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The Effect of Unemployment Benefits on Health, Living Standards and Unemployment in Turkey: Evidence from Structural Equation Modelling and Regression Discontinuity Design[1]

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Abstract

Unemployment can negatively affect individuals, their families and communities in various ways. When individuals are out of work may experience mental and physical health problems, material deprivation and poverty. This study aims to examine the impact of unemployment benefits on health, living standards and unemployment in Turkey using the panel Income and Living Conditions Survey (ILCS) over the period 2007-2015. We employ a structural equation modelling (SEM) to take into account the simultaneous relations among those variables. Moreover, we apply the propensity score matching (PSM) to reduce the selection bias. As a robustness check, we also propose a regression discontinuity design (RDD) within the SEM framework to infer for causality. Our findings suggest a significant impact of unemployment benefits on health and living standards. Moreover, we show that unemployment benefits play an important role in terms of improvement in health up to 5 months and living standards for up to 4 months, but after these periods the effects are vanished. This indicates that this type of social benefits has only a short-run effect. Furthermore, the findings show that benefits are not useful to increase the employment and they decrease the incentive of looking for a new job.

Keywords: Health Status; Propensity Score Matching; Regression Discontinuity Design; Structural Equation Modelling; Unemployment Benefits

JEL Codes: I14, J21, J38

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1. Introduction

Following the financial crisis of 2001, persistent high unemployment was one of the main challenges in Turkey. Even though, the Turkish economy has experienced a good performance in terms of economic growth, the unemployment rate has increased from 5.6 percent in 2001 to almost 10 percent in 2002 and remained high since then (Tiryaki and Khakimov, 2009). During the great recession of 2009 the unemployment has even reached the 14 percent, reduced at 9.2 in 2012 due to a decrease in labor force. However, unemployment rate has increased again to 14 percent, while youth unemployment rate has raised more dramatically reaching at 27.4 percent in August 2019 (TUIK, 2019).

The aim of this study is to explore the impact of unemployment benefits on unemployment, health and living standards in Turkey, using detailed micro-level panel data derived by the Income and Living Condition Survey (ILCS) during the period 2007-2015. *Unemployment benefits* in the dataset covers both *unemployment cash assistances* provided especially to poor people during recession periods and *unemployment insurance* that can be provided to all the unemployed, but it requires specific eligibility criteria as a certain period of working time before starting to receive the related benefits. The existing empirical evidence for other countries shows mixed results about the effect of unemployment benefits on unemployment. On the one hand, previous studies assume that unemployment benefits may increase unemployment duration due to the job search costs and high reservation wages which are increasing in the level of the benefits (Rogerson et al., 2005). On the other hand, as the unemployment social insurance schemes are more complex and they require certain eligibility criteria necessary to receive the respective benefits, some studies think that this may provide a further incentive to search and accept jobs that will allow people to be re-entitled and become eligible to receive the unemployment benefits in the case of a job loss occurred in the future again. Moreover, unemployment schemes may also be useful to smooth consumption helping to keep rather stable, if not improve the health status and living standards (Atkinson and Micklewright, 1991; Ortega and Rioux, 2010; Corsini, 2011).

Unemployment benefits, unemployment, health and living standards are the variables in the analysis affecting each other simultaneously and the relationship among those in any earlier study is not thoroughly examined within the system of simultaneous equations as we aim to address here.

Moreover, this study will be the first attempt for analysing the effectiveness of unemployment benefits in Turkey. Policy evaluation is important to determine whether the government budget has been allocated to the appropriate policies, and to explore whether policies that do not meet the desired and targeted outcomes should be prevented or to reallocate resources to the most effective policies.

The Structural Equation Modelling (SEM) employed is useful to explore, not only the effect of unemployment benefits on health, and living standards, but also the relationship among health, poverty and various socio-economic characteristics. Apart from that, we implement also the propensity score matching (PSM), which allows us to establish and maximize similarities to experimental designs using surveys and comparing the health and living standard levels between the case group, consisting of the individuals receiving the unemployment benefits, and the control group, which comprises of individuals who do not receive any unemployment allowance. Therefore, using the PSM we aim to ensure that similar individuals in terms of socioeconomic characteristics will be matched in the data set as an attempt to eliminate or reduce the selection bias problem. Moreover, given the individual's eligibility of receiving the benefits, which is 600 days in the last three years, we attempt to exploit the variation in the probability of receiving unemployment benefits due to this discontinuity by apply a regression discontinuity design (RDD) within the SEM framework. Overall, as these variables simultaneously affect each other or at least are related to each other, the study contributes to the earlier literature by employing the SEM instead of looking at their relationships using single regression modelling. Furthermore, the study attempts to establish causal relationships using the PSM and RDD within the SEM framework.

Based on the fixed effects SEM we find that the impact of unemployment benefits on health is insignificant; however, according to the SEM-PSM estimates unemployment benefits improve the health by 0.0477. Furthermore, the impact of unemployment benefit on living standards is positive and equal at 0.1532 and 0.1203 units respectively by the SEM and SEM-PSM estimates, indicating that SEM framework may slightly overestimate the impact of benefits. Moreover, using the SEM framework, our findings suggest that unemployment deteriorates health status and living standards respectively by 0.048 and 0.146, while the respective values according to the SEM-PSM become 0.042 and 0.139.

The structure of the paper is as follows: In section 2, we briefly discuss the earlier studies on the link between unemployment benefits, unemployment, health and living standards. In section 3, we explain the scheme of Turkish unemployment benefits and the methodology followed in the empirical analysis. In section 4 we present the data and surveys used in the empirical work. In section 5 we report the main findings and in section 6 we discuss the main concluding remarks of the study.

2. Literature Review

Various studies have explored the relationship between employment and health outcomes, both mental and physical (Saunders, 2002; Saunders and Taylor, 2002; McLean et al., 2005; Marmot and Wilkinson, 2006). It has been revealed that the loss of income caused by unemployment, financial tightness and even poverty lead to psychological diseases and physical health problems. Inadequate nutrition, inability to live in good conditions and mental depression are the main reasons for the emergence of health problems. It is found that unemployment is not only caused by loss of earnings, but also by removing the individual from the working environment and by reducing social interaction with other individuals. Studies support that social phobia, which occurs in individuals with reduced social sharing, brings along mental health problems. The evidence suggests that the decrease in social communication leads to self-confidence weakness in individuals, loss of status as a result of being unemployed and friends and relatives and triggers individual well-being and health problems (Björklund, 1985; Mayer et al., 1991; Björklund and Eriksson, 1998; Helliwell and Putnam, 2004).

Studying and having a job is a life therapy, but reverse unemployment is a health issue (Waddell and Burton, 2006). Karsten and Klaus (2009) analysed 237 horizontal-cross sectional data and 87 panel data studies on the relationship between unemployment and mental health through a meta-analysis method. The meta-analysis results of the cross-sectional studies revealed a positive and significant relationship between unemployment and mental health. Findings showed that unemployed individuals had more mental distress and health disorders than those who continued to work. The meta-analysis of panel data studies showed that while losing a job has negative effects on mental health, re-recruitment decreases this negative impact over time. Kroll and Lampert

(2011) analysed the relationship between unemployment, social support and physical, emotional and functional disorders in working age individuals in Germany. Using the GEDA (Gesundheit in Deutschland Aktuell) data set in Germany in 2009, the authors found that unemployment is closely related to these problems and complaints. Heggebø (2016), using the European Union Income and Living Conditions Micro Data Survey and applying the generalized least-squares method, analysed the health impact of the unemployment situation in Denmark, Norway and Sweden in the period 2007-2010 as a result of the great recession. Their findings pointed to Denmark as the only Scandinavian country in which the health status of the unemployed was worsened. Wang (2015) empirically estimated the short-term and long-term effects of the unemployment rate on health in China and found that a 1% decrease in the unemployment rate results in a 4% reduction in mortality. In the long term, it is also revealed that a 1% increase in unemployment rate will cause an increase in unemployment rate of 6.8%. Other studies have shown that unemployment has a great negative impact, not only on the unemployed individuals, such as material deprivation, mental and physical health problems, but also on other individuals in the household and the society on the whole (Bradshaw et al., 1983; Raphael, 2001; Johnson and Feng, 2013; Wiemers, 2014).

