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ARE JAPANESE MEN OF PENSIONABLE AGE UNDEREMPLOYED OR OVEREMPLOYED?

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We investigate how Japanese men aged 60–74 adjust their workforce attachment after beginning to receive a public pension. Men who were employees at 54 gradually move to part-time work or retire after beginning to receive pension benefits; those who continue working tend to be underemployed. Men self-employed at 54, however, neither reduce their working hours nor retire, tending to be overemployed. In contrast, US men retire or become part-timers when they first claim social security; those who continue working are unlikely to be either overemployed or underemployed. Therefore, unlike US men, Japanese men are not choosing the optimal pensionable age and labour hours to maximize their intertemporal utility.
JEL Classification Numbers: H55, I10, J26.

1. Introduction

Most Japanese men, approximately 90%, have high labour-force attachment until they reach age 60, according to the Population Census of Japan (2010). They gradually move from the labour force to retirement throughout their 60s, and approximately 75% are out of the labour force at age 75. Usui *et al*. (2016) found substantial work capacity among men over age 60: 16.0, 40.2 and 56.0% of men in the age groups of 60–64, 65–69 and 70–74 years, respectively, could 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 changes in men's work status from age 60 to 74, as they move from work to retirement, are 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 employment status or retirement even when their health status does not necessarily require them to do so. Because working arrangements in Japan may create substantial differences between salaried workers and the self-employed, we divide the sample into two groups: those who had salaried jobs at age 54 and those who were self-employed at age 54. 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 (Clark and Ogawa, 1997; Shimizutani and Oshio, 2010). Furthermore, this group of workers is often covered by Employees' Pension Insurance (EPI), whose benefits consist of both flat-rate and earnings-related components. Meanwhile, those who are self-employed in their 50s are not subject to mandatory 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, which consist only of the flat-rate component and are, thus, less generous than EPI benefits.

[1] Usui *et al*. (2016) estimate the elderly's work capacity (the ability to work based on their health) using the method of Cutler *et al*. (2013). Usui *et al*. (2016) first estimate the association between health and employment among those aged from 51 to 54. Then, based on the estimated associations, they project employment among those over age 55 to assess how much the observed decline in labour force participation can be explained by deteriorating health.

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 status of middle-aged and older adults. We also compare our results with US data using the Health and Retirement Study (HRS), which provides data comparable with Japanese data, along with information on the two countries' 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 behaviours between Japanese men who had salaried jobs at age 54 and those who were self-employed at age 54. Among the men 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 retire or work part-time than to work full-time. We also find that these men 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, the hours worked per week gradually decline. Meanwhile, among the men 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 than with the amount of their (expected) public pension benefits. 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 labour force even after they begin to receive pension benefits.

In contrast, our analysis using the HRS shows that just after beginning to receive social security, US men — especially white men — exhibit abrupt changes from full-time employment to part-time employment or retirement and, as a result, abrupt changes in hours worked. Therefore, for US 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: (i) Japanese men who had salaried jobs at age 54, whose working hours after they began to receive public pension gradually declined; and (ii) 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 labour supply, rational, forward-looking individuals choose their labour hours for the present and future and choose their pensionable ages to maximize their intertemporal lifetime utility. Because individuals optimally choose hours worked, under this model, individuals are not likely to report either overemployment or underemployment after they begin to receive pension benefits compared with their reporting 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 report underemployment. 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 report overemployment. These results are different from those from the HRS, which indicate that US men who work as employees are less likely to report either overemployment or underemployment after they begin to receive social security. Therefore, whereas US men adjust their employment status and working hours and are more satisfied with their hours worked when they begin to claim social security, Japanese men appear to have difficulty choosing optimal pensionable ages and labour hours to maximize their lifetime utility.

[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 jobs that are more in line with their preferred hours (Altonji and Paxson, 1986, 1988, 1992; Kahn and Lang, 1991, 1995; Lang and Kahn, 2001).

