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1 A spotlight on health and life courses in Europe using SHARE Waves 6 and 7

1.1 Health and socio-economic status over the life course

The Survey of Health, Ageing and Retirement in Europe (SHARE) puts special emphasis on the interplay among the triangular connections of health, social embeddedness and the socio-economic status of older individuals. Waves 6 and 7 add three important innovations to this triangle and make SHARE a highly powerful tool for investigating ageing societies in Europe. First, Wave 6 deepens the objective measurement of health via biomarkers obtained from dried blood spot samples (DBSS). Second, Wave 7 finally achieves the cross-nationality that was demanded in the SHARE-ERIC statutes and covers all 26 continental EU member states plus Switzerland and Israel. Third, Wave 7 strengthens longitudinality reaching far back into childhood by collecting life-history data in all 28 countries.

These three innovations substantially enrich the multidisciplinary SHARE data and belong together because health, economic and social status in later life emerge from complex interactions over the entire life course (see Figure 1.1).

Departing from a person's biological make-up, parental conditions and early education (indicated by the left box in Figure 1.1), the trajectories of health, economic status and social embeddedness are not determined in isolation but through mutual interactions over the entire life course (as indicated by the many two-sided arrows between the three trajectories). Health, for instance, influences economic status because healthier bodies are likely to support higher learning capacities at younger ages and higher workloads at older ages (e.g. Deaton 2002). In turn, income inequalities are likely also to cause inequalities in health because richer individuals can afford higher out-of-pocket healthcare costs and may have easier access to healthcare, especially in certain healthcare systems (e.g., Smith 2003). Health behaviours, lifestyle and environmental and occupational conditions add to these mutual interactions between health and economic status and simultaneously introduce interactions with the

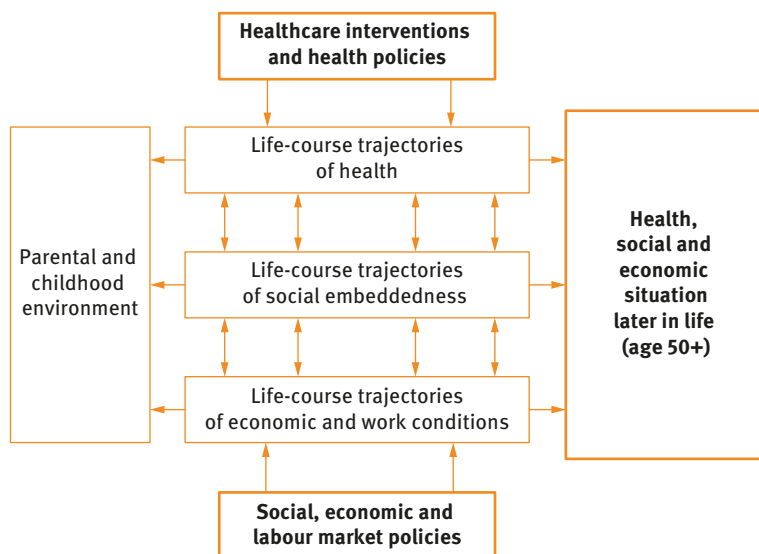


Figure 1.1: Conceptual background.

Source: Own illustration.

social environment in which individuals live. For example, ample evidence exists that embeddedness in a good family background is beneficial for the health of the family members (Fagundes et al. 2011). An important insight of recent research is that these interactions manifest their effects starting very early in life and then accumulate during positive and negative feedback cycles over the entire life course (Heckman and Conti 2013) before they determine later-life health, economic and social outcomes at older ages (right box in Figure 1.1).

Many of these interactions can be modified by policies, such as education, workplace regulations, poverty prevention or healthcare (indicated by the boxes at the top and bottom of 1. 1). Some welfare state interventions directly affect health and employment. Early retirement, for example, is directly and often immediately influenced by the rules of the pension, disability and unemployment systems (Börsch-Supan and Coile 2018). Health is directly affected by healthcare systems (Sirven and Or 2011). In addition, long-run interventions of the welfare state exist, such as education, preventive healthcare and workplace regulations, which have complex indirect and interrelated effects over the life course on both health and employment. Preventive healthcare, for instance, not only increases health but also makes meaningful occupation feasible at older ages (Jusot et al. 2012). High workplace standards not only improve

employment at older ages by reducing early retirement but also tend to improve physical and mental health (Reinhardt et al. 2013).

This volume presents 38 short studies that summarize SHARE-based research on these interactions over the lifecycle. These studies are showcases of the interdisciplinary and cross-nationally comparative research results obtained from Waves 6 and 7 of SHARE. Almost all contributions have a special focus on health. Collecting objective health data in Wave 6 was important because the health of the general population and, in particular, of the older aged population is very different across countries. Comparisons between SHARE, the English Longitudinal Study of Ageing (ELSA) and the US Health and Retirement Study (HRS) have documented that older people in continental Europe have better health than those in England. In turn, English people have better health than their American counterparts. For example, the percentages of individuals aged 50–74 years with at least one limitation in activities of daily living (ADL) is 12 per cent in the United States, 10 per cent in the United Kingdom and only 7 per cent in the European Union (Avendano et al. 2009).

Many reasons exist for these cross-national health differences. Healthcare systems are very different between the United States and Europe because almost all European countries have mandatory universal health insurance and the United States does not. Coverage, ease of access, co-payments, administrative rules and quality also differ across EU countries, as do historical life circumstances, income and wealth distributions, lifestyles and health behaviours. In addition, cross-Europe differences exist in the interactions between healthcare systems and lifestyles, such as when healthcare systems attempt to influence health behaviours, and in social policies and programmes potentially affecting health across the life course. The latter includes differences in early education and childcare programmes, employment protection and support programmes during middle age and social security and pension systems affecting older individuals. Although the impact of many of these policies on social outcomes is well documented, the extent to which they influence health and contribute to differences in longevity among high-income countries has yet to be established.