Although there is no existing study examining the relationship between unemployment benefits and health in Turkey[2], other country case studies are also few in the relevant literature. Rodriguez et al. (1997) using the "US National Survey of Families and Households" micro dataset, have found that individuals who do not receive unemployment benefits are depressed more often than those who do not. Cylus et al. (2014), using panel fixed effects method, have shown that unemployment benefits, received by the unemployed individuals at working age in the USA between 1968 and 2008, are effective in reducing suicide cases. Using the Panel Study of Income Dynamics, Cylus et al. (2015) have also found that unemployment benefits have an improving role on the health status of men in the USA. Similarly, Molnar (2015) provide evidence about the positive effects of unemployment insurance on the health status of individuals. Matoba et al. (2003) have examined the layoffs of Japanese workers and the effect of unemployment benefits on general health status. It has been observed that workers who have been dismissed have good

[2] The impact of other types of social spending, rather than unemployment benefits, on health in Turkey have been also analyzed by less number of studies. The effect of survivor benefits on the poverty and health status of women and children has been investigated by Ozdamar and Giovanis (2016) and Ozdamar and Giovanis (2017). Similarly, the effect of old-age benefits and pensions on health has been analysed by Ozdamar and Giovanis (2015). Moreover, the effect of family support on psychological health has been also investigated by Bilgiç and Yılmaz (2013).

health while receiving unemployment benefits, but they show mood disorders when unemployment benefits are terminated. Finally, Molnar et al. (2015) have also shown the positive effect of unemployment insurance on poverty and psychological disorders. Contrary to the literature on the positive effects of unemployment benefits on health, Korpi (1997) have stated that there is no difference in the health status between the unemployed and the employed individuals in Sweden due to their beneficiary status. Considering the effect of unemployment benefits on living standards, Gallie and Paugam (2000) pointed out that the living standards of individuals depend on the amount that they get from the unemployment insurance system. Pissarides (1998) has stated that in an economy where real wage increases are presented, if unemployment benefits are not increased sufficiently for unemployed individuals, they will experience a continuous decline in their living standards. Moreover, Bradshaw et al. (1983) have compared long-term unemployed people who receive benefits with the short-term unemployed beneficiaries and low-income workers who are currently employed. They have found that the long-term unemployed have low level of living standards compared to the short-term unemployed and low-income workers. Field (1977), Lister and Field (1978), and Burghes (1981) have also demonstrated that unemployment benefits are particularly unsuccessful in terms of improving the living standards of long-term unemployed individuals (Bradshaw et al., 1983).

Considering the literature on the employment effect of unemployment benefits, some articles claim that unemployment benefits create more unemployment as unemployment benefits at increasing amounts raise the reservation fees and therefore reduce the opportunity cost of job searching and naturally suggest to individuals to stay unemployed for long periods of time (Devine and Kiefer, 1991; Lippman and McCall, 1976). On the other hand, some other studies state that there will be an increase in the number of individuals employed in case where the benefits and therefore reservation fees are low or the marginal benefit of job search is high (Mortensen, 1977).

Two similar studies to ours is by Kuka (2018) and Shahidi et al. (2019) who explore the effects of unemployment benefits on health. Kuka (2018), explored the impact of unemployment insurance (UI) on health, by plausibly exogenous variation caused by changes in state UI law. The author suggests that more generous UI may experience less economic uncertainty improving mental health, by decreasing alcohol consumption, smoking and illness related to stress. Shahidi et al. (2019) using cross-sectional data from the Canadian Community Health Survey over the

period 2009-2014 and implementing the PSM approach, have investigated the effect of unemployment benefits on self-rated health among the unemployed. The authors found a positive association between unemployment benefits and health outcomes.

However, our study contributes to the earlier literature by various ways. First, we employ the SEM framework, as we aim to explore the simultaneous relationships among unemployment benefits, health and living standards. Second, we apply the SEM using individual fixed effects. Third, we implement the PSM within the SEM, in an effort to reduce the selection bias. Fourth, tto the best of our knowledge is one of the few studies proposing an RDD within the SEM framework. for causal inference. Hence, to sum up, there is no existing study examining the relationship among unemployment benefits, health, unemployment and living standards establishing a causal inference in Turkey. Moreover, other country case studies examine single relationships rather than employing structural models to analyse the simultaneous relations among those variables as this study attempts to do.

3. Methodology

3.1 The Turkish Unemployment Benefits Scheme

Unemployment benefits scheme covers both *unemployment cash assistances* provided especially to poor people during recession or crises periods and *unemployment insurance.* The eligibility for the unemployment insurance in Turkey, refers to employees, including foreign nationals, aged 18 or older working in the private or public sector. This excludes individuals working in the agriculture and forestry sector, self-employed, students and military personnel. The unemployment benefits provide at least 1 percent of monthly earning up to a maximum. In particular, unemployment benefits are equal to 50 percent of the individual's last four months' average gross earnings, and in no case benefits can be higher than the official minimum wage. The reference period for the eligibility is the past three years before the job loss. The required minimum employment record is 600 days and of these at least 120 days must have been accumulated in the past year. The payment period varies according to the days of contributions. More specifically, an

insured individual who has at least 600 days of contribution is eligible to receive the unemployment benefits for a period of 180 days. In the case of 900 days of contribution, the period of payment rises at 240 days, and if the insured person has contributed 1,080 days then she is entitled for a payment period of 300 days (European Commission, 2011).

3.2 Structural Equation Modelling (SEM)

In this section we describe the methodology applied in the empirical analysis. Structural Equation Modelling (SEM), is a system of equations that uses latent variables and models multivariate relationships (Goldberger, 1973; Bollen, 1989). SEM consists of the measurement model, which includes the latent variables that are not directly observable. There are 2 different SEM models employed in this study. The *first SEM model* aims at examining the effect of unemployment benefits on health and living standards. It is represented by equations (1)-(5). Equations (1) and (2) are used to measure the latent variables which are health and standard of livings. The observed variables used to construct these latent variables are reported in data section. In particular, the two latent variables employed in the empirical analysis are measured using the related survey questions.

$$h_{it} = \mathbf{\Lambda_h} H_{it} + \varepsilon_{it}^{h} \tag{1}$$

$$s_{it} = \mathbf{\Lambda_s} SoL_{it} + \varepsilon_{it}^{s} \tag{2}$$

$$UB_{it} = a'\mathrm{X} + v_{it} \tag{3}$$

$$H_{it} = b_1 UB_{it} + b'\mathbf{Z} + u_{it} \tag{4}$$

$$SoL_{it} = c_1 UB_{it} + c_2 H_{it} + c'\mathrm{W} + e_{it} \tag{5}$$

Equation (1) is the measurement model for the health latent variable *H* which relates the observed variables *h* used to contruct the health index in factor loadings matrix $\mathbf{\Lambda_h}$. Similarly, equation (2) is the measurement model for the standard of livings (SoL). Model (3)-(5) is the

structural equation model, where equation (3) explores the determinants of the unemployment benefits *UB* represented by vector **X**, and equation (4) examines the determinants of health including the unemployment benefits and the control variables in vector **Z**. The last equation is the living standards equation where we explore the relationship among health, unemployment and other variables in vector **W** and the living standards. In equation (3) where unemployment benefits is the dependent variable, we include as control variables the age, education level, marital status, household type, house tenure and the household income reduced by the level of unemployment benefits. The unemployment benefits itself is a dummy of taking value 1 for those who receive the benefits and 0 otherwise. In equation (4), which is the health equation, besides the unemployment benefits variable, we include the same control variables, as in equation (3). However, in this case we consider the household income reduced by unemployment benefits and also, sickness and disability benefits, as the latter are effects of poor health and not causes-determinants. In the standard of living (SoL) equation (5), we include the same control variables as in health equation, while we include also the age in quadratic term, as we assume the relationship between living standards and age can be quadratic. Furthermore, we take the household income as in equation (3), while we exclude the house tenure, since related variables are used to construct the SoL index.

