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The effect of retirement on social relationships: new evidence from SHARE

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Abstract

We analyze the causal effect of retirement on the size, composition and intensity of social relationships using data from the Survey of Health, Ageing and Retirement in Europe for 11 European countries. Our empirical strategy exploits the different retirement eligibility ages as instruments for the endogenous individuals' retirement decisions and controls for time invariant individual characteristics. We show that retirement changes the composition of the individual's social network, increasing the share of family members, and decreasing the share of colleagues and friends, while there is no effect on the network's absolute size. Changes in the social network's composition are associated with a higher overall satisfaction and more intense relationships. We argue that retirement induces a substitution between weak (friends or colleagues) and strong ties (family), along with an increase in the intensity of the surviving ties. Interestingly this substitution has a gender dimension: females mainly reduce the share of friends while males that of colleagues.

Keywords: retirement, social relationships, emotional closeness, ageing.

JEL Classification: J14; J26; C26

1. Introduction

Over the life-cycle individuals rely on each other to perform a large number of social activities, whether it be interactions with colleagues at the workplace, spending leisure time with friends and other acquaintances, or exchanging information, affection and help with family members. The ensemble of social relationships, henceforth referred to as social network (*SN*), changes over the life-cycle in terms of size and composition, while relationships evolve on their own in terms of emotional intensity. Theories explaining these changes are the Social Convoy Model (SCM) of Antonucci (2001) and the Socio-emotional Selectivity Theory (SST) of Carstensen (Carstensen,1993; Carstensen et al 2003). The SCM states that people tend to maintain a core and stable network of social relationships that escorts them over the life course like a convoy. In late adulthood, close core relationships (the convoy) remain stable, while peripheral relationships decrease in number. The SST predicts that as individuals grow old, motivated by emotional goals, they narrow the size of their network selecting fewer relationships among the existing ones. Thus, emotional involvement becomes higher, and this adjustment is actively sought after and not merely passively experienced. These two theories have the same empirical implications: social network size decreases with age, but older adults uphold their interactions with family and intimate friends. Indeed, many empirical studies show that older adults typically have smaller networks, since in late life people are more likely to be widowed or have friends who have died, also older people are more likely to live alone (Cumming and Henry 1961, Kramarow 1995). While smaller social networks place older adults at risk of isolation, social exclusion and dissatisfaction with their social lives (van Tilburg 1998), there is evidence that social interactions that are maintained throughout older age are rated as more satisfying and emotionally fulfilling (Lansford et al. 1998, Waite and Das 2010). Indeed, older adults report more positive emotions towards their social partners, better quality ties with their children, more positive marriages, closer friendships, and an overall greater proportion of positive versus problem-ridden relationships as compared to middle-aged adults (Charles and Piazza 2007; Fingerman, et al 2004). Thus, perceptions of socio-emotional support seem to increase with age (Field and Minkler 1988; Schnittker 2007).

Ageing, however, is not a smooth process, life events and changes in life-work balance also change discontinuously due to labour market decisions, health shocks and other unexpected events. For example, despite the fact that the age of retirement is a fairly predictable event, many empirical studies have reported significant shifts around the age of retirement in

consumption patterns, lifestyles, as well as in the health status of individuals (Banks et al. 1998, Coe and Zamarro 2011). Instead, less attention has been devoted to the relationship between retirement decisions – a milestone over the lifecycle of individuals – and individuals' social network. Retirement is a major life transition, a point in which free time hugely increases, thus time use and other activities patterns are rearranged (Gauthier and Smeeding, 2003). In this paper, we fill this gap and focus particular attention on the effect of retirement on the size and the composition of individuals' social network.

We contribute to the existing literature in a number of ways. As a first contribution, we investigate how retirement affects social networks, also addressing the endogeneity of individuals' retirement decisions. According to the Relationship Investment Model (RIM, Rusbult 1983), the choice of investing in a relationship depends positively on the satisfaction from past investment and negatively on the alternatives that are available. After retirement, the opportunity to meet new people and interact with colleagues diminishes, while there is more time to invest and strengthen existing relationships. Empirical evidence from existing studies is rather mixed. Using cross-sectional data, Fletcher (2014) find no evidence of changes in social network due to retirement, while Börsch-Supan and Schuth (2014) find a reduction in the size of the networks associated with transitions out of the labour market. Patacchini and Engelhardt (2016) instead use a longitudinal approach and show, for the US, that retirement significantly reduces the size of the networks for women and the more educated[1]. Since retirement decisions are likely to depend on (unobservable) individual characteristics and time-varying shocks affecting the decision to retire early, the empirical strategy should account for individual time-invariant effects and a quasi-random assignment strategy for the timing of retirement. To our knowledge, this is the first study that attempts to identify the causal effect of retirement on social network using both individual fixed-effect and an IV strategy. In particular, we focus on EU countries and exploit the panel dimension of the Survey of Health, Ageing, and Retirement in Europe (SHARE) with information on labor market status, network characteristics and a wide range of socioeconomic and demographic characteristics. We exploit the different retirement eligibility ages (early and ordinary retirement ages), by gender, cohort and country to instrument individuals' retirement decisions (Coe and Zamarro, 2011).