Understanding the reasons for cross-national health differences requires that studies use comparable health measurements. The findings by Avendano et al. (2009) were based on comparable measures, but these were self-reports and may have suffered from reporting biases. Few studies use more objective measurements of health-related biomarkers. SHARE Wave 6 was designed to fill this gap: We collected dried blood spot samples (DBSS) from approximately 27,000 respondents in 13 countries, which is among the largest collection of DBSS from a representative adult population. The DBSS include a small

calibration sample from Poland in which both DBSS and venous blood were collected. SHARE has also collected retrospective histories of participants' life courses and health events. Although we are still awaiting the laboratory results, preliminary analyses and validations are described in Part 8 of this book.

The central innovation in SHARE Wave 7 was the collection of highly structured retrospect life histories that are fully harmonized in all continental EU countries, Switzerland and Israel. This collection was achieved by using electronic displays that show the timeline of events and risk factors in several dimensions, such as health, work, family and housing. This display permits the respondent to see related events in one domain (family) with events in another domain (health), which significantly facilitates recall and improves the accuracy of the retrospective data.

Although we are aware that the hindsight perspective may create reporting biases, Smith (2003) shows the power and usefulness of retrospective data in detecting associations between health and socio-economic variables. More specifically, Korbmacher (2014) demonstrated the accuracy of retrospectively collected employment histories in a large-scale validation study comparing SHARE with linked administrative data. Life-course data on the timing of the major social, health and economic events over long segments of the lifecycle have been shown to be extremely helpful in identifying the causal mechanisms in the dynamic and cumulative relationship among health, lifestyles and socio-economic resources. Such data capture biological and socio-economic risk factors in early and mid-life, including health shocks, working conditions and behaviour during childhood and adulthood. Thus, these data allow us to not only quantify the long-lasting effects of early-life events (including interventions by health and social policies) on later-life health status but also to study potential behavioural channels causing associations between risk factors and health outcomes.

Many contributions in this book use the life-history data from Wave 7; some also use the earlier life histories collected in Wave 3. Therefore, this book is organized along the course of life. Part 1, edited by Agar Brugiavini and Guglielmo Weber, begins with the development of personality in early childhood and its influence until late in life. This part of the book features the inclusion of the widely used Big Five dimensions of personality in SHARE. Part 2, edited by Guglielmo Weber, describes how health inequalities are generated during the life course by inequalities in education and income. Part 3 is edited by Agar Brugiavini and uses another innovation of the SHARE data, namely, the 'job-coder', to describe labour market careers, occupation and retirement. Part 4, edited by Axel Börsch-Supan, celebrates the inclusion of eight new countries in SHARE. Based on the life-history data, this part showcases social transitions in

the new accession countries and the effects of the economic crisis. Part 5, edited by Howard Litwin, exploits the longitudinal social network data obtained in Wave 6, another innovation of the SHARE panel. Such data permit studies on the interactions between health and its social context. Healthcare and health behaviours are the subject of Part 6, which is edited by Florence Jusot. In Part 7, we focus on how objective health measures contribute to our understanding of the ageing process, which was edited by Karen Andersen-Ranberg. This topic is taken up in Part 8, edited by Axel Börsch-Supan, with a first glance at the dried blood spot analyses.

1.2 Personality and childhood

In the seventh wave of SHARE, respondents were for the first time asked a set of questions aimed at eliciting their five most important personality traits (John and Srivastava, 1999). These traits, or factors, known as the Big Five are Openness to experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism. For each of them, the respondents answered two – in one case, three – questions representing the high and the low poles (Rammstedt and John, 2007). Most respondents who participated in Wave 7 also answered a large number of questions on their life histories going back to their childhoods (with a special focus on their situation at age 10), and including the relationship they remember having with their parents.

In this part, edited by Agar Brugiavini and Guglielmo Weber, we present three chapters that analyse personality traits and their relationships with well-being, physical health and financial investment decisions late in life. We also present two chapters that relate the abuse respondents suffered from in their childhood with their current well-being and mental health.

A word of caution is necessary here. As Bertoni et al. note in Chapter 4, “estimating a model with adult-life outcomes as the dependent variable and personality traits as the explanatory variable is not without problems. First, personality cannot be measured directly: the measures used in our empirical analysis might be imperfect proxies of true non-cognitive abilities, introducing measurement error. Second, personality traits may themselves be the result of a dynamic process of investment in cognitive and non-cognitive skills.” We urge the reader to keep in mind these caveats when interpreting the evidence presented in this part.

The first chapter by Bracha Erlich and Howard Litwin describes in detail the Big Five personality traits and the manner in which they are elicited in

SHARE. The chapter examines the way in which these traits vary with age – and finds that Agreeableness shows a moderate rise across age groups and Openness to experience and Extraversion show small declines. The authors are careful to point out that their evidence could alternatively be interpreted as cohort effects (younger respondents belong to cohorts born in more recent years) or might even reflect selective mortality (if more agreeable individuals live longer, for instance). Perhaps the most important take-home message is that some traits – Neuroticism and Conscientiousness – are age-invariant. This age-invariance is important because the authors also study how the personality attributes relate to life satisfaction and find that a major negative role is played by Neuroticism and positive roles are played by Extraversion and Conscientiousness.

The second chapter, written by Jonathan Shemesh, Ella Schwartz and Howard Litwin, concentrates on personality and physical health. The authors point out that the determinants of health include genetics and lifestyle, such as physical activity and diet. However, they cite recent evidence suggesting that personality also exerts significant effects on health throughout the lifespan (Murray and Booth 2015). The authors investigate the manner in which personality traits are associated with a number of health indicators in older European adults, controlling for age, gender, marital status, financial capacity, years of education and country of residence. The strongest and most consistent personality-level correlates of good health are shown to be high Conscientiousness and low Neuroticism. To the extent that these personality traits are stable over time, as we observed in the previous chapter, and are not themselves affected by health, one might be tempted to interpret this finding as indicating a possible cause of good health in old age. However, even if this is not the case, an interesting policy implication is that personality testing can be used to assess the health risks of older people.

