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Sarah Smith

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Centre for Market and Public Organisation
Bristol Institute of Public Affairs
University of Bristol
2 Priory Road
Bristol BS8 1TX
http://www.bristol.ac.uk/cmpo/

Tel: (0117) 33 10752
Fax: (0117) 33 10705
E-mail: cmpo-admin@bristol.ac.uk

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Social connectedness and retirement: Evidence from the UK

Sarah Smith[1]

[1] *CMPO and Department of Economics, University of Bristol*

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Abstract
It has been suggested that social connectedness is potentially important for a healthy and happy retirement. This paper presents evidence that levels of social connectedness (defined as being active in social organisations) increase at retirement, by 25 per cent compared to pre-retirement levels. However, there is not a consistently strong and positive association between social connectedness and health and well-being in retirement for everyone. Rather, the evidence suggests that social connectedness may matter most in bad times.

Keywords Social capital, retirement, health and well-being

JEL Classification I12, J14

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Address for correspondence
CMPO, Bristol Institute of Public Affairs
University of Bristol
2 Priory Road
Bristol BS8 1TX
sarah.smith@bristol.ac.uk
www.bristol.ac.uk/cmpo/

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1. Introduction

With rising levels of life expectancy across most OECD countries, the issue of healthy ageing is increasingly important as a means both of reducing health expenditure costs and of raising levels of well-being among the growing elderly population. Among the many possible factors that might be important for a healthy and happy retirement is how well-connected individuals are with those around them. This is the focus of this paper.

First, the paper presents new evidence on the effect that retirement has on an individual's social connections.[1] A priori, the effect of retirement is unclear as individuals may lose day-to-day relationships with work colleagues when they retire (and with them, further social opportunities) but have more time for other social connections outside the workplace. Using a regression discontinuity design, retirement is shown to have a positive effect on social connectedness (defined, as in much of the previous literature, in terms of individuals' engagement with formal social organisations) – the proportion of individuals who are active in social organisations increases by 25 per cent compared to pre-retirement levels.

Second, the paper looks at the relationship between social connectedness and health and well-being among the retired population. There are a number of reasons why health may be affected by social connections. Individuals may derive direct economic, physical or cognitive assistance through their social relationships that can lead to health improvements. Their social network may provide financial or physical help in the case of an adverse shock, for example, or the mental (and physical) stimulation through social interaction might help to promote good health and well-being. Also, individuals may gain information about health-promoting or health-inhibiting activities and/or have such activities reinforced by the peer groups they associate with (Aizer and Currie, 2003; Kremer and Migeul, 2007; Rao et al, 2007).

[1] Previous literature has referred either to social capital or to social networks. However, the use of both these terms is contested and this paper therefore refers to social connectedness.

There is also evidence to suggest that there may be direct biological pathways that lead from an individuals' social connectedness to health outcomes.[2]

Numerous studies have identified a strong relationship in the general population between the degree to which individuals are socially connected and their health. This dates back to early studies by Durkheim (1897) who found a strong correlation between indicators of social connectedness and suicide, and later all-cause mortality. More recent studies have found a negative correlation between some conception of social capital and cause-specific mortality – including from accidents, suicides and strokes (Kaplan et al, 1988; Kawachi et al, 1999), from infectious, neoplastic, and cardiovascular diseases (Seeman, 1996; Cohen et al., 1997, Hawkley et al., 2006; Lett et al., 2007), from heart disease (Lochner et al., 2003) – as well as all-cause mortality (Berkman and Syme, 1979; Kaplan et al., 1988; Welin et al., 1985; Blazer, 1982; Seeman et al., 1993, Kawachi et al., 1996 & 1999; Veenstra, 2003; Lochner et al., 2003). And, as well as mortality, social connectedness has also been shown to correlate with self-rated physical or mental health (Rose, 2000; Bolin et al., 2003; Lindstrom, 2004; Veenstra et al., 2005). Reviewing the literature, Putnam (2000) concluded: "in none is the importance of social connectedness so well-established as the case of health and well-being."

However, finding evidence that social connectedness causally affects health is much harder than establishing that a relationship exists (see Durlauf, 2002, for a discussion). Reverse causality is an issue, in that health might affect social connections. Another possibility is that social capital and health might both be linked to other characteristics of the individual, some of which may be observable (such as

[2] Cohen et al (1997) found that social connections improve resistance to the common cold, through improved cellular-immune response, and better regulation of emotions and stress-hormones. Seeman et al (1994) found social integration to have a highly positive effect on post-myocardial infarction prognoses with a possible basis being better immune responses and lower neuroendocrine and cardiovascular activity, whilst Cole et al (2007) found that people who experience high levels of social isolation are at an elevated risk of inflammatory disease through an impairment of glucocorticoid genes and increased activity of pro-inflammatory transcription control pathways.

smoking) and potentially controlled for, but others (such as individual motivation) may not be.

