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Social Security Programs and Elderly Employment in Japan

Takashi Oshio, Akiko S. Oishi, and Satoshi Shimizutani

7.1 Introduction

The employment rates in Japan showed a modest recovery in the mid-2000s for men aged 60 and over (figure 7.1), although the business cycles made it ambiguous and the trend turned around a bit later compared to other advanced countries, which experienced this recovery in the late 1980s. Meanwhile, the employment rates for women aged 55–64 in Japan exceeded the pace of the recovery of labor participation of elderly men in the mid-2000s. At the same time, the Japanese government has been enacting a series of social security and labor market reforms since the mid-1980s, raising eligibility ages, reducing actuarial adjustment factors, and encouraging elderly workers to stay longer in the labor force.

In this study, we examine the extent to which the change in the trend of the employment rates for the elderly has been associated with the tax force to retire early, reflecting the social security programs and their related programs in Japan. We focus on the Employees' Pension Insurance (EPI; *Kosei Nenkin*) program, which we believe is a key driver of elderly employment rates. In addition to this EPI program, the public social security scheme in Japan has two core programs: National Pension Insurance (NPI; *Kokumin Nenkin*) and Mutual Aid Association Pension Insurance (MAAPI; *Kyosai Nenkin*). EPI, NPI, and MAAPI mainly cover private-sector employees, the self-employed, and public-sector employees, respectively. The benefits of EPI and MAAPI

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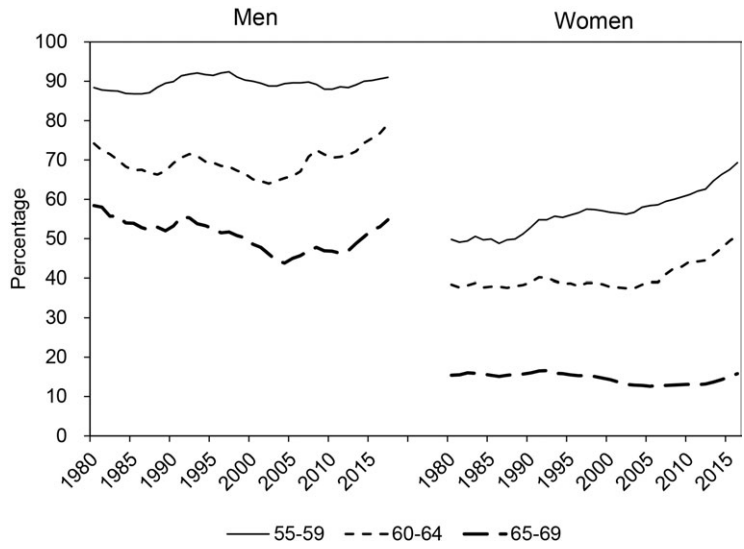

Fig. 7.1 Trends of the employment rates

include two components: flat-rate and wage-proportional benefits. MAAPI's structure is largely similar to that of EPI, and its reform has been following the same pattern as that of EPI. EPI and MAAPI members cover about 70 percent of all employees. Meanwhile, NPI only has a flat-rate benefit, and NPI members cover the remaining 30 percent. The eligibility age for availing the NPI has been fixed at 65 years since its introduction in 1961.

Based on the statistical analyses, our results suggest that a reduced disincentive to work due to a reduction in the overall generosity of the social security programs has been affecting the recent recovery of labor force participation of elderly men as well as the increasing upward trend of labor force participation of elderly women.

In what follows, we first present a brief overview of the social security reforms in section 7.2. In section 7.3, we construct the quantitative indicators of institutional changes and the tax forces to retire early. Using these variables, we examine the association between the tax force and the employment rates in section 7.4. Finally, we present the concluding remarks in section 7.5.

7.2 An Overview of Social Security Reforms in Japan

7.2.1 Increasing Eligibility Ages and Declining Generosity

Social security reforms, which have been enacted about every five years in response to their actuarial review, remarkably changed their direction in the mid-1980s in terms of the overall generosity of the programs (Oshio,

Oishi, and Shimizutani 2011). Before the 1985 reform, the government had continued to raise benefit levels to improve the standard of living of the elderly in line with a steady increase in per capita GDP. However, slower economic growth and a declining fertility trend raised concerns about the financial sustainability of social security programs. In addition, structural changes in the industry and labor force, such as a reduction in workers in the agricultural sector and self-employed workers, led to a larger disparity among the financial positions of the programs.

These concerns motivated the 1985 reform, which pushed for a reduction in the benefit multiplier and flat-rate benefit for the first time. At the same time, the basic pension benefit, which is commonly paid to all public pension members as a first-tier flat-rate benefit, was introduced, and the dependent spouses of the EPI beneficiaries became eligible to receive it without having to pay any premium. Overall, the EPI programs became less generous in terms of benefits. For example, a male EPI beneficiary who earned an average income of ¥254,000 per month in 1985, paid premiums for 40 years, and had a dependent wife was eligible to receive total benefits of around ¥176,000 per month under the 1985 scheme. This amount was less than the amount provided under the pre-1985 reform scheme—approximately ¥198,000, implying that the total benefit was reduced by more than 10 percent.

Subsequent reforms have consistently sought to improve the financial balance of the programs by raising the eligibility age, reducing the benefit multiplier, and scaling down benefit indexations. The eligibility age for receiving EPI benefits has been continuously raised. For male pensioners, the eligibility age for receiving both flat-rate and wage-proportional benefits was raised from 55 in 1957 to 60 years in 1973. In 2001, the eligibility age for the flat-rate component started to increase by one year every three years to reach 65 years in 2013; additionally, the eligibility age for the wage-proportional component has been scheduled to rise from 2013 by one year every three years to reach 65 years in 2025. The eligibility age for women until 1985 was 55 years, and it was gradually raised to 60 years in 2000. The eligibility age for women was set to be raised while keeping a five-year lag for men. The eligibility age for the flat-rate benefit was raised beginning in 2006, and the eligibility age for wage-proportional benefit was raised beginning in 2018.

In addition to an increase in the eligibility ages, the benefit multiplier[1] of the EPI wage-proportional benefit was reduced from 10/1,000 per year of contribution to 7.125/1,000 in 2001 and since then has remained at this level; this implies a 28.75 percent reduction in the benefit. During the same period,

1. The wage-proportional benefit per month is calculated in the following manner: average lifetime monthly wage * the number of months of contribution * the benefit multiplier. Since the current value of the multiplier is 7.125/1,000, the wage-proportional benefit per month is 21.4 percent of the average lifetime monthly wage earnings if one contributed the premiums for 30 years (7.125/1,000 * 30 = 21.4 percent).

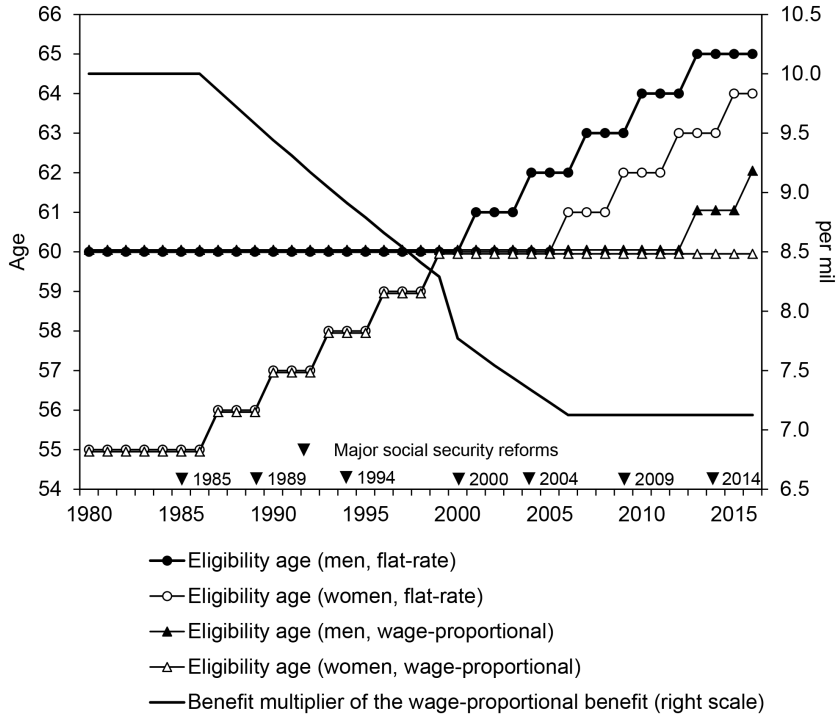

Fig. 7.2 Changes in the eligibility ages and benefit multiplier of the Employees' Pension Insurance program (EPI)

the fixed-rate benefit per month of contribution was reduced by 30.9 percent, from ¥2,424 to ¥1,675.

