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Abstract

Despite an extensive amount of published economic, psychological, and public health research, a consensual view on the causal relationship between retirement and health remains to be articulated. This lack of consensus is arguably due to the diversity in the transitional process from employment to full retirement, the usage of various characteristics of outcome measures, social and economic conditions affecting the retirement decision, and the impact of crowding-out by activities not related to formal work (e.g., in the family and community network). We used panel data from the Japanese Study of Aging and Retirement (JSTAR) to scrutinize the complex relationships among employment status transition; physical, functional, and cognitive aspects of health measures; and types of social participation. We confirmed that transitioning from employment to retirement is a diverse and gradual process with distinct gender-related aspects. Social participation is significantly related to exiting formal work situations for men, but not for women. There were distinct patterns of health transition across employment status transition, by types of health measures, and by reasons for retirement. Regression analyses were conducted to identify the effect of retirement, as leave from paid work, on health conditions. Variables included in the analyses accounted for social participation, stress received from the former job, and reasons for retirement. The results which included propensity weighting reveal that psychological distress and cognitive function decline after retirement for men, but not for women. Retirement from jobs with high stress was followed by an improvement in health, especially among men. Additional results indicate that retirement is accompanied by increased social participation. Social participation ameliorates psychological distress and cognitive decline among men, but not among women. Limitations in the instrumental activities of daily life as well as in grip strength are not considerably affected by retirement. Among women, retirement to engage in family care significantly and heavily affected the level of psychological distress. These results indicate that the theories on which aspects of health status determine—and are determined by—the mode of employment status transition should be improved. Policies on work and health in the elderly population should not seek a one-size-fits-all solution, but should target different segments in terms of work characteristics, economic and social needs, and gender roles in the household.

Keywords: Retirement, Health, JSTAR, Social network, Gender difference
JEL classification: I12, J14, J26

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I. Background

Retirement and retiree health status have been investigated by a large number of studies in the economics, psychological, and public health literature. However, a consensus on the causal relationship between retirement and health has not been reached. In the face of aging populations and increasing fiscal pressure from pensions for the elderly, economists have long been interested in health as human capital affecting retirement decisions [Gupta and Larsen 2010, Ichimura and Shimizutani 2012]. Recently, the impact of retirement on health has also been reported in the economic and public health literature [Behncke 2012; Bound 1989; Bound and Waidman 2007; Coe and Zammaro 2011; Dave, Rashad, and Spasojevic 2006; Fe and Hollingsworth 2011; Gallo, Bradley, Siegel and Kasl 2000; Lindeboom and Lindegaard 2010; Mojon-Azzi, Sousa-Poza, and Widmer 2007; Moon Glymour Suburamanian, Avendano, and Kawachi 2012; Sjo¨sten, Kivima¨ki, Singh-Manoux, et al. 2012; Westerlund Vahtera, Ferrie, et al. 2010; Zins, Gueguen, Kivimaki, et al. 2011].

Economists often use human capital theory to model the effect of retirement on health [Grossman 1972]. The original Grossman model treated health stock as determined by an individual's rational investment in health under certainty, in order to maximize utility obtained through healthy working days and consumption of goods to the net of health investment cost and loss of working days due to ill health over periods in a lifetime. Because the Grossman model treats wage rate as a reflection of time cost and individual economic productivity, model implications for health investment after leaving paid work are somewhat vague [Dave, Rashad, and Spasojevic 2006]. The model would predict that the time cost for health investment after leaving paid work is lower, so the retiree would invest more time in health stock. However, investment in health stock becomes more costly and less effective as physiological aging increases the depreciation rate. Thus, the net impact of retirement on health depends on the balance between cost and effectiveness of health investment, which will be further determined by income differential before and after retirement, pre-retirement health conditions, accessibility to healthcare, and other socio-economic conditions of retirees.

Psychologists who study retirement adjustment often rely on "role theory" and "life course theory" [Wang, Henkens, and van Solinge, 2011]. These theories regard retirement as a transition from the loss of work-related roles (e.g., as worker, or as organizational member) to the strengthening of other roles in the family and the community. The impact of retirement on retiree wellbeing varies depending on the relative significance of his/her spheres of life at worksites, in households, and in communities. Transitions in social roles affects wellbeing because social interaction exercised in different roles affects access to economic and to psychological and social resources for health maintenance (e.g., tangible and emotional social support, a sense of meaning in life, and other social capital) [Mein, Higgs, Ferrie, and Stansfeld 1998]. Studies on social

relationship and elderly wellbeing have consistently found that elderly people who enjoy frequent social interaction have better physical, mental, and cognitive prognoses, and better survival after illness [Sugisawa, Sugisawa, Nakatani, and Shibata 1997: Sirven and Debrand 2008]. Consistent with role theory, labor participation in later life could be beneficial because it allows access to economic investment in health, and provides opportunities for health-generating social participation. Newly established participation in the community network after retirement may compensate for the lost role in work places.

One could argue, however, whether all types of labor participation can be health generating. Some types of labor have a deleterious effect on health (e.g., jobs with higher stress, hazardous toxic exposure, and excessive physical strain). Models published in the economic and social psychological literature have mostly failed to incorporate differences in retirement-health association across occupational types. In their panel survey of UK civil servants, Mein et al. (2003) included these differences and found that retirement was related to stress reduction for higher occupational classes, but not for lower occupational classes. Their study results also indicated that the types of health stock (e.g., physical, mental, cognitive, functional and social aspects) may be differently affected by retirement, depending on the nature of pre-retirement occupational types and required capability.

Most problematic for retirement-health studies has been the definition of retirement per se. Retirement is a gradual process, not a discrete event [Ichimura and Shimizutani 2012; Shimizutani 2011]. However, much of the existing literature relies on the dichotomized status of retirement as leave from formal paid work. This approach may seem to provide consistent and valid measurement of retirement status. However, it may not precisely capture the degree of labor participation, especially among the self-employed, part-time base workers, and homemakers. Simply asking an individual to specify his/her own retirement status is also problematic because people judge differently what constitutes “retirement.”

Reasons for retirement decisions, especially whether the decision was voluntary and accompanied by alternative choices, will differentially affect the association between retirement and health outcomes [Jokela, Ferrie, Gimeno, et al. 2010]. Health concerns can be the main reason for the decision to retire if demands on health exceed the expected marginal utility obtained from labor wage and social participation. In this case, retirement will be superficially correlated with negative health outcomes because unhealthy workers will be more likely to retire. Forced retirement via lay-off or other external economic shocks may also occur, even if there is a desire to remain in paid employment status with suitable health stock [Gallo, Bradley, Siegel, and Kasl 2000]. Or, an individual may retire voluntarily in order to have more leisure time or to provide care for dependent family members. These different paths that lead to the decision to retire may result in different associations with health.

Our review of the existing literature on retirement and health revealed that the definition of retirement and its relationship to health in diverse subpopulations of post-retirement subjects remains to be determined. Among developed countries, Japan is at the front of population ageing. The relatively high labor participation rate in the elderly population is a unique phenomenon that invokes questions about the reasons for this participation, and the consequences for population health and financial status [Oshio and Oishi 2004: Yashiro and Oshio 1999].

In this discussion paper, we used JSTAR data to investigate the limitations and pitfalls of previous studies. JSTAR interviews consist of questions about current employment status, type of employment, reasons for retirement, job stresses, and various measures of health (e.g., functional, cognitive, and mental). A supplemental questionnaire is used to collect information about social support, social networks, the types and frequencies of social participation, and perceived social capital.

We begin the next section with a descriptive analysis of employment status transition from wave 1 to wave 2. The analysis was performed using stratification by gender because patterns of employment status transition displayed distinct between-gender differences (i.e., female respondents viewed homemaker status as an alternative status to retirement). Description of the transition patterns helped us confirm that retirement is a gradual process, and that the treatment of homemaker status is problematic among females. We also performed an additional series of descriptive analyses on various types of health measurements by categories of employment status transition. As we expected, the distributions of, and changes in, health measures across employment status transition are diverse. They vary according to the type of health measure (e.g., perceived health status, mental status, and physical functions measured by standardized batteries, grip strength, and cognitive function). Participation in different types of social networks was compared across employment status transition categories to investigate whether social participation and labor participation endogenously affect each other. Interestingly, we found gender differences in the association between leave from employment status and participation in social networks. Retired male respondents were more likely to participate in voluntary and leisure activities. There were no significant associations with social participation among retired females or among homemakers. The results suggest that in males, the pattern of social participation may confound the health effect of retirement. A series of regression analyses were also performed to identify the effect of retirement as leave from paid work on health conditions by gender, while accounting for social participation, stressful conditions in the former job, and reasons for retirement. The results of regression analysis with propensity weighting for retirement revealed that psychological distress and cognitive function decline after retirement in males, but not in females. Retirement from a job with high stress had a counter-effect on cognitive function among males. Additional independent regression analyses confirmed that retirement was accompanied by

increased social participation, and social participation counteracts psychological distress and cognitive decline after retirement among males. Participation in some types of social networks did improve instrumental activities of daily living (IADL) and psychological distress among females, but retirement per se did not have an effect. Limitations in IADL and grip strength were not affected considerably by retirement. Among women, retirement for family care duty significantly and strongly affected psychological distress. These results indicate that we need improved theories about the aspects of health status that determine, and are determined by, modes of employment status transition. The final section of the paper provides a summary of the results and implications for future research on retirement and health in Japan.

