_i' b_{i1t} + X_i' b_{i2t} + A_i' g_i + u_{it}^* \qquad \text{Equation I}$$

where HS is a vector of self-reported health status; U is a dummy variable for unemployment status; X is a vector of individual characteristics, i.e., age, higher education, personal income, per capita household income, capital city; A is the unobservable component of an individual's characteristics to be fixed over a short time period; i refers to individuals; t measures time; and u_{it}^* is the error component and varies over both individuals and time. The time-invariant variable, gender, cannot be included; however, equation 1 is estimated separately for men and women to capture potential differences. A positive (negative) b_1 corresponds to health deterioration (improvement) due to unemployment. Recall that high health scores (i.e., 4 and 5) indicate deteriorating/poor health.

In equation I, we also control for unemployment due to firm closure. We wish to examine whether involuntary unemployment entails a deterioration in health and thus offer estimations after minimizing unemployment-health related reverse causality. Focusing on involuntary unemployment allows the effect of unemployment on health to be examined in situations in which poor health or mental health is not the cause of unemployment (Sullivan and von Wachter, 2009; Eliason and Storrie, 2009; Paul and Moser, 2009). Under this assumption, studies have shown that unemployment due to firm closure nonetheless entails deterioration in health and mental health (Eliason and Storrie, 2009; Paul and Moser, 2009). Note, however, that in equation I, the unemployment effect on health status is estimated "gross of" income loss; that is, the annual personal income loss and the annual per capita household income loss are not included in the

regression. Based on our theoretical framework, because one of the main mechanisms through which unemployment impairs health/mental health is income loss, we suggest that it should not be kept constant in the regression. Hence, the possible effects of unemployment on health are a combination of monetary and non-monetary losses.

To test whether health status is more or less negatively affected by unemployment during the 2010-2013 period compared with the 2008-2009 period, equations I is re-estimated separately for both periods. Separate estimations per gender are offered, and unemployment due to firm closure is also included as explained above.

In addition, equation I is re-examined to test the effect of unemployment on mental health status. Because the mental health symptom (CES-D 20 items) scale lies between 0 and 60, we use fixed effect linear models (Dustmann et al., 2007; Schmitz, 2011). Consistent with Ruhm (2000; 2005), we present and evaluate the predicted effect of a one point rise in the specified variable (from the mean value for continuous variables and from zero to one for dummy variables) on health and mental health in the analysis of the results that follow, with other regressors evaluated at the sample means. In all health/mental health models, sandwich estimators are used to compute robust standard errors.

6. Estimations

6.1 Health estimations

Model I of Table 4 presents the health status estimations from equation I. Specifications A to C present estimations for men. Specification A reveals a negative unemployment effect on health on the order of 0.53 percentage points (or 0.18%). There appears to be a positive relationship between unemployment and impaired health. Thus, Hypothesis 1.a is accepted. Additionally, it is estimated that unemployment due to firm closure negatively affects health status by 0.32 percentage points (or 0.11%). Thus, unemployment negatively affects health after minimizing unemployment-health related reverse causality, supporting the robustness of our hypothesis and empirical findings.

Moreover, Specification B shows that unemployment during the 2008-2009 period entails a negative effect on health on the order of 0.38 percentage points (or 0.13%), whereas Specification C shows that unemployment during the 2010-2013 period entails a higher negative effect on health on the order of 0.62 percentage points (or 0.21%). The estimations suggest that during the 2010-2013 period, unemployment leads to higher health deterioration compared to the 2008-2009 period. Hypothesis 2.a is accepted. Importantly, Specification B shows that unemployment due to firm closure during the 2008-2009 period entails a negative effect on health on the order of 0.28 percentage points (or 0.09%), whereas Specification C shows that unemployment due to firm closure during the 2010-2013 period entails a higher negative effect on health on the order of 0.41 percentage points (or 0.14%). That is, even after minimizing unemployment-health related reverse causality the estimations suggest that during the 2010-2013 period, unemployment leads to higher health deterioration compared to the 2008-2009 period.

[Table 4]

In Specifications D to F, we replicate the estimation strategy presented above to offer health results for women. As observed, the outcomes are qualitatively comparable to those of men. Thus, Hypotheses 1.a and 2.a are accepted for women. As it is observed there is a positive relationship between unemployment and impaired health, and firm closure negatively affects health status. In addition, during the 2010-2013 period, unemployment and unemployment due to firm closure lead to higher health deterioration compared to the 2008-2009 period.