2. Overview of the public pension scheme in Japan

We begin by providing an overview of the public pension scheme in Japan. The public old-age pension scheme in Japan is composed of three plans: (i) National Pension Insurance (NPI, *Kokumin Nenkin*) for self-employed workers and non-employed people; (ii) Employees' Pension Insurance (EPI, *Kosei Nenkin*) for those employed by private companies that regularly employ five workers or more; and (iii) Mutual Aid Insurance (MAI, *Kyosai Nenkin*) for those employed in the public sector and private schools. In 2007, the NPI, EPI and MAI covered 45.5, 48.0 and 6.5%, respectively, of the population insured by public pension programs (Oshio *et al*., 2011). Because the MAI has almost the same benefit scheme as the EPI, the MAI and the EPI are combined in the JSTAR questionnaire. The NPI consists only of a flat-rate benefit (the so-called Old-Age Basic Pension, *Rorei Kiso Nenkin*), whereas the EPI consists of an "earnings-related pension" in addition to the flat-rate "Old-Age Basic Pension" provided by the NPI system.

The normal pensionable age for the NPI is 65. NPI beneficiaries can start to receive NPI benefits either earlier (*Kuriage*) or later (*Kurisage*) than the normal pensionable ages, with the pension benefits adjusted actuarially. In the JSTAR sample, among men aged 60 to 64 who are eligible to receive NPI benefits, 40.6% are already receiving them.[3] However, it is rare for a man to begin to claim benefits later than the normal pensionable age.

For EPI beneficiaries, the pensionable ages for flat-rate and earnings-related benefits, both of which were set in 1973 at age 60 for men, have been scheduled to be raised to age 65. In the first stage, the pensionable age for flat-rate benefits was raised 1 year every 3 years from 2001 to 2013, when it reached age 65. In the second stage, the pensionable age for earnings-related benefits is planned to rise by 1 year every 3 years from 2013 to 2025, when it will reach age 65.[4]

Similar to NPI beneficiaries, EPI beneficiaries can start to claim EPI benefits either earlier or later than the normal pensionable age. In the JSTAR sample, among men aged from 60 to 64 who are eligible to receive EPI benefits, 72.0% are already receiving them.[5] If EPI recipients keep working after reaching the pensionable age, an earnings test for pension benefits is used to reduce their pension benefits if earnings exceed specified amounts (*Zaishoku Rorei Nenkin*).[6]

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[3] The statistics from the Ministry of Health, Labour and Welfare (2007) indicate that more than 40% of NPI beneficiaries begin to claim benefits between ages 60 and 64.

[4] To provide stable employment for those in their early 60s who would no longer be eligible for the flat-rate EPI because the pensionable age had been raised, the government passed the Law Concerning the Stabilization of Employment of Older Persons in 2004. This law requires companies to extend employment up to the pensionable age; thus, it obligates companies to gradually raise the mandatory retirement age or to keep employing workers from 60 to 65 by introducing a continued employment system or to abolish mandatory retirement altogether.

[5] More than 60% of EPI beneficiaries start to claim pension benefits between ages 60 and 64 (Ministry of Health, Labour and Welfare, 2007). Because government statistics are not available for the proportion of MAI beneficiaries who begin to claim MAI benefits, we cannot make a comparison between the JSTAR sample and government statistics.

[6] In the JSTAR sample, among those who work while receiving a public pension, 34.4% report that their earnings are above the exemption amount, such that their pension benefits are reduced; 48.2% report that their earnings are below the exemption amount, such that their pension benefits are not affected; and 16.5% report that they do not know whether their pension benefits are affected. The 48.2% whose earnings are below the exemption amount consist of a mix of two groups: (i) those who choose their labour hours optimally; and (ii) those who are "underemployed" (because they would like to work more but cannot do so under the earnings test for public pensions). Among the 48.2%, there appears to be no bunching around the annual labour income of 3.36 million yen (the threshold at which benefits begin to be partially reduced); therefore, those who are "underemployed" may not constitute a significant portion of this group.

The Old-Age, Survivors, and Disability Insurance (OASDI), which corresponds to social security benefits in the United States, has similar programs for earlier/later claiming, but the earnings test for social security beneficiaries who reached the full retirement age was eliminated in 2000.

3. 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 HRS in the United States, the Survey of Health, Ageing and Retirement in Europe (SHARE) 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 *et al*. (2009).