The wage and price indexations have also become less generous. The EPI benefits used to be price indexed every year and wage indexed during each reform almost every five years. In the 1994 reform, the base of the wage indexation was changed from gross wage to net wage (after the social security contribution) to subdue the degree of indexation. Additionally, the 2000 reform called for restricting the wage indexation only to the initially claimed benefits. Finally, the 2004 reform introduced automatic adjustments of benefit levels based on demographic and macroeconomic factors, with the upper limit set to the premium rate.[2]

To help understand the direction of the social security reforms, figure 7.2 presents how the eligibility ages of EPI benefits and the benefit multiplier of the wage-proportional benefit have been changing since the 1980s. As shown in this figure, the eligibility ages of EPI benefits and the benefit multiplier of the wage-proportional benefit have both contributed toward reducing the

2. Takayama (2005, ch. 6) discusses the key issues in the 2004 reform.

generosity of the programs; the eligibility ages have been gradually raised for both men and women, and the latter has been gradually reduced. Figure 7.3 summarizes major reforms in the social security and employment programs, which are closely relevant to the analysis in this study.

7.2.2 Earnings-Tested Benefits (*Zaishoku*), Actuarial Adjustments, and Wage Subsidy

In addition to reforming the core social security programs, the government has been making several revisions to the related programs, which are expected to affect incentives to work. First, the government has been reforming the *Zaishoku* pension program, which is an earnings-tested pension program applied to those who remain in the labor force past their eligibility age. Starting with a 20 percent reduction in the benefit given to the working beneficiaries in the 1950s, the effective tax rate on additional work has been revised several times. In 2015, 34.0 percent of the new EPI beneficiaries claimed the *Zaishoku* pension benefit.

Figure 7.4 illustrates the evolution of the *Zaishoku* pension program through major reforms. Each line represents the total amount of monthly wages and earnings-tested pension benefit that correspond to the monthly wages of those aged 60–64 years (upper panel) and 65 years or older (below) under the *Zaishoku* pension program in each respective year. As seen in the figure, the sum of the wage and pension benefit has become more smoothly adjusted to wage earnings, especially for those aged 60–64 years, resulting in reduced disincentives to work. Indeed, many empirical studies have estimated the impact of the *Zaishoku* pension program based on microlevel data.[3] Most found that the reforms of the program—especially the 2005 reform, which eliminated a 20 percent reduction in the benefit given to working beneficiaries—encouraged the elderly to remain in the labor force longer, although the magnitude of the estimated impact varies substantially.

Second, the government changed the actuarial adjustments of social security benefits, reducing the degrees of adjustments for both the early and delayed benefit claims for those born in 1941 or later. The actuarial reduction rate was reduced from 40 percent to 30 percent for the claim at 60 years of age for the full flat-rate benefit that was to be paid at 65 years of age, while the actuarial increase rate for the claim at 70 years of age was reduced from 88 percent to 42 percent (figure 7.5). These changes in the actuarial adjustments are expected to discourage workers from continuing work until they reach the eligibility age and delaying claims after that age. As discussed in section 7.3.5, however, the actuarial adjustments do not significantly influence the decision to retire.

In addition to these changes in the social security programs, the government introduced the wage subsidy program for the elderly in 1995. This

3. For example, see Abe (2001) and Shimizutani and Oshio (2013).

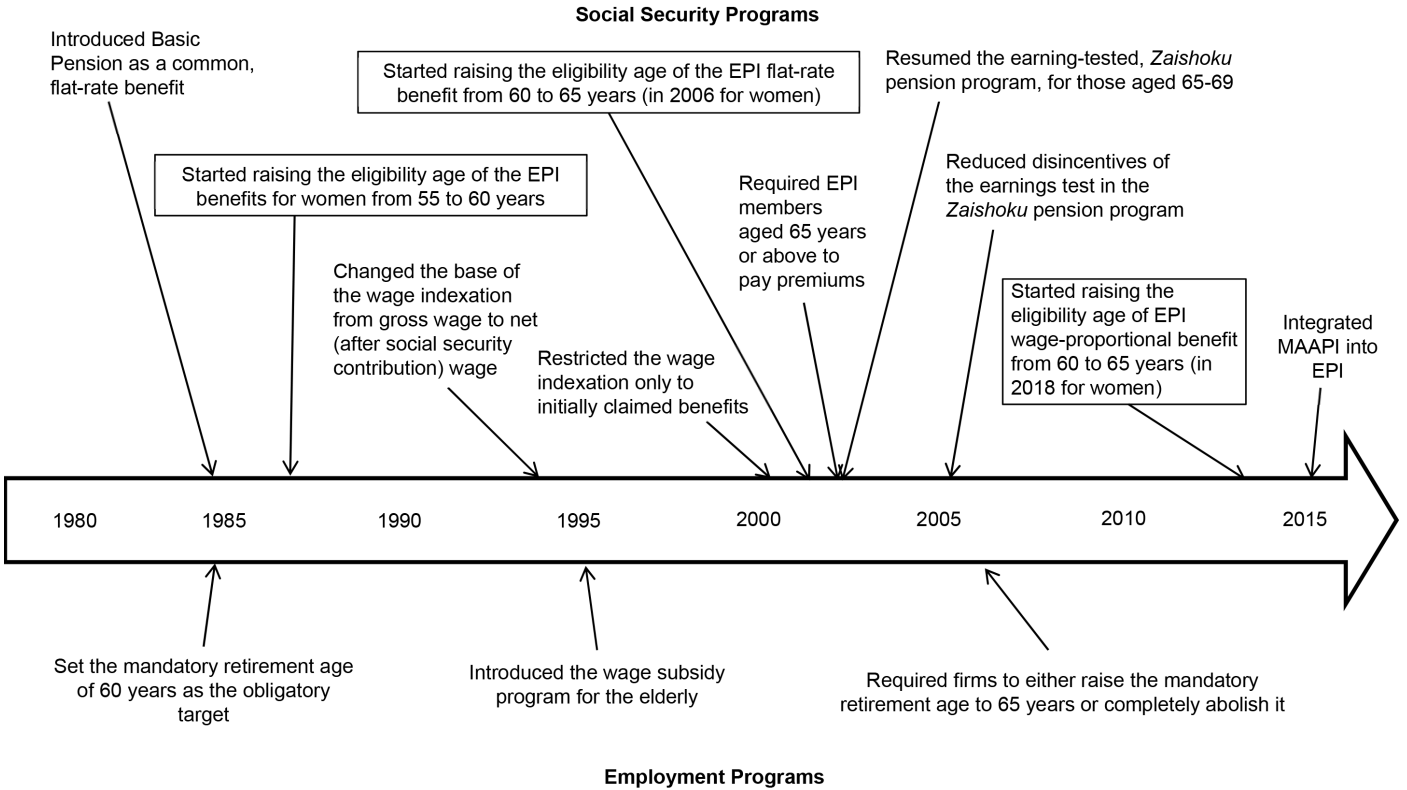

Fig. 7.3 Major reforms in social security and employment programs

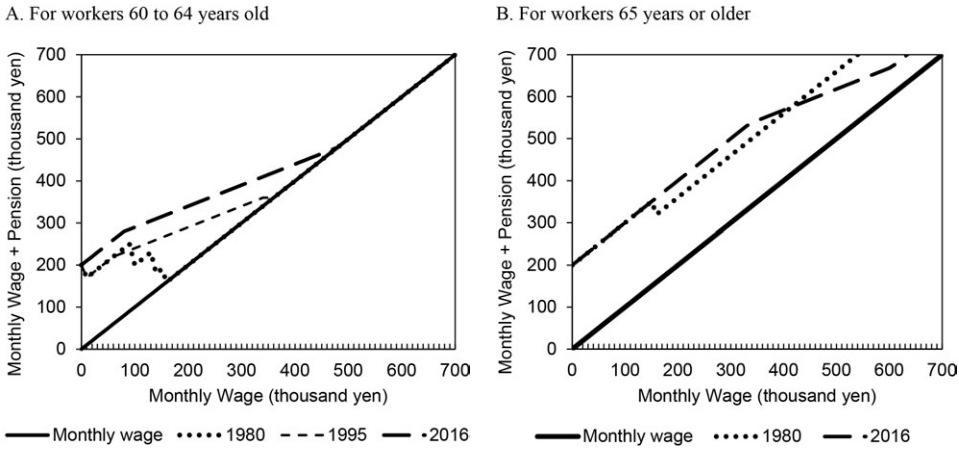

Fig. 7.4 Earnings-tested *Zaishoku* pension program

Note: Assuming a worker whose full amount of monthly pension is ¥200,000 (including the flat-part of ¥66,000).