In all specifications, however, women's health is affected more negatively by unemployment/unemployment due to firm than men's. For instance, in Specification D, a negative unemployment effect on health for women on the order of 0.62 percentage points (or 0.21%) is observed. For men, the relevant coefficient is equal to 0.53 percentage points (or 0.18%). Similarly, Specification F shows that unemployment during the 2010-2013 period entails a negative effect on health for women on the order of 0.81 percentage points (or 0.27%). For men, the relevant coefficient is equal to 0.62 percentage points (or 0.21%).

6.2 Mental health estimations

Model II of Table 4 presents the mental health status estimations from equation I. Estimations for men are presented in Specifications A to C. As observed in Specification A, unemployment negatively affects mental health on the order of 3.18 percentage points (or 0.30%). Hypothesis 1.b is accepted. Moreover, it is estimated that unemployment due to firm closure negatively affects mental health by 2.95 percentage points (or 0.28%) supporting the robustness of Hypothesis 1.b. Additionally, in Specification B, it is observed that unemployment during the 2008-2009 period entails a negative effect on mental health on the order of 3.01 percentage points (or 0.28%), whereas in Specification C, it is shown that unemployment during the 2010-2013 period entails a higher negative effect on mental health on the order of 4.93 percentage points (or 0.46%). Thus, Hypothesis 2.b is accepted. It seems that unemployment leads to higher mental health deterioration during the 2010-2013 period compared with the 2008-2009 period. Similarly, it is observed that during the 2010-2013 period, unemployment due to firm closure leads to higher mental health deterioration compared with the 2008-2009 period.

[Table 4]

Mental health estimations for women are presented in Specifications D to F. As observed in Specification D, there is a positive relationship between unemployment and poor mental health. Thus, Hypothesis 1.b is accepted. Importantly, it is observed also that unemployment due to firm closure negatively affects mental health status supporting Hypothesis 1.b. Moreover, in Specifications E and D, it is estimated that during the 2010-2013 period unemployment entails higher mental health deterioration compared with the 2008-2009 period. Thus, Hypothesis 2.b is accepted. Also, it is observed that during the 2010-2013 period, unemployment due to firm closure leads to higher mental health deterioration compared with the 2008-2009 period.

As observed, however, in all specifications, women's mental health is affected more negatively by unemployment/unemployment due to firm closure than is men's. For example, in Specification D, women's

negative unemployment effect on mental health is on the order of 4.64 percentage points (or 0.35%); for men, however, the relevant coefficient equals 3.18 percentage points (or 0.30%). Moreover, in Specification F, it is observed that unemployment during the 2010-2013 period entails a negative effect on mental health for women on the order of 7.33 percentage points (or 0.56%). For men, however, the relevant effect is on the order of 4.93 percentage points (or 0.46%).

7. Discussion and conclusions

In this study, we evaluated a topic of long-standing interest in the health economics and social epidemiology literature. Using six waves of the Longitudinal Labor Market Study data set, the results of our estimations show that self-reported health and mental health were negatively affected by unemployment during the 2008-2013 period. Importantly, this pattern was found to also hold for groups where involuntary unemployment has occurred due to firm closure, minimizing the unemployment-health related reverse causality problem that arises when examining the effect of unemployment on health and mental health. These results are consistent with international studies that examine the effect of job loss on indicators of well-being (Kawachi, and Wamala, 2006; Paul and Moser, 2009). The current study also demonstrated that the economic consequences of the current financial recession have exerted important effects on the health/mental health of Greece's population. During the 2010-2013 period, where unemployment was statistically significantly higher than the 2008-2009 period, unemployment has resulted in higher deterioration in health and mental health compared with the 2008-2009 period. Based on the assigned patterns, we suggest that job loss is particularly hurtful in periods marked by high unemployment rates. The same patterns were estimated by focusing on groups of people who became involuntarily unemployed, which enhanced the robustness of the outcomes. The results of this study support the current EU and US studies on the effects of adverse economic conditions due to the financial crisis on well-being indicators (Economou et al., 2008; Catalano et al., 2011; Goldman-Mellor et al. 2010).

