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How does the Participation in Social Activities of Older Individuals vary with their Retirement Decision?

Evidence from SHARE

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Introduction

In most developed countries, there has been growing concerns about the sustainability of social security programs due to increasing life expectancy, declining fertility, and declining labour force participation among older workers (Mazzonna and Peracchi 2017). In response to this, closer attention is being paid to the costs of early retirement in recent years (Börsch- Supan 2012). Not only does this issue affect the solvency of pension systems, countries with a disproportionate number of people outside the labour force are also at the risk of suffering from lower savings rates, which would in turn hinder investments and economic growth. This indicates the importance of maintaining a high labour force participation rate as it is crucial to a country's economic sustainability in the long run (Heller-Sahlgren 2012). Consequently, most economies have resorted to reforming their countries' pension systems. Some of these pension reforms in Europe include the reduction of the pay-as-you-go pension benefits and introduction of the multi-pillar pension systems with supplementary work and personal pensions as a supplement for existing unfunded retirement schemes (Börsch- Supan 2012). There has also been a general increase in the Statutory Retirement Age (SRA) – the age at which people are eligible for receiving a full pension without penalties – and reduction in early retirement financial incentives in most developed economies facing these issues (Börsch- Supan 2012). These policies have raised some concerns in different domains as researchers investigate the causal effect of retirement on physical health, mental health, different measures of well-being and cognitive functioning to mention a few.

Existing literature on the effect of retirement on well-being have been mixed. Some studies argue that retirement is beneficial to different measures of health and well-being since retirement provides an avenue for individuals to enjoy their free time and relax from work-related stress (see Coe and Zamarro 2011, Eibich 2015, Belloni et al. 2016, Kolodziej and Garca-Gómez 2019 for a review). On the other hand, some studies argue that retirement may be detrimental to health and well-being due to a loss of purpose and loss of work-related social networks after retirement (Heller-Sahlgren 2012, Behncke 2012, Godard 2016, Fé and Hollingsworth 2016, Hessel 2016, Mazzonna and Peracchi 2017, Rohwedder and Willis 2010). Hence, in accordance with continuity theory (Atchley, 1971), retirees facing these problems might feel the need to participate in social activities.

This study aims to investigate how participation in social activities of older individuals vary with the retirement decision. Particularly, we analyze the participation of retirees in voluntary or charity work, sports or social clubs, and political or community organizations using panel data from the Survey of Health, Ageing, and Retirement in Europe (SHARE).

This study contributes to existing literature by addressing some identification concerns that were not considered in the existing literature on the retirement effect on Social activities participation reviewed in chapter 1 (see Bogaard et al. 2014, Scherger et al. 2011, Kobayashi et al 2021). The retirement decision is expected to be endogenous with respect to social activity participation due to unobserved individual characteristics that might affect both variables. For instance, the marginal utility of leisure is expected to affect time use in the sense that a consumer is posed with a choice of time allocation between labour supply and nonlabour market activities, of which social activities are an example, based on the consumer's preferences and other factors. Also, "career oriented" individuals might delay retirement and be less inclined to participate in social activities. Moreover, personality traits (such as the "Big Five": extraversion, agreeableness, openness, conscientiousness, and neuroticism) have been shown to affect economic choices and in particular labour market outcomes. Hence, we exploit the longitudinal dimension of SHARE to control for these individual fixed effects.

Overall, our findings show that retirees are more likely to participate in and increase the number of social activities after retirement. We also checked whether the retirement effect varies over time but the data does not support this hypothesis.

The remainder of this thesis is organized as follows. Chapter 1 presents a review of existing literature. Chapter 2 describes the data used for this study. Chapter 3 presents the model specification and regression results as well as a check for heterogeneity and robustness.

1. Literature Review

1.1 Participation in Social Activities among the Elderly

The ongoing debates over the growing "weight of population ageing" should not overlook older people's significant productive potential. Since Butler and Gleason (1985) coined the phrase "productive aging," a large number of empirical research have revealed that a sizable fraction of the older population engages in a variety of productive activities outside of paid work. One of the most well-known examples of a productive aging activity is volunteering. European policymakers have come to recognize that the elderly can participate more actively in society and that more efforts should be made to encourage older people to participate in voluntary activities.

According to Bass and Caro (2001), "despite the growing interest among scholars, practitioners, and older people themselves in the area of productive aging, additional theoretical work is needed to better understand the multiple variables associated with the choices people make regarding work, learning, and leisure in later life," more theoretical work is needed to better understand the multiple variables associated with the choices people make regarding work, learning, and leisure in later life.

In light of this, Choi (2003) proposed a conceptual framework for volunteerism among the elderly in which "environmental factors" (e.g., region) and "social-structural factors" (e.g., gender) determine individuals' "social roles" (e.g., work) and "resources" (e.g., health), which, in combination with "lifestyle" factors, ultimately determine the volunteer decision. This framework recognizes the importance of social context in human action by taking environmental aspects into account, but it does not explicitly incorporate life-course dynamics, such as the impact of changes in individuals' social status or resources.

Erlinghagen and Hank (2006), used multivariate logistic regression to confirm the importance of sociodemographic factors in predicting a person's willingness to volunteer. They found that the likelihood of volunteering reduces dramatically if the respondent is over 75 years old, works, or believes his or her health is poor. Higher education, a stable partnership, and participation in other social activities are all factors that are favourably associated to volunteer work. Based on microdata from the 2004 Survey of Health, Ageing, and Retirement in Europe (SHARE), their research investigated the associations between selected socio-demographic factors (age, gender, educational attainment, employment status, health status) and rates of voluntary work involvement among persons aged 50 and up in 10 European nations. Their findings show a clear spatial pattern, with relatively high participation rates in Northern Europe and relatively low participation rates in Mediterranean countries, and that age, education, health, and participation in other social activities all have a significant impact on an individual's willingness to volunteer. However, they noted that there was no statistically significant heterogeneity based on variations in the composition of the population or its attributes, such as the age structure or differences in health status, which could explain the country differences.

Shaw et al. (2007) investigated age-related changes in characteristics of social relationships (social embeddedness, enacted support, perceived support) in later life. Interpersonal differences in intra-individual alterations were also investigated. They employed hierarchical linear modelling using data from a nationwide survey of 1,103 elderly people who were interviewed up to four times over a 10-year period. They stated that emotional support remained roughly constant as people became older, although other types of received assistance (such as tangible and informational) grew and levels of offered support decreased. Furthermore, their studies demonstrated a decrease in contact with friends, support satisfaction, and expected support. They also found heterogeneity based on gender and socioeconomic position. Furthermore, their findings show that older persons manage their social ties to handle the problems of aging while also emphasizing the importance of the interaction between giving and receiving support.

Hank and Stuck (2008) investigated the sociocultural factors that influence older people's participation in formal volunteering (considering informal volunteering and caring as well). Based on SHARE data from 2004, they estimated univariate and multivariate probit models, which allowed them to analyse the interrelationship between these different productive activities (volunteer work, informal help, and care). They contended that a society's civic culture should serve as a critical frame of reference for an individual's decision to volunteer, and that a country's "welfare state regime" is likely to shape the structure of opportunities for active volunteerism. Although their findings suggest that differences in population composition (e.g., the age distribution or the distribution of educational degrees) account for a significant portion of the observed cross-national variation in the propensity to engage in nonmarket productive activities at older ages, they also discovered that a country's degree of civil liberties, as well as government social spending, play a role.

Hank and Erlinghagen (2010) looked at the dynamics of volunteering among people aged 50 or older in 11 European countries. They ran multivariate regressions on a collection of binary-dependent variables (probability of taking-up voluntary work and frequency of engagement) suggesting transitions from active volunteering to inactivity and vice versa, using longitudinal data from the Survey of Health, Ageing, and Retirement in Europe's first two waves. They discovered that both time-invariant individual resources (gender, age at Wave 1, educational attainment) and changes in individual resources (partnership status, self-reported employment status, self-rated general health) influenced volunteer transitions. Furthermore, they discovered that not only does the societal framework in which older people reside have an influence on the occurrence of volunteering at any specific period, but also the dynamics of volunteering vary by country. In conclusion, their research backs up the idea of volunteering as a valuable productive aging activity and underscores the role of life-course and social environment elements in determining volunteer dynamics in later life.

1.2 Effect of Social Activities Participation on Well-Being

In older populations, social and productive activities have been linked to improved well-being and health outcomes (Wahrendorf et al. 2006). However, there is little agreement on what factors account for the reported effect and what pathways may be involved. A number of recent research have demonstrated that volunteering has physical health benefits. They allow the conclusion that volunteering causes excellent health, rather than that healthy people volunteer (Wilson and Musick 1999).

According to Wilson and Musick (1999), volunteering is thought to play a particularly essential role among the elderly, particularly among those who are retired, because it can help them avoid the downsides of retirement, physical deterioration, and idleness, which can lead to "serious leisure". In domains including public health, medicine, epidemiology, gerontology, and other health-related sciences, the relationship between social capital and health has gotten a lot of attention. However, there is a scarcity of economics literature on this topic.

Xue, Reed, and Menclova (2020) used meta-analysis to analyse the cross-disciplinary empirical literature to fill this research gap. They looked at 12,778 estimations from 470 different research. They discovered that social capital is linked to good health outcomes (general health, physical health and mental health). The magnitude of the effect, on the other hand, was consistently small. Their findings are robust for a group of social capital types (e.g., cognitive, structural, bonding, bridging, linking) as well as a group of health outcomes (e.g., mortality, disease/illnesses, depression). They also found strong evidence that social capital variables based on individual-level measures are more effectual for positive health outcomes than community average measures.

Wahrendorf et al (2006) investigated the types and quality of productive activities (voluntary work, care for a person, informal help) and their relationship with two well-being indicators (depressive symptoms, quality of life) using data from the 2004 'Survey of Health Aging and Retirement in Europe' (SHARE). Their analysis was based on 22,000 participants aged 50 and older from ten European countries. They looked at the quality of social productivity using a sociological model based on the concept of reciprocal exchange. Their findings, which were based on multivariate linear regression analysis adjusted for significant confounders (such as age, gender, retirement status, marital status, health, income, and education), confirm a link between productive activity and happiness. However, they reported some heterogeneity based on the quality of exchange: positive well-being is associated with experienced reciprocity between efforts expended and rewards received (with the exception of caring), whereas negative well-being is associated with non-reciprocal exchange (high effort and low reward) in all activities. They concluded that improving the quality of exchange in socially useful activities is necessary to encourage older people to participate in society.

Haski-Leventhal (2009) explored the link between volunteering and happiness in a group of 30,023 Europeans aged 50 and older from 12 different nations. The study looked at the impact of cultural and national identity on volunteering rates, as well as the relationship between volunteering rates and factors including gender, age, and work position. In most nations, they discovered a slight increase in volunteering rates between the ages of 61 and 70, followed by a sharp decline between the ages of 71 and older (but not in all countries). Volunteers also reported improved levels of physical health, life happiness, and less depression, as well as being more positive about the future.

Groezen et al. (2011) looked at how trust and civic participation affected self-reported health in 10 European nations. They reported that trust has a significant beneficial influence on perceived health in Sweden and Germany, but none in the other nations included in their study, after controlling for socioeconomic variables, actual health status, and health-related behaviours. In addition, their study revealed that civic participation has a beneficial and consistent effect across all countries. They came to the conclusion that trust and civic participation are two discrete characteristics of social capital that need to be managed separately.

Based on panel data from SHARE waves 1 and 2, Sirven et al. (2012) employed a time-based method to explore the causal association between health and social capital for older persons in Europe. They also included wave 3 data from retrospective life histories (SHARELIFE) to define the model's initial conditions. Volunteer/charity work, training courses, sports/social clubs, religious organizations, and political/community organizations are the five associations they characterized as having social capital. They used self-reported health, limits in activities of daily living (ADL), limitations with activities (GALI), limitations with mobility, arm function and fine motor function, and low grip strength as determinants of baseline health. They studied the influence of baseline social capital on current health and the impact of baseline health on current participation in social activities simultaneously using a bivariate recursive Probit model. In the first model (baseline social capital), they controlled for baseline health and in the second model (baseline health on current participation in social activities), they controlled for baseline social capital. In both models, they controlled for other current covariates (age, gender, education, living with spouse or partner, labour market status, log of household net income per consumption unit (corrected for Purchase Power Parity), and country dummies). They accounted for reverse causality: individual social capital has a significant beneficial effect on health and vice versa. They discovered that the impact of health on social capital appears to be substantially greater than the impact of social capital on health. Their findings show that those over the age of 50 who are in good health are more likely to participate in social activities. They also reported that the other half of the population in poor health at 50 may have faster health deterioration because of the lack of the beneficial effect of social capital. Hence, they concluded that social capital could be a source of health disparities among the elderly.

In an attempt to provide evidence of the positive association between social capital and health in low- and middle-income countries like Chile, Riumallo-Herl et al. (2014) investigated the relationship between social capital (social support and trust) and health (self-rated and biologically evaluated health) results. They modelled self-rated health, depression, measured diabetes, and hypertension as a function of social capital variables, controlling for socio-economic position and health behaviour, using data from the Chilean National Health Survey (2009–10). They utilized an Instrumental Variable (IV) technique to see if social capital was causally linked to health. They controlled for age, gender, educational attainment, marital status, household size, monthly household income, employment status, smoking status and excessive alcohol consumption. They discovered that connections between social capital and health exist in Chile as well as in high-income nations. Furthermore, they discovered that all social capital measures were significantly linked to depression at all ages, and that at least one social capital indicator was positively linked to self-rated health, hypertension, and diabetes in those aged 45 and above. They stated that associations for depression may imply a causal effect from social capital indicators on mental well-being, according to their instrumental variable models. They also uncovered evidence that social capital is directly connected with hypertension and diabetes, early markers of cardiovascular risk, using aggregate social capital as an instrument. In middle-income nations, their findings underscore the potential importance of social capital in the prevention of depression and early cardiovascular disease.