II. Descriptive analysis of transition in employment status, social participation, and health in the JSTAR population

II-1. Definition of retirement and employment status transition between wave 1 and wave 2

JSTAR interviewers ask whether the respondent currently participates in the labor force, including tentative leave. If the respondent answers NO, a follow-up question asks whether he/she is currently seeking employment opportunities. If the answer to this question is YES, the respondent is categorized as "unemployed." If the answer is NO, the respondent is asked to choose the category that best describes his/her current status: "retired", "homemaker", "convalescent", or "other".[1]

Table 1-1 presents the transition of employment status between waves 1 and 2 for both genders and for all age categories. Tables 1-2 and 1-3 present the results of a analysis stratified by male and female respondents. Gender differences were observed in the attrition rate among retirees and homemakers at the time of wave 1; male homemakers and female retirees were likely to drop out of follow-up survey.

For both genders, respondents with full-time, part-time, and self-employed labor participation statuses were most likely to remain in the same category after two years. Striking gender differences were observed for the categories, "other employment", "unemployment", "retired", and "homemakers" at wave 1. Males in other employment or unemployment during wave 1 had the highest proportion of retirement during wave 2 (24.0% and 29.6%, respectively), followed by part-time workers (10.0%). Female retirement rate was less than 2% in all categories. Females in other employment were most likely to stay in the same category after two years, and females unemployed at wave 1 were most likely to become homemakers at wave 2 (32.6%). An unexpected finding was that 47.4% of females who defined themselves as retired at wave 1 returned to

[1] Ichimura and Shimizutani [2012] further used self-reported work time for formal paid work as a marker for "retirement" because of inconsistencies in self-reported retirement. We did not use this strategy because we defined retirement more broadly than "leaving formal labor force."
However, there may be some misclassification of status because some respondents indicated they were "at work" even though they were only working a few hours per day.

homemakers at wave 2. Tables 2-1, 2-2, and 2-3 show the results limited to those aged 65 or less. Overall, findings were quite similar to those presented in Tables 1-1, 1-2, and 1-3. The descriptive analyses results presented in Tables 1s and 2s suggest that male respondent's transition to retirement was made via other employment, unemployment, and part-time status. Female respondents were more flexible in the use of homemaker status interchangeably with retirement status.

JSTAR also asks whether respondents were re-hired after compulsory retirement. About one-half of male respondents who were in full-time employment at wave 1 and have shifted to a part-time position at wave 2 were re-hired (Table 3-1). About 22% of these re-hired males had transition from part-time to part-time positions. In contrast, only a quarter of the female respondents who shifted from full-time to part-time positions were re-hired cases. These numbers are consistent with the findings in Tables 1s and 2s, in that a considerable proportion of males transition to retirement through non-full time positions instead of shifting directly to retirement. Females take a different path to retirement.

JSTAR also asked those who retired at wave 2 their reasons for retirement. The major reason for retirement for both genders was "no choice" (i.e., compulsory retirement at a fixed age, and/or retirement due to an external economic shock such as lay-off or bankruptcy) (Table 4-1). An additional reason was concern about health, which was more prevalent in respondents ≥65 years in age, compared with their younger counterparts. One-third of female respondents ≤65 years in age responded that they retired to care for dependent household members. Only 8–9% of the respondents aged 65+ retired to enjoy leisure activities.

Male response was excluded from a wave 2 question that asked about reasons for being homemakers because there were only 8 male respondents in this category. The results were stratified by age category and homemaker status at wave 1 (Table 4-2). The primary reason females became homemakers was to perform duties for informal care of family members. However, about one-quarter of female respondents who were in the workforce at wave 1 and who became homemakers at wave 2 made this change because of compulsory retirement and/or external economic shocks. About 15% of females working at wave 1 became homemakers at wave 2 because of health condition. These numbers suggest that a considerable portion of female cases regarded homemaker status as an alternative to leave from paid work.

To summarize, the descriptive analysis findings presented in this section were:

1. Retirement is a gradual process and not a discrete event.
2. Males and females take different paths to retirement. Among females, change to homemaker status is used as an alternative to retirement.
3. There are diverse reasons for retirement, or for changing to homemaker status.

In the next section, we present results that describe how a variety of transitions in employment status are related to changes in various health measures.

II-2. Descriptive analysis of employment status transition and change in health status

In this section, we turn our focus to the health status of JSTAR participants and how it changes according to employment status transition. In this preliminary analysis, we investigated the diverse associations between employment status transition and health markers, because we believe that inconsistent findings from previous studies could be at least partially attributed to different health markers with a heterogeneous mix of status transitions.

Tables 5-1 to 5-8 present the change in health markers among male respondents who participated in the labor force (full-time, part-time, self-employed, and other employment) at wave 1. The left two columns of the tables indicate the health markers among those newly retired between waves, divided by reasons for retirement: respondents who selected “non-choice” retired for compulsory reasons or because of an external economic shock such as a lay-off. Respondents who selected “health” decided to retire because of health concerns.

Table 5-1 presents the proportions of respondents with mobility limitations. Table 5-2 presents the proportions of respondents with IADL limitations. These two variables were measured using a standardized battery of questions asking about functions that the respondent found difficult to perform. Thus, even though the questionnaire is based on self-report, it should reflect objectively defined functional limitations. The proportion of respondents with any functional limitation was lower in those at full-time work at waves 1 and 2, compared with those who made transition to non full-time status at wave 2. This result suggests that functional limitation at baseline is associated with the likelihood of transition from full time status to non-full time status over time. Respondents who shifted from a full-time job at wave 1 to retirement status at wave 2 had a higher proportion of functional limitation at wave 2. This result is consistent with health-related selection for retirement.

Table 5-3 presents the results of grip strength, an objectively measured biomarker that reflects overall physical strength. The trend that was apparent for IADL and mobility limitation is even more apparent for grip strength change. Respondents who remained at fulltime work had a stronger grip than respondents who made transition to non-full time status.

Tables 5-4 and 5-5 present the proportions of respondents who reported difficulty with eyesight or hearing. Because these data are based on self-report, we can assume that they are strongly affected by daily demands on hearing and vision, and are susceptible to self-report bias. Compared with respondents who transitioned to non-full time status or retirement, the proportion of reported limitation was relatively higher among respondents who stayed in full-time

employment. This result indicates that self-report of sensory limitation is dependent on the functional demand to stay in the labor force.

Self-reported health status is the most frequently used measure to reflect health status. Although it is highly correlated with health prognosis (e.g., mortality) [Idler and Benyamin 1997], self-reported health status is also susceptible to report bias due to non-health related conditions [Groot 2000]. The highest proportion of self-reported ill health was observed in respondents who transitioned from employment to unemployed (Table 5-6). The same trend is apparent in Table 5-7, which presents data on depression (defined as 16+ points in a battery from the Center for Epidemiological Studies Depression Scales (CES-D)). Depression was common among the unemployed and among respondents with full time jobs. These results suggest that the proportion of self-reported ill health and depression reflects external conditions such as socio-economic difficulties and job stresses, rather than internal conditions of health.

Table 5-8 presents results for word recall as a marker of cognitive function.[2] This measure should be interpreted with caution, because the average number of words recalled improved from one wave to the next, contrary to physiological decline in memory function. The measurement battery used in wave 2 was similar to wave 1, so this unexpected improvement over time suggests the presence of a learning curve effect. There were no obvious differences in cognitive function at wave 1 across categories of employment status transition. Notably, there was a decline in recalled word counts over time in retirement categories. The result suggests that there was a negative change in cognitive function among newly retired respondents.

Tables 6-1 to 6-3 present the results for changes in limitations in mobility, IADL, and grip strength among female respondents. Compared with the findings for male respondents, there was a relatively narrower disparity in function across categories of employment status transition. For homemaker status at wave 2, however, a larger proportion of functional limitation and lower grip strength was consistently observed. Tables 6-4 and 6-5 present the results for proportion of respondents who complained of sensory functional limitations. These results were similar to the results for male respondents. Tables 6-6 and 6-7 present results for self-reported ill health and depression. There were greater proportions of ill health and depression among female respondents who became homemakers for health reasons or for family care giving. About one-half of the females who were full-time or part-time workers at wave 1, and who became homemakers for health reasons or for family care at wave 2, complained of ill health and depression. Table 6-8 presents results for the association between word recall and cognitive function. Compared with

[2] Ichimura and Shimizutani (2012), using the same set of JSTAR panel data, used imputation because a considerable portion of word recall measurement was missing. We did not use imputation in this research because of potential bias due to a learning effect from one wave to the next wave. Some selection bias from missing observations may have been present in the analysis.

male retirees, who showed a clear decline in cognitive function, only female retirees and homemakers who became homemakers because of health reasons experienced a decline in cognitive function.

To summarize, the associations that were related to employment status transition varied according to the type of health markers. Physical strength (measured as grip strength and mobility) and IADL seemed to affect the decision to retire. Cognitive function declined, and depression was more prevalent, after retirement in males. Self-reporting of sensory disability in hearing and eyesight was biased by the living conditions that require sensory function for communication, and may not be a good marker for retirement effects on health. Among female respondents, the association between employment status transition and health markers were less obvious than for male counterparts. Transition to retirement/homemakers for health reasons or for care of family was strongly related to depression and self-reported ill health.