A number of studies have attempted to overcome these endogeneity problems. Berkman and Syme (1979) control for initial health status and social connectedness and look at mortality in a ten-year follow-up period; they find that social relationships (including marriage, contacts with close friends and relatives, church membership, formal and informal group associations) are strongly associated with reduced mortality risk. D'Hombres et al (2007) use commuity-level heterogeneity (defined by religion, education and economic situation) to instrument social connectedness in transition countries, finding a positive effect. In an interesting study, Costa & Kahn (2008) examined whether social networks mitigate or accentuate the effects of wartime stress on older age mortality and morbidity using a longitudinal database of Union Army veterans in the American Civil War. In their civil war setting, the cohesiveness of a veteran's company is arguably exogenous because of the way companies were formed (veterans were regularly rotated) and rarely replenished. Men in more cohesive companies, as measured by diversity in ethnicity, occupation and/or age, were relatively less likely to develop cardiovascular disorders, die from ischemic and stroke causes, or develops arteriosclerosis and/or bounding pulse.

Following Berkman and Syme (1979), this paper looks at the relationship between social connectedness at baseline (i.e. at retirement) and later health outcomes, conditioning on baseline health. The evidence does not suggest a strong relationship between social connectedness and later health outcomes for all groups. Indeed, the estimated coefficients suggest a negative relationship with self-reported physical and mental health among those with excellent health at retirement, although this is not statistically significant. But, there is a positive association in the case of those with poorer health at retirement, suggesting that social connections may be particularly important in bad times. Supporting evidence also shows that shocks such as widow(er)hood have a less adverse effect on health outcomes for those with social connections.

The rest of the paper is structured as follows. The next section describes the data used. Section 3 presents results on the effect of retirement on social connectedness, while section 4 looks at health in retirement. Section 5 discusses the results.

2. Data and descriptives

The analysis in this paper is based on data from waves 3 – 16 of the British Household Panel Survey (BHPS). Since 1991 this survey has annually interviewed members of a representative sample of around 5,500 households, covering more than 10,000 individuals. On-going representativeness of the non-immigrant population is maintained by using a "following rule" – i.e. by following original sample members (adult and children members of households interviewed in the first wave) if they move out of the household or if their original household breaks up.[3] We select individuals who are aged 40-80. Our full selected sample has 44,893 observations (7,597 individuals), although much of the analysis is based on much smaller sub-samples. Summary statistics are given in Table A1 in the Appendix.

The measure of social connectedness used in the paper follows Putnam's definition of social capital and focuses on membership and activity related to formal organisations such as social clubs and voluntary groups (Putnam, 1996, 2000). This organisational activity measure has also been used in a number of previous studies in economics (see for example, DiPasquale and Glaeser, 1999, Alesina and La Ferrara, 2000, Glaeser et al, 2002).

In the BHPS, individuals are asked whether they are a member of any of a number of different types of organisations, including political party, environmental group, parents' association, tenants' group, residents' group, religious group, voluntary services group, other community group, social club, women's group, pensioners' group, other, trades union, professional group, sports club[4] and (conditional on

[3] The survey incorporated booster samples from Scotland and Wales in 1999 and Northern Ireland in 2001 but we restrict our sample to original sample members.

[4] For comparison, the set of groups included in the US General Social Survey includes Fraternal groups, service groups, veteran groups, political clubs, labour unions, sports clubs, youth groups,

being a member) whether they join in the activities of any of the organisations on a regular basis.[5]

The main indicator (similar to Alesina and La Ferrara, 2000) is whether the individual is active in any type of organisation. Trade unions and professional groups are excluded since they are specifically work-related organisations.[6] Robustness checks confirm that the main results in the paper are not sensitive to the definition of social connectedness and are similar using alternative indicators such as the number of organisations that an individual is a member of (as used in Putnam, 1996, 2000, and DiPasquale and Glaeser, 1999, Glaeser, Laibson and Sacerdote, 2002).

Table 1: Organisational activity

	Non-retired	Retired
Active in any organisation	0.451	0.432
Active in any (non-work) organisation	0.429	0.426
Active in political party	0.017	0.022
Active in trade union	0.047	0.007
Active in environmental group	0.020	0.021
Active in parents association	0.067	0.009
Active in tenants group	0.047	0.068
Active in religious group	0.123	0.182
Active in voluntary service group	0.048	0.071
Acitve in other community group	0.025	0.036
Active in social group	0.107	0.105
Active in sports club	0.159	0.099
Active in womens institute	0.020	0.043
Active in womens group	0.012	0.016
Active in professional organisation	0.039	0.017
Active in pensioners organisation	0.004	0.051
Active in scout/ guides association	0.019	0.005
Mean number of organisations	0.619	0.635
Number of observations	31,224	13,669

school service, hobby club, school fraternity, nationality group, farm organisation, literary or art group, professional society, church group, any other.