The individuals in the baseline JSTAR sample were between ages 50 and 75. The baseline sample (hereafter referred to as "Baseline Sample 1") was surveyed in 2007 from among people who lived in the following five municipalities in Japan: (i) Takikawa City in Hokkaido Prefecture; (ii) Sendai City in Miyagi Prefecture; (iii) Adachi Ward in the Tokyo metropolis; (iv) Kanazawa City in Ishikawa Prefecture; and (v) Shirakawa Town in Gifu Prefecture. The JSTAR expanded the sample (hereafter, "Baseline Sample 2") 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. 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 (yielding "Baseline Sample 3").[7] 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 2009, and that for Baseline Sample 2 was conducted in 2011. The third wave of data collection for Baseline Sample 1 was also 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: (i) those who had salaried jobs; and (ii) those who were self-employed. As for the respondents' employment history, the JSTAR asks respondents about their jobs at age 54, under the assumption that it is a reasonable indicator of respondents' careers before their mid-50s.[8] In Japan, those who have salaried jobs in their 50s tend to be subject to mandatory retirement arrangements. After mandatory retirement —

[7] The JSTAR is not a probabilistic national sampling, but within 10 cities, the researchers selected a probabilistic sample for each site.

[8] There may be a concern that men around the age of 54 may choose to move from salaried jobs to self-employment, hoping to secure a job that they can continue to hold even after mandatory retirement; in such a case, those who expect to have greater labour force attachment after mandatory retirement are more likely to choose to be self-employed at age 54. However, the number of those who move to self-employment during their 50s is smaller than those who do so in their early 60s. In particular, among those who had salaried jobs during their 50s, only 2.6% have moved to self-employment 2 years later, while among those who had salaried jobs between the ages of 60 and 64, 5.1% have moved to self-employment 2 years later. Moreover, the main reason why some people in their 50s move from salaried jobs to self-employment may be entrepreneurial motivations: aiming for higher income and/or as a response to dismissal from a salaried job. In their early 50s, salaried workers in Japan tend to earn the highest salaries they will earn in their lifetimes, so they are less likely to voluntarily leave their current employment.

which often comes between the ages of 60 and 65 — workers need to find new employment if they want to continue working. Meanwhile, those who are self-employed are not under mandatory retirement arrangements and are, therefore, not obliged to change employers during their 60s.

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; hence, approximately one-quarter of the men in the sample were self-employed at age 54.

For comparison, we use the HRS, a biennial survey of the US 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 US data, we make a rough comparison between US men and Japanese men who had salaried jobs at age 54 in the JSTAR sample. In the HRS sample, there are 8,214 white men and 1,507 black men. Appendix Table A1 provides the characteristics of the JSTAR and HRS samples.

4. Descriptive statistics

Figure 1 displays the distribution of employment status by age for Japanese men and US men. For Japanese men who had salaried jobs at age 54, Panel A uses the first wave of the baseline samples to separately plot the proportions of: (i) men between ages 55 and 74 who work full-time; (ii) those who work part-time; and (iii) those who are retired. Panel B then plots the same three proportions for those Japanese men who were self-employed at age 54 (also using the first wave of the baseline samples). Panel C plots the same three proportions for the US men (using the first wave of the HRS sample). "Full-time" refers to 35 h of work or more per week, whereas "part-time" refers to fewer than 35 h 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 work or retirement.[9] During 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-time 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. In addition, 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 these men who are retired is approximately 40% lower than that for those who had salaried jobs at age 54.

[9] This is in accordance with Shimizutani and Oshio (2010), who find, based on the data from the Survey on Employment of the Elderly, 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 labour force.