II-3. Social participation and employment status transition

JSTAR asks respondents if they participate in social relationships other than with family, relatives, and friends, or in social settings other than the workplace. We performed a multiple correspondence analysis (a multivariate statistical technique for categorical data) to reduce the questionnaire's eight types of social participation to a smaller number of meta-categories. The resulting categories were "commitment", "prestige", and "preference-based" network activities. Commitment network activity reflects activities such as volunteer activities in the community and other commitments that support the neighborhood. Prestige network activity consists of political and/or religious activities. Preference-based network activity includes sports, leisure, hobby, and learning activities.

Tables 7-1 to 7-3 present the proportions in each category of social participation by transition categories of employment status transition for males. Participation in commitment and preference-based networks occurred more frequently than participation in prestige networks. Compared with wave 1, males who became new retirees at wave 2 showed an increase in the proportion that joined commitment and preference-based networks. We also performed a logistic regression that used male participation in networks at wave 2 as a target variable (Table 8-1). Retirement at wave 2, adjusting for age, education, marital status, employment status at wave 1, and corresponding participation at wave 1, was significantly associated with the likelihood of joining commitment and preference-based networks at wave 2 (odds ratio=2.14 for commitment network, odds ratio=3.02 for preference-based network). Tables 7-4 to 7-6 and Table 8-2 present the results of similar analyses for females. The proportions that joined network activities were generally lower among females compared with males. For females, retirement and homemaker status at wave 2

was not associated with the likelihood of joining social network activities of any kind at wave 2.

II-4. Health outcomes, employment status transition, and social participation

We also performed a series of analyses that used health measures at wave 2 as targeted outcome variables. These variables were regressed on employment status transition between waves 1 and 2, with adjustment for age, educational attainment, marital status, and corresponding health status as of wave 1. We used a conventional treatment for the retirement variable that dichotomized the categories into paid employment status (full-time, part-time, self-employed, and other employment) and non-paid status (retired and homemaker), and treated the non-paid status as “retirement”.

We obtained a propensity score for retirement at wave 2 by using a probit regression on age, educational attainment, marital status, employment status at wave 1 and its interaction with gender, city dummy codes, and limitation in mobility and grip strength at wave 1. We used the reverse probability as a weight to account for an endogenous association between retirement and health status. The obtained probit model for propensity score had a pseudo R-square of 0.542, which is relatively high in explanatory power.

Table 9 presents the results of the propensity weighted regression of health indices at wave 2 on employment status transition. Transition from paid work to retirement was significantly associated with an increased likelihood of depression and declined cognitive function among males, but not among females. Paradoxically, limitation in IADL was more prevalent among males who returned to work, which may be a result of increased demand in the work place on function. Grip strength declined among retired males and increased among those who returned to work, but the difference was not statistically significant. Among females, grip strength declined significantly in the respondents who remained in retirement throughout the waves.

Table 10 presents results limited to respondents at work at wave 1 to account for stress conditions of the former work at wave 1, and reasons to leave employment status at wave 2. Job stress was measured as the ratio of job demand and job control, and was dichotomized at a cutoff point=1.0. Values>1.0 indicate stressful job conditions. An increased likelihood of depression at wave 2 was associated with retirement due to health reasons among males. The interaction between job stress and retirement was negligible among males. However, there was a relatively large-scale interaction among females. Females who retired for family reasons had a large positive coefficient for depression with marginal statistical significance. IADL limitation was not associated with leave from paid work, job stress, or reasons to leave paid work, except in males who retired for family reasons. Cognitive function declined significantly after retirement among males, and the interaction between retirement and stressful former job conditions was also significant and positive.

These results suggest that leaving a stressful job counters functional decline. The same relationship was not observed among females. Finally, decline in grip strength became marginally significant among males after accounting for job stress and reasons for retirement.

Table 11-1 presents the results for a set of independent regression analyses (for males) that account for a simultaneous relationship between the chance of social participation by employment status transition, the impact of social participation, and work transition on health. The first equation treated a health index at wave 2 as a targeted outcome, and was regressed on age, education, marital status, employment status transition, and social participation at wave 2. The second equation treated type of social social participation at wave 2 as an outcome, and was regressed on age, education, marital status, employment status transition, and social participation at wave 1.

Leaving paid work for retirement at wave 2 was associated with depression and decline in cognitive function, even after accounting for social participation. Participation in a commitment social network (e.g., voluntary service) was higher in respondents who returned to work, but not in newly retired respondents. Commitment network participation was significantly associated with a lower chance of reported depression and IADL limitation, and an improvement in cognitive function. Prestige network participation (e.g., political and religious circles) was not associated with any of the health indices except cognitive functional decline. Employment status transition was not associated with prestige network participation among males. Preference based network participation (e.g. hobby circles) was significantly associated with increased cognitive function, but, paradoxically, was also associated with an increased chance of depression at wave 2. Participation in preference based networks was higher for respondents that left paid employment status at wave 2.

Table 11-2 presents corresponding results for female respondents. Contrary to male respondents, social participation in commitment and prestige types were increased among females who returned to work. Females who were newly retired did not exhibit any change in any type of social participation. There were weak effects of social participation on function; commitment social participation was related to increased grip strength, prestige network participation improved depression, and preference-based network participation improved IADL limitation and grip strength.

III. Discussion and Conclusion

Transition in employment status among JSTAR participants was diverse and gradual. There was also striking gender differences in transitional paths. For female respondents, becoming a homemaker was an alternative to retirement. Thus, the results of treating “retirement” as a binary variable in the analytic model should be interpreted cautiously. Operationalization of a “retirement”

variable should be specifically justified for the theoretical hypothesis and objectives included in an investigation.

Depending on the nature of the health measures, their distributions across employment status transition were diverse among males. Functional limitation in mobility and IADL function appears to be related to a higher chance of leaving full-time work among males. This result suggests that limitation in physical function is a determinant of leaving employment status, while psychological distress is affected more by economic and social difficulties.

The decline in cognitive function among male retirees was a notable finding. There were limitations in measurement comparability between wave 1 and wave 2. However, wave 3 data will consist of a new battery of cognitive function measures that we can use to make more definitive conclusions about the association between employment status transition and cognitive function.

Females had a relatively narrower disparity in functions across employment status transition. Becoming a new homemaker was related to functional decline, however, which suggests the presence of a health-related selection process that affects the exit of females from the formal labor force. Female homemaker status is complicated by family care duties, which is reflected in higher proportions of depression and self-reported ill health. Thus, analyses of retirement and health among females will be affected by their duties and by time allocated for formal work and for informal care, and health conditions, before and after employment status transition.

Leaving employment status was related to the likelihood of participating in social networks, and could be a confounder on the association between employment status transition and health transition among males for some health measures. The association between employment status transition and social network transition was not so remarkable for females. The health impact of social participation varied according to the types of networks and health measures, which suggests the presence of different mechanisms through which each type of network activities affects health. Although our analytic model indicated that the impact of employment status transition is independent of subsequent social participation, analysis for male workers may be improved by accounting for the time trade-off between formal and informal social activities, and changes in economic status and social position [Chaix, Isacsson, et al. 2007].

These descriptive and exploratory analyses were primitive in terms of the precision of causal inference. They were also susceptible to the effects of specification biases. However, the implications of the results are not trivial. The definition of “retirement” as adopted by JSTAR and global sister surveys actually corresponds to leave from paid work and the respondent’s perception that he/she is retired. The relationship between “retirement” and health change should be grounded in a clearer theoretical basis. Leave from paid work implies a loss of labor income, but is not necessarily accompanied by relief from social responsibility for the household’s economic wellbeing or by a loss of social participation. One may choose to shift from full-time to non-full time

employment status, taking into consideration loss of income against gain in leisure, health investment, or family care, or simply availability of job opportunity. Given the diversity we discovered in this study, we should be more specific about the modes of “employment status” and the conditions of “health” under which we study the association between employment status transition and health change. Results of this study also indicate that policies on work and health in the elderly population should not seek a one-fits-all solution. They should effectively target specific segments of the population in terms of the nature of work, economic and social needs, and gender roles in the household.