[1] Fletcher (2014) and Börsch-Supan and Schuth (2014) use cross-section data drawn from the 4th wave of SHARE data, and exploit statutory minimum retirement age across European countries to instrument individuals' retirement decisions. Patacchini and Engelhardt (2016), to our knowledge, is the only study that uses longitudinal data drawn from the first two waves of the National Social Life, Health, and Aging Project.

Our second contribution is to investigate the different dimensions through which retirement impacts on the social network. We start with its size (number of ties in the network) and composition (family members or kin, friends, or colleagues). We then focus on the emotional quality of the ties. As suggested by Granovetter (1973), "the strength of a tie depends on the amount of time, the emotional intensity, the intimacy and the reciprocal services which characterize the tie" (1973:1361), thus we proxy the strength and intensity of the relationship using information about the frequency of contacts, geographical proximity and emotional closeness. Finally, we contribute to uncover the heterogeneous patterns of the effect of retirement across gender comparing the different social network of men and women.

Our results suggest that retirement induces substantial changes in social networks. In particular, even though the absolute size of the network does not change, retirement causes a reorganization of the active relationships, increasing the share of family members and reducing the share of friends and colleagues. Network's changes are also shown to be associated with higher satisfaction and higher emotional closeness. Overall, our findings suggest that the changes in the social network individuals experience at retirement can be explained in terms of substitution between weak (friends or colleagues) and strong ties (family), along with an increase in the intensity of the surviving ties. Interestingly this substitution effect differs by gender: females reduce the share of friends, while males reduce the share of colleagues. Moreover, after retirement males tend to feel emotionally closer to the alters listed in their network, while females show higher closeness in terms of frequency of contacts and proximity. The above results are found to be robust to a number of specification changes.

The remainder of this paper is organized as follows. In Section 2, we describe the data, and the measures of social network size, composition and intensity we use. We also provide some descriptive evidence about social network changes over time and around retirement. Section 3 illustrates our empirical strategy. The main results are reported in Section 4, while section 5 concludes and discusses the policy implications.

2. Data and descriptive statistics

We use data from Release 6 of the fourth and sixth waves (2011 and 2015) of the Survey of Health, Ageing and Retirement in Europe (SHARE), a multidisciplinary and cross-national bi-

annual household panel survey coordinated by the Munich Center for the Economics of Aging (MEA) with the technical support of CentERdata at Tilburg University. The survey collects detailed information on socio-economic status, health, social and family networks for nationally representative samples of elderly people in the participating countries. The target population consists of individuals aged more than 50 and their spouses or partners irrespectively of their age. We include in the analysis those countries for which social networks data are available both in wave 4 and 6[2]. Our working sample consists of people aged 50 to 70 at the time of their first interview, who classified themselves as employed, unemployed or retired, and participated to both wave 4 and 6 of SHARE and have valid information in all the relevant variables in both waves[3]. These selection criteria result in a balanced panel of 15,752 individuals, each interviewed twice. As it can be seen, in Panel A of Table 1, in the first wave around half of the sample is already retired. This figure increases of about 15% four years later. Slightly more than a half of the individual in the sample are female, the average age is 60, it naturally increases by 4 years in the second wave, and two out of three individuals are married while one out of three has a tertiary degree.

TABLE 1 AROUND HERE

2.1. Social Network variables

In wave 4 and 6 SHARE gathered information about egocentric social networks for each individual using the "name generator" approach. Each respondent (the "ego") was asked to name members (the "alters") of his/her social network, using the following script:

"*Now I am going to ask some questions about your relationships with other people. Most people discuss with others the good or bad things that happen to them, problems they are having, or important concerns they may have. Looking back over the last 12 months, who are the people with whom you most often discussed important things? These people may include your family members, friends, neighbors, or other acquaintances. Please refer to these people by their first names*."

[2] The countries for which information about social networks are available in two waves are: France, Germany, Austria, Belgium, Denmark, Netherlands, Spain, Sweden, Switzerland, Italy, Czech Republic, Estonia, Slovenia, Poland and Portugal.

[3] Individuals with empty social networks are not included in the analysis. They amount at about 2-3 percent of the operative sample.

