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IZA DP No. 16534

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ABSTRACT

Are Senior Entrepreneurs Happier than Who? The Role of Income and Health

We propose an extension of the standard occupational choice model to analyze the life satisfaction of senior entrepreneurs as compared to paid employees and particularly retirees in Germany. The analysis identifies income and health status as main factors that shape the relationship between occupational status and life satisfaction. Senior entrepreneurs enjoy higher levels of life satisfaction than retirees and senior paid employees. This higher life satisfaction is mainly due to their higher income. Physical and mental health play a crucial role in determining both an individual's occupational status and their overall life satisfaction. We find that senior self-employed report to be healthier compared to other groups of elderly individuals. However, when controlling for health, retirees exhibit an even higher level of life satisfaction compared to their self-employed counterparts. Heterogeneity analysis of various types of senior entrepreneurs and senior paid employees confirms this general pattern. In addition, we find some evidence indicating that senior entrepreneurs may compromise their leisure time, a main asset of retired individuals. Implications for research, policy, and practitioners are discussed.

JEL Classification: L26, I31, J10, D91

Keywords: senior entrepreneurship, health conditions, well-being, life satisfaction, age

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1. Introduction

Given the rising life expectancy and rapidly aging workforce population in many developed countries (OECD/EC, 2012; Eurostat, 2023), the decision when to retire becomes an increasingly relevant issue. While most dependent employees retire when they reach the statutory or the 'common' retirement age, a considerable share of self-employed people work significantly longer (Parker, 2018). This poses the question of what keeps these people in self-employment? How can self-employment at old age be explained? Are senior entrepreneurs happier than their paid employed and particularly their retired counterparts?

Most previous studies of entrepreneurial behavior focus on the workforce population and compare entrepreneurs with paid employees and sometimes unemployed individuals. Retired individuals are usually excluded from both theoretical and empirical analysis, as the retirement option is usually available only to very few individuals of working age. However, retirement becomes a highly relevant option for the elderly cohort that should not be ignored in an assessment of their occupational choice. Thus, this paper contributes to entrepreneurship theory by proposing an extension to the standard occupational choice model (see, e.g., Lucas, 1978; Kihlstrom and Laffont, 1979) to include the retirement option, which is necessary for the analysis of entrepreneurial behavior at an older age. In our extended occupational choice model, utility that individuals draw from employment and retirement options is captured by life satisfaction instead of monetary income, which is an outcome variable in the original occupational choice model.

The proposed extension to the standard occupational choice model allows us to investigate, both theoretically and empirically, the determinants of life satisfaction of senior entrepreneurs, compared to their paid employed and retired peers. From the theoretical point of view, we demonstrate that some standard arguments explaining greater life satisfaction of entrepreneurs, e.g., the procedural utility argument or the independence argument, need some refinement when retirees instead of paid employees are the reference group for the comparison. Using the extension to the model, we formulate hypotheses about the mediating

role of two key factors that are of particularly high relevance for senior entrepreneurs' life satisfaction, namely income and health.

From the empirical point of view, our study contributes to rather scarce empirical evidence on the relationship between senior self-employment and individual well-being. While previous research on senior entrepreneurship focused primarily on the decision to set up an own business (see, e.g., Shir, 2016; Amaral and Matos, 2019), we show that, at least in a country such as Germany, a decision to set up a business at older ages is an extremely rare event (see Section 4), as starting a firm at an older age might be particularly challenging and driven by motivations other than maintaining self-employed status. Thus, our empirical analysis mainly includes elderly self-employed individuals who continue running their businesses until old age. This also means that our focus is on the reasons why aging self-employed individuals remain in business, although we also perform various robustness checks for our definition of senior entrepreneurs. One factor that could explain why a considerable share of self-employed persons stay active longer than their paid employed counterparts could be that self-employed do not face a statutory retirement age. A second reason could be earning income. Furthermore, there may be considerable non-pecuniary benefits of being self-employed, such as self-realization and personal fulfillment that may play an important role in the decision to stay economically active longer.

Our study provides several further empirical contributions that add to our understanding of the well-being of senior entrepreneurs. We compare elderly persons in different employment states – self-employment, paid employment, and retirement – to explore whether senior self-employed live happier lives than their retired or paid-employed counterparts. In our analysis, we particularly focus on the complex relationship between an individual's health conditions, employment status as well as their income and life satisfaction for several reasons. First, an individual's health status is likely to have a direct impact on their life satisfaction. Since health conditions tend to aggravate as people age, they are particularly relevant to the well-being of elderly people. Second, health conditions can determine the potential to work in self-employment or in paid employment, and therefore are an important aspect of people's resources for entrepreneurship. Third, being self-employed can affect a person's health in a positive or in a

negative way. Furthermore, while several studies investigated the relationship between self-employment and mental health, studies that include physical health are rare (Torrès and Thurik, 2019; Stephan et al., 2023). We contribute to the literature by integrating physical health, in addition to mental health and income, into the analysis, which is expected to play a crucial role for career choices of older people.

The empirical analysis is based on the German Socio-Economic Panel (SOEP), a large representative household panel of more than 20,000 individuals surveyed annually, covering the period from 2000 to 2018. This data set includes a wide set of socio-economic variables that can be used, for example, to identify senior entrepreneurs, as well as information on health conditions (both mental and physical) and personality characteristics, such as the Big Five traits and risk tolerance (see Goebel et al. 2019). The results of the empirical analysis provide support for the hypotheses formulated, indicating the crucial importance of income and health in life satisfaction of senior entrepreneurs. Moreover, they highlight the importance of considering the extended occupational choice model in studies of senior entrepreneurship.

The paper proceeds as follows. Section 2 reviews relevant theory and main results of previous research. Section 3 introduces data and the empirical strategy. Basic patterns in the data are presented in Section 4. Section 5 reports and discusses the results of multivariate analyses. Section 6 summarizes the main findings and discusses implications for policy, theory and further research.

2. The empirical picture and the related theory

2.1 The empirical phenomenon: Why are people entrepreneurs at older ages?

There is no generally accepted definition of senior entrepreneurship in the literature. Most empirical analyses of labor force dynamics at older age use the age range of 50 years and older (see also Matos et al., 2018). Previous studies identified several key motivations for being or becoming self-employed within this age group (Halvorsen and Morrow-Howell, 2017). The general pattern is that a transition from the retirement state to self-employment is a rare event and much less likely than setting up an own business before retirement (Curran and

Blackburn, 2001; Zissimopoulos and Karoly, 2007, 2009; OECD/EC, 2021). Similarly, individuals who perceive their retirement from paid employment to be involuntary are more likely to remain economically active as self-employed (van Solinge, 2014). The GEM survey shows that, while necessity motivations are not the most prevailing ones, seniors in the EU were more likely to start a business than the overall adult population because they could not find suitable employment (25% vs. 18%, respectively) (OECD/EC, 2021). Self-employed people who decide to continue their business after having achieved retirement age tend to have relatively high levels of formal education, have higher income or better access to financial resources, are well embedded in networks, or live in a region with a high level of start-up activity and well-developed entrepreneurial institutions including government programs and cultural support (Abraham et al., 2020; Cerveny et al., 2016; Singh and DeNoble, 2003; van Solinge, 2014).

In their review of literature on senior entrepreneurship, Matos et al. (2018, 529) conclude that although financial aspects may be an important determinant of senior entrepreneurship, the main drivers seem to be non-pecuniary motivations. These include, for instance, pursuit of autonomy, self-realization and the desire to feel active, useful and valuable (Soto-Simeone and Kautonen, 2021). Entrepreneurship at an older age is further associated with several psycho-biological factors such as high self-efficacy scores (van Solinge, 2014), the polygenic risk score of subjective well-being[1] (Patel et al., 2021), a positive age-based self-image[2] (Kautonen et al., 2015), the subjectively felt age[3] (Maalaoui et al., 2022), and future time perspective (Gielnik et al., 2018).

In terms of the well-being of senior entrepreneurs, research has focused mostly on job satisfaction, while studies of life satisfaction remain scarce. Senior entrepreneurs appear to be more satisfied with their activity, compared to senior

[1] The polygenic risk score of subjective well-being is the weighted combination of multiple genetic variants which captures an individual's time-invariant genetic predisposition to subjective well-being.

[2] Age-based self-image refers to an individual's perception of their entrepreneurial potential in terms of their age.

[3] Subjective age refers to the age that an individual assigns to herself and that may be different from an individual's chronological age.

paid employees, who are least satisfied if employed in large firms (D'Angelo et al., 2016) or retirees (Justo et al., 2021). Job satisfaction is also a significant determinant of the intention to prolong a career (Kautonen et al., 2012) and, therefore, could be responsible for a relatively late retirement of the self-employed (Zwier et al., 2021; Holmquist et al., 2019). Furthermore, significant improvements in job satisfaction were observed for individuals over pension age after switching to more flexible working conditions or from paid employment to self-employment (Sacco et al., 2022).[4]

Starting a business beyond the age of 50 was found to be positively associated with changes in quality-of-life domains (e.g., control, autonomy, self-realization, and pleasure), even if it leads to a decrease in income (Kautonen et al., 2017). This finding is in line with the proposition that non-pecuniary motives are more important for elderly entrepreneurs. Based on data for China, Ng et al. (2017) find that life satisfaction among the elderly cohort is particularly positively influenced by health and the economic status than in other age cohorts. Further important determinants of life satisfaction are the level of physical activity, access to social security provisions, gender (higher life satisfaction of females), education, availability of social services in the community and type of location (higher life satisfaction in cities).

There are only a handful of studies on the economic well-being or business performance of senior entrepreneurs. In general, empirical evidence suggests that older self-employed individuals are neither less nor more innovative than younger entrepreneurs (Sternberg, 2009; OECD/EC, 2021) and that starting a business at an older age can negatively affect income (Kautonen et al., 2017).