Croezen et al. (2015) investigated whether changes in various types of social activity were linked to changes in depression symptoms in older Europeans. They used data from 9,068 people aged 50 in waves 1 (2004/2005), 2 (2006/2007), and 4 (2010/2011) of SHARE. They used fixed effects analysis which allowed them control for potential time-invariant confounders; sex, family background, pre-existing health, and levels of depression. They found that increased participation in religious groups was related with a decrease in depression symptoms (EURO-D Scale) 4 years later, but membership in political/community organizations was associated with an increase in depressed symptoms. In these connections, they found no substantial differences between European areas. Their findings imply that the link between social participation and depressive symptoms is heterogeneous based on the type of social activity. Particularly, participation in religious activities was the only type of social activity linked to a decline in depressive symptoms 4 years later. Conversely, participation in a political or community organization was linked to an increase in depressive symptoms. They also came to the conclusion that religious participation may provide mental health benefits in addition to those provided by other forms of social activity.

Deindl et al. (2016) added to existing literature by recognizing the impact of social networks and social cohesiveness in determining an individual's health. They estimated multilevel models of self-reported and observer-measured later-life health outcomes using social network data from SHARE. They looked at social integration on a micro-level (the number and quality of personal social networks) and social cohesion on a macro-level (participation in social organizations in a specific region). Their models account for the characteristics of 39,551 respondents' personal social networks as well as a measure of social cohesion—namely, membership in social organizations—across 57 Continental European areas clustered in 14 nations. They discovered strong links between people's health and numerous social network features (size, support, and quality), as well as social cohesion. They stated that cross-level interaction effects imply that the social network-health nexus is context-dependent. Their findings indicate a positive relationship between individuals' contentment with their social network and both SRH and OMH. They also reported that greater social cohesion is linked to better health. They reported the reverse causality; less healthy people are more likely to require and seek assistance from larger social networks than their healthier counterparts. They noted that the reverse causality could be the reason they found negative correlations between (self-reported) health and network size as well as social support.

1.3 Effect of Retirement on Well-Being

1.3.1 Health (Physical Health, Mental Health, Cognition, Depression)

The health impacts of retirement are little understood. Considering that retirement decision is not exogenous to health, establishing causal relationships is difficult. For example, it is well known that poor health leads to economic inactivity. As a result, witnessing bad health after retirement may not be an outcome of retirement, but rather the cause of retirement. Other confounding factors (e.g., age, wealth, and lifestyle) influence both the decision to retire and the subsequent health results (Behncke, 2012).

Using a regression discontinuity approach, Johnston and Lee (2009) estimated the impact of retirement on health for a sample of English men based on data from Health Survey for England (HSE), an annual cross-sectional survey. They calculated the effects of retirement on three subjective (an indicator of self-reported health, an index of mental health questions and the number of days in the past fortnight that illness has limited activities) and two objective health metrics (hypertension and BMI). Retirement improves a person's sense of well-being and mental health, but not necessarily their physical health, according to their findings. They stated that raising the formal retirement age is unlikely to have a significant impact on health expenses because retirement appears to have no effect on objective health. They only looked at short-term health consequences, which could be different from medium- and long-term effects.

Coe and Zamarro (2011) examined the health effects of retirement in a multi-country scenario using the Survey of Health, Ageing, and Retirement in Europe (SHARE) dataset. They examined the effect of retirement on self-reported health, depression and cognitive ability. As tools for retirement behaviour, they considered country-specific early and full retirement ages. They stated that statutory retirement ages certainly encourage retirement, but they have nothing to do with a person's health. They discovered that retirement had a health-preserving effect on overall general health by exploiting differences in retirement behaviour across countries. According to their findings, retiring reduces the likelihood of reporting to be in fair, bad, or very bad health by 35% and improves the health index by almost one standard deviation. They also stated that the health index revealed that there are long-term health variations even though self-reported health appears to have a transient effect. Their report acknowledged that retiring had a statistically and economically significant impact on overall health.

Heller-Sahlgren (2012) studied both the effects of being retired and the impact of spending more time in retirement. They used the first 3 waves of SHARE data from eleven European nations and two identification strategies to account for endogeneity in individuals' retirement decisions. The first identification strategy used in the study was based on a dummy indicating whether or not the spouse is retired at the time of the first wave interview as an instrument for employment status and time spent in retirement. Likewise, the second identification strategy was based on a dummy indicating whether the respondent is above the normal retirement age that was applied when they faced their retirement decisions. They identified a robust, negative influence of being retired and spending more time in retirement on self-assessed, general, mental, and physical health using spouses' characteristics as instruments, while ensuring validity. They reported that, while the short-term health consequences of retiring in Europe are uncertain, the medium- to long-term consequences appear to be detrimental and economically significant.

Behncke (2012) investigated the effects of retirement on various health outcomes (diagnosed diseases, self-assessed health and biomarkers). In the study, two identification strategies – non-parametric matching and instrumental variable (IV) approaches – were used to analyse data from the first three waves of the English Longitudinal Study of Ageing (ELSA). The first strategy controlled for an extensive set of confounding factors – age, gender, having children and grandchildren, education, current and expected income, geographical factors such as air pollution, traffic noise, proximity to recreation areas and supply of health services, activity level within the job, physical activity in leisure time, diet, smoking and drinking behaviour – that they believe jointly affect the retirement decision and health outcomes. The second strategy used state pension age as an instrumental variable and accounted for work and health expectations as confounding factors. Retirement was discovered to increase the probability of being diagnosed with a chronic disease considerably. They stated that retirement particularly increases the risk of serious cardiovascular disease and cancer. Additionally, they found that retiring deteriorates self-assessed health and an underlying health stock.

Eibich (2015) investigated the changes in health characteristics and time usage. He also investigated the presence of heterogeneity in the effects across age, gender, education, occupational strain and family characteristics using panel data from Germany. He addressed the enodegeneity of retirement using Regression Discontinuity Design (RDD) which exploits the discontinuous increases in the retirement probability at ages 60 and 65 induced by financial incentives in the German pension system. The study found that retiring enhances an individual's subjective and mental health while lowering the use of outpatient treatment. A wide range of health behaviours (dietary habit, alcohol consumption, body weight, sleep, social activity, smoking and physical exercise), time usage, and effect heterogeneity were investigated. He stated that relief from the stress and pressure experienced at work, longer sleep and more regular physical activity, appear to be primary ways by which retirement benefits health. His research found that retiring has a beneficial impact on health, boosting the likelihood of reporting good physical and mental health.

Using the SHARE data, Godard (2016) investigated the impact of retirement on a variety of weight outcomes - BMI of adults aged 50–69 years old, the probability of being either overweight or obsess and the probability of being obese. To induce an exogenous shock to retirement behaviour, they used a strategy that exploits the differences in European early retirement ages ERAs and the stepwise increases in ERAs in Austria and Italy over the study period. Based on their results, they stated that retirement induced by discontinuous incentives in early retirement schemes causes a 12-percentage point increase in the probability of being obese among men within a two- to four-year period. They also found that the effect of retirement is highly non-linear and mostly affects the right-hand side of the male BMI distribution. They found heterogeneity based on gender, the type of job and pre-existing weight. Particularly, the effect was statistically significant for men retiring from strenuous jobs and men who were already at risk of obesity. However, they did not find statistically significant results among women.

Using data from the British Household Panel Survey, Fé and Hollingsworth (2016) investigated the implications of retiring for health (self-reported mental health, physical health and health checks) in the short and long term. They estimated short-term effects using regression discontinuity design with definitive underlying assumptions of continuity of potential outcomes and that provides accurate inference even in the presence of weak instruments. They used a parametric model – which, under strong assumptions, can isolate the normal worsening of health from the worsening caused by retirement – to identify the long-term effects. Their results show that retirement has little effect on health. However, their estimates suggested that retirement create an avenue for an inactive lifestyle with a poor social component and this could cause an indirect effect of retirement on health in the long run.

Hessel (2016) used longitudinal data on twelve western European countries from the European Union Statistics on Income and Living Conditions to investigate the impact of retirement on health using an Instrumental Variables method. The health outcomes used include self-reported health, activity limitations, and chronic diseases. He used an IV approach to address concerns around the potential endogeneity of the relationship between health and retirement – health is a main determinant of individuals' labour force participation and retirement behaviour and the overestimation of the negative effects of retirement on health since individuals with comparatively worse health are more likely to retire earlier. As instruments, country and sex-specific early and full pension ages were included in the models. To examine potential effect heterogeneity, the models were split by sex and educational levels. Based on the conventional random-effects models in the study, he found that retired men and women have higher chances of reporting bad self-rated health, activity limitations as well as chronic conditions. On the contrary, the results from the instrumental variables (IV) approach suggest that retirement can lead to health improvements in self-reported health as well as activity limitations among men and women. He reported that there was no gender nor education based heterogeneity in the health improvements associated with retirement.

Belloni, Meschi, and Pasini (2016) investigated the role of economic conditions in shaping the impact of retirement on late-life mental health. Their research investigated the impact of retirement on mental health during the economic downturn across 10 European nations between 2004 and 2013. Based on SHARE data, their study used an IV-FE strategy to address the potential endogeneity of the retirement decision, using country-specific and gender-specific statutory and early retirement ages as retirement behaviour instruments. When endogeneity is taken into consideration, they reported that retirement does not have a substantial impact on depression scores. Their findings also showed gender based heterogeneity – retiring improves the mental health of men but not women. Conversely, their study showed that retirement improves mental health in periods and locations severely affected by the economic crisis. Furthermore, their research findings revealed that this positive effect is entirely attributed to blue-collar (ex) workers and not white-collar workers. The concluded that retirement could have an impact on mental health by reducing stress.

Mazzonna and Peracchi (2017) assessed the variation in old age retirement rules between and within European countries to investigate the causal effect of retirement on health (Self-rated health and depression) and cognitive abilities (memory, verbal fluency and numeracy). Their study was based on the panel dimension of the first two waves of the Survey of Health Ageing and Retirement in

Europe (SHARE). They discovered significant heterogeneity in the impact of retiring across current or past job types – individuals employed in more physically demanding occupations, and those employed in less physically demanding occupations. They discovered that for most workers, retiring accelerates the age-related deterioration in health and cognitive ability. On the other hand, the study discovered indications of a favourable immediate effect of retirement for people working in physically demanding employment.

Kolodziej and Garca-Gómez (2019) used SHARE data to investigate the causal influence of retirement on mental health, taking advantage of changes in retirement eligibility ages across countries and over time. They used distributional regression to check if the effects are distributed unequally across the mental health spectrum. They discovered that retirement has unequally distributed positive effects on mental health – individuals just below and above the clinically defined threshold of being at risk of depression showed the largest gains. For the rest of the distribution, the protective effect remained statistically significant, while the magnitude of the point estimates fell as mental health deteriorates. They also stated that women and blue-collar employees benefit the most from the preservation effects. The findings suggested that the size of the protective impact is unaffected by the presence of family support.

1.3.2 Social Network (Social Contacts)

Individuals rely on one another for a variety of social activities throughout their lives, whether it's interactions with coworkers, spending leisure time with friends and other acquaintances, or transferring information, affection, and assistance with family members (Comi et al 2020). Social network (SN) is a collection of social ties that evolves in size and composition over time, while individual relationships evolve in emotional intensity on their own. (Comi et al 2020)

Börsch-Supan and Schuth (2014) looked at how early retirement, mental health, and the size and character of social networks are all linked. They looked into one mechanism that could explain why early retirement has negative consequences: the breakdown of social networks. Their core hypothesis was that work provides social relationships, even if it is unpleasant and difficult. They further said that even hating your co-workers and having a terrible boss is preferable to social isolation since it provides cognitive challenges that keep your mind engaged and healthy. As a measure of mental health, they used five variables from the SHARE dataset: the number of words recalled from a list of ten—both immediately (ImmRecall) and delayed (after about thirty minutes)—, a composite indicator of numeracy, a twelve-item composite scale (CASP12) designed to measure the quality of life in old age, and a depression scale (EURO- D) targeted at severe depression symptoms. They classified social networks based on their size (the number of people listed as close confidants) and composition, focusing on non-family members such as friends and co-workers. They used the regionally aggregated means of the variable "trust in other people" (agg trust) from the European Social Survey (ESS) wave 2 (2004), which is available for all involved SHARE countries, as an instrument for the size and intensity of individual social networks to account for endogeneity bias caused by unobserved health and psychological characteristics. They discovered evidence that retirement, particularly early retirement, reduces the size of one's social network, particularly the number of friends and other non-family contacts in one's interpersonal milieu (and not only the number of immediate colleagues).

Using data from the Survey of Health, Ageing, and Retirement in Europe for 11 European nations, Comi, Cottini, and Lucifora (2020) investigated the causal effect of retirement on the magnitude, composition, and intensity of social interactions. They used an empirical technique that is adjusted for time invariant individual traits while using different retirement eligibility ages as instruments for endogenous individuals' retirement decisions. They demonstrated that retirement alters the composition of an individual's social network, boosting the proportion of family members and decreasing the proportion of colleagues and friends, while having no influence on the network's overall size. They also found that changes in the composition of a social network are linked to increased overall happiness and more intense connections. They also claimed that retirement causes a switch from weak (friends or coworkers) to strong (family) ties, as well as an increase in the strength of the surviving ties. This substitution was discovered to have a gender based heterogeneity, with females reducing their percentage of friends and males reducing their share of coworkers.

The impact of work and retirement on the size, density, and character of older Americans' social networks was studied by Patacchini and Engelhardt (2016). They used an instrumental variable fixed-effect estimate technique based on Social Security age-eligibility standards to isolate the causal effect of labor supply on social networks using panel data from the first two waves of the National Social Life, Health, and Aging Project. They discovered that retirement reduces the size and density of a person's social network. They noted that there exist a gender and education based heterogeneity in these effects – the majority of these effects occurring in women and those with a post-secondary education.

1.4 Effect of Retirement on Social Activities

Retirement, according to Henning et al (2021), is a major life shift in the second half of life, and it is linked to changes in leisure activity involvement. For many individuals, being employed is not merely a means to stay busy and earn a source of living, but also crucial to maintaining their status and purpose in life. After retirement, these benefits of employment are missing, and it is expected that people will try to recover this loss through other means (Bogaard et al. 2014). Although retirement adjustment theories have emphasized the importance of finding meaningful activities in retirement, they maintain that little is known about the nature of changes in leisure activity throughout the retirement transition and their link to mental health.