Survey participants were permitted to list up to seven names and reported information about the type of relationship (spouse, child etc.), the strength (emotional closeness)[4], the frequency of the contact[5] and the physical proximity of the alters[6]. Demographic information about "the alters" were also gathered, mainly their gender and age. These data are known as egocentric social network data and they are usually referred to as "discussion networks". Using these variables, we characterize networks' structure using the size (numbers of ties), the share of family members, the share of friends and the share of colleagues. Usually affinal kin is not dissimilar from genetic kin in terms of contact frequency and emotional closeness (Burton-Chellew and Dunbar 2011), therefore, we consider both genetic and affinal kin as "family".

To describe the intensity or strength of the network, we try to mimic its two main components as they are documented in the literature: the "feeling close" and the "behaving close" (Aron et al, 1992). In doing so, we proxy the first with emotional closeness and the latter with frequency of contact and geographical proximity. While it is clear that frequency of contact is an indicator of engagement in relationship maintenance, the latter can be view as a proxy for the easiness of spending time together and doing activities together. In SHARE, the relationships associated with ties living in the same household of the ego are imputed a "daily" frequency of contact. As these characteristics are asked for each alter, to better summarize them and capture any existing asymmetry in the distribution within each network, we computed the average value across alters, the percentage of alters with the highest value, and the percentage of the second to the highest and highest value. In doing so, we end up with 9 items, summarized in Table A1, and run a principal component analysis. We kept the first two components, which are those with an eigenvalue greater than one (4.9 and 1.9 respectively). This model explain 76% of the total variance. Each item is strongly associated with at least one component (see Table A2). The first component loads items related to the frequency of contact and the geographical proximity, while the second component loads items related to how close the ego is with the alters listed in her/his network. Hence, we interpret each component as capturing "behaving close" and "feeling close" across alters within each network, and name them accordingly.

Panel B of Table 1 shows the size and composition of the networks. The size is rather small on average and slightly higher in the second wave. Family members and friends mainly compose

[4] From 1 "not very close" to 4 "extremely close".
5 From 1 "never" to 7" daily".
[6] We reversed the original variable, which now spans from 1 "more than 500 km away" to 8 "in the same household".

these egocentrics networks. It seems that while the behaving close factor decreased over the four years, the feeling close increased significantly[7].

Figure 1 shows the evolution of the social network structure and intensity for individuals who are aged between 50 and 74 years. It exhibits a moderate declining trend in network size, an increase of the share of family members, together with an increase in overall satisfaction and feeling close. This preliminary evidence is in line with the two main theories of the life-span development of social relationships described above, SCM and SST.

3. Empirical Strategy

Our empirical strategy uses the panel dimension of SHARE, to control for individual time-invariant characteristics (such as gender, birth cohort, and level of education) and exploits institutional rules to replicate a quasi-random assignment of retirement decisions. In the baseline specification, we estimate the association between different dimensions of social relationship and retirement status, as follows:

$$SN_{it} = \alpha_i + \beta Retired_{it} + \delta X_{it} + \varepsilon_{it} \quad (1)$$

where SN_{it} is an indicator of social network attributes, such as size, composition of the network, satisfaction, feeling and behaving close (as previously described), for individual i in wave t. $Retired_{it}$ is a binary indicator for retirement, while X_{it} contains a function of our running variable, age_{it}, which is the age of the respondent at the time of the interview. Finally, ε_{it} is the idiosyncratic error term, which is potentially correlated with the individual's retirement status ($Retired_{it}$). Notice that, estimating equation (1) by OLS is likely to deliver biased coefficients due to the correlation between retirement choices and the unobservables (both time invariant and time varying factors). Moreover, also reverse causality could be an issue for OLS estimates, since individuals who retire earlier might suffer from poorer health and have a smaller network and less intensive ties. To address these problems, and estimate the causal effect of retirement on social relationships, we implement a fixed-effect instrumental variable strategy (Coe and Zamarro, 2011). We construct two instruments based on the legislated "early" and "normal" retirement ages. These are respectively the earliest age at which retirement benefits can be claimed, and the age at which the individual becomes eligible for full old-age pension. Using the above eligibility rules, we define two dummies that take value 1 if the individual age is

[7] The difference between the two waves is significantly different from zero for both factors.

above the gender-specific 'early' retirement age, or 'normal' retirement eligibility age in her country at the time of the interview (see Appendix for details on retirement rules for the countries included in the analysis). Hence, our identification relies on the increase in the individual probability of retiring as individuals become eligible for pension benefits in their country of residence. In other words, eligibility rules generate an exogenous shock to the individual's retirement decisions, across cohort, gender and countries, which is what we use to instrument retirement status. Our baseline specification also includes country-specific linear trends in age, while standard errors are clustered at country-cohort-gender level[8].