In addition to this first SEM model (1)-(5), we explore the direct effect of unemployment benefits on the probability of being unemployed, using another SEM model as we call it second SEM model from now on. To obtain the second SEM model, we modify the first model including also equation (6) in the SEM system (1)-(5). As unemployment benefits can have indirect effects on health and standard of livings through affecting being unemployed, SoL and H equations are modified in the second SEM model as well.

$$E_{it} = \alpha_1 UB_{it} + \alpha' \mathrm{L} + \zeta_{it} \tag{6}$$

Thus, the second SEM model (7)-(12) is as following where *E* takes the value 1 if the respondent is unemployed and 0 if she/he is employed. **L** is the vector of control variables in unemployment equation.

$$h_{it} = \mathbf{\Lambda_h} H_{it} + \varepsilon_{it}^{h} \tag{7}$$

$$s_{it} = \mathbf{\Lambda_s} SoL_{it} + \varepsilon_{it}^{s} \tag{8}$$

$$UB_{it} = a'\mathrm{X} + v_{it} \tag{9}$$

$$E_{it} = \alpha_1 UB_{it} + \alpha'\mathrm{L} + \zeta_{it} \tag{10}$$

$$H_{it} = \beta_1 E_{it} + \beta_2 UB_{it} + \beta'\mathrm{Z} + u_{it} \tag{11}$$

$$SoL_{it} = \gamma_1 E_{it} + \gamma_2 UB_{it} + \gamma_3 H_{it} + \gamma'\mathrm{W} + \eta_{it} \tag{12}$$

As a robustness check we will employ the Propensity Score Matching (PSM) developed by Rosenbaum and Rubin (1983) and re-estimate the first and the second SEM models with PSM as well. This approach relies on various assumptions, such as the Conditional Independence Assumption (CIA), the common support (Heckman et al., 1999) and the functional form. Since, it's a well-documented approach more details can be found in the studies by Rosenbaum and Rubin (1983) and Heckman et al. (1999). For the matching process we implement the nearest neighbour matching method with caliper, which selects the *k* best control matches for each treated unit. The specification of caliper can be crucial. As Cochran and Rubin (1973) show that a caliper of 0.2 standard deviations with normally distributed covariates can remove the 98 percent of the bias. Nevertheless, to increase the precision, we apply a caliper of 0.1 standard deviation. Overall, earlier studies support the use of PSM as a tool for robust analysis (Gu and Rosenbaum, 1993; Heckman et a., 1998; Rosenbaum, 2004). Moreover, earlier studies employing the differences-in-differences (DID) method, demonstrate that the PSM removes selection on both observables and unobservables and they propose that the PSM-DID estimator provide more robust estimates (Heckman et al., 1997; Blundell and Costa Dias, 2000; Smith and Todd, 2005).

Since we have a panel SEM models, subscripts *i* and *t* denote respectively the individual at year-wave of the survey. In particular, the general panel SEM model is:

$$y_{it} = \mathbf{B}_{yxt}\mathbf{x}_{it} + \mathbf{\Gamma}_{yzt}\mathbf{z}_{i} + \lambda_i \eta_i + e_{it} \tag{13}$$

As we have a system of equation, for simplicity we present only one equation to describe the fixed effects SEM. In the general model (13), y indicates the dependent variable for the i^{th} panel unit or individual in time *t*, **x** is the vector of time-varying covariates and $\mathbf{B_{yxt}}$ is the row vector of coefficients showing the impact of **x** on *y*. Vector **z** includes the time-invariant covariates and $\mathbf{\Gamma_{yzt}}$ is the row vector of coefficients showing the impact of **z** on *y*. The scalar η includes the rest of the

latent time-invariant variables that influence the dependent variable and λ represents the coefficient of η. The random disturbance term is represented by e, and we assume that $E(e_{it})=0$; $E(e^2_{it})= \sigma^2_{it}$; $Cov(e_{it}, e_{is})=0$ for $t \neq s$ and e_{it} is uncorrelated with $\mathbf{x}$, $\mathbf{z}$ and η. Scalar η represents the individual heterogeneity, since it includes the time-invariant variables that influence the dependent variable, but we cannot observe them. Following Bollen and Brand (2010) the general fixed effects model is:

$$y_{it} = \mathbf{B}_{yx}\mathbf{x}_{it} + \eta_i + e_{it} \quad (14)$$

In equation (14) we drop $\mathbf{\Gamma_{yzt}z_i}$ and the fixed effects SEM model shows the estimated coefficients of the time-varying variables, which are kept constant for all years of the survey and it is $\mathbf{B_{yxt}= B_{yx}}$ and $\boldsymbol{\lambda}=1$. The model also allows the scalar of latent time-invariant variables η_i being correlated with x_{it} and we set $\sigma^2_{et}= \sigma^2_{e.}$ Therefore, in the fixed effects SEM we drop the term $\mathbf{\Gamma_{yz}z_i}$, where the latter is included in the random effects SEM. We could argue that random effects SEM allows for the estimation of the time-invariant observed variables, such as gender, religion and race among others. This is also one of the possible benefits of the random effects SEM. However, we prefer the individual-fixed effects SEM for various reasons.

First, as in the random effects case, panel data may increase the estimation precision, as a result of increase in the number of observations. Nevertheless, we need to control also for correlation in the regression model and the standard errors in the pooled OLS regression typically are underestimated and the *t-statistics* are inflated. Second, fixed effects model allows for unobserved individual heterogeneity and omitted variables bias, as this heterogeneity can be correlated with the regressors. Thus, instead of using instrumental variables approach, which is quite difficult to find a valid instrument, the fixed effects may provide an alternative way to this issue if we assume the unobserved individual-specific effects be additive and time-invariant. Moreover, we do not observe time-invariant variables in our data, and in particular in the ILCS, except for gender.

3.3 Regression Discontinuity Design (RDD) within SEM Framework

The objective of this section is to present the RDD within the SEM framework in order to study the effect of unemployment benefits on health and living standards. In particular, employment and

working hours are unlikely to be independent from employment decisions. Therefore, to identify the effect of unemployment benefits on health and living standards, we exploit the exogenous variation in the probability of receiving unemployment benefits due to the discontinuity in individual's eligibility of receiving the benefits, which is 600 days in the last three years. Since, the working-employment history in the Income and Living Conditions Survey (ILCS) is recorded in monthly frequency, we convert the 600 days to months, which is equivalent to 20 months. RDD approach has several advantages discussed in earlier studies (Imbens and Lemieux, 2007; Van der Klaauw, 2008; Lee and Lemieux, 2010). Essentially, because individuals are close to the cut-off or on the two sides of the eligibility period cut-off point, are likely to be very similar. To recall, apart from the 600 days required for someone to be eligible to unemployment benefits we additionally consider individuals who had accumulated at least 120 working days in the last year. Therefore, every individual in our sample has accumulated this amount of days, but the cut-off point takes place only in the case of the 600 days.