Scherger, Nazroo, and Higgs (2011) evaluated the links between old age, retirement, and social inequalities as measured by involvement in leisure activities, using data from the first two waves of the English Longitudinal Study of Ageing (ELSA). Their research aimed to see if old age, particularly the transition to retirement, has an impact on participation in three different activities, and if the social inequalities in leisure activities change as people get older and retire. The three activities in their research was based on activities such as having a hobby, belonging to a club, and an index of cultural event participation (film, theatre/opera/classical music performances, museums and galleries). They discovered that, despite changes in work and age, respondents tended to continue their interests, with two exceptions: retirement was positively connected to having a hobby, and individuals who stopped working due to sickness experienced a large reduction in all three categories of activity. Participation in leisure activities followed the same pattern of stability. The different dimensions of social inequality they considered were education, occupational class, wealth.

Bogaard, Henkens, and Kalmijn (2014) investigated the impact of retirement on both informal and formal civic activities, such as support for family and friends and volunteering and organizational involvement. Their study was based on data from the Netherlands Kinship Panel Study; a large-scale panel study in the Netherlands that focuses on family ties and is representative of persons aged 18 to 79. Men and women who continued to work were compared to men and women who retired. Their analysis was based on three groups: a ‘control' group (those who continued to work) and two ‘treatment' groups (full- and part-time retirees). Ordinary least squares (OLS) regression was used to examine the differences between these groups, with the lagged dependent variable added as a predictor variable. People appear to change the character of some relationships after retirement by giving more instrumental support, according to the findings. Furthermore, they found that after retirement, retirees appear to spend more time helping and increasing their organizational memberships. In general, retirees establish some continuity for themselves by extending activities that benefit them and society as a whole, such as developing ties and increasing social capital. According to their study, retirees begin to provide further practical assistance to family and friends. They also reported that, It matters a lot whether or not you know your friends from work , that retirement has harmed relationships with previous co-workers and retirees invest in ‘productive' leisure pursuits, at least in part.

Although the retirement age is rising in aging societies, the impact on individuals and communities is uncertain, according to Kobayashi et al (2021). Their research examined how age influences the relationship between transitioning to retirement and engaging in productive and non-productive social activities after retirement. This was based on data from the National Survey of the Japanese Elderly (NSJE), a state-wide longitudinal survey of Japanese elderly aged 60 and older conducted from 1987 to 2017. Changes in volunteering, hobbies, and learning over the course of 3 to 5 years, as well as their participation level during the follow-up, were estimated using multinomial logistic regression analysis. When they examined the significant interactions between change in work status (remaining employed, full or partial retirement, and remaining not-working) and age at baseline, they discovered that fully retired people were more likely to increase these activities than those who remained employed only in their early seventies. As a result, they concluded that it is critical to encourage participation in social activities before retirement and it is also important to remove psychological and environmental barriers that prevent people from beginning new activities later in life. The outcomes of their study revealed that the benefits of transitioning to full retirement on social activity participation varied with age, and that there was minimal indication that partial retirement provided a bigger advantage in social activity involvement than continuing to work. Their findings also show that fully retired people were more likely to boost their volunteering and hobbies/learning activities than workers who only retired in their early seventies.

Based on four annual waves of the HEARTS (Health, Aging, and Retirement Transitions in Sweden) study and using bivariate dual change score models, Henning et al (2021) studied the long-term relationship between leisure activity participation and depressive symptoms. They made a distinction between intellectual, social, and physical activity participation. After retirement, they discovered increases in all three dimensions of active involvement. Although the level and change of activity were negatively correlated with depressive symptoms, the coupling parameters – that shows if the level of one variable at a given time point forecasts consequent changes until the next measurement point in the other variable (and vice versa) – were not significant, therefore the direction of effects is uncertain. Their results emphasize the need of taking lifestyle modifications into account when it comes to retirement adjustment and mental health.

1.5 Research Question

This study aims to investigate the effect of retirement on social activities participation. As demonstrated in section 3, there is a huge literature showing that retirement can have a – typically negative – effect on mental health/cognition/social networks. Most of the previously reviewed studies reveal a negative relationship between retirement and health (Heller-Sahlgren 2012, Behncke 2012, Godard 2016, Fé and Hollingsworth 2016, Hessel 2016, Mazzonna and Peracchi 2017)[1]. Likewise, social activities participation has been shown to be an important determinant of individual well-being dimensions. Particularly, a number of research show that there is a statistically significant positive relationship between different measures of social activities participation and good health outcomes especially among aged individuals (Wahrendorf et al. 2006, Wilson and Musick 1999, Xue et al. 2020, Haski-Leventhal 2009, Groezen et al. 2011, Riumallo-Herl et al. 2014, Croezen et al. 2015, Deindl et al. 2016)[2]. Hence it is intuitive to assume that, if retirement increases social activity

[1] see section 1.2 of this chapter for a detailed review
[2] See section 3.1 of this chapter for a detailed review

participation, this will in turn improve retirees' well-being and it can partially smooth away the negative effects of retirement on indicators of well-being found in the literature. Moreover, if being retired has no significant effect on participation in social activities, then the negative effect of retirement on well-being outcomes found in the literature and cited above (see also section 3 in this chapter) does not go through a reduction in social activity participation. Hence, this study aims to shed more light on the causal link between retirement and social activities participation. The primary motivation behind this study is to determine whether this is a subject that should attract more attention from economists and also be considered as a key factor in the decision-making process of policies makers regarding statutory retirement age and incentives for early retirement.

A priori, the effect of retirement on social participation is unclear. On one hand, retirees have more leisure time to devote to social activities. Alternatively, individuals in old-age might have an already-established set of habits and hobbies, which might be unaffected by retirement. Also, if retirement increases the occurrence of depression and reduces cognitive skills[3], retirees might face barriers to social activities participation. Likewise, if a retired individual has pre-existing mobility limitations, retirement could lead to a reduction in social activities previously carried out while working due to the absence of co-workers who could assist with mobility.

Previous research on the effect of retirement on social activities participation reveal a positive relationship between the retirement decision and continued participation in social activities across different groups (Scherger, Nazroo, and Higgs 2011). There is also evidence that retirees tend to change the form of some relationships after retirement by increasing their organizational memberships and providing further practical assistance to family and friends in an attempt to make up for the loss of relationships with previous co-workers (Bogaard et al. 2014). Kobayashi et al (2021)

[3] See section 3.1 of this chapter for a detailed review

reported a similar effect as Bogaard et al. (2014). However, they found some age-based heterogeneity in the effect. On the other hand, Henning et al (2021) – using a bivariate dual change score models – found statistically significant effects but stated that the direction of effects is uncertain given the presence of confounding factors arising in its estimation.

Indeed, the retirement decision is expected to be endogenous with respect to social activity participation due to unobserved individual characteristics that might affect both variables. For instance, the marginal utility of leisure is expected to affect time use in the sense that a consumer is posed with a choice of time allocation between labour supply and nonlabour market activities, of which social activities are an example, based on the consumer's preferences and other factors. Also, "career oriented" individuals might delay retirement and be less inclined to participate in social activities. Moreover, personality traits (such as the "Big Five": extraversion, agreeableness, openness, conscientiousness, and neuroticism) have been shown to affect economic choices and in particular labour market outcomes. For instance, Cuber et al. (2016) show that Big Five personality traits significantly affect performance on the job, which is higher for more conscientious individuals and lower for those who are more neurotic. Fletcher (2013) finds that workers with a higher extraversion received higher wages. These effects can have consequences on the timing of retirement and in general on the allocation of time between labour market and nonlabour market activities. To address these potential sources of endogeneity, this study implements a fixed-effects analysis. A fixed effects approach allows us control for endogeneity as long as these individual-specific unobserved characteristics are time-invariant[4]. To the best of my knowledge, the previous reviewed papers on the effect of retirement on social activities participation do not account for this potential endogeneity, hence this study contributes to the literature in this way. Also, unlike previous research, this study

[4] See chapter 3 for a detailed explanation of the application of the fixed effects approach in the context of this study.

investigates the presence of heterogeneity in the effect of interest across genders and types of social activities.

2. Data

The data for this study was pooled from the Survey of Health, Ageing and Retirement in Europe (SHARE). SHARE is a multidisciplinary and cross-national panel study, which is conducted biannually since 2004. The survey data provides extensive standardized information on health, socioeconomic status, and social and family networks from individuals aged 50 and older and their partners using computer-assisted personal interviews (CAPI). With the release of Wave 7, SHARE data covers 28 countries - including all 26 Continental EU Member States: Austria, Belgium, Croatia, Czech Republic, Denmark, Estonia, France, Germany, Greece, Hungary, Italy, Luxembourg, the Netherlands, Poland, Portugal, Slovenia, Spain, Sweden, Bulgaria, Cyprus, Finland, Latvia, Lithuania, Malta, Romania, Slovakia, Switzerland and Israel. (Bergmann et al. 2019)

The target population consists of individuals aged 50+ who speak the official language of each country and do not live abroad or in an institution, plus their spouses or partners irrespective of age. The universal questionnaire and interview mode, the effort devoted to translation of the questionnaire in the country languages, and the normalisation of fieldwork procedures and interviewing procedures are the most crucial design tools used to ensure cross-country comparability (Börsch-Supan et al. 2005) [5]

2.1 Sample Selection

For this study, data from waves 4(2010-2011), 5(2013) and 6(2015) were combined to increase the sample size and to implement a longitudinal analysis required to take into account unobserved fixed effects[6]. All countries that contributed to waves 4, 5 and 6 were considered except Czech Republic,

[5] The SHARE is a complex survey and not all the methodological aspects can be discussed here. For further information see: www.share-project.org

[6] see research question in chapter 1

Estonia and Slovakia.[7] The working sample for this analysis comprises individuals aged 50 – 70 at the time of their first interview, who identified themselves as employed or retired (20 years maximum) and participated in at least 2 waves (from waves 4 to 6) of SHARE. "Don't know" and "Refusal" were recoded as missing values in our working sample. These selection criteria resulted in a balanced panel data of 44,753 observations on 18,724 individuals who were present in at least two waves. The nine countries included in the final working sample are Austria, Germany, Sweden, Spain, Italy, France, Denmark, Switzerland and Belgium. *Table 1* presents the composition of our working sample by country and gender. Overall, the highest number of observations in out working sample is from interviews conducted in Belgium (6,431 observations).

Table 1: Number of Employed and Retired Individuals in Waves 4 – 6 by Country and Gender

Country identifier	Gender Male	Female	Total
Austria	2,608	3,105	5,713
Germany	2,285	2,425	4,710
Sweden	1,941	2,365	4,306
Spain	2,384	1,617	4,001
Italy	2,177	1,789	3,966
France	2,765	3,149	5,914
Denmark	2,463	2,646	5,109
Switzerland	2,268	2,335	4,603
Belgium	3,322	3,109	6,431
Total	22,213	22,540	44,753

2.2 Social Activities

Three distinct types of activities from SHARE were used in the construction of the dependent variables in this analysis: done voluntary or charity work; gone to a sport, social or other kind of club; and taken part in a political or community-related organization. Respondents' participation in these

[7] These countries were excluded because they were not present in waves 1(2004-2005) and 2(2006-2007) which were used for a robustness check of our results. See section 4 for further details.

social activities was collated in waves 4 to 6 as part of the social involvement questionnaire by asking "Which of the activities listed on this card - if any - have you done in the past twelve months?" These activities were captured in all 3 waves and were used in the construction of dependent variables for this study. This was necessary because the analysis of changes in social activities participation required comparable information in all the waves.

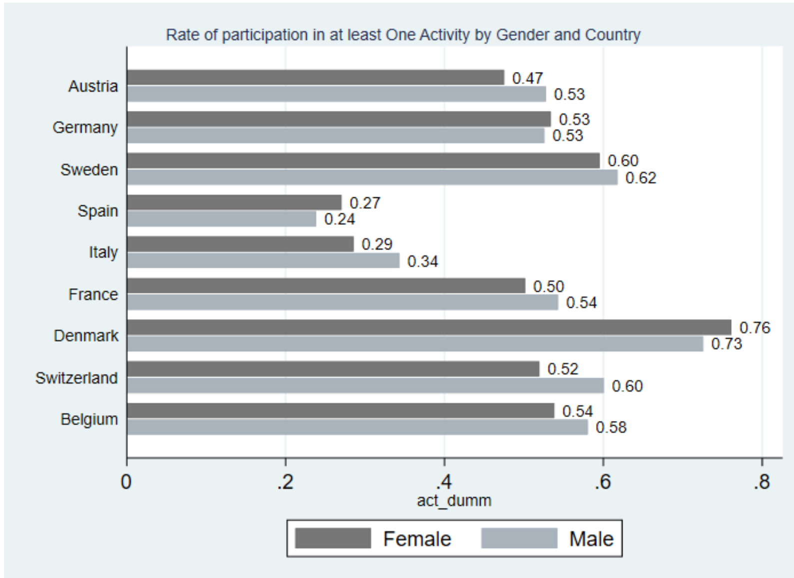
Three dependent variables were generated from the aforementioned activities. Firstly, a dummy variable act_dumm that takes value 1 if a respondent is involved in at least one of the three activities and 0 if a respondent does not participate in any activity. *Table 2* shows the rate of participating in social activities by country. The data indicates that more than 50% of the respondents in the working sample reported participating in at least one form of the above mentioned social activities.

Table 2: Rates of Participating in Social Activities by Country

Country	vol_char	social_club	pol_org	act_dumm
Austria	0.217	0.367	0.091	0.499
Germany	0.258	0.413	0.072	0.530
Sweden	0.137	0.515	0.120	0.605
Spain	0.078	0.182	0.044	0.251
Italy	0.163	0.182	0.044	0.317
France	0.282	0.361	0.119	0.521
Denmark	0.325	0.628	0.106	0.744
Switzerland	0.310	0.403	0.109	0.559
Belgium	0.297	0.383	0.120	0.560
Total	0.238	0.388	0.095	0.520

Figure 1 shows the rate if participation in at least one activity by gender and country. The highest rate of participation for both male (73%) and female (76%) individuals was in Denmark and the least participation for male (24%) and female (27%) individuals was in Spain.