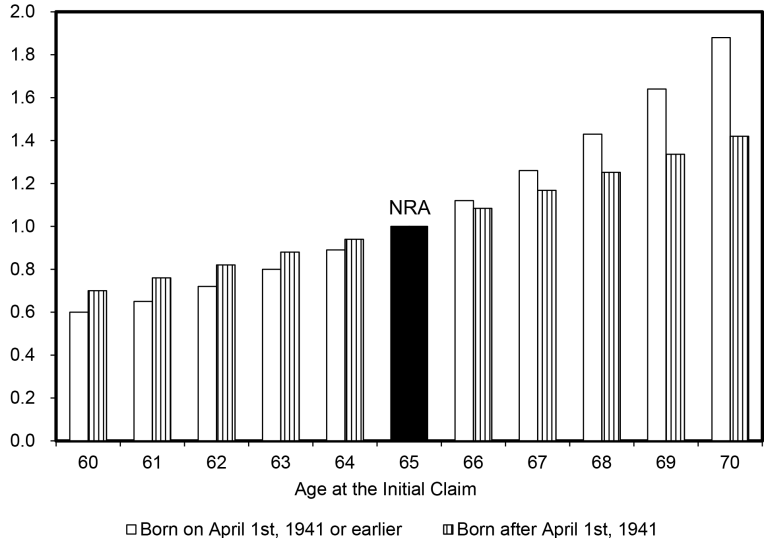

Fig. 7.5 Actuarial adjustment of the flat-rate benefit

program started by subsidizing 25 percent of the wages of individuals aged 60–64 years who continued to work for the same firm at a wage rate of less than 64 percent of the preretirement level. Since 1998, the *Zaishoku* pension benefit has been reduced for those who receive the wage subsidy, and the subsidy rate was reduced to 15 percent in 2003. Despite this reduced

generosity, this wage subsidy is expected to encourage workers to continue working by offsetting an expected reduction in wage earnings after mandatory retirement. According to the Annual Survey of Employment Insurance provided by the Ministry of Health, Labour and Welfare (MHLW), about 178,000 individuals, equivalent to 15.9 percent of the EPI beneficiaries who initially claimed EPI benefits, obtained this wage subsidy in 2015.

7.2.3 Employment Policies

An increase in the eligibility age for claiming EPI benefits has prompted the government to consider policy measures to allow for a smooth transition from work life to retirement for those aged 65 years or above. In 1973, the government enforced the Elderly Employment Stabilization Law (EESL) to encourage firms to raise the mandatory retirement age to 60 years, which was set as the obligatory target in 1986. In 2004, the government revised this law to propose that firms either completely abolish the mandatory retirement age or raise it to 65 years. The revised EESL became effective in 2006. In 2013, the government further amended the law to compel the firms to continue hiring individuals who wished to work until 65 years of age, albeit on a part-time basis in most cases. Combined with an increase in the eligibility age for claiming EPI benefits to 65 years, these employment policies are expected to increase the chances of the elderly staying in the labor force, even if they are not likely to have a direct impact on the elderly's incentives to work.[4]

7.3 Calculating the Tax Force to Retire Early

7.3.1 Quantitative Indicators of Institutional Changes

We incorporated several quantitative indicators of institutional changes into the calculation of the changes in social security incentives. As pointed out in section 7.1, we mainly focused on the changes in the EPI program, which cover the private-sector employees and are most likely to be associated with the long-term trend of elderly employment rates.

We focused on the increase in the eligibility age for claiming benefits, a potential driver of change in the trends of the elderly employment rates, which is expected to encourage individuals aged 60–64 to stay longer in the labor force. Specifically, EPI beneficiaries receive only the wage-proportional benefit before 65 years since 2013, when the eligibility age for the flat-rate component reached 65 years; the eligibility age of this claim was first raised in 2013 from 60 years and is scheduled to increase to reach 65 years in 2025

4. By comparing cohorts that were affected and unaffected by the revision of EESL in 2006, Kondo and Shigeoka (2017) found that the revision increased the employment rate of males in their early 60s, although its effect was smaller when compared to the increase in the pension eligibility age.

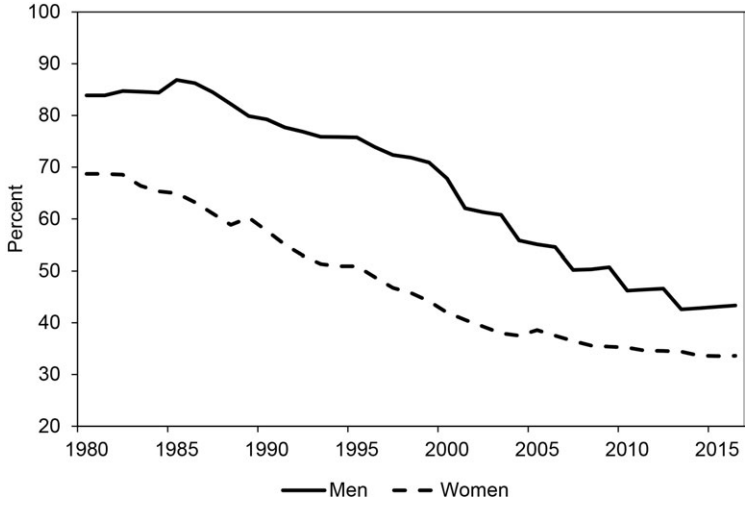

Fig. 7.6 Declining replacement rates
Note: Assuming median income.

(and five years later for women). At the same time, a gradual reduction in the benefit multipliers was expected to reduce the implicit tax rate for the postponed benefit claim.

Raised eligibility ages and reduced benefit generosity enhanced the importance of the earnings-tested *Zaishoku* pension program. The *Zaishoku* pension program for those aged 60–64 has been consistently revised to reduce its disincentive to work, along with the wage subsidy introduced in 1995. For those aged 65–69, the *Zaishoku* pension program was abolished in 1986 but reintroduced in 2002 (Shimizutani and Oshio 2013). The earnings-tested pension program tends to reduce the incentive to work in general, and this is remarkable for those considering to continue work, especially on a full-time basis, after the statutory eligibility age of 65 years.

To examine a long-term change in benefit generosity, we focused on the average replacement rate, which is defined as the ratio of the average net benefit to the average net wage. Using the institutional parameters, figure 7.6 shows the trends of average replacement rates for men and women aged 60–64 since 1980. As seen in this figure, the replacement rates have been gradually declining for both men and women over the past couple of decades, mainly reflecting the reduced generosity of benefits such as raised eligibility ages and reduced benefit multipliers.

7.3.2 Benefits Calculator

To examine the association between the social security incentives and elderly employment rates during 1980 and 2016, we constructed a benefits

calculator to compute the after-tax benefit stream of each age group in the EPI program as a function of a synthetic earnings history for men and women as well as for the three educational levels. We programmed the benefits calculator for a time span from 1980 to 2016, reflecting on the reforms that might affect the trends of elderly employment rates. Although we focused entirely on the EPI program, we considered statutory changes in both flat-rate and wage-proportional benefits, which have been substantially different, especially in terms of the eligibility ages and benefit formulae.

For the benefits calculator, we carefully distinguished the two decisions: retiring and claiming benefits.[5] Individuals may retire and immediately claim benefits; if this would have been the case, then there would not have been a need to distinguish between the two decisions. In Japan, however, some individuals continue to work, especially on a part-time basis, after initially claiming benefits, even if their benefits are reduced to the earnings test under the *Zaishoku* pension program. Hence we distinguish these two decisions and their correspondingly different impacts on the social security incentives as discussed below. We also use an income tax calculator to make the wage earnings and benefit net of income taxes applicable in each year.