[5] These questions are asked in each wave from 1 – 5 and then in alternate waves.

[6] The results are also robust to excluding sports clubs. These may pick up the effect of sporting rather than social activities.

Just over 40 per cent of our sample report being actively involved in at least one type of social organisation. As shown in Table 1, the proportion is slightly higher among the non-retired population, but almost identical once we remove work-related organisations (trade unions and professional organisations). Among the non-retired population, sports clubs are the most common, followed by religious groups, while for the retired, religious groups are the most common, followed by social groups. The mean number of types of organisations that people are active in is just over 0.6.

3. Retirement and social connectedness

What happens to an individual's level of social connection when they retire? Glaeser et al's (2002) approach to social connections as the outcome of an optimal individual investment decision suggests a number of possible effects of retirement. The transition to retirement may cause individuals to lose work colleagues and, through them, easy links to other social opportunities. However, individuals may also have more time to engage in non-work social activity. Glaeser et al (2002) present supporting evidence in favour of their investment model of social capital formation – including a hump-shaped relationship with age that they argue cannot all be linked to declining health, a positive relationship with home ownership (as in DiPasquale and Glaeser, 2000) and spatial proximity. However, they find no evidence that an individual's social capital is inversely related to the opportunity cost of time, something they attribute to the effect of confounding factors such as an individual's discount rate or complementarities between human and social capital.

Looking at what happens at retirement – which typically involves a discrete change in hours worked – can help to shed light on the importance of the opportunity cost of time in social capital investment decisions. Of course, other things may also change at retirement – for example, exit from the labour market may also impact on the potential returns to social capital, some of which may be in the form of improved employment opportunities. However, so long as retirement is expected, there is less reason to think that the returns should change discretely at retirement. Also, the effect of reduced potential returns is likely to be to reduce people's social

engagement, so it seems plausible that an observed increase in social connectedness at retirement can be attributed to an opportunity cost effect.

One potential issue in identifying the effect of retirement is that the decision to retire may itself be endogenous with respect to an individual's social connectedness. Individuals with lower levels of social capital may choose to work longer if they derive less utility from not working. Alternatively, individuals with stronger social connections may be better able to prolong their participation in employment whether through health or employment-related reasons. One way of addressing these endogeneity concerns is to use a regression discontinuity design (see Hahn et al, 2001), exploiting the fact that there are minimum pension ages in the UK (65 for men and 60 for women) at which individuals first become eligible for their state pension (and often for their private, employer pension). As shown in Figure A1 in the Appendix, there is a clear jump in the proportion of people retired at the state pension ages (22 per cent of men retire at age 65 and 22 per cent of women at age 60), although many people retire at other ages. This makes it a case of "fuzzy" RDD.

The fuzzy RDD approach exploiting pension eligibility ages is explained in detail in Battistin et al (2009) who use it in the Italian context to look at the effect of retirement on consumption. The main identifying assumption is that, in the absence of retirement, the relationship between social connectedness and age would otherwise be continuous. Here, the relationship between age and social connectedness is modelled using a second-order polynomial – the results are very similar using alternative linear and third-order polynomial specifications.

Hahn et al (2002) show that the fuzzy RDD yields an estimate of the Local Average Treatment Effect for those people who are induced into treatment at the cutoff – in this case, the effect of retirement on social connections for people who retire at the state pension age. This will therefore exclude people who retire early for ill-health reason. It is likely that for most people who retire at the state pension age, retirement will be a largely expected event.

The LATE is equivalent to the difference in social connectedness for the treatment and comparison groups (i.e. above and below the cutoff age) divided by the difference in the proportion retired, i.e:

$$\frac{\lim_{a \downarrow spa} E\left[SC \mid a = spa\right] - \lim_{a \uparrow spa} E\left[SC \mid a = spa\right]}{\lim_{a \downarrow spa} E\left[R \mid a = spa\right] - \lim_{a \uparrow spa} E\left[R \mid a = spa\right]} \quad (1)$$

Where *SC* is the indicator of social connectedness, i.e. whether the individual is active in any social organisation, *a* is the individual's age, *spa* is an indicator equal to 1 if the individual is above state pension age (60 for women and 65 for men) and *R* is an indicator equal to 1 if the individual is retired. In a regression framework, this can be estimated by means of a two stage least squares instrumental variable regression using the age cutoff (a binary indicator if the individual is at or above the state pension age) as an instrument for being retired.