To disentangle the short-run adjustment and the long-run changes of retirement on social relationships, we also estimate a more flexible specification (see equation (2) below). The first effect is captured by the *Retired* dummy, which identifies the effect of retiring (between waves). The second effect is captured by the *DistR* variable, which measures the longer-term adjustment proxied by number of years spent in retirement (i.e. from the date of the interview to the actual year of retirement, and set to zero if the individual is not yet retired at wave *t*).

$$SN_{it} = \alpha_i + \beta Retired_{it} + \gamma DistR_{it} + \delta X_{it} + \varepsilon_{it} \quad (2)$$

To estimate equation (2), we use the same estimation methodology as before, though we now also need to instrument the distance variable. By analogy we construct two instruments, as the positive distance between the actual age of individual *i* at time *t* and the eligibility ages for early and normal retirement that are relevant for individual *i* (Lucifora and Vigani 2018). Lastly, we explore the heterogeneous effect of retirement across gender. While social relationship is an important aspect of the ageing process for both sexes, men and women may react differently to retirement. Gender differences in social network's characteristics for younger adults are documented in the literature, suggesting that women typically report larger social networks compared to men, though this gap could increase or decrease with retirement (Ajrouch, Blandon, and Antonucci, 2005).

4. Results

In this section we report the main results of the empirical analysis. We start with the baseline model shown in equation (1) and, using a fixed-effect IV methodology, estimate the (causal)

[8] Notice that since pension reforms may change eligibility rules for early or normal retirement, in our sample the retirement eligibility ages may vary over time, by country and gender (see the appendix for more details). Moreover, only in the case of Germany eligibility rules vary also by cohort of birth.

effect of retirement on several indicators of social network. We present the first-stage results, then we analyze the effect on network size and composition (Table 2), and finally we assess how satisfaction and closeness of social network are affected (Table 3). Using the same approach, we estimate the specification outlined in equation (2) and compare the short-run adjustment, with the longer-run changes in social network (Table 4). Heterogeneity and sensitivity checks are discussed next (Table 5 and 6).

First stage results show a sizable and statistically significant effect on retirement decisions. Instruments, based on early and normal pensions' eligibility rules, are strong predictors of both the retirement dummy variable (*Retired*), as well as the variable on the number of years spent in retirement (*DistR*). Being older than statutory ages strongly affects the probability to retire (column 1, Table A4 in the Appendix)[9]. Also, the distance from statutory early (normal) retirement age is negatively (positively) correlated with the probability of retiring and positively with the number of years spent in retirement (columns 2 and 3, Table A4). Results from the second stage estimation are reported in Table 2. We find no statistically significant effect of retirement on the size of the network (column 1). Conversely, retirement has a statistically significant positive effect on the share of family members in the network (column 2) and a negative effect on the share of friends and colleagues (columns 3 and 4). In terms of network composition, retirement increases by 7% the share of family ties, while it reduces the share of friends and colleagues respectively by 4% and 2%. This pattern suggests that after retirement an immediate short-run reallocation of ties occurs, within the individual's social network, from 'weak' to 'strong' ties (non-family versus family members). In other words, retired individuals seem to disengage from peripheral relationships, to invest more in core network relationships (i.e. family). While role-guided relationships, such as those with colleagues, can be important and affectionate, still they remain primarily tied to the role setting (i.e. the workplace), which might limit them in terms of duration, strength and eventually emotional closeness (Van Tilburg, 2003).

TABLE 2 ABOUT HERE

In Table 3, we explore the effect of retirement on social network's intensity. We find that, along with the changes in the composition of the network described above, retirement is also positively associated with overall satisfaction with the network (column 1) and relationship

[9] We estimated the probability of retiring, with the dummy variable *Retired* as dependent variable, using a linear fixed-effect probability model. When the dependent variable was *DistR* – i.e. number of years spent in retirement – we used a fixed-effect within estimator.

intensity in terms of closeness (column 3). No effect is detected instead in terms of contact frequency and proximity -- i.e. the behaving close factor (column 2). This pattern is consistent with the hypothesis forwarded by the socioemotional selectivity theory (SST) and the social convoy model (SCM), arguing that, when people retire, they increasingly invest in fewer contacts that yield more emotional or practical benefits. This might also explain the internal reallocation towards family ties, previously observed, which means having more supportive and more emotionally connected people in the network.

TABLE 3 ABOUT HERE

In Table 4, we report estimates from the more flexible specification that also includes a variable on the number of years spent in retirement (equation (2)). The estimated short-run effect of retirement status (*Retired* dummy) are unchanged, in terms of magnitude and statistical significance, while the long-term adjustment, captured by the number of years since retirement (*DistR* variable), shows a negative and statistically significant association only with the behaving close factor (column 5). Overall, these results suggest that short after retirement individuals reallocate their social network ties towards family and away from friends and colleagues, as well as receiving more satisfaction and higher emotional intensity from the surviving ties. Conversely, contact frequency and proximity within the network (i.e. the behaving close factor) take longer to unfold and display their effect later on. Similar results has been documented in the literature for adults aged less than 85, while contact frequency will start to increase later on in life, when health begins to decline and the need for helpers and higher support increases (van Tilburg, 1998).

