Social Indicators Research (2020) 148:599–633
https://doi.org/10.1007/s11205-019-02207-8

ORIGINAL RESEARCH

Longitudinal Trends in Self-Rated Health During Times of Economic Uncertainty in Italy

Giovanni Piumatti[1,2]

Accepted: 9 October 2019 / Published online: 12 October 2019

Abstract
Previous research examining self-rated health (SRH) outcomes following the 2008 financial crisis in the most affected European countries has reported mixed results: some indicated an improvement in SRH during the crisis while others showed a decline. This study analysed longitudinal SRH trends across age groups in Italy between 2004 and 2015 adopting a longer period for health data and adjusting for pre-existing trends. Data consisted of 97,250 Italian adult residents (aged 18 to 81) from nine cohorts collected with an accelerated longitudinal design between 2004 and 2015 by the Italian National Institute of Statistics using questionnaires from the European Union Statistics on Income and Living Conditions. Latent growth modeling analysed longitudinal SRH trends by different age groups in each cohort along 4-year assessments. Consistently across cohorts, SRH declined among participants aged 71 to 81 while it remained more stable for those aged 30 to 50. The worst SRH trends were observed in the 2010–2013 period where SRH declined in all age groups except for the those aged 31 to 40. Conversely, in the 2008–2011 period SRH remained stable. While at the aggregate level there seems to be a slight overall positive trend in SRH after the crisis, this long-term longitudinal stability in SRH may mask consistent within-country contrasted trends in health outcomes across different age groups. Periods of economic uncertainty and austerity measures coincided with a decline in SRH among the normal adult population in Italy.

Keywords Italy · Global financial crisis · Self-rated health · Latent growth modeling

1 Introduction

The 2008 world economic crisis has caused severe and long-lasting challenges for the public health sectors of many European countries (McKeeargue 2010; Mladovsky et al. 2012; Thomson et al. 2014). Public health budget cuts coupled with increasingly higher

✉ Giovanni Piumatti
giovanni.piumatti@unige.ch

1 Faculty of Medicine, Unit of Development and Research in Medical Education (UDREM), University of Geneva, Medical School (CMU), Rue Michel Servet 1, Geneva, Switzerland

2 Population Epidemiology Unit, Primary Care Division, Geneva University Hospitals, Geneva, Switzerland

healthcare costs and the parallel weakening of labour markets are likely to have had an impact on health levels of citizens particularly in countries where the crisis hit harder (Baumbach and Gulis 2014; Karanikolos et al. 2013; Stuckler et al. 2009).

Secondary data analyses of national representative data from Spain, Greece and Italy, three countries that experienced economic turbulences more severely than others in the European region since 2008 (Tridico 2013), showed increasing rates of suicides (Branas et al. 2015; De Vogli et al. 2012; Lopez Bernal et al. 2013), mortality (Benmarhnia et al. 2014; Vlachadis et al. 2014) and poor mental health (Álvarez-Gálvez et al. 2018; De Vogli et al. 2013; Drydakis 2015; Moya et al. 2015) following the crisis. In particular, several studies have focused on the negative impact of the crisis on self-rated health (SRH) (Ferrarini et al. 2014; Hessel et al. 2014; Huijts et al. 2015; Zavras et al. 2012)—most commonly measured with a single item (e.g., "How is your health in general?")—since it is a robust predictor of morbidity (Perruccio et al. 2012; Rosso et al. 2008), healthcare utilization (Dominick et al. 2002; Tamayo-Fonseca et al. 2015), hospitalizations (Kennedy et al. 2001; Nielsen 2016), and mortality (Cesari et al. 2008; DeSalvo et al. 2006; Jylhä 2009; Singh-Manoux et al. 2007).

The mechanisms behind the connection between negative economic conditions and poor SRH have been largely examined in epidemiological (e.g., Marmot 2002) and economical studies (e.g., Rivera 2001; Simou and Koutsogeorgou 2014). Economic crises can negatively impact the health status of men and women due to the occurrence of mental disorders associated with unemployment and reduced income (Aguilar-Palacio et al. 2015; Drydakis 2015), or via the increasing incidence of addiction problems and unhealthy behaviours including the consumption of cheaper and less nutritious food (Brinkman et al. 2009; Pieroni et al. 2013; Bonaccio et al. 2014), smoking (Gallus et al. 2015) and alcohol use (Men et al. 2003). Moreover, during prolonged periods of economic uncertainty, families may reduce their healthcare spending (Terraneo et al. 2014) while overburdened healthcare services may fail to provide adequate assistance to everybody in need (Karanikolos et al. 2013). In addition, socio-economic inequalities exacerbated by the crisis can also negatively affect SRH due to increased stress levels associated with social comparisons (Kawachi and Berkman 2000; Mansyur et al. 2008; Wilkinson 2002). Thus, during an economic backlash all these factors may contribute to the worsening of SRH via biological, socioeconomic, life style and medical resources pathways.

Nevertheless, in a review of empirical studies assessing the impact of the 2008 crisis on health outcomes in Europe, Parmar et al. (2016) underlined how evidences regarding SRH were mixed: some reported an improvement in SRH during the crisis (Aguilar-Palacio et al. 2015; Bartoll et al. 2015; Regidor et al. 2014) while others a decline (Hessel et al. 2014; Reile et al. 2014; Vandoros et al. 2013; Zavras et al. 2012). The main limitations of such previous epidemiological studies are the relatively short time intervals for health data and the lack of adjustment for pre-existing trends (De Belvis et al. 2012; Parmar et al. 2016; Stuckler et al. 2010). Furthermore, the heterogeneity of results that was further observed within countries may reflect differences between age groups. Elderly for example are more likely to be exposed than other age groups to the negative effects of an economic crisis since they are in higher need of healthcare assistance and are more exposed to poverty, social exclusion and poorer health (De Belvis et al. 2012; Feinglass et al. 2007; Hurd and Rohwedder 2012; Piumatti et al. 2018a; Sargent-Cox et al. 2011). Moreover, also young people are considered a category at risk during economic downturns because they are vulnerable to marginalization in the labour market and youth unemployment rates are particularly sensitive to the economic climate of a country (Sarti and Zella 2016; Scarpetta et al. 2010; Verick 2009).

In order to overcome such limitations from previous research, the current study focused on national secondary data from a sample of 97,252 Italian adult residents divided along nine cohorts in an accelerated longitudinal design (Istat 2018a) to examine longitudinal trends in SRH between 2004 and 2015. Latent growth modeling (LGM) (Bollen and Curran 2006; Hancock and Lawrence 2006) within the framework of structural equation modeling (SEM) was adopted to determine initial levels and rates of change in SRH at the individual level in different age groups: 18–30, 31–40, 41–50, 51–60, 61–70 and 71–81. The main advantages of using LGM in SEM to assess longitudinal variation in SRH are to estimate the range of individual differences in change over time and to determine what type of trajectory best fit the data (i.e., linear or nonlinear) (Kline 2015). A further novelty of this study is to have extended the adoption of LGM into an accelerated longitudinal design. This consists of temporally overlapping repeated measurements of independent cohorts forming adjacent segments. Such technique allows to determine whether similar trends are observed for consecutive cohorts and to approximate longer longitudinal trends on the basis of shorter time periods (Duncan and Duncan 2009).

In sum, a clearer understanding of the link between recession and health of the exposed populations may help countries to develop strategies in support of those most affected that may also serve for future scenarios of financial crisis, as pointed out by the World Health Organization (WHO 2009a, b). Accordingly, the aim of this study was to assess whether longitudinal trends in SRH are similar and consistent across different age groups in Italy preceding and following the 2008 world economic crisis.

1.1 The Italian Context

According to a recent report of the central Bank of Italy (Banca d'Italia 2018) the percentage of Italians 'at-risk of poverty' increased from 19.6% to 22.9% in the 2006-2016 period and it is now substantially higher than in other European countries with a similar size such as France (13.6%) or Germany (16.5%) (Eurostat 2018a). In the same period, although total national health spending remained stable (Fig. 1; OECD 2018a, b), household expenditure for healthcare decreased immediately following the hit of the 2008 crisis (Istat 2011). Surveys showed that this decrease was indeed due to financial reasons connected to the economic crisis (Cercle Santé Sociale and Europ Assistance 2011; Freni Ricerche Sociali e di Marketing 2011).

Looking at Fig. 1, the *anni horribiles* for the Italian economy after the crisis could be placed in the years 2008–2009 and 2011–2012 when the annual growth rate in nominal GDP decreased the most and the unemployment rate—especially among youths—started to increase substantially. However, studies that looked at SRH changes in the Italian adult resident population after 2008 focused on different periods of time and reported mixed findings. Using multi-national data from the European Union Statistics on Income and Living Conditions (EU-SILC), Abebe et al. (2016) observed a decline in fair or poor SRH status in Italy in the 2005–2007 period while it remained stable between 2008 and 2011. Minelli et al. (2014) analysed longitudinal data collected by the Bank of Italy in the 2006–2010 period and found how differentials in SRH status spread in times of economic strain for those looking for job opportunities. Similar results were obtained by Sarti and Zella (2016) relying on 2007–2010 Italian data from the EU-SILC project that showed how unemployed and precarious workers had the higher risk of worsening their health status during those years. Other studies focused on the effects of recession on mental health outcomes in Italy and noticed how both suicides and attempted suicides due to economic reasons raised after

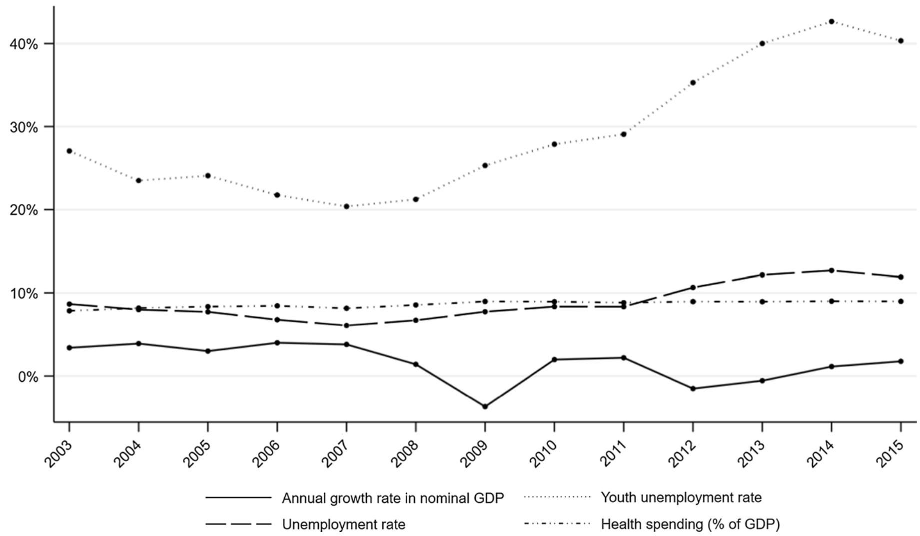

Fig. 1 Annual growth rate in nominal gross domestic product (GDP), unemployment rate, youth unemployment rate and health spending (% of GDP) in Italy for the 2003–2015 period. *Notes* Nominal gross domestic product (GDP) is GDP given in current prices, without adjustment for inflation. Unemployment rate is the number of unemployed people as a percentage of the labour force, where the latter consists of the unemployed plus those in paid or self-employment. The youth unemployment rate is the number of unemployed 15–24 year-olds expressed as a percentage of the youth labour force. Unemployed people are those who report that they are without work, that they are available for work and that they have taken active steps to find work in the last 4 weeks. Health spending measures the final consumption of health care goods and services (i.e., current health expenditure) including personal health care (curative care, rehabilitative care, long-term care, ancillary services and medical goods) and collective services (prevention and public health services as well as health administration), but excluding spending on investments. *Source*: OECD (2018a, b)

2008 (De Vogli et al. 2012) while deaths due to mental and behavioural disorders increased especially among the elderly (De Vogli et al. 2013). A review by Mattei et al. (2014) concluded that there is a reliable link between the economic recession and health and mental health of Italians but that more research is needed to better understand this phenomenon and guide social and political interventions at the national level.

During the 2004–2015 period, total national health spending in Italy followed similar trends than other European countries such as France, Germany or Netherlands, although it remained substantially lower (see Fig. 2; OECD 2018a). The National Health Service (*Servizio Sanitario Nazionale*, SSN) in Italy is a tax-funded decentralized system (with three levels: national, regional and local) providing universal healthcare coverage to all citizens. Funding to the SSN largely derives from public expenditures for nearly 78%, which is higher than the average 72% across OECD countries (OECD 2015). Out-of-pocket payments, regarding especially pharmaceuticals, outpatient care and dental services, account for much of the remaining financing (i.e., 18%, comparing to the average 20% across OECD countries), while less than 3% of the total healthcare expenditure is covered by private health insurances (OECD 2015). Overall, the Italian decentralized SSN system yields good health indicators with high quality care and significantly lower spending levels than many other European countries (OECD 2015). Italy is at the top of OECD countries with the highest life expectancy

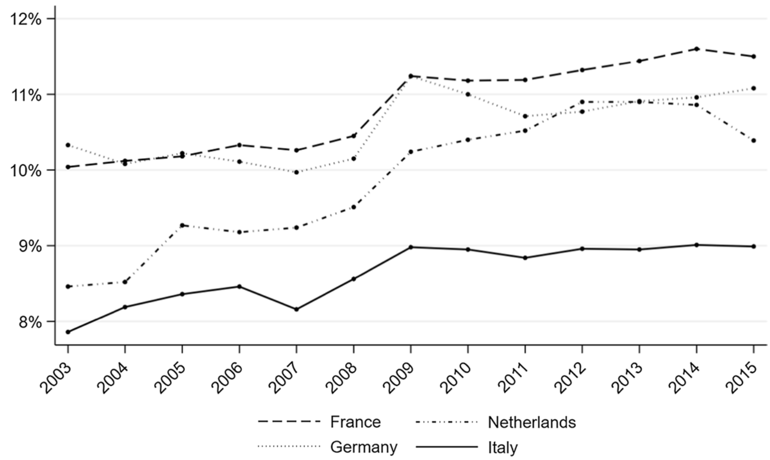

Fig. 2 Health spending (% of GDP) in Italy, France, Germany and Netherlands for the 2003–2015 period. *Notes* Health spending measures the final consumption of health care goods and services (i.e., current health expenditure) including personal health care (curative care, rehabilitative care, long-term care, ancillary services and medical goods) and collective services (prevention and public health services as well as health administration), but excluding spending on investments. *Source*: OECD (2018a, b)

(83.3 years) alongside Spain (83.4), Switzerland (83.7) and Japan (84.1) (OECD 2018b). Nevertheless, between 2000 and 2011 the share of out-of-pocket payments decreased on average by 1.2% in the European area and by 5.1% in Italy (OECD 2015). As a result of a consistent reduction in central funding (Mangano 2010), Italian regions with large health care deficits raised local taxes to recover deficits and increased co-payments to reduce pharmaceutical expenditures (Mladovsky et al. 2012). Accordingly, as pointed out above, the number of households postponing or even giving up some forms of medical care for financial reasons has raised (Cercle Santé Sociale and Europ Assistance 2011; Freni Ricerche Sociali e di Marketing 2011). In this current scenario in Italy, it is thus very important to evidence whether periods of economic downturns at the national level correspond to worse SRH trends among the normal adult population.