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Table 1-1; Trajectory of work status (all, both genders)

			Wave 2 status									
		N	full-time	part-time	self-employed	other employment	unemploy-ment	retired	home-maker	other status	lost to follow	total (%)
Wave 1	full-time	768	53.0	10.7	3.1	1.2	2.6	3.5	1.4	1.2	23.3	100
	part-time	669	5.4	55.5	2.4	1.8	2.2	5.1	4.0	1.4	22.3	100
	self-employed	529	3.4	3.6	60.1	2.5	0.4	4.5	1.3	2.1	22.1	100
	other employment	234	5.6	6.8	9.4	44.4	1.3	3.0	8.6	2.6	18.4	100
	unemployed	113	5.3	23.0	0.9	0.9	3.5	15.0	19.5	0.9	31.0	100
	retired	470	0.2	3.0	1.3	0.2	0.6	65.5	4.7	5.7	18.7	100
	homemaker	856	0.1	2.2	0.4	1.4	0.2	2.3	66.9	3.9	22.6	100
	other status	189	0.0	1.1	0.5	1.1	1.1	18.5	16.4	26.5	34.9	100

Table 1-2; Trajectory of work status (all male)

			Wave 2 status									
		N	full-time	part-time	self-employed	other employment	unemploy-ment	retired	home-maker	other status	lost to follow	total (%)
Wave 1	full-time	599	53.1	11.7	3.3	0.3	3.0	4.2	0.0	1.2	23.2	100
	part-time	290	7.6	52.1	4.5	1.4	2.1	10.0	0.7	1.7	20.0	100
	self-employed	443	4.1	3.6	61.6	1.1	0.5	5.0	0.2	2.3	21.7	100
	other employment	25	4.0	4.0	20.0	12.0	8.0	24.0	4.0	0.0	24.0	100
	unemployed	54	7.4	18.5	1.9	1.9	3.7	29.6	1.9	1.9	33.3	100
	retired	412	0.2	3.2	1.5	0.2	0.5	71.1	0.7	5.1	17.5	100
	homemaker	8	0.0	0.0	0.0	0.0	0.0	50.0	0.0	0.0	50.0	100
	other status	95	0.0	2.1	1.1	1.1	0.0	32.6	0.0	29.5	33.7	100

Table 1-3; Trajectory of work status (all female)

			Wave 2 status									
		N	full-time	part-time	self-employed	other employment	unemploy-ment	retired	home-maker	other status	lost to follow	total (%)
Wave 1	full-time	169	52.0	7.1	2.6	3.3	1.3	1.3	5.8	1.3	25.3	100
	part-time	378	4.2	59.0	1.0	1.6	2.6	0.7	6.5	1.0	23.5	100
	self-employed	86	0.0	1.7	62.7	5.1	0.0	1.7	5.1	1.7	22.0	100
	other employment	209	6.7	7.4	5.9	45.9	0.7	0.7	8.2	3.0	21.5	100
	unemployed	59	4.7	27.9	0.0	0.0	2.3	2.3	32.6	0.0	30.2	100
	retired	58	0.0	0.0	0.0	0.0	5.3	10.5	47.4	10.5	26.3	100
	homemaker	848	0.3	4.5	0.0	2.4	0.3	0.3	66.5	2.1	23.7	100
	other status	94	0.0	0.0	0.0	0.0	3.6	0.0	39.3	17.9	39.3	100

Table 2-1; Trajectory of work status, age<=65, in labor market at wave1, both genders

			Wave 2 status									
		N	full-time	part-time	self-employed	other employment	unemploy-ment	retired	home-maker	other status	lost to follow	total (%)
Wave 1	full-time	702	54.7	10.4	2.4	0.9	2.7	2.7	1.3	1.0	23.9	100
	part-time	477	6.5	55.9	2.7	1.5	3.0	3.0	4.4	1.1	21.9	100
	self-employed	335	4.5	3.0	63.3	1.5	0.6	1.5	0.9	1.2	23.6	100
	other employment	144	6.3	6.9	8.3	44.4	0.7	1.4	7.6	2.8	21.5	100
	unemployed	75	8.0	25.3	0.0	1.3	4.0	9.3	18.7	0.0	33.3	100

Table 2-2; Trajectory of work status, age<=65, in labor market at wave1, male

			Wave 2 status									
		N	full-time	part-time	self-employed	other employment	unemploy-ment	retired	home-maker	other status	lost to follow	total (%)
Wave 1	full-time	548	55.5	11.3	2.4	0.2	3.1	3.1	0.0	0.9	23.5	100
	part-time	167	10.8	50.3	6.0	1.2	3.6	7.2	0.6	1.2	19.2	100
	self-employed	276	5.4	3.3	63.4	0.7	0.7	1.5	0.0	1.1	23.9	100
	other employment	9	0.0	0.0	44.4	22.2	0.0	11.1	0.0	0.0	22.2	100
	unemployed	32	12.5	21.9	0.0	3.1	6.3	18.8	0.0	0.0	37.5	100

Table 2-3; Trajectory of work status, age<=65, in labor market at wave1, female

			Wave 2 status									
		N	full-time	part-time	self-employed	other employment	unemploy-ment	retired	home-maker	other status	lost to follow	total (%)
Wave 1	full-time	154	52.0	7.1	2.6	3.3	1.3	1.3	5.8	1.3	25.3	100
	part-time	307	4.2	59.0	1.0	1.6	2.6	0.7	6.5	1.0	23.5	100
	self-employed	59	0.0	1.7	62.7	5.1	0.0	1.7	5.1	1.7	22.0	100
	other employment	135	6.7	7.4	5.9	45.9	0.7	0.7	8.2	3.0	21.5	100
	unemployed	43	4.7	27.9	0.0	0.0	2.3	2.3	32.6	0.0	30.2	100

Table 3-1; Trajectory of work status, age<=65, proportion of being re-hired, male

		Wave 2 status			
		full-time	part-time	self-employed	other employment
Wave 1	full-time	0.056	0.516	0.077	0.000
	part-time	0.167	0.226	0.000	0.000
	self-employed	0.067	0.000	0.006	0.000
	other employment	0.000	0.000	0.250	0.000

Table 3-2; Trajectory of work status, age<=65, proportion of being re-hired, female

		Wave 2 status			
		full-time	part-time	self-employed	other employment
Wave 1	full-time	0.100	0.273	0.000	0.000
	part-time	0.077	0.044	0.000	0.000
	self-employed	0.000	0.000	0.000	0.000
	other employment	0.000	0.000	0.000	0.016

Table 4-1 Reasons to be retired, by age and sex

	Male		Female	
	age<=65	age 65+	age<=65	age 65+
N	95	332	10	36
Choice	0.084	0.030	0.000	0.000
No choice	0.695	0.569	0.400	0.444
Leisure	0.053	0.099	0.000	0.083
Health	0.084	0.139	0.100	0.139
Pension	0.053	0.054	0.100	0.028
Family care	0.042	0.006	0.300	0.083

No choice = compulsory retirement or other external shock (e.g. lay off)

Table 4-2 Reasons to be homemaker, female, by homemaker status at wave 1

	Homemaker at wave 1		No homemaker at wave 1	
	age<=65	age 65+	age<=65	age 65+
N	224	349	77	55
Choice	0.013	0.009	0.052	0.055
No choice	0.094	0.155	0.234	0.218
Leisure	0.165	0.238	0.091	0.145
Health	0.076	0.083	0.143	0.145
Pension	0.067	0.158	0.039	0.091
Family care	0.598	0.467	0.403	0.255

No choice = compulsory retirement or other external shock (e.g. lay off)

Table 5-1; proportion of mobility limitation by work status trajectories; male

		full-time at wave2	part-time at wave2	self-employed at wave2	other employment at wave2	unemployed at wave2	retired at wave2	retire nonchoice	retire health
full-time at wave1	N	317	70	20	2	18	25	14	4
	wave1	0.025	0.057	0.050	0.000	0.056	0.080	0.071	0.000
	wave2	0.016	0.100	0.050	0.500	0.056	0.040	0.071	0.000
part-time at wave1	N	22	151	13	5	6	29	20	3
	wave1	0.045	0.106	0.000	0.200	0.000	0.069	0.050	0.333
	wave2	0.045	0.066	0.154	0.600	0.167	0.000	0.000	0.000
self-employed at wave1	N	18	16	272	5	2	22	3	8
	wave1	0.167	0.000	0.063	0.200	0.000	0.182	0.000	0.375
	wave2	0.056	0.063	0.103	0.200	0.000	0.227	0.333	0.500
other employment at wave1	N	1	1	5	3	2	6	2	3
	wave1	1.000	1.000	0.400	0.000	0.000	0.000	0.000	0.000
	wave2	0.000	0.000	0.400	0.000	0.000	0.167	0.000	0.333

Table 5-2; proportion of IADL limitation by work status trajectories; male

		full-time at wave2	part-time at wave2	self-employed at wave2	other employment at wave2	unemployed at wave2	retired at wave2	retire nonchoice	retire health
full-time at wave1	N	290	66	17	2	18	24	14	4
	wave1	0.379	0.379	0.471	0.500	0.333	0.375	0.571	0.250
	wave2	0.341	0.394	0.294	0.500	0.333	0.458	0.500	0.750
part-time at wave1	N	21	138	13	5	6	28	19	3
	wave1	0.429	0.428	0.077	0.600	0.333	0.357	0.316	0.333
	wave2	0.524	0.406	0.538	0.600	0.500	0.286	0.263	0.333
self-employed at wave1	N	14	15	249	3	2	19	3	7
	wave1	0.429	0.600	0.382	0.667	1.000	0.632	0.333	0.857
	wave2	0.357	0.533	0.382	0.667	0.000	0.421	0.000	0.571
other employment at wave1	N	1	1	5	2	2	6	2	3
	wave1	1.000	1.000	0.200	0.000	0.000	0.000	0.000	0.000
	wave2	1.000	0.000	0.600	0.000	0.000	0.333	0.000	0.333

Table5-3; mean grip by work status trajectories; male

		full-time at wave2	part-time at wave2	self-employed at wave2	other employment at wave2	unemployed at wave2	retired at wave2	retire nonchoice	retire health
full-time at wave1	N	238	58	15	2	15	21	11	3
	wave1	39.2	37.2	39.3	37.0	34.7	36.8	36.6	36.7
	wave2	37.9	35.0	35.9	38.0	32.7	34.0	34.2	33.0
part-time at wave1	N	15	125	9	4	4	22	15	2
	wave1	38.3	35.4	37.1	25.5	36.8	32.5	31.9	36.5
	wave2	38.1	34.0	41.1	24.4	35.0	32.0	33.1	25.5
self-employed at wave1	N	13	14	218	5	2	17	2	5
	wave1	39.0	35.3	36.7	30.0	34.5	33.1	35.5	25.8
	wave2	37.5	32.7	35.1	31.4	29.0	33.4	34.0	30.0
other employment at wave1	N		1	3	2	2	6	2	3
	wave1		29.0	38.7	41.0	36.0	33.8	30.5	34.3
	wave2		27.0	35.0	37.5	37.0	32.8	29.0	35.0