TABLE 4 ABOUT HERE

Does the evidence shown so far differ across gender?[10] Table 5 replicates results from the baseline specification by gender – i.e. interacting the *Retired* dummy with both a *male* and *female* dummy – on our indicators of social network's size and composition (columns 1 to 4) as well as intensity (columns 5 to 7)[11].

TABLE 5 ABOUT HERE

[10] We present estimates obtained by interacting *Retirement* with the gender dummy. A possible alternative could be to run estimates over separate samples (split sample estimates). We did this exercise and the results were similar to those presented here.

[11] First stage estimates are presented in Table A5.

The lack of any effect of retirement on network size is confirmed both for males and females, as it is the (positive) effect on the share of family members relative to the (negative) effect on the share of friends and colleagues. Interestingly, the substitution between weak and strong ties upon retirement takes a different form by gender: females reduce friends, while males mainly lose colleagues (column 3 and 4, respectively). The effect on satisfaction with the social network (column 5) seems to be entirely driven by females (i.e. for males it positive but not statistically significant). In line with previous finding in the literature, we also detect differences in social network behavior between men and women. As far as emotional intensity is concerned, males tend to feel more close to their alters after retirement, while females tend to behave more close (columns 6 and 7, respectively). The continuity of social roles and routines that characterizes the behavior of males, particularly in late life, makes them more likely to maintain previous schedules also after retirement (Barer, 1994). Furthermore, when gender roles are traditional, men tend to invest more in professional relationship, and invest less in social ties (Smith-Lovin and Miller McPherson, 1993; Kalmijn 2012). With retirement the first tie is dissipated, leaving men more time to invest emotionally in family ties (Rusbult et al. 1998). Conversely, after retirement the likelihood of being informal homecare providers increases substantially more for women than for men, it explains why the frequency of contact towards family members increases for females and remains stable for males (Eurostat, 2019).

Finally, in Table 6 we check the sensitivity of our results with respect to the specification of the running variable. In particular, since a linear-in-age specification for the running variable may be overly restrictive, we replace it with a more flexible specification that includes country specific age squared trends. Results from this exercise are qualitatively unchanged both in coefficient size and statistical significance.

5. Conclusion

In this paper, we provide new evidence of the causal effect of retirement on social network composition and characteristics. We show that after retirement individuals change the composition of their social network increasing the share of family members, while decreasing that of colleagues and friends. No statistically significant effects are detected in terms of network absolute size. The above changes are shown to be associated with a higher overall

satisfaction and stronger and more intense emotional relationships, especially in terms of a higher feeling of closeness with alters in the network. We interpret the above findings as indication of a substitution between weak (friends or colleagues) and strong ties (family), along with an increase in the intensity of the relationship with the surviving ties. These effects are partially in line with the theories of SCM and SST. In fact, individuals seems to strengthen their convoy or inner circle substituting those relationships that will be harder to maintain in late life. Thus, the process of higher emotional involvement seems to start earlier than the decline in the size of the network.

Interestingly, this substitution appears to occur differently by gender. In particular, females reduce the share of friends, while males that of colleagues. In terms of intensity of surviving ties, after retirement males feel closer to their alters in the social network, while females increase the frequency of contacts and the proximity with their alters. These effects mostly occur in the short-run after retirement, while only contact frequency and proximity within the network take longer to unfold, as years spent in retirement pass by. The main implication of these findings is that, upon retirement, individuals select among their relationships those they can count and invest more on them also deriving more satisfaction and emotional intensity.

A final consideration concerns the implications of our research. Results show that retirement does not alter social network's size, the main effect is in terms of reallocation of core network ties towards family members, along with a higher intensity of the surviving relationships. The absence of major changes in the size of individual’s social network seem to suggest that, after retirement, individuals quickly adjust to the new situation in order to preserve the quality of their social network and reduce the adverse effects of social exclusion. Future research is needed to understand whether the coping strategies adopted are effective also in the longer run, especially for those individuals that are isolated or become isolated with age. Also, an open question left to future research is how the substitution between weak and strong ties might later impact on the wellbeing of the individual.