For earnings profiles, we based the calculation on the following three assumptions: (a) common synthetic earnings profiles in which the slopes are the same across all the countries, (b) Japanese earnings profiles that are constant over time (based on 2016), and (c) Japanese time-specific earnings profiles. The earnings profiles (a) are based on data from the US Current Population Survey (CPS) and the German Socio-economic Panel (GSOEP). Additionally, the administrative data from the Italian pension system (INPS) contain three skill/education groups (low, median, and high) for men and women, respectively. They are scaled in such a manner that the earnings at 50 years of age are one; we scale the groups by 50 years up to median income at the age of 50 in Japan.[6]

7.3.3 Social Security Wealth, Its Accrual, and the Implicit Tax Rate

Social security wealth (SSW) is the key concept employed for gauging the tax force to retire early; SSW is the discounted value of all future social security benefits.[7] The social security benefits are calculated using the benefit formulae applied to individuals of each age in each year and their assumed earnings profiles. Discounting has the following two components: the survival probability at each age in each year and the time discount rate, which is

5. Shimizutani and Oshio (2016) analyze the determinants of pension-claiming behavior.

6. The earnings of low and high groups of men with median income aged 60 years are 86.7 percent and 137.8 percent, respectively, and the earnings of women in the same age group are 60.0 percent and 160.0 percent, respectively.

7. Refer to Stock and Wise (1990a, 1990b) for the theoretical background of the study. Additionally, refer to Gruber and Wise (1999, 2004, 2007) and Oshio, Oishi, and Shimizutani (2011) for more details on the construction of these variables.

set at 3 percent. We first computed the accrual of SSW, which is the amount of SSW accrued when postponing the benefit claim by one year. As a benchmark, we calculated this accrual of SSW, denoted by ACC, assuming that individuals claim benefits upon retirement, although they sometimes receive benefits as well as earn wage income. Postponing benefit claiming has the following three effects on ACC: it raises future benefits due to additional contributions and actuarial adjustments, it leads to a one-year loss in benefits, and it entails additional contributions, which reduces ACC on a net basis.

In this definition of ACC, we assume that individuals will choose between (i) fully retiring and claiming benefits and (ii) continuing work without receiving benefits (even if they are eligible for claiming the benefits). This assumption is not fully realistic in Japan, where individuals sometimes continue working and receiving benefits, as discussed below. However, we applied this assumption for baseline calculations for cross-country comparisons. By dividing the negative value of ACC by after-tax earnings during the additional year of work, we computed the implicit tax rate (ITAX) for claiming benefits one year later. ITAX can have both positive and negative signs, which indicate the disincentive and incentive to work. We then created the matrix of ITAX for each age and calendar year.

7.3.4 Financial Loss Due to Postponement of Claim by One Year

ITAX, which is defined above, can precisely measure social security incentives only if social security or other rules enforce the equity of the age of retirement and that of the benefit claims. In Japan, however, there is a partial retirement scheme under which individuals are entitled to receive benefits when they continue working. Under this scheme, individuals will bear both ACC and the earnings lost due to the earnings test. In the Japanese context, the latter corresponds to a reduction in benefits due to the earnings-tested *Zaishoku* pension program. The sum of the negative value of ACC and the potential earnings lost due to the earnings test indicates the financial loss, denoted by LOSS, on account of working one year longer. Subsequently, we define the relative financial loss, denoted as RFL, by dividing LOSS by after-tax earnings during the additional year of work and construct the age-year matrix of RFL. As in the case of ITAX, RFL can be both positive and negative. If RFL is higher than ITAX, then we can argue that the earnings test adds to the disincentive to work.

7.3.5 Note on Actuarial Adjustments

EPI beneficiaries can claim actuarially reduced benefits even before the statutory eligibility age, and this adjustment is expected to allow individuals to freely choose when to claim the benefit. However, the MHLW's Annual Survey of EPI and NPI Programs (2015) suggests that only a limited proportion of EPI beneficiaries claim actuarially reduced benefits, presumably because they are entitled to claim the wage-proportional benefit at the age of 60

(for men and women born on or before 1952) or 61 (for men born on or after 1953).[8]

Meanwhile, the actuarially increased benefits are expected to encourage individuals to consider a delayed benefit claim beyond the statutory eligibility age of 65 years. However, this effect is partly attenuated for those who want to continue working on a full-time basis, especially if their pension benefits are high enough to be reduced by the *Zaishoku* pension program. The actuarial increase of the wage-proportional benefit will be applied only to the portion of the pension benefit that would have been obtained after the earnings test in the *Zaishoku* pension program. In addition, the male EPI members will lose the *Kakyu Nenkin* benefit, which is entitled to be given to their wives until they become 65 years old, if they claim the actuarial increase of the wage-proportional benefit. Probably owing to these institutional reasons, the proportion of delayed claimers was negligible—that is, only 0.2 percent of all the EPI new claimers in 2015 according to the MHLW's Annual Survey of EPI and NPI Programs (2015).

Considering these institutional backgrounds and statistical facts, we did not incorporate any actuarial adjustment in the benefit calculation. This means that we incorporated changes in (i) the eligibility ages, (ii) the benefit multipliers and other benefit parameters, (iii) the *Zaishoku* pension program, (iv) the wage subsidy, and (v) the social security premiums and income tax rates.

7.4 Results

7.4.1 Tax Force to Retire Early

First, we presented a set of replacement rates, SSW, ACC, and ITAX for median-educated men in the age group of 60–64 years, which is based on the common synthetic earnings profile in figure 7.7, to provide an overview of the calculated social security incentives. The replacement rate and SSW declined steadily at all ages, reflecting the declined generosity of benefits; the replacement rate dropped from about 90 percent in the early 1980s to about 60 percent in recent years. SSW also declined from the range of ¥45–50 million to about ¥30 million during the same period (in 2015 prices). Correspondingly, the negative values of ACC as well as ITAX showed downward trends, suggesting a reduction in the tax force to retire early. The ACC and ITAX curves dropped sharply for each age every three years starting in 2001, reflecting a stepwise increase in the eligibility age of the flat-rate benefit.

8. Early benefit claims are prevalent among the NPI beneficiaries, who only receive the flat-rate benefit. However, the proportion of early claimers out of the entire new NPI claimers had been steadily declining and reached 10.9 percent in 2015. The proportion of early claimers out of the entire new EPI claimers was much lower than that, although there are no official statistics to show it.