1.2 Research Objectives and Hypotheses

The current study aimed to assess whether longitudinal trends in SRH vary before, during and after the 2008 world economic crisis in Italy. In particular, longitudinal changes in SRH at the individual level were examined according to different age groups to evidence consistencies or differences in SRH trajectories across the crisis and the life-span. Although the nature of the analyses carried out here was mainly explorative, the following hypotheses were formulated: (1) youngest (i.e., 18-30) and oldest (70+) cohorts are the ones where the worst SRH can be observed in correspondence with the years of greater economic uncertainty; and (2) worst trends in SRH can be observed immediately after the crisis (i.e., 2008–2009) and following the most severe periods of economic downturns (i.e., 2011–2012).

2 Method

2.1 Sample and Measures

The current study used secondary data available from the Italian National Institute of Statistics (Istat). Since 2004, each year Istat collected information from national representative samples of Italian adult residents using questionnaires from the EU-SILC project with the aim of obtaining comparable cross-sectional and longitudinal data on income, poverty, social exclusion and living conditions across European countries (Eurostat 2018b). In each baseline assessment year, a stratified multistage sampling design was adopted (Official Journal of the European Union 2003), that is a probability method based on dividing the target population into strata and then using a hierarchical structure of units within each stratum (Jain and Hausman 2006; Lohr 2008). More specifically, stratifying a population means dividing it into non-overlapping subpopulations, called strata. Independent samples are then selected within each stratum. Longitudinal EU-SILC data are collected over four-year periods. The first baseline data collection took place in 2004. Accordingly, Italian data from 9 overlapping longitudinal cohorts were obtained (N = 116,137), the first one comprehending the 2004–2007 period and the last one comprehending the 2012–2015 period. Figure 6 in the Appendix illustrates the adopted rotational design pattern.

SRH was measured with the following questions: "How is your health in general?". Response options were coded 1 = very good, 2 = good, 3 = fair, 4 = bad and 5 = very bad (values were reverse coded for the current analyses to ease interpretation). SRH encompasses different dimensions of mental, physical and subjective health status (Altman et al. 2016; Singh-Manoux et al. 2006). The operationalization of this question as it was analysed here is aligned with previous research (Fayer and Sprangers 2002; DeSalvo et al. 2006; Jylhä 2009). Since LGM requires to have the same continuous dependent variable (in this case SRH) measured at least on three different occasions for each individual at the same intervals, in every cohort only participants reporting SRH at least two times out of four assessments were retained for the analyses while the remaining missing values were treated using the full information maximum likelihood estimation method (FIML) which adopts the expectation–maximization (EM) (see below the Analyses section for a full explanation of this approach). This decision was made considering also that it is preferred to have a sizeable portion of cases with at least three assessments of observed information so to over-identify a linear trajectory (Curran et al. 2010). Excluding participants that reported missing values on more than two observed measures of SRH across four assessments ensured this goal. This left a total of 97,252 individuals, 84% of the total original sample. Given this selection procedure, at baseline assessments the missing rates ranged between 0 and 1.7% across all cohorts. Moreover, the percentage of participants with at least three longitudinal observed measures of SRH ranged between 81 and 90%.

Table 4 in the Appendix reports descriptive differences between selected and non-selected participants at baseline. The latter were in general older, with lower educational level, more likely to not being married, and more likely to suffer from a chronic disease or to report limitations due to health problems. Baseline SRH levels were also significantly lower among non-selected participants. Table 1 reports cohorts' socio-demographic information (i.e., gender, age, marital status) along with the incidence of chronic diseases and limitations due to health problems at baseline. Overall, the percentage of participants declaring to suffer from a chronic disease or to experience limitations in their daily activities due to health problems substantially increased from the first to the last cohort.

Table 1 Baseline sample's socio-demographic characteristics by cohorts. Values are percentages

Variables	2004–2007 (N = 11,432)	2005–2008 (N = 11,663)	2006–2009 (N = 11,315)	2007–2010 (N = 11,310)	2008–2011 (N = 11,015)	2009–2012 (N = 10,441)	2010–2013 (N = 8640)	2011–2014 (N = 11,021)	2012–2015 (N = 10,415)
Gender									
Females	52.49	52.15	52.94	52.09	51.69	52.69	51.96	52.80	52.40
Males	47.51	47.85	47.06	47.91	48.31	48.31	48.04	47.20	47.60
Education									
Primary or lower	29.16	27.96	27.79	26.02	25.25	24.40	24.06	20.23	20.71
Lower secondary	28.34	28.30	28.44	28.44	28.24	27.56	29.24	28.91	29.36
Upper secondary	30.73	31.13	29.58	31.50	33.77	33.95	33.42	37.10	37.63
Post-secondary or higher	12.77	12.61	14.19	14.04	12.74	14.10	13.28	13.77	12.30
Marital status									
Never married	26.89	28.74	27.88	28.04	27.89	28.27	27.58	28.51	28.55
Married	60.23	58.88	59.16	59.21	59.44	57.92	58.61	56.84	57.05
Separated	1.73	1.78	1.64	1.91	2.21	2.34	2.38	2.87	2.41
Widowed	9.51	9.04	9.59	8.96	8.50	9.35	8.97	9.16	9.47
Divorced	1.64	1.56	1.72	1.88	7.97	2.13	2.45	2.62	2.53
Chronic disease									
No	79.01	77.92	78.56	78.62	76.64	77.65	76.76	74.51	73.63
Yes	20.99	22.09	21.44	21.38	23.36	22.35	23.24	25.49	26.37
Limitation due to health problems									
No	85.37	80.73	77.17	73.53	71.34	72.70	78.90	72.56	70.39
Yes	9.28	13.20	15.59	18.59	20.13	19.52	15.37	20.32	20.39
Yes, strongly	5.37	6.06	7.24	7.88	8.53	7.78	5.72	7.12	9.22

Moreover, the percentage of individuals with a primary or lower educational level diminished in favour of the percentage of individuals with at least upper secondary education. These variations can be linked to demographic changes that took place within the Italian society between 2004 and 2015 (Istat 2018b), including the declining rates of married couples (Istat 2018c).

2.2 Analyses

Within LGM two latent factors are estimated: the intercept, that is a constant for any individual across assessments representing the point where the individual trajectory of the observed measure intercepts the vertical axis; and the slope of an individual trajectory. The intercept and the slope are random estimates in LGM capturing how every individual growth curve differs from the overall trajectory (Curran 2003; McNeish and Matta 2018). The specific advantage of modeling individual longitudinal development using LGM within the SEM framework is a greater flexibility to estimate different shapes of growth by freely estimating specific slope factors so that change may better corresponds to the unique characteristics of the population under study (Curran et al. 2010). This straightforward flexibility of LGM, coupled with the possibility of adopting FIML and EM to deal with missing values, make it particularly suitable for the specific aim of the current study—namely to assess longitudinal trends in SRH between 2004 and 2015 across different age groups and consecutive cohorts—in comparison with other mathematically equivalent models such as the mixed effect approach (Curran 2003; McNeish and Matta 2018). In fact, LGM have been adopted in similarly designed studies (Duncan and Duncan 2004; Duncan et al. 2006).

Figure 3 depicts the LGM structural path diagram applied to estimate the intercept (i.e., average initial level) and slope (i.e., growth) factors of SRH for different age groups (i.e., 18–30, 31–40, 41–50, 51–60, 61–70 and 71–81) within each cohort. The current cut-offs to define age bands were chosen to provide a wide range of age categories, also considering the distribution of age and the large available sample size in each cohort. Three alternative model's solutions were tested in each age group (Phan, 2011):

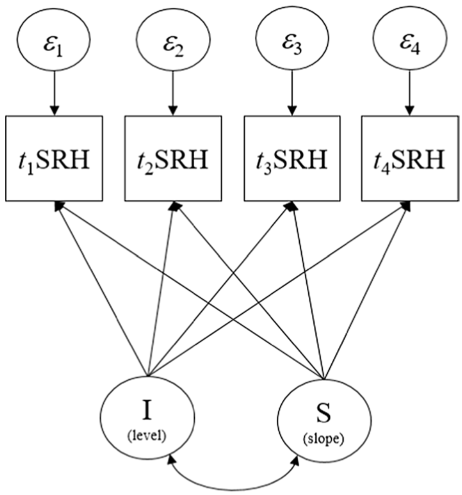

Fig. 3 Latent growth curve model for self-rated health. *Notes* Observed variables are depicted as squares: t_1SRH, t_2SRH, t_3SRH and t_4SRH = self-rated health at assessment years 1, 2, 3 and 4. Latent variables are depicted as circles: Intercept (I; average initial level) and Slope (S; growth)

1. A no-growth model where no slope component was assumed. The equation for this model can be written as

$$y_{it} = \alpha_i + \varepsilon_{it}$$

where y_{it} is the repeated measure under analysis (in our case the SRH score) for individual i ($i=1, 2, \ldots, N$) at Time t ($t=1, 2, 3\ 4,$) and α_i denotes the intercept for individual i, namely an individual's SRH level at the first time of measurement.
2. A linear growth model assuming a linear pattern of change across assessments by fixing slope parameters to 0 at Time 1, to 1 at Time 2, to 2 at Time 3 and to 3 at Time 4 (i.e., corresponding to the years between assessments). The equation for this model can be written as

$$y_{it} = \alpha_i + \lambda_t \beta_i + \varepsilon_{it}$$

where λ_t represents slope parameters at Time t ($t=1, 2, 3\ 4,$) and it is defined as $\lambda_t = t-1$ and β_i denotes the slope of the latent trajectory for individual i ($i=1, 2, \ldots, N$).
3. A nonlinear growth model where the form of change across assessments was not specified a priori and slope parameters were fixed to 0 at Time 1 (i.e. $\lambda_1=0$, reading from the equation reported above), freely estimated at Time 2 and Time 3 and fixed to 3 at Time 4 (i.e. $\lambda_4=3$) to allow a separation of the intercept and slope components at baseline assessment and provide a scale of measurement for the slope.

Individual intercepts (α_i) and slopes (β_i) are assumed to follow multivariate normal distributions with means (μ_α, μ_β), variances (σ^2_α, σ^2_β) and covariance ($\sigma_{\alpha,\beta}$) (Grimm et al. 2011; McArdle and Nesselroade 2003). Comparisons between each solution were conducted by the means of Chi square (χ^2) difference tests. Overall model fit was evaluated using the following fit indexes: The Bentler comparative fit index (CFI) (Bentler 1990), the Tucker Lewis index (TLI) (Bentler and Bonett 1980) and the Steiger–Lind root mean square error of approximation (RMSEA) (Steiger 1990). Models with CFI and TLI values over or equal to 0.90 and RMSEA values below or equal to 0.08 are considered acceptable in terms of fit (Curran et al. 2010; Preacher et al. 2008; Wu et al. 2009). Since the RMSEA may falsely indicated a poor fitting model when having small degree of freedoms, using different indexes at the same time provided a more reliable assessment of model fit (Kenny et al. 2015). Error variances for SRH at each assessment were freely estimated. Missing values were estimated using FIML, this procedure adjusts the likelihood function so that each case contributes information on the variables that are observed. FIML relays on the missing at random assumption and it assumes also the multivariate Gaussian distribution for the underlying variables (Dempster et al. 1977; Kline 2015). In addition to LGM analyses, average SRH was calculated for each participant across assessment years so to test for mean differences between cohorts based on univariate analyses of variance (ANOVAs) with Bonferroni post hoc adjustments. All analyses were carried out in Stata 15 (StataCorp. 2015. Stata Statistical Software: Release 15. College Station, TX: StataCorp LP).

3 Results

Absolute values of skewness and kurtosis for SRH across cohorts were respectively below 1 and 4 suggesting that this variable was reasonably normally distributed in every assessment year (Kline 2015). Little's test for data missing completely at random (MCAR) applied to each set of four longitudinal SRH assessments per cohort was always significant indicating data were not MCAR. This is not surprising if we read the results of Table 4 in the Appendix: higher age, lower education, not being married or suffering from chronic diseases and limitations due to health problems are all factors that can explain why participants did not take part to every assessment. Nevertheless, as described above, the ML procedure in Stata to deal with missing values in LGM produces less biased estimates than other methods when data are not missing at random (Little and Rubin 1989; Schafer and Olsen 1998). This estimation procedure was further supported in the context of the current analyses considering the large sample size available, the portion of participants with at least three observations out of four in each cohort (i.e., between 81 and 90%) and the fact the normality assumption was met.

