Are Japanese men of pensionable age underemployed or overemployed?

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Abstract

Using the Japanese Study on Aging and Retirement (JSTAR), this paper investigates how men in Japan from ages 60 to 74 adjust their attachment to the labor force to their new lives after beginning to claim public pension benefits. We compare men who were employed with those who were self-employed at age 54. The former group (those employed at age 54) gradually moved to part-time status or retirement after they began to receive pension benefits, and those who remained in the workforce were more likely to feel underemployed. In contrast, the latter group (those self-employed at age 54) did not retire or change their working hours—hours per week or weeks per year—even after they began to receive pension benefits, and those who remained in the workforce were more likely to feel overemployed. These results suggest that there remains extra work capacity to be utilized even after pensionable age for men who had been employed (but not self-employed). We compare our results with those for U.S. men using the Health and Retirement Study (HRS). We find that U.S. men decide to retire or move to part-time status more often than Japanese men do at the time of their initial social security claims, and that U.S. men who work as employed workers after beginning to receive social security are not likely to feel either over- or underemployed. Therefore, in contrast to U.S. men, Japanese men may not be choosing the optimal pensionable ages and labor hours to maximize their intertemporal utility.

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1. Introduction

Most Japanese men have high labor-force attachment, approximately 90%, until they reach age 60, according to the Population Census of Japan (2010). They gradually move from the labor force to retirement throughout their 60s, and approximately 75% of them are out of the labor force at age 75. Recently, Usui, Shimizutani, and Oshio (2015) found substantial work capacity among men over age 60: 15.8%, 42.1%, and 57.3% in the age groups of 60–64, 65–69, and 70–74 years, respectively, can potentially move from retirement to work, assuming that the relationship between their health and their employment status remains unchanged from that in their 50s.[1] These results suggest that men's changing work status from age 60 to 74, moving from work to retirement, is not fully attributable to deteriorating health conditions, partly because their health declines slowly and does not deteriorate significantly throughout their 60s.

In this paper, we examine why men from ages 60 to 74 move from full-time to part-time status or retirement even when their health conditions do not necessarily require them to do so. To address this issue, we separate the sample into two groups: those who had salaried jobs at age 54 and those who were self-employed at age 54, considering the possibility that these groups may differ substantially as a result of the working arrangements in Japan. Specifically, those men who have salaried jobs in their 50s tend to work in jobs subject to mandatory retirement, and therefore, they often leave their jobs because of mandatory retirement and find new jobs if they wish to continue working. Furthermore, this group of workers is often covered by Employees' Pension Insurance (EPI), whose benefits consist of both flat-rate and wage-proportional components. Meanwhile, those who are self-employed in their 50s are not subject to mandatory

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[1] Usui, Simizutani and Oshio (2015) estimate the elderly's work capacity (the ability to work based on their health) using the method of Cutler, Meara and Richands-Shubik (2012). Usui et al. first estimate the association between health and employment among those aged from 50 to 59. Then, based on the estimated associations, they project employment among those over age 60 to assess how much the observed decline in labor force participation can be explained by deteriorating health.

retirement and are not obliged to change employers during their 60s. In terms of pensions, most of these men are eligible to receive National Pension Insurance (NPI) benefits at age 65, which consist only of the flat-rate component and thus are less generous than EPI benefits.

We use data from the Japanese Study of Aging and Retirement (JSTAR), which covers a wide range of information about the economic, social, and health conditions of middle-aged and older adults. We also compare our results with U.S. data using the Health and Retirement Study (HRS), in which data that are comparable with Japanese data are available, along with information on the very different systems regarding work opportunities for those over age 60 and their social security arrangements.

Using the JSTAR, we find substantial differences in work and retirement behaviors between Japanese men who had salaried jobs at age 54 and those who were self-employed at age 54. Those who were employees at age 54, those who expect to receive greater public pension benefits in the future or those who are already doing so are more likely to work part-time or retire than they are to work full-time. These men are also found to gradually move from full-time employment to part-time employment or retirement after they begin to receive pension benefits. For those who work after they begin to receive pension benefits, their hours worked per week gradually decline. Meanwhile, for those who were self-employed at age 54, their decisions to move from full-time employment to part-time employment or retirement are more likely to be associated with their deteriorating health conditions, and the amount of their (expected) public pension benefits is not related to their work status decisions. Furthermore, there is no significant change in their employment status or their working hours—hours worked per week and weeks worked per year—before and after they begin to receive pension benefits. Therefore, these workers remain in the labor force even after they begin to receive pension benefits.

Based on the analysis using the HRS, we find that U.S. men, especially white men, exhibit

abrupt changes from full-time employment to part-time employment or retirement and abrupt changes in working hours just after beginning to receive social security. Therefore, for U.S. men, the decision to receive social security coincides with their decision to retire or reduce their working hours. This finding is in sharp contrast to (1) Japanese men who had salaried jobs at age 54 whose working hours after they began to receive public pension gradually declined and (2) Japanese men who were self-employed at age 54 who did not change their work status or working hours even after they began to receive pension benefits.

According to the models of the intertemporal substitution of the labor supply, rational, forward-looking individuals choose their labor hours for the present and future and choose their pensionable ages to maximize their intertemporal lifetime utility. Because individuals optimally choose hours worked across time, under this model, individuals are not likely to feel either over- or underemployed after they begin to receive pension benefits compared with the time before they began receiving pension benefits.[2] We find that among Japanese men who had salaried jobs at age 54, those who work after they begin to receive pension benefits are more likely to feel underemployed. In contrast, among Japanese men who were self-employed at age 54, those who work after they begin to receive pension benefits are more likely to feel overemployed. These results are different from those from the HRS, which indicate that U.S. men who work as employees are less likely to feel overemployed and less likely to feel underemployed after they begin to receive social security. Therefore, whereas U.S. men adjust their employment statuses and working hours and better satisfy their work hours when they begin to claim social security, Japanese men appear to have difficulty choosing optimal pensionable ages and labor hours to

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[2] However, empirical studies have observed that many employees are not perfectly matched to jobs with their desired working hours, and that those who report dissatisfaction with their hours change employers to work in positions that are more in line with their preferred hours (Altonji and Paxson, 1988; 1992; Kahn and Lang, 1992, 1995; Lang and Kahn, 2001).

maximize their lifetime utility.