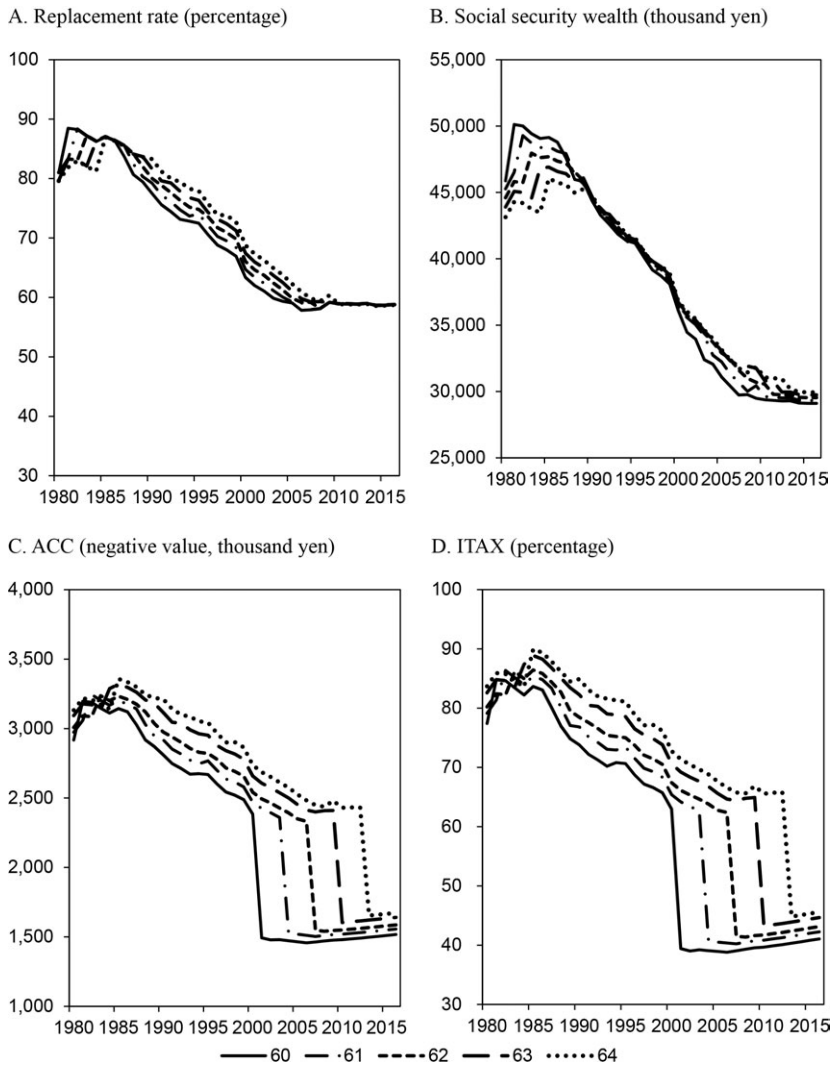

Fig. 7.7 Social security incentives at ages 60–64 for median-educated men

For example, the curve for individuals aged 61 dropped sharply in 2004. In the same year, individuals aged 61 did not lose the flat-rate benefit despite working one year longer; this is because of an increase in the eligibility age for the flat-rate benefit to age 62 in the same year. We obtained similar figures for men in the low- and high-educated groups (not presented due to space constraints). However, the replacement rates and ITAX were somewhat higher (lower) for high- (low-) educated men, reflecting the different levels of wage-proportional benefit.

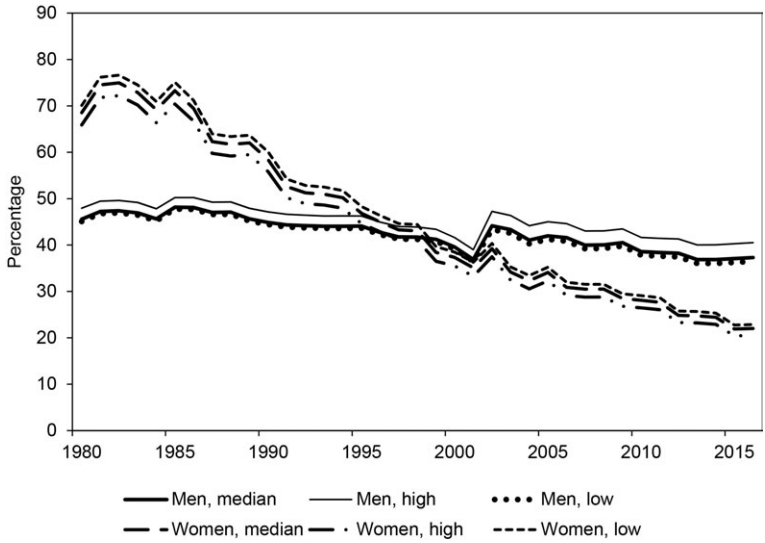

Fig. 7.8 Average ITAX over all ages for each combination of gender and educational level

The tax force to retire early can be computed at various levels of aggregation. First, we computed the average ITAX over all ages for each combination of gender and educational level, as shown in figure 7.8. For each subgroup, the ITAX curve has a downward trend, while its slope is somewhat steeper for women than for men largely due to delayed and continued increases in the eligibility ages of EPI benefits for women (from age 55 to age 60). An upward shift in 2002 reflects the resumption of the earning-tested *Zaishoku* pension program.

Second, we aggregated ITAX over the subgroups in figure 7.9. We observed different patterns of ITAX across age groups (55–59, 60–64, and 65–69 years). ITAX is the lowest for those aged 55–59, and it dropped below zero by the early 2000s, reflecting a stepwise increase in the eligibility age of the flat-rate and wage-proportional benefits for women. ITAX for this age group has been modestly negative for more than 10 years; it implies that social security programs currently encourage those below age 60 to stay in the labor force.

ITAX for those aged 60–64 has been on a downward trend since the mid-1980s, and it started dropping in 2001 in response to an increase in the eligibility age of the flat-rate benefit; each curve has two kinks reflecting a five-year interval in an increase in the eligibility age between men and women. ITAX for this age group dropped from about 70 percent in the 1980s to about 30 percent in recent years, pointing toward a substantial reduction

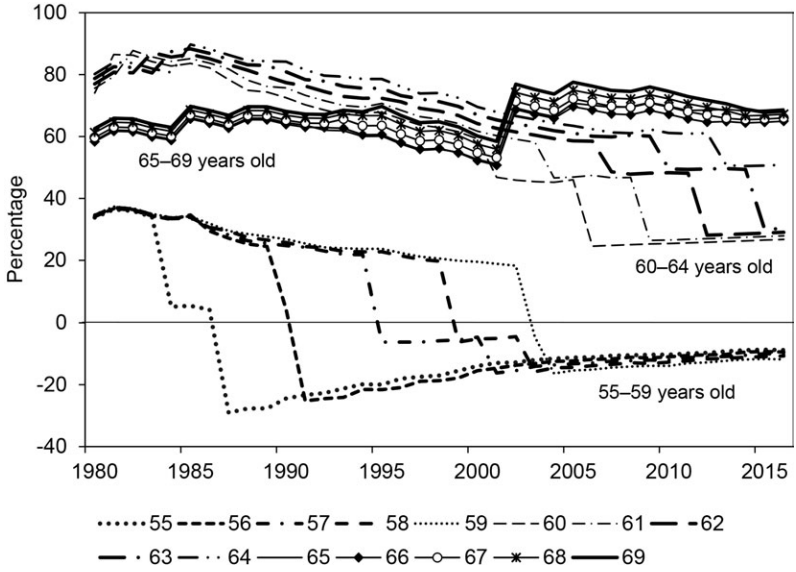

Fig. 7.9 Average ITAX over genders and educational levels

in the disincentive to work. Meanwhile, ITAX for those aged 65–69 rose modestly in 2002, reflecting the resumption of the earning-tested *Zaishoku* pension program. Thus we can argue that since the early 2000s, which is the period when the programs started raising the disincentive for those aged 65–69, social security programs have been reducing the disincentive to work for those aged 60–64.

Finally, we aggregated over genders, educational levels, and ages to observe the trend of a general measure of the tax force to retire early. The bold curve in figure 7.10 shows how ITAX aggregated for all subgroups and ages has been evolving since 1980, confirming its moderate downward trend. As already noted and confirmed in the figure, however, the trends of ITAX differs across age groups; ITAX has been declining for those aged 55–59 and 60–64 and rising for those aged 65–69.

We further compared the results between ITAX and RFL in figure 7.11, focusing on the case of median-educated men. There is no difference between the two with regards to those aged 55–59; this is because the *Zaishoku* pension program is not relevant to them. The RFL curve for those aged 60–64, deviating downward from the ITAX curve in 2005, reflects the change in the *Zaishoku* pension program that is aimed at a reduction in earnings-tested benefits. The most remarkable difference between ITAX and the RFL curve is observed for those aged 65–69. The *Zaishoku* pension program was not applied to them during 1986 and 2001, and this allowed the EPI beneficiaries