The estimations also suggested that women's health and mental health were affected more negatively by unemployment and unemployment due to firm closure than were men's both before and during the financial crisis. Current EU empirical studies demonstrate that women are highly impacted by the adverse effects of unemployment (European Commission, 2010; World Health Organization, 2011). The greater vulnerability to health/mental health indicators may be explained by factors such as higher insecurity due to high long term unemployment, debt, social isolation, poor housing and nutrition, and sex discrimination, which mainly affect women; further, all of these factors are positively associated with vulnerability and deteriorating well-being (European Commission, 2010; World Health Organization, 2011). Previous experiences with financial crisis suggest that higher unemployment affects those population groups who are already socioeconomically deprived and belong to disadvantaged minority population groups (Phua, 2011).

Based on the patterns of this study, we suggest that greater economic hardships resulting from higher unemployment during the period of the financial crisis (2010-2013) may more negatively affect health and mental health status. Thus, based on the utilized sample, we cannot support the idea that being unemployed can be expected to depress people's well-being less if they are not alone in their fate (Frey and Stutzer, 2002,

Clark, 2003). In the literature, the evidence on how an economic downturn resulting in significant job losses and income reduction affects individual's well-being and health behaviors is not homogeneous. For instance, in the UK, Clark (2013) uses a fixed effect analysis for the period 1991-1997 and finds that higher regional unemployment increases the well-being of unemployed prime-age men. Ruhm (2000) also uses longitudinal US data for the period 1972-1995 to estimate that the death rates due to major causes of death drop when unemployment increases in an economic downturn. Furthermore, using a fixed effect model, Oesch and Oliver (2012) estimate that in Germany for the period 1984-2010 and in Switzerland for the period 2000-2010, unemployment is not more detrimental to well-being (life satisfaction) in periods of high unemployment. The most common explanation offered for these outcomes is that a reduction in time at work may reduce the prevalence of stress-induced health deterioration and make more time available for exercise and healthy dieting, the combination of which can affect general health behaviors and indicators of well-being (Ruhm, 2000; 2005). Also, studies suggest that during recessions or in cases of higher regional unemployment when the number of unemployed people increases and unemployment becomes a status, the psychological cost and stigma of being unemployed diminishes and the subjective well-being of the unemployed improves (Frey and Stutzer, 2002, Clark, 2003).

Importantly, during the 2010-2013 period, Greece faced significantly lowered labor demand, higher long-term unemployment, higher debt, and increased poverty, all of which may have been detrimental to unemployed people's mental health. As we have shown, psychosocial theories frequently assume that stress during periods of economic downturns is a central feature of increased unemployment and that stress affects physiological regulations that can lead to health problems (Jahoba, 1981; 1982, Warr, 1987; 2007; Kawachi, and Wamala, 2006; Catalano et al., 2011; Goldman-Mellor et al, 2010). Financial crisis can harm mental health unless it is ameliorated by public health policies (Stuckler et al., 2009b). Unfortunately, this was not the case for Greece, where state funding for mental health decreased by 20% between 2010 and 2011 and by a further 55% between 2011 and 2012 (Anagnostopoulos and Soumaki, 2013).

In addition, the longitudinal correlation matrix of our study estimated a negative correlation between personal income/per capita household income and impaired health/mental health and between personal income/per capita household income in the 2010-2013 time period. A greater reduction in income due to job loss as a result of the financial crisis can significantly restrict access to medical health care and can deter unemployed individuals from purchasing medications to manage chronic illness or to prevent the onset of chronic conditions (Grossman 1972; 2000; Macintyre, 1997; Kawachi and Wamala, 2006; Galama and van Kippersluis, 2010). Indeed, the rate of self-reported unmet needs for medical care in Greece because care was "too expensive" rose from 4.1% in 2009 to 6.3 per cent in 2011. These patterns are unfavorably compared with the EU as a whole, where the figures rose from 1.9% in 2009 to 2.4% in 2011 (Eurostat, 2011; OECD, 2013). In addition, as discussed above, because long-term unemployment increased from 2010-2013 and unemployment benefits run out in 12 months, there was a risk of seeing a significant decline in income for the long term unemployed compared with the pre-crisis period, resulting in the deterioration of the well-being of the unemployed.