In sum, the group of senior entrepreneurs represents a highly heterogeneous group of individuals in terms of their motives for running a business. Studies of the subjective well-being of senior entrepreneurs are rare, but existing ones suggest that late-career entrepreneurship is positively associated with quality of life. It is quite remarkable that most empirical studies of the well-

[4] It should be noted, however, that these findings hold primarily for countries with well-developed institutions that are conducive to entrepreneurship, while the overall picture might be very different in countries with less developed entrepreneurial ecosystems (Fritsch et al., 2019, 2021).

being of senior entrepreneurs exclude retired individuals from their empirical analysis and use paid employees as the reference group for comparisons of well-being.

2.2 Self-employment, well-being, and age: a theory framework and hypotheses

Occupational choice theory provides a general framework for analyzing and explaining an individual's decision to be self-employed (Lucas, 1978; Kihlstrom and Laffont, 1979). According to this approach, individuals opt for self-employment if the expected income exceeds the expected income from paid employment. This classical model is applied in a wide range of studies, but it has several shortcomings when it is employed to understand the well-being of senior entrepreneurs, which we address in this paper.

Most importantly, the occupational choice model neglects retirement as a career option beyond self-employment and paid employment. This option is usually excluded in empirical studies of entrepreneurship, probably because only a relatively small fraction of the workforce population retires before achieving the statutory retirement age. However, as individuals age, the retirement option becomes highly relevant, and thus, should be considered in a realistic model of occupational choice.

A further shortcoming of the occupational choice model is that it focuses on pecuniary income as a measure the utility that individuals draw from each career option. The focus on income is inappropriate when comparing the decision to retire vs. being dependently employed or self-employed, as employed seniors would earn income in addition to pension payments. Thus, it would almost always be unprofitable for the senior individuals to retire, and everyone would choose to be actively working (either as paid- or as self-employed). This is, however, not in line with the empirical evidence. Therefore, it is crucial that the model, instead of pecuniary income, considers non-pecuniary benefits, such as subjective well-being derived by senior individuals from each career option.

To address these shortcomings of the classical occupational choice model and make it suitable for the study of senior entrepreneurship, we propose focusing on subjective well-being instead of income and introducing retirement as a career

option in addition to self-employment and paid employment. In this adjusted occupational choice model, we assume that older people assess the expected subjective well-being, measured, for example, by the life satisfaction they could achieve through their occupational choice between self-employment, paid employment, and retirement. We suppose that people choose self-employment if their expected life satisfaction from this choice is higher than their expected life satisfaction from retirement or paid employment.

Several theories can be used to assess the level of subjective well-being that senior people draw from each career option. According to the *activity theory* (Havighurst et al., 1964), older individuals who maintain the roles and activities they developed during their lives exhibit higher life satisfaction. This may suggest that people who remain economically active later in life, either as senior entrepreneurs or paid employees, experience higher life satisfaction compared to retired persons. Therefore, employment at the age of the elderly may have a positive effect on well-being regardless of income earned. In about the same vein, the *theory of continuity* (Atchley, 1989) posits that individuals try to deal with changes occurring in their lives in a way that is coherent and consistent with their past. With regard to senior entrepreneurship, this may mean that people draw utility from remaining self-employed. Altogether, we hypothesize:

H1: Senior self-employed and senior paid employed persons have higher life satisfaction than retired individuals.

According to the *procedural utility theory* (Frey et al., 2004), employed individuals draw utility from the work process itself rather than from its outcomes (e.g., wages or profits). It is further argued that self-employed individuals have a greater procedural utility than their paid employed counterparts due to higher levels of autonomy and flexibility, as well as a stronger sense of pursuing their own goals (Frey et al., 2004). Thus, self-employment stimulates a feeling of self-determination and self-efficacy (for a detailed exposition, see Shir, 2016), which might result in higher levels of subjective well-being. There is mounting empirical evidence showing that entrepreneurs draw particularly high levels of well-being from non-pecuniary factors such as autonomy and self-determination (see, e.g., Stephan et al., 2022) despite earning less as compared to paid employment (see,

e.g., Sorgner et al., 2017). These factors can play a particularly strong role for older entrepreneurs (see Section 2.1).

Relatedly, the psychological *self-determination theory* (see, e.g., Deci et al., 2001; Ryan and Deci, 2017; Van den Broeck et al., 2016) states as its core premise that individuals have three innate psychological needs—autonomy, relatedness, and competence—and that perceived fulfillment of these needs positively affects their well-being. It is argued that entrepreneurship can be conducive to fulfilling these innate needs, particularly if it is based on opportunities or is economically 'unenforced' (see, e.g., Kibler et al., 2019; Shir et al., 2019). In this way, entrepreneurship can positively contribute to the social and psychological functioning of individuals (Nikolaev et al., 2020).[5] Therefore, we expect that:

H2: Senior self-employed persons have higher life satisfaction than senior paid employees.

It should be noted that the procedural utility theory cannot be directly applied to the assessment of utility that senior individuals draw from a retirement option, because, by definition, retired people are not employed. Put differently, "being one's own boss" is not a strong argument in the comparison between self-employed and retired people because retired people do not work for a boss anyway. This means that the need for autonomy should not play a role in the decision of senior citizens to remain self-employed or retire. In addition, although retirement is associated with a secure income stream that comes without working for others, for many self-employed people this income would be much lower than what was earned before retirement. This is because self-employed people tend to have less retirement savings compared to employees (Joulfaian, 2018), for instance, because they prefer to re-invest their profits or run into debt. Hence, when choosing to be self-employed, financial aspects (income) may play a much more important role as compared to non-pecuniary aspects such as autonomy.

[5] Psychological functioning refers to living well which means "purpose-seeking, realization of personal talents and capabilities, and enlightened self-knowledge" (Ryff, 2014, 10). It should be noted that these arguments do not depend on an individual's age.

This implies that people should decide to be self-employed instead of retiring only if their expected income from self-employment is higher than the income stream from retirement. At the same time, we can expect that a higher income is positively associated with life satisfaction (Killingsworth, 2021). Put differently, if senior self-employed experience a higher level of life satisfaction than retired individuals, a main reason for this higher life satisfaction should be higher income. Altogether, income from self-employment may also be an important mediator of life satisfaction, as entrepreneurship at older ages depends on comparing the income stream that one can generate in self-employment (or in paid employment) to the income in retirement (Levesque and Minniti, 2006).

H3a: Income mediates the positive relationship between senior self-employment, as compared to retirement, and life satisfaction.

We also argue that health plays a very important role in understanding the link between self-employment and well-being at an older age. Self-employment requires a certain minimum level of physical and mental health. Since age is generally negatively related to health (Cohen, 1996), one may expect a negative effect of old age on the propensity to be self-employed. At the same time, self-employed individuals generally exhibit better health conditions compared to other occupational categories (Stephan and Roesler, 2010), although entrepreneurship can also affect health in a negative way (Williamson et al., 2021). Based on these empirical findings, it seems likely that older self-employed have a better health status than their peers of the same age. Since health is also positively related to life satisfaction (Lombardo et al., 2018), this health premium may be an important mediator in explaining the life satisfaction of older self-employed individuals. Thus, we hypothesize:

H3b: Health status mediates the positive relationship between senior self-employment, as compared to retirement, and life satisfaction.

3. Data and methods

Our empirical analysis is based on the German Socio-Economic Panel (SOEP) for the period 2000 to 2018.[6] The SOEP is an annual representative panel survey containing detailed information about the socio-economic situation of more than 20,000 persons living in more than 10,000 households in Germany.[7] The SOEP was frequently used to study the entrepreneurial behavior of individuals, including their well-being. Our target population are senior individuals whom we define, in accordance with the literature, as individuals aged 50 years and older.

Our dependent variable is an individual's self-reported level of life satisfaction that is measured by the response to the question "*How satisfied are you with your life, all things considered?*" This variable is measured on an 11-point Likert scale, where the value of 0 indicates complete dissatisfaction and the value of 10 means complete satisfaction. Life satisfaction is intended to represent a broad, reflective appraisal that a person makes of his or her life. It is the by far most widely used concept for measuring well-being and has a high level of validation (Pavot and Diener, 2008). Although the measure of life satisfaction is related to happiness, it differs in the sense that responses to the question about a person's life satisfaction tend to be considerably more stable over time and less influenced by momentary incidences (Lucas et al., 1996; Diener et al., 2013). This type of question is well established in empirical research on well-being and responses have been shown to have a high level of validity (see Diener et al., 2013).

The key explanatory variable is an individual's current employment status in the main occupation, which contains three categories: retired, paid employee, and self-employed. In additional analyses, we further distinguish between

[6] The sample does not cover years affected by the Covid-19 pandemic. The start year for the analysis is 2000, because some of the key variables, such as health domains, are not available for earlier waves of the SOEP.

[7] The SOEP is similar to the PSID (Panel Study of Income Dynamics) in the US and the BHPS (British Household Panel Survey) in the UK. A stable set of core questions appears every year, covering the most essential areas, such as: population and demography; education, training, and qualification; labor market and occupational dynamics; earnings, income, and social security; housing; health; and personality traits. For a detailed data description, see Goebel et al. (2019).

different subtypes of currently employed individuals[8], since there may be considerable differences between these types with regard to individual motivations and economic outcomes. The two mediating variables that we use to test our hypotheses are household net income (in Euros) and an individual's self-reported health status. A battery of further variables allow for a more detailed assessment of an individual's mental and physical health conditions (see Section 5.2).