Figure 1: Rate of Participation in at Least One Activity by Gender and Country



Two variables, num_act defined as the total number of activities per observation and num_act_cond defined as the total number of activities per observation conditional on the respondent participating in at least one activity, were generated as measures of the magnitude of social activities participation. In the working sample, all observations with missing values for act_dumm, num_act or num_act_cond were dropped. In the overall sample, the average number of activities the respondents participated in was 0.722 and the average number conditional on participating in at least one activity was 1.388.[8] *Figure 2* shows the average number of activities reported by respondents by gender and country. In Denmark, on average, male respondents participated in 1.05 out of 3 activities while female respondents participated in 1.07 activities. Likewise, *Figure 3* shows the average number of activities carried out by respondents conditional on participating in at least one activity. The graph shows a drastic reduction in the country difference in the number of activities carried out for the subgroup of respondents that participate in one or more activities. Particularly, the average for male

[8] See Appendix for detailed descriptive statistics on all variables.

respondents in Spain increased from 0.29 to 1.22 when the condition was applied. This can be explained by the low participation rate shown in *Figure 1*.

Figure 2: Average Number of Activities per Respondent by Gender and Country

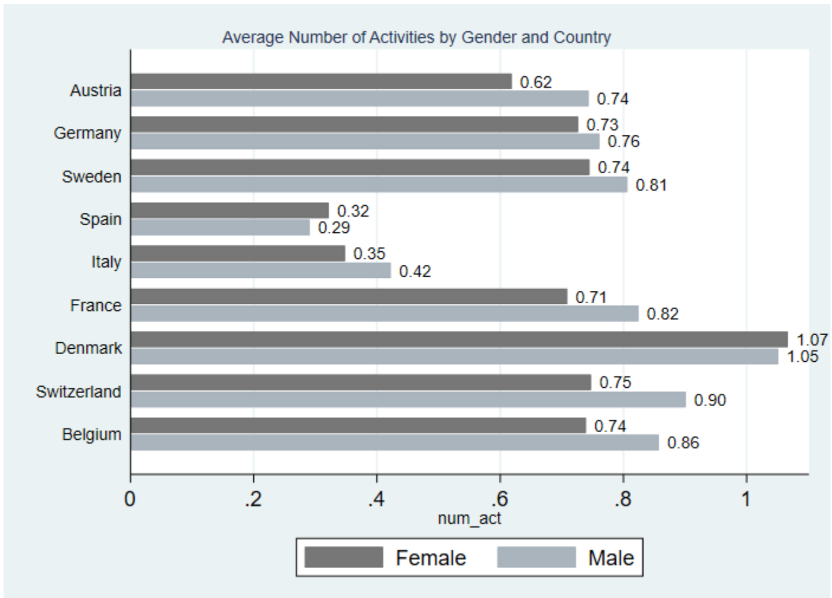
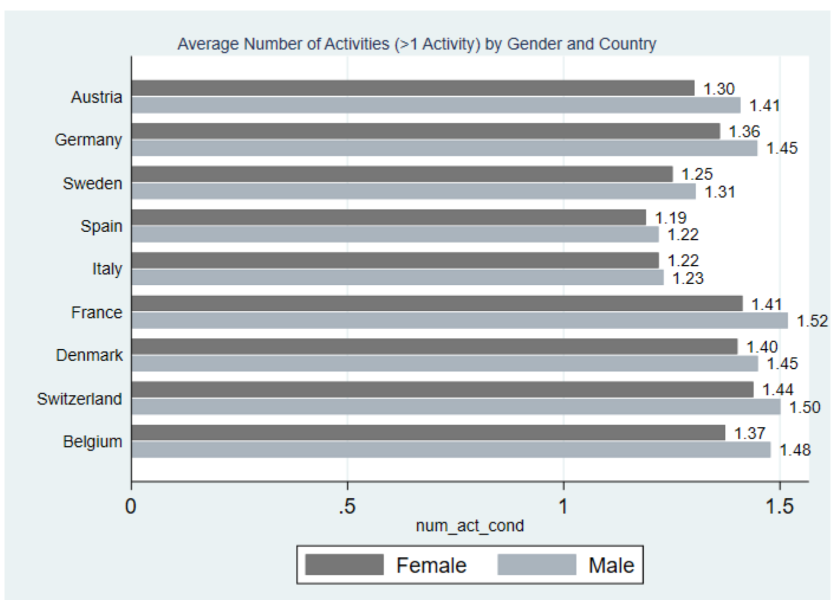


Figure 3: Average Number of Activities per Respondent (conditional on participating in at least one activity) by Gender and Country



2.3 Retirement

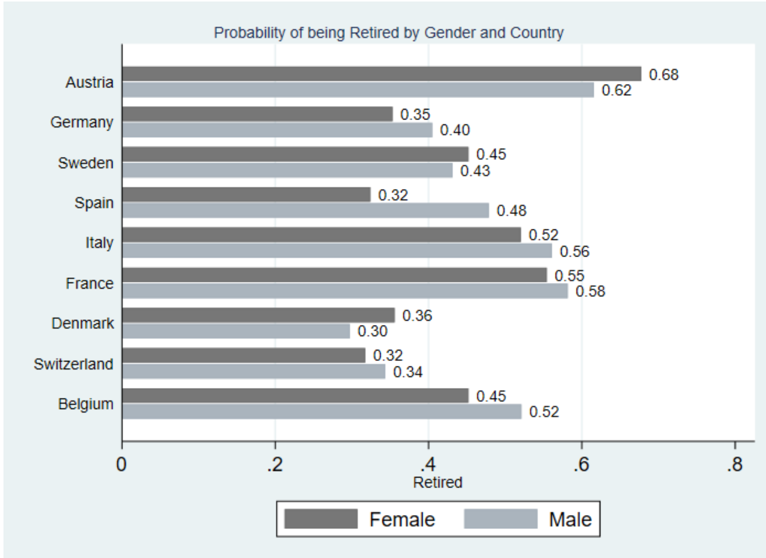
Two variables were generated to analyse retirement decision: a retirement status dummy (retired) and the number of years of retirement (num_year_ret). For each respondent, the dummy variable (retired) takes value 1 for retired individuals and 0 for employed individuals; based on the employment status variable (ep005)[9]. The SHARE variable ep005 documents the current job situation of respondents in the EP module of each wave. Since this study aims to compare only individuals at work or retired from work, only observations with ep005=1 for retired individuals and ep005=2 for employed individuals were included in the working sample. *Table 3* which shows the distribution of the retired dummy variable by country indicates that almost half (47%) of the individuals in the study sample were retired. *Figure 4* shows the percentage of retired respondents at the time of the interview by gender and country. 68 percent of the female respondents from Austria were retired while only 30 percent of the male respondents from Denmark were retired at the time of the interview.

Table 3: Distribution of Retired Dummy Variable by Country

country	N	mean
Austria	5,713	0.649
Germany	4,710	0.378
Sweden	4,306	0.443
Spain	4,001	0.416
Italy	3,966	0.543
France	5,914	0.567
Denmark	5,109	0.327
Switzerland	4,603	0.330
Belgium	6,431	0.488
Total	44,753	0.467

[9] ep005_= Current job situation. 1 means retired; 2 means employed. Other employment statuses were excluded from the working sample because they are not relevant to the analysis.

Figure 4: Percentage of Retired Respondents by Gender and Country



The number of years of retirement at the time of the interview was calculated as follows;

$$num\_year\_int = year\ of\ interview - ret\_year$$ [10]

This variable takes value 0 for employed individuals. To avoid outliers in the analysis, only individuals with num_year_ret between 0 and 20 were included in the working sample. *Table 4* which shows the distribution of the number of years of retirement by country indicates that retired individuals in the working sample have been retired for an average of 5 years[11].

Table 4: Distribution of Number of Years of Retirement by Country

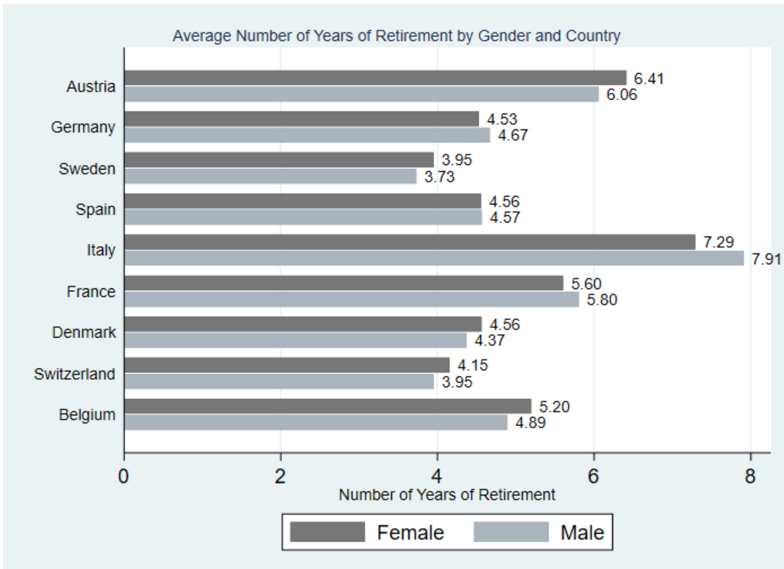
country	N	mean	min	p25	p50	p75	max
Austria	3709	6.258	0	3	5	9	20
Germany	1781	4.601	0	2	4	6	20
Sweden	1906	3.854	0	2	3	5	20
Spain	1665	4.563	0	2	3	6	20
Italy	2152	7.643	0	4	7	11	20
France	3353	5.700	0	3	5	8	20
Denmark	1673	4.479	0	2	4	6	20
Switzerland	1520	4.051	0	2	3	6	19
Belgium	3136	5.028	0	2	4	7	20
Total	20895	5.328	0	2	4	8	20

[10] where: num_year_ret = number of years of retirement at the time of interview; ret_year = year of retirement

[11] The sample size in table 4 only refers to retired individuals

Figure 5 shows the average number of years of retirement for retired individuals in the working sample by gender and country. On average, male retirees in Italy had the highest number of years of retirement (7.91 years) while male retirees in Sweden had the lowest number (3.73 years) across the working sample.

Figure 5: Average Number of Years of Retirement by Gender and Country



2.4 Other Covariates

We controlled for the effect of sociodemographic differences (age, gender and education), as well as singleness (absence of a partner), number of children, number of grandchildren, household wealth, limitations with activities of daily living, limitations with instrumental activities of daily living and country dummies.

Table 5 shows the descriptive statistics of these covariates[12]. age60 is defined as a dummy variable that takes value 1 for those aged 60 and above and 0 for respondents aged 50 to 59 based on the SHARE variable – age. The mean age in the working sample is 61 years. gend_dumm is defined as a gender dummy that takes value 1 for female and 0 for male based on the SHARE variable – gender. Fewer than half of respondents were male (49.63%). The dummies for Educational attainment were

[12] See appendix for the extensive descriptive statistics for all the variables in the working sample

based on the SHARE variable isced which is coded by the Educational level classifications from the 1997 International Standard Classification of Education (ISCED). National levels were reclassified into 3 categories: lower education (classifications 0–2), medium education (classifications 3–4), and higher education (classifications 5–6) (UNESCO, 2006). In *Table 5*, ISCED0 to ISCED6 are dummies that represent each of the ISCED educational level. Each of these dummies takes value 1 if the respondent has that level of education and 0 otherwise. 31.9% of the respondents in the working sample had higher educational attainment (ISCED code 5 and 6), 42% had medium education (ISCED code 3 and 4) and 26.1% had lower education (ISCED code 0, 1 and 2). The absence of a partner was measured by a dummy variable – single that takes value 1 if the respondent is single and 0 otherwise – which is based on the SHARE variable – partner. 41.7% of the respondents reported being single. In order to gather data on the number of children per household, SHARE asked the family respondent to count all living children who are either natural, foster, adopted, or stepchildren of his/hers and/or his/her partner. Our working sample included a derived version of this variable (nchild) which includes imputed values for respondents for whom the number of living children is missing. Similar to nchild, ngrchild represents the number of grandchildren the respondent and his/her partner have regardless of whether they have a living child. On an average, each respondent reported having approximately two children and two grandchildren.

Household wealth was measured by the SHARE household net worth variable - hnetw which is a generated measure of household worth net of liabilities and that is expressed in ten thousands of euros in the working sample. The average household wealth in the working sample was 407,200 euros. Respondents' levels of physical functioning were assessed by means of the Activities of Daily Living (ADL), and Instrumental Activities of Daily Living (IADL) (Robine and Jagger 2003). Scores for each index of activity limitations were dichotomized on the basis of whether respondents had limitations in performing 1 or more activities.