Table 5 in the Appendix reports the full set of comparisons between fitted latent growth models for SRH by cohorts and age groups while Table 2 only reports results for the best fitting models along with standardized estimates for the intercept and slope factors. In addition, Fig. 4 depicts the standardized estimated individual growth rates (i.e., slopes) in SRH by cohorts and age groups based on the results from the best fitting latent growth models.

Pre-crisis cohorts, namely the 2004–2007 and 2005–2008 ones, were the only ones where the two youngest age groups (i.e., aged 18 to 30 and 31 to 40) exhibited descending trajectories in SRH. Nevertheless, in the two subsequent ones collected around the beginning of the crisis, the 2006–2009 and the 2007–2010, only the oldest groups (i.e., aged 71 to 81) significantly declined in SRH across time. Indeed, with the exception of the 2008–2011 period, participants from the oldest age group (i.e., 71–81) always exhibited a significant longitudinal decrease in SRH across all cohorts. On the other hand, SRH trajectories were consistently stable among participants aged 41 to 50 across all cohorts except for the 2010–2013 period where SRH significantly declined.

The first post-crisis cohort, 2008–2011, appeared to be the 'healthiest' since it is the only one where no significant decline in SRH was observed at the individual-level for any age group, followed by the 2006–2009 and the 2007–2010. The rest of the post-crisis cohorts reported fluctuating trends in SRH. In the 2012–2015 cohort the 18–30 age group was the only one among all groups and cohorts to show a positive increase in SRH across time despite the fact that in this same cohort SRH was significantly declining from age 51 onward. Finally, the 2010–2013 cohort was the one with the worst SRH trends, with all age groups except the one aged 31 to 40 exhibiting a significant decline in SRH across 4 years.

Table 3 reports the results of ANOVAs with Bonferroni post hoc adjustments testing for mean differences in SRH (calculated as average SRH across assessment years) between cohorts. To further ease the interpretation of these last analyses, Fig. 5 depicts longitudinal observed mean scores in self-rated health by cohorts. Overall, it appeared to be a positive trend in SRH across cohorts, especially when looking at the significant differences between pre- and post-crisis periods. On average, every cohort after the 2005–2008 period reported significant higher levels of SRH. This tendency seemed to be interrupted by an abrupt decline in SRH taking place in 2011. Nevertheless, average outcomes in SRH did not return to pre-crisis levels. On average, SRH significantly decreased only once between the 2011–2014 and 2012–2015 cohorts.

4 Discussion

This study examined longitudinal trends in SRH between 2004 and 2015 across different age groups in Italy. Data were obtained from a national representative sample of 97,252 Italian adult residents from nine cohorts in an accelerated longitudinal design. The specific

Table 2 Results of latent growth models for self-rated health by cohorts and age groups. Standardized results are shown

Cohorts	Age groups	χ^2	*df*	*p*	Intercept M (SE)	Slope M (SE)	CFI	TLI	RMSEA
2004–2007	18–30 (*n* = 2218)	22.75	3	< 0.001	8.03 (0.94)***	– 0.15 (0.05)**	0.988	0.976	0.054
	31–40 (*n* = 2218)	10.19	3	0.017	8.61 (0.29)***	– 0.08 (0.04)*	0.996	0.992	0.034
	41–50 (*n* = 1969)	36.37	5	< 0.001	6.94 (0.20)***	0.01 (0.05)	0.984	0.981	0.056
	51–60 (*n* = 1849)	34.32	5	< 0.001	5.99 (0.17)***	– 0.01 (0.05)	0.987	0.984	0.056
	61–70 (*n* = 1602)	2.44	3	0.487	5.29 (0.25)***	– 0.16 (0.05)**	1.000	1.001	0.000
	71–81 (*n* = 1676)	23.14	5	< 0.001	4.96 (0.16)***	– 0.44 (0.09)***	0.991	0.989	0.047
2005–2008	18–30 (*n* = 2157)	19.26	3	< 0.001	9.00 (0.58)***	– 0.18 (0.04)**	0.987	0.974	0.050
	31-40 (*n* = 2127)	17.36	5	0.004	8.16 (0.26)***	– 0.14 (0.05)**	0.991	0.989	0.034
	41-50 (*n* = 2116)	12.34	3	0.006	6.64 (0.37)***	– 0.01 (0.07)	0.996	0.992	0.038
	51-60 (*n* = 1849)	10.28	5	0.068	5.62 (0.15)***	0.07 (0.04)	0.998	0.997	0.024
	61-70 (*n* = 1628)	33.11	5	< 0.001	5.27 (0.16)***	0.01 (0.06)	0.986	0.983	0.059
	71-81 (*n* = 1786)	25.57	5	< 0.001	4.56 (0.14)***	– 0.21 (0.06)***	0.989	0.987	0.048
2006–2009	18–30 (*n* = 1993)	10.16	5	0.071	9.60 (0.33)***	– 0.05 (0.04)	0.997	0.996	0.023
	31–40 (*n* = 2016)	5.62	5	0.345	7.40 (0.21)***	0.04 (0.05)	1.000	1.000	0.008
	41–50 (*n* = 2054)	18.38	5	0.003	6.58 (0.17)***	– 0.01 (0.04)	0.994	0.993	0.036
	51–60 (*n* = 1821)	45.17	5	< 0.001	6.14 (0.18)***	0.06 (0.05)	0.982	0.978	0.066
	61–70 (*n* = 1631)	19.16	5	0.002	5.06 (0.14)***	– 0.04 (0.05)	0.994	0.992	0.042
	71–81 (*n* = 1800)	7.91	5	0.162	4.12 (0.12)***	– 0.22 (0.04)***	0.999	0.998	0.018
2007–2010	18–30 (*n* = 2011)	19.21	5	0.002	9.51 (0.30)***	– 0.01 (0.05)	0.992	0.990	0.038
	31–40 (*n* = 1976)	23.98	5	< 0.001	7.65 (0.21)***	0.06 (0.05)	0.991	0.990	0.044
	41–50 (*n* = 2072)	38.49	5	< 0.001	7.36 (0.20)***	– 0.02 (0.05)	0.987	0.984	0.057
	51–60 (*n* = 1815)	8.14	5	0.149	5.78 (0.17)***	0.03 (0.06)	0.999	0.998	0.019
	61–70 (*n* = 1635)	25.65	5	< 0.001	4.87 (0.14)***	– 0.06 (0.05)	0.990	0.988	0.050
	71–81 (*n* = 1801)	15.62	5	0.008	4.07 (0.12)***	– 0.16 (0.05)**	0.995	0.994	0.034

Table 2 (continued)

Cohorts	Age groups	χ^2	*df*	*p*	Intercept M (SE)	Slope M (SE)	CFI	TLI	RMSEA
2008–2011	18–30 (*n* = 1922)	61.92	5	< 0.001	7.70 (0.21)***	− 0.07 (0.05)	0.952	0.943	0.077
	31-40 (*n* = 1941)	4.33	3	< 0.001	8.53 (0.29)***	− 0.04 (0.05)	0.999	0.998	0.015
	41–50 (*n* = 2125)	21.44	3	< 0.001	7.23 (0.19)***	− 0.09 (0.07)	0.991	0.983	0.054
	51–60 (*n* = 1704)	15.24	3	0.002	6.38 (0.19)***	− 0.15 (0.09)	0.993	0.987	0.049
	61–70 (*n* = 1529)	30.21	3	< 0.001	5.00 (0.12)***	− 0.19 (0.23)	0.986	0.971	0.077
	71–81 (*n* = 1784)	74.70	5	< 0.001	4.16 (0.12)***	− 0.71 (0.73)	0.964	0.957	0.088
2009–2012	18–30 (*n* = 1838)	3.28	3	0.351	9.44 (0.37)***	− 0.06 (0.04)	1.000	0.999	0.007
	31–40 (*n* = 1748)	30.24	5	< 0.001	8.00 (0.26)***	0.04 (0.04)	0.969	0.962	0.054
	41–50 (*n* = 1987)	66.07	5	< 0.001	6.56 (0.17)***	0.01 (0.03)	0.956	0.947	0.078
	51–60 (*n* = 1654)	42.64	5	< 0.001	5.56 (0.15)***	− 0.03 (0.04)	0.978	0.973	0.067
	61–70 (*n* = 1540)	51.75	5	< 0.001	4.72 (0.13)***	− 0.19 (0.05)***	0.972	0.967	0.078
	71–81 (*n* = 1674)	4.35	3	0.226	4.37 (0.11)***	− 0.32 (0.05)***	0.999	0.998	0.016
2010–2013	18–30 (*n* = 1427)	46.92	5	< 0.001	14.13 (1.20)***	− 0.18 (0.08)*	0.904	0.885	0.077
	31–40 (*n* = 1407)	28.85	3	< 0.001	14.65 (3.48)***	− 0.13 (0.07)	0.950	0.901	0.078
	41–50 (*n* = 1646)	52.47	5	< 0.001	8.53 (0.39)***	− 0.27 (0.09)**	0.959	0.951	0.076
	51–60 (*n* = 1446)	60.17	5	< 0.001	6.99 (0.29)***	− 0.27 (0.07)***	0.953	0.944	0.087
	61–70 (*n* = 1290)	53.36	5	< 0.001	5.77 (0.24)***	− 0.24 (0.06)***	0.959	0.951	0.087
	71–81 (*n* = 1424)	31.98	5	< 0.001	4.97 (0.21)***	− 0.50 (0.07)***	0.978	0.973	0.062

Table 2 (continued)

Cohorts	Age groups	χ^2	*df*	*p*	Intercept M (SE)	Slope M (SE)	CFI	TLI	RMSEA
2011–2014	18–30 ($n=1812$)	9.53	3	0.023	10.40 (0.31)***	−0.01 (0.03)	0.994	0.988	0.035
	31–40 ($n=1684$)	56.64	5	< 0.001	8.11 (0.28)***	0.09 (0.05)	0.950	0.940	0.078
	41–50 ($n=2183$)	45.26	5	< 0.001	6.98 (0.19)***	−0.02 (0.04)	0.978	0.973	0.061
	51–60 ($n=1832$)	37.45	5	< 0.001	6.00 (0.18)***	−0.02 (0.04)	0.982	0.978	0.060
	61–70 ($n=1725$)	26.68	5	< 0.001	4.93 (0.14)***	−0.05 (0.05)	0.989	0.987	0.050
	71–81 ($n=1785$)	20.96	5	< 0.001	3.92 (0.11)***	−0.24 (0.04)***	0.991	0.989	0.042
2012–2015	18–30 ($n=1611$)	14.44	5	0.013	8.04 (0.24)***	0.08 (0.04)*	0.993	0.992	0.034
	31–40 ($n=1602$)	15.69	3	0.001	6.95 (0.93)***	0.09 (0.05)	0.990	0.980	0.051
	41–50 ($n=2029$)	32.53	5	< 0.001	6.39 (0.17)***	−0.05 (0.03)	0.984	0.981	0.052
	51–60 ($n=1768$)	30.98	5	< 0.001	6.68 (0.24)***	−0.19 (0.06)**	0.983	0.979	0.054
	61–70 ($n=1621$)	24.89	5	< 0.001	4.87 (0.14)***	−0.14 (0.05)**	0.988	0.985	0.050
	71–81 ($n=1784$)	40.62	5	< 0.001	4.27 (0.13)***	−0.46 (0.09)***	0.979	0.975	0.063

Standard errors were obtained based on the observed information matrix

*$p<0.05$; **$p<0.01$; ***$p<0.001$

aim of the analyses presented here was to assess whether longitudinal trends in SRH were similar and consistent across different age groups in Italy preceding and following the 2008 world economic crisis. Two hypotheses were formulated: (1) youngest (i.e., 18–30) and oldest (70+) cohorts are the ones where the worst SRH can be observed in correspondence with the years of greater economic uncertainty; and (2) worst trends in SRH can be observed immediately after the crisis (i.e., 2008–2009) and following the most severe periods of economic downturns (i.e., 2011–2012). Results partially confirmed these hypotheses. First, worst longitudinal health trends were observed only few years after the strike of the crisis, namely between 2010 and 2013, while the years immediately after 2008 registered better health trends than precedent ones. Second, health levels among the oldest cohorts (70+) appeared indeed to be more prone to the negative influence of national economic downturns. On the other hand, youngest cohorts (i.e., 18–30) exhibited more fluctuating trends across years: they were more likely to show declining SRH in the years preceding rather than following the crisis, and during the worst four-year period for health trends they were not affected as much as participants from older cohorts. Moreover, youngest participants were the only ones across all cohorts and age groups to report a significant positive trend in SRH, namely in the 2012–2015 period.