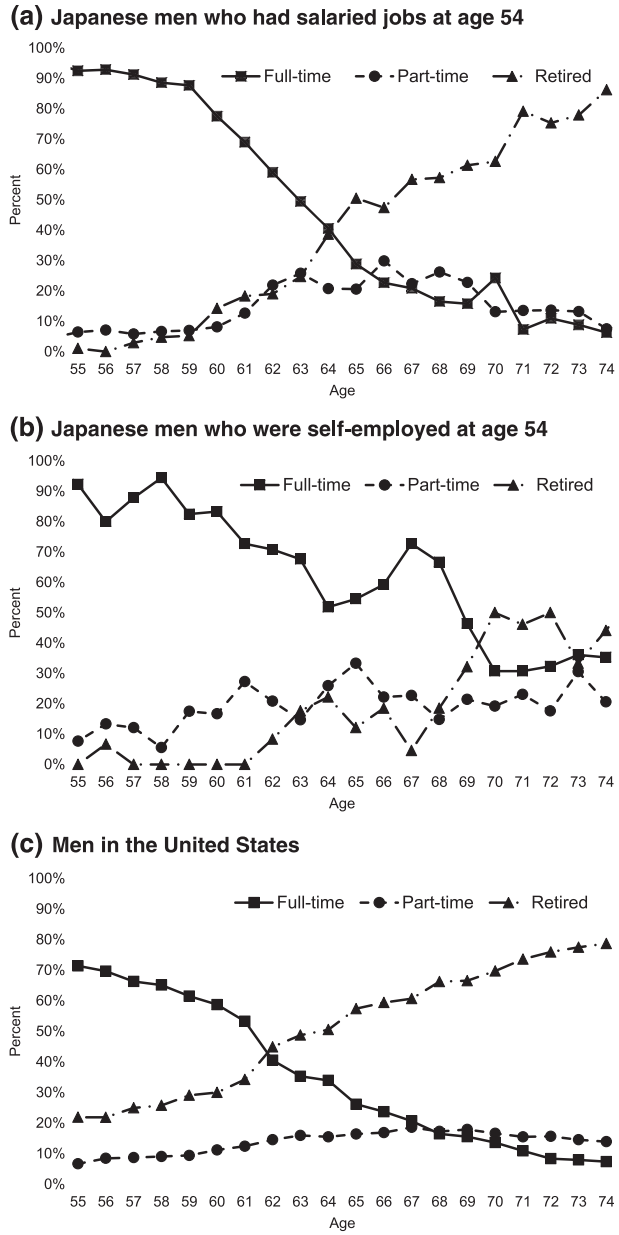

FIGURE 1. Distribution of employment status by age, JSTAR and HRS. (a) Japanese men who had salaried jobs at age 54. (b) Japanese men who were self-employed at age 54. (c) Men in the United States

Therefore, there is a distinct difference in work and retirement behaviours 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 United States (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 behaviours of the Japanese elderly.

5. 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, using all waves of the JSTAR. 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,[10] and individuals' expected or actual annual pension benefits. The variable for expected or actual annual pension benefits is the *actual* amount of annual pension benefits if the respondent is currently receiving a pension, or the *expected* amount of annual pension benefits if the respondent is not currently receiving but expects to receive a pension in the future.[11]

Table 1 reports the relative risk ratios from the multinomial logit regression for the sample of Japanese men who had salaried jobs at age 54 (left panel) and for those who were self-employed at age 54 (right panel). The dependent variable is the employment status (part-time employment or retirement) with full-time employment as the reference category.

When one looks 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 than to work full-time, and 0.933 times more likely to work part-time than to work 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 than to work full-time, and 3.859 times more likely to work part-time than to work full-time. Therefore, those who were self-employed at age 54 and report their health as fair or poor have a higher likelihood of retiring or of working part-time than working full-time, compared to others who also report their health as fair or poor but who had a salaried job at age 54.

At the same time, for those who were self-employed at age 54, health problems appear to be 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 6.264 times more likely to retire than to work full-time, and 5.653 times more likely to work part-time than to work full-time; and those who have

[10] Health variables include: (i) self-assessed health; (ii) physical functional limitations; (iii) instrumental activities of daily living (IADL) limitations; (iv) various types of illness (heart disease, lung disease, stroke, psychiatric disorders, cancer, hypertension, arthritis and diabetes); (v) the Center for Epidemiologic Studies Depression Scale (CES-D) score; (vi) weight; and (vii) smoking behaviours. Health conditions have been found to be closely associated with the elderly's decisions about work and retirement (McGarry, 2004, 2009; Wise, 2012).

[11] Because the government has been distributing official notifications of future pension benefits to possible future pensioners since 2009, even those who do not currently receive pension benefits are likely to have better knowledge of their expected amount of annual pension benefits than they would have in the past. Therefore, we assume here that people have the information needed to correctly expect the amount of annual pension benefits they will receive in the future if they are not currently receiving them. However, using the JSTAR, Okumura and Usui (2014) find 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 annual pension benefits for which he is eligible.

instrumental activities of daily living (IADL) limitations are 5.879 times more likely to retire than to work full-time.[12]

For those who had salaried jobs at age 54, given a 1-million-yen increase in expected or actual annual pension benefits, they are 2.315 times more likely to be retired than to work full-time and 1.804 times more likely to work part-time than to work full-time. That is, these individuals with higher expected or actual annual 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 annual pension benefits they receive or expect to receive does not have a statistically significant association with their likelihood of retiring or of working part-time rather than working full-time.[13]