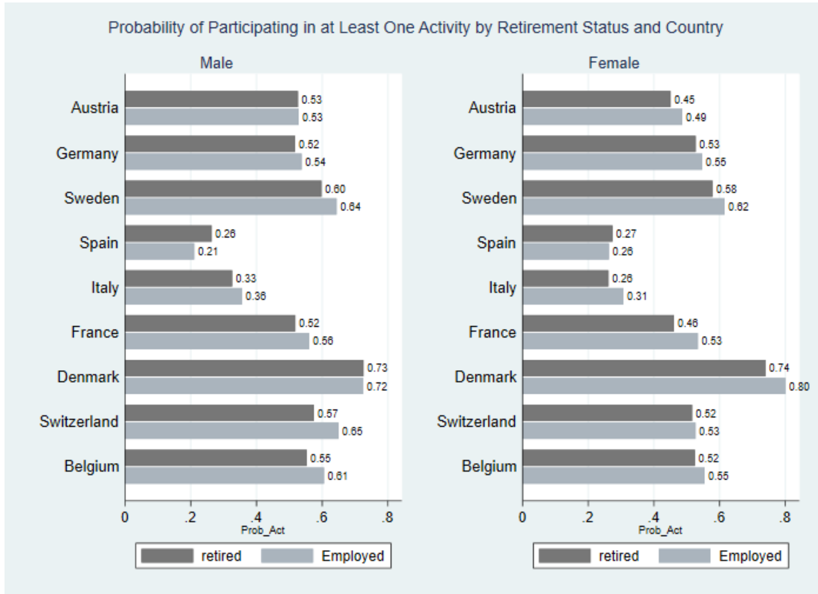
Table 5: Descriptive Statistics of Covariates

VARIABLES	(1) mean	(2) sd	(3) min	(4) max
age	61.11	5.366	50	70
nchild	2.058	1.247	0	17
ngrchild	1.805	2.366	0	20
adl	0.0734	0.420	0	6
iadl	0.0968	0.490	0	9
age60	0.607	0.488	0	1
hnetw	40.72	63.20	-71.89	3,512
gend_dumm	0.504	0.500	0	1
single	0.417	0.493	0	1
ISCED0	0.022	0.146	0	1
ISCED1	0.101	0.301	0	1
ISCED2	0.139	0.345	0	1
ISCED3	0.375	0.484	0	1
ISCED4	0.045	0.208	0	1
ISCED5	0.305	0.460	0	1
ISCED6	0.014	0.117	0	1

2.5 Social Activities Participation and Retirement Decision

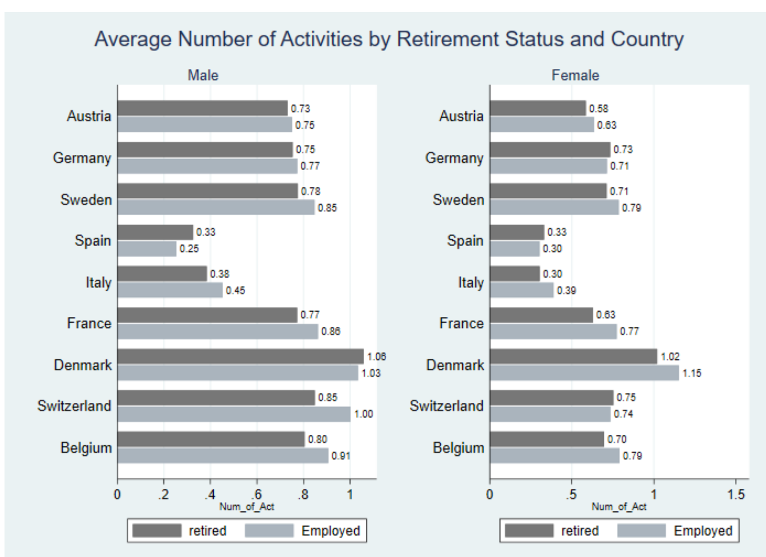
The main objective of our analysis is to establish whether participation in social activities of older individuals vary with retirement decision, and whether such effects are contingent on selected characteristics like gender and type of activity. The first step in our analysis is to observe how the measure of social activities participation vary with retirement decision in our working sample without controlling for individual characteristics. The descriptive analysis shows that there are variation in the relationship between social activities participation and retirement. Also, there is some evidence of gender-based heterogeneity in how social activities participation varies with retirement - without controlling for any individual characteristic. *Figure 6* which shows the rate of participating in at least one activity by retirement status and county indicates that there is little or no variation in the rates of participation in social activities between employed and retired individuals in most countries. In Demark, employed female individuals are more likely to participate in social activities than retired females by 0.06 percent.

Figure 6: Retirement Status and Probability of Participating in at Least One Activity by Country



Similarly, as seen in *Figure 7* which shows the average number of activities carried out by respondents by retirement decision and country, in most countries, the average number of activities carried out by employed individuals was higher compared to that of retired individuals. Also, on the average, men had a higher number of activities than women in most countries. However, across the working sample, employed women in Denmark reported the highest participation while employed men in Spain reported the least participation.

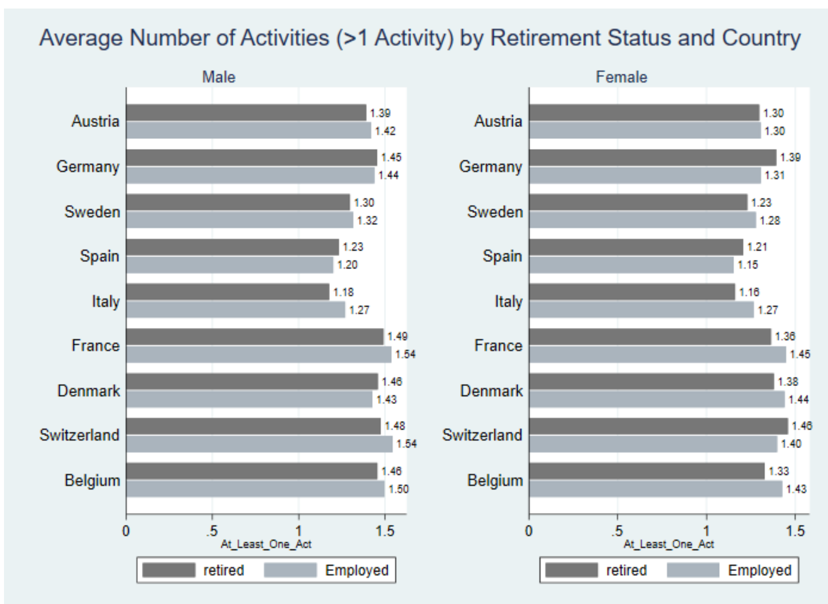
Figure 7: Retirement Status and Average Number of Activities by Country



However, *Figure 8* which shows the average number of activities conditional on participating in at least one activity indicates a more uniform distribution than *Figure 7*. This casts some doubts on the evidence shown in *Figure 7* of potential gender-based heterogeneity. Also the relationship between social activities participation and retirement decision varies across the sample. In Austria, Sweden, Italy, France, Switzerland and Belgium, male employed individuals reported a higher number of activity participation than male retired individuals. Conversely, in Germany and Switzerland, female retired individuals reported a higher number of activities than female employed individuals.

From this descriptive analysis, it is evident that without controlling for individual characteristics, the relationship between social participation and retirement decision is unclear.

Figure 8: Retirement Status and Average Number of Activities (conditional on participating in at least one activity) by Country



3. Results

In this section we report the result from OLS and FE estimation of the effect of retirement on social activities participation. We also present the results of a few checks for heterogeneity of the effect and robustness.

3.1 Model specification and Estimation

The baseline specification (Model A) of this study has the following form:

$$A_{it} = \beta_0 + \beta_1 retired_{it} + \boldsymbol{\gamma}'_2 \boldsymbol{X}_i + \boldsymbol{\gamma}'_3 \boldsymbol{Z}_{it} + \alpha_i + \varepsilon_{it} \qquad \text{(A)}$$

where the outcome variable, A_{it} is either the dummy variable for social activities participation (act_dumm), the average number of activities (num_act) or the average number of activities conditional on carrying out at least one activity (num_act_cond) of individual i in wave t, $retired_{it}$ is a binary indicator of the retirement decision, X_i is a vector of binary time-invariant variables for educational level, gender, wave (with wave 4 as the reference wave) and the country of residence (with Austria as the reference country), Z_{it} is a vector of time-varying controls, such as absence of partner, number of children and grandchildren, household wealth, ADL and IADL[13] , α_i is any time-invariant unobservable individual effect such as marginal utility of leisure, career orientation and personality traits, and ε_{it} is a regression error term. In this specification we assume that the effect of retirement on social activities participation does not vary with the number of years spent in retirement at the time of the interview.

A second specification (Model B) which allows us to investigate the time-varying effect of retirement on social activities participation was considered. It has the form:

$$A_{it} = \beta_0 + \beta_1 retired_{it} + \beta_2 num\_year\_ret_{it} + \boldsymbol{\gamma}'_1 \boldsymbol{X}_i + \boldsymbol{\gamma}'_2 \boldsymbol{Z}_{it} + \alpha_i + \varepsilon_{it} \qquad \text{(B)}$$

[13] ADL - Activities of Daily Living; IADL - Instrumental Activities of Daily Living

where $num\_year\_ret_{it}$ is the number of years spent in retirement at the time of the interview. This is coded as zero if the respondent is employed. This specification allows the effect of retirement to vary over time.

Both models are estimated first on the combined data and then separately by gender or type of activity to account for these crucial sources of potential heterogeneity.

3.2 OLS Regressions

We ran six (three for each model) Ordinary Least Squares (OLS) regressions separately on act_dumm, num_act and num_act_cond (dependent variables) and retirement status (independent variable) while controlling for the extensive set of covariates[14]. In these models, time-invariant unobservable individual effect such as marginal utility of leisure, career orientation and personality traits are assumed to be uncorrelated with the error term. Also, the error term ε_{it} is assumed to be uncorrelated with all the covariates in our models.

Table 6 displays our baseline findings based on model specification A. The coefficient estimates in these models are positive and statistically significant (99% confidence interval level) suggesting that retiring increases social activities participation in general. Model 1 – the difference in the probability of carrying out at least one activity between retirees and those employed – suggests that being retired increases an individual's probability of participating in at least one activity by 12.40% on average [15]. Model 2 which is the difference between the average number of activities carried out by retirees compared to the average number of activities by employed individuals suggests that retiring increases the number of social activities participation by 15.65% on average. Likewise, Model 3 – the difference in the average number of activities carried out by retired individuals compared to employed

[14] All analyses were carried out using Stata statistical software, release 15 (StataCorp LP, College Station, Texas)

[15] Sample average of act_dumm = 0.520; num_act=0.722; num_act_cond=1.388

individuals conditional on the subgroup of individuals that participate in at least one activity – suggests that active retired individuals participate in more activities by 3.40% on average. These results support the belief that continuity theory (Atchley, 1971) is at play in the sense that retirees tend to change the character of some relationships after retirement by increasing their organizational memberships in an attempt to make up for the loss of relationships with previous co-workers (Bogaard et al. 2014). However, these results did not account for unobserved individual effects that might influence social activities participation and retirement decision.

Table 6: OLS Regression of Social Activities Participation on Retirement Based on Model Specification A

OLS Estimates for Model A			
	Model 1	Model 2	Model 3
VARIABLES	act_dumm	num_act	num_act_cond
retired	0.0645***	0.113***	0.0472***
	(0.00723)	(0.0121)	(0.0122)
Constant	0.295***	0.353***	1.212***
	(0.0209)	(0.0309)	(0.0388)
Observations	44,686	44,686	23,242
R-squared	0.104	0.104	0.036

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Notes: specifications control for partner, nchild, ngrchild, hnetw, adl, iadl, country dummy, isced, age60

Furthermore, *Table 7* shows the regression results after accounting for the number of years of retirement. Considering that the coefficient estimates for the number of years of retirement are not statistically significant at any significance level, model 1 and 3 suggest that retirement effect does not vary with the number of years of retirement. However, the OLS coefficient estimate of the number of years of retirement in model 2 suggests that the number of activities increases with time for retired individuals. In particular, the estimates suggest that on average, retired individuals are 10.26 percentage points more likely to participate in a higher number of activities every year spent in retirement. However, it is important to note that these are OLS estimates, and they do not control for unobservable individual effect.

Table 7: OLS Regressions of Social Activities Participation on Retirement Based on Model Specification B

OLS Estimates for Model B			
	Model 1	Model 2	Model 3
VARIABLES	act_dumm	num_act	num_act_cond
retired	0.0590***	0.100***	0.0369***
	(0.00828)	(0.0137)	(0.0139)
num_years_ret	0.00116	0.00257*	0.00224
	(0.000962)	(0.00156)	(0.00158)
Constant	0.295***	0.353***	1.211***
	(0.0209)	(0.0310)	(0.0388)
Observations	44,686	44,686	23,242
R-squared	0.104	0.104	0.036

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Notes: specifications control for partner, nchild, ngrchild, hnetw, adl, iadl, country dummy, isced, age60

3.3 FE Regressions

Considering that the OLS estimates of our models may be biased due to the potential correlation between the choice of retirement and unobservable factors in the regression error term. Additionally, other crucial identification issues – the endogeneity of retirement and social activities participation[16]. Fixed effect (FE) estimators sometimes called "within-person" estimators, control for individual-specific unobserved heterogeneity that may be correlated with the variables. FE exploits the panel dimension of the data by examining the association between changes in the independent variable and changes in the dependent variable within individuals, hence it controls for specific characteristics that vary across individuals. Essentially, FE provides additional insights into the potential causal association between social participation and retirement decision by controlling for time-invariant

[16] These are discussed extensively in section 1.5 Research Question

individual heterogeneity such as, individuals who place a higher value on non-labour market activities, personality traits, family background, existing physical and mental health conditions[17].

In all the FE regressions, the error term ε_{it} is assumed to be uncorrelated with all covariates. Also the assumption that time-invariant unobservable individual effect – such as marginal utility of leisure, career orientation and personality traits – are uncorrelated with the error term is relaxed. The time-invariant FE regressions based on Model A predict a positive statistically significant effect of between the three measures of social activities participation and retirement status. Essentially, similar to the OLS estimates of this model, a change from being employed to being retired can increase an individual's likelihood of participating in social activities and also lead to a positive change in the number of activities. In particular, *Table 8* displays the fixed effects estimates based on model specification A. Similar to the OLS estimates, the coefficient estimates in these models are positive and statistically significant (99% confidence interval level) suggesting that – after controlling for time-invariant unobservable individual fixed effects – retiring increases social activities participation in general. Model 1 suggests that being retired increases an individual's probability of participating in at least one activity by an average of 10.90%. Model 2 suggests that retiring increases the number of social activities participation by 13.12% on average. Likewise, Model 3 suggests that – conditional on the subgroup of individuals that participate in at least one activity – active retired individuals participate in more activities by 3.93% on average. This further substantiate the findings in the literature that retired individuals compensate for lost work relationships and work-related social activities by participating in voluntary or charity activities, social and sports activities as well as political or community organizations.

[17] Although FE does not control for time-varying factors such as educational background and presence of a partner, these variables can be accounted for by including them directly in the model.