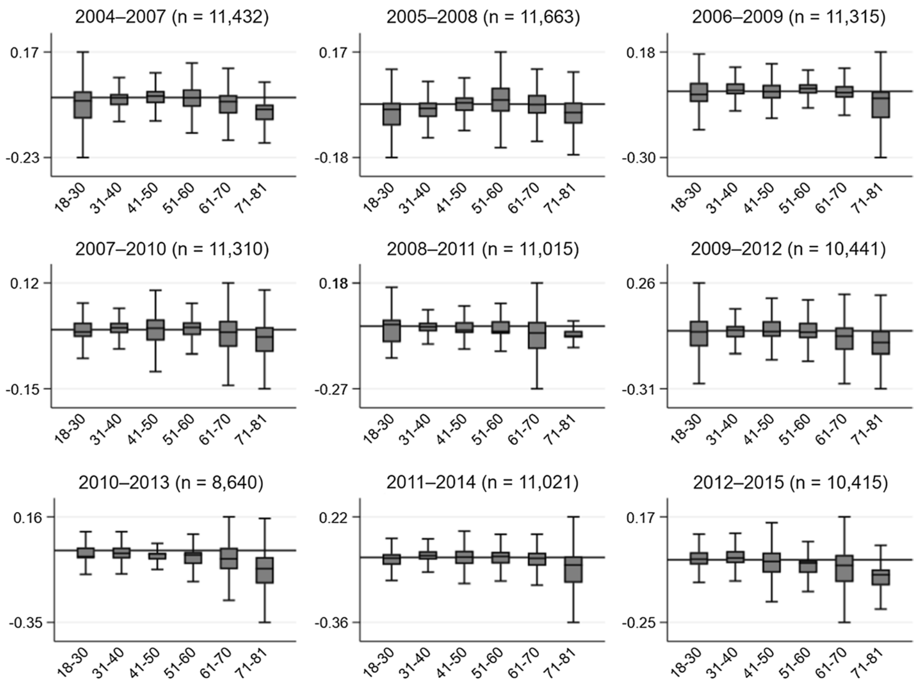

Fig. 4 Estimated individual growth rates (i.e., slopes) in self-rated health by cohorts and age groups based on results from latent growth models. Y-axis reference lines indicate zero. Standardized results are shown

In contrast with what reported by Abebe et al. (2016), SRH declined in Italy in the years preceding the 2008 crisis. This tendency was especially true among participants aged 40 and below or 71 and above and took place during a rather favourable period of economic stability characterized by a slow but steady decrease of the unemployment rate, also among youth (see Fig. 1). Subsequently, until 2012 SRH appeared very stable across age groups. It is noteworthy that between 2008 and 2011 SRH did not decline among any age group, and in general between 2006 and 2012 the only decline was observed among the elderly. SRH declining across the 4-year assessments among the oldest portions of each cohort (i.e., aged 71 to 81) and remaining more stable for participants aged 30 to 50 were indeed the most consistent results. The finding about a higher longitudinal stability of SRH from early adulthood throughout middle-life is aligned with previous research findings (Andersen et al. 2007; McCullough and Laurenceau 2004). Moreover, the fact that SRH tends to decline in older age is not only aligned with previous research findings (Cullati et al. 2014; Dening et al. 1998; Orfila et al. 2000; Sargent-Cox et al. 2010), but it specifically echoes the results of past research that adopted LGM to explore this issue (Cullati 2015; Piumatti 2017; Rohlfsen and Jacobs Kronenfeld 2014; Sacker et al. 2011). Nevertheless, we know that several factors can still impact SRH trajectories, yelding different outcomes across the life-span (Cullati et al. 2014; Pinquart 2001). Accordingly, heterogeneity in health changes in later life during times of economic crisis in contexts such as Italy should be further explored to evidence whether for specific portions of the elderly population positive SRH may be preserved across time if not even improved as some pointed out (Ferraro 1980; Idler 1993).

The clearer correspondence between economic downturns at the national level and declining trajectories of SRH is evident after 2011. In that year political and economic

Table 3 Comparisons of average longitudinal self-rated health between cohorts based on univariate analysis of variance with Bonferroni post hoc adjustments

Cohorts	M (SD)	2004–2007 Diff. (p)	2005–2008 Diff. (p)	2006–2009 Diff. (p)	2007–2010 Diff. (p)	2008–2011 Diff. (p)	2009–2012 Diff. (p)	2010–2013 Diff. (p)	2011–2014 Diff. (p)
2004–2007 (n = 11,432)	3.58 (0.76)								
2005–2008 (n = 11,663)	3.57 (0.76)	−0.01 (1.000)							
2006–2009 (n = 11,315)	3.60 (0.78)	0.02 (0.996)	0.03 (0.240)						
2007–2010 (n = 11,310)	3.62 (0.79)	0.04 (0.004)	0.05 (< 0.001)	0.02 (1.000)					
2008–2011 (n = 11,015)	3.63 (0.78)	0.05 (< 0.001)	0.05 (< 0.001)	0.03 (0.453)	0.01 (1.000)				
2009–2012 (n = 10,441)	3.64 (0.76)	0.06 (< 0.001)	0.07 (< 0.001)	0.04 (0.006)	0.02 (1.000)	0.01 (1.000)			
2010–2013 (n = 8640)	3.63 (0.77)	0.05 (< 0.001)	0.06 (< 0.001)	0.30 (0.211)	0.01 (1.000)	0.01 (1.000)	−0.01 (1.000)		
2011–2014 (n = 11,021)	3.67 (0.78)	0.09 (< 0.001)	0.09 (< 0.001)	0.06 (< 0.001)	0.05 (< 0.001)	0.04 (0.008)	0.02 (0.664)	0.03 (0.082)	
2012–2015 (n = 10,415)	3.63 (0.78)	0.05 (< 0.001)	0.06 (< 0.001)	0.03 (0.170)	0.01 (1.000)	0.01 (1.000)	−0.01 (1.000)	−0.01 (1.000)	−0.03 (0.037)

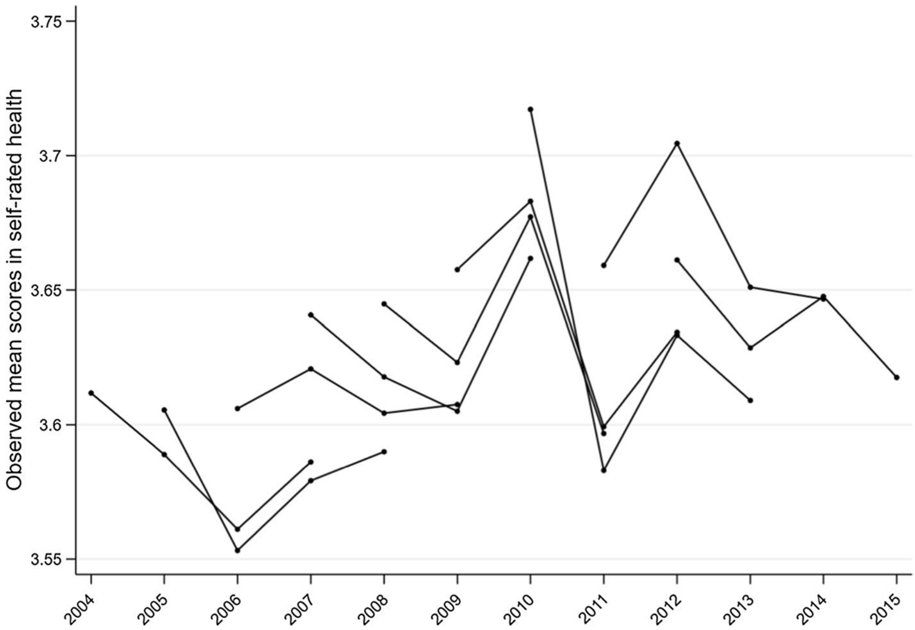

Fig. 5 Longitudinal observed mean scores in self-rated health by cohorts (N = 97,252)

turbulences in Italy reached their peak with the government forced to resign after failing to gain a full majority in the Chamber of Deputies during a budget vote. These events were following a period during which financial markets and international institutions such as the International Monetary Fund and the European Central Bank were warning Italy about its public debt. The next government introduced a consistent package of austerity measures and spending cuts including raising taxes and retirement age. National plans were made to cut funding for investments in healthcare infrastructures from over 1 billion to 236 million euros, for research funding in the public health care sector from 91.9 to 18.4 million, and for disease prevention and health promotion from 29.6 to 5.9 million (Mladovsky et al. 2012). Even resources for semi-automatic defibrillators in public places were expected to be reduced from 4 to 2 million euros (Mladovsky et al. 2012). Italian regions had to introduce co-payments for visits to public and private accredited specialists and hospital emergency departments deemed inappropriate so to compensate reductions in central funding: 10+ euros for visits to doctors and analysis and 25+ euros for interventions in emergency wards not justified by urgent situations (De Belvis et al. 2012; Mladovsky et al. 2012).

A 2011 survey clearly summarises how Italians perceived the situation at that time (Cercle Santé Sociale and Europ Assistance 2011): 12% compared to 57% in 2009 were willing to pay more taxes to receive better health service. Indeed, in 2011 Italians diminished their household expenditure for healthcare (Istat 2011). Moreover, 2011 data show negative trends regarding health-related behaviours in Italy, including a reduced consumption of fruits and vegetables and a lower frequency of physical activity (Costa et al. 2012). Concurrently, in certain areas of the country such as the North, rates of first admission for hearth attack increased substantially in 2011 as a possible consequence of the stress related to precarious economic conditions (Costa et al. 2012). Results from the current study are thus consistent with those from such previous surveys and evidence once more a link between austerity measures of a country and the health of its citizens (Brand et al. 2013; Habibov and Afandi 2015; Karanikolos et al. 2013; Skroumpelos et al. 2014).

Despite the abrupt decline in SRH observed in 2011, there seems to be a slight overall positive trend in Italians' SRH in the longer period. In fact, among participants from the cohort exhibiting worst SRH trends (i.e., 2010–2013), the estimated average initial level of SRH was the highest compared to the other cohorts, nevertheless they also declined on average more than any other cohort. This is due to the fact that post-crisis cohorts analysed here exhibited on average better health outcomes than pre-crisis ones. Reading from results of previous research (Burgard et al. 2013), we know that when examining the health consequences of recession at the aggregate level we are more likely to observe positive or stable health longitudinal trends. Evidences from previous economic crises have indeed pointed out that the number of individuals whose health is negatively affected by recessions is often exceeded by the portion of the population who reap benefits (Granados 2005; Riva et al. 2011). By contrast, this is happening when at the individual level we observe a slight decline in SRH. The explanation for this may be the higher mortality and non-responses rates among the participants with the poorest self-rated health (Andersen et al. 2007) and the compensatory mechanisms within individuals' social capital networks to face adverse events such as unemployment (Piumatti 2016; Piumatti et al. 2018b; Saltkjel et al. 2017). Previous studies have in fact reported that while at the overall country level we may observe stable or positive trends in SRH during time of crisis even in the most affected regions, contrasted trends in health outcomes may still take place across specific portions of the population (Clause-Verdreau et al. 2018; Lersch et al. 2018; Saltkjel et al. 2017).

Individual social capital nets may have been especially determinant for youngest participants to compensate or alleviate the negative effects of the crisis in Italy. Indeed, in Mediterranean countries such as Italy young people are more likely to reserve a strong interdependence with their families but not with the society at large (Tsekeris et al. 2015). National surveys show that the percentage of Italian young adults (aged 18 to 34) living with their parents has increased from 78.5% in 2008 to 84.1% in 2017 and it is currently the fourth highest in the European area (where the mean percentage is 66.7%) after Slovakia (84.2%), Macedonia (84.7%) and Croatia (87.8%) (Eurostat 2019). In the absence of social safety valves, Italian young adults continue to live with their parents until they reach a stable enough position in the job market and a certain degree of economic independence (Alfieri et al. 2015). The support Italian young adults receive within their own families plays thus an essential role for their well-being in conditions of economic instability (Paleari et al. 2002; Piumatti et al. 2016). On the other hand, the situation concerning elderly people in Italy is radically different, with a share of people aged 65 or older living alone close to 31% (Eurostat 2015). In a recent survey conducted by Istat in Italy, 25.9% of interviewed elderly people declared to not have a strong net of social support, while 18% perceived their social support nets as weak, and about 50% have an intermediate situation (Istat 2017). Despite the fact that elderly people living alone are more likely to receive weak social support and are often in fragile health conditions, they are nevertheless often involved in providing informal care or assistance to relatives and non-relatives, in Italy as in the rest of Europe (Istat 2017). Concurrently, due to the low level of public service provision for home-based elder care in Italy, many families have turned to migrant care workers to provide care to their frail older members (Di Rosa et al. 2012). In Italy, as in other European countries, this widespread phenomenon is posing additional financial challenges especially for households with elderly members suffering from multiple ambulatory care-sensitive chronic conditions (Williams 2012). Therefore, findings from the current study confirm once more the impellent need to develop adequate economic and social policies in response of economic turbulences in Italy so to support elderly people in the current and future scenarios of crisis.

4.1 Limitations and Implications for Future Research

This study was not without limitations. First, selection biases cannot be excluded since for the type of longitudinal analyses conducted here participants which were absent more than twice across each four-year assessment were excluded. Looking at the differences between selected and non-selected participants (see Table 4 in the Appendix), it is likely that these latter could have contributed to observe worse longitudinal trends in SRH. Accordingly, the decline in SRH especially in the worst performing age groups (i.e., aged 61 and above) could have been underestimated. Second, several other confounding factors other than age that are known to be related to health outcomes in times of crisis have not been treated here. This study was mainly focused on examining long-term SRH trends to assess how these have changed before and after the 2008 crisis across different age groups. However, future studies should look at other specific determinants of SRH to study how the economic crisis in Italy has exacerbated social disparities in health between advantaged and disadvantaged groups. At this regard, the same longitudinal model applied here may be extended with a focus on the most critical period for SRH observed here (i.e., 2010–2013) by further adding time fixed and time-varying covariates and evidence whether different trajectories may be observed for different groups according to specific socio-demographic factors: not only age but also gender, socio-economic and working status. On a related note, other more recent methodological approaches to deal with ordinal responses could also be adopted, such as mixture latent auto-regressive models (Bartolucci et al. 2014) or latent Markov and growth mixture models for ordinal individual responses (Pennoni and Romeo 2017), to replicate and corroborate the findings of the current study. Finally, although SRH is a robust predictor of a wide range of health-related outcomes (Nielsen 2016; Perruccio et al. 2012; Singh-Manoux et al. 2007; Tamayo-Fonseca et al. 2015), future studies may look at the extent to which changes in SRH reported during the most uncertain economic periods in Italy correspond to changes in true health (Lindeboom and van Doorslaer 2004; Schneider et al. 2012).

5 Conclusions

To the best of the author's knowledge, this is the first study to use data from an accelerated longitudinal design covering 11 years of economic instability in Italy to examine SRH trends in the normal adult population. The results discussed here contribute to understand how citizens' health levels may be affected by prolonged periods of economic uncertainty and austerity. In particular, this study underlined the importance of studying this phenomenon at the individual level since longitudinal stability at the aggregate level may mask consistent within-country differences across time such as different longitudinal trends in health outcomes between different age groups.