Figure 1: Organisational activity, before and after retirement

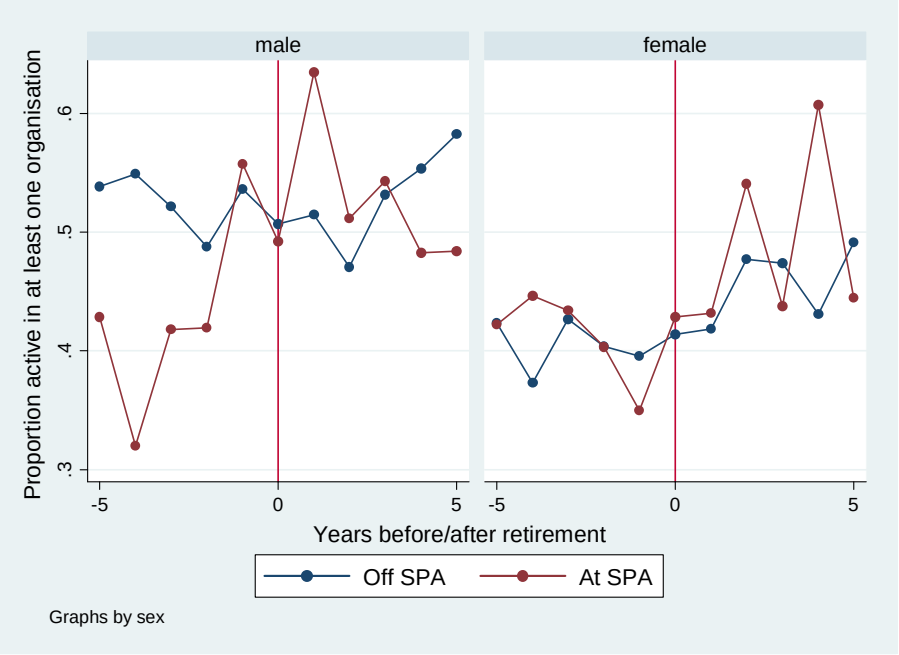


Figure 1 provides some preliminary descriptive analysis showing the proportion of people who report being actively involved in an organisation before and after retirement – separately for those who retire at the state pension age and for those who retire at other ages. There is clear evidence of an increase after retirement among those who retire at the state pension age. This is confirmed by the regression results in Table 2. The IV results, reported in column 3, show that retirement is associated with a significant, 11 percentage point increase in organisational activity – representing a 25 per cent increase compared to the average pre-retirement level

among the group who retires at state pension age.[7] We also provide results for organisational membership which also shows a significant increase post-retirement. Thus, it is not just that individuals become more active in organisations they were already members of but join new organisations. This provides consistent evidence that engagement in social organisations increases post-retirement; and the fall in opportunity cost seems to be the most likely explanation for this.

The regression results confirm other earlier findings in relation to social capital. There is a positive association with having children; although not where the youngest child is aged less than five years. In cross-section there is a positive effect of being an owner occupier, compared to owning with a mortgage, but unlike di Pasquale and Glaeser (1999) this relationship is not statistically significant when individual fixed effects are included. In the fixed effects specification, the marital status variables are negative (compared to being single).

Before looking at the relationship between social connectedness and health, we can also use the RDD methodology to identify the effect of retirement on health and well-being. These results are also reported in Table 2 (panels c – g). The BHPS contains a number of health measures, including a self-assessed health status (1 = very poor, 2 = poor, 3 = fair, 4 = good, 5 = very good) and a measure of subjective well-being, the twelve-part General Health Questionnaire (GHQ).[8] Individual mortality rates are also constructed based on the reason given for individual non-response. These match fairly closely with the Government Actuary Department's age-specific mortality rates (see Appendix, Figure A2). According to all these

[7] The organisations that show a significant increase in activity are environmental organisations (4.6 ppt), parents associations (3.8 ppt), voluntary service groups (6.8 ppts) and women's institute (4.5 ppts).

[8] The GHQ was originally developed as a screening instrument for psychiatric illness, but is often used as an indicator of subjective well-being. Respondents are asked about concentration, sleep, self-worth, decision-making, strain, ability to cope, enjoyment of day-to-day activities, facing problems and happiness. Each indicator is scores from 0 to 3 and then added together to produce a total possible score from 0 – 36 (the scoring has been changed such that a lower number denotes poorer well-bring).

measures, the IV results show that retirement has a positive effect on health and well-being– resulting in an increase in self-reported health status and subjective well-being and a reduction in the mortality rate.