2. Data

The data used in this study are from the JSTAR, which is designed and conducted jointly by the Research Institute of Economy, Trade, and Industry (RIETI), Hitotsubashi University, and the University of Tokyo. The JSTAR is Japan's first globally comparable panel data survey of the elderly. Its design is similar to that of the U.S. HRS, the Survey of Health, Ageing and Retirement (SHARE) in Europe, and the English Longitudinal Study of Ageing (ELSA). The JSTAR covers a wide range of information, including the economic, social, and health conditions of middle-aged and older adults. A detailed description of the survey's design and sample methodology can be found in Ichimura, Hashimoto, and Shimizutani (2009).

The individuals in the baseline JSTAR sample were between ages 50 and 75. The baseline sample was surveyed in 2007 from among people who lived in the following five municipalities in Japan: (1) Takikawa City in Hokkaido Prefecture; (2) Sendai City in Miyagi Prefecture; (3) Adachi Ward in the Tokyo Metropolis; (4) Kanazawa City in Ishikawa Prefecture; and (5) Shirakawa Town in Gifu Prefecture (hereafter referred to as "Baseline Sample 1"). The JSTAR expanded the sample by adding those who lived in Naha City in Okinawa Prefecture in 2008 and those who lived in Tosu City in Saga Prefecture in 2009 ("Baseline Sample 2"). In 2011, those who lived in Chofu City in the Tokyo Metropolis, Tondabayashi City in Osaka Prefecture, and Hiroshima City in Hiroshima Prefecture were also added to the JSTAR ("Baseline Sample 3").[3] The response rate in the baseline sample was near 60%, and the sample comprised a total of 7,723 participants. The second wave of data collection for Baseline Sample 1 was conducted in

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[3] The JSTAR is not a probabilistic national sampling, but within the eleven cities, the researchers selected a probabilistic sample for each site.

2009, and that for Baseline Sample 2 was conducted in 2011. The third wave of data collection for Baseline Sample 1 was conducted in 2011.

In the analysis, we restrict the data to male respondents from ages 60 to 74. We separate the respondents by the jobs they held at age 54 into (1) those who had salaried jobs (or who were employed) and (2) those who were self-employed. In Japan, those who have salaried jobs in their 50s tend to work under mandatory retirement arrangements. After mandatory retirement—the mandatory retirement age is often between the ages of 60 and 65—workers need to find new employment in order to continue working. Regarding their pensions, those who work for companies that regularly employ 5 workers or more are mandatorily covered by the EPI system. EPI benefits consist of an "earnings-related pension" in addition to the flat-rate "Old-Age Basic Pension" provided by the NPI system.[4] Meanwhile, those who are self-employed are not under mandatory retirement arrangements and are therefore not obliged to change employers during their 60s. Regarding their pensions, self-employed workers are eligible to receive only the Old-Age Basic Pension provided by the NPI system at age 65.[5]

In the JSTAR sample used in this paper, 2,513 men held salaried jobs at age 54, and 885 men were self-employed at age 54, meaning that approximately one-fourth of the men in the sample were self-employed at age 54.

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[4] The public old-age pension scheme in Japan is composed of three plans: (1) National Pension Insurance (NPI, *Kokumin Nenkin*) for self-employed workers and the unemployed; (2) Employees' Pension Insurance (EPI, *Kosei Nenkin*) for those who are employed by private corporations; and (3) Mutual Aid Insurance (MAI, *Kyosai Nenkin*) for those who are employed in the public sector and by private schools. In 2007, the NPI, EPI, and MAI covered 45.5%, 48.0%, and 6.5% of the population that was insured by public pension programs, respectively (Oshio, Oishi, Shimizutani, 2011). Because the MAI has nearly the same benefit scheme as the EPI does, the MAI and the EPI are combined in the JSTAR questionnaire. To be eligible to receive the NPI, EPI, and MAI benefits, one must have contributed to the plan for a minimum of 10 years.

[5] Japan has been extending the eligible age for EPI and MAI benefits. For male pensioners, the eligibility age for the flat-rate benefits increased by one year for every three years from age 60 in 2001 to 65 years in 2013. Furthermore, the eligibility age for the wage-proportional benefits was scheduled to increase beginning in 2013 by one year for every three years to reach 65 years old in 2025. (Oshio, Oishi and Shimizutani, 2011).

For comparison, we use the HRS, a biennial survey of the U.S. population over age 50. The original HRS cohort was first interviewed in 1992 for a nationally representative sample of individuals born between 1931 and 1941. We use cohorts that entered the HRS in 1998 and 2004, and we use data from the first to the eleventh waves, through 2012. Similar to our procedure for the JSTAR, for the HRS, we restrict the sample to men between ages 60 and 74. In the HRS, the questions on hours constraints (which we use to construct indicators for overemployment and underemployment) were not presented to those who were self-employed at the time of the interview. Therefore, for the analysis of work hours and hours constraints using the HRS sample, self-employed individuals are excluded. Ultimately, using the U.S. data, we make a rough comparison between U.S. men and Japanese men who had salaried jobs at age 54 in the JSTAR sample. In the HRS sample, there are 47,981 person-wave observations for whites and 8,873 person-wave observations for blacks.

Appendix Table 1 provides the characteristics of the JSTAR and HRS samples.

3. Descriptive statistics

Figure 1 separately plots the proportions of Japanese men between ages 55 and 74 who work full-time, those who work part-time, and those who are retired among those who had salaried jobs at age 54 (Panel A) and those who were self-employed at age 54 (Panel B), using the first wave of the baseline samples. Full-time refers to 35 or more hours of work per week, whereas part-time refers to fewer than 35 hours of work per week.

For Japanese men who had salaried jobs at age 54, approximately 90% of them continue to work full-time until the age of 59. Then, they gradually shift to part-time or retirement.[6] During

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[6] This is in accordance with Shimizutani and Oshio (2010), who find that a substantial proportion of the Japanese elderly move to part-time jobs after they retire from their primary, full-time jobs rather than completely leaving the labor force, based on the data from the Survey on Employment of the Elderly.

their early 70s, the proportion of those who work part-time declines, and that of those who retire increases. At age 74, 86.3% of men have retired, and only 7.5% and 6.3% work part- and full-time, respectively.