Acknowledgements This research has been conducted using the Istat resources under Application Number 02814/2018. The data reported in this article are available via application directly to Istat. The author wishes to thank Dr. Cecilia Morello for the support provided during the drafting of the article.

Appendix

See Fig. 6, Tables 4, 5, 6.

Cohorts	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
2004–2007	Baseline	Year 2	Year 3	Year 4								
2005–2008		Baseline	Year 2	Year 3	Year 4							
2006–2009			Baseline	Year 2	Year 3	Year 4						
2007–2010				Baseline	Year 2	Year 3	Year 4					
2008–2011					Baseline	Year 2	Year 3	Year 4				
2009–2012						Baseline	Year 2	Year 3	Year 4			
2010–2013							Baseline	Year 2	Year 3	Year 4		
2011–2014								Baseline	Year 2	Year 3	Year 4	
2012–2015									Baseline	Year 2	Year 3	Year 4

Fig. 6 Illustration of the adopted rotational design pattern. *Notes* At every baseline assessment, a cross-sectional representative sample of individuals aged 18 to 81 is selected. Participants are then requested to take part to three following yearly assessments. Any particular replication remains in the survey for 4 years

Table 4 Comparisons between selected and non-selected participants across demographics and baseline self-rated health. Values are percentages unless stated otherwise

Variables	Selected participants ($n = 97{,}252$)	Non-selected participants ($n = 18{,}885$)	p
Age M (SD)	49.40 (17.85)	49.72 (18.64)	0.025[a]
Gender			0.507[b]
Females	52.36	52.10	
Males	47.64	47.90	
Education			0.003[b]
Primary or lower	25.18	26.33	
Lower secondary	28.51	28.04	
Upper secondary	32.99	32.06	
Post-secondary or higher	13.31	13.57	
Marital status			< 0.001[b]
Never married	28.04	32.51	
Married	58.62	50.43	
Separated	2.13	2.90	
Widowed	9.17	11.56	
Divorced	2.04	2.61	
Chronic disease			< 0.001[b]
No	77.09	73.54	
Yes	22.91	26.46	
Limitation due to health problems			< 0.001[b]
No	75.94	72.19	
Yes	16.84	16.81	
Yes, strongly	7.21	11	
Self-rated health M (SD)	3.64 (0.89)	3.54 (0.98)	< 0.001[a]

[a]Probability results based on univariate analysis of variance

[b]Probability results based on Chi square test

Table 5 Descriptive statistics for self-rated health at each assessment year per cohort. Values are ranges and means (standard deviations)

Cohorts	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
2004–2007 (*n* = 11,432)	1–5 3.61 (0.88)	1–5 3.59 (0.87)	1–5 3.56 (0.88)	1–5 3.59 (0.87)								
2005–2008 (*n* = 11,663)		1–5 3.61 (0.89)	1–5 3.55 (0.88)	1–5 3.58 (0.86)	1–5 3.59 (0.86)							
2006–2009 (*n* = 11,315)			1–5 3.61 (0.89)	1–5 3.62 (0.89)	1–5 3.60 (0.89)	1–5 3.61 (0.88)						
2007–2010 (*n* = 11,310)				1–5 3.64 (0.90)	1–5 3.62(0.89)	1–5 3.61 (0.89)	1–5 3.66 (0.89)					
2008–2011 (*n* = 11,015)					1–5 3.64 (0.89)	1–5 3.62 (0.90)	1–5 3.68 (0.87)	1–5 3.60 (0.92)				
2009–2012 (*n* = 10,441)						1–5 3.66 (0.88)	1–5 3.68 (0.84)	1–5 3.60 (0.91)	1–5 3.63 (0.89)			
2010–2013 (*n* = 8640)							1–5 3.72 (0.87)	1–5 3.58 (0.93)	1–5 3.63 (0.91)	1–5 3.61 (0.91)		
2011–2014 (*n* = 11,021)								1–5 3.66 (0.90)	1–5 3.70 (0.91)	1–5 3.65 (0.91)	1–5 3.65 (0.90)	
2012–2015 (*n* = 10,415)									1–5 3.66 (0.91)	1–5 3.63 (0.89)	1–5 3.65 (0.90)	1–5 3.62 (0.92)

Self-rated health was measured with the following question: "How is your health in general?", coded 1 = very bad, 2 = bad, 3 = fair, 4 = good and 5 = very good

Table 6 Comparison of fitted latent growth models for self-rated health by cohorts and age groups. Standardized results are shown

Cohorts	Age groups	Model	χ^2	*df*	*p*	Intercept M (SE)	Slope M (SE)	CFI	TLI	RMSEA	$\Delta\chi^2$	Δdf	*p*(d)
2004–2007	18–30	No growth	106.37	8	< 0.001	9.83 (0.21)***		0.939	0.954	0.074			
	(*n* = 2218)	Linear growth	33.43	5	< 0.001	9.45 (0.30)***	− 0.23 (0.05)***	0.982	0.979	0.051	72.94	3	<0.001
		Nonlinear growth	**22.75**	**3**	**< 0.001**	**8.03 (0.94)*****	**− 0.15 (0.05)****	**0.988**	**0.976**	**0.054**	**10.68**	**2**	**< 0.01**
	31–40	No growth	83.27	8	<0.001	8.29 (0.17)***		0.958	0.969	0.067			
	(*n* = 2118)	Linear growth	38.41	5	<0.001	8.16 (0.26)***	− 0.07 (0.05)	0.982	0.978	0.056	44.86	3	<0.001
		Nonlinear growth	**10.19**	**3**	**0.017**	**8.61 (0.29)*****	**− 0.08 (0.04)***	**0.996**	**0.992**	**0.034**	**28.22**	**2**	**< 0.001**
	41–50	No growth	60.89	8	<0.001	7.23 (0.15)***		0.974	0.980	0.058			
	(*n* = 1969)	**Linear growth**	**36.37**	**5**	**< 0.001**	**6.94 (0.20)*****	**0.01 (0.05)**	**0.984**	**0.981**	**0.056**	**24.52**	**3**	**< 0.001**
	51–60	No growth	75.75	8	<0.001	6.14 (0.13)***		0.970	0.977	0.068			
	(*n* = 1849)	**Linear growth**	**34.32**	**5**	**< 0.001**	**5.99 (0.17)*****	**− 0.01 (0.05)**	**0.987**	**0.984**	**0.056**	**41.43**	**3**	**< 0.001**
	61–70	No growth	73.13	8	<0.001	5.35 (0.12)***		0.969	0.976	0.071			
	(*n* = 1602)	Linear growth	21.22	5	<0.001	5.52 (0.17)***	− 0.17 (.06)**	0.992	0.991	0.045	51.91	3	<0.001
		Nonlinear growth	**2.44**	**3**	**0.487**	**5.29 (0.25)*****	**− 0.16 (0.05)****	**1.000**	**1.001**	**0.000**	**18.78**	**2**	**< 0.001**
	71–81	No growth	113.40	8	<0.001	4.56 (0.10)***		0.946	0.959	0.089			
	(*n* = 1676)	**Linear growth**	**23.14**	**5**	**< 0.001**	**4.96 (0.16)*****	**− 0.44 (0.09)*****	**0.991**	**0.989**	**0.047**	**90.26**	**3**	**< 0.001**

Table 6 (continued)

Cohorts	Age groups	Model	χ^2	*df*	*p*	Intercept M (SE)	Slope M (SE)	CFI	TLI	RMSEA	$\Delta\chi^2$	Δdf	*p*(d)
2005–2008	18–30 ($n = 2157$)	No growth	117.30	8	<0.001	10.66 (0.25)***		0.913	0.935	0.080			
		Linear growth	33.48	5	<0.001	9.40 (0.31)***	−0.15 (0.04)***	0.977	0.973	0.051	83.82	3	<0.001
		Nonlinear growth	**19.26**	**3**	**<0.001**	**9.00 (0.58)*****	**−0.18 (0.04)****	**0.987**	**0.974**	**0.050**	**14.22**	**2**	**<0.001**
	31–40 ($n = 2127$)	No growth	62.76	8	<0.001	9.26 (0.21)***		0.961	0.970	0.057			
		Linear growth	**17.36**	**5**	**0.004**	**8.16(0.26)*****	**−0.14 (0.05)****	**0.991**	**0.989**	**0.034**	**45.40**	**3**	**<0.001**
	41–50 ($n = 2116$)	No growth	56.26	8	<0.001	6.91 (0.14)***		0.980	0.985	0.053			
		Linear growth	19.08	5	0.002	6.81(0.19)***	−0.03 (0.05)	0.994	0.993	0.036	37.18		<0.001
		Nonlinear growth	**12.34**	**3**	**0.006**	**6.64 (0.37)*****	**−0.01 (0.07)**	**0.996**	**0.992**	**0.038**	**6.74**	**2**	**<0.05**
	51–60 ($n = 1849$)	No growth	86.01	8	<0.001	6.10 (0.13)***		0.966	0.975	0.073			
		Linear growth	**10.28**	**5**	**0.068**	**5.62 (0.15)*****	**0.07 (0.04)**	**0.998**	**0.997**	**0.024**	**75.93**	**3**	**<0.001**
	61–70 ($n = 1628$)	No growth	59.07	8	<0.001	5.28 (0.12)***		0.974	0.981	0.063			
		Linear growth	**33.11**	**5**	**<0.001**	**5.27 (0.16)*****	**0.01 (0.06)**	**0.986**	**0.983**	**0.059**	**29.16**	**3**	**<0.001**
	71–81 ($n = 1786$)	No growth	76.11	8	<0.001	4.51 (0.10)***		0.964	0.973	0.069			
		Linear growth	**25.57**	**5**	**<0.001**	**4.56 (0.14)*****	**−0.21 (0.06)*****	**0.989**	**0.987**	**0.048**	**50.54**	**3**	**<0.001**

Table 6 (continued)

Cohorts	Age groups	Model	χ^2	*df*	*p*	Intercept M (SE)	Slope M (SE)	CFI	TLI	RMSEA	$\Delta\chi^2$	Δdf	*p*(d)
2006–2009	18–30 ($n=1993$)	No growth	112.75	8	<0.001	9.98 (0.23)***		0.929	0.947	0.081			
		Linear growth	**10.16**	**5**	**0.071**	**9.60 (0.33)*****	**−0.05 (0.04)**	**0.997**	**0.996**	**0.023**	**102.59**	**3**	**<0.001**
	31–40 ($n=2016$)	No growth	34.43	8	<0.001	8.04 (0.17)***		0.986	0.990	0.040			
		Linear growth	**5.62**	**5**	**0.345**	**7.40 (0.21)*****	**0.04 (0.05)**	**1.000**	**1.000**	**0.008**	**28.81**	**3**	**<0.001**
	41–50 ($n=2054$)	No growth	99.63	8	<0.001	7.40 (0.15)***		0.961	0.971	0.075			
		Linear growth	**18.38**	**5**	**0.003**	**6.58 (0.17)*****	**−0.02 (0.04)**	**0.994**	**0.993**	**0.036**	**81.25**	**3**	**<0.001**
	51–60 ($n=1821$)	No growth	71.79	8	<0.001	6.20 (0.13)***		0.971	0.979	0.066			
		Linear growth	**45.17**	**5**	**<0.001**	**6.14 (0.18)*****	**0.06 (0.05)**	**0.982**	**0.978**	**0.066**	**26.62**	**3**	**<0.001**
	61–70 ($n=1631$)	No growth	51.48	8	<0.001	5.19 (0.11)***		0.981	0.985	0.058			
		Linear growth	**19.16**	**5**	**0.002**	**5.06 (0.14)*****	**−0.04 (0.05)**	**0.994**	**0.992**	**0.042**	**32.32**	**3**	**<0.001**
	71–81 ($n=1800$)	No growth	108.90	8	<0.001	4.35 (0.10)***		0.949	0.962	0.084			
		Linear growth	**7.91**	**5**	**0.162**	**4.12 (0.12)*****	**−0.22 (0.04)*****	**0.999**	**0.998**	**0.018**	**100.99**	**3**	**<0.001**

Table 6 (continued)

Cohorts	Age groups	Model	χ^2	*df*	*p*	Intercept M (SE)	Slope M (SE)	CFI	TLI	RMSEA	$\Delta\chi^2$	Δdf	*p*(d)
2007–2010	18–30 (*n* = 2011)	No growth	51.72	8	<0.001	9.88 (0.21)***		0.974	0.981	0.052			
		Linear growth	**19.21**	**5**	**0.002**	**9.51 (0.30)*****	**−0.01 (0.05)**	**0.992**	**0.990**	**0.038**	**32.51**	**3**	**< 0.001**
	31–40 (*n* = 1976)	No growth	54.74	8	< 0.001	8.12 (0.17)***		0.979	0.984	0.054			
		Linear growth	**23.98**	**5**	**< 0.001**	**7.65 (0.21)*****	**0.06 (0.05)**	**0.991**	**0.990**	**0.044**	**30.76**	**3**	**< 0.001**
	41–50 (*n* = 2072)	No growth	81.17	8	< 0.001	7.33 (0.14)***		0.971	0.978	0.066			
		Linear growth	**38.49**	**5**	**< 0.001**	**7.36 (0.20)*****	**−0.02 (0.05)**	**0.987**	**0.984**	**0.057**	**42.68**	**3**	**< 0.001**
	51–60 (*n* = 1815)	No growth	22.35	8	0.004	5.93 (0.12)***		0.994	0.996	0.031			
		Linear growth	**8.14**	**5**	**0.149**	**5.78 (0.17)*****	**0.03 (0.06)**	**0.999**	**0.998**	**0.019**	**14.21**	**3**	**< 0.01**
	61–70 (*n* = 1635)	No growth	71.88	8	< 0.001	5.27 (0.12)***		0.969	0.977	0.070			
		Linear growth	**25.65**	**5**	**< 0.001**	**4.87 (0.14)*****	**−0.06 (0.05)**	**0.990**	**0.988**	**0.050**	**46.23**	**3**	**< 0.001**
	71–81 (*n* = 1801)	No growth	58.92	8	< 0.001	4.12 (0.09)***		0.978	0.983	0.059			
		Linear growth	**15.62**	**5**	**0.008**	**4.07 (0.12)*****	**−0.16 (0.05)****	**0.995**	**0.994**	**0.034**	**43.30**	**3**	**< 0.001**