Table 2: Regression results – social connectedness and retirement

	(1) OLS		(2) FE		(3) IV	
(a) Dependent variable = active in any organization (0/1)						
Retired	0.028	*(0.020)*	0.022*	*(0.014)*	0.110*	*(0.058)*
Age	0.010	*(0.012)*	-0.003	*(0.009)*	-0.002	*(0.009)*
Age^2	-0.000	*(0.000)*	0.000	*(0.000)*	-0.000	*(0.000)*
In a couple	0.035	*(0.051)*	-0.331**	*(0.155)*	-0.340**	*(0.158)*
Widowed	0.083	*(0.058)*	-0.221	*(0.157)*	-0.216	*(0.160)*
Divorced/sep	0.034	*(0.061)*	-0.351**	*(0.152)*	-0.347**	*(0.157)*
One child	0.065	*(0.050)*	0.065*	*(0.038)*	0.064*	*(0.037)*
Two children	0.161**	*(0.064)*	0.114**	*(0.055)*	0.109**	*(0.053)*
Three children	0.131	*(0.094)*	0.165	*(0.123)*	0.150	*(0.106)*
Youngest 0-4	-0.242**	*(0.073)*	-0.165**	*(0.069)*	-0.170**	*(0.063)*
Youngest 12-18	-0.055	*(0.042)*	-0.002	*(0.034)*	-0.003	*(0.033)*
Ln income	-0.015	*(0.060)*	-0.030	*(0.048)*	-0.041	*(0.051)*
Ln $income^2$	0.002	*(0.005)*	0.001	*(0.004)*	0.003	*(0.004)*
Owner occupier	0.038*	*(0.022)*	0.008	*(0.016)*	0.001	*(0.017)*
Social renter	-0.001	*(0.036)*	0.025	*(0.044)*	0.020	*(0.042)*
Private renter	-0.032	*(0.046)*	-0.061	*(0.047)*	-0.059	*(0.043)*
Car	0.035	*(0.025)*	0.050**	*(0.024)*	0.049**	*(0.022)*
1^{st} year in area	-0.045	*(0.034)*	-0.012	*(0.026)*	-0.016	*(0.028)*
(b) Dependent variable = member of any organization (0/1)						
Retired	0.040**	*(0.019)*	0.031**	*(0.012)*	0.109**	*(0.053)*
(c) Dependent variable = health status (1 – 5)						
Retired	-0.069**	*(0.031)*	-0.017	*(0.018)*	0.174**	*(0.072)*
(d) Dependent variable = excellent/ good health status (0/1)						
Retired	-0.025	(0.016)	-0.018*	(0.010)	0.019	(0.040)
(e) Dependent variable = poor/very poor health status						
Retired	0.022**	(0.008)	0.012*	(0.006)	-0.074**	(0.024)
(f) Dependent variable = mortality rate (0/1)						
Retired	0.006**	*(0.002)*	0.003	*(0.002)*	-0.019**	*(0.008)*
(g) Dependent variable = subjective well-being (0 – 36)						
Retired	0.577**	*(0.163)*	0.281**	*(0.100)*	0.986**	*(0.405)*

Note: Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$. OLS regression additionally includes indicators for female, nonwhite and religious denomination and standard errors are clustered at the individual level. All regressions include regional dummies. Regressions in panels (a) – (g) include full set of controls as in panel (a).

4. Social connectedness and health in retirement

This section considers the relationship between social connectedness and individuals' health in retirement, ie:

$$H_{it} = \beta_0 + \beta_1 SC_{it} + X_{it}\gamma + u_{it} \qquad (2)$$

where H_{it} is a measure of physical/ mental health, SC_{it} is a measure of individual's social connectedness and X_{it} includes economic and demographic controls, including marital status, household composition, age and income. The error term, u_{it}, includes both an individual fixed effect as well as a mean-zero, random error term, i.e. $u_{it} = \phi_i + \varepsilon_{it}$

OLS estimates of β_1 are positive and statistically significant (see Appendix, Table A2), but are likely to be biased estimate of the coefficient of interest, β_1. There may be reverse causation (i.e. an individual's health may affect their ability to form and maintain social connections) and/or both health and social connections may be jointly a function of unobservable individual characteristics (such as time preference or individual motivation). Fixed effects estimation can be used to remove the confounding effect of time-invariant individual characteristics, and this reduces the magnitude of the estimated coefficients (see Appendix, Table A2), but there is still a concern that contemporaneous shocks may affect both health and social connectedness (i.e. $E(\varepsilon_{it}, SC_{it}) \neq 0$).

One approach, following Berkman and Syme (1979), that removes the problem caused by contemporaneous shocks, is to condition on baseline health and social connectedness (where baseline is retirement), and to look at the difference in health in retirement between those who are socially connected and those who are not, i.e.

