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The Effectiveness of Government Intervention to Promote Elderly Employment:
Evidence from Elderly Employment Stabilization Law

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Abstract

Since the pension eligibility age started to rise in 2001, there had been a gap between the eligibility age for full pension benefits and the prevailing retirement age in Japan. To fill the gap, the government of Japan revised the Elderly Employment Stabilization Law (EESL): starting from 2006, employers are legally obliged to introduce a system to continue employment up to the pension eligibility age. This paper examines the effect of this legal enforcement on elderly men's labor supply and employment status, by comparing the affected cohorts and cohorts a few years older than them. We find that the EESL revision actually increases the employment rate of men in the affected cohorts in their early 60s, and the effect is larger for employees of the large firms. Also, the increase in elderly workers who stay in the same employer does not replace elderly workers who switch employers, suggesting that the revised EESL does not hinder elderly worker's mobility.

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Abstract

Since the pension eligibility age started to rise in 2001, there had been a gap between the eligibility age for full pension benefits and the prevailing retirement age in Japan. To fill the gap, the government of Japan revised the Elderly Employment Stabilization Law (EESL): starting from 2006, employers are legally obliged to introduce a system to continue employment up to the pension eligibility age. This paper examines the effect of this legal enforcement on elderly men's labor supply and employment status, by comparing the affected cohorts and cohorts a few years older than them. We find that the EESL revision actually increases the employment rate of men in the affected cohorts in their early 60s, and the effect is larger for employees of the large firms. Also, the increase in elderly workers who stay in the same employer does not replace elderly workers who switch employers, suggesting that the revised EESL does not hinder elderly worker's mobility.

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Disclaimer required by the Statistics Bureau: (1) Since the Labour Force Survey is a sample survey, all results are potentially subject to sampling errors. (2) All the analyses in this paper are done by the author, not the Bureau, and thus their consistency with the Bureau's official reports is not guaranteed.

1 Introduction

Aging population is emerging as a serious social concern in many developed countries. Among others, Japan has experienced very rapid aging in the past few decades. As of 2010, the ratio of the elderly (65 years or older) in Japan's population is 23.1%, which is the highest among the OECD countries. Given this fast aging population and resulting pressure on the social security system, the government of Japan started to raise the eligibility age for full pension benefit in 2001. This is a gradual rise from the age of 60 to 65; one age increases every two years, which takes 10 years to complete.

In the meantime, it is legally allowed for employers to set the mandatory retirement age to 60, and the growing gap between the mandatory retirement age and the pension eligibility age has emerged as a social problem. Thus in 2006, five years after the gradual rise in pension eligibility age started, the government revised the Elderly Employment Stabilization Law (here after EESL) and mandated employers to institute a system to continue to employ workers up to their pension eligibility age.

This paper examines the effect of this legal enforcement on elderly men's labor supply and employment status. We exploit this five-year lag between the rise in the pension eligibility age and the revision of the EESL, which allows us to distinguish the effect of the EESL from the effect of pension reform. Both reforms affect the cohorts who turn 60 at the time of implementation or younger. Thus, cohorts born in 1946 and after are affected by both the rise in the eligibility age for the full pension benefit and the revision of the EESL, while cohorts born in 1941–1945 are subject only to the rise in the eligibility age for full pension benefit. Comparing these two groups of cohorts, we can

isolate the effect of continued employment forced by the revised EESL from the effect of the rise in pension eligibility age.

This policy change offers a unique opportunity to examine whether a policy that intends to increase labor *demand* rather than *supply* can be effective in promoting employment of the elderly. It is not *a priori* obvious whether the revision indeed affects employment of the elderly in their 60s for two reasons. First, even before the EESL revision, it had not been prohibited to employ workers older than 60; therefore, if there is no excess supply of labor, the EESL revision may have no effect. Second, unlike an increase in the mandatory retirement age, the revised EESL has no clear guideline for wages and working hours for the continued employment of elderly workers. In fact, the law allows firms to induce “voluntary” retirement at 60 by offering very low wages for workers older than 60.