Table 8: FE regressions of Social Activities Participation on Retirement Based on Model Specification A

FE Estimates for Model A			
	Model 1	Model 2	Model 3
VARIABLES	act_dumm	num_act	num_act_cond
retired	0.0567***	0.0947***	0.0545***
	(0.0102)	(0.0152)	(0.0208)
Observations	44,686	44,686	23,242
R-squared	0.002	0.003	0.003

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Note: specifications control for partner, nchild, ngrchild, hnetw, adl, iadl, wave dummies, age60

Furthermore, *Table 9* shows the FE estimates from the regressions based on Model B – accounting for the time-variability of the effect of retirement on social activities participation. The estimates indicate that the retirement effect does not vary with the number of years of retirement.

Table 9: FE Regressions of Social Activities Participation on Retirement Based on Model Specification B

FE Estimates for Model B			
	Model 1	Model 2	Model 3
VARIABLES	act_dumm	num_act	num_act_cond
retired	0.0566***	0.0939***	0.0529**
	(0.0103)	(0.0153)	(0.0209)
num_years_ret	2.76e-05	0.000937	0.00177
	(0.00139)	(0.00200)	(0.00298)
Observations	44,686	44,686	23,242
R-squared	0.002	0.003	0.003

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Note: specifications control for partner, nchild, ngrchild, hnetw, adl, iadl, wave dummies, age60

3.4 Heterogeneity

As discussed in the section 3.3, FE provides additional insights into the potential causal association between social participation and retirement decision by controlling for time-invariant individual heterogeneity. Hence, we included a check for gender-based or activity-based heterogeneity in the analysis.

3.4.1 Gender

Women are typically burdened by extra-labour market activities (looking after old parents) and this can prevent them from undertaking social activities, even after retirement. To investigate if there is any cross-gender heterogeneity in the effect, we ran FE regressions on the three measures of social activities participation separately by gender. As seen in *Table 10* and *Table 11*, the FE estimates for the two sub-groups suggests the presence of gender-based heterogeneity in the retirement effect – the point estimates for women are larger for the three outcome variables considered.

Table 10: FE Regressions of Social Activities Participation on Retirement by Gender Based on Model Specification A – Female

FE Estimates (Model A) by Gender - Female

VARIABLES	Model 1 act_dumm	Model 2 num_act	Model 3 num_act_cond
retired	0.0647***	0.130***	0.106***
	(0.0157)	(0.0226)	(0.0305)
Observations	22,524	22,524	11,597
R-squared	0.003	0.006	0.007

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Note: specifications control for partner, nchild, ngrchild, hnetw, adl, iadl, wave dummies, age60

Table 11: FE Regressions of Social Activities Participation on Retirement by Gender Based on Model Specification A – Male

FE Estimates (Model A) by Gender - Male

VARIABLES	Model 1 act_dumm	Model 2 num_act	Model 3 num_act_cond
retired	0.0509***	0.0666***	0.0139
	(0.0135)	(0.0206)	(0.0283)
Observations	22,162	22,162	11,645
R-squared	0.003	0.002	0.001

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Note: specifications control for partner, nchild, ngrchild, hnetw, adl, iadl, wave dummies, age60

Table 12 and *Table 13* show that the retirement effect does not vary with the number of years of retirement even after considering female and male individuals separately.

Table 12: FE Regressions of Social Activities Participation on Retirement by Gender Based on Model Specification B – Female

FE Estimates (Model B) by Gender - Female

	Model 1	Model 2	Model 3
VARIABLES	act_dumm	num_act	num_act_cond
retired	0.0656***	0.128***	0.102***
	(0.0158)	(0.0226)	(0.0304)
num_years_ret	-0.00115	0.00181	0.00558
	(0.00197)	(0.00276)	(0.00383)
Observations	22,524	22,524	11,597
R-squared	0.003	0.006	0.008

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Note: specifications control for partner, nchild, ngrchild, hnetw, adl, iadl, wave dummies, age60

Table 13: FE Regressions of Social Activities Participation on Retirement by Gender Based on Model Specification B – Male

FE Estimates (Model B) by Gender - Male

	Model 1	Model 2	Model 3
VARIABLES	act_dumm	num_act	num_act_cond
retired	0.0496***	0.0664***	0.0163
	(0.0136)	(0.0207)	(0.0288)
num_years_ret	0.00129	0.000178	-0.00236
	(0.00195)	(0.00291)	(0.00459)
Observations	22,162	22,162	11,645
R-squared	0.003	0.002	0.001

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Note: specifications control for partner, nchild, ngrchild, hnetw, adl, iadl, wave dummies, age60

3.4.2 Type of Activity

We also analysed if there exists any activity-based heterogeneity of the retirement effect for the three activities included in this study; voluntary or charity work, sport or social club, and political or community organisation[18]. The results in *Table 14* suggest that participation in political or community organization is not affected by retirement. However, the regression coefficient estimates for voluntary or charity work and sport or social club suggest that retired individuals are more likely to participate in these activities than employed individuals.

Table 14: FE Regressions of Social Activities Participation on Retirement by Activity Based on Model Specification A

FE Estimates (Model A) by Type of Activity

VARIABLES	Model 1 vol_char	Model 2 social_club	Model 3 pol_org
retired	0.0552***	0.0348***	0.00473
	(0.00891)	(0.00992)	(0.00614)
Observations	44,686	44,686	44,686
R-squared	0.003	0.002	0.001

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Note: specifications control for partner, nchild, ngrchild, hnetw, adl, iadl, wave dummies, age60

Similar to the FE estimations for model specification B in the combined dataset, *Table 15* indicates that the retirement effect does not vary with the number of years of retirement for the different types of activities.

Table 15: FE Regressions of Social Activities Participation on Retirement by Activity Based on Model Specification B

FE Estimates (Model B) by Type of Activity

VARIABLES	Model 1 vol_char	Model 2 social_club	Model 3 pol_org
retired	0.0553***	0.0350***	0.00361
	(0.00898)	(0.0100)	(0.00616)
num_years_ret	-8.90e-05	-0.000201	0.00123
	(0.00115)	(0.00137)	(0.000827)
Observations	44,686	44,686	44,686
R-squared	0.003	0.002	0.001

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Note: specifications control for partner, nchild, ngrchild, hnetw, adl, iadl, wave dummies, age60

[18] vol_char="Done voluntary or charity work"; social_club=" Gone to a sport, social or other kind of club"; pol_org=" Taken part in a political or community-related organization"

3.5 Robustness Check

This section presents the results of the robustness check of our estimation strategy. Our main analysis was carried out on waves 4, 5 and 6 of SHARE in which the question posed to respondents on social activities participation was; “Which of the activities listed on this card - if any - have you done in the past twelve months?” However, in waves 1 and 2 of SHARE, the question posed to respondents was “Have you done any of these activities in the last month?”

The difference in the time reference for social activities participation between waves 1&2 and waves 4,5&6 presents an opportunity to investigate if the effects previously discussed in sections 3.2 and 3.3 hold true with a change in time-reference.

For consistency, we used the same sample selection criteria that was used for the main dataset (waves 4, 5 and 6)[19].

3.5.1 OLS Robustness Check

Table 16 presents the OLS regression results based on model A specification using SHARE data from waves 1 and 2. The results from model 1 and 2 indicate that the retirement effect on the probability of participating in at least one activity and the average number of activities remain positive and statistically significant with a change in the time reference. However, model 3 – the OLS regression of the average number of activities on retirement decision and an extensive set of covariates – is not robust to changes in time reference.

[19] See chapter 2 for details

Table 16: OLS Regressions of Social Activities Participation on Retirement Based on Model Specification A – Waves 1 and 2

OLS Estimates for Model A - Waves 1 and 2

VARIABLES	Model 1 act_dumm	Model 2 num_act	Model 3 num_act_cond
retired	0.0834***	0.122***	0.0431
	(0.0148)	(0.0220)	(0.0264)
Constant	0.117***	0.109*	1.084***
	(0.0417)	(0.0565)	(0.0709)
Observations	10,265	10,265	4,035
R-squared	0.075	0.076	0.028

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Note: specifications control for gender, partner, nchild, ngrchild, hnetw, adl, iadl, country dummies, wave dummies, isced, age60

Also, *Table 17* indicates that the estimation strategy is not robust for models 1 and 2 – the sign of the effect changed but the coefficient estimates for the number of years of retirement are still statistically irrelevant. The sign for model 3 remained unchanged but it is statistically irrelevant and we cannot conclude that it is robust or not to changes in the time reference.

Table 17: OLS Regressions of Social Activities Participation on Retirement Based on Model Specification B – Waves 1 and 2

OLS Estimates for Model B - Waves 1 and 2

VARIABLES	Model 1 act_dumm	Model 2 num_act	Model 3 num_act_cond
retired	0.0992***	0.139***	0.0339
	(0.0177)	(0.0264)	(0.0316)
num_years_ret	-0.00306	-0.00331	0.00194
	(0.00187)	(0.00278)	(0.00377)
Constant	0.120***	0.112**	1.083***
	(0.0418)	(0.0566)	(0.0711)
Observations	10,265	10,265	4,035
R-squared	0.075	0.077	0.028

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Note: specifications control for gender, partner, nchild, ngrchild, hnetw, adl, iadl, country dummies, wave dummies, isced, age60

3.5.2 FE Robustness Check

Similar to the findings in section 3.5.1, *Table 18* indicates that – after controlling for time-invariant unobservable individual fixed effects – model 1 and 2 are positive and statistically significant as seen in the FE regression results of the main sample. This suggests that the estimation strategy is robust. However, as seen in section 3.5.1, the estimation strategy for the effect of retirement on the number of activities for those who participate in at least one activity is not robust to a change in time reference.

Table 18: FE Regressions of Social Activities Participation on Retirement Based on Model Specification A – Waves 1 and 2

FE Estimates for Model A - Waves 1 and 2

VARIABLES	Model 1 act_dumm	Model 2 num_act	Model 3 num_act_cond
retired	0.0887***	0.117***	0.0146
	(0.0236)	(0.0332)	(0.0581)
Observations	10,265	10,265	4,035
R-squared	0.008	0.009	0.008

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Note: specifications control for partner, nchild, ngrchild, hnetw, adl, iadl, wave dummies, age60

However, similar to the findings in section 3.5.1, *Table 19* indicates that the estimation strategy is not robust for models 1 and 2 – the sign of the effect changed but the coefficient estimates for the number of years of retirement are still statistically irrelevant. The sign for model 3 remained unchanged but it is statistically irrelevant and we cannot conclude that it is robust or not to changes in the time reference.

Table 19: FE Regressions of Social Activities Participation on Retirement Based on Model Specification B– Waves 1 and 2

FE Estimates for Model B - Waves 1 and 2

VARIABLES	Model 1 act_dumm	Model 2 num_act	Model 3 num_act_cond
retired	0.0902***	0.122***	0.0125
	(0.0307)	(0.0416)	(0.0781)
num_years_ret	-0.000932	-0.00324	0.00145
	(0.0150)	(0.0183)	(0.0300)
Observations	10,265	10,265	4,035
R-squared	0.008	0.009	0.008

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: specifications control for partner, nchild, ngrchild, hnetw, adl, iadl, wave dummies, age60

Conclusion

Using data on social activities participation and retirement from waves 4, 5 and 6 of SHARE, we analysed the retirement effect on three measures of social activities participation; the probability of participating in at lease one activity, the average number of social activities and the average number of social activities conditional on participating in at least one activity. The main results of the analysis come from the estimation of linear regression models that exploits the longitudinal dimension of our dataset to allow for the endogeneity of retirement and control for whatever source of time-invariant and individual-specific heterogeneity. Indeed, there might be several individual attitudes typically unobservable, such marginal utility of leisure, career orientation and personality traits, that can affect both retirement and social activity participation decisions. As long as these factors are time-invariant, they fall within the individual fixed-effects that our specifications control for, thus providing an advantage as compared to similar research questions addressed in the literature (Scherger et al., 2011, Bogaard et al., 2014, Kobayashi et al., 2021, Henning et al., 2021)

Our results show that the probability to participate in social activities and the intensity of participation (measured by the number of activities individuals are involved in) increases after retirement. This effect is found for both men and women. These findings support the general concept that retired individuals expand their involvement in activities – that are beneficial to them – to create some continuity[20] for themselves after retirement (as discussed by Bogaard et al., 2014, Scherger et al., 2011, Kobayashi et al., 2021). Moreover, they suggest that the higher amount of leisure available after retirement translated in a higher propensity towards social activities regardless of the heavier burden women typically face due to care provided to children and older parents.

[20] Continuity theory: valuable interaction and job-related activity seems to be replaced with other purposeful activities (Atchley, 1971)

Likewise, the retirement effect was found to be heterogenous by activity type; there was a statistically significant positive relationship between retiring and participation in voluntary or charity work and between retiring and sports or social club membership. However, there was no causal relationship between retirement and participation in political or community organizations. This pattern suggests that individuals interested in this type of activities typically get involved in them before exiting the labour market. Alternatively, if they are not interested, the expansion of leisure time due to retirement is not a significant incentive to undertake them.

In conclusion, as long as social activities preserve social networks and mental health (Xue et al., 2020, Wahrendorf et al., 2006, Haski-Leventhal 2009, Sirven et al., 2012, Riumallo-Herl et al., 2014, Deindl et al., 2016), the results of our analysis show that retirees find in the augmented social activities participation a device to preserve their social inclusion. Also, an increased social activity participation of retirees supports the positive contribution of older individuals to the social capital production within their community, which can have a positive impact on the well-being of older adults themselves (Cramm et al., 2013). Lastly, the results in this thesis can be used to shed light on the mechanisms underlying the impact of retirement on the individual socioeconomic status, which has been the focus of a wide literature. In particular, the negative effect of retirement on mental health, cognition and social networks found in other studies (Heller-Sahlgren 2012, Behncke 2012, Godard 2016, Fé and Hollingsworth 2016, Hessel 2016, Mazzonna and Peracchi 2017, Rohwedder and Willis 2010) seem not to be driven by a reduction in social activity participation.