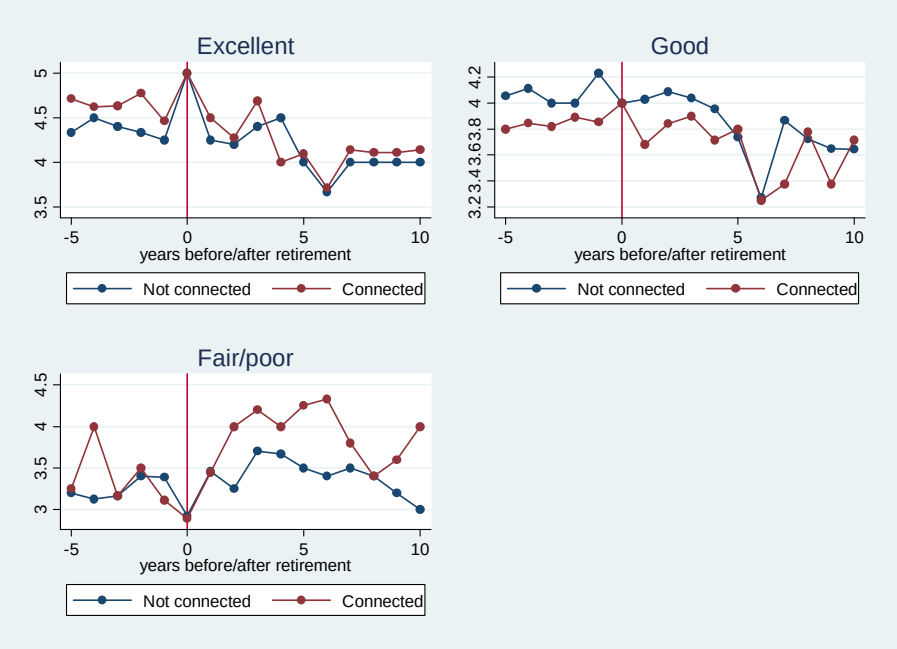
$$E(H_t \mid H_o = h, X_t, SC_o = 1) - E(H_t \mid H_o = h, X_t, SC_o = 0) \qquad (3)$$

Looking at the relationship between current health and baseline social connections avoids bias issues caused by contemporaneous shocks. Conditioning on baseline health can potentially also remove any bias that is caused by unobservable individual characteristics that jointly determine health and social connectedness. However, this requires that the full effect of such unobservables is captured by the individual's baseline health status. Thus, the estimates may still be biased to the extent that the

change in health since retirement is affected by unobservable characteristics that are also correlated with social connectedness at baseline.[9]

Figure 2 shows self-reported health status (1 – 5) before and after for three groups – those whose health at retirement is excellent, good and fair/poor. The sample includes only those who retire at the state pension ages, this is to avoid any potential problems associated with people whose timing of retirement is endogenously determined with respect to their health and/or their social connectedness. Whether someone is "connected" or not refers to organisational activity at baseline, rather than current activity. Evidence of a positive relationship between health and social connections is clearest in the case of those whose baseline health is fair/poor.

Figure 2: Self-reported health, by baseline health status



[9] Ideally, we would like to find an instrument for social connectedness – a variable that is correlated with an individual's organisational activity, but does not otherwise directly affect their health. However, in a general household survey, such as the BHPS, it is hard to find a good instrument. Following d'Hombres et al, 2009, we looked at a number of community-level variables, including income inequality. However, none was significant in the fixed effects specification. In the cross-section specification, there is a concern that such variables may themselves be endogenous.

Despite conditioning on baseline health status, the graphs show some differences in pre-retirement health status between those who are connected and those who are not (although these are not systematic). To test whether there is a significant difference post-retirement between those who are connected and those who are not – and to allow for the effect of other characteristics – we run "difference-in-differences" regressions of the following form:

$$H_{it} = \beta_0 + \beta_1 SC_o R_{it} + \beta_2 R_{it} + \beta_3 SC_o + X_{it}\gamma + u_{it}$$

These regressions are run separately for each of the three groups according to baseline health. This controls for the confounding effect of unobservable factors that jointly determine both current and baseline health and social connections at baseline. It also allows the association between current health and social connections to vary according to an individual's baseline health. The coefficient of interest is β_1 which reflects the difference in health, post-retirement, between those who are connected at baseline and those who are not.

Table 3: Regression results – health and social connectedness in retirement

	Health at retirement = excellent	Health at retirement = good	Health at retirement = fair/poor
(a) Dependent variable = health status (1 – 5)			
Connected x retired	-0.296	0.023	0.209
	(0.254)	(0.161)	(0.183)
(b) Dependent variable = fair/poor health status			
Connected x retired	0.015	0.010	0.112
	(0.017)	(0.039)	(0.105)
(c) Dependent variable = excellent/ good health status (0/1)			
Connected x retired	0.021	-0.088	0.225*
	(0.127)	(0.105)	(0.114)
(d) Dependent variable = mortality rate (0/1)			
Connected x retired	-0.028	0.003	-0.056*
	(0.032)	(0.015)	(0.031)
(e) Dependent variable = GHQ score (0 – 36)			
Connected x retired	-0.323	0.590	0.515
	(1.177)	(0.752)	(1.479)
N	236	604	220

Note: Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$. All regressions include full set of controls as in Table 2 as well as indicators for retired and for being connected at baseline. Standard errors are clustered at the individual level. Post- and pre-retirement exclude year of retirement, pre-retirement defined as five-year period.