Table 6 (continued)

Cohorts	Age groups	Model	χ^2	*df*	*p*	Intercept M (SE)	Slope M (SE)	CFI	TLI	RMSEA	$\Delta\chi^2$	Δdf	*p*(d)
2008–2011	18–30 ($n=1922$)	No growth	226.47	8	<0.001	10.22 (0.25)***		0.817	0.863	0.119			
		Linear growth	**61.92**	**5**	**<0.001**	**7.70 (0.21)*****	**−0.07 (0.05)**	**0.952**	**0.943**	**0.077**	**164.55**	**3**	**<0.001**
	31–40 ($n=1941$)	No growth	129.15	8	<0.001	8.73 (0.19)***		0.922	0.941	0.088			
		Linear growth	52.36	5	<0.001	7.28 (0.19)***	−0.02 (0.06)	0.969	0.963	0.070	52.36	3	<0.001
		Nonlinear growth	**4.33**	**3**	**<0.001**	**8.53 (0.29)*****	**−0.04 (0.05)**	**0.999**	**0.998**	**0.015**	**48.03**	**2**	**<0.001**
	41–50 ($n=2135$)	No growth	98.02	8	<0.001	7.23 (0.14)***		0.958	0.969	0.073			
		Linear growth	61.90	5	<0.001	6.53 (0.11)***	0.11 (0.10)	0.974	0.968	0.073	36.12	3	<0.001
		Nonlinear growth	**21.44**	**3**	**<0.001**	**7.23 (0.19)*****	**−0.09 (0.07)**	**0.991**	**0.983**	**0.054**	**40.46**	**2**	**<0.001**
	51–60 ($n=1704$)	No growth	87.13	8	<0.001	6.24 (0.14)***		0.957	0.968	0.076			
		Linear growth	60.13	5	<0.001	5.69 (0.16)***	0.10 (0.14)	0.970	0.964	0.080	60.13	3	<0.001
		Nonlinear growth	**15.24**	**3**	**0.002**	**6.38 (0.19)*****	**−0.15 (0.09)**	**0.993**	**0.987**	**0.049**	**44.89**	**2**	**<0.001**
	61–70 ($n=1529$)	No growth	81.02	8	<0.001	5.10 (0.12)***		0.962	0.971	0.077			
		Linear growth	58.31	5	<0.001	4.95 (0.14)***	−0.38 (0.15)*	0.972	0.966	0.084	22.71	3	<0.001
		Nonlinear growth	**30.21**	**3**	**<0.001**	**5.00 (0.12)*****	**−0.19 (0.23)**	**0.986**	**0.971**	**0.077**	**28.10**	**2**	**<0.001**
	71–81 ($n=1784$)	No growth	104.41	8	<0.001	4.30 (0.09)***		0.951	0.963	0.082			
		Linear growth	**74.70**	**5**	**<0.001**	**4.16 (0.12)*****	**−0.71 (0.73)**	**0.964**	**0.957**	**0.088**	**29.71**	**3**	**<0.001**

Table 6 (continued)

Cohorts	Age groups	Model	χ^2	*df*	*p*	Intercept M (SE)	Slope M (SE)	CFI	TLI	RMSEA	$\Delta\chi^2$	Δdf	*p*(d)
2009–2012	18–30 (*n* = 1838)	No growth	189.97	8	< 0.001	11.44 (0.33)***		0.774	0.831	0.111			
		Linear growth	29.20	5	< 0.001	8.41 (0.26)***	− 0.07 (0.03)	0.970	0.964	0.051	160.77	3	<0.001
		Nonlinear growth	**3.28**	**3**	**0.351**	**9.44 (0.37)*****	**− 0.06 (0.04)**	**1.000**	**0.999**	**0.007**	**25.92**	**2**	**< 0.001**
	31–40 (*n* = 1748)	No growth	121.23	8	< 0.001	10.35 (0.29)***		0.859	0.894	0.090			
		Linear growth	**30.24**	**5**	**< 0.001**	**8.00 (0.26)*****	**0.04 (0.04)**	**0.969**	**0.962**	**0.054**	**90.99**	**3**	**< 0.001**
	41–50 (*n* = 1987)	No growth	212.03	8	< 0.001	8.39 (0.20)***		0.853	0.889	0.113			
		Linear growth	**66.07**	**5**	**< 0.001**	**6.56 (0.17)*****	**0.01 (0.03)**	**0.956**	**0.947**	**0.078**	**145.96**	**3**	**< 0.001**
	51–60 (*n* = 1654)	No growth	135.27	8	< 0.001	6.38 (0.15)***		0.925	0.944	0.098			
		Linear growth	**42.64**	**5**	**< 0.001**	**5.56 (0.15)*****	**− 0.03 (0.04)**	**0.978**	**0.973**	**0.067**	**92.63**	**3**	**< 0.001**
	61–70 (*n* = 1540)	No growth	144.91	8	< 0.001	5.23 (0.12)***		0.919	0.939	0.105			
		Linear growth	**51.75**	**5**	**< 0.001**	**4.72 (0.13)*****	**− 0.19 (0.05)*****	**0.972**	**0.967**	**0.078**	**93.16**	**3**	**< 0.001**
	71–81 (*n* = 1674)	No growth	179.89	8	< 0.001	4.54 (0.11)***		0.877	0.908	0.113			
		Linear growth	57.28	5	< 0.001	4.04 (0.12)***	− 0.23 (0.05)***	0.963	0.955	0.079	122.61	3	<0.001
		Nonlinear growth	**4.35**	**3**	**0.226**	**4.37 (0.11)*****	**− 0.32 (0.05)*****	**0.999**	**0.998**	**0.016**	**52.93**	**2**	**< 0.001**

Table 6 (continued)

Cohorts	Age groups	Model	χ^2	*df*	*p*	Intercept M (SE)	Slope M (SE)	CFI	TLI	RMSEA	$\Delta\chi^2$	Δdf	*p*(d)
2010–2013	18–30 ($n=1427$)	No growth	78.07	8	< 0.001	12.87 (0.46)***		0.840	0.880	0.078			
		Linear growth	**46.92**	**5**	**< 0.001**	**14.13 (1.20)*****	**−0.18 (0.08)***	**0.904**	**0.885**	**0.077**	**31.15**	**3**	**< 0.001**
	31–40 ($n=1407$)	No growth	149.00	8	< 0.001	11.35 (0.40)***		0.729	0.797	0.112			
		Linear growth	69.81	5	< 0.001	13.98 (1.36)***	−0.04 (0.06)	0.876	0.851	0.096	79.19	3	<0.001
		Nonlinear growth	**28.85**	**3**	**< 0.001**	**14.65 (3.48)*****	**−0.13 (0.07)**	**0.950**	**0.901**	**0.078**	**40.96**	**2**	**< 0.001**
	41–50 ($n=1646$)	No growth	93.43	8	< 0.001	7.86 (0.20)***		0.927	0.945	0.081			
		Linear growth	**52.47**	**5**	**< 0.001**	**8.53 (0.39)*****	**−0.27 (0.09)****	**0.959**	**0.951**	**0.076**	**40.96**	**3**	**< 0.001**
	51–60 ($n=1446$)	No growth	101.48	8	< 0.001	6.67 (0.17)***		0.920	0.940	0.090			
		Linear growth	**60.17**	**5**	**< 0.001**	**6.99 (0.29)*****	**−0.27 (0.07)*****	**0.953**	**0.944**	**0.087**	**41.31**	**3**	**< 0.001**
	61–70 ($n=1290$)	No growth	112.34	8	< 0.001	5.46 (0.15)***		0.912	0.934	0.101			
		Linear growth	**53.36**	**5**	**< 0.001**	**5.77 (0.24)*****	**−0.24 (0.06)*****	**0.959**	**0.951**	**0.087**	**58.98**	**3**	**< 0.001**
	71–81 ($n=1424$)	No growth	210.28	8	< 0.001	4.43 (0.12)***		0.831	0.874	0.133			
		Linear growth	**31.98**	**5**	**< 0.001**	**4.97 (0.21)*****	**−0.50 (0.07)*****	**0.978**	**0.973**	**0.062**	**178.30**	**3**	**< 0.001**

Table 6 (continued)

Cohorts	Age groups	Model	χ^2	*df*	*p*	Intercept M (SE)	Slope M (SE)	CFI	TLI	RMSEA	$\Delta\chi^2$	Δdf	*p*(d)
2011–2014	18–30 ($n = 1812$)	No growth	57.57	8	< 0.001	11.05 (0.27)***		0.954	0.965	0.058			
		Linear growth	18.89	5	< 0.001	9.77 (0.34)***	− 0.01 (0.05)	0.987	0.984	0.039	38.68	3	<0.001
		Nonlinear growth	**9.53**	**3**	**0.023**	**10.40 (0.31)*****	**− 0.01 (0.03)**	**0.994**	**0.988**	**0.035**	**9.36**	**2**	**< 0.01**
	31–40 ($n = 1684$)	No growth	103.69	8	< 0.001	9.65 (0.25)***		0.908	0.931	0.084			
		Linear growth	**56.64**	**5**	**< 0.001**	**8.11 (0.28)*****	**0.09 (0.05)**	**0.950**	**0.940**	**0.078**	**47.05**	**3**	**< 0.001**
	41–50 ($n = 2183$)	No growth	146.79	8	< 0.001	7.71 (0.16)***		0.924	0.943	0.089			
		Linear growth	**45.26**	**5**	**< 0.001**	**6.98 (0.19)*****	**− 0.02 (0.04)**	**0.978**	**0.973**	**0.061**	**101.53**	**3**	**< 0.001**
	51–60 ($n = 1832$)	No growth	84.49	8	< 0.001	6.39 (0.14)***		0.957	0.967	0.072			
		Linear growth	**37.45**	**5**	**< 0.001**	**6.00 (0.18)*****	**− 0.02 (0.04)**	**0.982**	**0.978**	**0.060**	**47.05**	**3**	**< 0.001**
	61–70 ($n = 1725$)	No growth	65.40	8	< 0.001	5.23 (0.12)***		0.971	0.978	0.064			
		Linear growth	**26.68**	**5**	**< 0.001**	**4.93 (0.14)*****	**− 0.05 (0.05)**	**0.989**	**0.987**	**0.050**	**38.72**	**3**	**< 0.001**
	71–81 ($n = 1785$)	No growth	134.28	8	< 0.001	4.17 (0.10)***		0.928	0.946	0.094			
		Linear growth	**20.96**	**5**	**< 0.001**	**3.92 (0.11)*****	**− 0.24 (0.04)*****	**0.991**	**0.989**	**0.042**	**113.32**	**3**	**< 0.001**

Table 6 (continued)

Cohorts	Age groups	Model	χ^2	*df*	*p*	Intercept M (SE)	Slope M (SE)	CFI	TLI	RMSEA	$\Delta\chi^2$	Δdf	*p*(d)
2012–2015	18–30 (n = 1611)	No growth	128.49	8	< 0.001	9.20 (0.22)***		0.915	0.937	0.097			
		Linear growth	**14.44**	**5**	**0.013**	**8.04 (0.24)*****	**0.08 (0.04)***	**0.993**	**0.992**	**0.034**	**114.05**	**3**	**< 0.001**
	31–40 (n = 1602)	No growth	85.99	8	< 0.001	8.30 (0.20)***		0.940	0.955	0.078			
		Linear growth	35.59	5	< 0.001	7.77 (0.28)***	0.03 (0.05)	0.976	0.972	0.062	50.40	3	<0.001
		Nonlinear growth	**15.69**	**3**	**0.001**	**6.95 (0.93)*****	**0.09 (0.05)**	**0.990**	**0.980**	**0.051**	**19.90**	**2**	**< 0.001**
	41–50 (n = 2029)	No growth	156.99	8	< 0.001	7.57 (0.16)***		0.915	0.936	0.096			
		Linear growth	**32.53**	**5**	**< 0.001**	**6.39 (0.17)*****	**−0.05 (0.03)**	**0.984**	**0.981**	**0.052**	**124.46**	**3**	**< 0.001**
	51–60 (n = 1768)	No growth	59.63	8	< 0.001	6.72 (0.15)***		0.966	0.974	0.060			
		Linear growth	**30.98**	**5**	**< 0.001**	**6.68 (0.24)*****	**−0.19 (0.06)****	**0.983**	**0.979**	**0.054**	**28.65**	**3**	**< 0.001**
	61–70 (n = 1621)	No growth	78.53	8	< 0.001	5.38 (0.13)***		0.956	0.967	0.074			
		Linear growth	**24.89**	**5**	**< 0.001**	**4.87 (0.14)*****	**−0.14 (0.05)****	**0.988**	**0.985**	**0.050**	**53.64**	**3**	**< 0.001**
	71–81 (n = 1784)	No growth	114.48	8	< 0.001	4.30 (0.10)***		0.938	0.954	0.086			
		Linear growth	**40.62**	**5**	**< 0.001**	**4.27 (0.13)*****	**−0.46 (0.09)*****	**0.979**	**0.975**	**0.063**	**73.86**	**3**	**< 0.001**

Standard errors were obtained based on the observed information matrix. Results are shown till the best fitting solution (reported in bold) for each group

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

References

Abebe, D. S., Tøge, A. G., & Dahl, E. (2016). Individual-level changes in self-rated health before and during the economic crisis in Europe. *International Journal for Equity in Health, 15,* 1.