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FIGURE 1: Evolution of Social Network composition and intensity in the late life (individuals aged 50 to 74)

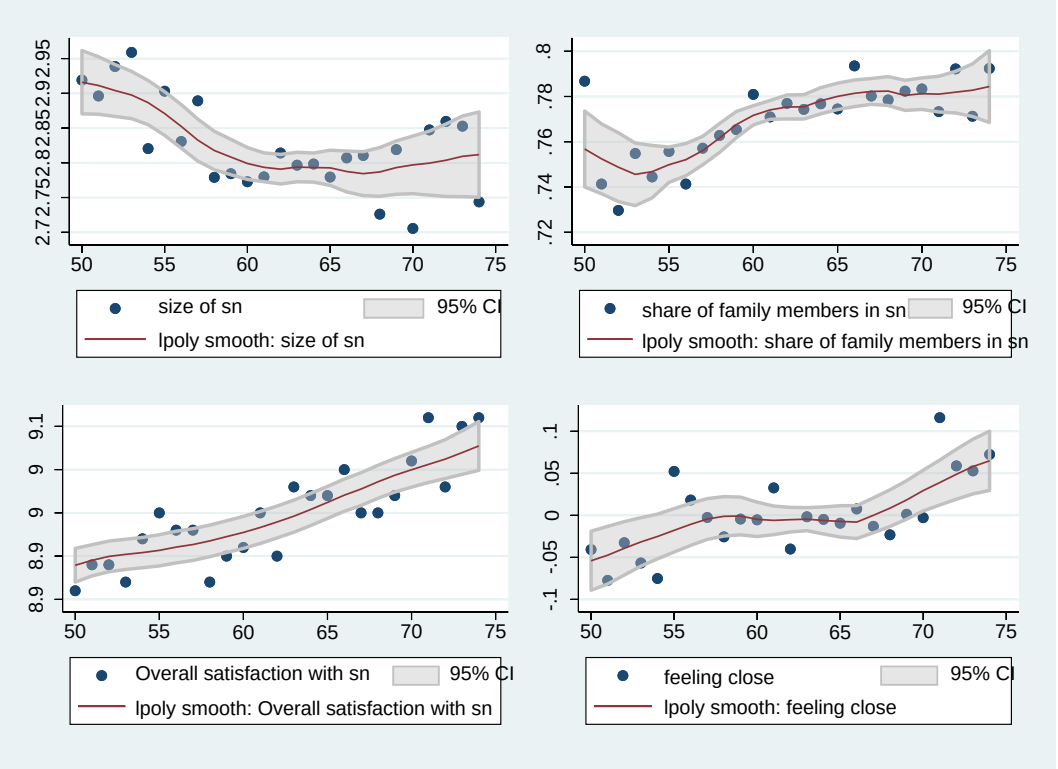

TABLE 1: Descriptive statistics.

VARIABLES	(1) Wave four	(2) Wave six
Panel A: individual characteristics		
Retired	0.49 (0.49)	0.64 (0.48)
Distance from retirement	2.93 (4.44)	5.14 (5.74)
Employed	0.46 (0.50)	0.33 (0.47)
Unemployed	0.04(0.20)	0.03 (0.17)
Female	0.54 (0.49)	0.54(0.49)
Age	60,7 (5.56)	64,7 (5.56)
Married	0.72 (.44)	0.70 (.46)
Tertiary degree	0.32(0.47)	0.32 (0.47)
Panel B:Social relationships characteristics		
Size	2.74 (1.58)	2.88 (1.57)
Share of family ties	0.75 (0.32)	0.78 (0.29)
Share of friends	0.19 (0.29)	0.17(0.27)
Share of colleagues	0.03 (0.11)	0.02 (0.09)
SN satisfaction	8.9 (1.22)	9.0 (1.15)
Behaving close	0.01 (0.99)	-0.01 (1)
Feeling close	-0.10 (1.01)	0.10 (0.97)
Observations	15752	15752

Note: Standard deviations in parentheses.

TABLE 2: Effect of retirement on social network structure. Fixed-Effect IV estimates. 50-70.

VARIABLES	(1) Size of the network	(2) Share of family ties	(3) Share of friends	(4) Share of colleagues
Retired	-0.0375	0.0719***	-0.0397**	-0.0218***
	(0.147)	(0.0216)	(0.0200)	(0.00797)
Constant	0.536	0.446***	0.422***	0.110***
	(0.358)	(0.0630)	(0.0552)	(0.0222)
Observations	31,504	31,504	31,504	31,504
Number of id	15,752	15,752	15,752	15,752
Country specific age trend	YES	YES	YES	YES

Notes: *** p<0.01, ** p<0.05, * p<0.1. Clustered SE by cohort-country-gender in parentheses.

TABLE 3: Effect of retirement on social network intensity. Fixed-Effect IV estimates. 50-70.