RDD is the closest to a randomised control trial (RCT) that can be applied in non-experimental settings, such as the empirical analysis relies on the ILCS. Furthermore, this approach requires fewer assumptions compared to other techniques, with the most common method being the differences-in-differences (DID) method, which rely on identifying a control group very similar to the treatment group. Since, the cut-off point is determined at 20 months, we have a "sharp" RDD and considering the structural equations (4)-(5) we have the following:

$$H_{it} = b_1 \mathbf{D}_{i,t} + f(UBE_{i,t} - c, a) + \mathbf{D}_{i,t} * f(UBE_{i,t} - c, a) + b'\mathbf{Z} + u_{it} \quad (15)$$

$$SoL_{it} = b_1 \mathbf{D}_{i,t} + f(UBE_{i,t} - c, a) + \mathbf{D}_{i,t} * f(UBE_{i,t} - c, a) + b_2 H_i + b'\mathbf{W} + e_{it} \quad (16)$$

System (15)-(16) is the same with structural equation (4)-(5), with the difference that we include the dummy variable *D*, indicating whether individuals are below ($D_i = 0$) or above ($D_i = 1$) the threshold of 20 months. Term $f(UBE_{it} - c, a)$ refers to the functional form of the forcing variable *UBE*, which is the period in months and it stands for the unemployment benefits eligibility, and the threshold *c*, which corresponds to 20 with parameters *a*. We allow for a range of specifications for the months of unemployment function $f(UBE_{it} - c, a)$, including linear and quadratic terms.

Apart from the benefits that RDD may offer, as for instance, the properties of a RCT, is still important to test for the stability of the RDD models estimated in this study. Therefore, we also

apply the Treatment Effect Derivative (TED) test developed by Dong and Lewbel (2015) for the stability test of RDD.

4. Data

The empirical work relies on data derived from the panel ILCS in the period 2007-2015 provided by the Turkish Statistical Institute (TURKSTAT). The ILCS is an annual panel survey, which includes a personal and a household questionnaire and its aim is to collect information that will allow for illustration and comparison of the income distribution between individuals and households, to measure the living conditions, poverty with monetary and non-monetary dimensions and social exclusion. The survey provides rich information on individual characteristics, such as gender, age, education, health, income and employment status among others, and household characteristics, including material deprivation, social benefits, income, house tenure status, dwelling and environment characteristics.

In table 1, we report the descriptive statistics for the main outcomes and the number of independent variables employed in the empirical analysis. As we have discussed in the methodology section, SEM consists of two main latent variables, health and living standards. In table 1, we present the three observed variables used to create the health index, where have been converted into dummy variables taking value 0 for healthy state and 1 for unhealthy state. Thus, for the coefficient estimates, presented in the next section in details, the positive sign of unemployment or any other estimated coefficient, implies a negative impact on health. On the contrary, the variables used for the living standards index are constructed taking value 1 on whether the household does not face any particular financial problem. More specifically, regarding the questions on financial burden and arrears, we define as 1 the households do not report any financial burden related to housing costs or debts and also those households with no arrears on mortgage or utility bills. Regarding the capacity to afford holiday, unexpected financial expenses, or meat-fish every second day in a row if required, we define value 1 for those who can afford related expenses and 0 otherwise. Therefore, in this case a positive sign of the estimated coefficients of any variable will indicate an improvement in living standards. Another set of potential variables used to construct the living standards index is durable goods, such as whether the households has a car,

kitchen, computer internet connection, mobile phone, air conditioner and others. However, since we explore the impact of unemployment benefits, durable goods could have been probably purchased a long time ago. Thus, as we do not have the information of the date of purchase, we prefer to consider only the indicators in panel A of table A for the standard of livings index.

In panel A of table 1, we report the average and standard deviation of the observed variables used to construct the health and living standard indices, while the minimum and maximum values are always 0 and 1 respectively. The average value shows also the proportion, as for instance the percentage of people who state a poor or very poor health status is almost 9.7 percent, while those who report that suffer from chronic illness or condition reaches roughly the 31 percent. Also, the proportion of people receiving the unemployment schemes in our sample is 2.21 percent. We will not thoroughly discuss the rest of the control variables, including the marital status, education level and house tenure, but we report those in table 1 to show that the majority of the respondents is either single or married, own the house and have completed the primary school.

(Insert Table 1)

5. Empirical Results

In table 2, we report the estimates of the main SEM and PSM-SEM system (1)-(5), where in the first column we present the unemployment benefits regressions, while in columns (2)-(3) we report respectively the estimated coefficients for the health and SoL equations. We should recall that in table 2 we consider the dummy of unemployment benefits, taking value 1 for those who receive the benefits and 0 otherwise. In panel A, it becomes apparent that households receiving these benefits enjoy higher wealth (living standards) levels, but their impact on health is insignificant. As it was expected, poor health conditions deteriorate the living standards by -0.076, while the household income excluding the unemployment benefits improves both health and standard of livings. While the direction of the unemployment benefits effect is the same in SEM and SEM-PSM, on both living standards and health, we observe that in the latter model the estimated coefficient in the SoL regression is lower at 0.1203 compared to the 0.1532 we found using the SEM. On the other hand, employing the SEM-PSM model, we find a significant and positive impact of the unemployment benefits on health in contrast to the SEM Model where the coefficient of unemployment benefits is insignificant. We are in favour of SEM-PSM estimates as

it employs a matched sample in an effort to reduce the potential selection bias. Moreover, in figure 1 we present the propensity scores before and after the matching process. It becomes obvious that after the matching the treated and control groups share very similar characteristics.

Regarding the estimated coefficients of the control variables, we observe that educated people enjoy higher levels of living standard and better health outcomes. However, regarding the unemployment benefits regression our findings are contradictory. In particular, based on the SEM model, a higher education level is associated with a higher probability of receiving the unemployment benefits, while the inverse is observed in the SEM-PSM. While there could be various explanations, we prefer the SEM-PSM model, as it reduces the selection bias. Regarding marital status, widowed and divorced experience lower levels of health, which can be attributed to age, especially for widowed who consist mainly of the elder people. Married people present higher levels of living standards using the SEM framework, but the estimated coefficient becomes insignificant in the case of the SEM-PSM. Households consisting of 2 adults with no dependent children report lower levels of living standards, while those households with 2 adults and one or two dependent children are wealthier. One explanation may lie in the fact that wealthier households may decide to have more children, while on the other hand, we could argue that larger households may experience additional expenses. Nevertheless, the main aim of the study is to explore the relationship among unemployment benefits, health and living standards, while further investigation of the remained variables can be extended in future studies.

(Insert Table 2)
(Insert Figure 1)

In table 3, we demonstrate the estimates obtained from the second SEM framework and equations (7)-(12). Panel A shows the SEM results, while panel B presents the SEM-PSM. The signs and the significance of the coefficients are similar in both SEM and SEM-PSM showing that people taking unemployment benefits are more likely to be unemployed, which can be explained by the fact that, especially the long term unemployed, can be less likely to find a job and they have to rely on benefits. Another explanation can be the high reservation wages or cost of job search. The positive coefficient of unemployment benefits on SoL implies that those who are unemployed and receive benefits live in higher standards than those unemployed but are not receiving any

benefit. The relevant coefficient is almost doubled in the SEM estimates compared to the SEM-PSM model, which confirms the estimates in table 2. In both panels, living standards are increasing with the better levels of health status. As for being unemployed, we find a positive and significant sign in the health equation, indicating that unemployed are more likely to report lower levels of health status. Similarly, as it was expected, unemployment is associated with lower levels of living standards using both SEM and SEM-PSM in panels A and B.

(Insert Table 3)

The last part of the analysis is the SEM-RDD where we use the number of days required to be eligible for the unemployment benefits scheme as the cut-off point, discussed in a previous section. In panel A of table 4, we present the estimates for the SEM-RDD system (15)-(16) and the cut-off point of 600 days or 20 months of employment over the last 3 years. We choose a bandwidth of 1 to 6 months, corresponding to 30, 60, 90, 120, 150 and 180 days below and above the threshold. However, using a cut-off point higher than 5 months for health and 4 months for the living standards, the causal effects become insignificant and bandwidths more than 6 months are not reported as the causal effect remains similar. Higher polynomial orders in the RDD are found insignificant, in particular the terms $f(UBE_{i,t} - c, a)$ and the interaction term $\mathbf{D}_{i,t} * f(UBE_{i,t} - c, a)$ in the SEM-RDD (15)-(16), therefore, we present the estimates for the linear terms only.