Table 3 reports the estimated β_1 coefficients from regressions using a number of different health indicators. Again, we restrict the sample to be those who retire at the state pension ages and this limits the sample size and the statistical significance of the results. Contrary to the cross-section evidence, the results do not present strong evidence of a consistently positive association between social connectedness and health for all groups. Indeed, the relationship between social connectedness and self-assessed physical and mental health is negative for those who have excellent health at retirement, although this is not statistically significant.

However, there is some evidence that social connectedness at baseline is positively associated with health at retirement within the group who report fair/poor health at retirement. Among this group, those with social connections at baseline are significantly more likely to report positive (good or excellent) health in retirement (compared to those who are not socially connected at baseline). Also, within this group the mortality rate is significantly lower among those who are socially connected compared to those who are not. Mental well-being is also higher, although this is not statistically significant. One interpretation of these results is that social connections may be particularly important for health and well-being in bad times.

As a further piece of evidence of the importance of social connections in bad times, we look at what happens when people lose their spouse or partner. Looking separately at the change in health and well-being for those who are socially connected and those who are not, the regression results in Table 4 show that any adverse impact appears to be much less for those who are socially connected. Unlike Costa and Kahn (2008), this cannot be given a causal interpretation since the social connections are endogenously chosen and may reflect other individual characteristics that mean that people cope better. However, the results from a fixed effects regression which removes the effect of unobservables on the level of health and well-being show that there is no adverse impact of widow(er)hood on self-reported physical health or mortality for those who are socially connected, while the adverse impact on mental well-being is lessened – and is significantly less for those with social connections than for those without.

Table 4: Fixed effects regression results – effect of widow(er)hood

	Dependent variable				
	Health status (1-5)	Ex/ Good health (0/1)	Poor/fair health (0/1)	Mortality rate (0/1)	GHQ score (0-36)
Widowed	-0.091	-0.032	0.043	0.020**	-2.733**
	(0.091)	(0.051)	(0.031)	(0.010)	(0.521)
Wid x SC	0.135	0.042	-0.058*	-0.025**	1.594**
	(0.100)	(0.056)	(0.034)	(0.011)	(0.570)

Note: Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$. Regressions include additional controls for age. Social connectedness is defined based on pre-widow(er)hood observations.

5. Discussion and conclusions

Social connectedness – or social capital – is seen by many to be important for health and well-being. Societies with growing elderly populations may therefore be interested in promoting opportunities for social interaction among the retired as a way of encouraging healthy ageing.

This paper has presented new evidence on what happens to social connectedness at retirement. While there may be a concern about social isolation among some elderly people, the evidence shows that retirement itself has a positive effect on social connectedness (defined as being active in formal organisations). The proportion of people who are active in any organisationsincreases by 25 per cent compared to pre-retirement levels. It seems likely that this reflects the reduced opportunity cost of time. As such, this evidence provides some additional support for Glaeser et al's (2002) model of social capital as an individual investment decision.

The second aim of the paper has been to look at the relationship between social connectedness and health among the retired population. Absent a suitable instrument for social connectedness, the paper explored the link between social connectedness at retirement (baseline) and later health outcomes, conditional on baseline health following the approach in Berkman and Syme (1979). This avoids any bias problems that may arise as a result of contemporaneous shocks that affect health and social interaction. It also removes the confounding effect of individual characteristics that jointly determine both current health as well as health and social

interaction at baseline. However, there may be a concern that the change in health since baseline is also affected by unobservables that correlate with social connectedness at baseline. Thus, the estimates of the effect of social connectedness may still be subject to some positive bias. Given this, the results are striking in that they do not support a strong, positive relationship between social connectedness and health for all groups. Indeed, the association is negative for people who have excellent health at retirement (although not significant).

However, there is a positive association for people who have below-average health at retirement. Among this group, mortality rates in retirement are significantly lower for those who are socially connected than for those who are not and the probability of reporting positive health outcomes in retirement is also significantly higher. This suggests that social connectedness may matter more for health and well-being in bad times. Additional supporting evidence for this is the fact that widow(er)hood has a much less adverse effect on health and well-being for those who are socially connected.