We identify and include a large set of control variables representing factors that may severely impact individual life satisfaction including socio-demographic characteristics, measures of human and financial capital, and psychological characteristics. Table A1 in the Appendix provides an overview on the definition of the variables used in the empirical analysis. Table A2 reports descriptive statistics, and Figure A1 shows a visualized correlation matrix. The final sample yields 173,410 person-year observations of respondents aged 50 years and older excluding non-employed, unemployed, public and military servants, students and apprentices, helping family members, self-employed farmers, and paid employees in sheltered workshops for individuals with disabilities.

Our empirical strategy consists of estimating the impact of employment status on the probability that a person is satisfied with his or her life. To this end, we estimate OLS regressions where the dependent variable is the individual's self-reported life satisfaction and the key explanatory variable is an individual's current employment status. In the first step, we determine the effect of employment status on life satisfaction by successively adding various sets of control variables and observing potential changes in the effect of our key explanatory variable. We then investigate the relationship between various types of paid employment, self-employment, and life satisfaction. Finally, we explore two mechanisms that can drive the relationship between self-employment and life satisfaction, namely the role of health and the role of leisure activities.

[8] E.g., self-employed with and without employees; full-time, part-time and marginally self-employed vs. paid employees; established vs. newly self-employed.

4. Occupational status and life satisfaction at age 50+: basic patterns and observations

The number of self-employed individuals per paid employee tends to increase as people age. While this ratio tends to lie below 0.5 for individuals up to 65 years of age, it increases considerably after this threshold is reached.[9] The ratio is approximately 1 for the group of people who are 75 years old, and it is 3 for those aged 80. These numbers clearly suggest that self-employed individuals stay longer in the labor market compared to paid employees. Pointing in the same direction, Figure A2 in the Appendix shows that the share of self-employed individuals declines with increasing age at a significantly slower pace than the share of paid employees. At the same time, the propensity for a start-up drops dramatically as individuals age. While the start-up rate, i.e. the share of entrepreneurs who set up a business within the last year, is 0.51% in the age cohort of individuals aged 50-65 years, it is 0.07% among individuals aged more than 65 years. Remarkably, the average tenure of the self-employed is much longer than the average tenure of paid employees, for whom it drops after the age of 65 years (see Figure A3 in the Appendix). This insight suggests that senior paid employees are more likely to start new jobs after achieving the retirement age, while senior self-employed are more likely to continue their businesses. This insight is in line with the empirical evidence discussed earlier.

Figure 1 about here!

The scores of life satisfaction by employment status in Table 1 show that self-employed persons are on average more satisfied with their lives compared to paid employees and retired individuals, who show the lowest average level of life satisfaction. Interestingly, the share of highly satisfied self-employed (who score at least 7 on an 11-point Likert scale) is almost 10% higher (76.3 percent) than the

[9] In a number of countries such as Germany, the possibility of working in paid employment beyond the statutory retirement age is rather limited. Therefore, the main possibility for a paid employee to work beyond the statutory retirement age is self-employment. Hence, the desire to work longer may be an important motivation for starting an own business at an older age. A frequent motivation for someone to extend the working period may be that pension rights are regarded as insufficient. In recent years, this motivation has become increasingly relevant in various countries, including Germany, as occupational pension entitlements became less generous. The insufficient availability of financial resources for retirement may be particularly an issue that keeps elderly self-employed persons in business.

share of highly satisfied individuals among those who are retired (66.7%). Employers appear to be most satisfied with their lives (mean=7.44), followed by self-employed without employees (mean=7.23).

Table 1 about here!

Interestingly, a higher average life satisfaction is observed in both paid employed and self-employed individuals compared to retired individuals for all age cohorts (Figure 2). There is a trend of increasing average life satisfaction with age in the three employment categories. This increase is strongest for those who retired before their mid-60s, which is the statutory retirement age in Germany. After the age of 65 the life satisfaction of the retired population remains constant and then decreases at the age of about 80.[10]

Figure 2 about here!

In sum, the description reveals that self-employed individuals maintain their active employment status longer than paid employees. In addition, they report on average higher levels of life satisfaction compared to paid employees and retired individuals. In the next section, we perform multivariate analyses to gain insight into the key factors that contribute to greater life satisfaction among senior entrepreneurs.

5. Multivariate analyses

5.1 Main estimations

We start our multivariate analysis by regressing overall life satisfaction on employment status, controlling only for year-fixed effects (Table 2, model 1). Both employment categories, paid employed and self-employed individuals, are compared to the reference group of retired individuals. Individuals in both types of employment report significantly higher levels of life satisfaction compared to retired individuals, while the effect size for self-employed is almost three times

[10] Please note that Figure 2 shows an average value of life satisfaction for the cohort of individuals aged 80+ years old, which explains an abrupt decline in life satisfaction compared to younger age cohorts.

larger compared to the effect size for paid employees. This is in line with hypotheses 1 and 2.

Table 2 about here!

Next, in a series of estimations, we successively add various sets of control variables, such as demographics (model 2 in Table 2), human capital (model 3), wealth (model 4), income (model 5), health status (model 6), and personality traits (model 7). Remarkably, the effect of self-employment status becomes statistically non-significant (but remains positive) after adding controls for income (in model 5). This lends support to hypothesis 3a suggesting that senior self-employed individuals have an income surplus that keeps them in self-employment.[11] Most strikingly, the effect of self-employment status is reversed and becomes significantly negative after controlling for self-reported health status (model 6).[12] Adding a control variable for health status also results in a significant increase in R^2, pointing to an important role of health in overall life satisfaction. This is in line with hypothesis 3b. Lastly, adding control variables for personality traits (in model 7) leads to a further increase in R^2, but the effect of self-employment on life satisfaction is still negative.

These results clearly indicate that there is a positive self-selection of healthier people into self-employment, which appears to be a key driver of higher life satisfaction among self-employed compared to retired individuals. Table A5 in the Appendix provides further details: While approximately every second self-employed individual reports a good or very good health condition (52.3% of all self-employed), only approximately every fourth retired individual reports a comparable health condition (24.93%). Therefore, when individuals are statistically comparable in terms of their health status, self-employed individuals appear to be statistically significantly less satisfied with their lives than retired individuals. In the following analysis, we explore the possible reasons behind this effect.

[11] This income premium might be significant, as self-employed (both with and without employees) report having higher incomes than retired and paid employed individuals across all percentiles of the income distribution (see Table A4 in the Appendix).

[12] This result remains robust people over the age of 80 are excluded.

Table 3 about here!

In Table 3, we distinguish between different types of self-employed and paid employed individuals, as they may have different motivations to continue working that may affect their overall satisfaction with life. We confront the effects for various types of employment with the effects from the baseline model estimation (Table 2, model 7) that are repeated in Table 3, model 1, for convenience. For instance, one could expect that seniors might decide to be solo self-employed out of necessity, while senior entrepreneurs with employees might be driven by opportunity motives and can generally be more successful. Thus, one could expect employers to be more satisfied with their lives, while solo self-employed may be less satisfied with their lives than retired individuals. Based on the analysis in Table 3 (model 2), we cannot confirm this expectation, as both types of self-employed are significantly less satisfied with their lives compared to retired individuals. Similarly, distinguishing between full-time, part-time, and marginally self-employed (in model 3) and between young and established businesses[13] (in model 4) does not basically change the picture: self-employed are significantly less satisfied with their lives than retirees independently of the time effort they have put into their job and the duration of their activity.

Since the life satisfaction of employed individuals might be significantly affected by the degree to which they are satisfied with their job, we distinguish between paid employed and self-employed individuals with low and high scores (<7 and >=7 on an 11-point Likert scale) on job satisfaction (Table 3, model 5). The results suggest that both paid employed and self-employed with low job satisfaction are significantly less satisfied with their lives compared to retired individuals. In turn, the results for those who report high satisfaction with their job appear puzzling. While paid employees who are happy in their job are expectedly more likely to report higher levels of life satisfaction, the self-

[13] Young businesses are defined as being 1 year old and younger. Start-ups by senior individuals is a very rare event in our data set, while most senior self-employed individuals report being in entrepreneurship for more than 1 year.

employed who are highly satisfied with their job are significantly less likely to be satisfied with their lives compared to retired people.[14]

To explore the influence of income and health in this relationship, we exclude control variables for both income and health status in model 6, and, in model 7, we only exclude the health status while keeping the income control variable. In both models, self-employed with high levels of job satisfaction are also significantly more satisfied with their lives. Thus, income and health conditions appear to be the key factors that mediate the link between self-employment and life satisfaction of the elderly. This is in line with hypotheses 3a and 3b. It is somewhat surprising that self-employment is even negatively linked to life satisfaction after accounting for health conditions. Therefore, we explore the role of health in more detail.

5.2 Exploring the role of health

In exploring the role of health in the life satisfaction of senior individuals, we first want to understand if physical or mental health status is responsible for the observed change in the effect sign (see Section 5.1). A battery of questions on health-related quality of life (the SF-12v2 health survey[15]) is included in the SOEP biannually starting in 2002. It is meant to measure eight domains of health that are then combined by means of a factor analysis into two superordinate scales, the Physical Component Summary (PCS) and Mental Component Summary (MCS) (see Andersen et al., 2007). In SOEP, the original scales are standardized through z-transformation (mean value = 0, standard deviation = 1) and then linearly transformed to a mean value of 50 and a standard deviation of 10. This procedure results in "norm-based scores" (NBS) of the eight health

[14] We repeated this analysis for various subsamples, such as by income quartiles, sector, the level of formal education, and gender. While the general pattern of the results is comparable across the subsamples, the negative effect is strongest for the self-employed with high job satisfaction in services, those without a tertiary degree, and for females. The results are available from the authors upon request.