There is a large difference in the amounts of the actual and expected annual 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 annual pension benefits are 2 million yen for those who have retired, 1.8 million yen for those who work part-time and 720,000 yen for those who work full-time. For those who were self-employed at age 54, the median expected or actual annual pension benefits are 840,000 yen for those who have retired, 720,000 yen for those who work part-time and 690,000 yen for those who work full-time. Therefore, the amounts of the expected or actual annual 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 current employment status. Furthermore, for those who were self-employed at age 54, the expected or actual annual pension benefit amounts vary much less by current employment status compared with the benefits for those who had salaried jobs at age 54. Because the two groups differ in the amount of public pension benefits they are entitled to receive, their work and retirement behaviours after they begin to receive pension benefits are likely to differ. In the following section, we examine how the two groups differ in the changes in work versus retirement and hours constraints before and after they begin to receive pension benefits.

6. Changes in employment status before and after the initial claim for pension benefits

We estimate a multinomial logit model of the choice to work full-time, to work part-time or to retire, similar to that shown in Table 1, by replacing the amounts of expected or actual annual pension benefits with years since beginning to receive the benefits. Specifically, the regression includes binary variables for the years during which an individual has been receiving pension

[12] Those who have more than two physical functional limitations are 2.633 times more likely to retire than to work full-time if they had salaried jobs at age 54, and 2.651 times more likely to retire than to work full-time if they were self-employed at age 54. This means that regardless of their work status at age 54, this group is more likely to retire than to work full-time. Note that the physical functional limitations include limitations in performing the following: (i) walking 100 m; (ii) sitting for about 2 h; (iii) getting up from a chair after sitting for long periods; (iv) climbing several flights of stairs without resting; (v) climbing one flight of stairs without resting; (vi) stooping, kneeling or crouching; (vii) lifting arms above shoulder level; (viii) pushing or pulling large objects; (ix) lifting or carrying weights over 5 kg; and (x) picking up a 1-yen coin from the table.

[13] Among both those who had salaried jobs at age 54 and those who were self-employed at that age, those who have a higher subjective expected probability of survival until age 85 are less likely to be retired than to be working full-time.

TABLE 1
Multinomial logit estimates of employment status: Men 60–74, Japanese Study of Aging and Retirement

	Salaried at age 54				Self-employed at age 54			
	Retired		Part-time		Retired		Part-time	
Variable	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 (actual or expected)	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	−1,414.1				−461.7			
N	1,835				658			

Notes: 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 clustered at the individual level are shown in parentheses. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$. CES-D, Center for Epidemiologic Studies Depression Scale score; IADL, instrumental activities of daily living; RRR, relative risk ratio; SE, standard error.

benefits, where benefits have been received: (i) for less than 1 year; (ii) for 1 to 2 years; (iii) for 3 to 5 years; and (iv) for 6 years or more. (The reference category is having not yet begun to receive pension benefits.) Panel A in Table 2 reports the relative risk ratios from the multinomial logit regression for the sample of Japanese men who had salaried jobs at age 54 (left panel) and for those who were self-employed at age 54 (right panel).[14] Panel B of Table 2 reports the results for US white men (left panel) and US black men (right panel).

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. Compared with the years before they receive any pension benefits, these men are 4.816 times more likely

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

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			
	Retired		Part-time		Retired		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	13.644	5.673***	9.373	4.214***	2.603	2.107	1.738	1.049
Log pseudolikelihood	−1,472.6				−474.2			
N	1,881				689			

Panel B: HRS

Years since beginning to receive social security	White men				Black men			
	Retired		Part-time		Retired		Part-time	
	RRR	SE	RRR	SE	RRR	SE	RRR	SE
0 year	3.321	0.199***	2.836	0.208***	4.204	0.712***	3.927	0.853***
1 to 2 years	3.620	0.248***	3.296	0.276***	3.173	0.567***	1.973	0.478***
3 to 5 years	3.880	0.216***	3.115	0.201***	4.536	0.624***	3.839	0.705***
6 years and over	8.344	0.699***	3.797	0.345***	8.190	1.423***	4.866	1.071***
Log pseudolikelihood	−23,094.5				−3,218.5			
N	28,652				4,572			