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Appendix

Figure A1: Proportion of men and women who are retired by age

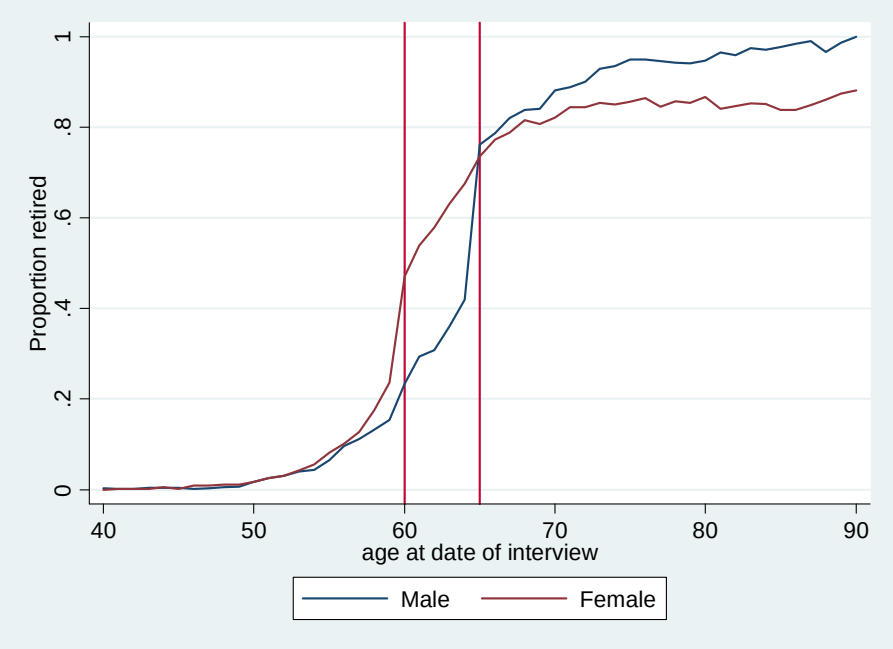

Figure A2: Sample and population mortality rates, by age

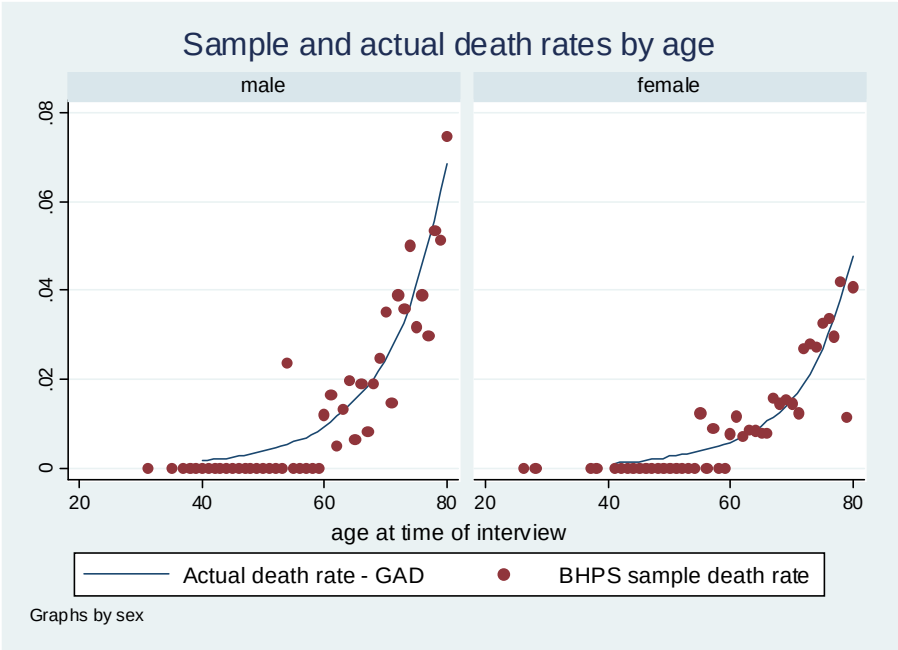

Table A1: Summary statistics

	Non-retired	Retired
Age	50.9	69.2
Female	0.523	0.569
Couple	0.809	0.633
Widowed	0.038	0.240
Divorced/ separated	0.097	0.058
Never married	0.056	0.069
Education: Degree or above	0.152	0.092
Children in household	0.298	0.022
Monthly household income	£2,679	£1,261
Owner occupier (outright)	0.259	0.645
Owner occupier (mortgage)	0.560	0.102
Social renter	0.131	0.216
Privately renting	0.050	0.037
Nonwhite	0.033	0.010
No religion	0.449	0.295
Health status (1 – 5)	3.81	3.56
Mortality rate	0.005	0.021
GHQ score (0 – 36)	24.5	25.0

Table A2: Regression results -

	OLS	FE
(a) Dependent variable: health status (1 – 5)		
Active in an organization	0.130**	0.052
	(0.040)	(0.038)
(b) Dependent variable: health status = poor/fair (0/1)		
Active in an organization	-0.027**	0.014
	(0.011)	(0.013)
(c) Dependent variable: health status = good/excellent (0/1)		
Active in an organization	0.064**	0.048**
	(0.021)	(0.022)
(d) Dependent variable: mortality rate		
Active in an organization	-0.008*	-0.003
	(0.004)	(0.006)
(e) Dependent variable: GHQ score (0 – 36)		
Active in an organization	0.613**	0.476**
	(0.218)	(0.178)

Note: Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$. Regressions include full set of controls as in Table 2.