Additionally, during the 2010-2013 period, reduced government spending may have affected the quality and quantity of the public health services available and further contributed to the deterioration of the population's health evaluations, particularly for the unemployed population facing reduced incomes (Kentikelenis et al., 2014). Public spending on health and hospital budgets were reduced, and there was a general disruption in health provision in relation to the requirement to pay in advance for medicines and medical treatment, which is reimbursed by the state; reimbursement, however, could take months (Matsaganis, 2013). Income loss due to unemployment combined with reduced government spending and increased economic struggles and social exclusion may have resulted in higher adverse effects of job loss during the financial crisis than the period before the crisis. Despite the enormous increase in the need for public assistance during the 2010-2013 period, support for the unemployed and poorest families has remained weak, which may have a direct impact on their health/mental health (OECD, 2014). Greece and Italy remained the only EU countries without a nationwide minimum-income benefit, a policy omission that may negatively affect health in periods of increased unemployment, discontinuation of unemployment benefits and cuts in public health spending (OECD, 2014; Rucket and Labonte, 2013).

The outcomes of this study may be interesting to social planners from regions that experienced severe increases in unemployment due to the current financial crisis. If the health and mental health status of the unemployed increases more in a context of higher surrounding unemployment, officials should seek a strategy to combat high aggregate unemployment that will emphasize increasing employment opportunities. Higher unemployment may lead to vicious cycles of exposure to disadvantages and other risks and may lead to cumulative effects later in life (Lynch et al., 1997). The extent to which economic changes impact well-being, however, depends on the extent to which individuals are protected from harm (Stuckler et al., 2009a). Social protection responses are crucial for mitigating health concerns (World Health Organization, 2011). Monetary and fiscal policy programs that exploit an economy's growth potential and create jobs for the unemployed should be of great importance (Oesch, 2010). Labor market programs – in addition to household support interventions and nationwide minimum-income benefit, debt relief programs, access to health related services and psychological support – can be effective in preventing or mitigating the adverse effects of unemployment on health status and mental health (World Health Organization, 2011). Interventions targeting the prevention of major risk factors and focusing on the most vulnerable population groups, the most vulnerable of which was shown to be women in our study, may help maintain social cohesion and reduce societal inequalities that affect minority groups (Commission of the European Communities, 2009; World Health Organization, 2011).

Because the current findings are strictly applicable only to the time, country, and individual characteristics from which the sample was drawn, we should also highlight that the reported results are simply one indication of the relationship between unemployment and health/mental health; they are by no means the final word. It is also notable that (as with other variables) measurement errors are likely. One bias may stem from individuals who may wish to represent themselves as having fewer health limitations or a better mental health status to the survey interviewer. Furthermore, by including only individuals who answer their home phones, the 2008-2013 LLMS excludes homeless people and people without a phone. Moreover,

although self-reported health status and mental health status are perceived as reliable indicators, one should also consider aggregate medical reports and/or mortality rates to be robust indicators of the phenomenon under consideration.

In addition, the current study did not consider either healthy behaviors and/or mortality rates to provide evaluations. Whether unemployed Greeks during the 2010-2013 period had previously adopted unhealthy behaviors with a direct impact on self-reported health/mental health status remains an open question. Additionally, because the current data set does not hold information regarding cuts on public health spending and cuts to medical care on the individual/household level, we cannot offer empirical evaluations on the relationship among unemployment, reductions in health spending/investments and their return on health/mental health. It is possible that among the studies we reviewed that found positive well-being outcomes during economic recessions, the role of social protection programs to alleviate unemployed people's struggles was significant and affected the patterns in a way that cannot be evaluated in this study. An interesting future study would estimate whether the duration of unemployment benefits and a nationwide minimum-income benefit can have a positive impact on unemployed people's health and mental health. Moreover, although we attempted to account for unemployment-health related reverse causalities by controlling for unemployment due to firm closure, our estimations may have been affected by a lack of information regarding contextual factors influencing overall employee health before unemployment and/or before firm closure. The aforementioned shortcomings may weaken our fixed effect estimators. Given the importance of the topic and the potential for research-informed policy to affect individuals' well-being, this area cries out for robust future assessments.

References

Anagnostopoulos, D. C. and Soumaki, E. (2013). The State of Child and Adolescent Psychiatry in Greece During the Intarnational Crisis: A Brief Report. *European Child Adolescent Psychiatry*, 22: 131-134.

Bambra, C. and Eikemo, A. (2009). Welfare State Regimes, Unemployment and Health: A Comparative Study of Relationship Between Unemployment and Self-Reported Health in 23 European Countries. *Journal of Epidemiology and Community Health*, 63: 92-98.