Even though the effectiveness of the EESL revision is theoretically ambiguous, we find that the EESL revision actually increased the employment rate of men in their early 60s. The employment to population ratio of 60-year-old men in the affected cohorts increased about 4–5 percentage point than the unaffected cohorts. We also find that the more than one in six men came to stay another year after the implementation of the revised EESL compared to the unaffected cohorts. These results imply that the government intervention in the demand side can successfully increase the employment of elderly men.

Furthermore, we find that the increase in employment of elderly by the EESL revision is larger for large firms, probably because they have substantial number of workers who reach 60 every year and thus need an explicit rule for retirement and re-

employment. Also, we confirm that the increase in employment after the EESL is attributable to an increase in workers who remain in the same employer. At the same time, the decline in the number of workers who switch employers is negligible, suggesting that the increase in staying incumbents does not crowd out hiring of elderly workers who “retired” from other employers. In this sense, the revised EESL does not hinder the mobility of elderly workers.

A large body of literature documents that an increase in the retirement age defined in the social security system increases elderly’s labor supply and delays the actual age of retirement (e.g., Krueger and Pischke 1992, Mastrobuoni 2009, Manoli and Weber 2012, Behaghel and Blau 2012).¹ This paper is distinct from these existing studies in that, while the changes in pension eligibility age in the past literature primarily affect the labor supply, the EESL revision in Japan is an intervention in the demand side.

Indeed, there are a few existing studies on the effects of demand side interventions to protect elderly workers.² In the United States, the mandatory retirement became illegal in the 1980s due to the Age Discrimination in Employment Act (ADEA), and von Wachter (2002) finds a significant increase in the labor force participation among elderly men. Also Neumark and Song (2013) find that, in the United States, the increase in employment due to reduced pension benefits and the rise of full retirement age is larger in the states where age discrimination protection is stronger. In contrast, Shannon and

¹ Studies using Japanese data also show significant effects of pension benefits on elderly’s employment (e.g. Abe 2001, Oishi and Oshio 2000, Ishii and Kurosawa 2009).

² As a different type of employment protection for elderly workers, there are a few studies on the higher lay-off taxes for workers older than 50 in European countries. In France, Behaghel, Crepon and Sedillot (2008) find a rather negative effect on hiring whereas the effect on layoffs is less clear cut. In Austria, in contrast, Schnalzenberger and Winter-Ebmer (2009) find a significant decrease in lay-offs of older workers without a decrease in hiring because lay-off tax in Austria is applied only to workers with a tenure of more than 10 years.

Grierson (2004) find that the abolition of mandatory retirement in Canada did not increase the size of the older workforce.

An important difference between the anti-age discrimination laws in the United States and Canada and the EESL in Japan is that the EESL explicitly targets the protection of workers before the pension eligibility age, and it allows mandatory retirement after the age of 65. While Neumark and Stock (1999) argue that the ADEA steepens the age-earnings profile by making it easier for employers to commit to Lazear (1979) type long-term contract, the EESL in Japan is expected to flattening the age-earnings profile because it expands the length of implicit contract to which the employers have to commit. Indeed, Clark and Ogawa (1992) show that the tenure-earnings profile in Japan became flatter in the late 1980s, when many firms switch the mandatory retirement age from 55 to 60.

Our results are also consistent with the earlier studies in Japan.³ Using data from Keio Household Panel Survey, Yamamoto (2008) finds that the revision of the EESL in 2006 substantially increases employment of the affected cohorts among men who were salaried workers in their 50s. Our study extends Yamamoto (2008) by using a nationally representative data with a large sample size.

The rest of the paper is organized as follows. In the next section, we provide a detailed explanation of the institutional settings. Then Section 3 describes data and Section 4 presents our empirical models. Section 5 reports our findings, and Section 6 concludes.

³ Relatedly, Ishii and Kurosawa (2009) examine the effect of the rise in pension eligibility age using data for 2000-2004 from Survey on Employment Conditions of Older Persons and find a modest positive effect on full-time employment for the affected cohorts.