[15] The SF-12v2® Health Survey is a practical, reliable, and valid measure of physical and mental health. It is a 12-item short-form health survey that assesses the same eight health domains as the SF-36v2® Health Survey, acting as an abridged version with one or two questions per domain: physical functioning, role-physical, bodily pain, general health, vitality, social functioning, role-emotional, and mental health. Each health domain score contributes to the Physical Component Summary (PCS) and Mental Component Summary (MCS) scores.

subscales. The analysis of correlations reveals that the self-reported health status that we used in previous estimations is highly correlated with the measure of physical health, PCS (r=0.77), and only moderately correlated with the indicator of mental health, MCS (r=0.35).

Table 4 about here!

Table 4, models 2 and 3, shows the results of estimations with the PCS and MCS replacing the health status variable and included separately, while both components are included simultaneously in model 4. According to the results, both physical and mental health are important for life satisfaction of self-employed individuals, while the negative effect of being self-employed is almost three times greater when only physical health is controlled. This is also true for paid-employed individuals. In model 3 that only controls for mental health, paid employees are more satisfied with their lives than retired individuals, which is the opposite of the result of the model that controls for physical health. In model 5, we show the effects of eight health domains that are used to calculate PCS and MCS. Due to considerable correlation of the single components, the estimated coefficients should be interpreted with great caution. Furthermore, in Table 4 (model 6) we control for the legally attested degree of disability (0-100) that may refer to physical and mental health. The results remain robust to this model specification. Lastly, we explore whether the effects vary between people with and without disabilities (models 7 and 8). Interestingly, the effect of self-employment is not statistically significant in the sample of individuals with a high share of legally attested disabilities (>30%), while the results of the baseline model are confirmed in the sample of individuals with a low share of legally attested disabilities (<=30%).

5.3 Life satisfaction and leisure activities

Our previous analysis showed that, after controlling for income and health conditions, senior entrepreneurs are significantly less satisfied with their lives than retired people. This observation raises the question: Are senior self-employed

individuals compromising their leisure time by dedicating a significant share of their time to their job?[16]

Table 5 about here!

To answer this question, we use a set of variables from SOEP that measure the frequency of various types of leisure activities.[17] The results of a single-factor analysis of variance (ANOVA) reported in Table 5 suggest that there are statistically significant differences between retired, paid-employed, and self-employed individuals in average values for all types of activities, except visiting friends. Leisure activities performed more frequently by self-employed individuals than by paid employed and retired individuals include going out, going on excursions or short trips, visiting opera, visiting cinema, exercising active sport, artistic and musical activities, volunteering, and participating in political parties, local politics, or citizen initiatives. Leisure activities performed less frequently by self-employed than by paid employees and retired individuals are visiting family, handicrafts, repairs, gardening, and visiting church.

Remarkably, self-employed individuals who are highly satisfied with their job report being more frequently involved in leisure activities than the entire sample of self-employed. Despite the wide range of activities that self-employed perform more frequently than paid employed and retired people, they are on average least satisfied with their leisure time. An explanation for this result could be that self-employed individuals are generally more active and involved in social life and would prefer to have more time to perform various types of leisure activities.

Table 6 about here!

[16] For instance, various leisure activities, such as participation in art events, socializing, and going on trips, were found to be positively related to well-being of economically inactive population (Akay et al., 2021).

[17] These variables include survey items measured on a 5-point Likert scale (1=never, 2=rarely, 3=min. once per month, 4=min. once per week, 5=daily). The following survey items were asked in 2003, 2008, 2013, 2017, 2018: going out; visiting friends; visiting family; short trips; handicrafts, repairs, gardening; visiting sport events. The following survey items were asked biannually starting from 2001 and also in 2008 and 2018: visiting opera; visiting cinema; exercising active sport; artistic and musical activities; helping friends; volunteering; participating in political parties, local politics, citizens' initiatives; and visiting church.

In Table 6, we test whether the frequency of leisure activities and satisfaction with leisure time impact life satisfaction and if they may explain the lower life satisfaction of self-employed individuals (with high job satisfaction). We estimate several models because some items on leisure activities were raised in different years, so that it would be inappropriate to estimate the model with all variables included. When controlling for frequencies of various types of leisure activities, the effect of self-employed who are satisfied with their jobs becomes statistically insignificant (Table 6, models 1 and 2). In models that additionally control for the level of satisfaction with leisure time (Table 6, models 3 and 4), self-employed with high job satisfaction are significantly more likely to be also satisfied with their lives compared to retired individuals. Thus, it appears that on average lower satisfaction with leisure time of self-employed individuals can at least partly explain their lower life satisfaction compared to the reference group of retired persons.

6. Discussion and conclusions

6.1 Main results

Comparing the share of self-employed, paid employees, and retired persons among different age cohorts, we confirm, for the case of Germany, that self-employed individuals tend to retire later than paid employees. Since elderly people, particularly once they retired, show a rather low propensity to start an own business, most senior entrepreneurs that we observe in our sample are owners of established businesses who have been in self-employment for more than one year.

Prima facie, senior self-employed tend to report higher life satisfaction than paid employees and particularly higher life satisfaction than retired persons. However, if income is controlled for, the difference of life satisfaction between self-employed and retired people is no longer statistically significant. This result suggests that the higher life satisfaction of self-employed as compared to retirees is mainly due to the on average higher income of the self-employed. Furthermore, an advantage of ‘being one’s own boss’ does not apply to retirees. The higher average income of self-employed individuals may be regarded as a compensation for the time that they spend in entrepreneurship, while retired individuals receive

their income without actively engaging in work. Remarkably, paid employees still express higher life satisfaction than retired persons when income is controlled for.

Including a person's health status in the empirical model leads to a rather pronounced increase in the R^2 value, indicating that the health status has a relatively strong effect. Quite strikingly, when accounting for health status, the estimations indicate significantly lower life satisfaction of self-employed individuals and of paid employees compared to retired persons. This result clearly suggests that there is a positive selection of healthier individuals into self-employment. Therefore, a relatively good health status appears to be a key driver of higher life satisfaction among senior self-employed compared to retirees.

We find that senior self-employed are more engaged in the different types of leisure activities than retirees. This indicates that senior self-employed people tend to have a more active life than their retired counterparts. However, they express lower satisfaction with their leisure time, which is probably a result of the time they need to engage in entrepreneurship as well as their greater participation in various types of leisure activities.

6.2 Practical implications

The differences of retirement ages between self-employed and paid employees suggest that the retirement of at least some paid employees can be regarded involuntary and enforced by the regulation of a statutory retirement age. A general conclusion that may be drawn from this observation is that more flexibility with regard to the age at which someone is more or less forced to retire would be welfare enhancing. We also observe that start-up propensity among elderly people is very low. An explanation for these low entry rates could be that retirement offers an instant and secure income stream while it may require a longer period of time until running a new business may generate an (uncertain) income that may not be satisfying (see also Levesque and Minniti, 2006). At the same time, we find that income is a crucial factor in explaining why older self-employed report a higher life satisfaction compared to retirees.

The strong impact of a person's health condition on her or his life satisfaction and the propensity to be self-employed clearly suggests that a policy

that tries to keep older self-employed in business needs to consider their health limitations. Quite obviously, elderly persons with poor health conditions have hardly any option to increase their income, be it in self-employment or in paid employment. In cases where poor health conditions impede attempts to earn additional income, public support is required if pensions are below the poverty level.

Our findings also have implications for (younger) entrepreneurs. Since health conditions are a crucial factor in obtaining well-being from self-employment at older age, younger entrepreneurs should proactively address potential ill-health that may arise later due to the mental and physical demands of their entrepreneurial activity. There are several tools for remaining healthy as an entrepreneur (for an overview, see Williamson et al. 2021). Our results can help shaping awareness among younger entrepreneurs that poor health at older ages implies that self-employment may even be negatively linked to life satisfaction.

6.3 Conclusions for theory

The main conclusions for theory development concern models that attempt to explain occupational choice (Lucas, 1978; Kihlstrom and Laffont, 1979). Since the choice of a certain occupational status may be considerably influenced by intrinsic motivations, such theories could be more relevant and powerful if they would use life satisfaction (instead of income) as the outcome variable because life satisfaction is more appropriate to account for intrinsic motivations than monetary income. Furthermore, our analyses suggest that when analyzing self-employment at older ages it may be more meaningful to compare life satisfaction in self-employment with life satisfaction in retirement instead of paid employment. This is pivotal as standard arguments from the previous literature do not apply when retired people are the reference group.

Our results provide a strong indication that health conditions are an important element of a person's entrepreneurial ability. This is in line with Hatak and Zhou (2021) who conceptualize health as an extension of the human capital that can influence monetary and nonmonetary entrepreneurial success. This recognition is particularly relevant to explain the occupational choice and performance of people of older age when health conditions tend to deteriorate.

Therefore, our work demonstrates that the standard occupational choice model needs to be extended to provide more realistic guidance to understand the link between life satisfaction and well-being in the case of elderly people.

6.4 Avenues for further research

Given the demographic developments in many countries towards an aging society, investigating the motivations, circumstances, and effects of senior self-employment is a relatively relevant field. In contrast to its growing relevance, senior entrepreneurship is still very under-researched. This includes the relationship between entrepreneurial activity and life satisfaction. Exploring the underlying reasons for individual variations in the relationship between entrepreneurial activity and life satisfaction is of significant interest in explaining the motivations and relevant incentives for elderly people to stay or to become self-employed. For example, why do some people strive for early retirement, while others prefer to stay in entrepreneurship (and also in paid employment) even after having achieved the statutory retirement age? To what extent does the actual retirement age reflect individual differences in the relationship between life satisfaction and entrepreneurship (or working as a paid employee)?

We also know little about the characteristics of senior entrepreneurs' businesses and how they differ from those of younger self-employed with regard to issues such as industry, size and innovativeness. How large is the share of necessity entrepreneurship among senior self-employed (and also among senior paid employees)? Do older self-employed individuals have stronger motivations towards 'social' entrepreneurship? Similarly, we also need a better understanding of the characteristics of paid employees at older ages. Comparing this group to retired people is interesting as well. For example, our remarkable result that paid employees still express higher life satisfaction than retired persons when income is controlled for deserves further investigation.