Table5-4; proportion of eye-sight limitation by work status trajectories; male

		full-time at wave2	part-time at wave2	self-employed at wave2	other employment at wave2	unemployed at wave2	retired at wave2	retire nonchoice	retire health
full-time at wave1	N	317	70	20	2	18	25	14	4
	wave1	0.104	0.100	0.100	0.500	0.056	0.160	0.143	0.000
	wave2	0.091	0.071	0.100	0.000	0.111	0.080	0.071	0.000
part-time at wave1	N	22	151	13	5	6	29	20	3
	wave1	0.000	0.106	0.154	0.200	0.167	0.069	0.100	0.000
	wave2	0.091	0.099	0.077	0.000	0.333	0.103	0.050	0.333
self-employed at wave1	N	18	16	272	5	2	22	3	8
	wave1	0.000	0.125	0.088	0.200	0.000	0.136	0.333	0.000
	wave2	0.056	0.063	0.088	0.000	0.000	0.091	0.333	0.000
other employment at wave1	N	1	1	5	3	2	6	2	3
	wave1	0.000	0.000	0.400	0.000	0.500	0.000	0.000	0.000
	wave2	0.000	0.000	0.400	0.000	0.500	0.167	0.000	0.000

Table5-5; proportion of hearing limitation by work status trajectories; male

		full-time at wave2	part-time at wave2	self-employed at wave2	other employment at wave2	unemployed at wave2	retired at wave2	retire nonchoice	retire health
full-time at wave1	N	317	70	20	2	18	25	14	4
	wave1	0.060	0.143	0.150	0.000	0.056	0.200	0.286	0.250
	wave2	0.072	0.086	0.150	0.000	0.056	0.160	0.214	0.250
part-time at wave1	N	22	151	13	5	6	29	20	3
	wave1	0.000	0.113	0.077	0.200	0.000	0.069	0.050	0.333
	wave2	0.091	0.099	0.308	0.000	0.167	0.207	0.200	0.667
self-employed at wave1	N	18	16	272	5	2	22	3	8
	wave1	0.111	0.188	0.081	0.000	0.000	0.182	0.333	0.125
	wave2	0.056	0.063	0.103	0.000	0.000	0.182	0.333	0.000
other employment at wave1	N	1	1	5	3	2	6	2	3
	wave1	1.000	0.000	0.000	0.333	0.000	0.500	0.000	1.000
	wave2	0.000	0.000	0.200	0.000	0.500	0.333	0.000	0.667

Table5-6; proportion of self-reported ill health by work status trajectories; male

		full-time at wave2	part-time at wave2	self-employed at wave2	other employment at wave2	unemployed at wave2	retired at wave2	retire nonchoice	retire health
full-time at wave1	N	317	70	20	2	18	25	14	4
	wave1	0.394	0.443	0.450	0.000	0.722	0.480	0.571	0.250
	wave2	0.478	0.571	0.400	0.500	0.556	0.440	0.500	0.500
part-time at wave1	N	22	151	13	5	6	29	20	3
	wave1	0.364	0.510	0.538	0.600	0.667	0.310	0.300	0.000
	wave2	0.545	0.510	0.385	0.400	0.833	0.655	0.550	1.000
self-employed at wave1	N	18	16	272	5	2	22	3	8
	wave1	0.222	0.563	0.438	0.600	0.500	0.500	1.000	0.250
	wave2	0.500	0.313	0.474	0.400	0.000	0.545	1.000	0.375
other employment at wave1	N	1	1	5	3	2	6	2	3
	wave1	0.000	1.000	0.600	0.000	1.000	0.500	0.000	0.667
	wave2	0.000	1.000	0.800	0.333	1.000	0.833	1.000	1.000

Table5-7; proportion of depression by work status trajectories; male

		full-time at wave2	part-time at wave2	self-employed at wave2	other employment at wave2	unemployed at wave2	retired at wave2	retire nonchoice	retire health
full-time at wave1	N	283	67	17	2	18	22	12	4
	wave1	0.152	0.194	0.059	0.000	0.278	0.091	0.167	0.000
	wave2	0.152	0.134	0.000	0.000	0.389	0.273	0.083	0.750
part-time at wave1	N	19	130	10	5	6	27	18	3
	wave1	0.053	0.092	0.100	0.400	0.167	0.037	0.056	0.000
	wave2	0.105	0.092	0.000	0.400	0.333	0.148	0.167	0.333
self-employed at wave1	N	13	15	240	2	2	17	3	5
	wave1	0.077	0.200	0.108	0.000	0.000	0.059	0.000	0.000
	wave2	0.154	0.133	0.146	0.000	0.000	0.176	0.333	0.000
other employment at wave1	N	1	1	4	2	1	4	1	3
	wave1	0.000	1.000	0.000	0.500	1.000	0.000	0.000	0.000
	wave2	0.000	1.000	0.250	0.500	0.000	0.250	0.000	0.333

Table5-8; mean number of initial word recall by work status trajectories; male

		full-time at wave2	part-time at wave2	self-employed at wave2	other employment at wave2	unemployed at wave2	retired at wave2	retire nonchoice	retire health
full-time at wave1	N	217	50	15	2	13	15	8	2
	wave1	5.3	5.2	5.3	3.0	5.0	5.3	5.5	6.0
	wave2	5.7	5.7	5.5	5.0	5.1	4.7	5.1	3.5
part-time at wave1	N	16	108	7	4	4	21	14	2
	wave1	5.2	5.1	4.4	4.3	5.0	4.8	4.6	6.0
	wave2	5.4	5.4	5.4	5.0	5.5	4.5	4.5	4.5
self-employed at wave1	N	17	12	186	4	1	19	3	6
	wave1	4.6	5.3	4.7	5.5	2.0	4.4	4.3	4.0
	wave2	5.0	5.5	5.2	3.5	3.0	4.3	5.3	3.3
other employment at wave1	N			4	3	1	6	2	3
	wave1			4.5	6.3	5.0	4.7	4.0	5.3
	wave2			4.5	6.3	4.0	6.0	6.0	6.7

Table 6-1; proportion of mobility limitation by work status trajectories; female

		full-time at wave2	part-time at wave2	self-employed at wave2	other employ-ment at wave2	un-employed at wave2	retired at wave2	home-maker at wave2	home-maker nochoice	home-maker health	home-maker family care
full-time at wave1	N	89	12	4	7	2	2	11	6	3	6
	wave1	0.124	0.000	0.000	0.143	1.000	0.000	0.182	0.167	0.333	0.167
	wave2	0.067	0.000	0.250	0.143	0.500	0.000	0.182	0	0.333	0.167
part-time at wave1	N	14	220	3	8	9	5	25	4	3	12
	wave1	0.071	0.095	0.000	0.125	0.000	0.200	0.24	0	0.333	0.167
	wave2	0.000	0.073	0.333	0.000	0.000	0.000	0.12	0	0.333	0.167
self-employed at wave1	N		3	45	8		2	6	2	1	1
	wave1		0.333	0.111	0.125		0.500	0.000	0.000	0.000	0.000
	wave2		0.000	0.089	0.250		0.500	0.000	0.000	0.000	0.000
other employment at wave1	N	12	15	17	101	1	1	19	4	3	5
	wave1	0.250	0.267	0.294	0.168	0.000	0.000	0.263	0.000	0.000	0.000
	wave2	0.167	0.200	0.235	0.158	0.000	0.000	0.316	0.500	0.333	0.000

Table 6-2; proportion of IADL limitation by work status trajectories; female

		full-time at wave2	part-time at wave2	self-employed at wave2	other employ-ment at wave2	un-employed at wave2	retired at wave2	home-maker at wave2	home-maker nochoice	home-maker health	home-maker family care
full-time at wave1	N	82	12	4	4	2	2	10	5	2	6
	wave1	0.232	0.083	0.000	0.000	0.500	0.500	0.200	0.000	1.000	0.000
	wave2	0.207	0.083	0.000	0.000	0.500	0.000	0.200	0.200	0.500	0.167
part-time at wave1	N	14	206	3	8	9	5	25	4	3	12
	wave1	0.286	0.252	0.333	0.375	0.556	0.400	0.360	0.500	0.667	0.333
	wave2	0.286	0.233	0.000	0.375	0.444	0.600	0.560	0.500	0.667	0.333
self-employed at wave1	N		3	41.000	7		1	5	1	1	1
	wave1		1.000	0.366	0.143		1.000	0.200	0.000	1.000	0.000
	wave2		0.333	0.293	0.000		1.000	0.200	0.000	1.000	0.000
other employment at wave1	N	12	14	16	98	1	1	19	4	3	5
	wave1	0.083	0.500	0.000	0.316	1.000	0.000	0.263	0.500	0.000	0.200
	wave2	0.500	0.429	0.250	0.306	1.000	0.000	0.211	0.250	0.000	0.200