VARIABLES	(1) Overall satisfaction	(2) Behaving close	(3) Feeling close
Retired	0.197**	0.0863	0.154*
	(0.0986)	(0.108)	(0.0847)
Constant	7.594***	0.455**	-2.821***
	(0.246)	(0.224)	(0.213)
Observations	31,504	31,501	31,501
Number of id	15,752	15,752	15,752
Country specific age trend	YES	YES	YES

Notes: *** p<0.01, ** p<0.05, * p<0.1. Clustered SE by cohort-country-gender in parentheses.

TABLE 4: Effect of retirement on social network (short- long-term effect). Fixed-Effect IV estimates. 50-70.

VARIABLES	(1) Size of the network	(2) Share of family ties	(3) Share of friends	(4) Share of colleagues	(5) Overall satisfaction	(6) Behaving close	(7) Feeling close
Retired	-0.0519	0.0637***	-0.0314	-0.0182**	0.174*	0.101	0.135*
	(0.138)	(0.0215)	(0.0201)	(0.00782)	(0.0987)	(0.0970)	(0.0822)
DistR	0.00995	-0.00216	0.00134	0.000362	-0.00243	-0.019***	-0.000876
	(0.0112)	(0.00223)	(0.00173)	(0.000725)	(0.00766)	(0.00585)	(0.00716)
Constant	0.822	0.365***	0.478***	0.128***	7.477***	-0.125	-2.88***
	(0.550)	(0.0985)	(0.0811)	(0.0362)	(0.324)	(0.313)	(0.318)
Observations	31,504	31,504	31,504	31,504	31,504	31,501	31,501
Number of id	15,752	15,752	15,752	15,752	15,752	15,752	15,752
Country specific age trend	YES	YES	YES	YES	YES	YES	YES

Notes: *** p<0.01, ** p<0.05, * p<0.1. Clustered SE by cohort-country-gender in parentheses.

TABLE 5: Effect of Retirement on social network, by gender. Fixed Effect IV estimates. 50-70.

VARIABLES	(1) Size of the network	(2) Share of family ties	(3) Share of friends	(4) Share of colleagues	(5) Overall satisfaction	(6) Behaving close	(7) Feeling close
*Retired *male*	0.0690	0.0768***	-0.0300	-0.034***	0.184	-0.00818	0.216**
	(0.187)	(0.0285)	(0.0249)	(0.00913)	(0.118)	(0.123)	(0.0881)
*Retired*female*	-0.186	0.0629***	-0.0425**	-0.0101	0.227**	0.201**	0.0663
	(0.144)	(0.0214)	(0.0214)	(0.00746)	(0.113)	(0.102)	(0.0926)
Constant	0.498	0.436***	0.435***	0.111***	7.594***	0.442**	-2.758***
	(0.353)	(0.0617)	(0.0537)	(0.0212)	(0.242)	(0.215)	(0.209)
Observations	31,504	31,504	31,504	31,504	31,504	31,504	31,504
Number of id	15,752	15,752	15,752	15,752	15,752	15,752	15,752
Country specific age trend	YES	YES	YES	YES	YES	YES	YES

Notes: *** p<0.01, ** p<0.05, * p<0.1. Clustered SE by cohort-country-gender in parentheses.

TABLE 6: Sensitivity analysis.

VARIABLES	(1) Size of the network	(2) Share of family ties	(3) Share of friends	(4) Share of colleagues	(5) Overall satisfaction	(6) Behaving close	(7) Feeling close
Retired	-0.026	0.0636***	-0.0391*	-0.020**	0.164*	0.0522	0.147*
	(0.146)	(0.0209)	(0.0200)	(0.00791)	(0.0993)	(0.106)	(0.0867)
Constant	1.979	0.142	0.652***	0.126	6.415***	-2.69***	-3.448***
	(1.439)	(0.260)	(0.222)	(0.0914)	(1.051)	(0.832)	(0.907)
Observations	31,504	31,504	31,504	31,504	31,504	31,501	31,501
Number of id	15,752	15,752	15,752	15,752	15,752	15,752	15,752
Country specific age trend	YES	YES	YES	YES	YES	YES	YES
Country specific age squared trend	YES	YES	YES	YES	YES	YES	YES
Individual fixed effect	YES	YES	YES	YES	YES	YES	YES

Notes: *** p<0.01, ** p<0.05, * p<0.1. Clustered SE by cohort-country-gender in parentheses.