Furthermore, it is important to understand the complex relationships between self-employment and well-being at older ages in different (institutional and cultural) contexts. One may well expect that particularly labor market regulations (strictness of the statutory retirement age), the level of pensions as well as the generosity of the welfare system shape individual behavior (Fritsch et

al. 2019b, 2021). In our paper, we analyzed the specific German context. Future research should investigate and compare the situation in other countries to provide a more complete picture.

The great importance of an individual's health conditions for life satisfaction and the propensity for entrepreneurial activity that we found requires more detailed investigation. While several studies focused on the relationship between mental health and entrepreneurship (Stephan, 2018), rather little is known about the role of physical health conditions in self-employment. What is the role of different aspects of health conditions for the entrepreneurial ability of a person? What are the types of businesses that are run by people with certain health restrictions? Are there differences with regard to the role of health restrictions between old and young people? Can self-employment at an older age strengthen and preserve a person's mental health? Is there a self-reinforcing effect of senior entrepreneurship based on mental health conditions?

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Tables and Figures

Table 1: Life satisfaction by employment status

Life satisfaction	Full sample	Retired	Paid employees	Self-employed	Solo self-employed	Employers
0	0.38	0.51	0.2	0.16	0.16	0.15
1	0.46	0.56	0.31	0.36	0.4	0.32
2	1.22	1.39	0.94	1.16	1.32	0.95
3	2.41	2.63	2.1	2.16	2.38	1.88
4	3.37	3.56	3.12	2.95	3.25	2.56
5	12.14	13.44	10.69	8.12	8.93	7.09
6	10.87	11.22	10.64	8.82	9.5	7.95
7	20.75	19.54	22.8	20.38	20.15	20.69
8	31.02	30.03	32.23	33.51	33.15	33.98
9	11.79	10.84	12.51	16.64	15.38	18.26
10	5.6	6.28	4.46	5.74	5.4	6.18
>=7	*69.16*	*66.69*	*72*	*76.27*	*74.08*	*79.11*
Total	100%	100%	100%	100%	100%	100%
Mean	7.05	6.97	7.13	7.32	7.23	7.44
Standard deviation	1.80	1.87	1.67	1.71	1.75	1.66
Number of observations	173,410	101,336	61,286	10,788	6,061	4,727

Table 2: Estimation of baseline models

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		(1) + demographics	(2) + human capital	(3) + wealth	(4) + income	(5) + health status	(6) + personality traits
Retired				Reference			
Paid employed	0.123***	0.375***	0.269***	0.211***	0.143***	-0.0683***	-0.0885***
	(0.019)	(0.028)	(0.027)	(0.029)	(0.029)	(0.023)	(0.023)
Self-employed	0.334***	0.486***	0.272***	0.134***	0.00279	-0.231***	-0.313***
	(0.038)	(0.040)	(0.041)	(0.042)	(0.042)	(0.036)	(0.034)
Regional FE	No	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	6.970***	1.475***	2.083***	1.954***	-1.682***	-1.506***	-1.929***
	(0.022)	(0.397)	(0.405)	(0.440)	(0.480)	(0.387)	(0.384)
Number of observations	173410	172302	169552	149507	149503	149303	143504
F-statistic	48.25***	48.86***	57.13***	51.44***	59.47***	238.77***	247.14***
R^2	0.0108	0.0495	0.0653	0.0715	0.0797	0.272	0.312

Notes: Pooled OLS regressions with standard errors clustered at the level of individuals. Dependent variable: overall life satisfaction. Control variables in various models: demographics (age, male, German nationality, marital status, type of household, location in East Germany, region), human capital (years of formal education, years of work experience), wealth (log of household net wealth, property owner), income (log of household net income), health status, personality traits (the Big Five, willingness to take risks). Statistical significance: ***p<0.000, **p<0.05, *p<0.1. Estimates of the effects of control variables are reported in Table A3 in the Appendix.

Table 3: Life satisfaction by employment types

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Baseline model	Solo self-employed vs. employ-ers	Type of em-ployment (full-time, part-time, marginal)	Duration of self-employment	High vs. low job satisfaction	(5) without income and health status	(5) without health status
Retired				Reference			
Paid employed	-0.0885***	-0.0880***		-0.0889***			
	(0.023)	(0.023)		(0.023)			
Self-employed	-0.313***						
	(0.034)						
Solo self-employed		-0.328***					
		(0.042)					
Employer		-0.292***					
		(0.043)					
Full-time paid employee			-0.114***				
			(0.026)				
Part-time paid employee			-0.0451				
			(0.029)				
Marginal paid employee			-0.0948**				
			(0.038)				
Full-time self-employed			-0.364***				
			(0.039)				
Part-time self-employed			-0.125**				
			(0.056)				
Marginal self-employed			-0.262***				
			(0.062)				
Self-employed > 1 year				-0.304***			
				(0.035)			
Self-employed <= 1 year				-0.514***			
				(0.093)			
Paid employed – low job satisfaction					-0.575***	-0.555***	-0.600***
					(0.027)	(0.032)	(0.032)
Paid employed – high job satisfaction					0.134***	0.414***	0.359***
					(0.023)	(0.026)	(0.027)
Self-employed – low job satisfaction					-1.027***	-0.991***	-1.045***
					(0.059)	(0.064)	(0.064)
Self-employed – high job satisfaction					-0.0671**	0.247***	0.139***
					(0.032)	(0.035)	(0.035)
Constant	-1.929***	-1.924***	-1.890***	-1.915***	-1.141***	2.181***	-0.643
	(0.384)	(0.384)	(0.386)	(0.384)	(0.378)	(0.403)	(0.441)
Number of observations	143,504	143,504	143,504	143,504	143,504	143,701	143,699
F-statistic	247.14***	243.25***	232.94***	243.52***	272.82***	149.38***	154.33***
R^2	0.312	0.312	0.312	0.312	0.328	0.198	0.203

Notes: Pooled OLS regressions with standard errors clustered at the level of individuals. Dependent variable: overall life satisfaction. Low job satisfaction: less than 7 on an 11-point Likert scale; high job satisfaction: greater than or equal 7 on an 11-point Likert scale. All models include a full set of control variables. Baseline model (1) as in Table 2, model (7). Statistical significance: ***p<0.000, **p<0.05, *p<0.1.

Table 4: The role of physical and mental health for life satisfaction

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Baseline model	Physical health	Mental health	Physical and mental health	Health domains (NBS)	Legally attested degree of disability (%)	Legally attested disability >30%	Legally attested disability <=30%
Retired					Reference			
Paid employed	-0.0885***	-0.0676**	0.0694***	-0.0790***	-0.0279	-0.0940***	-0.00655	-0.147***
	(0.023)	(0.028)	(0.026)	(0.024)	(0.023)	(0.026)	(0.060)	(0.028)
Self-employed	-0.313***	-0.282***	-0.103***	-0.261***	-0.209***	-0.309***	-0.0566	-0.362***
	(0.034)	(0.040)	(0.037)	(0.036)	(0.034)	(0.038)	(0.132)	(0.039)
Health status: 1=very bad .. 5=very good	0.766***							
	(0.009)							
PCS: Summary scale physical health (NBS)		0.0442***		0.0466***				
		(0.001)		(0.001)				
MCS: Summary scale mental health (NBS)			0.0714***	0.0729***				
			(0.001)	(0.001)				
Physical functioning (NBS)					-0.00179**			
					(0.001)			
Role-physical (NBS)					-0.00327***			
					(0.001)			
Bodily pain (NBS)					0.000311			
					(0.001)			
General health (NBS)					0.0448***			
					(0.001)			
Vitality (NBS)					0.0124***			
					(0.001)			
Social functioning (NBS)					0.0153***			
					(0.001)			
Role-emotional (NBS)					0.0152***			
					(0.001)			
Mental health (NBS)					0.0397***			
					(0.001)			
Disability degree, in %						-0.0108***	-0.0125***	-0.0108***
						(0.000)	(0.001)	(0.004)
Constant	-1.929***	-2.730***	-1.934***	-2.956***	-3.173***	-0.559	-0.0311	-0.32

Table 4 (cont'd.)

	(0.384)	(0.469)	(0.440)	(0.409)	(0.394)	(0.437)	(1.114)	(0.455)
Number of observations	143,504	67,376	67,376	67,376	67,376	143,699	28,121	112,781
F-statistic	247.14***	151.78***	225.96***	292.75***	308.41***	126.57***	33.37***	86.65***
R^2	0.312	0.227	0.313	0.372	0.4	0.198	0.2	0.165

Notes: Pooled OLS regressions with standard errors clustered at the level of individuals. Dependent variable: overall life satisfaction. All models include a full set of control variables. NBS = norm-based scores. Baseline model (1) as in Table 2, model (7). Statistical significance: ***p<0.000, **p<0.05, *p<0.1.