Notes: Relative risk ratios are reported. The regressions using the Japanese Study of Aging and Retirement (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 Health and Retirement Study (HRS) include the same variables used in the analysis using the JSTAR. Robust standard errors clustered at the individual level are shown in parentheses. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$. RRR, relative risk ratio; SE, standard error.

to retire during the first year of receiving benefits than to work full-time, and they are 3.894 times more likely to work part-time during that first year than to work full-time. There is an uptrend in the estimated relative risk ratios as the number of years since the start of pension benefits increases. Compared with the years before they began to receive their pension benefits, those who have been receiving benefits for 6 years 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 working full-time. 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 after the initial claim of pension benefits. For men who began receiving benefits 6 years earlier or longer, the estimates of relative risk increase to only 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 conducted the same multinomial logit estimation using the HRS sample. Compared with the years before they begin to receive social security, during the first year of receiving social security, US white men are 3.321 times more likely to be retired than to be 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 8.344 for those who have been receiving social security for 6 years or longer. In contrast, however, the estimated relative risk of working part-time compared with working full-time is approximately three 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 or more years have elapsed since they first received social security, they are more likely to retire. This employment pattern is different from that in Japan; in particular: (i) Japanese men who had salaried jobs at age 54 move only gradually from full-time status to part-time status or retirement; and (ii) Japanese men who were self-employed at age 54 continue to work full-time even after they begin receiving pension benefits.

Compared with the years before they begin to receive social security, during the first year of receiving social security, US black men are 4.204 times more likely to be retired than to work full-time. These estimates regarding the likelihood of retirement compared to full-time status steadily increase, so that in the periods of 1–2 years, 3–5 years and 6 or more years after social security benefits start, these men are 3.173 times, 4.536 times and 8.190 times, respectively, more likely to be retired than to be working full-time. When part-time employment is compared with full-time employment, during the first year of receiving benefits US black men are 3.927 times more likely to work part-time than to work full-time, and the estimated relative risk increases slightly to 4.866 times after 6 years or more since the initial social security claim. These patterns for black men are also 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.

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

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

Panel A of Table 3 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 for those who were self-employed at age 54. Panel B of Table 3 reports those results separately for US white and black men. For Japanese men who had salaried jobs at age 54, hours per week decrease by 5.5 h and weeks per year by 2.3 weeks, once they begin to receive pension benefits, which corresponds to a reduction of approximately 340 h $[\approx 35 \times 50 - (35 - 5.5) \times (50 - 2.3)]$ for 1 year as a whole if we assume that the men work 35 h per week and 50 weeks per year before claiming pension benefits. For those who began receiving benefits 6 years ago or longer, their hours per week decrease by 10.9 h, although their weeks per year decrease by only 1.0 week. That is, the number of weeks per year gradually returns to the level before they began claiming benefits, perhaps because only those with high labour force

attachment continue to work after 6 years or more after beginning to receive pension benefits. These decreases correspond to a reduction of approximately 420 h [$\approx 35 \times 50 - (35 - 10.9) \times (50 - 1.0)$] for 1 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 the total number of annual hours continues to decline subsequently.

In contrast, for Japanese men who were self-employed at age 54, the 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 for this group, adjusting their work hours is not related to their receipt of pension benefits.

The results for US white men show that during the first year of receiving social security, the hours worked per week decline by 6.1 and weeks worked per year decline by 1.8, corresponding to a reduction of approximately 360 h [$\approx 35 \times 50 - (35 - 6.1) \times (50 - 1.8)$] per year. These declines in hours per week and weeks per year are gradual; beginning 6 years or more after they start to receive social security, their hours worked per week decline by 10.3 and weeks worked per year by 5.7, corresponding to a reduction of approximately

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

Panel A: JSTAR

Years since beginning to receive pension benefits	Hours per week				Weeks per year			
	Salaried at age 54		Self-employed at age 54		Salaried at age 54		Self-employed at age 54	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	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	−10.897	2.597***	−3.016	4.515	−0.983	1.249	−1.985	1.378
R^2	0.195		0.189		0.148		0.153	
N	1,026		522		1,069		551	

Panel B: HRS

Years since beginning to receive social security	Hours per week				Weeks per year			
	White men		Black men		White men		Black men	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
0 year	−6.094	0.659***	−5.057	1.433***	−1.838	0.501***	−3.934	1.354***
1 to 2 years	−9.225	0.721***	−3.998	1.917***	−2.859	0.554***	−1.893	1.501
3 to 5 years	−9.035	0.662***	−7.511	1.488***	−3.763	0.519***	−5.301	1.260***
6 years and over	−10.292	1.045***	−8.733	2.064***	−5.712	0.795***	−5.191	1.406***
R^2	0.191		0.196		0.075		0.100	
N	8,137		1,235		8,090		1,233	

Notes: The regressions using the Japanese Study of Aging and Retirement (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 Health and Retirement Study (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 clustered at the individual level are shown in parentheses. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$.