Aguilar-Palacio, I., Carrera-Lasfuentes, P., & Rabanaque, M. J. (2015). Youth unemployment and economic recession in Spain: Influence on health and lifestyles in young people (16–24 years old). *International Journal of Public Health, 60*(4), 427–435.

Alfieri, S., Sironi, E., Marta, E., Rosina, A., & Marzana, D. (2015). Young Italian NEETs (Not in Employment, Education, or Training) and the influence of their family background. *Europe's Journal of Psychology, 11*(2), 311–322.

Altman, C. E., Van Hook, J., & Hillemeier, M. (2016). What does self-rated health mean? Changes and variations in the association of obesity with objective and subjective components of self-rated health. *Journal of Health and Social Behavior, 57*(1), 39–58.

Álvarez-Gálvez, J., Rodero-Cosano, M. L., Salinas-Pérez, J. A., & Gómez-Baya, D. (2018). Exploring the complex associations among social determinants of health in Andalusia after the 2008 financial crisis. *Social Indicators Research, 141*(2), 873–893.

Andersen, F. K., Christensen, K., & Frederiksen, H. (2007). Self-rated health and age: a cross-sectional and longitudinal study of 11,000 Danes aged 45–102. *Scandinavian Journal of Public Health, 35*(2), 164–171.

Banca d'Italia. (2018). *Indagine sui bilanci delle famiglie italiane*. Retrieved September 20, 2018, from http://www.bancaditalia.it/pubblicazioni/indagine-famiglie/bil-fam2016/Statistiche_IBF_20180312.pdf.

Bartoll, X., Toffolutti, V., Malmusi, D., Palència, L., Borrell, C., & Suhrcke, M. (2015). Health and health behaviours before and during the Great Recession, overall and by socioeconomic status, using data from four repeated cross-sectional health surveys in Spain (2001–2012). *BMC Public Health, 15*(1), 865.

Bartolucci, F., Bacci, S., & Pennoni, F. (2014). Longitudinal analysis of self-reported health status by mixture latent auto-regressive models. *Journal of the Royal Statistical Society: Series C (Applied Statistics), 63*(2), 267–288.

Baumbach, A., & Gulis, G. (2014). Impact of financial crisis on selected health outcomes in Europe. *The European Journal of Public Health, 24*(3), 399–403.

Benmarhnia, T., Zunzunegui, M.-V., Llácer, A., & Béland, F. (2014). Impact of the economic crisis on the health of older persons in Spain: Research clues based on an analysis of mortality. SESPAS report 2014. *Gaceta Sanitaria, 28,* 137–141.

Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin, 107*(2), 238.

Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin, 88*(3), 588.

Bollen, K. A., & Curran, P. J. (2006). *Latent curve models: A structural equation perspective*. New York: Wiley.

Bonaccio, M., Di Castelnuovo, A., Bonanni, A., Costanzo, S., De Lucia, F., Persichillo, M., et al. (2014). Decline of the Mediterranean diet at a time of economic crisis. Results from the Moli-sani study. *Nutrition, Metabolism and Cardiovascular Diseases, 24*(8), 853–860.

Branas, C. C., Kastanaki, A. E., Michalodimitrakis, M., Tzougas, J., Kranioti, E. F., Theodorakis, P. N., et al. (2015). The impact of economic austerity and prosperity events on suicide in Greece: a 30-year interrupted time-series analysis. *British Medical Journal Open, 5,* e005619.

Brand, H., Rosenkötter, N., Clemens, T., & Michelsen, K. (2013). Austerity policies in Europe—Bad for health: Health protection within the EU mandate is more relevant than ever. *BMJ, 346*(7941), 7.

Brinkman, H. J., De Pee, S., Sanogo, I., Subran, L., & Bloem, M. W. (2009). High food prices and the global financial crisis have reduced access to nutritious food and worsened nutritional status and health. *The Journal of Nutrition, 140*(1), 153S–161S.

Burgard, S. A., Ailshire, J. A., & Kalousova, L. (2013). The Great Recession and health: People, populations, and disparities. *The Annals of the American Academy of Political and Social Science, 650*(1), 194–213.

Cercle Santé Sociale and Europ Assistance. (2011). *Healthcare in Europe and the United States. Results from the 2011 study and developments observed since 2006—Summary note*. Retrieved July 18, 2018, from http://www.europ-assistance.com/sites/default/files/ea_cham2011_synthesis_en.pdf.

Cesari, M., Onder, G., Zamboni, V., Manini, T., Shorr, R. I., Russo, A., et al. (2008). Physical function and self-rated health status as predictors of mortality: results from longitudinal analysis in the ilSIRENTE study. *BMC Geriatrics, 8*(1), 34.

Clause-Verdreau, A.-C., Audureau, É., Leplège, A., & Coste, J. (2018). Contrasted trends in health-related quality of life across gender, age categories and work status in France, 1995–2016: Repeated population-based cross-sectional surveys using the SF-36. *Journal of Epidemiology and Community Health*. https://doi.org/10.1136/jech-2018-210941.

Costa, G., Marra, M., & Salmaso, S. (2012). Health indicators in the time of crisis in Italy. *Epidemiologia e Prevenzione, 36*(6), 337–366.

Cullati, S. (2015). Socioeconomic inequalities in health trajectories in Switzerland: Are trajectories diverging as people age? *Sociology of Health & Illness, 37*(5), 745–764.

Cullati, S., Rousseaux, E., Gabadinho, A., Courvoisier, D. S., & Burton-Jeangros, C. (2014). Factors of change and cumulative factors in self-rated health trajectories: A systematic review. *Advances in Life Course Research, 19,* 14–27.

Curran, P. J. (2003). Have multilevel models been structural equation models all along? *Multivariate Behavioral Research, 38*(4), 529–569.

Curran, P. J., Obeidat, K., & Losardo, D. (2010). Twelve frequently asked questions about growth curve modeling. *Journal of Cognition and Development, 11*(2), 121–136.

De Belvis, A. G., Ferrè, F., Specchia, M. L., Valerio, L., Fattore, G., & Ricciardi, W. (2012). The financial crisis in Italy: implications for the healthcare sector. *Health Policy, 106*(1), 10–16.

De Vogli, R., Marmot, M., & Stuckler, D. (2012). Excess suicides and attempted suicides in Italy attributable to the great recession. *Journal of Epidemiology and Community Health*. https://doi.org/10.1136/jech-2012-201607.

De Vogli, R., Vieno, A., & Lenzi, M. (2013). Mortality due to mental and behavioral disorders associated with the Great Recession (2008–10) in Italy: A time trend analysis. *The European Journal of Public Health, 24*(3), 419–421.

Dempster, A. P., Laird, N. M., & Rubin, D. B. (1977). Maximum likelihood from incomplete data via the EM algorithm. *Journal of the Royal Statistical Society: Series B (Methodological), 39*(1), 1–22.

Dening, T. R., Chi, L.-Y., Brayne, C., Huppert, F. A., Paykel, E. S., & O'Connor, D. W. (1998). Changes in self-rated health, disability and contact with services in a very elderly cohort: A 6-year follow-up study. *Age and Ageing, 27*(1), 23–33.

DeSalvo, K. B., Bloser, N., Reynolds, K., He, J., & Muntner, P. (2006). Mortality prediction with a single general self-rated health question. *Journal of General Internal Medicine, 21*(3), 267–275.

Di Rosa, M., Melchiorre, M. G., Lucchetti, M., & Lamura, G. (2012). The impact of migrant work in the elder care sector: Recent trends and empirical evidence in Italy. *European Journal of Social Work, 15*(1), 9–27.

Dominick, K. L., Ahern, F. M., Gold, C. H., & Heller, D. A. (2002). Relationship of health-related quality of life to health care utilization and mortality among older adults. *Aging Clinical and Experimental Research, 14*(6), 499–508.

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

Duncan, T. E., & Duncan, S. C. (2004). An introduction to latent growth curve modeling. *Behavior Therapy, 35*(2), 333–363.

Duncan, T. E., & Duncan, S. C. (2009). The ABC's of LGM: An introductory guide to latent variable growth curve modeling. *Social and Personality Psychology Compass, 3*(6), 979–991.

Duncan, S. C., Duncan, T. E., & Strycker, L. A. (2006). Alcohol use from ages 9 to 16: A cohort-sequential latent growth model. *Drug and Alcohol Dependence, 81*(1), 71–81.

Eurostat. (2015). *People in the EU: Who are we and how do we live?*. Luxembourg: Publications Office of the European Union.

Eurostat. (2018a). *Income poverty statistics*. Retrieved December 15, 2018, from https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Income_poverty_statistics.

Eurostat. (2018b). *European Union statistics on income and living conditions (EU-SILC)*. Retrieved December 15, 2018, from https://ec.europa.eu/eurostat/web/microdata/european-union-statistics-on-income-and-living-conditions.

Eurostat. (2019). *Share of young adults aged 18–34 living with their parents by age and sex—EU-SILC survey*. Retrieved April 15, 2019, from http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do.

Fayers, P. M., & Sprangers, M. A. (2002). Understanding self-rated health. *The Lancet, 359*(9302), 187–188.

Feinglass, J., Lin, S., Thompson, J., Sudano, J., Dunlop, D., Song, J., et al. (2007). Baseline health, socioeconomic status, and 10-year mortality among older middle-aged Americans: Findings from the Health and Retirement Study, 1992–2002. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 62*(4), S209–S217.

Ferrarini, T., Nelson, K., & Sjöberg, O. (2014). Unemployment insurance and deteriorating self-rated health in 23 European countries. *Journal of Epidemiology and Community Health*. https://doi.org/10.1136/jech-2013-203721.
Ferraro, K. F. (1980). Self-ratings of health among the old and the old-old. *Journal of Health and Social Behavior, 21*(4), 377–383.
Freni Ricerche Sociali e di Marketing. (2011). *Comportamenti in materia di spese sanitarie davanti alla crisi economica*. Florence.
Gallus, S., Ghislandi, S., & Muttarak, R. (2015). Effects of the economic crisis on smoking prevalence and number of smokers in the USA. *Tobacco Control, 24*(1), 82–88.
Granados, J. A. T. (2005). Increasing mortality during the expansions of the US economy, 1900–1996. *International Journal of Epidemiology, 34*(6), 1194–1202.
Grimm, K. J., Ram, N., & Hamagami, F. (2011). Nonlinear growth curves in developmental research. *Child Development, 82*(5), 1357–1371.
Habibov, N., & Afandi, E. (2015). Pre-and post-crisis life-satisfaction and social trust in transitional countries: An initial assessment. *Social Indicators Research, 121*(2), 503–524.
Hancock, G. R., & Lawrence, F. R. (2006). Using latent growth models to evaluate longitudinal change. In G. R. Hancock & R. O. Mueller (Eds.), *Structural equation modeling: A second course* (pp. 171–196). Greenwood, CT: Information Age.
Hessel, P., Vandoros, S., & Avendano, M. (2014). The differential impact of the financial crisis on health in Ireland and Greece: A quasi-experimental approach. *Public Health, 128*(10), 911–919.
Huijts, T., Reeves, A., McKee, M., & Stuckler, D. (2015). The impacts of job loss and job recovery on self-rated health: testing the mediating role of financial strain and income. *The European Journal of Public Health, 25*(5), 801–806.
Hurd, M., & Rohwedder, S. (2012). Effects of the economic crisis on the older population: How expectations, consumption, bequests, and retirement responded to market shocks. *Reshaping Retirement Security: Lessons from the Global Financial Crisis* (pp. 64–80).
Idler, E. L. (1993). Age differences in self-assessments of health: Age changes, cohort differences or survivorship? *Journal of Gerontology, 48*(6), S289–S300.
Istat. (2011). *Household consumption*. Retrieved August 12, 2018, from http://www.istat.it/en/archive/32560.
Istat. (2017). *Elderly people: Health conditions in Italy and in the European Union*. Retrieved August 12, 2018, from https://www.istat.it/it/files//2017/09/Elderly_Health-conditions_2015.pdf.
Istat. (2018a). *Indagine sulle condizioni di vita (UDB IT - SILC) componente longitudinale*. Retrieved March 25, 2019, from https://www.istat.it/it/archivio/5663.
Istat. (2018b). *Livelli di istruzione della popolazione e ritorni occupazionali: i principali indicatori*. Retrieved March 25, 2019, from https://www.istat.it/it/archivio/219264.
Istat. (2018c). *Popolazione residente per stato civile*. Retrieved March 25, 2019, https://www.istat.it/it/files//2018/09/Report_popolazione_residente_e_stato_civile.pdf.
Jain, A. K., & Hausman, R. E. (2006). Stratified multistage sampling. In *Encyclopedia of Statistical Sciences*. Hoboken: Wiley.
Jylhä, M. (2009). What is self-rated health and why does it predict mortality? Towards a unified conceptual model. *Social Science and Medicine, 69*(3), 307–316.
Karanikolos, M., Mladovsky, P., Cylus, J., Thomson, S., Basu, S., Stuckler, D., et al. (2013). Financial crisis, austerity, and health in Europe. *The Lancet, 381*(9874), 1323–1331.
Kawachi, I., & Berkman, L. (2000). Social cohesion, social capital, and health. *Social Epidemiology, 174*(7), 190.
Kennedy, B. S., Kasl, S. V., & Vaccarino, V. (2001). Repeated hospitalizations and self-rated health among the elderly: A multivariate failure time analysis. *American Journal of Epidemiology, 153*(3), 232–241.
Kenny, D. A., Kaniskan, B., & McCoach, D. B. (2015). The performance of RMSEA in models with small degrees of freedom. *Sociological Methods & Research, 44*(3), 486–507.
Kline, R. B. (2015). *Principles and practice of structural equation modeling*. New York: Guilford Publications.
Lersch, P. M., Jacob, M., & Hank, K. (2018). Long-term health consequences of adverse labor market conditions at time of leaving education: Evidence from West German panel data. *Journal of Health and Social Behavior, 59*(1), 151–168.
Lindeboom, M., & Van Doorslaer, E. (2004). Cut-point shift and index shift in self-reported health. *Journal of Health Economics, 23*(6), 1083–1099.
Little, R. J., & Rubin, D. B. (1989). The analysis of social science data with missing values. *Sociological Methods & Research, 18*(2–3), 292–326.