The role of personality traits is also investigated in further research areas in addition to health. It is well known from the behavioural finance literature that an investor's personality traits are significantly associated with his or her financial behaviour, even conditioning on his or her partner's cognition and other observable characteristics. In the chapter 'Personality traits and financial behaviour', Marco Bertoni, Andrea Bonfatti, Martina Celidoni, Angela Crema and Chiara Dal Bianco show that the personalities of both partners matter in determining household financial decision making, although to different extents and through different traits. The authors find that some personality traits of the financial household head (that is, the person who volunteered to answer questions on assets and debts), namely, Conscientiousness and Neuroticism, are significantly associated with stock market participation. Also reported was that risk aversion plays a role, but its role is much less strong when the likelihood of

having financial liabilities is considered. In this case, whenever the financial household head is a female, her degrees of Agreeableness and Neuroticism are positively associated with proneness to indebtedness, and the Openness and Consciousness of her (male) partner also attract significant coefficients.

The following chapter by Noam Damri and Howard Litwin, titled ‘Relationships with Parents in Childhood and Well-Being in Later Life’, shows that the familial environment that older Europeans experienced during childhood is associated with their well-being in later life. The chapter contributes to the vast socio-economic literature on the long-term effects of early childhood events by focusing on the broad quality of the parent–child relationship and more specifically on physical abuse by either parent. The authors show that the six survey questions can be combined into two factors: one for the quality of the relationship with the parents, and the other for the frequency of parental abuse. They then take two different measures of (current) well-being and relate them to the two indices of the childhood interpersonal environment in the home, controlling for a host of confounders that are generally associated with these same measures, such as age, gender, education, number of children, marital status, health status, financial status and social activity.

Their key finding is that people who had good relationships with their parents show higher well-being scores at older ages, whereas those who grew up in an abusive familial environment show a lower quality of life scores in old age. This result can partly be attributed to a form of recall or justification bias whereby unhappy people tend to blame others for the low quality of their lives, whereas happy people put to rest their memories of past negative events. Even if this is the case, the implication of these findings for policy and practice are that the childhood interpersonal environment of older people needs to be addressed when dealing with ways to maintain or promote well-being in late life.

The last chapter of this part is written by Raluca E. Buia, Matija Kovacic and Cristina E. Orso. Similar to the preceding chapter, the motivation of this chapter is the concern that adverse childhood experiences may exert a negative influence on emotional well-being later in life. However, and unlike the preceding chapter, this contribution puts a specific focus on mental health problems. The authors investigate the extent to which exposure to adverse early life experiences favours the onset of emotional disorders. The chapter addresses the potential relationship between emotional neglect and physical harm in childhood and adolescence, and the onset of emotional disorders later in life. The authors recognize a potential recall bias: if depressed individuals tend to remember negative episodes more than otherwise identical individuals, this situation may lead to an overestimate of the effect. However, to the extent that such bias is invariant across individuals, the reader may want to focus on some very

interesting differences in the effects of adverse childhood circumstances by cohort and gender.

First, the authors find that the intensity of the effects of adverse childhood experiences on mental well-being displays important differences between the pre- and post-war cohorts. A poor relationship with parents has a stronger and more significant impact on the post-war cohort, whereas having experienced physical harm from parents is not significantly different from having experienced zero harm for the pre-war cohort. However, physical abuse from persons outside the family has a more important effect for the older respondents. Interestingly, most adverse childhood experiences have a stronger and more significant impact on women. In particular, the analysis shows that physical harm from parents is not significant for men but is for women.

1.3 Health inequalities—Education and income

Income and wealth inequality have attracted much attention in both the public debate and academia – going back to the work by Tony Atkinson and collaborators and leading to the highly influential (and controversial) volume by Piketty. The link between economic resources (such as income and wealth) and health has also been recognized as empirically relevant. For instance, Shorrocks (1975) pointed out that the strong relationship between wealth and mortality should lead to great caution in the analysis of cross-sectional age effects because richer individuals live longer; therefore, older individuals are on average richer. More recently, health inequality has attracted renewed attention, as testified by the media coverage of the recent work by Deaton and Case on the rise of mid-life mortality and morbidity in the United States.

SHARE data are ideal not only to document patterns of health inequalities across elderly Europeans and to focus on specific aspects of health (such as frailty) but also to investigate the roots behind health inequality in old age and its long-term determinants. For instance, thanks to the rich life history information collected in the seventh wave, one can trace health inequality back to early life conditions and check the extent to which poorer health in old age can be attributed to the effects that a bad start in life has on education, income and wealth. This part on health inequality is edited by Guglielmo Weber.

The first chapter of this part, with the title ‘Dynamic Changes in Determinants of Inequalities in Health in Europe with a Focus on Retirement’ by Terkel Christiansen, Jørgen T. Lauridsen and Astrid Roll Vitved, computes a concentration index for health in eleven SHARE countries and investigates the extent to

which current income, education, age and other observable characteristics explain the index. The authors are particularly interested in the role of retirement from work on health inequality and allow the role to vary not only by country but also by age group (50–64; 65–74; 75+). The authors are also interested in changes over time and, thus, carry out their analysis on the first and seventh waves of SHARE.

The authors find that retirement status contributes to a varying extent to income-related inequality in health across European countries and that the differences can be associated with income inequality as well as health differences depending on the country considered. The intuition behind some of the results is not obvious because disentangling the effect of retirement from the effect of age is difficult. However, the approach taken in this chapter is promising, and future research along these lines may be able to develop more solid and more policy-relevant conclusions.

The following chapter by Louis Arnault, Florence Jusot, Nicolas Sirven, Marie-Anne Brieu, Didier Halimi and Françoise Forette focuses on a specific health indicator – frailty – that is particularly important at older ages. This indicator provides an analysis of the trends of inequalities in frailty in nine European countries. The key findings are that large and significant social inequalities exist in the prevalence of frailty between high and low education groups: frailty prevalence is on average 4.5 percentage points higher for less educated men than for more educated men; this figure increases to 6.7 percentage points for women. These social inequalities tend to increase with age, reaching 6.6 percentage points for men and 10.9 percentage points for women in the 75+ age class. These results are stable over time, indicating that new generations face a similar risk of frailty as previous generations. The authors point out that two counteracting effects may be at play here: medical progress reduces the risk of frailty for any given age but also increases the pool of survivors such that the prevalence of frailty is stable over time.