According to the TED test and its associated p-values, we conclude that the SEM-RDD estimates are stable. The TED test is applied for a maximum bandwidth of 6 months. In particular, the TED value of -0.0024 refers to health and the value 0.0393 to SoL and in both cases the TED statistic is insignificant, indicating that the RDD results are stable.

In figures 2 and 3, we illustrate the RDD graphs respectively for health and standard of livings index, which are standardized. In figure 2 we observe a significant jump downwards indicating a better health status for the "treated", since lower levels of the health variable are associated with better health status levels. We observe a positive slope in the right side of the graph shows that as the period of receiving the unemployment benefits is extended, the health conditions can be severely worsened. Similarly, in figure 3 we observe a significant jump upwards around the cut-off point of 600 days 20 months, implying that individuals who are eligible for unemployment benefits may improve their living standards. However, this may last for a couple of months, as

after a prolonged period of 4 months, the living standards between the case and control group become similar. In particular, up to 5 months, we note that the *b1* on the health equation, for those bandwidths, ranges between 0.068-0.089, and for the SoL equation, it ranges between 0.11-0.14 up to 4 months and it becomes insignificant later. Thus, we observe that using a bandwidth between 1-5 months the effect is positive on health and it is vanished after the period of 4 months for living standards.

The results show a significant and positive effect of the unemployment benefits on health and living standards. In particular, we find the effect on health ranging between -0.068 and -0.089, while in table 2 the estimated coefficients were found equal at -0.047 based on the SEM- PSM estimates. Regarding the impact on living standards, we observe that unemployment benefits may improve the living standards, by 0.11 to 0.134, which is close to the SEM-PSM estimates in table 2, indicating that RDD and PSM are our favoured estimates.

To sum up, the main concluding remark is that unemployment benefits initially have a positive effect on health and living standards, but this lasts only for a short period of time around 5 months for health and 4 months for the SoL where the effect after that becomes insignificant and even is reversed in the long run. Even though the unemployment benefits scheme may have a short-run impact, this does not exclude the assumption that they can be beneficial for the individuals looking for a job and their families. This type of social benefits may improve the health status, especially the mental health issues, smoothing the consumption during this period and enhance their living standards. However, it seems that this type of social benefits scheme does not provide any additional benefit in longer periods, and this shows that alternative policies should be implemented to reduce unemployment, such as training programmes, investments on industry and supply side policies that enhance productivity and increase wealth. This is because, the unemployment benefits and especially the level of amount received may increase the unemployment spell.

(Insert Table 4)
(Insert Figures 2-3)

6. Conclusions

In this study we attempted to investigate the impact of unemployment benefits on health and living standards, using the SEM and SEM-PSM approaches, while we also proposed an RDD

design within the SEM framework. The findings suggest a positive impact of the social benefits on both health and the households' standard of livings, even though this might be limited in the short-run period. We prefer the SEM-PSM estimates compared to the SEM findings, as we have attempted to reduce the selection bias, for the reasons discussed earlier, and also the SEM-RDD to infer for causal effects.

However, the study is not without drawbacks. One issue is the plausible small sample of those who are eligible for the certain type of social benefits explored, which may limit the robustness of the findings. This is especially the case of the PSM and the RDD and the threshold used, which considerably reduces the sample size. Even though, we consider the PSM and RDD as additional robustness checks, still the survey is an unbalanced panel and limited to a short period of time as 9 years.

Concerns about the job destruction and unemployment increases the demand for social insurance, which in our case is the unemployment benefits. While the findings suggest this social insurance scheme may cushion the negative effects of the job loss in terms of health and living standards, has also a negative side effect which is the decreasing incentive to find a new job. Thus, it is important to set up an unemployment benefits scheme having a structure that minimises the disincentive of looking for a job, but also provides insurance to individuals and households to smooth their consumption, and protect them from poverty traps and health negative shocks.

References

Atkinson, A.B. and Micklewright, J. (1991). Unemployment Compensation and Labor Market Transitions: A Critical Review. *Journal of Economic Literature*, 29(4), 1679-1727.

Bilgiç R. and Yılmaz, N. (2013). The correlates of psychological health among the Turkish unemployed: psychological burden of financial help during unemployment. *International Journal of Psychology*, 48(5), 1000-1008.

Björklund, A. (1985). Unemployment and mental health: Some evidence from panel data. *Journal of Human Resources*, 20, 469-483.

Björklund, A. and Eriksson, T. (1998). Unemployment and mental health: evidence from research in the Nordic countries. *Scandinavian Journal of Social Welfare*, 7, 219-235.

Blundell, R. and Costa Dias, M. (2000). Evaluation Methods for Non-Experimental Data. *Fiscal Studies*, 21(4), 427-468.

Bollen, K. A. (1989). *Structural Equations with Latent Variables*. New York: John Wiley.

Bollen, K.A. and Brand, J.E. (2010). A General Panel Model with Random and Fixed Effects: A Structural Equations Approach. *Social Forces*, 89(1), 1-34

Bradshaw, J., Cooke, K. R. and Godfrey, C. (1983) Impact of unemployment on the living standards of families. *Journal of Social Policy*, 12(4), 433-452.
Cochran, W. G. and Rubin, D. B. (1973). Controlling bias in observational studies: A review. *Sankhya: The Indian Journal of Statistics Series A*, 35, 417-446.
Corsini, L. (2011). On Wealth, Unemployment Benefits and Unemployment Duration: some Evidence from Italy. Discussion Papers 2011/119, Dipartimento di Economia e Management (DEM), University of Pisa, Pisa, Italy.
Cylus, J, Glymour M.M. and Avendano M. (2014). Do Generous Unemployment Benefit Programs Reduce Suicide Rates? A State Fixed-Effect Analysis Covering 1968–2008. *American Journal of Epidemiology*, 180(1), 45-52.
Cylus, J., Glymour, M.M. and Avendano M. (2015). Health Effects of Unemployment Benefit Program Generosity. *American Journal of Public Health*, 105(2), 317-323.
Devine, Theresa J., and Kiefer, Nicholas M. Empirical Labor Economics: The Search Approach. New York: Oxford University Press, 1991.
Dong, Y. and Lewbel, A. (2015). Identifying the effect of changing the policy threshold in regression discontinuity models. *Review of Economics and Statistics*, 97(5), 1081-1092.
European Commission (2011). European Employment Observatory Review 2011 Adapting unemployment benefit systems to the economic cycle, 2011. European Commission Directorate-General for Employment, Social Affairs and Inclusion Unit C1. Luxembourg: Publications Office of the European Union.
Gallie, D. and Paugam, S. (2000). The Experience of Unemployment in Europe: The Debate. *Age*. 15(24), 12-9.
Goldberger, A. S. (1973). Structural equation models: An overview. In Goldberger, A. S. and Duncan, O. D. (Eds.). *Structural equation models in the social sciences*, (pp. 1-18). New York: Seminar Press.
Gu, X. and Rosenbaum, P. R. (1993). Comparison of multivariate matching methods: structures, distances, and algorithms. *Journal of Computational and Graphical Statistics* 2(4), 405-420.
Heckman, J.J., Ichimura, H., and Todd, P.E. (1997). Matching as an Econometric Evaluation Estimator: Evidence from Evaluating a Job Training Programme. *Review of Economic Studies*, 64(4), 605-654.
Heckman, J., Ichimura, H., Smith, J. and Todd, P. (1998). Characterizing selection bias using experimental data. *Econometrica*, 66(5), 1017-1098.
Heckman, J., LaLonde, R. and Smith, J. (1999). The Economics and Econometrics of Active Labor Market Programs. in *Handbook of Labor Economics* Vol. III, ed. by O. Ashenfelter, and D. Card, pp. 1865-2097. Elsevier, Amsterdam.
Heggebø, K. (2016). Hiring, employment, and health in Scandinavia: the Danish 'flexicurity' model in comparative perspective. *European Societies*, 18(5), 460-486.
Helliwell, J. and Putnam, D. (2004). The social context of well-being. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 359(1449), 1435-1446.
Imbens, G.W. and Lemieux, T. (2008). Regression discontinuity designs: A guide to practice. *Journal of Econometrics*, 142(2), 615-635.
Johnson, R. W. and Feng, A. (2013). Financial Consequences of Long-Term Unemployment during the Great Recession and Recovery. Washington, DC: The Urban Institute. Available at https://www.urban.org/sites/default/files/publication/23526/412800-financial-consequences-of-long-term-unemployment-during-the-great-recession-and-recovery.pdf

Karsten, P. I. and Klaus M. (2009). Unemployment Impairs Mental Health: Meta-Analyses. *Journal of Vocational Behavior*, 74(3), 264-282.