660 h [≈35 × 50 − (35 − 10.3) × (50 − 5.7)] per year. Therefore, for the white men 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, US white men are more likely than Japanese men to decide to start their retirement and their receipt of social security benefits simultaneously. However, those men who remain in the labour force after they begin to receive social security are able to reduce their working hours drastically (compared to their working hours before they began to receive social security), from a reduction of 360 h during the first year of receiving social security to a reduction of 660 h 6 years or longer after the social security benefits began.

This result is in contrast to that for Japanese men, who reduce their work time by 340 h per year during the first year that they receive public pension benefits, and by 420 h per year 6 or more years after they started receiving benefits, compared with their hours worked before they began to receive public pension benefits. Rather than completely leaving the labour force, as Japanese men of pensionable age who had salaried jobs at age 54 do, US white men of pensionable age are able to continue working and reduce their hours substantially, suggesting that the elderly in the United States are offered more flexibility in their work hours.

For US black men, during the first year of receiving social security, their hours worked per week decline by 5.1 and weeks worked per year decline by 3.9, corresponding to a reduction of approximately 370 h [≈35 × 50 − (35 − 5.1) × (50 − 3.9)] per year. For those who began receiving social security 6 or more years earlier, the hours worked per week decline by 8.7 and weeks worked per year by 5.2, corresponding to a reduction of approximately 570 h [≈35 × 50 − (35 − 8.7) × (50 − 5.2)] per year. For black men, hours worked per week decline gradually after they start receiving social security, but their weeks worked per year decrease immediately after they begin to receive social security and, therefore, 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.

8. 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 "(Not 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.[15]

Panel A of Table 4 reports the proportions of Japanese men who report being overemployed and underemployed before and after they began to receive pension benefits, and Panel B

[15] 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.

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					
	White men			Black men			White men			Black men		
	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	1,096	0.062	0.241	167
6 years and over	0.056	0.229	1333	0.061	0.241	214	0.072	0.259	1,333	0.165	0.372	216

Note: The Health and Retirement Study (HRS) sample is restricted to those who were not self-employed at the time of the interview. JSTAR, Japanese Study of Aging and Retirement; SD, standard deviation.

reports these proportions for US men. For Japanese men who had salaried jobs at age 54, 6.5% of workers report underemployment before they began to receive pension benefits, and this percentage increases to 11.3% for the year these workers began to receive pension benefits. The percentage remains steady at this level, and 11.6% of those who have received pension benefits for 6 years or more report underemployment. However, for those who had salaried jobs at age 54, there is no clear difference in the percentages of overemployment before pension benefits begin and in the first 2 years thereafter. Meanwhile, for those who were self-employed at age 54, 5.1% of workers report overemployment before they began to receive pension benefits, and the percentage increases to 14.5% for the year they began to receive benefits. For those who were self-employed at age 54, there is no clear difference in the percentages concerning underemployment 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 report underemployment, and those who were self-employed at age 54 are more likely to report overemployment.

In contrast, for US men, the overemployment and underemployment indicators are higher before they begin to receive social security than afterward, by between approximately 2 and 6%. That is, after they begin to receive social security, US men are less likely to report either overemployment or underemployment, 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. Panel A of Table 5 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 for those who were self-employed at age 54. Panel B of Table 5 reports the results separately for US white and black men.