Michele Belloni, Danilo Cavapozzi, Chiara Dal Bianco, Yao Pan and Serena Trucchi investigate in their contribution how health dynamics late in life vary with early-life conditions. They document that better early-life conditions are associated with better health outcomes and find that education as well as current income and wealth are important mediating factors of this relationship. They first establish that socioeconomic status in childhood is positively correlated with health in late life. This association holds for both physical and mental health and is stronger for females than for males. In most cases, this association remains stable over the entire age range considered (50–80 years). They also find evidence that this effect is mostly indirect, that is, mediated by socioeconomic status in adulthood. This evidence suggests that an individual

who grew up in adverse conditions is penalized in terms of education, income and wealth over the lifecycle, leading to worse health in old age. However, a small direct effect remains, suggesting that childhood circumstances partly act as an indelible imprint on individuals' health.

This part concludes with the chapter 'Tracking and educational inequality in health in later life' by Fabian Kratz and Johanna Bristle. This chapter focuses on the role that certain features of education systems play in explaining health inequality late in life by classifying countries according to the amount of tracking, which is the extent of 'separation of students into specialized schools and ability groups'. The authors show that countries with more tracking (that is, stronger separation) display larger educational disparities in subjective and objective health.

The authors identify three possible pathways. First, in countries with higher levels of tracking, parental background might have a stronger influence on educational attainment. Second, the higher the level of tracking, the stronger the impact that education may have on adult socioeconomic status. Third, a higher level of tracking may exacerbate the negative effects of low educational achievement on health. A limitation of the analysis lies in the authors' assumption that tracking does not change over time, such that the effects of tracking are necessarily captured at the country, and not the individual, level. Previous work on tracking (Brunello and Checchi, 2007) suggests that tracking has changed over the years, albeit slowly and not in all countries. Future research should use historical changes in tracking that reflect the education system at the time that the respondents were in school to produce cohort-level evidence on the importance of this feature of the educational system on health inequality in old age.

1.4 Labour market, occupation and retirement

A salient innovation of the seventh wave of SHARE is represented by the 'life histories', which investigate the major events, the different experiences and the choices made by individuals over their life course. The SHARELIFE data allow the researcher to construct a retrospective panel, that is, the entire sequence of events taking place, year-by-year, back to when the respondent was age ten or even younger, and to pinpoint the relevant changes in their lives such as leaving school, starting a job, getting married and having children. Because the same data collection mode was implemented in the third wave, the SHARELIFE component of SHARE provides an impressive mapping of the life of Europeans

over almost a century. An important dimension of the life events is labour market participation and respondents' labour supply, which is relevant *per se* but is also central to the relationship to a variety of benefits that the respondent may have access to in the different welfare systems. Thanks to the richness of SHARELIFE, researchers can investigate respondents' careers under different circumstances and different labour market arrangements. Early-life events can be related to patterns of work and inactivity with a specific focus, such as the gender differences in wages and pension benefits for older individuals, controlling for the many other determinants of economic outcomes, such as education levels or parental effect on occupational choices.

An important innovation of SHARE (in Waves 6 and 7) is the use of the 'job-coder', that is, a feature built in the questionnaire that elicits 'ex ante' the respondent's occupation by matching open-ended answers on job type with a list of existing occupations and related ISCO codes. This feature allows the researcher to associate a very detailed definition of the job to the self-reported occupation. This part on labour market, occupation and retirement is edited by Agar Brugiavini.

The chapter 'Long-term effects of different labour careers' by Yuri Pettinicchi and Axel Börsch-Supan addresses the challenging question of the consequences of different types of labour market participation. The general view is that multiple jobs, labour inactivity and non-standard working patterns are associated with lower employability and lower social protection, leading to poor financial conditions in old age. However, job mobility is not necessarily a negative event and could represent a rational decision of the worker in the expectation of obtaining a better contract and/or higher wages, a conclusion that can be reached only by taking advantage of empirical evidence. The authors identify different career modes and relate them to the actual *ex post* outcomes observed in the data in terms of access to resources. They find that 15 per cent of men and 52 per cent of women in the SHARE sample experience some inactivity in their life and that older women have more variability in their working patterns. A substantial history of inactivity is related to a higher risk of falling into poverty, whereas a higher number of job spells has a mitigating effect on this outcome.

In a second chapter, Pettinicchi and Börsch-Supan analyse a very relevant labour market condition that is neglected in much of the literature, that is, the late-in-life consequences of being a self-employed worker. Self-employment is typically associated with precarious working conditions given the reduced welfare coverage and the prevalence of more volatile earnings. The evidence from SHARELIFE shows that self-employed workers are in fact a heterogeneous group: some workers make an explicit choice to gain control over their working

conditions, whereas for others self-employment is a transitory stage leading to (or coming from) dependent employment. In all cases, public pension provisions are limited and self-employed workers are more likely to be at risk of poverty in old age. However, the first group offsets the higher costs involved with the job transitions with higher earnings growth, which may in turn provide higher private wealth in old age. The second group, which end up in self-employment because of exogenous factors, is not in a condition to accumulate sufficient financial assets to protect their retirement.

The contribution ‘Patterns of labour market participation and their impact on the well-being of older women’ by Agnieszka Chłoń-Domińczak, Iga Magda and Paweł A. Strzelecki is motivated by the observation that women have shorter and more interrupted careers if compared with men and that career patterns differ among countries. The authors maintain that the patterns of female life-course working careers depend on the institutional organization of the labour market, including the regulation of part-time work. Using SHARELIFE, in 13 countries, they distinguish women who have had full labour market careers and women with interrupted careers and relate these patterns to current outcomes at older age, including health, income and life satisfaction. The chapter uses sequence analysis to describe in a parsimonious manner the patterns of work and out-of-work during the life of the respondents. Pronounced differences emerge in labour market participation within and between countries: in southern Europe, women normally withdrew from the labour market for good, whereas in Scandinavian and some continental countries (i.e., Germany, France, Switzerland), women were more likely to continue part-time labour market careers. Predominant patterns of interrupted careers affect the current health assessment, life satisfaction and financial situation: women who worked either full- or part-time currently have a better overall financial situation. The level of life satisfaction is also higher among those women who were economically active during their working lives.