Bank of Greece (2014). Inequality, Poverty and Social Welfare in Greece. Distributional Effects of Austerity, No. 174. Athens.

Bowling, A. (2004). *Measuring Health*, 3rd Edition. Maidenhead: Open University Press.

Bowling, A. (2005). Just One Question: If One Question Works Why Ask Several? Editorial. *Journal of Epidemiology and Community Health*, 59:342-345.

Brackbill, P. M. Siegel, P. Z. and Ackermann, S. P. (1995). Self-Reported Hypertension Among Unemployed People in the United States. *British Medical Journal*, 310: 568.

Buckert, A. and Labonte, R. (2012). The Global Financial Crisis and Health Equity: Toward a Conceptual Framework. *Critical Public Health*, 22: 267-279.

Catalano, R. Goldman-Mellor, S. Saxton, K. Margerison-Zilko, C. Subbaraman, M. LeWinn, K. Anderson, E. (2011). The Health Effects of Economic Decline. *Annual Review of Public Health*, 32: 431-450.

Chadi, A. (2011). Regional Unemployment and Norm-Induced Effects on Life-Satisfaction. SOEP Papers on Multi-Disciplinary Panel Data Research 387, DIW Berlin.

Clark, A. (2003). Unemployment as a Social Norm: Psychological Evidence from Panel Data. *Journal of Labor Economics*, 21: 323-351.

Commission of the European Communities. (2009). *Solidarity in Health: Reducing Health Inequalities in the EU*. Brussels.

Dustmann, C. Engracia, M. and Barrachina, R. (2007). Selection Correction in Panel Data Models: An Application to the Estimation of Females' Wage Equations. *Econometric Journal*, 10:263-293.

Economou, A. Nikolaou, A. and Theodossiou, I. (2008). Are Recessions Harmful to Health After All? Evidence From the European Union. *Journal of Economic Studies*, 35:368-384.

Eliason, M. Storrie, D. (2009). Does Job Loss Shorten Life? *Journal of Human Resources*, 4:277-302.

European Central Bank. (2011). Central Bank Statistics: What Did the Financial crisis Change. Germany.

European Commission. (2010). Urban Cities Facing the Crisis. Impact and Responses. Paris: European Commission.

Eurostat, (2011a). Euro Area and EU27 Government at 6.0% and 6.4% of GDP, Respectively. Luxembourg.

Eurostat, (2011b). Cross-Sectional European Union Statistics on Income and Living Conditions (EU-SILC), 2007 and 2009 Users' Database. Luxembourg.

Ferrer-i-Carbonell, A. and Frijters, P. (2004). How Important is Methodology for the Estimates of the Determinants of Happiness? *Economic Journal*, 114:641-659.

Franzini, L. Caughy, M. Spears, W. Esquer, M. (2005). Neighbourhood Economic Conditions, Social Processes and Self-Assessed Health in Low-Income Neighbourhoods in Texas: A Multilevel Latent Variables Model. *Social Science and Medicine*, 61:788-804.

Frijters, P. Haisken-DeNew, J. Shields, M. (2004a). Changes in the Pattern and Determinants of Life Satisfaction in Germany Following Reunification. *Journal of Human Resources*, 39: 649-674.

Frijters, P. Haisken-DeNew, J. Shields, M. (2004b). Money Does Matter! Evidence from Increasing Real Incomes and Life Satisfaction in East Germany Following Reunification. *American Economic Review*, 94: 730-740.

Freyer, B. and Stutzer, A. (2002). What Can Economists Learn from Happiness Research? *Journal of Economic Literature*, 40: 402-435.

Fryer, D. and Payne, R. (1986). Being Unemployed: A Review of the Literature on the Psychological Experience of Unemployment, in Cooper, C. L. and Robertson I. T. (Eds.), International Review of Industrial and Organizational Psychology (pp. 235–278). Chichester, England: Wiley.

Fuchs, V. (2004). Reflections on the Socio-Economic Correlates of Health. *Journal of Health Economics*, 23: 653-661.

Galama, T. and van Kippersluis, H. (2010). *A Theory of Socioeconomic Disparities in Health Over the Life Cycle*. RAND Corporation Publications Department. Amsterdam: Tinbergen Institute.

Goldman-Mellor, S. J. Saxton, K. B. and Catalano, R. C. (2010). Economic Contraction and Mental Health: A Review of the Evidence, 1990-2009. *International Journal of Mental Health*, 39: 6-31.