Table 5: Leisure activities and satisfaction with leisure time by employment status

	Retired		Paid employees		Self-employed		Self-employed (high job satisfaction)		Test of differences in means between retired, paid employees and self-employed people: oneway ANOVA
Frequency of leisure activities	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Statistical significance
Going out	2.45	1.00	2.64	0.89	2.98	0.96	3.07	0.94	***
Visiting friends	2.97	0.99	2.99	0.85	2.99	0.84	3.04	0.83	
Visiting family	3.30	1.01	3.21	0.94	3.00	0.93	3.04	0.92	***
Excursions, short trips	2.13	0.80	2.23	0.66	2.33	0.70	2.39	0.69	***
Handicrafts, repairs, gardening	3.23	1.48	3.30	1.24	3.15	1.24	3.16	1.23	***
Visiting sport events	1.36	0.69	1.61	0.81	1.57	0.79	1.60	0.81	***
Visiting opera	1.82	0.78	1.90	0.68	2.12	0.73	2.17	0.73	***
Visiting cinema	1.45	0.69	1.87	0.71	1.94	0.76	1.97	0.76	***
Exercising active sport	2.07	1.39	2.46	1.37	2.65	1.38	2.72	1.37	***
Artistic and musical activities	1.63	1.00	1.76	1.01	1.95	1.11	1.98	1.12	***
Helping friends	2.22	0.95	2.45	0.77	2.32	0.77	2.33	0.77	***
Volunteering	1.54	1.01	1.65	1.04	1.86	1.15	1.91	1.17	***
Participating in political parties, local politics, citizens' initiatives	1.14	0.48	1.16	0.51	1.29	0.71	1.30	0.72	***
Visiting church	1.89	1.06	1.72	0.94	1.69	0.91	1.71	0.92	***
Satisfaction with leisure time	8.06	1.87	6.85	2.09	6.49	2.46	6.79	2.35	***

Notes: Frequency of leisure activities is measured on a 5-point Likert scale (1=never, 2=rarely, 3=min. once per month, 4=min. once per week, 5=daily). Statistical significance for the oneway ANOVA test: ***p<0.000.

Table 6: Life satisfaction and leisure activities

	(1)	(2)	(3)	(4)
Retired		Reference		
Paid employee – low job satisfaction	-0.540***	-0.603***	-0.206***	-0.259***
	(0.045)	(0.034)	(0.045)	(0.033)
Paid employee – high job satisfaction	0.182***	0.147***	0.321***	0.313***
	(0.036)	(0.027)	(0.035)	(0.026)
Self-employed – low job satisfaction	-0.970***	-0.990***	-0.534***	-0.532***
	(0.092)	(0.077)	(0.094)	(0.074)
Self-employed – high job satisfaction	-0.0496	-0.011	0.202***	0.268***
	(0.050)	(0.039)	(0.050)	(0.038)
Going out	0.0476***		0.0342***	
	(0.013)		(0.012)	
Visiting friends	0.0513***		0.0227*	
	(0.013)		(0.012)	
Visiting family	0.0599***		0.0514***	
	(0.012)		(0.011)	
Excursions, short trips	0.188***		0.140***	
	(0.015)		(0.015)	
Handicrafts, repairs, gardening	0.0292***		0.0141*	
	(0.008)		(0.008)	
Visiting sport events	-0.0104		-0.0155	
	(0.013)		(0.013)	
Visiting opera		0.118***		0.0878***
		(0.013)		(0.012)
Visiting cinema		-0.0106		-0.0190*
		(0.011)		(0.011)
Exercising sport		0.0177***		0.00252
		(0.006)		(0.006)
Artistic and musical activities		0.0015		-0.00871
		(0.008)		(0.008)
Helping friends		0.0862***		0.0692***
		(0.009)		(0.009)
Volunteering		-0.00568		-0.0143*
		(0.008)		(0.008)
Participating in political parties, local politics, citizens' initiatives		-0.0276*		-0.000456
		(0.016)		(0.015)
Visiting church		0.0839***		0.0812***
		(0.009)		(0.009)
Satisfaction with leisure time			0.215***	0.216***
			(0.006)	(0.005)
Constant	-0.874	-0.28	-2.261***	-1.542***
	(0.621)	(0.457)	(0.609)	(0.437)
Number of observations	22,216	52,256	21,638	51,717
F-statistic	145.78***	227.06***	175.52***	286.96***
R^2	0.342	0.342	0.393	0.396

Notes: Pooled OLS regressions with standard errors clustered at the level of individuals. Dependent variable: overall life satisfaction. Low job satisfaction: less than 7 on an 11-point Likert scale; high job satisfaction: greater than or equal 7 on an 11-point Likert scale. All models include a full set of control variables. Statistical significance: ***p<0.000, **p<0.05, *p<0.1.