Meanwhile, for those who were self-employed at age 54, the shift from full-time employment to part-time employment or retirement is more gradual. The proportion of those who work full-time gradually declines from age 55 to 74, and there is not a distinct change in the pace of decline beginning at age 60, as was observed for those who had salaried jobs at age 54. Additionally, there is no decline in the proportion of those who work part-time from their late 60s to their early 70s, as was observed for those who had salaried jobs at age 54. At age 74, 35.3% still work full-time, 20.6% work part-time, and 44.1% are retired. The proportion of those who are retired is approximately 40% lower than that for those who had salaried jobs at age 54.

Therefore, there is a distinct difference in work and retirement behaviors between those who had salaried jobs at age 54 and those who were self-employed at age 54. The self-employment rate for male workers in 2010 was 12.6% in Japan, which is higher than the 7.5% in the U.S. (OECD, 2014), and the well-being of these self-employed men is as important as that of the employed. Because of the differences between these two groups in terms of their employment opportunities and public pension arrangements, as described in detail in Section 2, it is important to distinguish the two groups when we think about the work and retirement behaviors of the Japanese elderly.

4.   Determinants of employment status for Japanese men between ages 60 and 74

We begin by estimating a multinomial logit model of the choice to work full-time, work part-time, or retire. We use this model to examine which demographic, health, and pension-related variables are associated with employment status among Japanese men between the ages of 60

and 74. The regressions include demographic characteristics (e.g., age, education, and marital status), various health measures,[7] and individuals' expected or actual pension benefits. The variable for expected or actual pension benefits is the *actual* amount of pension benefits if the respondent is currently receiving a pension or the *expected* amount of pension benefits the respondent is not currently receiving them but expects to do so in the future.[8]

Table 1 reports the results from the multinomial logit regression with relative risk ratios separated between Japanese men who had salaried jobs at age 54 (left panel) and those who were self-employed at age 54 (right panel). The coefficients report the risk of employment status (part-time or retirement) relative to the base outcome of being employed full-time.

Looking at the health variables, for those who had salaried jobs at age 54, those who report their health as fair or poor are 1.931 times more likely to be retired from working full-time, but there is no significant association between this report and their likelihood of working part-time relative to full-time. However, for those who were self-employed at age 54, those who report their health as fair or poor are 2.525 times more likely to be retired from working full-time and 3.859 times more likely to work part-time than to work full-time. Because those who had salaried jobs at age 54 and report their health as fair or poor tend to retire altogether but those who were self-employed at age 54 tend to work part-time or retire, those who were self-employed at age 54 have the option to continue working by reducing their work hours to less

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[7] Health variables include:(1) self-assessed health, (2) physical functional limitations, (3) IADL (instrumental activities of daily living) limitations, (4) various types of illness (heart disease, lung disease, stroke, psychiatric disorders, cancer, hypertension, arthritis, and diabetes), (5) CES-D (the Center for Epidemiologic Studies Depression Scale) score, (6) weight, and (7) smoking behaviors. Health conditions have been found to be closely associated with the elderly's decisions on work and retirement (Wise, 2012; McGarry, 2004, 2009).

[8] We assume that people can correctly expect the amount of pension benefits they will receive in the future if they are not currently receiving them. Because the official notifications of future pension benefits have been distributed to possible future pensioners since 2009, even those who do not currently receive pension benefits may have better knowledge of their expected amount of pension benefits than they would have in the past. Okumura and Usui (2014) find using the JSTAR that 8.3% of those who plan to receive pension benefits in the future do not know the exact amount they will receive. Therefore, the regression in Table 1 includes a dummy for whether an individual reported not knowing the amount of pension benefits for which he was eligible.

than 35 hours per week.

At the same time, for those who were self-employed at age 54, health measures appear to be more related to their decision to retire or work part-time. Specifically, those who have arthritis are 3.812 times more likely to work part-time than to work full-time; those who had a stroke are more likely to retire or work part-time than to work full-time; and those who have IADL limitations are significantly more likely to retire than to work full-time.

For those who had salaried jobs at age 54, given a 1-million-yen increase in pension benefits, they are 2.315 times more likely to be retired from working full-time and 1.804 times more likely to work part-time than to work full-time. That is, these individuals with higher pension benefits are more likely to retire or to work part-time than to work full-time. Meanwhile, for those who were self-employed at age 54, the amount of pension benefits they receive or expect to receive does not have a statistically significant association with their likelihood to retire or to work part-time rather than full-time.

There is a large difference in the amounts of the actual and expected pension benefits between those who held salaried jobs at age 54 and those who were self-employed at age 54. Specifically, for those who had salaried jobs at age 54, the median expected or actual pension benefits are 2,000-thousand-yen for those who retire, 1,800-thousand-yen for those who work part-time, and 720-thousand-yen for those who work full-time. For those who were self-employed at age 54, the median expected or actual pension benefits are 840-thousand-yen for those who retire, 720-thousand-yen for those who work part-time, and 690-thousand-yen for those who work full-time. Therefore, the amounts of the expected or actual pension benefits are much larger for those who had salaried jobs at age 54 than for those who were self-employed at age 54, conditional on employment status. Furthermore, for those who were self-employed at age 54, the pension benefit amounts vary little by employment status compared with the benefits for

those who had salaried jobs at age 54. Because the two groups differ in the amounts of public pension benefits they are entitled to receive, their work and retirement behaviors after they begin to receive pension benefits are likely to differ. In the following section, we examine the types of differences in the changes in work vs. retirement and hours constraints between the two groups before and after they begin to receive pension benefits.

5. Changes in employment status before and after the initial claim of pension benefits

We estimate a multinomial logit model of the choice to work full-time, work part-time, or retire, similar to that shown in Table 1, by replacing the amounts of pension benefits with years since beginning to receive the benefits. Specifically, the regression includes binary variables for the year an individual begins to receive pension benefits where (1) is less than 1 year since the benefits began, (2) is 1 to 2 years, (3) is 3 to 5 years, and (4) is 6 years or more since beginning to receive pension benefits (the reference category is having not yet begun to receive pension benefits). Table 2, Panel A displays the results from the multinomial logit regression with relative risk ratios separately for Japanese men who had salaried jobs at age 54 and those who were self-employed at age 54. Table 2, Panel B displays the results for U.S. men for whites and blacks separately.[9]

Japanese men who had salaried jobs at age 54 gradually move from full-time employment to part-time employment or retirement once they begin to receive pension benefits. In the year in which they begin to receive pension benefits, men are 4.816 times more likely to retire from working full-time than they are in the years before they begin to receive their benefits, and they are 3.894 times more likely to work part-time than to work full-time. There is an uptrend in the estimated relative risk ratios as the number of years since beginning to receive pension benefits

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[9] The estimation results for the other variables are close to those in Table 1 and are not reported to conserve space.

increases. Those who began receiving benefits 6 years ago or longer are 13.64 times more likely to be retired than to be working full-time and 9.373 times more likely to be working part-time than full-time compared with the years before they began to receive their pensions. That is, those who had salaried jobs at age 54 claim pension benefits first and change their employment status later rather than simultaneously deciding to receive their pensions and to retire or work part-time.