Table 6-3; mean grip by work status trajectories; female

		full-time at wave2	part-time at wave2	self-employed at wave2	other employ-ment at wave2	un-employed at wave2	retired at wave2	home-maker at wave2	home-maker nochoice	home-maker health	home-maker family care
full-time at wave1	N	71	9	4	5	1	2	9	6	2	5
	wave1	24.7	26.1	24.0	28.8	25.0	26.0	23.3	23.2	23.0	24.4
	wave2	24.7	23.4	23.8	26.4	22.0	26.0	23.0	22.7	22.5	24.0
part-time at wave1	N	10	180	2	7	8	2	21	4	3	9
	wave1	25.7	23.9	26.5	25.9	21.6	20.0	23.2	25.0	18.3	23.8
	wave2	25.8	23.4	25.0	25.4	24.3	21.5	21.5	23.0	18.7	21.2
self-employed at wave1	N		1	32	5		1	4	1	1	1
	wave1		23.0	22.8	24.0		21.0	22.8	23.0	29.0	22.0
	wave2		25.0	21.9	21.2		22.0	24.5	22.0	29.0	27.0
other employment at wave1	N	12	12	14	83		1	17	4	3	4
	wave1	22.1	21.3	21.8	22.7		27.0	23.9	24.5	21.3	27.3
	wave2	22.8	21.9	23.7	22.3		32.0	24.8	25.5	22.3	27.8

Table 6-4; proportion of eyesight limitation by work status trajectories; female

		full-time at wave2	part-time at wave2	self-employed at wave2	other employ-ment at wave2	un-employed at wave2	retired at wave2	home-maker at wave2	home-maker nochoice	home-maker health	home-maker family care
full-time at wave1	N	89	12	4	7	2	2	11	6	3	6
	wave1	0.079	0.083	0.250	0.143	0.500	0.000	0.091	0.167	0.000	0.167
	wave2	0.056	0.083	0.000	0.000	0.500	0.000	0.091	0.000	0.333	0.000
part-time at wave1	N	14	220	3	8	9	5	25	4	3	12
	wave1	0.214	0.118	0.000	0.125	0.000	0.000	0.080	0.250	0.000	0.000
	wave2	0.000	0.109	0.000	0.125	0.000	0.000	0.040	0.000	0.000	0.083
self-employed at wave1	N		2	45	8		2	6	2	1	1
	wave1		0.000	0.133	0.125		0.500	0.333	1.000	0.000	0.000
	wave2		0.000	0.111	0.250		0.500	0.333	1.000	0.000	0.000
other employment at wave1	N	12	15	17	101	1	1	19	4	3	5
	wave1	0.250	0.267	0.059	0.109	0.000	0.000	0.263	0.000	0.333	0.600
	wave2	0.083	0.067	0.118	0.059	0.000	0.000	0.105	0.250	0.000	0.000

Table 6-5; proportion of hearing limitation by work status trajectories; female

		full-time at wave2	part-time at wave2	self-employed at wave2	other employ-ment at wave2	un-employed at wave2	retired at wave2	home-maker at wave2	home-maker nochoice	home-maker health	home-maker family care
full-time at wave1	N	89	12	4	7	2	2	11	6	3	6
	wave1	0.011	0.000	0.000	0.000	0.500	0.000	0.000	0.000	0.000	0.000
	wave2	0.022	0.000	0.000	0.000	0.000	0.000	0.091	0.000	0.333	0.000
part-time at wave1	N	14	220	3	8	9	5	25	4	3	12
	wave1	0.000	0.027	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	wave2	0.000	0.045	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
self-employed at wave1	N		2	45	8		2	6	2	1	1
	wave1		0.000	0.089	0.125		0.000	0.000	0.000	0.000	0.000
	wave2		0.000	0.044	0.125		0.500	0.000	0.000	0.000	0.000
other employment at wave1	N	12	15	17	101	1	1	19	4	3	5
	wave1	0.083	0.133	0.000	0.059	1.000	0.000	0.105	0.000	0.000	0.000
	wave2	0.167	0.067	0.118	0.050	1.000	0.000	0.053	0.000	0.000	0.000

Table 6-6; proportion of self-reported ill health by work status trajectories; female

		full-time at wave2	part-time at wave2	self-employed at wave2	other employ-ment at wave2	unemployed at wave2	retired at wave2	home-maker at wave2	home-maker nochoice	home-maker health	home-maker family care
full-time at wave1	N	89	12	4	7	2	2	11	6	3	6
	wave1	0.382	0.417	0.500	0.429	1.000	1.000	0.273	0.167	0.667	0.167
	wave2	0.551	0.250	0.250	0.143	1.000	1.000	0.455	0.333	0.667	0.500
part-time at wave1	N	14	219	3	8	9	5	25	4	3	12
	wave1	0.357	0.393	0.667	0.375	0.444	0.400	0.400	0.250	0.667	0.250
	wave2	0.429	0.438	1.000	0.625	0.667	0.400	0.640	0.500	1.000	0.667
self-employed at wave1	N		2	44	8		2	6	2	1	1
	wave1		0.500	0.318	0.500		1.000	0.667	0.500	1.000	1.000
	wave2		0.000	0.568	0.375		1.000	0.500	0.500	0.000	1.000
other employment at wave1	N	12	15	17	101	1	1	19	4	3	5
	wave1	0.500	0.667	0.706	0.426	0.000	0.000	0.526	0.500	0.000	0.600
	wave2	0.500	0.533	0.529	0.485	1.000	0.000	0.579	0.500	0.667	0.600

Table 6-7; proportion of depression by work status trajectories; female

		full-time at wave2	part-time at wave2	self-employed at wave2	other employ-ment at wave2	un-employed at wave2	retired at wave2	home-maker at wave2	home-maker nochoice	home-maker health	home-maker family care
full-time at wave1	N	81	12	4	4	2	2	9	5	1	6
	wave1	0.148	0.000	0.000	0.000	0.000	0.000	0.111	0.200	0.000	0.167
	wave2	0.210	0.083	0.250	0.500	0.500	0.000	0.222	0.200	0.000	0.333
part-time at wave1	N	14	196	3	8	9	5	22	3	3	10
	wave1	0.143	0.138	0.000	0.375	0.111	0.000	0.273	0.000	0.333	0.300
	wave2	0.143	0.184	0.333	0.250	0.000	0.200	0.273	0.000	0.000	0.500
self-employed at wave1	N		3	39	7		1	4	1	1	1
	wave1		0.000	0.179	0.000		0.000	0.250	1.000	0.000	0.000
	wave2		0.000	0.205	0.000		1.000	0.000	0.000	0.000	0.000
other employment at wave1	N	12	14	15	85	1	1	15	2	1	5
	wave1	0.083	0.357	0.200	0.106	0.000	0.000	0.000	0.000	0.000	0.000
	wave2	0.083	0.214	0.067	0.141	0.000	0.000	0.067	0.000	0.000	0.200

Table 6-8; mean nubmer of intial word recall by work status trajectories; female

		full-time at wave2	part-time at wave2	self-employed at wave2	other employ-ment at wave2	un-employed at wave2	retired at wave2	home-maker at wave2	home-maker nochoice	home-maker health	home-maker family care
full-time at wave1	N	72	8	3	5	2	2	7	5	1	4
	wave1	5.8	6.4	6.3	6.4	5.5	5.0	6.1	6.4	7.0	6.5
	wave2	6.4	6.3	5.7	7.0	5.5	6.0	6.7	6.2	4.0	7.3
part-time at wave1	N	9	178	2	8	8	5	21	4	3	9
	wave1	5.8	5.7	4.0	5.1	4.8	5.6	5.2	4.8	5.3	5.2
	wave2	5.6	5.9	4.0	6.0	6.1	4.0	5.7	5.0	4.0	6.6
self-employed at wave1	N		2	36	7		1	4	1		1
	wave1		4.5	5.7	5.1		6.0	6.0	6.0		4.0
	wave2		3.5	6.3	5.3		7.0	4.8	6.0		6.0
other employment at wave1	N	10	14	15	75		1	17	3	3	4
	wave1	5.3	4.8	5.1	5.1		6.0	5.7	6.7	5.0	6.8
	wave2	5.5	5.7	6.0	5.6		8.0	5.2	5.3	4.7	6.8

Table7-1; Participation in "commitment" social network by work status trajectories; male

		full-time at wave2	part-time at wave2	self-employed at wave2	other employ-ment at wave2	un-employed at wave2	retired at wave2
full-time at wave1	N	284	65	15	2	17	23
	wave1	0.204	0.123	0.400	0.000	0.059	0.174
	wave2	0.243	0.292	0.333	0.000	0.294	0.435
part-time at wave1	N	21	134	12	4	6	26
	wave1	0.286	0.224	0.167	0.000	0.333	0.231
	wave2	0.333	0.269	0.333	0.000	0.500	0.385
self-employed at wave1	N	15	15	240	3	2	16
	wave1	0.067	0.400	0.283	0.667	0.000	0.250
	wave2	0.333	0.467	0.338	0.667	0.500	0.313
other employment at wave1	N	1	1	5	3	1	6
	wave1	0.000	0.000	0.200	0.000	0.000	0.333
	wave2	0.000	0.000	0.400	0.333	0.000	0.667