Goldman, N. (2001). Social Inequalities in Health: Disentangling the Underlying Mechanisms. Strengthening the Dialogue between Epidemiology and Demography: Annals of the New York Academy of Science 954:118–39.

Grossman, M. (1972). On the Concept of Health Capital and the Demand for Health. *Journal of Political Economy*, 80:223-255.

Grossman, M. (2000). The Human Capital Model. In: Culyer, A. J. and Newhouse, J. P. (Eds). *Handbook of Health economics* (Vol. 1: pp. 347-408). Oxford: Elsevier.

Henkel, D. (2011). Unemployment and Substance Use: A Review of the Literature (1990-2010). *Current Drug Abuse Reviews*, 4: 4-27.

International Monetary Fund. (2013). Greece: Ex Post Evaluation of Exceptional Access Under the 2010 Stand By Arrangement. No. 13/156. Washington, D.C.

Jahoda, M. (1981). Work, Employment, and Unemployment: Values, Theories, and Approaches in Social Research. *American Psychologist*, 36: 184–191.

Jahoda, M. (1982). *Employment and Unemployment*. Cambridge, England: University Press.

Johansen, E. Skalli, A. and Theodossiou, I. (2006). *Are the Healthier Wealthier od the Wealthier Healthier?* The European Evidence, ETLA Publications, Helsinki.

Kalousova, L. and Burgard, S. (2014). Unemployment, Measured and Perceived Decline of Economic Resources: Contrasting Three Measures of Recessionary Hardships and their Implications for Adopting Negative Health Behaviors. *Social Science and Medicine*, 106: 28-34.

Kawachi, I. and Wamala, I. (2006). *Globalization and Health*. Oxford University Press: New York

Kawachi, I. Beckman, L. (2000). *Social Epidemiology*. Oxford University Press: New York.

Kentikelenis, A. Karanikols, M. Papanicolas, I. Basu, S. Reeves, A. McKee, M. Stuckler, D. (2011). Greece's Health Crisis: From Austerity to Denialism. *Lancet*, 378: 1457-1458.

Kentikelenis, A. Karanikols, M. Reeves, A. McKee, M. Stuckler, D. (2014). Greece's Health Crisis: From Austerity to Denialism. *Lancet*, 383: 748-753.

Laitinen, J. Ek, E. and Sovio, U. (2002). Stress-Related Eating and Drinking Behavior and Body Mass Index and Predictors of this Behavior. *Preventive Medicine*, 34: 29-39.

Lemieux, T. (2006). The Mincer Equation Thirty Years after Schooling, Experience, and Earnings, in Grossbard-Shechtman, S. (Ed.), Jacob Mincer, A Pioneer of Modern Labor Economics Springer Verlag.

Lynch, J. W. Kaplan, G. A. and Shema, S. J. (1997). Cumulative Impact of Sustained Economic Hardship on Physical, Cognitive, Psychological and Social Functioning. *The New England Journal of Medicine*, 337: 1889-1895.

Maadooliat, M. Pourahmadi, M. and Huang, J. (2013). Robust Estimation of the Correlation Matrix of Longitudinal Data. *Statistics and Computing*, 23:17-28.

Matsaganis, M (2013). The Greek Crisis: Social Impact and Policy Responses. Friedrich-Ebert-Stiftung, Berlin.

Macintyre, S. (1997). The Black Report and Beyond: What Are the Issues? *Social Science and Medicine*, 44: pp. 723-745.

Meads, D. M. McKenna, S. P. Doward, L C. (2006). Assessing the Cross-Cultural Comparability of the Centre for Epidemiologic Studies Depression Scale (CES-D). *Value Health*, 9:A324-A324.

OECD, (2013): Health data. Paris: Organisation for Economic Cooperation and Development. Paris.

OECD, (2014). Society at a Glance 2014.

Oesch, D. (2010). What Explains High Unemployment Among Low-Skilled Workers? Evidence from 21 OECD Countries. *European Journal of Industrial Relations*, 16: 39-55.

Oesch, D. and Lipps, O. (2012). Does Unemployment Hurt Less if There is More of it Around? A Panel Analysis of Life Satisfaction in Germany and Switzerland. *European Sociological Review*, doi: 10.1093/esr/jcs071.

Paul, K. I, and Moser, K. (2009). Unemployment Impairs Mental Health: Meta-Analyses. *Journal of Vocational Behavior*, 74: 264-282.