Meanwhile, for Japanese men who were self-employed at age 54, the estimates are all insignificant, and the estimates of the binary variables for the number of years since the initial claim of pension benefits are close to one up until 5 years since the initial claim of pension benefits. For men who began receiving benefits 6 years ago or longer, the estimates of relative risk only increase to 2.603 for retirement and 1.738 for part-time employment (these estimates are insignificant). Thus, those who are self-employed at age 54 continue to work in the same manner as before even after they begin to receive pension benefits.

For comparison, we conduct the same multinomial logit estimation using the HRS sample. The U.S. white men who began receiving social security less than one year earlier are 3.321 times more likely to be retired from working full-time, and the estimates for retirement relative to full-time status remain at roughly this level until 5 years have passed since they began receiving social security. The estimate increases to 8.383 for those who began receiving social security 6 years earlier or longer. In contrast, however, the estimated relative risk of working part-time compared with retiring is approximately 3 times greater throughout the years after a man begins to receive social security. That is, when white men begin to receive social security, they often retire altogether or work part-time and maintain that status (however, after 6 years or more since beginning to receive social security, they are more likely to retire). This employment pattern is different from that in Japan; in particular, (1) Japanese men who had salaried jobs at age 54 gradually move from full-time status to part-time status or retirement and (2) Japanese

men who were self-employed at age 54 continue to work full-time even after they begin receiving pension benefits.

For U.S. black men, those who began receiving social security less than one year earlier are 4.199 times more likely to be retired from working full-time, and these estimates regarding retirement relative to full-time status steadily increase from 3.172, 4.526, and 8.173 times for 1–2 years, 3–5 years, and 6 years or more, respectively, since the initial claim of social security. For part-time employment compared with full-time employment, those who began receiving benefits less than one year earlier are 3.928 times more likely to work part-time than to work full-time, and the estimated relative risk increases slightly to 4.967 times after 6 years or more since the initial social security claim. Although the change from full-time employment to part-time employment or retirement is slightly more gradual for black men than it is for white men, these patterns are still distinctly different from those of Japanese men—for whom the movement from full-time employment to part-time employment or retirement is more gradual or not observed.

6. Changes in working hours before and after the initial pension benefits claim

To capture the evolution of working hours before and after beginning to receive pension benefits in more detail, we examine how working hours—in particular, hours per week and weeks per year—change before and after the receipt of pension benefits. To do this, we regress hours of work on the same sets of covariates that were used in Table 2. Obviously, note that the regression analysis on hours of work will be restricted to those with positive hours.

Table 3, Panel A reports the estimation results for hours per week in the left panel and weeks per year in the right panel separately for Japanese men who had salaried jobs at age 54 and those who were self-employed at age 54. Table 2, Panel B reports those results for the U.S. men separately for whites and blacks. For Japanese men who had salaried jobs at age 54, hours per

week and weeks per year decrease by 5.5 hours and by 2.3 weeks, respectively, once they begin to receive pension benefits, which corresponds to a reduction of approximately 340 [≈ 35×50 – (35 – 5.5)×(50 –2.3)] hours for one year as a whole if we assume that men work 35 hours per week and 50 weeks per year before claiming pension benefits. For those who began receiving benefits six years ago or longer, their hours per week decrease by 10.9 hours and their weeks per year decrease by only 1.0 week (i.e., weeks per year gradually return to the level before they began claiming benefits, perhaps because only those with high labor force attachment continue to work after 6 years or more since beginning to receive pension benefits). These decreases correspond to a reduction of approximately 420 hours [≈ 35×50 – (35 – 10.9)×(50 –1.0)] for one year. In sum, those who had salaried jobs at age 54 reduce both hours per week and weeks per year just after they begin to receive pension benefits, and subsequently, the total annual hours continue to decline.

In contrast, for Japanese men who were self-employed at age 54, years since they began to receive pension benefits are not associated with hours per week or weeks per year; the estimates are all small and insignificant. This confirms that adjusting their work hours is not related to their receipt of pension benefits.

Looking at the results for white U.S. men, within a year after beginning to receive social security, the hours worked per week decline by 6.1 and weeks worked per year decline by 1.9, corresponding to a reduction of approximately 360 [≈ 35×50 – (35 –6.1)×(50 –1.9)] hours per year. These declines in hours per week and weeks per year are gradual; beginning 6 years or more after they began to receive social security, their hours worked per week decline by 10.4 and weeks worked per year by 5.8, corresponding to a reduction of approximately 660 [≈ 35×50 – (35 –10.4)×(50 –5.8)] hours per year. Therefore, for those who work after they begin to receive social security, their hours decline quite significantly, much more than those for the Japanese

men who had salaried jobs at age 54. As shown in Table 2, U.S. white men are more likely to simultaneously decide when they will begin to receive social security and when they will retire. However, those men who remain in the labor force after they begin to receive social security are able to reduce their working hours drastically, from a reduction of 360 hours for those who began to receive social security less than 1 year earlier to a reduction of 660 hours for those who began receiving social security 6 years earlier or longer compared to their working hours before they began to receive social security. This result is in contrast to that for Japanese men, for whom the reduction is 340 hours per year for those who began receiving public pension benefits less than 1 year earlier and 420 hours per year for those who began receiving benefits 6 years earlier or longer compared with their hours worked before they began to receive public pension benefits. Rather than completely leaving the labor force, as Japanese men of pensionable age who had salaried jobs at age 54 do, U.S. white men of pensionable age are able to continue working and reduce their hours substantially, suggesting that the elderly in the U.S. are offered more flexibility in their work hours.