Table7-2; Participation in "prestige" social network by work status trajectories; male

		full-time at wave2	part-time at wave2	self-employed at wave2	other employ-ment at wave2	un-employed at wave2	retired at wave2
full-time at wave1	N	284	65	15	2	17	23
	wave1	0.053	0.062	0.200	0.000	0.118	0.000
	wave2	0.063	0.062	0.200	0.000	0.059	0.087
part-time at wave1	N	21	134	12	4	6	26
	wave1	0.048	0.067	0.000	0.000	0.000	0.077
	wave2	0.143	0.037	0.000	0.000	0.000	0.038
self-employed at wave1	N	15	15	240	3	2	16
	wave1	0.000	0.200	0.104	0.000	0.000	0.125
	wave2	0.067	0.067	0.067	0.000	0.000	0.000
other employment at wave1	N	1	1	5	3	1	6
	wave1	0.000	0.000	0.000	0.333	0.000	0.167
	wave2	0.000	0.000	0.000	0.333	0.000	0.000

Table7-3; Participation in "preference-based" social network by work status trajectories; male

		full-time at wave2	part-time at wave2	self-employed at wave2	other employ-ment at wave2	un-employed at wave2	retired at wave2
full-time at wave1	N	284	65	15	2	17	23
	wave1	0.243	0.231	0.400	0.000	0.235	0.304
	wave2	0.204	0.277	0.667	0.000	0.353	0.391
part-time at wave1	N	21	134	12	4	6	26
	wave1	0.238	0.261	0.167	0.000	0.167	0.154
	wave2	0.333	0.239	0.167	0.000	0.333	0.538
self-employed at wave1	N	15	15	240	3	2	16
	wave1	0.000	0.200	0.250	0.333	0.000	0.188
	wave2	0.133	0.200	0.233	0.333	0.500	0.188
other employment at wave1	N	1	1	5	3	1	6
	wave1	0.000	0.000	0.400	0.333	0.000	0.500
	wave2	1.000	0.000	0.200	0.333	0.000	0.500

Table7-4; Participation in "commitment" social network by work status trajectories; female

		full-time at wave2	part-time at wave2	self-employed at wave2	other employ-ment at wave2	un-employed at wave2	retired at wave2	home-maker at wave 2
full-time at wave1	N	78	12	4	5	2	2	10
	wave1	0.128	0.083	0.000	0.000	0.000	0.000	0.200
	wave2	0.167	0.083	0.250	0.000	0.000	0.000	0.100
part-time at wave1	N	13	194	3	7	9	5	24
	wave1	0.077	0.216	0.333	0.000	0.000	0.000	0.124
	wave2	0.231	0.216	0.667	0.429	0.000	0.400	0.167
self-employed at wave1	N		3	40	7		1	4
	wave1		0.000	0.200	0.286		0.000	0.500
	wave2		0.333	0.175	0.143		0.000	0.500
other employment at wave1	N	12	14	16	89	1	1	18
	wave1	0.000	0.214	0.188	0.180	0.000	1.000	0.333
	wave2	0.083	0.214	0.250	0.157	0.000	1.000	0.556

Table7-5; Participation in "prestigeous" social network by work status trajectories; female

		full-time at wave2	part-time at wave2	self-employed at wave2	other employ-ment at wave2	un-employed at wave2	retired at wave2	home-maker at wave 2
full-time at wave1	N	78	12	4	5	2	2	10
	wave1	0.038	0.083	0.000	0.000	0.000	0.000	0.000
	wave2	0.038	0.083	0.000	0.200	0.000	0.000	0.000
part-time at wave1	N	13	194	3	7	9	5	24
	wave1	0.077	0.072	0.333	0.143	0.222	0.400	0.000
	wave2	0.000	0.046	0.333	0.143	0.111	0.000	0.083
self-employed at wave1	N		3	40	7		1	4
	wave1		0.000	0.075	0.000		0.000	0.000
	wave2		0.000	0.025	0.000		0.000	0.000
other employment at wave1	N	12	14	16	89	1	1	18
	wave1	0.000	0.071	0.000	0.090	0.000	1.000	0.222
	wave2	0.000	0.071	0.000	0.056	0.000	1.000	0.111

Table7-6; Participation in "preference-based" social network by work status trajectories; female

		full-time at wave2	part-time at wave2	self-employed at wave2	other employ-ment at wave2	un-employed at wave2	retired at wave2	home-maker at wave 2
full-time at wave1	N	78	12	4	5	2	2	10
	wave1	0.218	0.083	0.500	0.400	0.000	0.000	0.200
	wave2	0.244	0.333	0.750	0.000	0.000	0.000	0.400
part-time at wave1	N	13	194	3	7	9	5	24
	wave1	0.231	0.227	1.000	0.000	0.000	0.000	0.208
	wave2	0.308	0.278	1.000	0.143	0.222	0.200	0.208
self-employed at wave1	N		3	40	7		1	4
	wave1		0.333	0.350	0.143		0.000	0.250
	wave2		0.000	0.275	0.000		0.000	0.750
other employment at wave1	N	12	14	16	89	1	1	18
	wave1	0.500	0.357	0.375	0.180	0.000	1.000	0.444
	wave2	0.250	0.357	0.250	0.213	0.000	1.000	0.389

Tablel 8-1 Odds ratio for network participation at wave 2 by work status trajectory; male

	commitment network participation at wave2	p-value	prestige network participation at wave 2	p-value	preference-based network participation at wave 2	p-value
age	0.985	0.313	1.018	0.537	1.020	0.206
education high	0.823	0.310	0.957	0.908	0.998	0.991
education college	1.011	0.972	0.807	0.711	1.157	0.653
education grad	0.961	0.862	0.766	0.576	1.178	0.502
never married	0.408	0.109	0.464	0.497	0.613	0.352
widowned	0.988	0.982	0.720	0.785	1.077	0.901
divorced	0.636	0.277	1.105	0.896	0.981	0.964
part-time wave2	1.293	0.319	0.546	0.255	1.242	0.429
self-employed wave 2	1.102	0.755	1.097	0.879	2.288	0.015
other employment wave 2	0.973	0.971	1.434	0.805	1.105	0.908
unemployed wave 2	1.922	0.150	0.402	0.422	2.498	0.050
retired wave 2	2.143	0.022	0.549	0.432	3.016	0.001
homemaker wave 2	1.687	0.683	NA		2.349	0.525
other wave 2	0.220	0.061	1.402	0.760	1.020	0.977
part-time wave 1	1.003	0.991	0.690	0.483	0.949	0.836
self-employed wave1	1.336	0.321	0.567	0.323	0.473	0.021
other employment wave 1	1.638	0.395	0.636	0.754	0.743	0.630
mobility limitation wave 2	1.179	0.575	0.133	0.058	0.639	0.204
ill health wave 2	1.114	0.491	1.141	0.672	0.954	0.781
N	933		930		933	
Pseud R2	0.090		0.195		0.099	

* adjusted for network participation as of wave 1

Tablel 8-2 Odds ratio for network participation at wave 2by work status trajectory; female

	commitment network participation at wave2	p-value	prestige network participation at wave 2	p-value	preference-based network participation at wave 2	p-value
age	1.020	0.365	1.002	0.970	1.019	0.341
education high	1.748	0.059	0.662	0.480	1.309	0.315
education college	1.763	0.133	1.038	0.961	1.455	0.265
education grad	1.054	0.933	1.213	0.857	1.522	0.395
never married	2.012	0.156	0.342	0.400	1.246	0.641
widowned	1.579	0.196	0.689	0.604	1.005	0.988
divorced	0.635	0.448	NA		1.011	0.982
part-time wave2	0.690	0.407	1.891	0.513	1.528	0.281
self-employed wave 2	0.900	0.860	2.645	0.479	1.762	0.277
other employment wave 2	0.603	0.318	3.261	0.268	0.896	0.808
unemployed wave 2	NA		2.093	0.634	1.117	0.897
retired wave 2	2.117	0.392	2.983	0.493	1.320	0.758
homemaker wave 2	1.313	0.571	3.548	0.224	1.831	0.165
other wave 2	2.510	0.228	10.131	0.097	1.354	0.699
part-time wave 1	2.082	0.097	0.502	0.389	0.759	0.459
self-employed wave1	1.091	0.892	0.107	0.159	0.443	0.146
other employment wave 1	2.222	0.091	0.302	0.183	0.881	0.751
mobility limitation wave 2	0.647	0.269	1.523	0.546	0.672	0.272
ill health wave 2	1.148	0.558	1.067	0.895	0.838	0.409
N	564		542		576	
Pseud R2	0.1177		0.2958		0.0914	

* adjusted for network participation as of wave 1

Table 9. Results of propensity weighted regression of health indices at wave 2 on work status transition

		Male		Female	
Depression		Coeff	p-value	Coeff	p-value
	work->work	reference		reference	
	work->retire	0.497	0.007	-0.096	0.621
	retire-> work	-0.763	0.025	-0.065	0.823
	retire->retire	0.136	0.456	0.161	0.178
Instrumental ADL limitation					
	work->work	reference		reference	
	work->retire	0.053	0.758	0.077	0.669
	retire-> work	0.497	0.040	-0.046	0.835
	retire->retire	0.258	0.070	0.211	0.049
Cognitive function (word recall)					
	work->work	reference		reference	
	work->retire	-0.492	0.022	-0.199	0.399
	retire-> work	-0.406	0.153	-0.006	0.981
	retire->retire	-0.187	0.297	0.037	0.751
Grip strength					
	work->work	reference		reference	
	work->retire	-0.421	0.516	0.400	0.312
	retire-> work	0.796	0.252	-0.033	0.944
	retire->retire	-0.456	0.261	-0.659	0.003

1. Results of probit regression for depression and IADL limitation and
   OLS linear regression for word recall and grip strength.
2. Adjusting for age, educational attainment, marital status, and corresponding health index at wave 1.
3. Weighted by propensity for retirement regressed on age, educational attainment
   retirement at wave1 and its interaction with gende3r, marital status,
   city dummy codes, grip strength and mobility limitation at wave 1.