Korpi, T. (1997), Is Utility Related to Employment Status? Employment, Unemployment, Labor Market Policies and Subjective Well-Being Among Swedish Youth, *Labour Economics* 4(2), 125-147.

Kroll, L.E. and Lampert, T. (2011). Unemployment, social support and health problems: results of the GEDA study in Germany, 2009. *Deutsches Ärzteblatt International*, 108(4), 47-52.

Kuka, E. (2018). Quantifying the benefits of social insurance: Unemployment insurance and health Working Paper No. w24766. National Bureau of Economic Research.

Lee, D. and Lemieux, T. (2010). Regression Discontinuity Designs in Economics. *Journal of Economic Literature, American Economic Association*, 48(2) 281-355.

Lippman, S.A. and McCall, J.J. (1976). The economics of job search: A survey. *Economic inquiry*, 14(2), 155-189.

Marmot, M. and Wilkinson, R.G. (2006). *Social determinants of health*, 2nd edition. Oxford University Press, Oxford.

Matoba, T., Ishitake, T. and Noguchi, R. (2003). A 2-year follow-up survey of health and life style in Japanese unemployed persons. *International archives of occupational and environmental health*, 76(4), 302-308.

Mayer, F., Paul-Marcel, R., Emond, A. and Pincault, R. (1991). Unemployment and mental health: a longitudinal analysis. *Canadian Journal of Economics*, 24, 551-562.

McLean, C., Carmona, C., Francis, S., Wohlgemuth, C. and Mulvihill, C. (2005). *Worklessness and health - what do we know about the casual relationship? Evidence review*. 1st edition. Health Development Agency, London.

Molnar, A., O'Campo, P., Ng, E., Mitchell, C., Muntaner, C., Renahy, E., John, A.S. and Shankardass, K., (2015). Protocol: realist synthesis of the impact of unemployment insurance policies on poverty and health. *Evaluation and program planning*, 48,1-9.

Mortensen, Dale T. (1977), Unemployment Insurance and Job Search Decisions. *Industrial Labor Relations Review*, 505-520.

Ortega, J. and Rioux, L. (2010). On the extent of re-entitlement effects in unemployment compensation. *Labour Economics*, 17(2), 368-382.

Ozdamar O. and Giovanis E. (2015). The Effects of Old Age Pensions on Health Status: Evidence from the Health Survey in Turkey, *The Empirical Economics Letters*, 14(3), 205-212.

Ozdamar O. and Giovanis E. (2016). The Effect of Survivors' Benefits on Poverty and Health Status of Widowed Women, *Journal of Applied Economics and Business Research*, 6(3), 232-250

Ozdamar, O. and Giovanis, E. (2017). The causal effects of survivors' benefits on health status and poverty of widows in Turkey: Evidence from Bayesian Networks. *Economic Analysis and Policy,* 53, 46-61.

Pissarides, C. A. (1998). The Impact of Employment Tax Cuts on Unemployment and Wages; the Role of Unemployment Benefits and Tax Structure. *European Economic Review*, 42(1), 155-183.

Raphael, D. (2001). Increasing poverty threatens the health of all Canadians. *Canada Family Physician*, 47, 1703-1706.

Rodriguez, E., Lasch, K. and Mead, J. P. (1997). The Potential Role of Unemployment Benefits in Shaping the Mental Health Impact of Unemployment. *International Journal of Health Services*, 27(4), 601-623

Rogerson, R., Shimer, R. and and Wright, R. (2005). Search-Theoretic Models of the Labor Market: A Survey. *Journal of Economic Literature*, 43, 959-988

Rosenbaum, P.R. and Rubin, B. (1983). The Central Role of the Propensity Score in Observational Studies for Causal Effects. *Biometrika*, 70(1), 41-55.

Rosenbaum, P. (2004). Matching in observational studies. In A. Gelman & X. Meng (Eds.), *Applied Bayesian modeling and causal inference from an incomplete-data perspective* (pp. 15-24). New York, NY: Wiley

Saunders, P. (2002). Mutual obligation, participation and popularity. Social security reform in Australia. *Journal of Social Policy*, 31, 21-38.

Saunders, P. and Taylor, P. (2002). The *price of prosperity. The economic and social costs of unemployment*. University of New South Wales Press, Sydney.

Shahidi, F. V., Muntaner, C., Shankardass, K., Quiñonez, C. and Siddiqi, A. (2019). The effect of unemployment benefits on health: A propensity score analysis. *Social Science & Medicine*, 226, 198-206.

Smith, J. and Todd, P. (2005). Does matching overcome LaLonde's critique of non-experimental estimators? *Journal of Economics*, 125, 305-353.

Tiryaki, A. and Khakimov, O., (2009). Any Relationship between Unemployment and Output? Testing Okun's Law for Turkey. Presented in Anadolu International Conference in Economics I, Anadolu University-Turkey.

TUIK (2019), Press Release, No: 30692, http://www.turkstat.gov.tr/HbGetirHTML.do?id=30692 , [Access Date: 15. Nov.2019]

Van der Klaauw, W. (2008). Regression-Discontinuity Analysis: A Survey of Recent Developments in Economics, *Labour*. 22(2), 219-245.

Waddell, G. and Burton, A.K. (2006). Is work good for your health and well-being? London: Her Majesty's Stationery Office.

Wang, Q. (2015). The Effects of Unemployment Rate on Health Status of Chinese People. *Iranian Journal of Public Health*, 44(1), 28-35.

Wiemers, E.E. (2014). The Effect of Unemployment on Household Composition and Doubling Up. *Demography*, 51(6), 2155-2178

Figure 1. Propensity Score Matching (PSM)