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Appendix

(A) Sample Averages of variables in the working sample

VARIABLES	(1) Mean	(2) Standard Deviation	(3) Minimum	(4) Maximum
partner	1.417	0.493	1	2
gender	1.504	0.500	1	2
age	61.11	5.366	50	70
nchild	2.058	1.247	0	17
ngrchild	1.805	2.366	0	20
adl	0.0734	0.420	0	6
iadl	0.0968	0.490	0	9
ac035d1	0.238	0.426	0	1
ac035d5	0.388	0.487	0	1
ac035d7	0.0950	0.293	0	1
vol_char	0.238	0.426	0	1
social_club	0.388	0.487	0	1
pol_org	0.0950	0.293	0	1
act_dumm	0.520	0.500	0	1
num_act	0.722	0.817	0	3
num_act_cond	1.388	0.600	1	3
num_years_ret	2.488	3.887	0	20
retired	0.467	0.499	0	1
age60	0.607	0.488	0	1
hnetw_new	40.72	63.20	-71.89	3,512
gend_dumm	0.504	0.500	0	1
single	0.417	0.493	0	1
ISCED0	0.0218	0.146	0	1
ISCED1	0.101	0.301	0	1
ISCED2	0.139	0.345	0	1
ISCED3	0.375	0.484	0	1
ISCED4	0.0452	0.208	0	1
ISCED5	0.305	0.460	0	1
ISCED6	0.0140	0.117	0	1

(B) OLS Estimates based on main working sample (Waves 4, 5 and 6)

OLS Estimates for Model A

VARIABLES	(1) act_dumm	(2) num_act	(3) num_act_cond
retired	0.0645***	0.113***	0.0472***
	(0.00723)	(0.0121)	(0.0122)
5.wave	0.00497	0.0185***	0.0247***
	(0.00451)	(0.00682)	(0.00813)
6.wave	0.00603	0.0233***	0.0311***
	(0.00510)	(0.00795)	(0.00913)
12.country	0.0203	0.0464**	0.0368*
	(0.0131)	(0.0218)	(0.0208)
13.country	0.0973***	0.0721***	-0.0937***
	(0.0131)	(0.0210)	(0.0190)
15.country	-0.181***	-0.272***	-0.126***
	(0.0128)	(0.0194)	(0.0220)
16.country	-0.127***	-0.201***	-0.105***
	(0.0132)	(0.0201)	(0.0214)
17.country	0.0386***	0.111***	0.113***
	(0.0124)	(0.0213)	(0.0199)
18.country	0.216***	0.329***	0.0488**
	(0.0124)	(0.0217)	(0.0190)
20.country	0.0403***	0.110***	0.0970***
	(0.0140)	(0.0239)	(0.0215)
23.country	0.0532***	0.104***	0.0619***
	(0.0122)	(0.0209)	(0.0195)
1.isced	0.0259	0.0402	0.0279
	(0.0190)	(0.0265)	(0.0371)
2.isced	0.0931***	0.135***	0.0512
	(0.0188)	(0.0265)	(0.0362)
3.isced	0.153***	0.227***	0.0938***
	(0.0184)	(0.0261)	(0.0350)
4.isced	0.222***	0.380***	0.192***
	(0.0232)	(0.0362)	(0.0417)
5.isced	0.264***	0.443***	0.196***
	(0.0186)	(0.0271)	(0.0354)
6.isced	0.268***	0.469***	0.224***
	(0.0297)	(0.0520)	(0.0535)
age60	-0.00248	-0.00640	-0.00340
	(0.00725)	(0.0121)	(0.0122)
gend_dumm	-0.0189***	-0.0640***	-0.0716***
	(0.00599)	(0.0102)	(0.00993)
single	0.000229***	0.000403***	0.000163
	(8.14e-05)	(0.000136)	(0.000133)
ngrchild	-0.000904	0.000198	0.00172
	(0.00131)	(0.00222)	(0.00220)
hnetw_new	0.000524***	0.000939***	0.000341***
	(6.37e-05)	(0.000116)	(7.34e-05)
adl	-0.0110	-0.00689	0.0223
	(0.00735)	(0.0118)	(0.0156)
iadl	-0.0534***	-0.0835***	-0.0363***
	(0.00598)	(0.00911)	(0.0127)
Constant	0.295***	0.353***	1.212***
	(0.0209)	(0.0309)	(0.0388)
Observations	44,686	44,686	23,242
R-squared	0.104	0.104	0.036

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

OLS Estimates for Model B

VARIABLES	(1) act_dumm	(2) num_act	(3) num_act_cond
retired	0.0590***	0.100***	0.0369***
	(0.00828)	(0.0137)	(0.0139)
num_years_ret	0.00116	0.00257*	0.00224
	(0.000962)	(0.00156)	(0.00158)
5.wave	0.00459	0.0176**	0.0239***
	(0.00453)	(0.00685)	(0.00816)
6.wave	0.00546	0.0220***	0.0299***
	(0.00515)	(0.00804)	(0.00920)
12.country	0.0215	0.0491**	0.0393*
	(0.0132)	(0.0219)	(0.0209)
13.country	0.0991***	0.0760***	-0.0902***
	(0.0131)	(0.0212)	(0.0193)
15.country	-0.180***	-0.269***	-0.123***
	(0.0128)	(0.0195)	(0.0221)
16.country	-0.128***	-0.203***	-0.107***
	(0.0133)	(0.0201)	(0.0214)
17.country	0.0391***	0.112***	0.114***
	(0.0124)	(0.0213)	(0.0199)
18.country	0.218***	0.331***	0.0512***
	(0.0124)	(0.0218)	(0.0191)
20.country	0.0416***	0.113***	0.0996***
	(0.0141)	(0.0240)	(0.0216)
23.country	0.0542***	0.106***	0.0636***
	(0.0123)	(0.0210)	(0.0196)
1.isced	0.0252	0.0386	0.0267
	(0.0190)	(0.0265)	(0.0371)
2.isced	0.0926***	0.134***	0.0504
	(0.0188)	(0.0265)	(0.0362)
3.isced	0.152***	0.226***	0.0930***
	(0.0184)	(0.0261)	(0.0350)
4.isced	0.222***	0.379***	0.191***
	(0.0232)	(0.0362)	(0.0417)
5.isced	0.264***	0.443***	0.196***
	(0.0186)	(0.0271)	(0.0355)
6.isced	0.268***	0.469***	0.225***
	(0.0297)	(0.0520)	(0.0535)
age60	-0.00288	-0.00727	-0.00411
	(0.00726)	(0.0121)	(0.0122)
gend_dumm	-0.0189***	-0.0640***	-0.0717***
	(0.00599)	(0.0102)	(0.00993)
single	0.000230***	0.000406***	0.000167
	(8.14e-05)	(0.000136)	(0.000133)
ngrchild	-0.000956	8.10e-05	0.00157
	(0.00131)	(0.00222)	(0.00220)
hnetw_new	0.000524***	0.000941***	0.000342***
	(6.37e-05)	(0.000116)	(7.34e-05)
adl	-0.0110	-0.00693	0.0223
	(0.00735)	(0.0118)	(0.0157)
iadl	-0.0538***	-0.0845***	-0.0370***
	(0.00599)	(0.00913)	(0.0127)
Constant	0.295***	0.353***	1.211***
	(0.0209)	(0.0310)	(0.0388)
Observations	44,686	44,686	23,242
R-squared	0.104	0.104	0.036

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

(C) FE Estimates based on main working sample (Waves 4, 5 and 6)

FE Estimates for Model A

VARIABLES	(1) act_dumm	(2) num_act	(3) num_act_cond
retired	0.0567***	0.0947***	0.0545***
	(0.0102)	(0.0152)	(0.0208)
5.wave	0.000788	0.0137**	0.0224**
	(0.00457)	(0.00672)	(0.00954)
6.wave	-0.00341	0.0125	0.0338***
	(0.00553)	(0.00825)	(0.0117)
age60	0.0106	-0.00266	-0.0263
	(0.00911)	(0.0134)	(0.0191)
single	-0.000255	-0.000425	-0.000330
	(0.000187)	(0.000287)	(0.000422)
nchild	-0.00401	-0.000182	0.00981
	(0.00516)	(0.00765)	(0.0112)
ngrchild	0.00117	0.00423	0.00342
	(0.00260)	(0.00399)	(0.00586)
hnetw_new	0.000153***	0.000225***	8.20e-05
	(5.21e-05)	(8.10e-05)	(8.68e-05)
adl	0.00208	0.00743	0.0122
	(0.00777)	(0.0106)	(0.0209)
iadl	-0.0146**	-0.0256***	-0.0226
	(0.00647)	(0.00858)	(0.0180)
Constant	0.484***	0.647***	1.322***
	(0.0130)	(0.0194)	(0.0287)
Observations	44,686	44,686	23,242
R-squared	0.002	0.003	0.003
Individuals	18,723	18,723	12,215

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

FE Estimates for Model B

VARIABLES	(1) act_dumm	(2) num_act	(3) num_act_cond
retired	0.0566***	0.0939***	0.0529**
	(0.0103)	(0.0153)	(0.0209)
num_years_ret	2.76e-05	0.000937	0.00177
	(0.00139)	(0.00200)	(0.00298)
5.wave	0.000762	0.0128*	0.0206**
	(0.00479)	(0.00698)	(0.00995)
6.wave	-0.00346	0.0108	0.0305**
	(0.00611)	(0.00900)	(0.0128)
age60	0.0106	-0.00191	-0.0248
	(0.00918)	(0.0135)	(0.0192)
single	-0.000255	-0.000424	-0.000330
	(0.000187)	(0.000287)	(0.000423)
nchild	-0.00401	-0.000178	0.00982
	(0.00516)	(0.00764)	(0.0112)
ngrchild	0.00117	0.00423	0.00344
	(0.00260)	(0.00399)	(0.00586)
hnetw_new	0.000153***	0.000226***	8.32e-05
	(5.21e-05)	(8.10e-05)	(8.67e-05)
adl	0.00208	0.00746	0.0123
	(0.00777)	(0.0106)	(0.0209)
iadl	-0.0146**	-0.0257***	-0.0224
	(0.00647)	(0.00858)	(0.0180)
Constant	0.484***	0.646***	1.319***
	(0.0132)	(0.0196)	(0.0290)
Observations	44,686	44,686	23,242
R-squared	0.002	0.003	0.003
Individuals	18,723	18,723	12,215

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

(D) FE Estimates based on main working sample (Waves 4, 5 and 6) by Gender

FE Estimates (Model A) by Gender - Female

	(1)	(2)	(3)
VARIABLES	act_dumm	num_act	num_act_cond
retired	0.0647***	0.130***	0.106***
	(0.0157)	(0.0226)	(0.0305)
5.wave	0.00252	0.0205**	0.0362***
	(0.00655)	(0.00927)	(0.0130)
6.wave	0.00981	0.0310***	0.0472***
	(0.00785)	(0.0114)	(0.0158)
age60	0.00938	-0.0169	-0.0501*
	(0.0131)	(0.0186)	(0.0259)
single	-0.000182	-0.000431	-0.000371
	(0.000258)	(0.000404)	(0.000587)
nchild	-0.00117	-0.00265	-0.00199
	(0.00750)	(0.0106)	(0.0139)
ngrchild	-0.00120	0.00469	0.00930
	(0.00372)	(0.00538)	(0.00764)
hnetw_new	0.000153**	0.000166	-1.69e-05
	(7.51e-05)	(0.000114)	(0.000126)
adl	-0.00847	-0.00538	0.0201
	(0.0111)	(0.0147)	(0.0288)
iadl	-0.0123	-0.0206*	-0.0289
	(0.00898)	(0.0117)	(0.0232)
Constant	0.472***	0.610***	1.281***
	(0.0194)	(0.0278)	(0.0373)
Observations	22,524	22,524	11,597
R-squared	0.003	0.006	0.007
Individuals	9,433	9,433	6,146

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

FE Estimates (Model A) by Gender - Male

VARIABLES	(1) act_dumm	(2) num_act	(3) num_act_cond
retired	0.0509***	0.0666***	0.0139
	(0.0135)	(0.0206)	(0.0283)
5.wave	-0.00114	0.00629	0.00849
	(0.00638)	(0.00974)	(0.0139)
6.wave	-0.0172**	-0.00697	0.0198
	(0.00779)	(0.0120)	(0.0173)
age60	0.0113	0.0102	-0.00373
	(0.0126)	(0.0193)	(0.0278)
single	-0.000317	-0.000373	-0.000244
	(0.000272)	(0.000406)	(0.000608)
nchild	-0.00673	0.00265	0.0243
	(0.00701)	(0.0110)	(0.0175)
ngrchild	0.00367	0.00393	-0.00217
	(0.00365)	(0.00592)	(0.00890)
hnetw_new	0.000154**	0.000261**	0.000182
	(7.05e-05)	(0.000115)	(0.000117)
adl	0.0134	0.0216	0.00561
	(0.0107)	(0.0151)	(0.0309)
iadl	-0.0182*	-0.0317**	-0.0157
	(0.00928)	(0.0125)	(0.0284)
Constant	0.498***	0.683***	1.350***
	(0.0174)	(0.0271)	(0.0435)
Observations	22,162	22,162	11,645
R-squared	0.003	0.002	0.001
Individuals	9,290	9,290	6,069

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

FE Estimates (Model B) by Gender - Female

	(1)	(2)	(3)
VARIABLES	act_dumm	num_act	num_act_cond
retired	0.0656***	0.128***	0.102***
	(0.0158)	(0.0226)	(0.0304)
num_years_ret	-0.00115	0.00181	0.00558
	(0.00197)	(0.00276)	(0.00383)
5.wave	0.00364	0.0187*	0.0301**
	(0.00687)	(0.00966)	(0.0137)
6.wave	0.0119	0.0277**	0.0362**
	(0.00866)	(0.0125)	(0.0176)
age60	0.00848	-0.0155	-0.0453*
	(0.0132)	(0.0187)	(0.0261)
single	-0.000185	-0.000427	-0.000357
	(0.000259)	(0.000403)	(0.000587)
nchild	-0.00115	-0.00268	-0.00211
	(0.00751)	(0.0106)	(0.0139)
ngrchild	-0.00125	0.00476	0.00924
	(0.00372)	(0.00538)	(0.00763)
hnetw_new	0.000153**	0.000167	-1.32e-05
	(7.51e-05)	(0.000114)	(0.000126)
adl	-0.00846	-0.00539	0.0197
	(0.0111)	(0.0147)	(0.0289)
iadl	-0.0122	-0.0207*	-0.0287
	(0.00899)	(0.0117)	(0.0232)
Constant	0.474***	0.607***	1.273***
	(0.0196)	(0.0281)	(0.0378)
Observations	22,524	22,524	11,597
R-squared	0.003	0.006	0.008
Individuals	9,433	9,433	6,146