For black U.S. men, within a year after beginning to receive social security, their hours worked per week decline by 5.2 and weeks worked per year decline by 4.0, corresponding to a reduction of approximately 380 [$\approx 35 \times 50 - (35 - 5.2) \times (50 - 4.0)$] hours per year. For those who began receiving social security 6 or more years earlier, the hours worked per week decline by 8.9 and weeks worked per year by 5.2, corresponding to a reduction of approximately 580 [$\approx 35 \times 50 - (35 - 8.9) \times (50 - 5.2)$] hours per year. For black men, hours worked per week decline gradually after beginning to receive social security, but their weeks worked per year decrease after they begin to receive social security and remain at roughly the same level. After they begin to receive social security, their hours worked decline, but not as dramatically as those for white men; however, the reduction in working hours for black men is greater than that for Japanese men who

had salaried jobs at age 54.

7. Changes in hours constraints before and after initial claims of pension benefits

To capture a job's hours constraints, we construct the binary variables of overemployment and underemployment based on the JSTAR and HRS responses following Altonji and Paxson (1988, 1992), Altonji and Usui (2007), and Usui (2009, 2015). Specifically, we allocate one to the overemployment variable if the respondent answered "No" to "(No counting overtime hours), Could you reduce the number of paid hours in your regular work schedule?" *and* "Yes" to "Would you like to do so even if your earnings were reduced in the same proportion?" and zero otherwise. We also allocate one to the underemployment variable if the respondent answered "No" to "Could you increase the number of paid hours in your regular work schedule?" *and* "Yes" to "Would you like to do so if your earnings were increased in the same proportion?" and zero otherwise. Because these questions were not included in the JSTAR until 2009 (only for Baseline Sample 2) and 2011, the sample size is substantially smaller.[10]

Table 4, Panel A reports the proportions of Japanese men who report being overemployed and underemployed before and after they began to receive pension benefits, and Panel B reports the same proportions for U.S. men. For Japanese men who had salaried jobs at age 54, 6.5% of workers felt underemployed before they began to receive pension benefits, and this percentage increased to 11.3% for the year these workers began to receive pension benefits. The percentage remains at this level, and 11.6% of those who have received pension benefits for 6 years or more feel underemployed. However, for those who had salaried jobs at age 54, regarding the overemployment indicator, there is no clear difference in percentages before and immediately after they begin to receive pension benefits. Meanwhile, for those who were self-employed at age

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[10] The questions on hours constraints are adopted from the HRS. Although the HRS did not ask these questions of self-employed workers, the JSTAR asked them of all workers.

54, 5.1% of workers felt overemployed before they began to receive pension benefits, and the percentage of those who felt overemployed increased to 14.5% for the year they began to receive benefits. For those who were self-employed at age 54, regarding the underemployment indicator, there is no clear difference in the percentages before and immediately after they begin to receive pension benefits. Therefore, the summary statistics suggest that after they begin to receive public pension benefits, men who had salaried jobs at age 54 are more likely to feel underemployed, and those who were self-employed at age 54 are more likely to feel overemployed.

In contrast, for U.S. men, the overemployment and underemployment indicators are higher before they begin to receive social security compared with afterward, by between approximately 2% and 6%. That is, after they begin to receive social security, U.S. men are less likely to feel overemployed or underemployed, indicating that they are more satisfied with their working hours after they begin to receive social security.

Next, we examine this issue by estimating probit models of overemployment and underemployment using the same sets of covariates as in Tables 2 and 3. Table 5, Panel A reports the marginal effects on the means for the probit models with overemployment as the outcome in the left panel and underemployment as the outcome in the right panel separately for Japanese men who had salaried jobs at age 54 and those who were self-employed at age 54. Table 2, Panel B reports the results for U.S. men separately for whites and blacks.

In the overemployment model, for the men who had salaried jobs at age 54, the estimated marginal effects on the number of years since they began to receive pension benefits are all negative, although the findings were only significantly negative for 6 years or more since beginning to receive pension benefits. Meanwhile, for those who were self-employed at age 54, the estimated marginal effects on the number of years since they began to receive pension benefits are significantly positive for less than 1 year and 1 to 2 years since beginning to receive

pension benefits. Consequently, opposite results are obtained for the underemployment model. Specifically, the estimated coefficients on the number of years since they began to receive pension benefits are all positive for those who had salaried jobs at age 54, and they are significantly positive for beginning to receive benefits less than 1 year earlier, whereas the estimates are all negative for those who were self-employed at age 54, although the coefficients are insignificant.

Although many estimates are not significant, we find support for the notion that men who had salaried jobs at age 54 are more likely to feel underemployed after they begin to receive pension benefits, whereas those who were self-employed at age 54 are more likely to feel overemployed after they begin to receive benefits.

For white U.S. men, in the overemployment model, the estimated marginal effects on the number of years since beginning to receive social security are significantly negative except for beginning to receive benefits less than 1 year earlier. In the underemployment model, the estimated marginal effects on the number of years since beginning to receive social security are also often negative, although they are insignificant. Similarly, black U.S. men are less likely to feel overemployed; the marginal effects for overemployment take negative values (although insignificant) for the years after they begin to receive social security. The marginal effects for the underemployment model are also significantly negative until 5 years after beginning to receive social security.

Men in the U.S. are less likely to report being overemployed or underemployed after they begin to receive social security, and therefore, they are more likely to be satisfied with their work hours compared with their work hours before they began to receive benefits. However, Japanese men are more likely to feel either overemployed or underemployed after they begin to receive pension benefits.

8. Conclusion

This paper is one of the first attempts in Japan to examine how men over age 60 change their employment status and working hours after they claim public pension benefits. In particular, there have been no empirical studies that explicitly present the differences in working behaviors between Japanese men who had salaried jobs in their 50s and those who were self-employed in their 50s. We use the JSTAR, and we also make a comparison with the U.S. using the HRS.

There are remarkable differences in work and retirement behaviors between Japanese men who had salaried jobs at age 54 and those who were self-employed at that age. Those who had salaried jobs at age 54, who largely correspond to EPI recipients, exhibit a clear shift from full-time status to part-time status or retirement once they begin to receive pension benefits. For those who work in the labor force after they begin to receive pension benefits, the more years that pass after their initial benefit claims, the more these men reduce their hours worked per week without exhibiting a significant reduction in weeks worked per year. In contrast, for those who were self-employed at age 54, who likely belong to the NPI because they were self-employed, there is no significant change in employment status (full-time employment, part-time employment or retirement) or working hours (hours per week and weeks per year) before and after they begin to receive pension benefits. This result is in contrast to the U.S., where there is an abrupt change in employment status and working hours immediately before and immediately after beginning to receive social security.