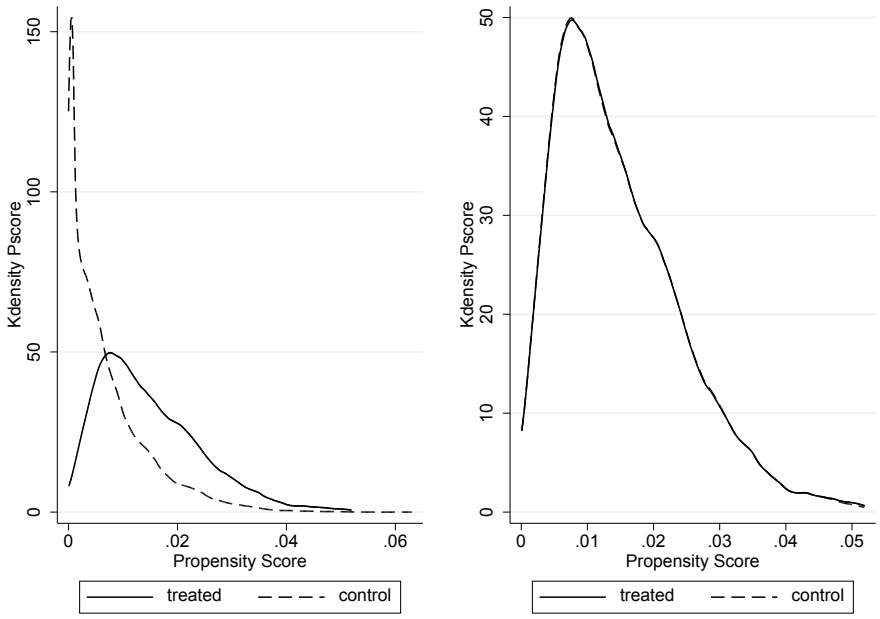

Figure 2. SEM-RDD Estimates for the Health

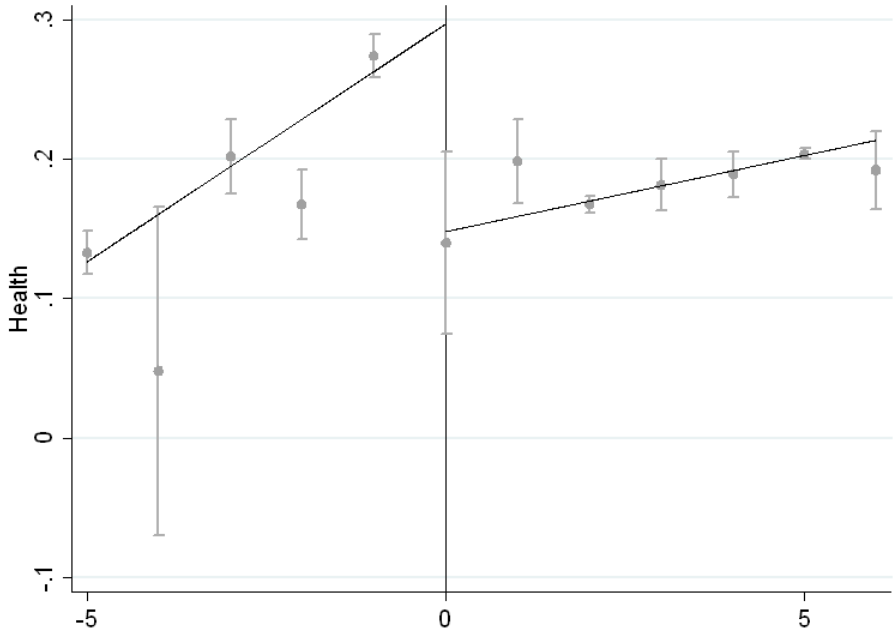

Figure 3. SEM-RDD Estimates for the SoL

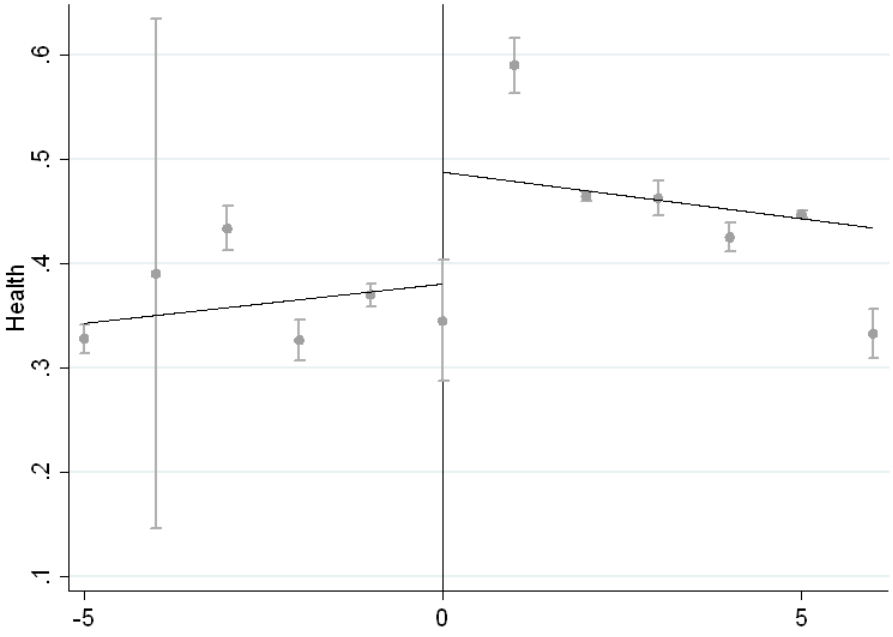

Table 1. Summary statistics

Variables	Mean	Standard Deviation	Minimum	Maximum
Panel A: Latent variables				
Health Index				
Health Status (1 for Very poor and poor)	0.0968	0.2957	0	1
Suffer from any a chronic (long-standing) illness or condition (Yes)	0.3069	0.4612	0	1
Health limitations (Yes)	0.2198	0.4141	0	1
Standard of Livings Index				
Arrears on mortgage, loan repayments or rent payments in the last 12 months (No)	0.7172	0.4503	0	1
Arrears on utility bills in the last 12 months (No)	0.6948	0.4604	0	1
Arrears on hire purchase instalments, credit cards or other loan payments in the last 12 months (No)	0.6969	0.4595	0	1
Financial burden of the repayment of debts from hire purchases or loans excluding housing costs (No)	0.0683	0.2524	0	1
Financial burden of the total housing cost (No burden)	0.1644	0.3706	0	1
Capacity to afford paying for one week whole household annual holiday away from home if needed or required (Yes)	0.1975	0.3981	0	1
Capacity to afford a meal with meat, chicken, fish (or vegetarian equivalent) every second day if needed (Yes)	0.5157	0.4997	0	1
Capacity to face unexpected financial expenses (Yes)	0.4899	0.4998	0	1
Ability to keep home adequately warm (Yes)	0.7215	0.4482	0	1
Ability to Make Ends Meet with total monthly household Income (Easily)	0.3686	0.3935	0	1
Panel B: Unemployment and Continuous Control Variables				
Unemployment Benefits (Receive)	0.0221	0.1093	0	1
Annual Unemployment Benefits-Allowance	3,056.153	6,006.379	6.47	89,134.93
Annual Household Income	27,402.78	23,943.64	0	642,017.8
Annual Household Income Excluding Unemployment Benefits	27,374.24	23,931.21	0	642,017.8
Annual Household Income Excluding Unemployment, Sickness and Disability Benefits	27,318.84	23,944.96	0	642,017.8
Age	36.619	11.760	15	65
Unemployed	0.0886	0.2768	0	1

Table 1 (Cont.) Summary Statistics

Variables	Proportions	Variables	Proportions
Panel C: Categorical Control Variables			
Marital Status-Never Married	50.92	Education- General high school	9.20
Marital Status- Married	40.40	Education- Vocational or technical high school	7.11
Marital Status-Widowed	2.66	Education- University, College and higher	10.04
Marital Status- Divorced	6.02	House tenure-Owner	65.15
Illiterate	12.86	House tenure- Tenant	19.09
Education-Literate, not finishing a school	8.27	House tenure- Lodging	1.50
Education- Primary school	33.94	House tenure-Other	14.26
Education- Secondary school	18.58		

Table 2. SEM Estimates of the First System of Equations (1)-(5)