Table 10. Results of propensity weighted regression of health indices at wave 2 on work status transition
Limited to those at work at wave 1, with reasons to leave paid work status

		Male		Female	
Depression		Coeff	p-value	Coeff	p-value
	work->retired	0.592	0.020	0.005	0.981
	stressful job	-0.008	0.956	0.220	0.218
	retire X stress	-0.279	0.428	-0.684	0.149
	non-voluntary retirement	-0.408	0.265	NA	
	health reasons	0.853	0.052	NA	
	family reasons	-0.284	0.680	1.490	0.078
Instrumental ADL limitation					
	work->retired	0.021	0.929	0.047	0.846
	stressful job	-0.101	0.366	-0.017	0.911
	retire X stress	-0.081	0.804	0.168	0.630
	non-voluntary retirement	-0.114	0.711	NA	
	health reasons	0.568	0.149	NA	
	family reasons	1.605	0.027	NA	
Cognitive function (word recall)					
	work->retired	-0.674	0.025	-0.271	0.446
	stressful job	0.103	0.452	-0.083	0.598
	retire X stress	0.691	0.043	0.200	0.659
	non-voluntary retirement	-0.241	0.403	0.121	0.885
	health reasons	-0.613	0.226	1.528	0.001
	family reasons	-0.704	0.045	-0.450	0.222
Grip strength					
	work->retired	-1.016	0.084	0.125	0.796
	stressful job	0.689	0.113	0.517	0.084
	retire X stress	-0.011	0.993	0.448	0.560
	non-voluntary retirement	2.396	0.217	0.509	0.495
	health reasons	-0.197	0.938	6.727	0.000
	family reasons	3.325	0.290	-2.812	0.162

1. Results of probit regression for depression and IADL limitation and
   OLS linear regression for word recall and grip strength.
2. Adjusting for age, educational attainment, marital status, and corresponding health index at wave 1.
3. Weighted by propensity for retirement regressed on age, educational attainment
   retirement at wave1 and its interaction with gende3r, marital status,
   city dummy codes, grip strength and mobility limitation at wave 1.

Table 11-1. Seemingly unrelated regression results of health indices with social network participation; Male

Types of network	Health indices: Depression		IADL limitation		Cognitive function		Grip strength	
Commitment social network	coeff	p-value	coeff	p-value	coeff	p-value	coeff	p-value
1st eq. for health index								
work->work	reference		reference		reference		reference	
work->retire	0.567	0.001	0.126	0.451	-0.325	0.075	0.018	0.973
retire-> work	-0.696	0.074	0.793	0.001	-0.262	0.363	0.611	0.481
retire->retire	0.103	0.551	0.208	0.119	-0.166	0.208	-0.325	0.411
social network	-0.892	0.014	-1.312	0.000	0.187	0.071	0.326	0.286
2nd eq. for social network participation								
work->retire	0.229	0.162	0.237	0.136	0.109	0.044	0.082	0.101
retire-> work	0.602	0.025	0.651	0.012	0.157	0.064	0.202	0.014
retire->retire	-0.132	0.317	-0.073	0.562	0.020	0.604	0.018	0.636
rho	0.460	0.090	0.592	0.007	-0.006	0.856	0.000	0.991
Prestige social network								
1st eq. for health index								
work->work	reference		reference		reference		reference	
work->retire	0.543	0.004	0.180	0.756	-0.322	0.078	0.039	0.941
retire-> work	-0.981	0.013	0.250	0.053	-0.233	0.417	0.683	0.429
retire->retire	0.141	0.447	0.150	0.101	-0.179	0.176	-0.315	0.427
social network	0.059	0.927	1.661	0.898	-0.437	0.037	0.027	0.964
2nd eq. for social network participation								
work->retire	-0.153	0.545	0.252	0.517	-0.030	0.250	-0.007	0.782
retire-> work	-0.440	0.420	0.447	0.745	-0.005	0.911	0.005	0.898
retire->retire	-0.237	0.241	0.215	0.291	-0.025	0.189	-0.013	0.476
rho	0.091	0.767	-0.292	0.724	-0.014	0.672	-0.011	0.730
Preference based social network								
1st eq. for health index								
work->work	reference		reference		reference		reference	
work->retire	0.385	0.039	0.055	0.743	-0.332	0.069	0.013	0.981
retire-> work	-1.042	0.002	0.492	0.064	-0.268	0.351	0.642	0.458
retire->retire	0.099	0.510	0.251	0.077	-0.173	0.189	-0.329	0.406
social network	0.895	0.078	-0.054	0.928	0.295	0.007	0.287	0.375
2nd eq. for social network participation								
work->retire	0.369	0.027	0.389	0.021	0.087	0.083	0.091	0.055
retire-> work	0.437	0.100	0.479	0.068	0.088	0.267	0.101	0.200
retire->retire	-0.032	0.823	-0.055	0.682	0.019	0.605	0.025	0.478
rho	-0.611	0.088	-0.173	0.612	-0.017	0.599	0.002	0.947

* 1st equation for health indices was regressed on age, educational attainment, marital status, and initial health index at wave 1 other than work transition and social network dummy codes.

** 2nd equation for social network participation was aregressed on age, educational attainment, marital status, and initial network participation at wave 1, other than work transition.

*** Seemingly unrelated probit models were run for depression and IADL limitation with weighting by reverse probability of retirement propensity.

**** Zellner's seemingly unrelated regression model was run for cogntive function (# of word recall) and grip strength (kg)

Table 11-2. Seemingly unrelated regression results of health indices with social network participation; Female

Types of network	Health indices: Depression		IADL limitation		Cognitive function		Grip strength	
Commitment social network	coeff	p-value	coeff	p-value	coeff	p-value	coeff	p-value
1st eq. for health index								
work->work	reference		reference		reference		reference	
work->retire	-0.133	0.533	0.112	0.556	-0.202	0.286	0.560	0.135
retire-> work	-0.192	0.472	0.197	0.422	0.059	0.819	-0.176	0.724
retire->retire	0.191	0.135	0.242	0.043	0.070	0.530	-0.306	0.150
social network	-0.573	0.142	-0.509	0.269	-0.039	0.714	0.380	0.069
2nd eq. for social network participation								
work->retire	0.244	0.200	0.262	0.147	0.102	0.052	0.071	0.175
retire-> work	0.532	0.028	0.576	0.014	0.195	0.006	0.144	0.040
retire->retire	0.245	0.034	0.220	0.051	0.046	0.135	0.054	0.069
rho	0.064	0.801	0.102	0.708	-0.007	0.828	-0.009	0.773
Prestige social network								
1st eq. for health index								
work->work	reference		reference					
work->retire	-0.130	0.535	0.070	0.712	-0.205	0.279	0.569	0.130
retire-> work	-0.195	0.442	0.062	0.769	0.051	0.844	-0.125	0.802
retire->retire	0.155	0.211	0.206	0.062	0.067	0.543	-0.281	0.186
social network	-0.893	0.070	0.183	0.779	-0.015	0.940	0.358	0.364
2nd eq. for social network participation								
work->retire	0.117	0.654	0.125	0.624	0.030	0.266	0.045	0.094
retire-> work	0.723	0.030	0.650	0.050	0.069	0.059	0.085	0.019
retire->retire	0.031	0.866	0.044	0.813	0.007	0.637	0.009	0.542
rho	0.440	0.071	-0.353	0.318	-0.003	0.924	-0.016	0.616
Preference based social network								
1st eq. for health index								
work->work	reference		reference					
work->retire	0.209	-0.553	0.119	0.518	-0.214	0.258	0.547	0.143
retire-> work	0.257	-0.766	0.060	0.776	0.049	0.849	-0.104	0.834
retire->retire	0.131	-0.093	0.306	0.008	0.057	0.605	-0.343	0.107
social network	0.374	-0.833	-1.065	0.001	0.104	0.305	0.624	0.002
2nd eq. for social network participation								
work->retire	0.179	-0.162	0.176	0.300	0.078	0.161	0.065	0.252
retire-> work	0.221	-0.534	-0.056	0.790	0.004	0.959	0.002	0.978
retire->retire	0.107	0.067	0.258	0.014	0.070	0.032	0.077	0.017
rho	-0.011	0.962	0.479	0.032	0.007	0.812	-0.018	0.565

* 1st equation for health indices was regressed on age, educational attainment, marital status, and initial health index at wave 1 other than work transition and social network dummy codes.

** 2nd equation for social network participation was aregressed on age, educational attainment, marital status, and initial network participation at wave 1, other than work transition.

*** Seemingly unrelated probit models were run for depression and IADL limitation with weighting by reverse probability of retirement propensity.

**** Zellner's seemingly unrelated regression model was run for cogntive function (# of word recall) and grip strength (kg)