In the overemployment model, for the Japanese 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 are significantly negative only when 6 years or more had elapsed after 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 these men began to receive pension benefits are significantly positive during the first 2 years after they start receiving pension benefits. Consequently, the opposite results are obtained for the underemployment model. Specifically, the estimated coefficients on the number of years since the men began to receive pension benefits are all positive for those who had salaried jobs at age

TABLE 5
Probit estimates for hours constraints: Men 60–74, JSTAR and HRS (marginal effects at the mean)

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	
	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: HRS

Years since beginning to receive social security	Overemployed				Underemployed			
	White men		Black men		White men		Black men	
	dF/dx	SE	*dF/dx*	SE	*dF/dx*	SE	*dF/dx*	SE
0 year	0.0005	0.012	−0.042	0.027	−0.004	0.013	−0.100	0.035***
1 to 2 years	−0.041	0.014***	−0.018	0.034	−0.021	0.016	−0.140	0.046***
3 to 5 years	−0.056	0.013***	−0.058	0.034*	0.001	0.014	−0.132	0.039***
6 years and over	−0.072	0.017***	−0.051	0.036	−0.012	0.018	−0.038	0.033
Log pseudolikelihood	−2,323.8		−301.2		−2,458.5		−413.1	
N	8,122		1,146		8,162		1,238	

Notes: Regressions using the Japanese Study of Aging and Retirement (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 Health and Retirement Study (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 clustered at the individual level are shown in parentheses. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$.

54, and significantly positive for these men during the first year of receiving benefits; in contrast, 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, nevertheless, find support for the prediction that men who had salaried jobs at age 54 are more likely to report underemployment after they begin to receive pension benefits, whereas those who were self-employed at age 54 are more likely to report overemployment after they begin to receive benefits.

For US white 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 during the first year after beginning to receive benefits. 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, US black men are less likely to report overemployment; the marginal effects of overemployment take negative values (although insignificantly) for all the years after they begin to receive social security. The marginal effects for the underemployment model are also significantly negative until 5 years after the men began to receive social security.

Men in the United States are less likely than Japanese men to report being overemployed or underemployed after they begin to receive social security; they are, therefore, more likely to be satisfied with their work hours than they were before they began to receive benefits. However, Japanese men are more likely than US men to be either overemployed or underemployed after they begin to receive pension benefits.

9. 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, no prior empirical studies have explicitly presented the differences in working behaviours between Japanese men who had salaried jobs in their 50s and those who were self-employed in their 50s. For this study, we used the JSTAR, and we also made a comparison with the United States using the HRS.

We found remarkable differences in work and retirement behaviours 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 correspond largely 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 remain in the labour force after they begin to receive pension benefits, the more years that have passed after their initial benefit claims, the more these men reduce their hours worked per week without, however, making a significant reduction in weeks worked per year. In contrast, for those who were self-employed at age 54, who typically belong to the NPI group, there is no significant change in employment status (whether full-time employment, part-time employment or retirement) or working hours (hours per week and weeks per year) after they begin to receive pension benefits. This result is in clear contrast to the United States, where we find an abrupt change in employment status and working hours immediately after social security benefits begin.

Using a series of questions on hours constraints, we find that those who had a salaried job at age 54 tend to reduce their working hours once they begin receiving pension benefits, and tend to be underemployed. This finding suggests that they have not voluntarily adjusted their working hours downward, which presumably reflects their limited job opportunities after the

mandatory retirement age. In contrast, those who were self-employed at age 54 tend to be overemployed. This finding may reflect: (i) the limited scope of arrangements in work conditions, especially when they are engaged in family or small-sized businesses, as well as (ii) the less generous amount of NPI benefits, when compared with EPI benefits.

In an intertemporal model of optimizing individuals' behaviours, individuals are assumed to choose their pensionable ages and labour hours to maximize their lifetime utility. Under this model, individuals optimally choose the number of hours worked, and, thus, they are neither overemployed nor underemployed after they begin to receive pension benefits compared with the time period before that. The model is likely to be applicable to the US case because, after US workers begin to receive social security, they report neither overemployment nor underemployment compared with the time period before receiving benefits. As we have seen, however, Japanese men who had salaried jobs at age 54 tend to report underemployment, while those who were self-employed at age 54 tend to report overemployment after they begin to receive pension benefits. Therefore, there appear to be factors that distort individuals' intertemporal allocations of work hours in Japan. One such factor is likely to be insufficient pension benefits for those who were self-employed throughout their work lives, given that these individuals are eligible only for the flat-rate portion of the pension and may, therefore, desire additional income support. In contrast, few employment opportunities exist 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 — would better 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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Appendix

Table A1. 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	1,269	1,235	1,230	13,309	10,203	11,080

Notes: CES-D, Center for Epidemiologic Studies Depression; HRS, Health and Retirement Study; IADL, instrumental activities of daily living; JSTAR, Japanese Study of Aging and Retirement.

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