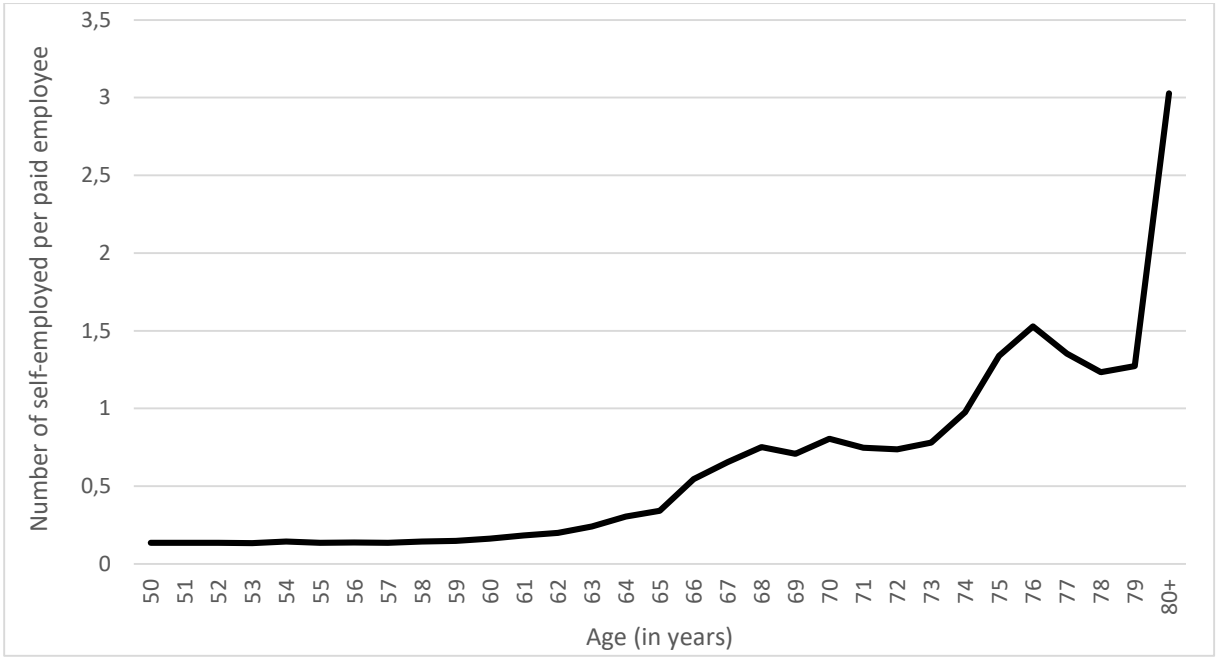

Figure 1: Self-employed–to–paid employed ratio by age

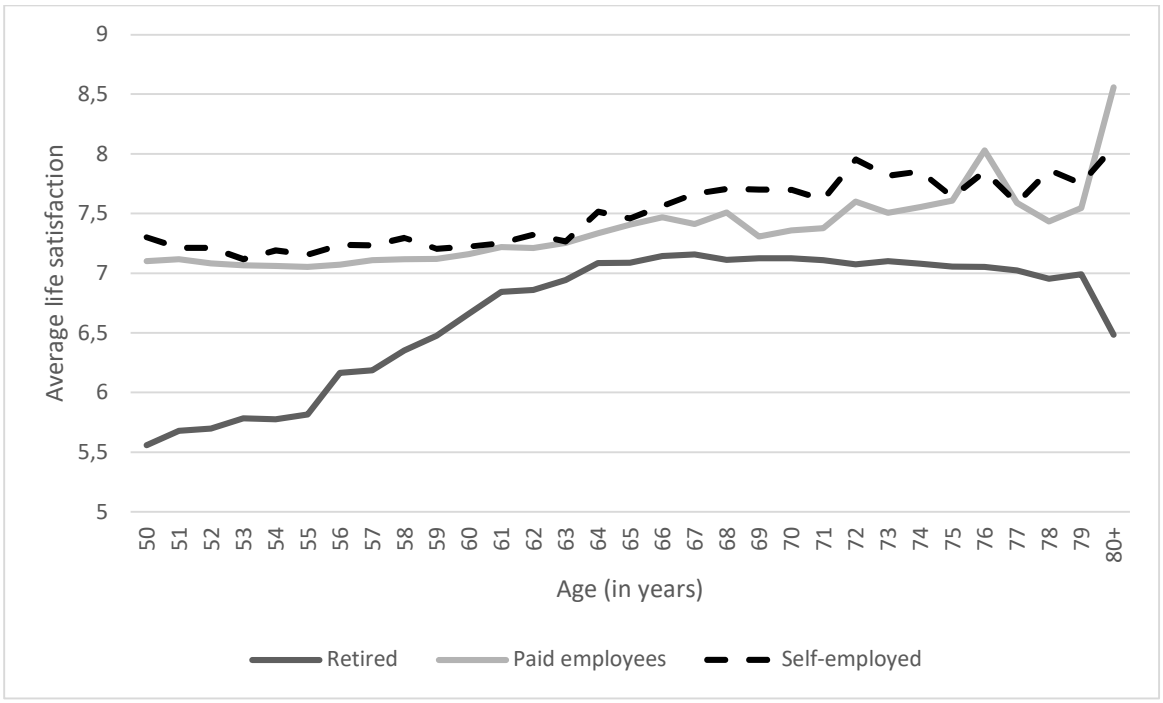

Figure 2: Average life satisfaction by age and employment status

Note: Life satisfaction is measured on an 11-point Likert scale

Appendix: Tables and Figures

Table A1: List of variables

Variable	Measurement
Life satisfaction	Response on an 11-point Likert scale to the question "*How satisfied are you with your life, all things considered?*", where 0 means completely dissatisfied and 10 means completely satisfied.
Employment status	The variable was built using the information on the current employment status. It contains three categories: retired, paid employed, and self-employed. The following employment categories are excluded from the sample: self-employed farmers, non-employed, unemployed, students, public and military servants, helping family members, paid employees in sheltered workshops for individuals with disabilities.
Male	Gender dummy: =1 if male, =0 if female
Age	Age, in years
German nationality	=1 if German, =0 otherwise
Marital status	Marital status categories: single, married, separated, divorced, widowed
Household type	Single person, couple without children, single parent, couple with children less or equal 16 years old, couple with children > than 16 years old, couple with children less or equal and greater than 16 years old, multiple generation household, other combination
Region	Federal state dummies
East Germany	Dummy variable for location in East Germany (=1 if East, =0 if West)
Years of formal education	Number of years of formal education
Years of work experience	Number of years of work experience (full- and part-time)
Log of household net income	Natural logarithm of household net income, in €
Log of household net wealth	Natural logarithm of household net wealth, in €
Property owner	Dummy variable for owner of property in which a respondent resides (=1 if yes, =0 if no)
Health status	Response on a 5-point Likert scale ranging from 1 (very bad) to 5 (very good)
Big Five personality traits:	Scale: 1 ('does not apply to me at all') to 7 'applies to me perfectly'.
Conscientiousness	An average of response scores to the questions: I see myself as someone who: "does a thorough job", "does things effectively and efficiently", "tends to be lazy" (reversed scale).
Extraversion	An average of response scores to the questions: I see myself as someone who: "is communicative, talkative", "is outgoing, sociable", "is reserved" (reversed scale).
Agreeableness	An average of response scores to the questions: I see myself as someone who: "has a forgiving nature", "is considerate and kind to others", "is sometimes somewhat rude to others" (reversed scale).
Openness	An average of response scores to the questions: I see myself as someone who: "is original, comes up with new ideas", "values artistic experiences", "has an active imagination".
Neuroticism	An average of response scores to the questions: I see myself as someone who: "worries a lot", "gets nervous easily", "is relaxed, handles stress well" (reversed scale).
Willingness to take risks	Response on an 11-point Likert scale to the question *"Are you generally a person who is willing to take risks or do you try to avoid taking risks?"*, where 0 means not at all willing to take risks and 10 means very willing to take risks.

Table A2: Descriptive statistics for the full sample

Variable	Number of observations	Mean	Standard deviation	Median	Minimum	Maximum
Life satisfaction	173,410	7.05	1.8	7	0	10
Employment status: Retired	173,410	0.58	0.49	1	0	1
Employment status: Paid employed	173,410	0.35	0.48	0	0	1
Employment status: Self-employed	173,410	0.06	0.24	0	0	1
Male	173,509	0.49	0.50	0	0	1
Age	173,507	65.14	10.16	65	50	105
German nationality	173,509	0.95	0.22	1	0	1
Marital status: Single	172,403	0.05	0.21	0	0	1
Marital status: Married	172,403	0.69	0.46	1	0	1
Marital status: Separated	172,403	0.02	0.15	0	0	1
Marital status: Divorced	172,403	0.09	0.29	0	0	1
Marital status: Widowed	172,403	0.14	0.35	0	0	1
Household type: single person	173,509	0.21	0.41	0	0	1
Household type: couple without children	173,509	0.55	0.50	1	0	1
Household type: single parent	173,509	0.04	0.19	0	0	1
Household type: couple with children < 16	173,509	0.03	0.16	0	0	1
Household type: Couple with children > 16	173,509	0.13	0.33	0	0	1
Household type: Couple with children < and > 16	173,509	0.02	0.15	0	0	1
Household type: Multiple generation	173,509	0.01	0.12	0	0	1
Household type: other combination	173,509	0.01	0.12	0	0	1
East Germany	173,509	0.25	0.44	0	0	1
Years of formal education	172,587	11.95	2.64	11	7	18
Years of work experience	171,478	31.94	10.64	34	0	87.7
Log of household net income	173,452	10.30	0.63	10.28	3.30	14.22
Log of household wealth	151,238	11.47	1.72	11.92	1.10	18.09
Property owner	173,480	0.58	0.49	1	0	1
Health status	173,289	3.05	0.94	3	1	5
Conscientiousness	160,939	5.94	0.92	6	1	7
Extraversion	160,924	4.73	1.11	4.67	1	7
Agreeableness	160,963	5.46	0.99	5.67	1	7
Openness	160,879	4.46	1.25	4.33	1	7
Neuroticism	160,952	3.88	1.24	4	1	7
Willingness to take risks	167,900	4.16	2.38	4	0	10

Table A3: Effects of control variables in baseline models

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		(1) + demograhics	(2) + human capital	(3) + wealth	(4) + income	(5) + health status	(6) + personality traits
Retired				Reference			
Paid employed	0.123***	0.375***	0.269***	0.211***	0.143***	-0.0683***	-0.0885***
	(0.0186)	(0.0275)	(0.0273)	(0.0289)	(0.0290)	(0.0232)	(0.0228)
Self-employed	0.334***	0.486***	0.272***	0.134***	0.00279	-0.231***	-0.313***
	(0.0376)	(0.0401)	(0.0406)	(0.0420)	(0.0418)	(0.0355)	(0.0344)
Male		-0.0145	-0.167***	-0.133***	-0.124***	-0.104***	-0.115***
		(0.0204)	(0.0223)	(0.0239)	(0.0236)	(0.0191)	(0.0193)
Age		0.147***	0.100***	0.0809***	0.0949***	0.0507***	0.0559***
		(0.0115)	(0.0119)	(0.0129)	(0.0128)	(0.0102)	(0.00988)
Age, squared		-0.00101***	-0.00069***	-0.000555***	-0.000642***	-0.000249***	-0.000291***
		(0.000084)	(0.0000865)	(0.0000939)	(0.0000935)	(0.0000742)	(0.0000718)
German nationality		0.334***	0.159***	0.0234	0.0217	0.0404	0.0189
		(0.0454)	(0.0460)	(0.0565)	(0.0558)	(0.0450)	(0.0447)
Single		Reference	Reference	Reference	Reference	Reference	Reference
Married		0.0962*	0.133**	0.107*	0.116*	0.121**	0.0698
		(0.0567)	(0.0568)	(0.0616)	(0.0607)	(0.0494)	(0.0477)
Separated		-0.314***	-0.264***	-0.229***	-0.227***	-0.225***	-0.303***
		(0.0796)	(0.0794)	(0.0872)	(0.0864)	(0.0700)	(0.0676)
Divorced		-0.113**	-0.0579	0.0528	0.0541	0.0237	-0.0632
		(0.0568)	(0.0567)	(0.0619)	(0.0609)	(0.0491)	(0.0472)
Widowed		0.0417	0.158***	0.0975	0.0386	0.0274	-0.0545
		(0.0567)	(0.0566)	(0.0614)	(0.0606)	(0.0489)	(0.0471)
Single person household		Reference	Reference	Reference	Reference	Reference	Reference
Couple without children		0.269***	0.288***	0.124***	-0.121**	-0.0456	-0.00534
		(0.0434)	(0.0435)	(0.0477)	(0.0493)	(0.0400)	(0.0388)
Single parent		-0.196***	-0.182***	-0.225***	-0.380***	-0.256***	-0.184***
		(0.0509)	(0.0510)	(0.0560)	(0.0563)	(0.0455)	(0.0436)
Couple with children < 16		0.272***	0.290***	0.147**	-0.135**	-0.111**	-0.0734
		(0.0595)	(0.0598)	(0.0638)	(0.0650)	(0.0541)	(0.0531)
Couple with children > 16		0.123**	0.165***	-0.0154	-0.375***	-0.282***	-0.209***
		(0.0490)	(0.0491)	(0.0534)	(0.0563)	(0.0459)	(0.0446)

Table A3 (cont'd)

Couple with children < and > 16		0.236***	0.259***	0.0924	-0.239***	-0.205***	-0.115**
		(0.0622)	(0.0622)	(0.0673)	(0.0689)	(0.0570)	(0.0554)
Multiple generation household		-0.183**	-0.0944	-0.300***	-0.708***	-0.494***	-0.323***
		(0.0833)	(0.0843)	(0.0925)	(0.0944)	(0.0743)	(0.0725)
Other combination		-0.180**	-0.108	-0.289***	-0.609***	-0.374***	-0.242***
		(0.0761)	(0.0768)	(0.0883)	(0.0898)	(0.0732)	(0.0685)
East Germany		-0.277***	-0.328***	-0.290**	-0.220*	-0.131	-0.131
		(0.107)	(0.106)	(0.115)	(0.114)	(0.0977)	(0.0919)
Years of formal education			0.0801***	0.0537***	0.0280***	0.000750	-0.00861**
			(0.00388)	(0.00427)	(0.00451)	(0.00361)	(0.00352)
Years of work experience			0.0128***	0.0105***	0.00931***	0.00372***	0.00142
			(0.00115)	(0.00126)	(0.00126)	(0.00101)	(0.000965)
Log of household net wealth				0.142***	0.0965***	0.0590***	0.0594***
				(0.00844)	(0.00864)	(0.00700)	(0.00678)
Property owner				-0.0659**	-0.0168	-0.000503	0.00177
				(0.0277)	(0.0274)	(0.0224)	(0.0218)
Log of household net income					0.410***	0.321***	0.290***
					(0.0231)	(0.0189)	(0.0183)
Health status						0.878***	0.766***
						(0.00925)	(0.00902)
Conscientiousness							0.0769***
							(0.00908)
Extraversion							0.0766***
							(0.00777)
Agreeableness							0.127***
							(0.00865)
Openness							0.0549***
							(0.00730)
Neuroticism							-0.187***
							(0.00684)
Willingness to take risks							0.0362***
							(0.00314)
Region fixed effects	No	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	6.970***	1.475***	2.083***	1.954***	-1.682***	-1.506***	-1.929***
	(0.0224)	(0.397)	(0.405)	(0.440)	(0.480)	(0.387)	(0.384)

Table A3 (cont'd)

Number of observations	173410	172302	169552	149507	149503	149303	143504
F-statistic	48.25***	48.86***	57.13***	51.44***	59.47***	238.77***	247.14***
R^2	0.0108	0.0495	0.0653	0.0715	0.0797	0.272	0.312

Notes: Dependent variable: overall life satisfaction. Pooled OLS regressions with standard errors clustered at the level of individuals. Statistical significance: ***p<0.000, **p<0.05, *p<0.1.