The fourth chapter of this part by Marco Bertoni, Andrea Bonfatti, Martina Celidoni, Angela Crema and Chiara Dal Bianco investigates the unexplained part (termed the ‘gender discrimination’ component) of gender differences in occupation and earnings once one has considered other determinants, such as education or job experience. One explanation of gender discrimination is a (supposedly) lower attachment of women to work, but this explanation does not consider several factors over the life course of women. In particular, differences in individual characteristics may lead women to prefer jobs that pay on average lower wages and/or might prevent them from entering certain top-paid jobs. In these dimensions, parental education, non-cognitive skills and health shocks occurring over one’s life may play a role over and above the standard

characteristics. One important modelling aspect is to control for the endogeneity of occupational choices. Indeed, the authors find that the end-of-working life wage gap is approximately 28 per cent, and about one fifth can be explained by standard personal and job characteristics. Accounting for the endogeneity of job selection raises the explained part of the total wage gap to about 50 per cent, whereas adding parental education, health shocks and non-cognitive skills increases the explained part of the gap only marginally. The authors conclude that the wage penalty for women is mostly explained by a within-occupation differential.

The chapter by Danilo Cavapozzi, Simona Fiore, and Giacomo Pasini analyses the association between family dissolution and labour supply decisions during the life course of Europeans aged 50 and over. Family dissolution episodes, that is, a household split or divorce, can force individuals – especially women – to enter the labour market to make ends meet and may induce others to leave the labour market because of stress and related psychosocial effects. Family dissolution typically takes place in two steps. First, the household splits and an agreement is made about income support of the former partner (the most vulnerable) and children, which is then formally specified in the case of divorce. The employment consequences of family dissolution are analysed by considering household split and divorce separately also to exploit the timeframe necessary to adjust the labour supply. After a divorce, alimonies mitigate the adverse effects of family dissolution on the dependent partner, thus inducing former partners with a low labour market attachment to exit the labour force. At the other extreme, the need to pay alimony is expected to increase the employment participation of the former household breadwinner. The authors find that employment choices are affected by the occurrence of family dissolution episodes and, as expected, the effect is stronger for women. The magnitude of this effect increases with the presence of children.

The concluding contribution of this part by Michele Belloni, Raluca Elena Buia, Matija Kovacic and Elena Meschi observes the relationship between job characteristics and health of older workers by using the detailed coding of occupations in SHARE Waves 6 and 7 obtained from the SHARE jobcoder. Some occupations are more physically or mentally demanding than others or have higher exposure to risk, which may affect health. The authors characterize each job category in terms of a set of job quality dimensions measured using data from recent waves of the European Working Conditions Survey (EWCS, Eurofound). The measures of job quality are drawn from an external source to reduce the subjective bias that would exist if workers were self-reporting their jobs' working conditions. Thanks to the presence of a detailed ISCO code, associating a set of job characteristics to each respondent is possible. The authors

then use some standard measures of general (physical) health and mental health. The chapter finds that general health correlates with the physical environment, the work intensity, the skills and discretion associated with the job. Low job security and uncertain career prospects are associated with mental and behavioural disorders late in life. These findings have policy implications because an increase in the legal retirement age can have adverse effects on workers' health and should be accompanied by policies aimed at protecting the most vulnerable workers and jobs.

1.5 Social transitions and economic crises

Wave 7 was also the first time that SHARE and its sister surveys in the British Isles – ELSA in England and TILDA in Ireland – covered the entire European Union. The expansion of SHARE to all 26 continental EU member states was an important landmark for SHARE. This part, edited by Axel Börsch-Supan, includes three chapters that focus on EU accession countries and their transition challenges.

Large social transitions were also sparked by the economic crisis and affected the original EU member countries in an unprecedented way. These transitions are the focus of two chapters that analyse how the economic crisis has changed patterns of care giving and intergenerational exchange. All contributions in this part are showcases of the complex and sometimes unpredictable interactions between historical changes of the political landscape and responses at the family and the social levels.

The health of the population in post-socialist CEE countries lags considerably behind the European Union average. For example, life expectancy at birth and at age 65 is approximately 3–6 years lower than the EU-average. The authors of the opening chapter, Anikó Bíró and Réka Branyiczki, do not focus on mortality but on health status and its evolution before and after the transition from a socialist to a capitalist system, conditional on having survived at least 20 years after the transition and based on individual life history data. This transition implied a dramatic restructuring of the CEE economies and their social security systems. Such major events could have affected not only the healthcare system but also the health status of the population in CEE. The authors attempt to disentangle these two effects: the 'shock effect' through the transition and the effect of changing healthcare systems. The authors document that health disparities existed even before the transition. They also showed that the era of post-socialist transition was more often associated with the start of stressful

periods and financial difficulties in post-socialist CEE countries than in the West. Finally, they found evidence that stressful periods, financial difficulties and job loss around the period of transition are all associated with worse health at older ages, even after netting out the effect of childhood health and demographic factors. Overall, the results by Anikó Bíró and Réka Branyiczki suggest that the post-socialist transition itself increased the health disadvantage of the post-socialist CEE countries.

The contribution by Ekaterina Markova and Gabriela Yordanova has a special focus on ageing Bulgarians. Bulgaria is the country with the deepest demographic change not only throughout Europe but also among the oldest populations worldwide. The authors' aim is to employ the new data on Bulgaria to describe what is hidden behind the unprecedented ageing in the country. They frame together three domains relevant for an ageing society – general physical health in Bulgaria, attitudes towards early retirement and elderly care within family networks – and take a comparative perspective with Germany, Belgium, Croatia and Romania as comparison countries. Regarding health, Ekaterina Markova and Gabriela Yordanova detect the problematic health status of older Bulgarians, which contrasts starkly with their relatively positive self-assessment of general health. This contrast is in line with the underutilization of the healthcare system. The authors also find that a comparatively large share of currently employed Bulgarians seeks early retirement, especially women and individuals with a primary or lower education. Finally, the authors point out the importance of family networks in developing integrated long-term care policies but also of overcoming the negative public attitudes towards institutionalized elderly care in times of rapid population ageing.