Appendix (intended for on-line publication only)

Principal component analysis (PCA)

Table A1: Descriptive statistics of items used in PCA

Item	Average	St Dev	Min	Max
Average closeness	3.26	.59	0	4
Share of Extremely close ties	.42	.41	0	1
Share of extremely close and very close ties	.85	.27	0	1
Average frequency of contact	6.07	.93	1	7
Share of ties contacted daily	.51	.36	0	1
Share of ties contacted daily or weekly	.71	.32	0	1
Geographical proximity	5.73	1.6	1	8
Share of ties in the same household	.39	.36	0	1
Share of ties in the same household or building	.42	.36	0	1

Table A2: Factor loading PCA

Item	**Factor 1**	**Factor 2**
Average closeness	0.16	**0.98**
Share of Extremely close ties	0.14	**0.85**
Share of extremely close and very close ties	0.13	**0.79**
Average frequency of contact	**0.82**	0.26
Share of ties contacted daily	**0.86**	0.19
Share of ties contacted daily or weekly	**0.70**	0.24
Geographical proximity	**0.89**	0.08
Share of ties in the same household	**0.88**	0.12
Share of ties in the same household or building	**0.90**	0.12

Note: in bold loadings with absolute values higher than 0.60

Pension Eligibility Rules in SHARE Countries

The eligibility ages reported in the paper are the results of the country specific retirement rules that cover the two waves of SHARE. Our primary source of information on early and normal ages of eligibility for public old-age pensions in the SHARE countries is the Social Security Programs Throughout the World database (SSPTW). The SSPTW website highlights the principal features of social security programs in more than 170 countries every year. In Table A3 below, we report the statutory old age and early retirement ages used in this paper for each country. In panel A we report rules for the year 2016 (wave 6 of Share), while in Panel B for 2012 (wave 4).

Table A3: Eligibility rules in 2016 and 2012 for SHARE countries.

Panel A:	*at Wave 6*			
	Normal pension		*Early retirement*	
	Male	*female*	*male*	*female*
Austria	65	60	64	59
Belgium	65	65	62	62
Denmark	65	65	65	65
France	61 and 7 months		61	61
Germany	65 and 5 months 67 for those born since 1964		63	63
Italy	66 and 7 months public 65 and 7 months private		63	63
Netherlands	65 and 6 months			
Spain	65 and 4 months		63 and 4 months	
Sweden	61			
Switzerland	65	64	63	62
Czech republic	68	67	63	62
Poland	65	60	60	55
Slovenia	65	65	60	60
Estonia	63	63	60	60
Portugal	66.1	66.1	55	55
Panel B:	*at Wave 4*			
	Normal pension		*Early retirement*	
	Male	*female*	*male*	*female*
Austria	65	60	64	59
Belgium	65	65	61	61
Denmark	65	65	65	65
France	61 and 2 months		61	61
Germany	65 and 3months 67 for those born since 1964		63	63
Italy	66 and 3 months public 62 and 3 months private		63	63

Netherlands	65 and 2months			
Spain	65 and 2months		63 and 2 months	
Sweden	61			
Switzerland	65	64	63	62

Note: source of data is SSPTW 2012-2016 (https://www.ssa.gov/policy/docs/progdesc/ssptw/).

First stage estimates

Table A4: Fixed Effect first stage estimates.

	(1)	(2)	(3)
	First stage for Table 2 and 3	First stages for Table 4	
VARIABLES	*Retired*	*Retired*	*DistR*
Eligible Early retirement	0.181***	0.157***	0.0654
	(0.0288)	(0.0319)	(0.134)
Eligible Normal retirement	0.151***	0.149***	-0.282**
	(0.0340)	(0.0338)	(0.116)
Distance from Early retirement		-0.0256***	0.267***
		(0.00945)	(0.0579)
Distance from Normal retirement		0.0155	0.725***
		(0.0120)	(0.0602)
Constant	-1.012***	-1.153***	-6.332***
	(0.166)	(0.262)	(1.222)
Observations	31,504	31,504	31,504
R-squared	0.215	0.220	0.822
Number of id	15,752	15,752	15,752
Country specific age trend	YES	YES	YES
F test	43.30	27.48	220.3

Notes: *** p<0.01, ** p<0.05, * p<0.1. Clustered SE by cohort-country-gender in parentheses.

Table A5: Fixed Effect First stage estimates by gender.

	(1)	(2)
VARIABLES	Retired *Males	Retired *female
*Eligible Early retirement*male*	0.238***	-0.0311***
	(0.0424)	(0.00754)
*Eligible Early retirement*female*	-0.0346***	0.193***
	(0.00842)	(0.0335)
*Eligible Normal retirement*male*	0.160***	-0.0325***
	(0.0445)	(0.00730)
*Eligible Normal retirement*female*	-0.0329***	0.205***
	(0.00876)	(0.0517)
Constant	-0.535***	-0.480***
	(0.144)	(0.136)
Observations	31,504	31,504
R-squared	0.198	0.189
Number of id	15,752	15,752
Country specific age trend	YES	YES

Notes: *** p<0.01, ** p<0.05, * p<0.1. Clustered SE by cohort-country-gender in parentheses.

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