Table A4: Household net income (in €) by employment status

	Full sample	Retired	Paid employed	Self-employed	Self-employed without employees	Self-employed with employees
Mean	36,603	28,607	44,304	68,273	56,461	83,448
Standard deviation	30,438	19,978	28,779	67,175	57,059	75,621
10th percentile	13,773	12,082	18,788	23,004	19,742	30,160
25th percentile	19,731	17,001	26,817	35,932	30,782	44,378
50th percentile	29,263	23,894	38,534	54,138	46,774	65,819
75th percentile	45,267	34,306	54,511	80,120	67,997	96,214
90th percentile	66,024	50,508	74,537	117,461	93,379	145,495
Number of observations	175,681	102,855	61,914	10,912	6,136	4,776

Table A5: Health status by employment status (in %)

Self-reported health status (1=very bad..5=very good)	Retired	Paid employees	Self-employed	Full sample
1	8.74	2.27	2.05	6.04
2	24.05	14.16	11.58	19.79
3	42.29	39.79	34.07	40.9
4	22.55	38.54	43.36	29.48
5	2.38	5.24	8.94	3.8
Total	100	100	100	100

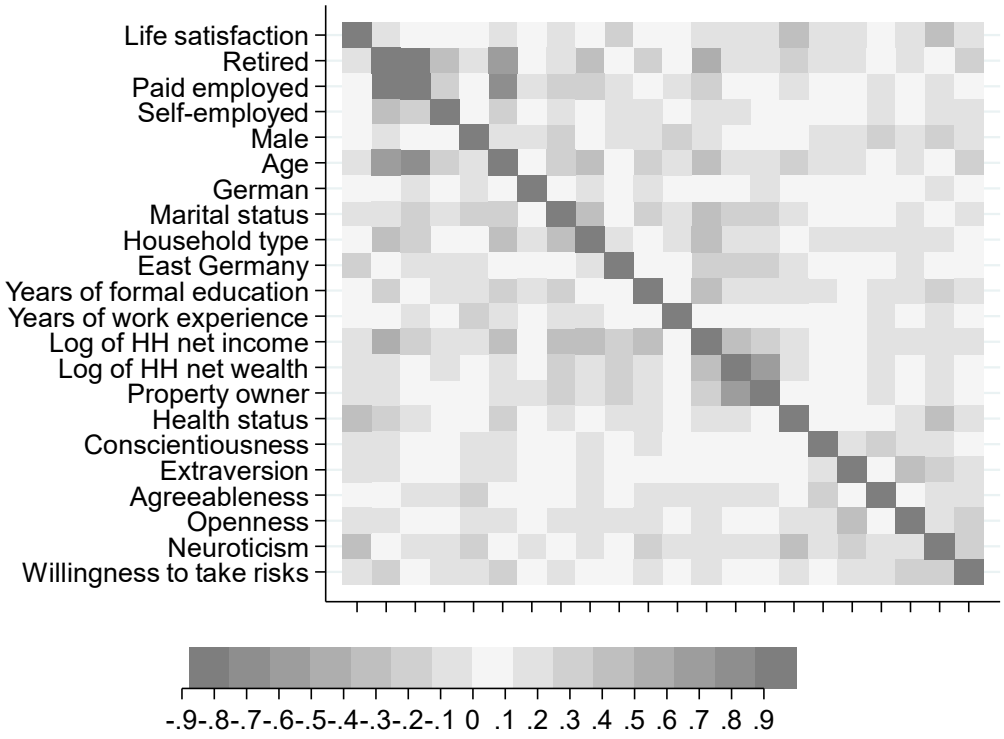

Figure A1: Correlation matrix

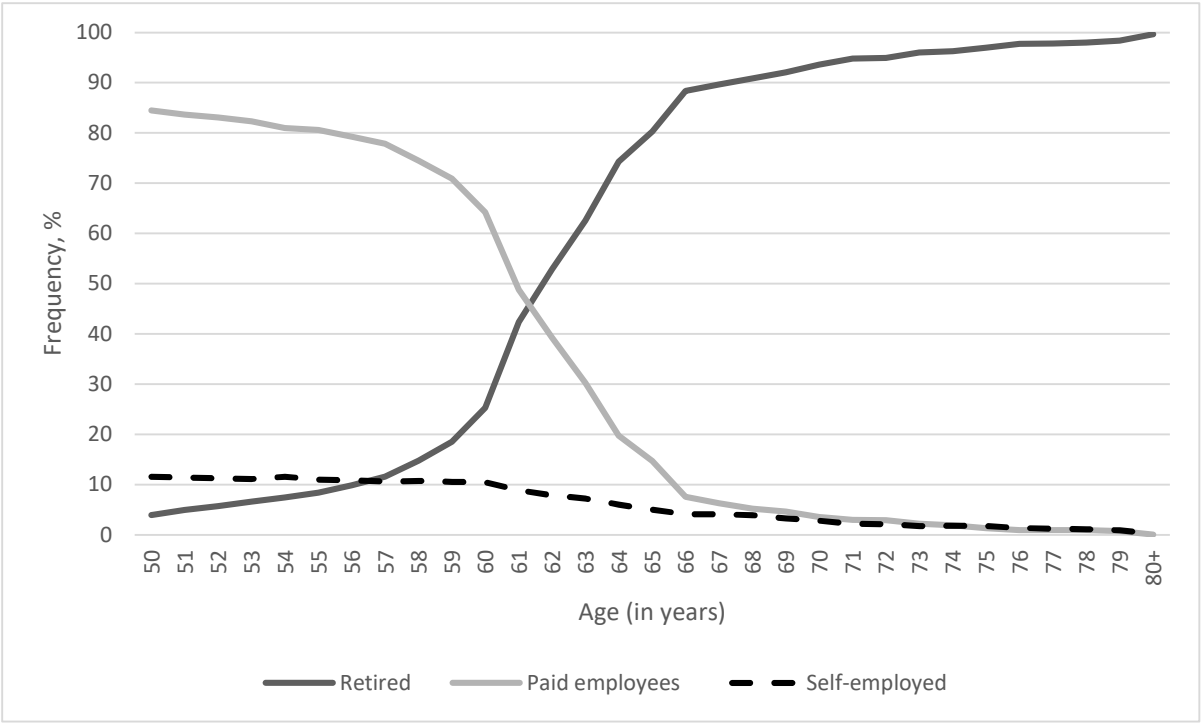

Figure A2: Retirement-, paid-employment-, and self-employment rates by age

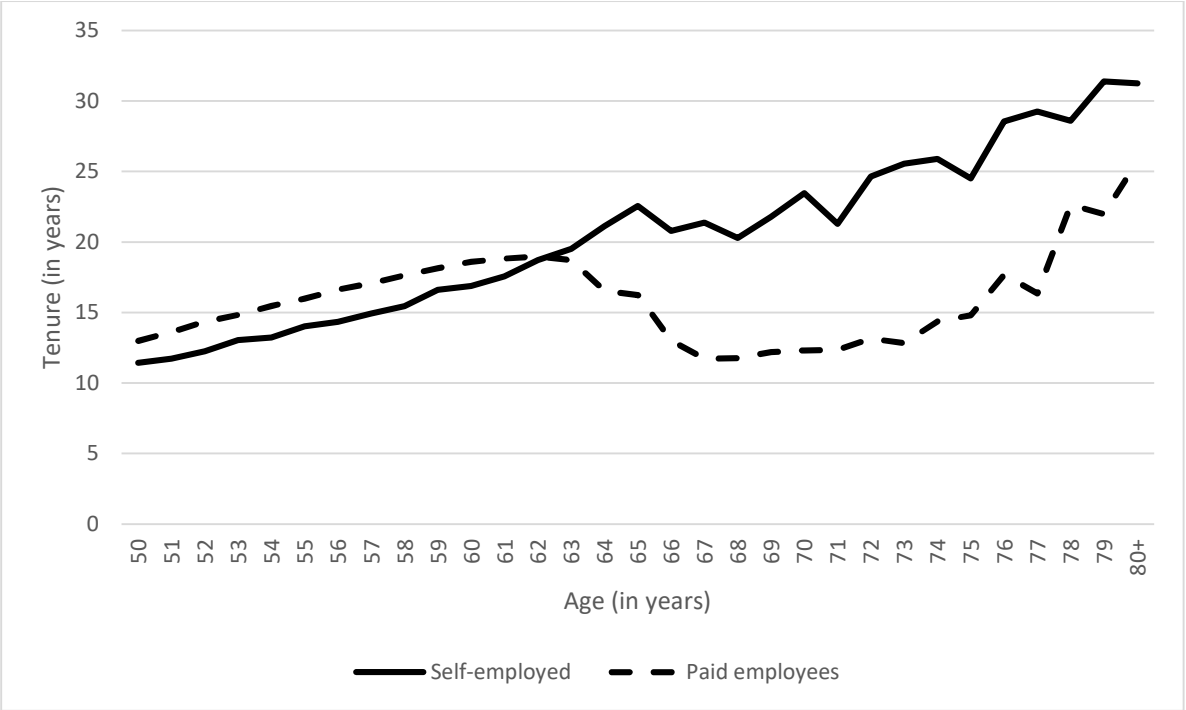

Figure A3: Average tenure (in years) by age and employment status