Using a series of questions on hours constraints, we find that those who had a salaried job at age 54, who tend to reduce their working hours once they begin receiving pension benefits, tend to feel underemployed. This finding suggests that they do not voluntarily adjust their working hours, which presumably reflects their limited job opportunities after the mandatory retirement age. In contrast, those who were self-employed at age 54 tend to feel overemployed. This finding

may reflect the limited scope of arrangements in work conditions, especially when they are engaged in family or small-sized businesses, as well as the lower generosity of NPI benefits compared with EPI benefits.

In an intertemporal model of optimizing individuals' behaviors, individuals are considered to choose their pensionable ages and labor hours to maximize their lifetime utility. Because individuals optimally choose the number of hours worked across time under this model, they feel neither overemployed nor underemployed after they begin to receive pension benefits compared with the time period before they began receiving benefits. The model is likely applicable to the U.S. case because after they begin to receive social security, U.S. workers feel neither overemployed nor underemployed compared with the time period before they began receiving benefits. However, for Japanese men, those who had salaried jobs at age 54 tend to feel underemployed, and those who were self-employed at age 54 tend to feel overemployed after they begin to receive pension benefits. Therefore, there appear to be factors that distort individuals' intertemporal allocations of work hours in Japan. These factors may include insufficient pension benefits for those who were self-employed throughout their work lives, given that these individuals are only eligible for the flat-rate portion of the pension and may therefore desire additional income support. In contrast, there are few employment opportunities after the mandatory retirement age of the early 60s for those who had salaried jobs in their 50s. Policy measures to provide people who were employed in their 50s with more work opportunities—specifically, allowing them to work on a full-time basis as well as offering more flexible work—may utilize their potential work capacity. Future research is needed to more clearly identify the factors that cause this distortion in individuals' optimal intertemporal allocations of work hours in Japan.

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Figure 1. Distribution of employment status by age, JSTAR and HRS.

(A) Japanese men who had salaried jobs at age 54
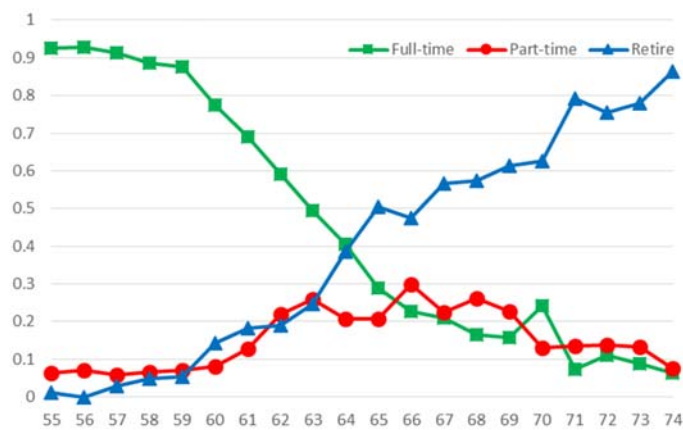
(B) Japanese men who were self-employed at age 54
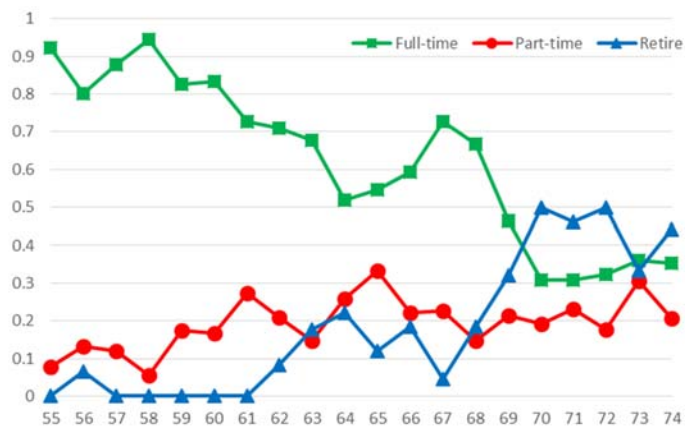
(C) Men in the United States

Table 1. Multinomial logit estimates of employment status, Men 60–74, JSTAR.

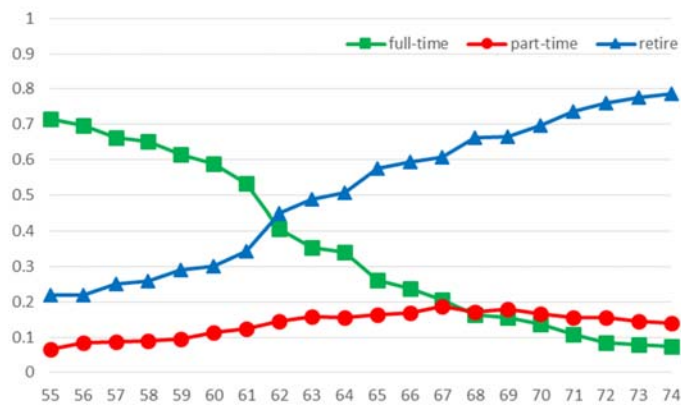| Variable	Salaried at age 54						Self-employed at age 54					
	Retired			Part-time			Retired			Part-time		
	RRR	SE		RRR	SE		RRR	SE		RRR	SE	
Self-assessed health: very good	1.443	0.310	*	1.216	0.269		1.238	0.509		1.268	0.462	
Self-assessed health: good	1.212	0.233		0.988	0.206		1.684	0.646		2.426	0.851	**
Self-assessed health: fair or poor	1.931	0.518	**	0.933	0.294		2.525	1.206	*	3.859	1.762	***
Physical functional limitation: 1	0.984	0.280		0.554	0.214		1.825	0.897		0.631	0.353	
Physical functional limitation: 2+	2.633	0.736	***	0.661	0.321		2.651	1.220	**	1.338	0.608	
Any IADL limitations	1.298	0.428		0.623	0.343		5.879	3.869	***	0.691	0.743	
CES-D	1.028	0.058		0.979	0.058		1.105	0.085		0.962	0.079	
Heart disease	0.997	0.245		1.120	0.299		1.323	0.489		1.012	0.430	
Lung disease	4.187	2.521	**	4.227	2.767	**	1.228	1.011		1.929	2.065	
Stroke	1.814	0.700		0.333	0.276		6.264	4.515	**	5.653	4.368	**
Cancer	0.802	0.254		1.066	0.433		0.263	0.191	*	0.506	0.331	
Hypertension	1.335	0.228	*	1.987	0.365	***	1.391	0.415		1.331	0.394	
Arthritis	0.809	0.330		0.374	0.246		1.334	0.959		3.812	2.418	**
Diabetes	1.231	0.271		1.105	0.270		0.804	0.333		0.629	0.224	
Underweight	0.942	0.459		3.141	1.772	**	1.167	1.139		0.304	0.302	
Overweight	0.721	0.131	*	0.808	0.152		1.530	0.490		0.802	0.233	
Obese	1.325	0.838		0.568	0.296		0.814	0.694		2.669	2.146	
Former smoker	1.168	0.245		1.148	0.259		0.927	0.335		1.090	0.388	
Current smoker	0.796	0.170		0.837	0.201		0.519	0.236		1.159	0.455	
Below high school	0.793	0.165		0.925	0.204		0.907	0.313		0.881	0.274	
Some college	0.740	0.281		0.509	0.229		0.360	0.261		1.036	0.511	
College	0.820	0.183		0.613	0.146	**	0.419	0.243		0.944	0.387	
Married	0.500	0.148	**	1.070	0.325		0.555	0.281		1.814	1.074	
Blue collar job at age 54	1.506	0.283	**	1.195	0.230		5.751	1.903	***	2.250	0.789	**
Low-skilled services at age 54	1.990	0.673	**	1.621	0.660		5.904	4.746	**	1.470	1.309	
Pension benefits (million yen)	2.315	0.186	***	1.804	0.148	***	1.166	0.319		1.264	0.278	
Probability of survival until age 85	0.774	0.116	*	0.999	0.155		0.453	0.131	***	1.056	0.249	
Log pseudolikelihood	-1414.1						-461.67					
N	1835						658					