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

FE Estimates (Model B) by Gender - Male

VARIABLES	(1) act_dumm	(2) num_act	(3) num_act_cond
retired	0.0496***	0.0664***	0.0163
	(0.0136)	(0.0207)	(0.0288)
num_years_ret	0.00129	0.000178	-0.00236
	(0.00195)	(0.00291)	(0.00459)
5.wave	-0.00234	0.00613	0.0108
	(0.00669)	(0.0101)	(0.0143)
6.wave	-0.0195**	-0.00728	0.0241
	(0.00863)	(0.0130)	(0.0186)
age60	0.0124	0.0103	-0.00572
	(0.0127)	(0.0194)	(0.0279)
single	-0.000319	-0.000373	-0.000238
	(0.000272)	(0.000406)	(0.000606)
nchild	-0.00670	0.00265	0.0242
	(0.00701)	(0.0110)	(0.0174)
ngrchild	0.00364	0.00392	-0.00223
	(0.00364)	(0.00592)	(0.00890)
hnetw_new	0.000155**	0.000261**	0.000180
	(7.06e-05)	(0.000115)	(0.000116)
adl	0.0134	0.0216	0.00528
	(0.0107)	(0.0150)	(0.0309)
iadl	-0.0183**	-0.0317**	-0.0160
	(0.00927)	(0.0125)	(0.0284)
Constant	0.496***	0.682***	1.355***
	(0.0177)	(0.0274)	(0.0437)
Observations	22,162	22,162	11,645
R-squared	0.003	0.002	0.001
Individuals	9,290	9,290	6,069

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

(E) FE Estimates based on main working sample (Waves 4, 5 and 6) by Type of Activity

FE Estimates (Model A) by Type of Activity

	(1)	(2)	(3)
VARIABLES	vol_char	social_club	pol_org
retired	0.0552***	0.0348***	0.00473
	(0.00891)	(0.00992)	(0.00614)
5.wave	0.0106***	-0.00109	0.00418
	(0.00397)	(0.00457)	(0.00281)
6.wave	0.00822*	-0.000887	0.00519
	(0.00485)	(0.00556)	(0.00345)
age60	-0.00602	0.00533	-0.00197
	(0.00783)	(0.00904)	(0.00577)
single	-0.000206	-0.000229	9.31e-06
	(0.000176)	(0.000179)	(0.000126)
nchild	-0.00806*	0.00696	0.000919
	(0.00414)	(0.00495)	(0.00349)
ngrchild	0.00128	-0.000409	0.00336*
	(0.00223)	(0.00262)	(0.00180)
hnetw_new	-1.44e-05	0.000193***	4.63e-05
	(4.07e-05)	(5.84e-05)	(3.36e-05)
adl	0.00137	0.00735	-0.00129
	(0.00623)	(0.00702)	(0.00493)
iadl	-0.00677	-0.0132**	-0.00572
	(0.00482)	(0.00601)	(0.00363)
Constant	0.221***	0.345***	0.0816***
	(0.0110)	(0.0125)	(0.00861)
Observations	44,686	44,686	44,686
R-squared	0.003	0.002	0.001
Individuals	18,723	18,723	18,723

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

FE Estimates (Model B) by Type of Activity

	(1)	(2)	(3)
VARIABLES	vol_char	social_club	pol_org
retired	0.0553***	0.0350***	0.00361
	(0.00898)	(0.0100)	(0.00616)
num_years_ret	-8.90e-05	-0.000201	0.00123
	(0.00115)	(0.00137)	(0.000827)
5.wave	0.0107***	-0.000901	0.00301
	(0.00412)	(0.00475)	(0.00289)
6.wave	0.00838	-0.000523	0.00297
	(0.00524)	(0.00607)	(0.00372)
age60	-0.00609	0.00517	-0.000987
	(0.00789)	(0.00910)	(0.00578)
single	-0.000206	-0.000229	1.02e-05
	(0.000176)	(0.000179)	(0.000126)
nchild	-0.00806*	0.00696	0.000924
	(0.00414)	(0.00495)	(0.00348)
ngrchild	0.00128	-0.000411	0.00336*
	(0.00223)	(0.00262)	(0.00180)
hnetw_new	-1.45e-05	0.000193***	4.70e-05
	(4.06e-05)	(5.84e-05)	(3.36e-05)
adl	0.00137	0.00735	-0.00126
	(0.00623)	(0.00702)	(0.00493)
iadl	-0.00676	-0.0131**	-0.00580
	(0.00482)	(0.00600)	(0.00363)
Constant	0.221***	0.345***	0.0796***
	(0.0111)	(0.0127)	(0.00869)
Observations	44,686	44,686	44,686
R-squared	0.003	0.002	0.001
Individuals	18,723	18,723	18,723

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

(F) OLS Estimates from Robustness Check (Waves 1 and 2)

OLS Estimates for Model A - Waves 1 and 2

VARIABLES	(1) act_dumm	(2) num_act	(3) num_act_cond
retired	0.0834***	0.122***	0.0431
	(0.0148)	(0.0220)	(0.0264)
2.wave	0.00926	0.0172	0.0148
	(0.00928)	(0.0126)	(0.0173)
12.country	0.0510**	0.0732**	0.0272
	(0.0252)	(0.0366)	(0.0440)
13.country	0.151***	0.194***	0.0210
	(0.0238)	(0.0351)	(0.0423)
15.country	-0.115***	-0.165***	-0.162***
	(0.0265)	(0.0358)	(0.0485)
16.country	-0.0525**	-0.0923***	-0.109**
	(0.0246)	(0.0342)	(0.0454)
17.country	0.0489**	0.0815**	0.0650
	(0.0245)	(0.0362)	(0.0446)
18.country	0.198***	0.256***	0.0198
	(0.0265)	(0.0394)	(0.0435)
20.country	0.255***	0.372***	0.104*
	(0.0310)	(0.0487)	(0.0531)
23.country	0.113***	0.167***	0.0607
	(0.0237)	(0.0356)	(0.0436)
1.isced	0.0499	0.0743*	0.0832
	(0.0339)	(0.0436)	(0.0583)
2.isced	0.110***	0.155***	0.110*
	(0.0348)	(0.0456)	(0.0591)
3.isced	0.154***	0.218***	0.136**
	(0.0339)	(0.0439)	(0.0557)
4.isced	0.150***	0.236***	0.173**
	(0.0431)	(0.0606)	(0.0724)
5.isced	0.254***	0.375***	0.194***
	(0.0347)	(0.0458)	(0.0569)
6.isced	0.186***	0.228***	0.0565
	(0.0616)	(0.0797)	(0.0854)
age60	-0.0198	-0.0197	0.0107
	(0.0138)	(0.0205)	(0.0236)
gend_dumm	-0.0537***	-0.0960***	-0.0697***
	(0.0108)	(0.0160)	(0.0189)
single	-0.000314**	-0.000332	0.000192
	(0.000150)	(0.000223)	(0.000265)
nchild	0.0120**	0.0192**	0.00804
	(0.00505)	(0.00747)	(0.00890)
ngrchild	-0.00136	-0.00361	-0.00467
	(0.00282)	(0.00416)	(0.00469)
hnetw_new	0.000344***	0.000670***	0.000586**
	(0.000131)	(0.000228)	(0.000246)
adl	-0.00959	-0.00925	0.0139
	(0.0154)	(0.0226)	(0.0324)
iadl	-0.0418***	-0.0545***	-0.000579
	(0.0137)	(0.0193)	(0.0306)
Constant	0.117***	0.109*	1.084***
	(0.0417)	(0.0565)	(0.0709)
Observations	10,265	10,265	4,035
R-squared	0.075	0.076	0.028

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

OLS Estimates for Model B - Waves 1 and 2

VARIABLES	(1) act_dumm	(2) num_act	(3) num_act_cond
retired	0.0992***	0.139***	0.0339
	(0.0177)	(0.0264)	(0.0316)
num_years_ret	-0.00306	-0.00331	0.00194
	(0.00187)	(0.00278)	(0.00377)
2.wave	0.00920	0.0172	0.0149
	(0.00928)	(0.0126)	(0.0173)
12.country	0.0475*	0.0694*	0.0289
	(0.0253)	(0.0369)	(0.0443)
13.country	0.146***	0.189***	0.0234
	(0.0240)	(0.0356)	(0.0427)
15.country	-0.119***	-0.169***	-0.159***
	(0.0266)	(0.0361)	(0.0489)
16.country	-0.0521**	-0.0918***	-0.110**
	(0.0246)	(0.0342)	(0.0456)
17.country	0.0454*	0.0778**	0.0662
	(0.0247)	(0.0364)	(0.0447)
18.country	0.193***	0.250***	0.0230
	(0.0268)	(0.0400)	(0.0444)
20.country	0.250***	0.368***	0.106**
	(0.0312)	(0.0490)	(0.0534)
23.country	0.109***	0.163***	0.0621
	(0.0238)	(0.0359)	(0.0438)
1.isced	0.0505	0.0750*	0.0825
	(0.0339)	(0.0436)	(0.0585)
2.isced	0.110***	0.155***	0.110*
	(0.0348)	(0.0455)	(0.0592)
3.isced	0.154***	0.218***	0.135**
	(0.0339)	(0.0439)	(0.0559)
4.isced	0.150***	0.236***	0.173**
	(0.0431)	(0.0606)	(0.0725)
5.isced	0.254***	0.375***	0.193***
	(0.0347)	(0.0458)	(0.0571)
6.isced	0.185***	0.227***	0.0564
	(0.0616)	(0.0799)	(0.0853)
age60	-0.0182	-0.0179	0.00968
	(0.0139)	(0.0206)	(0.0237)
gend_dumm	-0.0536***	-0.0958***	-0.0699***
	(0.0108)	(0.0160)	(0.0189)
single	-0.000318**	-0.000337	0.000193
	(0.000150)	(0.000223)	(0.000265)
nchild	0.0120**	0.0192**	0.00808
	(0.00505)	(0.00747)	(0.00890)
ngrchild	-0.00128	-0.00352	-0.00474
	(0.00283)	(0.00416)	(0.00469)
hnetw_new	0.000340***	0.000666***	0.000589**
	(0.000130)	(0.000227)	(0.000247)
adl	-0.00955	-0.00920	0.0139
	(0.0153)	(0.0226)	(0.0324)
iadl	-0.0402***	-0.0528***	-0.00147
	(0.0137)	(0.0193)	(0.0307)
Constant	0.120***	0.112**	1.083***
	(0.0418)	(0.0566)	(0.0711)
Observations	10,265	10,265	4,035
R-squared	0.075	0.077	0.028

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

(G) FE Estimates from Robustness Check (Waves 1 and 2)

FE Estimates for Model A - Waves 1 and 2

VARIABLES	(1) act_dumm	(2) num_act	(3) num_act_cond
retired	0.0887***	0.117***	0.0146
	(0.0236)	(0.0332)	(0.0581)
2.wave	-0.00138	0.00977	0.0313
	(0.0104)	(0.0141)	(0.0242)
age60	0.0474**	0.0499	-0.0245
	(0.0239)	(0.0330)	(0.0558)
single	-0.000484	-0.000533	-0.00158
	(0.000545)	(0.000761)	(0.00139)
nchild	0.00171	-0.00279	0.00651
	(0.0139)	(0.0207)	(0.0527)
ngrchild	-0.00219	-0.0116	-0.00583
	(0.0103)	(0.0150)	(0.0197)
hnetw_new	0.000142	0.000295	0.000470
	(0.000159)	(0.000210)	(0.000568)
adl	-0.00394	-0.0171	-0.119*
	(0.0275)	(0.0356)	(0.0706)
iadl	0.0256	0.0465	0.0886
	(0.0302)	(0.0391)	(0.0888)
Constant	0.328***	0.442***	1.224***
	(0.0327)	(0.0462)	(0.125)
Observations	10,265	10,265	4,035
R-squared	0.008	0.009	0.008
Individuals	6,593	6,593	3,079

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

FE Estimates for Model B - Waves 1 and 2

VARIABLES	(1) act_dumm	(2) num_act	(3) num_act_cond
retired	0.0902***	0.122***	0.0125
	(0.0307)	(0.0416)	(0.0781)
num_years_ret	-0.000932	-0.00324	0.00145
	(0.0150)	(0.0183)	(0.0300)
2.wave	-0.00137	0.00979	0.0313
	(0.0104)	(0.0141)	(0.0242)
age60	0.0473**	0.0497	-0.0244
	(0.0239)	(0.0330)	(0.0559)
single	-0.000486	-0.000538	-0.00158
	(0.000545)	(0.000761)	(0.00139)
nchild	0.00172	-0.00273	0.00648
	(0.0139)	(0.0207)	(0.0527)
ngrchild	-0.00219	-0.0116	-0.00583
	(0.0103)	(0.0150)	(0.0197)
hnetw_new	0.000142	0.000296	0.000471
	(0.000160)	(0.000210)	(0.000569)
adl	-0.00392	-0.0170	-0.119*
	(0.0275)	(0.0356)	(0.0706)
iadl	0.0257	0.0467	0.0886
	(0.0302)	(0.0391)	(0.0888)
Constant	0.329***	0.446***	1.222***
	(0.0392)	(0.0532)	(0.132)
Observations	10,265	10,265	4,035
R-squared	0.008	0.009	0.008
Individuals	6,593	6,593	3,079

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1