Numerous adult outcomes can be influenced by childhood health and cognition, as suggested in the chapter by Loretta I. Dobrescu and Alin Marius Andrieș. Their contribution, 'The link to the past and the post-communist welfare state', focuses on the prevalence of adverse health and financial circumstances among older Romanians. The authors investigate how these relations are affected by the generosity (or stinginess) of the welfare state. Thus, their analysis is particularly relevant in light of the current social and political debate in Romania that has seen the public affected by extreme polarization around two main camps defined by their support for or against the welfare state. Loretta Dobrescu and Alin Marius Andrieș find that childhood health and cognition have long-lasting effects on the prevalence of dire health and financial circumstances later in life. Such bad health effects appear mitigated across various dimensions by the generosity of the welfare state, mostly related to extreme but reversible circumstances (serious – but not long-term or chronic – illnesses, financial hardship or hunger). Superior cognitive skills are associated

with better chances of making ends meet or avoiding hunger, whereas having experienced financial hardship seems unavoidable given the last 30–40 years of turmoil.

Long-term care (LTC) is an example of a family need that is met by a mix of public, private professional and family care. Given that most formal care is provided by public bodies, LTC is likely to be on the receiving end of austerity policies. If access to public LTC is affected, the family will be called to make up any deficit using its own resources, which is the topic of the fourth contribution in this part by Antigone Lyberaki, Platon Tinios, George Papadoudis and Thomas Georgiadis. This chapter aims to identify how and whether needs for LTC were met. The authors do so by focusing on three southern countries that participated in both Wave 2 and Wave 6 (Greece, Italy and Spain) and that share a familial model of LTC. Their results are very surprising at first glance: the proportion of needy people without any care shrank between 2007 and 2016. Despite austerity, professional care and not family-based solidarity expanded. Taking a second glance, Lyberaki, Tinios, Papadoudis and Georgiadis provide a convincing explanation for this apparent paradox. One part of the explanation is that formal systems were maturing; in addition, in the open market, the incomes of beneficiaries fell less than the wages of carers.

The contribution ‘Financial and time transfers from parents to adult children after the economic crisis’ by Ela Ostrovsky-Berman and Howard Litwin nicely complements the preceding one. Its central question is: do financial shocks have long-term consequences for the intra-familial exchange of resources and for intergenerational solidarity? The great financial crisis that struck Europe in 2008 provides a unique opportunity to address this important research question. Towards this aim, this contribution presents analyses using data from SHARE to consider the effects of the economic crisis on the parental provision of financial and non-financial assistance to adult children. The longitudinal SHARE data, which span some six waves of data collection from 2004 to 2015, make it possible to examine the trends in private familial transfers before and after the crisis. The main aim of the enquiry is to clarify whether macroeconomic shocks indeed have long-term effects on the provision of private transfers from older parents to their adult children. An additional aim is to shed light on the inter-relationship between financial and non-financial transfers following an economic crisis. Ela Ostrovsky-Berman and Howard Litwin shed light on the question of whether these two types of transfers re-enforce themselves or whether one substitutes for the other in times of deep financial distress. The results are clear. Indeed, the economic crisis has had a long-term effect on financial and time transfers from older Europeans to their adult children: large financial transfers from parents aged 65 and older to their adult

children increased dramatically during the crisis and remain higher than they were before the crisis. In turn, the frequency of looking after grandchildren has decreased since the crisis and continues to be lower than it was before the crisis.

1.6 Social context and health

The fifth part, edited by Howard Litwin, looks at the intersection of the social environment and health in later life. The social environment, or the interpersonal relations that one variously maintains during one's lifetime, can impact one's health in a variety of ways, and its effects are not absent in older age. Moreover, the cumulative role of the social environment seems to increase as one moves across the life course, such that 'who you're with' strongly shapes 'how you feel' in your older years. The social network, or the convoy of close social ties that accompanies one through life, is an especially important component of the quality of late life as well as a key predictor of health outcomes.

The first set of chapters in this part examines selected aspects of the social network in relation to late-life health. SHARE is a pioneer in the study of social networks because it is the first major European survey to systematically examine the changing landscape of meaningful interpersonal relations among those in the third age and beyond. The SHARE questionnaire employs a name-generating social network inventory that captures the key aspects of one's closest social ties. The inventory was first applied in Wave 4 of SHARE in 2011 and then again in Wave 6 in 2015. Because SHARE is a panel study that returns in each wave of data collection to the same survey participants, the SHARE data allow an unprecedented look at the dynamics of personal social networks and, in particular, how they change.

The chapter by Ella Schwartz and Howard Litwin examines the changes in the personal social networks of older adults and their effects on cognitive health. The chapter considers the four most prevalent social ties, namely, spouse, children, relatives and friends, as well as the stability of these types of ties in relation to cognitive function. Their analysis reveals that the loss of social ties is, indeed, a risk factor for cognitive decline even in the short term. However, on a more positive note, they find that the addition of new ties can be helpful towards maintaining one's cognitive capabilities.

Liili Abuladze and Luule Sakkeus consider the effect of social networks on survival, particularly among those who have some degree of disability in later life. They find that more extensive social networks protect from dying earlier,

which is the case for everyone – those with disabilities and those without. Moreover, among people with disabilities, having no friends in their social network is a mortality risk factor. In contrast, having children in the network among those in this same group does not increase their survival prospects.

In their chapter, Melanie Wagner and Ina Holdik look at the social networks of an important subset of older adults – those who provide long-term care to a dependent spouse, usually because of poor health. Also considered are the corresponding networks of the spouses who receive care from their partners. The authors find that both the care recipients and their spousal caregivers actually have more extensive networks than their non-care-providing counterparts. Interestingly, the uptake of care decreases the quality of the partner relationship for the spouse who provides the care but does not have the same effect for the care-receiving spouse.

The second set of chapters in this part of the volume examines the absence of social networks and health effects. That is, the authors look at how social isolation and loneliness impact a range of health states. This area of inquiry is particularly important insofar as loneliness among older people is increasingly being recognized as a significant problem in modern society. The SHARE data enable us to systematically scrutinize the concomitants and outcomes of the loneliness/health nexus.

In their analysis, Fátima Barbosa, Cláudia Cunha, Gina Voss and Alice Delerue Matos consider the impact of living alone on physical and mental health among older persons. Their findings show that, although solo living is currently on the rise, the negative effect of living alone on health is explained primarily by how lonely one feels. That is, when the effect of loneliness is taken into account, the fact of living alone is not a risk factor in itself for poor late-life health.