Note: Relative risk ratios are reported. The standard errors are transformed to correspond with the relative risk ratios. The reference group for education is high school education, and that for self-assessed health is excellent health. Regressions include indicators for age, municipality, year, and missing variables. Robust standard errors are in parentheses.

$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 2. Multinomial logit estimates of employment status, Men 60–74, JSTAR and HRS.

Panel A. JSTAR

Years since beginning to receive pension benefits	Salaried at age 54						Self-employed at age 54					
	Retire			Part-time			Retire			Part-time		
	RRR	SE		RRR	SE		RRR	SE		RRR	SE	
0 year	4.816	1.455	***	3.894	1.151	***	1.114	0.666		1.852	0.822	
1 to 2 years	5.556	1.973	***	4.323	1.420	***	0.774	0.523		0.646	0.334	
3 to 5 years	8.453	3.069	***	5.600	2.154	***	1.369	1.002		1.454	0.749	
6 years and over	13.64	5.673	***	9.373	4.214	***	2.603	2.107		1.738	1.049	
Log pseudolikelihood	-1472.6						-474.2					
N	1881						689					

Panel B. Health and Retirement Study

Years since beginning to receive social security	Whites						Blacks					
	Retire			Part-time			Retire			Part-time		
	RRR	SE		RRR	SE		RRR	SE		RRR	SE	
0 year	3.321	0.199	***	2.840	0.208	***	4.199	0.712	***	3.928	0.849	***
1 to 2 years	3.643	0.249	***	3.321	0.278	***	3.172	0.567	***	1.981	0.480	***
3 to 5 years	3.923	0.218	***	3.149	0.203	***	4.526	0.623	***	3.864	0.710	***
6 years and over	8.383	0.705	***	3.822	0.348	***	8.173	1.418	***	4.967	1.094	***
Log pseudolikelihood	-23141.0						-3224.4					
N	28652						4572					

Note: Relative risk ratios are reported.

The regressions using the JSTAR include various health measures (see footnote 7 for a detailed list of the variables), education, marital status, occupation at age 54, pension coverage, the probability of survival until age 85 divided by life table probability, age, municipality, survey years, and indicators for missing variables, which are also used in the regression analysis in Table 1.

The regressions using the HRS include the same variables used in the analysis using the JSTAR.

Robust standard errors are in parentheses. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 3. OLS estimates for hours worked: Men 60–74, JSTAR and HRS.

Panel A. JSTAR

| | Hours per Week | | | | | | Weeks per Year | | | | | |
| | Salaried at age 54 | | | Self-employed at age 54 | | | Salaried at age 54 | | | Self-employed at age 54 | | |
Years since beginning to receive pension benefits	Coef.	SE		Coef.	SE		Coef.	SE		Coef.	SE	
0 year	-5.541	1.403	***	-0.124	2.875		-2.347	0.816	***	-1.475	1.152	
1 to 2 years	-7.932	1.725	***	4.709	3.317		-1.386	0.778	*	0.305	1.049	
3 to 5 years	-9.885	2.119	***	-1.122	3.861		-1.988	0.970	**	-1.132	1.425	
6 years and over	-10.90	2.597	***	-3.016	4.515		-0.983	1.249		-1.985	1.378	
R2	0.195			0.189			0.148			0.153		
N	1026			522			1069			551		

Panel B. Health and Retirement Study

| | Hours per Week | | | | | | Weeks per Year | | | | | |
| | Whites | | | Blacks | | | Whites | | | Blacks | | |
Years since beginning to receive social security	Coef.	SE		Coef.	SE		Coef.	SE		Coef.	SE	
0 year	-6.088	0.660	***	-5.188	1.430	***	-1.857	0.501	***	-4.014	1.359	***
1 to 2 years	-9.288	0.720	***	-3.973	1.923	**	-2.886	0.555	***	-1.909	1.499	
3 to 5 years	-9.117	0.663	***	-7.484	1.487	***	-3.806	0.519	***	-5.292	1.259	***
6 years and over	-10.36	1.053	***	-8.852	2.068	***	-5.757	0.797	***	-5.210	1.407	***
R^2	0.189			0.194			0.073			0.095		
N	8137			1235			8090			1124		

Note: The regressions using the JSTAR include various health measures, education, marital status, occupation at age 54, pension coverage, the probability of survival until age 85, age, municipalities, survey years, and indicators for missing variables, which are also used in the analysis in Table 1.

The regressions using the HRS include the same variables used in the analysis using the JSTAR. The HRS sample is restricted to those who were not self-employed at the time of the interview.

Robust standard errors are in parentheses. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 4. Summary statistics of overemployment and underemployment: Men 60–74, JSTAR and HRS.