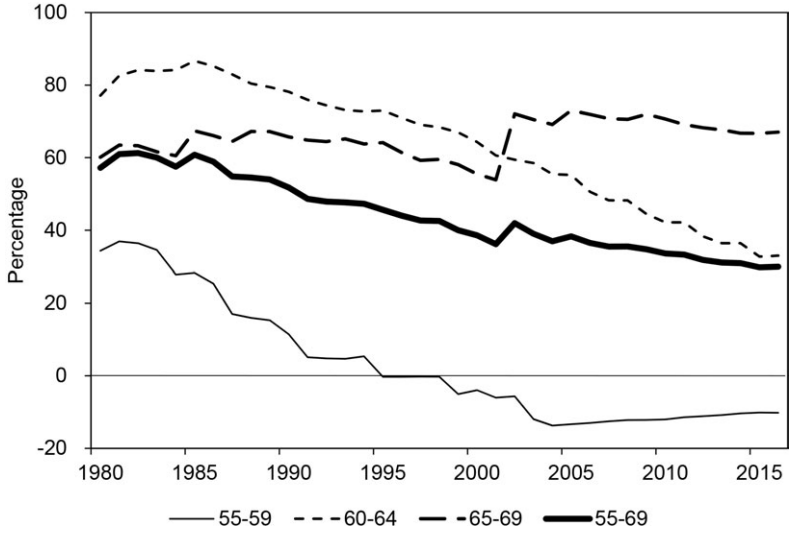

Fig. 7.10 Average ITAX over ages, genders, and educational levels

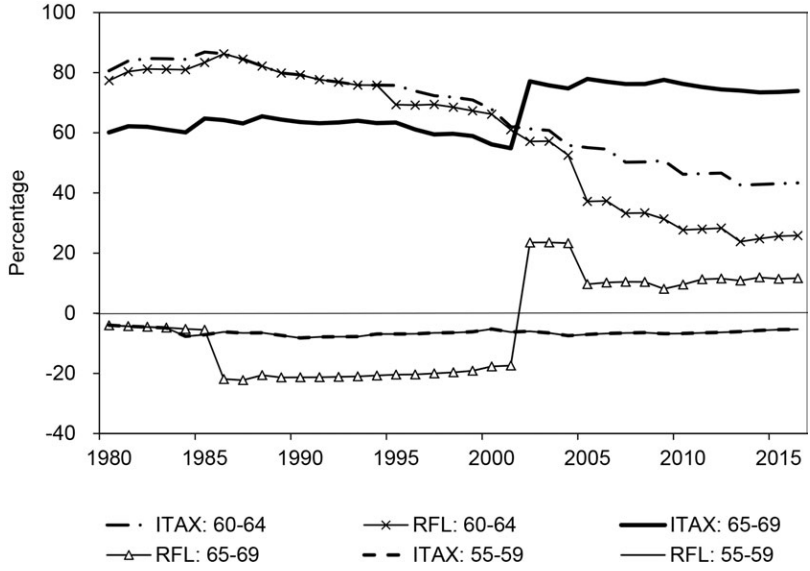

Fig. 7.11 Comparing ITAX and RFL for median-educated men

to obtain the full benefit while working. The *Zaishoku* pension program for those aged 65–69 was resumed in 2002, while the earnings test has been much limited when compared to those aged 60–64.

7.4.2 Relationship with Elderly Employment: Graphical Analysis

Based on the tax force measures obtained in the previous sections, we examined how elderly employment rates are related to social security incentives. We evaluated the tax force to retire early based on the Japanese earnings profiles, which have remained constant over time (based on 2016), to control for the cohort effect.

First, we plotted the tax force measures against the calendar year for men and women separately in figure 7.12. While the tax force has stayed somewhat below zero for men aged 55–59, it has been moving in the opposite direction between men aged 60–64 and those aged 65–69. For men aged 60–64, the tax force started dropping in 2001 and converged to around 40 percent, reflecting a stepwise increase in the flat-rate EPI benefit. Contrarily, the tax force for men aged 65–69 rose in 2002, reflecting the resumption of the earning-tested *Zaishoku* pension program."

For women aged 55–59, drops in the tax force first occurred during the late 1980s and early 2000s, and these drops started in 2006 for women aged 60–65. The former drops, which reflect increases in the eligibility ages for both flat-rate and wage-proportional benefits, are larger than the latter, which reflect stepwise increases in the eligibility age only for the flat-rate benefit. The rise in the tax force for women aged 65–69 is due to an extension of the period from which they were required to pay premiums, as in the case of men.

Subsequently, we transposed the presentation in figure 7.13 by showing the tax force against age, with different lines for the selected calendar year, for men and women. We observed that the tax force has been almost unchanged, falling, and rising for men aged 55–59, 60–64, and 65–69, respectively, in line with the results in figure 7.12. For women, the drop in ITAX was most remarkable for those aged 55–59, followed by those aged 60–64, while it was largely unchanged for those aged 65–69.

It is useful to have an overview of the trends of the employment rates separately for men and women in figure 7.1 before examining the association between the tax force to retire early and the employment rates. We observed that the employment rates for men aged 55–59 and 60–64 started recovering around 2005, while their recoveries were made obscure by the changes in the macroeconomic conditions during 1990 and 2000, when the economy experienced a long recession after the burst of the economic bubble. Contrarily, the employment rates for men aged 50–59 remained above 90 percent during the study period. For women, the employment rates show clearer upward trends for all three age groups, with the increase accelerating around 2005.

We plotted the dots connecting the employment rate and ITAX in each

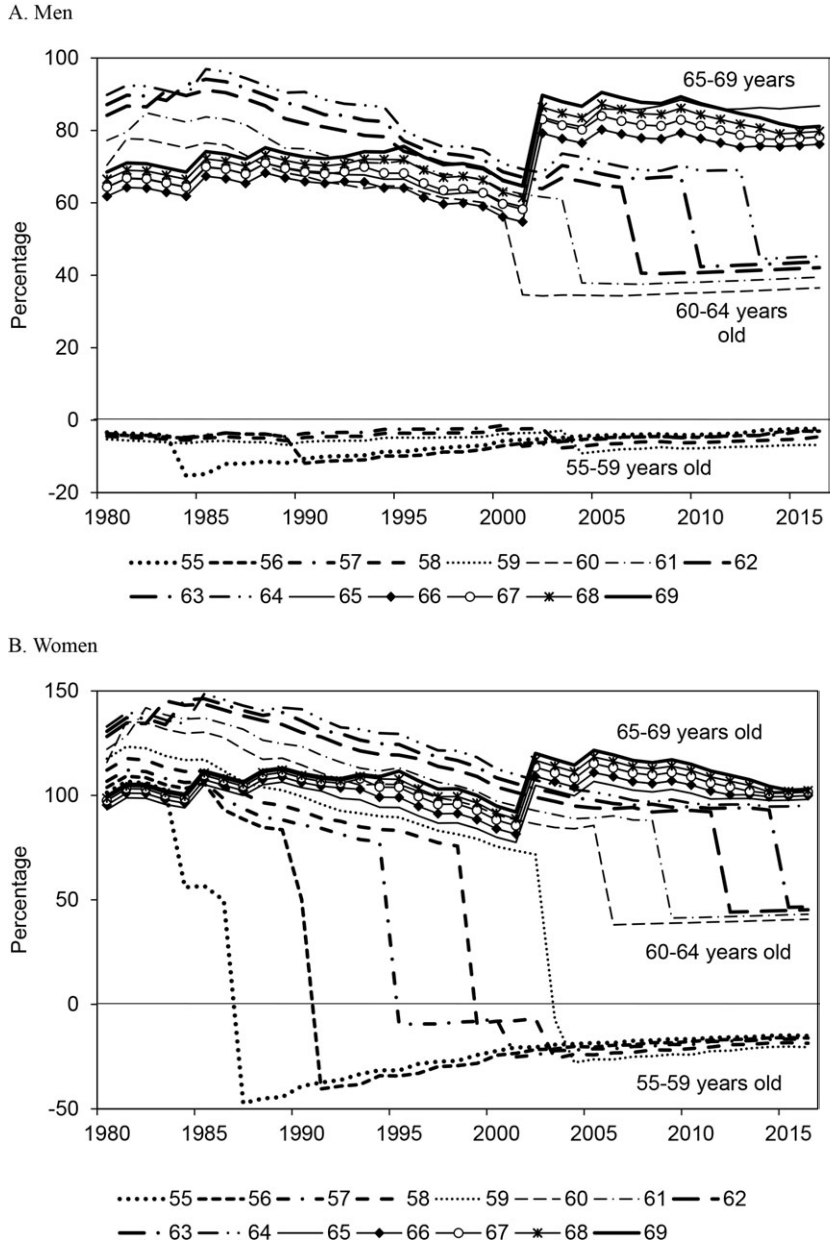

Fig. 7.12 Evolution of ITAX against year at different ages, using Japanese earnings profile in 2016