2 Institutional Background

Japan's population is aging rapidly. The ratio of elderly (65 years or older) has increased from 14.6% in 1995 to 23.1% in 2010,⁴ which is already the highest among the OECD countries. This ratio is expected to keep rising and exceed 30% by 2025, according to the projection by National Institute of Population and Social Security Research. Since the Japanese public pension program is designed as a pay-as-you-go system, this rapid aging of population makes it inevitable to raise the pension eligibility age. Along with the rise in pension eligibility age, the government of Japan has been trying to ensure that elderly workers can stay in the labor force longer by revising the EESL.

Established in 1971, the EESL initially intended to protect and promote employment of workers older than 50. The major revision passed in 1994 and enacted in 1998 prohibited firms to set mandatory retirement age younger than 60. Since the eligibility age for old-age pension for employed workers had been 60 until 2001, most employees in private companies continue work until they became eligible for the full pension benefit.

However, the Pension Reform Act to gradually raise the pension eligibility age came into effect in 2001, and cohorts born in 1941 or later (i.e., those who turn 60 in 2001 or later) can no longer receive the full pension benefit at the age of 60, the prevailing mandatory retirement age. This pension reform led to the another major revision of the EESL passed in 2004 and enacted in 2006, which legally mandated

⁴ Source: Population Census of Japan.

employers to institute a system to continue employment until the pension eligibility age. The timings of revisions of the EESL and the pension system are summarized in Table 1.

As seen in Table 1, there is a five-year lag between the rise in the pension eligibility age and the revision of the EESL. Importantly, both reforms affect the cohorts who turn 60 at the time of implementation or younger. Thus, as summarized in Table 2, while cohorts born in 1946 and after are affected by both the rise in pension eligibility age and change in the EESL, cohorts born in 1941–1945 are subject to only the rise in pension eligibility age. Comparing these “gap” cohorts and cohorts born after 1946, we can isolate the effect of mandated employment from the effect of the rise in pension eligibility age.

Prior to the EESL revision in 2006, employees typically retire from their current position as a regular staff either in the month in which they reach 60 or at the end of the fiscal year during which they reach 60. Regular staffs, or “*seishain*” in Japanese, are full time workers on the lifetime employment track with increasing age-earnings profiles. Therefore, the mandatory “retirement” in Japan merely means a termination of such lifetime employment contract. After this mandatory retirement, some workers leave the labor force or begin working for a new employer, but a substantial number of the “retired” employees are re-employed by the same employer on a different employment contract as a non-regular worker, typically paid much lower wages.⁵

⁵ The Japan’s unemployment insurance system offers so-called Continuous Employment Benefits (*koyo keizoku kyufu*), compensating benefits to workers older than 60 who are paid significantly lower than wages paid before they reached the age of 60. This makes it easier for the employers to offer very low wages to the re-employed workers.

The EESL revision legally mandated firms to offer such re-employment opportunities to all employees below the pension eligibility age.⁶ Since such kind of re-employment had been quite common in small companies even before the EESL revision, the effect of this revision is expected to be larger for employees in large firms.

Also, it is important to note that the revised EESL allows employers to terminate the contact as a regular staff and offer a re-employment contract with much lower wages. Employers can even offer a higher severance pay conditional on retirement at 60 to induce “voluntary” retirement. To this effect, the revised EESL is much less binding than a requirement to raise the mandatory retirement age, which would mean that the employer would have to keep the worker *on the same contract as a regular staff*.⁷

Lastly, since our focus is on the effect of the EESL revision, we discuss the details of Japan’s old age pension scheme and the effect of the pension reform in 2001 in the Appendix. Specifically, we compare the cohort born before and after 1941, the first cohort affected by the pension reform, to explore the effects of the changes in pension eligibility age. In sum, the size of the effect of pension reform on elderly men’s employment is much smaller than that of the EESL revision.

3 Data: Labour Force Survey

⁶ Strictly speaking, until April 2013, employers can refuse to renew the contract for some of the employees who have reached mandatory retirement age, if these employees do not meet the “criteria” set by a labor-management agreement. However, according to a press release by the Ministry of Welfare, Labor and Health (<http://www.mhlw.go.jp/stf/houdou/2r9852000002m9lq-att/2r9852000002m9q6.pdf>), only 2.3% of those who wished continued employment were refused by such criteria.