Lohr, S. L. (2008). Coverage and sampling. In D. A. Dillman & J. J. Leeuw (Eds.), *International handbook of survey methods* (pp. 97–102). New York: Lawrence Erlbaum Associates.
Lopez Bernal, J. A., Gasparrini, A., Artundo, C. M., & McKee, M. (2013). The effect of the late 2000s financial crisis on suicides in Spain: An interrupted time-series analysis. *The European Journal of Public Health, 23*(5), 732–736.
Mangano, A. (2010). An analysis of the regional differences in health care utilization in Italy. *Health & Place, 16*(2), 301–308.
Mansyur, C., Amick, B. C., Harrist, R. B., & Franzini, L. (2008). Social capital, income inequality, and self-rated health in 45 countries. *Social Science and Medicine, 66*(1), 43–56.
Marmot, M. (2002). The influence of income on health: Views of an epidemiologist. *Health Affairs, 21*(2), 31–46.
Mattei, G., Ferrari, S., Pingani, L., & Rigatelli, M. (2014). Short-term effects of the 2008 Great Recession on the health of the Italian population: An ecological study. *Social Psychiatry and Psychiatric Epidemiology, 49*(6), 851–858.
McArdle, J. J., & Nesselroade, J. R. (2003). Growth curve analysis in contemporary psychological research. In J. A. Schinka & W. F. Velicer (Eds.), *Handbook of psychology: Research methods in psychology* (pp. 447–480). New York, NY: Wiley.
McCullough, M. E., & Laurenceau, J. P. (2004). Gender and the natural history of self-rated health: A 59-year longitudinal study. *Health Psychology, 23*(6), 651.
McKeeargue, M. (2010). Budget crises, health, and social welfare programmes. *BMJ, 341,* 77.
McNeish, D., & Matta, T. (2018). Differentiating between mixed-effects and latent-curve approaches to growth modeling. *Behavior Research Methods, 50*(4), 1398–1414.
Men, T., Brennan, P., Boffetta, P., & Zaridze, D. (2003). Russian mortality trends for 1991–2001: Analysis by cause and region. *BMJ, 327*(7421), 964.
Minelli, L., Pigini, C., Chiavarini, M., & Bartolucci, F. (2014). Employment status and perceived health condition: Longitudinal data from Italy. *BMC Public Health, 14*(1), 946.
Mladovsky, P., Srivastava, D., Cylus, J., Karanikolos, M., Evetovits, T., Thomson, S., et al. (2012). *Health policy responses to the financial crisis in Europe edited by Philipa Mladovsky et al.*. Copenhagen: WHO Regional Office for Europe.
Moya, A. Z., Buffel, V., Yáñez, C. N., & Bracke, P. (2015). Social inequality in morbidity, framed within the current economic crisis in Spain. *International Journal for Equity in Health, 14*(1), 131.
Nielsen, T. H. (2016). The relationship between self-rated health and hospital records. *Health Economics, 25*(4), 497–512.
OECD. (2015). *OECD reviews of health care quality: Italy 2014: Raising standards, OECD reviews of health care quality*. Paris: OECD Publishing.
OECD. (2018a). *Health speding*. Retrieved February 12, 2019, from https://data.oecd.org/healthres/health-spending.htm.
OECD. (2018b). *Health statistics*. Retrieved February 12, 2019, from http://www.oecd.org/els/health-systems/health-data.htm.
Official Journal of the European Union. (2003). Regulation (EC) No 1982/2003 of 21 October 2003 implementing Regulation (EC) No 1177/2003 of the European parliament and of the Council of 16 June 2003 concerning Community statistics on income and living conditions (EUSILC) as regards the sampling and tracing rules.
Orfila, F., Ferrer, M., Lamarca, R., & Alonso, J. (2000). Evolution of self-rated health status in the elderly: Cross-sectional vs. longitudinal estimates. *Journal of Clinical Epidemiology, 53*(6), 563–570.
Paleari, F. G., Rosnati, R., & Lanz, M. (2002). The support in family relations and young-adults' well-being: Differences of perspective. *Ricerche di Psicologia, 25*(4), 39–56.
Parmar, D., Stavropoulou, C., & Ioannidis, J. P. (2016). Health outcomes during the 2008 financial crisis in Europe: Systematic literature review. *BMJ, 354,* i4588.
Pennoni, F., & Romeo, I. (2017). Latent Markov and growth mixture models for ordinal individual responses with covariates: A comparison. *Statistical Analysis and Data Mining: The ASA Data Science Journal, 10*(1), 29–39.
Perruccio, A. V., Katz, J. N., & Losina, E. (2012). Health burden in chronic disease: Multimorbidity is associated with self-rated health more than medical comorbidity alone. *Journal of Clinical Epidemiology, 65*(1), 100–106.
Phan, H. P. (2011). Deep processing strategies and critical thinking: Developmental trajectories using latent growth analyses. *The Journal of Educational Research, 104*(4), 283–294.
Pieroni, L., Lanari, D., & Salmasi, L. (2013). Food prices and overweight patterns in Italy. *The European Journal of Health Economics, 14*(1), 133–151.

Pinquart, M. (2001). Correlates of subjective health in older adults: A meta-analysis. *Psychology and Aging, 16*(3), 414–426.
Piumatti, G. (2016). Capitale sociale e benessere percepito nella popolazione anziana in Italia. [Social capital and self-perceived well-being in the Italian elderly population]. *Psicologia della Salute, 3,* 47–63.
Piumatti, G. (2017). Relations between longitudinal trajectories of subjective financial wellbeing with self-rated health among elderly. *Medicina, 53*(5), 323–330.
Piumatti, G., Garro, M., Pipitone, L., Di Vita, A. M., & Rabaglietti, E. (2016). North/South differences among Italian emerging adults regarding criteria deemed important for adulthood and life satisfaction. *Europe's Journal of Psychology, 12*(2), 271–287.
Piumatti, G., Lietz, F., Marinković, J., & Bjegović-Mikanović, V. (2018a). Self-rated health among older adults in two fast ageing European countries: Evidence from Italy and Serbia. *Vojnosanitetski Pregled., 75*(7), 664–674.
Piumatti, G., Magistro, D., Zecca, M., & Esliger, D. W. (2018b). The mediation effect of political interest on the connection between social trust and wellbeing among older adults. *Ageing & Society, 38*(11), 2376–2395.
Preacher, K. J., Wichman, A. L., MacCallum, R. C., & Briggs, N. E. (2008). *Latent growth curve modeling*. Thousand Oaks, CA: Sage.
Regidor, E., Barrio, G., Bravo, M. J., & de la Fuente, L. (2014). Has health in Spain been declining since the economic crisis? *Journal of Epidemiology and Community Health, 68*(3), 280–282.
Reile, R., Helakorpi, S., Klumbiene, J., Tekkel, M., & Leinsalu, M. (2014). The recent economic recession and self-rated health in Estonia, Lithuania and Finland: A comparative cross-sectional study in 2004–2010. *Journal of Epidemiology and Community Health*. https://doi.org/10.1136/jech-2014-204196.
Riva, M., Bambra, C., Easton, S., & Curtis, S. (2011). Hard times or good times? Inequalities in the health effects of economic change. *International journal of Public Health, 56*(1), 3–5.
Rivera, B. (2001). The effects of public health spending on self-assessed health status: An ordered probit model. *Applied Economics, 33*(10), 1313–1319.
Rohlfsen, L. S., & Jacobs Kronenfeld, J. (2014). Gender differences in trajectories of self-rated health in middle and old age: An examination of differential exposure and differential vulnerability. *Journal of Aging and Health, 26*(4), 637–662.
Rosso, A. L., Gallagher, R. M., Luborsky, M., & Mossey, J. M. (2008). Depression and self-rated health are proximal predictors of episodes of sustained change in pain in independently living, community dwelling elders. *Pain Medicine, 9*(8), 1035–1049.
Sacker, A., Worts, D., & McDonough, P. (2011). Social influences on trajectories of self-rated health: Evidence from Britain, Germany, Denmark and the USA. *Journal of Epidemiology and Community Health, 65*(2), 130–136.
Saltkjel, T., Holm Ingelsrud, M., Dahl, E., & Halvorsen, K. (2017). A fuzzy set approach to economic crisis, austerity and public health. Part II: How are configurations of crisis and austerity related to changes in population health across Europe? *Scandinavian Journal of Public Health, 45*(18_suppl), 48–55.
Sargent-Cox, K. A., Anstey, K. J., & Luszcz, M. A. (2010). Patterns of longitudinal change in older adults' self-rated health: The effect of the point of reference. *Health Psychology, 29*(2), 143–152.
Sargent-Cox, K., Butterworth, P., & Anstey, K. J. (2011). The global financial crisis and psychological health in a sample of Australian older adults: A longitudinal study. *Social Science and Medicine, 73*(7), 1105–1112.
Sarti, S., & Zella, S. (2016). Changes in the labour market and health inequalities during the years of the recent economic downturn in Italy. *Social Science Research, 57,* 116–132.
Scarpetta, S., Sonnet, A., & Manfredi, T. (2010). Rising youth unemployment during the crisis: How to prevent negative long-term consequences on a generation? OECD Social, Employment and Migration Working Papers 106.
Schafer, J. L., & Olsen, M. K. (1998). Multiple imputation for multivariate missing-data problems: A data analyst's perspective. *Multivariate Behavioral Research, 33,* 545–571.
Schneider, U., Pfarr, C., Schneider, B. S., & Ulrich, V. (2012). I feel good! Gender differences and reporting heterogeneity in self-assessed health. *The European Journal of Health Economics, 13*(3), 251–265.
Simou, E., & 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*(2–3), 111–119.
Singh-Manoux, A., Guéguen, A., Martikainen, P., Ferrie, J., Marmot, M., & Shipley, M. (2007). Self-rated health and mortality: Short-and long-term associations in the Whitehall II study. *Psychosomatic Medicine, 69*(2), 138–143.

Singh-Manoux, A., Martikainen, P., Ferrie, J., Zins, M., Marmot, M., & Goldberg, M. (2006). What does self rated health measure? Results from the British Whitehall II and French Gazel cohort studies. *Journal of Epidemiology and Community Health, 60*(4), 364–372.

Skroumpelos, A., Pavi, E., Mylona, K., & Kyriopoulos, J. (2014). The impact of economic crisis on chronic patients' self-rated health, health expenditures and health services utilization. *Diseases, 2*(2), 93–105.

Steiger, J. H. (1990). Structural model evaluation and modification: An interval estimation approach. *Multivariate Behavioral Research, 25*(2), 173–180.

Stuckler, D., Basu, S., McKee, M., & Suhrcke, M. (2010). Responding to the economic crisis: A primer for public health professionals. *Journal of Public Health, 32*(2), 298–306.

Stuckler, D., Basu, S., Suhrcke, M., Coutts, A., & McKee, M. (2009). The public health effect of economic crises and alternative policy responses in Europe: An empirical analysis. *The Lancet, 374*(9686), 315–323.

Tamayo-Fonseca, N., Nolasco, A., Quesada, J. A., Pereyra-Zamora, P., Melchor, I., Moncho, J., et al. (2015). Self-rated health and hospital services use in the Spanish National Health System: A longitudinal study. *BMC Health Services Research, 15*(1), 492.

Terraneo, M., Sarti, S., & Bordogna, M. T. (2014). Social inequalities and pharmaceutical cost sharing in Italian regions. *International Journal of Health Services, 44*(4), 761–785.

Thomson, S., Figueras, J., Evetovits, T., Jowett, M., Mladovsky, P., Maresso, A., et al. (2014). *Economic crisis, health systems and health in Europe: Impact and implications for policy*. Copenhagen: WHO Regional Office for Europe.

Tridico, P. (2013). The impact of the economic crisis on EU labour markets: A comparative perspective. *International Labour Review, 152*(2), 175–190.

Tsekeris, C., Pinguli, M., & Georga, E. (2015). Young people's perception of economic crisis in contemporary Greece: A social psychological pilot study. *Crisis Observatory Research Paper, 19,* 1–25.

Vandoros, S., Hessel, P., Leone, T., & Avendano, M. (2013). Have health trends worsened in Greece as a result of the financial crisis? A quasi-experimental approach. *The European Journal of Public Health, 23*(5), 727–731.

Verick, S. (2009). *Who is hit hardest during a financial crisis? The vulnerability of young men and women to unemployment in an economic downturn*. IZA Discussion Paper, no. 4359, Institute for the Study of Labor, Bonn.

Vlachadis, N., Vrachnis, N., Ktenas, E., Vlachadi, M., & Kornarou, E. (2014). Mortality and the economic crisis in Greece. *The Lancet, 383*(9918), 691.

WHO. (2009a). *Health in times of global economic crisis: Implications for the WHO European Region*. Denmark: WHO, Regional Office for Europe.

WHO. (2009). *The finacial crisis and global health. Report of a high-level consultation.* Geneva, Switzerland-19 January 2009: WHO.

Wilkinson, R. G. (2002). *Unhealthy societies: The afflictions of inequality*. London: Routledge.

Williams, F. (2012). Converging variations in migrant care work in Europe. *Journal of European Social Policy, 22*(4), 363–376.

Wu, W., West, S. G., & Taylor, A. B. (2009). Evaluating model fit for growth curve models: Integration of fit indices from SEM and MLM frameworks. *Psychological Methods, 14*(3), 183–201.

Zavras, D., Tsiantou, V., Pavi, E., Mylona, K., & Kyriopoulos, J. (2012). Impact of economic crisis and other demographic and socio-economic factors on self-rated health in Greece. *The European Journal of Public Health, 23*(2), 206–210.