Panel A: SEM	**DV: UB**	**DV: Health**	**DV: SOL**
Unemployment Benefits		-0.0089 (0.0144)	0.1532*** (0.0166)
Health			-0.0764*** (0.0032)
Log of Household Income Excluding Unemployment, Disability and Sickness Benefits		-0.0982*** (0.0032)	
Log of Household Income Excluding Unemployment Benefits	-0.0073*** (0.0001)		0.6681*** (0.004)
Age	0.2587*** (0.0145)	-1.0866*** (0.0857)	0.3192*** (0.1122)
Age squared	-0.3293*** (0.0176)	0.7751*** (0.1025)	-0.2301* (0.138)
Marital Status- Married	0.0011 (0.0071)	0.0017 (0.0043)	0.0725*** (0.0052)
Marita l Status- Widowed	0.0021 (0.0022)	0.0801*** (0.0130)	-0.0200 (0.017)
Marital Status- Divorced	0.0032 (0.0024)	0.1053*** (0.0141)	-0.0184 (0.0181)
Education Level-Literate, but not graduate (Reference Illiterate)	0.0020 (0.0018)	-0.1678*** (0.0103)	0.0176 (0.0142)
Education Level-Primary School	0.0093*** (0.0014)	-0.2817*** (0.0080)	0.0512*** (0.0110)
Education Level –Secondary vocational School	0.0135*** (0.0016)	-0.3181*** (0.0092)	0.0508*** (0.0123)
Education Level - General High School	0.0161*** (0.0017)	-0.3587*** (0.0099)	0.1209*** (0.0131)
Education Level –Vocational and technical high School	0.0225*** (0.0017)	-0.3628*** (0.0101)	0.1601*** (0.0133)
Education Level -University and higher	0.0089*** (0.0017)	-0.3804*** (0.0099)	0.3379*** (0.0129)
House Tenure-Tenant (Reference Category Owner)	0.0064*** (0.0008)	0.0020 (0.0048)	
House Tenure-Lodging	-0.0110 (0.0123)	-0.0166 (0.0142)	
Household Type- 2 adults<65 years, no dependent children (Reference Category-Single)	0.00011 (0.002)	0.0470*** (0.0154)	-0.2633*** (0.0195)
Household Type-Two adults with one dependent child	0.0022 (0.0026)	0.0172 (0.0153)	0.3584*** (0.0192)
Two adults with two dependent children	0.0018 (0.0025)	0.0199 (0.0152)	0.4221*** (0.0192)
No Observations	162,398		
AIC	279,880.1		
BIC	280,899.96		

Table 2 (cont.) PSM-SEM Estimates of the First System of Equations (1)-(5)

Panel B: PSM-SEM	**DV: UB**	**DV: Health**	**DV: SOL**
Unemployment Benefits		-0.0477**	0.1203***
		(0.0201)	(0.0235)
Health			-0.0827***
			(0.0158)
Log of Household Income Excluding Unemployment, Disability and Sickness Benefits		-0.0973***	
		(0.0182)	
Log of Household Income Excluding Unemployment Benefits	-0.0067***		0.7313***
	(0.0005)		(0.0217)
Age	0.9149***	1.5923**	1.8930***
	(0.0380)	(0.7708)	(0.9775)
Age squared	-1.378***	-0.5119	-1.4771
	(0.0386)	(0.9190)	(1.2411)
Marital Status- Married	0.0146	-0.0290	0.0492*
	(0.0155)	(0.0247)	(0.0297)
Marital Status- Widowed	-0.0814*	0.0391*	-0.2291***
	(0.0415)	(0.0227)	(0.0739)
Marital Status- Divorced	-0.0841	0.1427*	-0.1165
	(0.0620)	(0.0811)	(0.1039)
Education Level-Literate, but not graduate (Reference Illiterate)	-0.0872	-0.2547*	0.0880
	(0.1018)	(0.1504)	(0.1459)
Education Level-Primary School	-0.1962**	-0.3442***	0.2694**
	(0.0862)	(0.1271)	(0.1222)
Education Level –Secondary vocational School	-0.1887**	-0.3438***	0.3849***
	(0.0871)	(0.1286)	(0.1240)
Education Level - General High School	-0.2155**	-0.4813***	0.5074***
	(0.0875)	(0.1292)	(0.1245)
Education Level –Vocational and technical high School	-0.2231**	-0.4445***	0.5181***
	(0.0873)	(0.1288)	(0.1241)
Education Level -University and higher	-0.2621***	-0.4883***	0.6473***
	(0.0881)	(0.1302)	(0.1252)
House Tenure-Tenant (Reference Category Owner)	0.0270*	0.0165	
	(0.0147)	(0.0229)	
House Tenure-Lodging	0.0298	0.0284	
	(0.0737)	(0.1173)	
Household Type 2 adults<65 years, no dependent children (Reference Category-Single)	0.0038	-0.1366	-0.1078*
	(0.0535)	(0.0843)	(0.0563)
Household Type-Two adults with one dependent child	-0.0923*	-0.1160	0.0818
	(0.0522)	(0.0825)	(0.0850)
Two adults with two dependent children	-0.1726***	-0.0791	0.3099***
	(0.0524)	(0.0828)	(0.0868)
No Observations	5,961		
AIC	25,610.16		
BIC	26,245.99		

Robust standard errors within parentheses, ***, ** and * indicate significance respectively at 1%, 5% and 10% level. UB denotes unemployment benefits, and SOL denotes standard of living. DV denotes dependent variable while AIC and BIC refer to the Akaike Information Criteria and Bayesian Information Criteria respectively.

Table 3. SEM and PSM-SEM Estimates of the Second System of Equations (7)-(13)

Panel A: SEM	**DV: Health**	**DV: Unemployed**	**DV: SOL**
Health			-0.0752***
			(0.0336)
Unemployment Benefits	-0.0163	0.0870***	0.0684**
	(0.0143)	(0.0053)	(0.0332)
Unemployed	0.0487***		-0.1462***
	(0.0068)		(0.0089)
No Observations	162,398		
AIC	483,047.6		
BIC	483,835.1		
Panel B: PSM-SEM	**DV: Health**	**DV: Unemployed**	**DV: SOL**
Health			-0.0651***
			(0.0191)
Unemployment Benefits	-0.0261	0.0803***	0.0620**
	(0.0212)	(0.0099)	(0.0276)
Unemployed	0.0418*		-0.1398***
	(0.0228)		(0.0412)
No Observations	5,961		
AIC	25,383.34		
BIC	26,052.64		

Robust standard errors within parentheses, ***, ** and * indicate significance respectively at 1%, 5% and 10% level. SOL denotes standard of living. DV denotes dependent variable while AIC and BIC refer to Akaike Information Criteria and Bayesian Information Criteria respectively.

Table 4. SEM-RDD Estimates for the First System of Equations

	Bandwidth 1 month		**Bandwidth 2 months**		**Bandwidth 3 months**		**Bandwidth 4 months**		**Bandwidth 5 months**		**Bandwidth 6 months**	
	DV: Health	DV: SOL	DV: Health	DV: SOL	DV: Health	DV: SOL	DV: Health	DV: SOL	DV: Health	DV: SOL	DV: Health	DV: SOL
b_1 (D)	-0.0892** (0.0424)	0.1344** (0.0671)	-0.0735** (0.0344)	0.1238** (0.0601)	-0.075** (0.0363)	0.1159** (0.0512)	-0.071** (0.0327)	0.1122** (0.0626)	-0.068* (0.0354)	0.0924 (0.0628)	-0.062 (0.0569)	0.037 (0.0305)
Health		-0.057** (0.0271)		-0.063*** (0.0196)		-0.068*** (0.0154)		-0.074*** (0.0142)		-0.069*** (0.0128)		-0.061*** (0.0110)
No Obs.	4,883		6,344		8,382		9,552		11,492		13,217	
AIC	6,844.353		12,257.42		18,940.94		22,646.3		28,691.69		37,482.88	
BIC	7,193.381		12,660.48		19,372.75		23,089.5		29,150.95		37,960.16	
TED Test	-0.0024 (0.0376)	0.0393 (0.0262)										

Robust standard errors within parentheses, ***, ** and * indicate significance respectively at 1%, 5% and 10% level. SOL denotes standard of living. DV denotes dependent variable, while AIC and BIC refer to Akaike Information Criteria and Bayesian Information Criteria respectively