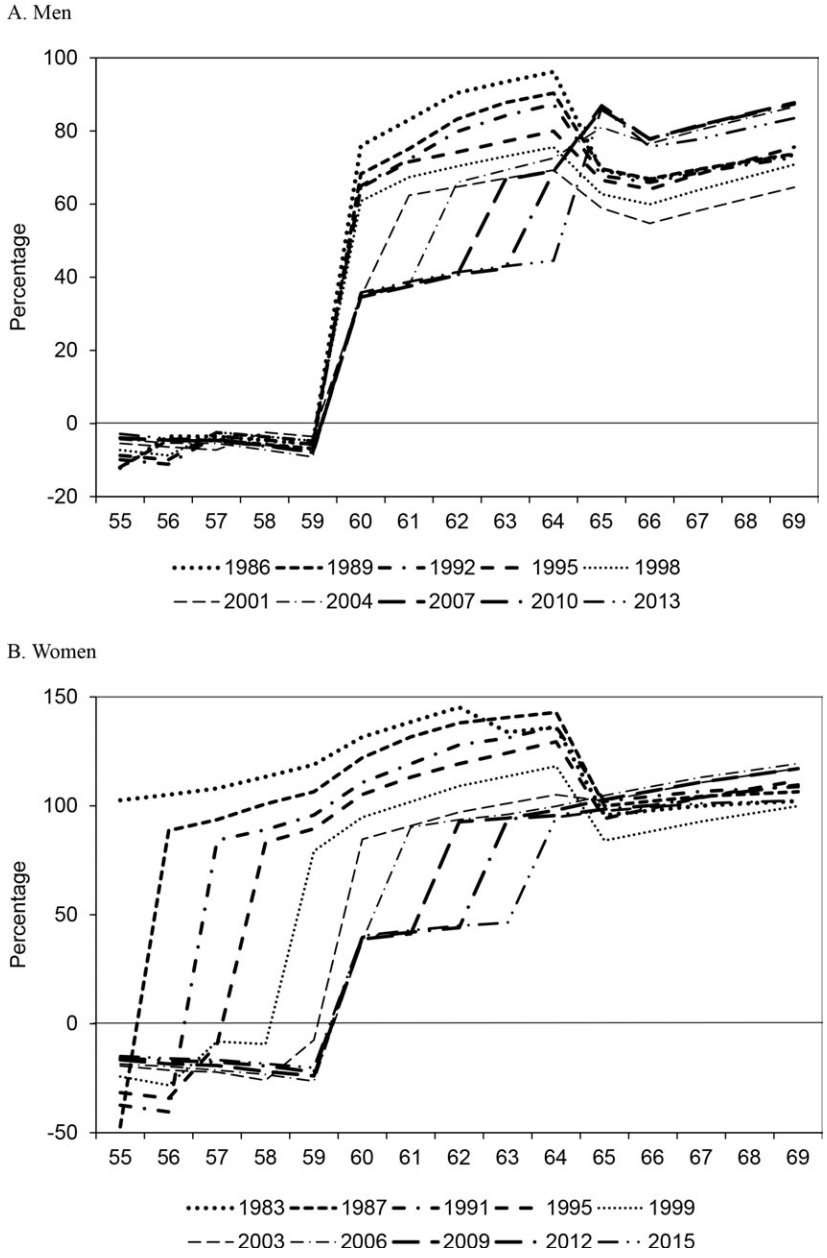

Fig. 7.13 Evolution of ITAX against age in different years, using Japanese earnings profile in 2016

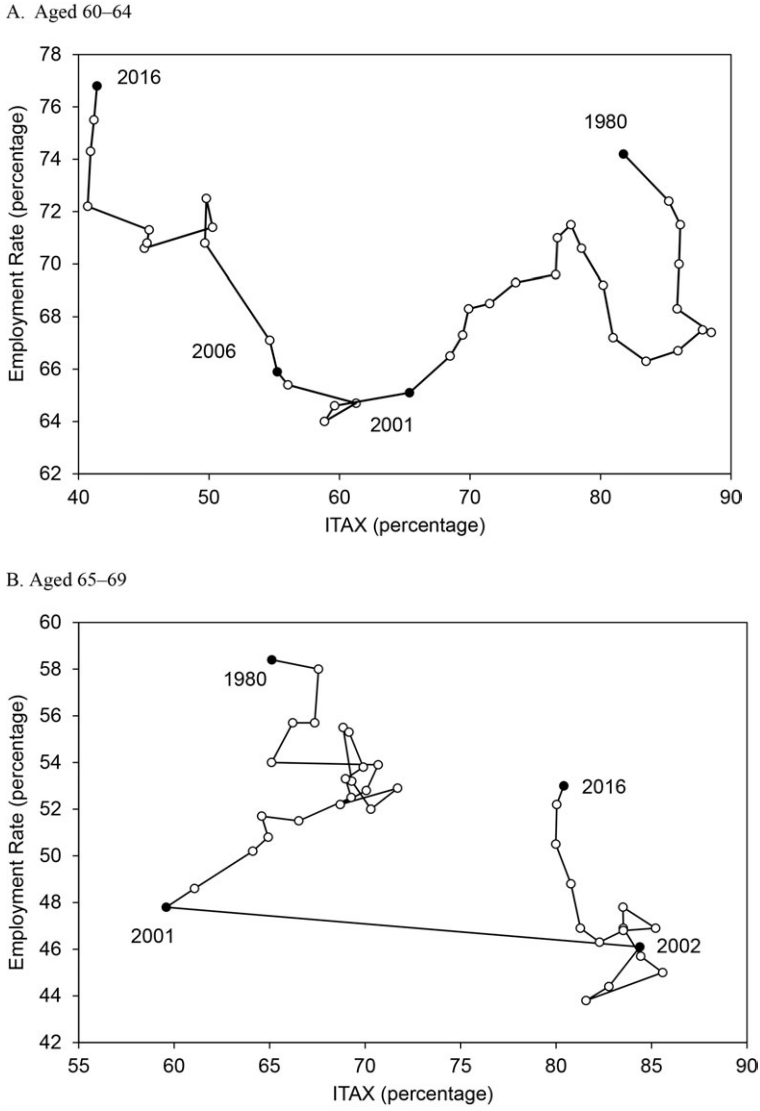

Fig. 7.14 The evolution of a combination of ITAX and the employment rate: men

year for selected age groups for men and women in figures 7.14 and 7.15, respectively. A cursory glance does not show a clear relationship between the employment rate and ITAX for men aged 60–64. While ITAX declined during most of the period between 1980 and 2016, the employment rate curve showed a positive association with the ITAX curve during the mid-1990s and the mid-2000s. However, the curve depicted a negative slope after the mid-2000s, prob-