Stipica Mudražija, Šime Smolić and Ivan Čipin extend the study of living alone to the domain of health behaviours, particularly those that enhance or restrain good health. They demonstrate that older adults living alone tend to smoke more and eat less healthy food than those living with others. In contrast, solo dwellers are less likely to drink excessively. The authors also note that both residential arrangements and health behaviours vary substantially across countries, suggesting that health policy in this area should be formulated in response to the unique characteristics of each country.

Finally, Yarine Fawaz and Pedro Mira study both social networks and loneliness in relation to the health of those who lost a spouse or another close confidant. Their analysis reveals that, when a spouse or close confidant dies, loneliness and depressive symptoms increase. In addition, the death of a confidant reduces one's satisfaction with one's social network. The findings from

their innovative study underscore the concept that bereavement is an important factor in the association between social connectedness and health and should receive more attention from health policy analysts.

1.7 Healthcare and health behaviour

The sixth part of this volume, edited by Florence Jusot, concentrates on health in old age with regard to individual health investments and health behaviours. Additionally, the issue of access to care plays an important role in this part. Healthcare depicts inequalities in different ways. If healthcare use is an individual decision that may depend on individual preferences, incentives and expectations, healthcare access can also be highly dependent on education and origin and migration status. As this part shows, the interaction of barriers to healthcare access and individual health behaviours as well as out-of-pocket expenses are also important to look at, not the least because it is telling with regard to public health and insurance systems.

In the first chapter of this part, the authors Hendrik Jürges and Luca Stella look into social inequality in access to healthcare. They examine how access to healthcare varies across European countries as well as over time by analysing three relevant dimensions: unmet need, catastrophic healthcare expenses and satisfaction with health insurance coverage. The authors use data from three waves of SHARE, including the retrospective data of Wave 7. These data allow them to document healthcare access over time and to investigate the dynamics of access barriers by exploring whether those barriers are only temporary or persistent. Jürges and Stella find that a remarkable cross-national heterogeneity exists in terms of healthcare access, with Greece, Italy and Poland being the countries with the most serious deficiencies in Waves 6 and 7. Over the life-cycle, however, unmet healthcare needs are most prevalent among eastern European countries, although in those countries educational inequalities in healthcare access are not as high as in southern Europe. Regarding the persistence of access barriers, the analyses reveal that low-educated, sick, disabled or divorced individuals face a greater risk of suffering from constant difficulties with access to care.

In the subsequent chapter, Simona Fiore, Matija Kovacic and Cristina Orso approach the issue of health by comparing the situation of immigrants and natives in different European countries. More precisely, they investigate the extent to which immigrants and natives utilize health services and examine their health-related expenditures to assess the differences in health-related

behaviours between the two demographic groups. Because Fiore, Kovacic and Orso use data from SHARE Waves 6 and 7, they are able to exploit information on healthcare utilization, out-of-pocket expenditures and polypharmacy. The authors also control for socio-demographic variables and healthcare needs. For instance, they take into account that immigrants' self-perceived health status is better but that they have greater limitations in daily activities and have more chronic diseases. The results suggest that immigrants and locals have different healthcare behaviours. For example, the authors find that the immigrant population is more likely than the local population to postpone a doctor's visit due to financial difficulties. Additionally, immigrants' out-of-pocket expenditures for medical aids and appliances are lower than those of natives, suggesting that immigrants face more important barriers to healthcare use.

Marco Bertoni, Andrea Bonfatti, Martina Celidoni, Angela Crema and Chiara Dal Bianco analyse in their chapter the association between life expectancy and health investments. They argue that, in light of increasing lifespans of Europeans, health investments need to be a focus because they have important implications for the sustainability of public health systems. The authors state that the theoretical predictions for the association between life expectancy and health investments are ambiguous, suggesting, on the one hand, that a longer lifespan may generate an incentive to invest more in health, but, on the other hand, that it might also provide a disincentive because of the lower marginal value of additional years of life. Bertoni and colleagues analyse data from SHARE Waves 4, 5 and 6 for 16 European countries and consider health behaviours such as body weight, nutrition, physical activity and smoking. They find that life expectancy has a causal positive effect on most of the considered health behaviours and conclude that a longer life increases the incentive to invest in health to improve quality of life in old age. Therefore, longer lives do not necessarily imply a more extensive time spent in poor health, which in turn is beneficial for the sustainability of public health systems.

The last chapter of this part more deeply investigates health issues. Andrej Srakar and Valentina Prevolnik Rupel propose a network analysis approach to analyse the prevalence of multiple chronic conditions in older people in European countries and to explore whether some health systems are more exposed to comorbidities than some others. The data from SHARE Wave 6 allow them to show that European countries differ in their distribution of comorbidities of older people and that those differences largely follow Esping Andersen's welfare regime typology. In particular, strong connections among diseases are found in eastern European countries. Systems that already suffer from healthcare problems, including eastern European countries, are likely to suffer even more in the future given the prevalence of comorbidities. Because the question

of comorbidities brings worse health outcomes, more complex clinical management and increased healthcare costs, this issue should receive additional attention in the future from policymakers.

1.8 Objective health

This part, edited by Karen Andersen-Ranberg, addresses the domain of health. The four contributions are examples of the broadness of the SHARE data and, except for one chapter, the value of including objective tests to self-reported information. One contribution also shows the benefits of adding new countries mainly from eastern Europe in the SHARE survey.

The first chapter by Luzia M. Weiss, Judith Kronschnabl, Thorsten Kneip and Michael Bergmann dives into the obesity paradox. Obesity is mainly associated with adverse health outcomes, such as diabetes, hypertension and poorer cognitive performance. However, in recent years, the term obesity paradox has emerged, where obesity counterintuitively is protective and associated with greater survival in people suffering from, for example, cognitive impairment. The critics have put forward many arguments against the paradox, one being that normal weight could be obtained through weight loss as a result of a disease process. Given the panel structure of SHARE, the authors were able to use changes in both BMI and cognitive performance over time, as well as grip strength – a proxy for muscle mass – and show in their chapter that being underweight is associated with poorer cognitive performance relative to normal weight, whereas being overweight is neither better nor worse. In their analyses of weight changes, the authors found no benefits of a weight increase on cognitive performance, whereas weight loss was associated with cognitive decline.