Phua, K. L. (2011). Can we Learn from History? Policy Responses and Strategies to Meet Health Care Needs in Times of Severe Economic Crisis. *The Open Public Health Journal*, 4: 1-5.

Ruhm, C. J. (2000). Are Recessions Good for Your Health? *Quarterly Journal of Economics*,115: 617-650.

Ruhm, C. J. (2005). Healthy Living in Hard Times. *Journal of Health Economics*, 24: 341-3363.

Schmitz, H. (2011). Why Are Unemployed in Worse Health? The Causal Effect of Unemployment on Health. *Labour Economics*, 18:71-78.

Simou, E. and Koutsogeorgou, E. (2014). Effects of the Economic Crisis on Health and Healthcare in Greece in the Literature from 2009 to 2013: A Systematic Review. *Health Policy*, 115: 111-119.

Stanbury, J. Ried, L. D. and Velozo, C. (2006). Unidimensionality and Bandwidth in the Center for Epidemiologic Studies Depression (CES-D) Scale. *Journal of Personality Assessment*, 86:10–22.

Stuckler, D. Basu, S. Suhrcke, M. and McKee, M. (2009a). The Health Implications of Financial crisis: A Review of the Evidence. *Ulster Medical Journal*, 78:142-145.

Stuckler, D. Basu, S. Suhrcke, M. Coutts, A. and McKee, M. (2009b). The Public Health Effect of Economic Crisis and Alternative Policy Responses in Europe: An Empirical Analysis. *Lancet*, 374: 315-323.

Sullivan, D. von Wachter, T. (2009). Job Displacement and Mortality: An Analysis Using Administrative Data. *Quarterly Journal of Economics*, 124: 1265-1306.

Tefft, N. (2011). Insights on Unemployment, Unemployment Insurance, and Mental Health. *Journal of Health Economics*, 30: 258-264.

Warr, P. B. (1987). *Work, Unemployment and Mental Health*. Oxford, England: Clarendon Press.

Warr, P. B. (2007). *Work, Happiness, and Unhappiness*. Mahwah, NJ: Lawrence Erlbaum.

World Health Organization. (2011). Impact of Economic Crisis on Mental Health. Denmark: World Health Organization.

Table 1. Descriptive statistics for the total sample; for the 2008-2013 period

	Panel I Men	**Panel II Women**	**Panel III Men and Women**
Age	39.32	39.49	39.41
(mean)	(10.21)	(6.25)	(8.83)
Higher education	26.63	23.92	25.38
(mean)	(0.44)	(0.40)	(0.42)
Employed	65.99	60.49	62.18
(%)	(0.44)	(0.45)	(0.43)
Unemployed	19.28	22.02	21.04
(%)	(0.38)	(0.39)	(0.38)
Inactive	5.12	12.02	9.11
(%)	(0.19)	(0.35)	(0.21)
Retired	6.02	2.54	4.76
(%)	(0.27)	(0.14)	(0.15)
Students	3.51	2.43	2.89
(%)	(0.18)	(0.10)	(0.12)
Personal income	€1,031.71	€758.65	€884.83
(net/monthly; mean)	(98.65)	(81.85)	(89.37)
Per capita household income	€451.03	€410.63	€422.19
(net/monthly; mean)	(79.73)	(72.56)	(74.92)
Personal income loss between 2008-2013	€332.75	€278.35	€301.37
(net/monthly; mean)	(68.73)	(64.13)	(65.84)
Per capita household income loss between 2008-2013	€118.82	€169.45	€147.72
(net/monthly; mean)	(45.24)	(51.38)	(48.37)
Health status	2.87	2.95	2.92
(mean)	(0.86)	(1.05)	(0.91)
Mental health status	10.51	12.93	11.93
(mean)	(7.03)	(7.47)	(7.43)
Capital city	34.53	37.42	36.03
(%)	(0.43)	(0.45)	(0.43)
Observations	8,557	9,156	17,713

Notes: Source, 2008-2013 Longitudinal Labor Market Study. Excluded self-employed. Standard deviations are in parenthesis.