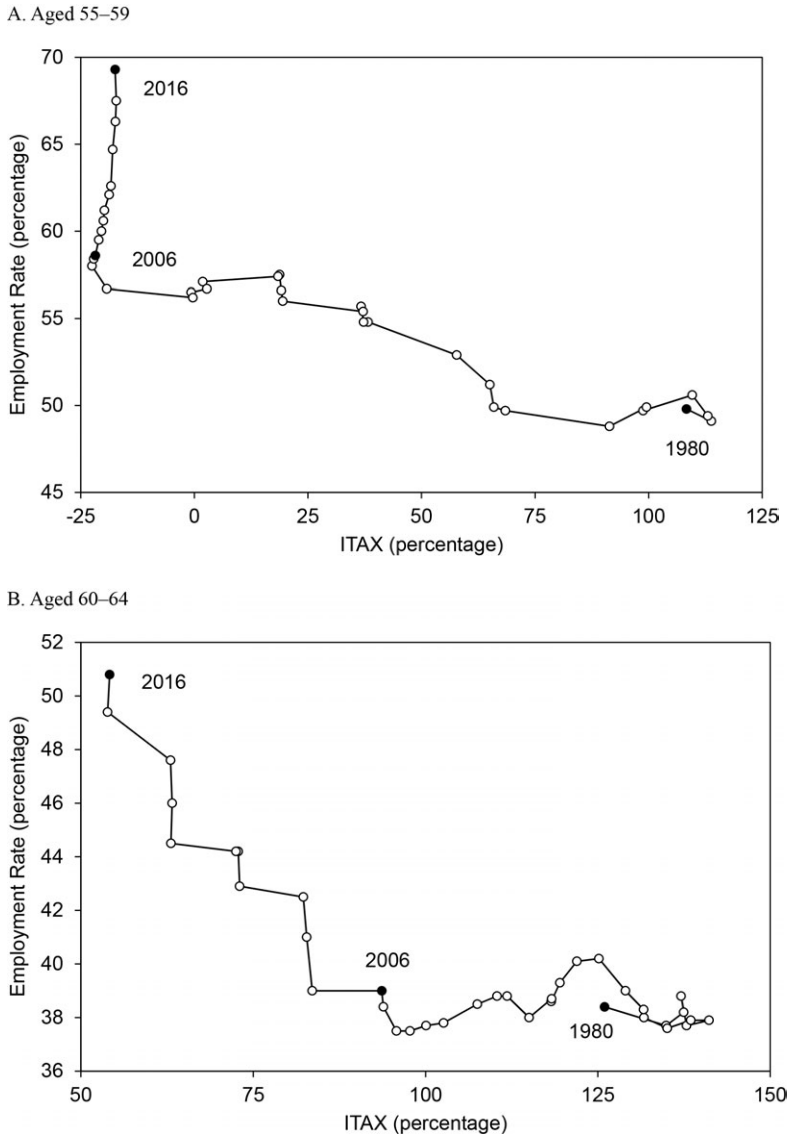

Fig. 7.15 The evolution of a combination of ITAX and the employment rate: women

ably reflecting a rise in the eligibility age for the flat-rate benefit and the enactment of the revised EESL, which required firms to completely abolish the mandatory retirement age or raise it to 65 years. For men aged 65–69, a sharp increase in ITAX in 2002, reflecting the resumption of the earning-tested *Zaishoku* pension program, shifted the combinations of ITAX and employment

to the right. After this shift, a negative association between the two variables was observed.

In sharp contrast to men, women's employment rates indicated a clear negative association with ITAX for women in aged 55–59 and 60–64. Notably, in the mid-2000s, the employment rates for women aged 60–64 started rising, and they soared for women aged 55–59.[9]

7.4.3 Relationship with Elderly Employment: Simple Regression Analysis

To examine the association between ITAX and the employment rates for each of the four groups chosen in figure 7.14, we estimated simple regression models using the actual earnings profiles in Japan. Model 1 just regresses ITAX on the employment rate. Model 2 adds the industrial production index (2010 = 100) as a regressor to model 1 to control for the macroeconomic conditions. Model 3 further adds the employment rate, which was prevalent five years ago, of the age group in figure 7.13 as a regressor to control for its previous work/retirement decision.

Table 7.1 provides the estimation results. We observed a negative association between ITAX and employment rate only for men aged 65–69 in model 1. The addition of the industrial production index as a regressor in model 2 also showed a negative association for men aged 60–64, suggesting that the macroeconomic conditions make their association unclear. When the five-year lagged employment rate in model 3 was further added, the association remained negative and significant. A 1 percentage point increase in ITAX corresponds to a 0.21–0.26 percentage point decrease in the employment for men aged 60–64 and 65–69. For men aged 60–64, ITAX declined by around 40 percent during 1985 and 2016, implying that the change in the social security incentives raised the employment rate by about 8 percentage points during that period. This might have contributed to the recovery of the employment rate for this age group. For those aged 65–69, the ITAX jumped in 2002, and it might have had a negative impact on employment. A modest increase in the employment rate since mid-2005 seems to have been accounted for by other factors, including the cyclical recovery of the economy and the cohort effect, reflecting higher employment rates for those at younger ages.

For women, we observed a negative association between ITAX and the employment rate for those aged 55–59 and 60–64 even in model 1, and it is confirmed in Models 2 and 3. The impact of ITAX on the employment rate is 0.05–0.25 percentage points for those subgroups; notably, the magnitude of the association for those aged 60–64 is similar to those of men in the same age group.

By replacing ITAX with RFL, we obtained largely similar results, as presented in table 7.2. The employment rate is negatively associated with RFL

9. We do not depict the figures of men aged 55–59 years or women aged 65–69 years, whose employment rates do not bear any apparent relation to ITAX.

Table 7.1 **Regression results: Explaining employment rates by ITAX**

	Men						Women					
	Model 1		Model 2		Model 3		Model 1		Model 2		Model 3	
	Coeff.	(SE)	Coeff.	(SE)	Coeff.	(SE)	Coeff.	(SE)	Coeff.	(SE)	Coeff.	(SE)
55–59												
ITAX	−0.133	(0.288)	0.074	(0.232)	−0.151	(0.297)	−0.098***	(0.010)	−0.124***	(0.014)	−0.046***	(0.010)
Industrial production			0.092***	(0.020)	0.113**	(0.035)			−0.151*	(0.059)	0.003	(0.037)
Employment rate (5-year lag)					0.121	(0.402)					0.534***	(0.049)
Adj. *R*-squared	−0.022		0.360		0.223		0.738		0.774		0.941	
60−64												
ITAX	−0.058	(0.031)	−0.106**	(0.033)	−0.211***	(0.024)	−0.105***	(0.013)	−0.120***	(0.013)	−0.253***	(0.042)
Industrial production			−0.141**	(0.048)	0.013	(0.044)			−0.079*	(0.033)	−0.101*	(0.046)
Employment rate (5-year lag)					−2.114***	(0.275)					−0.843**	(0.256)
Adj. *R*-squared	0.063		0.230		0.734		0.653		0.695		0.763	
65–69												
ITAX	−0.320***	(0.060)	−0.253***	(0.055)	−0.256***	(0.062)	−0.066*	(0.030)	−0.052	(0.030)	−0.061	(0.033)
Industrial production			−0.147***	(0.040)	−0.110	(0.074)			−0.037*	(0.018)	−0.038	(0.032)
Employment rate (5-year lag)					−0.114	(0.269)					−0.115	(0.115)
Adj. *R*-squared	0.430		0.578		0.368		0.093		0.172		0.066	

Note: $n = 32$ for each subgroup; *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

Table 7.2 **Regression results: Explaining employment rates by RFL**

	Men						Women					
	Model 1		Model 2		Model 3		Model 1		Model 2		Model 3	
	Coeff.	(SE)	Coeff.	(SE)	Coeff.	(SE)	Coeff.	(SE)	Coeff.	(SE)	Coeff.	(SE)
55–59												
RFL	−0.133	(0.288)	0.074	(0.232)	−0.151	(0.297)	−0.098***	(0.010)	−0.124***	(0.014)	−0.046***	(0.010)
Industrial production			0.092***	(0.020)	0.113**	(0.035)			−0.151*	(0.059)	0.003	(0.037)
Employment rate (5-year lag)					0.121	(0.402)					0.534***	(0.049)
Adj. *R*-squared	−0.022		0.360		0.223		0.738		0.774		0.941	
60−64												
RFL	−0.041*	(0.020)	−0.068**	(0.020)	−0.130***	(0.015)	−0.064***	(0.009)	−0.079***	(0.009)	−0.124***	(0.029)
Industrial production			−0.135**	(0.047)	0.018	(0.044)			−0.106**	(0.036)	−0.139*	(0.055)
Employment rate (5-year lag)					−2.065***	(0.270)					−0.413	(0.257)
Adj. *R*-squared	0.084		0.244		0.736		0.587		0.660		0.674	
65–69												
RFL	−0.143***	(0.036)	−0.137***	(0.026)	−0.142***	(0.026)	−0.057***	(0.009)	−0.054***	(0.009)	−0.077***	(0.009)
Industrial production			−0.201***	(0.036)	−0.076	(0.066)			−0.035**	(0.013)	−0.013	(0.018)
Employment rate (5-year lag)					0.128	(0.229)					−0.317***	(0.076)
Adj. *R*-squared	0.295		0.622		0.507		0.498		0.580		0.714	

Note: $n = 32$ for each subgroup. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

for men aged 60–64 and 65–69 and women aged 55–59 and 60–64, although the magnitudes of their associations and the goodness of fit are somewhat lower when compared to ITAX, and the associations become significant for women aged 65–69 as well.

7.5 Concluding Remarks

We examined how the change in the trend of elderly labor force participation has been associated with changes in incentives of social security and its related programs in Japan. Our results support the view that the recovery of labor force participation of the elderly has been at least partially accounted for by a reduction in the tax force to retire early due to a series of social security reforms, although the macroeconomic conditions tend to make their association obscure. Our results suggest that reducing the tax force to retire early would help alleviate pressures from the aging population and enhance the sustainability of the social security programs.

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