Panel A: JSTAR

Years since beginning to receive pension benefits	Overemployed						Underemployed					
	Salaried at age 54			Self-employed at age 54			Salaried at age 54			Self-employed at age 54		
	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N
Before	0.121	0.326	199	0.051	0.220	99	0.065	0.248	199	0.061	0.240	99
0 year	0.119	0.325	159	0.145	0.355	69	0.113	0.318	159	0.072	0.261	69
1 to 2 years	0.122	0.329	74	0.172	0.384	29	0.081	0.275	74	0.069	0.258	29
3 to 5 years	0.063	0.244	64	0.073	0.264	41	0.109	0.315	64	0.073	0.264	41
6 years and over	0.042	0.202	95	0.119	0.326	59	0.116	0.322	95	0.051	0.222	59

Panel B: HRS

Years since beginning to receive social security	Overemployed						Underemployed					
	Whites			Blacks			Whites			Blacks		
	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N
Before	0.117	0.322	3306	0.120	0.325	499	0.101	0.302	3328	0.151	0.358	500
0 year	0.077	0.267	457	0.078	0.270	62	0.091	0.288	460	0.105	0.309	61
1 to 2 years	0.057	0.233	428	0.119	0.327	48	0.079	0.270	430	0.040	0.197	49
3 to 5 years	0.048	0.214	1093	0.028	0.165	164	0.077	0.266	1096	0.062	0.241	167
6 years and over	0.056	0.229	1333	0.061	0.241	214	0.072	0.259	1333	0.165	0.372	216

Note: The HRS sample is restricted to those who were not self-employed at the time of the interview.

Table 5. Probit estimates for hours constraints: Men 60–74, JSTAR and HRS.

(Marginal effects at the mean)

Panel A. JSTAR

	Overemployed					Underemployed				
Years since beginning to	Salaried at age 54		Self-employed at age 54			Salaried at age 54		Self-employed at age 54		
receive pension benefits	dF/dx	SE	dF/dx	SE		dF/dx	SE	dF/dx	SE	
0 year	-0.012	0.023	0.074	0.032	**	0.061	0.028	**	-0.022	0.020
1 to 2 years	-0.013	0.035	0.086	0.044	**	0.018	0.039		-0.0003	0.024
3 to 5 years	-0.056	0.047	0.048	0.044		0.056	0.040		-0.006	0.027
6 years and over	-0.108	0.057	*	-0.005	0.051	0.049	0.051		-0.002	0.036
Log pseudolikelihood	-153.0		-69.7			-151.4		-54.1		
N	579		290			579		290		

Panel B. Health and Retirement Study

	Overemployed					Underemployed				
Years since beginning to	Whites		Blacks			Whites		Blacks		
receive social security	dF/dx	SE	dF/dx	SE		dF/dx	SE	dF/dx	SE	
0 year	0.0002	0.012	-0.040	0.028		-0.005	0.013	-0.097	0.036	**
1 to 2 years	-0.042	0.014	***	-0.018	0.034	-0.020	0.016	-0.141	0.045	***
3 to 5 years	-0.057	0.013	***	-0.059	0.035	*	0.001	0.014	-0.132	0.039	***
6 years and over	-0.073	0.017	***	-0.051	0.036	-0.012	0.018	-0.035	0.033	
Log pseudolikelihood	-2329.4		-302.7			-2460.6		-413.9		
N	8122		1146			8162		1238		

Note: Regressions using the JSTAR include various health measures, education, marital status, occupation at age 54, pension coverage, the probability of survival until age 85, age, municipalities, survey years, and indicators for missing variables, which are also used in the analysis in Table 1.

The regressions using the HRS include the same variables used in the analysis using the JSTAR. The HRS sample is restricted to those who were not self-employed at the time of the interview.

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

Appendix Table 1. Summary statistics, JSTAR and HRS.

	JSTAR			HRS		
	Age Group			Age Group		
Variable	60–64	65–69	70–74	60–64	65–69	70–74
Retired	0.195	0.477	0.670	0.408	0.617	0.751
Part-time worker	0.179	0.227	0.154	0.137	0.174	0.153
Full-time worker	0.625	0.296	0.176	0.454	0.209	0.096
Self-assessed health: excellent	0.274	0.220	0.154	0.140	0.115	0.111
Self-assessed health: very good	0.246	0.258	0.258	0.323	0.318	0.277
Self-assessed health: good	0.349	0.363	0.348	0.306	0.318	0.336
Self-assessed health: fair	0.111	0.128	0.186	0.163	0.180	0.194
Self-assessed health: poor	0.020	0.031	0.053	0.068	0.069	0.082
Physical functional limitation: 1	0.047	0.056	0.084	0.143	0.170	0.181
Physical functional limitation: 2+	0.052	0.101	0.160	0.185	0.202	0.241
Any IADL limitations	0.043	0.059	0.087	0.060	0.059	0.073
CES-D	1.042	0.957	1.164	1.159	1.068	1.072
Heart disease	0.092	0.121	0.188	0.196	0.267	0.330
Lung disease	0.016	0.021	0.026	0.071	0.092	0.117
Stroke	0.032	0.075	0.078	0.054	0.073	0.096
Psychiatric disorder	0.006	0.009	0.010	0.123	0.116	0.085
Cancer	0.043	0.053	0.057	0.088	0.135	0.181
Hypertension	0.401	0.424	0.460	0.486	0.558	0.556
Arthritis	0.018	0.039	0.040	0.450	0.535	0.515
Diabetes	0.143	0.206	0.197	0.178	0.219	0.213
Underweight	0.020	0.025	0.034	0.005	0.006	0.007
Overweight	0.279	0.271	0.257	0.005	0.006	0.007
Obese	0.025	0.017	0.016	0.765	0.765	0.710
Former smoker	0.418	0.495	0.532	0.693	0.714	0.731
Current smoker	0.357	0.273	0.190	0.194	0.157	0.117
Below high school	0.231	0.345	0.429	0.154	0.190	0.252
High school	0.450	0.429	0.392	0.323	0.341	0.334
Some college	0.065	0.042	0.047	0.230	0.203	0.174
College	0.254	0.184	0.132	0.293	0.266	0.240
Married	0.891	0.916	0.913	0.762	0.768	0.771
Currently receiving pension	0.653	0.961	0.978	0.380	0.925	0.975
N	1269	1235	1230	13309	10203	11080