Table 2. Descriptive Statistics for the labor force for both men and women

	Panel I 2008-2013 Period	Panel II 2008-2009 Period	Panel III 2010-2013 Period
Unemployment rate (%) Observations	21.04 (0.38) 14,853	11.84 (0.32) 4,968	25.18 (0.44) 9,885
Personal income loss (mean) Observations	€306.64 (64.45) 14,853	€10.57 (3.22) 4,968	€255.65 (54.11) 9,885
Per capita household income loss (mean) Observations	€138.72 (42.03) 14,853	€14.42 (4.35) 4,968	€121.29 (44.17) 9,885
Employed individuals' health status (mean) Observations	2.48 (0.87) 11,186	2.28 (0.87) 4,282	2.52 (0.88) 6,904
Unemployed individuals' health status (mean) Observations	3.21 (0.88) 3,667	2.97 (0.88) 686	3.48 (0.86) 2,981
Employed individuals' mental health status (mean) Observations	9.39 (6.53) 11,186	7.82 (5.21) 4,282	11.14 (7.04) 6,904
Unemployed individuals' mental health status (mean) Observations	12.67 (7.42) 3,667	9.39 (5.86) 686	14.05 (7.58) 2,981

Notes: Source, 2008-2013 Longitudinal Labor Market Study. Excluded self-employed. Standard deviations are in parenthesis.

Table 3. Longitudinal correlation matrix for the labor force for both men and women

	1.	**2.**	**3.**	**4.**	**5.**	**6.**
1. Unemployed	1					
2. Personal income	-0.845 (0.000)***	1				
3. Per capita household income	-0.673 (0.000)***	0.758 (0.000)***	1			
4. Health status	0.733 (0.000)***	-0.657 (0.000)***	-0.424 (0.000)***	1		
5. Mental health status	0.682 (0.000)***	-0.717 (0.000)***	-0.454 (0.000)***	0.518 (0.000)***	1	
6. 2010-2013 period	0.735 (0.000)***	-0.614 (0.000)***	-0.581 (0.000)***	0.622 (0.000)***	0.821 (0.000)***	1

Notes: Source, 2008-2013 Longitudinal Labor Market Study. Self-employed individuals are excluded from the sample. We use Spearman correlation coefficient to estimate correlations for both scales ordinal. We use Biserial correlation coefficient to estimate correlations between ordinal and quantitative variables. We use Rank-Biserial correlation coefficient to estimate correlations between ordinal and nominal variables. P-values are in parenthesis. (***) *Significant at the 1% level.*

Table 4. Fixed-Effect Ordered Logit Health Estimations and Fixed-Effect Linear Mental Health Estimations

	Model I	**Model II**
	Fixed-Effect Ordered Logit Health Estimations	**Fixed-Effect Linear Mental Health Estimations**
Specification A: 2008-2013 period- Men		
Unemployed	0.0053 (0.0016)***	0.0318 (0.0021)***
Unemployed due to firm closure	0.0032 (0.0008)***	0.0295 (0.0095)***
Observations	7,295	7,295
Specification B: 2008-2009 period- Men		
Unemployed	0.0038 (0.0010)***	0.0301 (0.0042)***
Unemployed due to firm closure	0.0028 (0.0010)***	0.0276 (0.0111)***
Observations	2,352	2,352
Specification C: 2010-2013 period- Men		
Unemployed	0.0062 (0.0011)***	0.0493 (0.0087)***
Unemployed due to firm closure	0.0041 (0.0012)***	0.0416 (0.0063)***
Observations	4,943	4,943
Specification D: 2008-2013 period- Women		
Unemployed	0.0062 (0.0014)***	0.0464 (0.0037)***
Unemployed due to firm closure	0.0039 (0.0012)***	0.0432 (0.0102)***
Observations	7,558	7,558
Specification E: 2008-2009 period- Women		
Unemployed	0.0045 (0.0013)***	0.0425 (0.0050)***
Unemployed due to firm closure	0.0034 (0.0009)***	0.0408 (0.0096)***
Observations	2,616	2,616
Specification F: 2010-2013 period- Women		
Unemployed	0.0081 (0.0010)***	0.0733 (0.0113)***
Unemployed due to firm closure	0.0063 (0.0015)***	0.0674 (0.0086)***
Observations	4,942	4,942

Notes: Source, 2008-2013 Longitudinal Labor Market Study. Self-employed individuals are excluded from the sample. Table shows the predicted effect of a one point rise in the specified variable (from zero to one for dummy variables) on health and mental health with other regressors evaluated at the sample means. Control set: age, age^2, higher education, personal income, per capita household income, capital city, and annual dummies. Robust standard errors are in parenthesis.