Good cognitive functioning is a prerequisite for being able to live an independent life at older ages; good physical functioning is another. Being physically active is well-known to be important to maintain good health and independent living. However, with advancing age, the tendency is to adapt to a more sedentary lifestyle that causes loss of muscle strength and eventually loss of independence in activities of daily living. The chapter by Jens Elmelund Rise, Linda Juel Ahrenfeldt, Rune Lindahl-Jacobsen and Karen Andersen Ranberg explores the association between self-reported physical activity and higher physical performance in relation to age. The authors use SHARE Waves 1 to 6 and demonstrate that older people who engage in moderate or vigorous physical activities have more muscle strength than their physically inactive peers. In addition, the benefits of physical activity are larger with advancing age and

seem to be highest in the oldest age groups – 80+ years. The results underline the importance of supporting initiatives to increase physical activity among older people and to promote healthy ageing.

Recently, a new definition of sarcopenia uses grip strength measurements to identify people at risk of probable sarcopenia, that is, the probable state of low muscle strength, quality and quantity that leads to functional loss and dependency in activities in daily living. Using data from SHARE Wave 2, a north to south gradient in grip strength has previously been shown to exist, with the highest levels in the more northern and the lowest in the most southern countries. In their contribution, Pedro Pita Barros, Fernando M. Pimentel-Santos and David Dias Neto use data from SHARE Wave 7. They not only confirm this earlier finding but also show that a western to eastern gradient exists. Eastern European countries have the lowest levels of grip strength relative to the rest of the SHARE regions and thus seem to have a higher probability of sarcopenia than their more western, northern and even southern peers (except for Spain). Although SHARE cannot disentangle the degree to which these gradients are explained by inherent or socio-cultural factors, the results from the aforementioned chapter by Rise and colleagues indicate that physical activity may reduce the risk of probable sarcopenia.

Hendrik Jürges, Anne Laferrère and Adèle Lemoine conclude this part with their chapter on palliative care and address the end of life of Europeans. The authors describe the care and need for care at the end of life and address the quality of care delivery. The authors show that room for improvement exists in the care provided at the end of life, but with large variations across countries. Although the need for relief from pain, dyspnea or anxiety before dying was similar across the countries, the need for palliative care and the quality of palliative care both differ, as does the provision of relief of pain, dyspnea or anxiety. Moreover, low income and low educational levels increase the risk of receiving inadequate palliative care. How we provide good care at the end of life deserves greater attention in society.

1.9 Dried blood spot samples

Health, as important as it becomes when individuals age, is not straightforward to measure, as the preceding part has shown. This difficulty is partially the result of the multidimensionality of health and partially the result of the subjectivity by which individuals classify themselves as healthy or ill. Wave 6 has added a key element to the health measurement: blood. Although venous blood

is the gold standard of medicine in hospitals and clinical studies, obtain venous blood samples in a population survey such as SHARE has been financially prohibitive. Therefore, SHARE has resorted to taking dried blood spot samples (DBSS) from its respondents. This part of the volume, edited by Axel Börsch-Supan, describes the first results from the laboratory analyses generated by the Danish Staten Serum Institute (SSI) in Copenhagen and the University of Washington (UW) in Seattle in the United States.

Laboratory results from DBSS assays cannot be directly compared with the results that would be obtained from assays of venous plasma samples using standard laboratory methods. Although the ‘gold standard’ values from venous blood also have considerable measurement variations, DBS values of total cholesterol, for example, have both a larger mean and a larger variance, influenced by many laboratory and fieldwork-related factors. The first chapter of this part, ‘Dried blood spot samples and their validation’, by Axel Börsch-Supan, Martina Börsch-Supan and Luzia M. Weiss summarizes an important innovation of SHARE, namely, a set of structured validation studies of the DBSS results. They establish an equation that computes a ‘gold standard’ value from the DBS value obtained from the respondents, the applicable field and laboratory conditions (e.g., temperature, humidity protection, drying time, shipment time, spot size) and donor characteristics (e.g., health, age, sex) with a degree of accuracy comparable with the measurement variation of the gold standard values obtained from plasma or wet blood.

The second chapter of this part by Luzia M. Weiss and Axel Börsch-Supan describes one element of our structured validation studies. This part explores the systematic associations of raw DBS values with a set of fieldwork conditions and quality measures. Our main result is that some of these associations are statistically significant and substantially large. Moreover, they cannot be measured in isolation but interact with each other, such as short drying time and the lack of humidity protection. The main result of this contribution is that understanding DBS results requires understanding the fieldwork process.

The Polish test study to be introduced in the third chapter of this part addresses the validation challenge head-on. This study was twofold. The first aim was to collect venous blood samples in addition to DBS samples in the sometimes-difficult circumstances of fieldwork using a population survey and to compare the analyses’ results from both types of blood samples. The second aim was to serve as the basis for a potential full-scale roll-out of the collection of biomaterials from a large and representative population. Luzia M. Weiss, Martina Börsch-Supan, Michal Myck, Kataryna Nocoń, Monika Oczkowska, Roman Topór-Mądry and Axel Börsch-Supan outline the concept and implementation of the blood sample collection in the field through this small-scale

experiment. The collected samples allowed for a meaningful comparison of the DBS and venous blood results, and the exercise has provided a number of useful lessons for the conduct of similar studies in the future.

Nis Borbye-Lorenzen and Martina Börsch-Supan conclude with the chapter ‘Identification of cytokine and lipoprotein markers for analyses in SHARE wave 6 dried blood spots’. Cytokines are small blood-based proteins prominently involved in the inflammatory process. They are signalling molecules between cells, crucial for fighting off infections, and are important in other immune responses. Cytokines are not routinely analysed in a blood count but offer innovative opportunities to better understand low-level chronic inflammation, such as in atherosclerosis and the onset of CVD. They biologically back up the results of objective cognitive testing in the survey questionnaire. This contribution describes the selection of ten protein markers to be determined from the SHARE Wave 6 DBS and their potential for studying ageing and cognitive decline.

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