⁷ Although employers could have raised the mandatory retirement age or even abolish the mandatory retirement in response to the EESL revision, the majority of employers actually did not change the mandatory retirement system. According to the General Survey on Working Conditions by the Ministry of Welfare, Labor and Health, among establishments with 30 or more employees, 81% still set 60 as the mandatory retirement age, and most of them set up an explicit rule for re-employment (80%) or employment extension (20%) as of 2012.

Our primary source of data is the Labour Force Survey conducted monthly by the Statistics Bureau of the Ministry of Internal Affairs and Communications. The survey covers all households residing in Japan. There are two types of questionnaire in the survey: basic questionnaire and special questionnaire. The basic questionnaire is distributed to about 40 thousand households, and the questions on employment status are asked to all the members who are 15 years old or older (about 100 thousand persons in total) in those household. In addition, the special questionnaire, which contains more detailed questions than the basic questionnaire, is distributed to 10 thousand households among the subset of the respondents to basic questionnaire. The survey is conducted monthly as of the last day of each month, and the reference period is the last week of the month.

We limit our sample to men because women are less likely to be affected by the EESL directly. In fact, the proportion of full-time employees in population is as low as about 10–15% for women in their 50s, thus the majority of women are not subject to the continued employment mandated by the revised EESL.

The outcome variables from basic questionnaire include labor force participation rate, the employment to population ratio, the unemployment to population ratio, and the shares of self-employed and those employed by large, medium and small firms. In addition, the month and year when the respondent started the current job is available from the special questionnaire. Using this variable, we generate dummy variables for working at the same firm since the age of 59 and working at a different firm than the employer at the age of 59.

Regarding explanatory variables, the precise information on age is essential in our analysis. The Labour Force Survey asks the year and month of birth to all adult respondents, thus we can compute the age in months at the survey month. Note that education is available only in the special questionnaire, thus our analyses using the basic questionnaire do not control for educational background.

The data from the basic questionnaire are available from 1986–2012. Thus, we can trace two birth-year cohorts (born in 1946 and 1947) who are fully affected by the EESL revision implemented in 2006 (i.e., cohort who turns 60 in 2006 or later) up to the age of 65. In some analyses that do not need to follow the same cohort up to the age of 65, we use cohorts born in 1938–1950. We exclude cohorts born before 1938, because it was legally allowed to set the mandatory retirement age younger than 60 until 1998. The data from the special questionnaire is available only for 2002–2012, thus the oldest cohort in the analyses based on the special questionnaire is born in 1943 (i.e., 55 years old in 2002). Summary statistics by selected cohorts are presented in Table 3.

4 Empirical Strategy

4.1 Estimation of discontinuity in employment status at the age of 60

Since the EESL revision affects cohorts who reached 60 in 2006 or later, we estimate the discrete change in employment status at the age of 60 in the regression discontinuity design (RDD) and examine the change in the magnitude of jumps across affected (born in 1946 or later) and non-affected (born before 1946) cohorts. Comparing these two groups of cohorts allows us to isolate the changes in employment and labor supply induced by additional employment opportunities generated by the EESL revision.

Since the RDD requires a large sample size around the cut off age, we use data

from the basic questionnaires. We limit the sample to a bandwidth of one year around the age threshold and estimate the following equation:

$$Y_i = \alpha_0 + \alpha_1 I[A_i \geq c] + \alpha_2 I[A_i \geq c] * (A_i - c) + \alpha_3 (1 - I[A_i \geq c]) * (A_i - c) + \alpha_4 I[A_i = c] + \varepsilon_i \dots(1)$$

where Y_i is the measure of employment for individual i , A_i is the age of individual i in months, c is the age cutoff, and ε_i represents unobserved error components. In our case, c is 60 years old. $I[A_i \geq c]$ is a post-cutoff dummy that takes one if individual i is c years old or older. Our parameter of interest is coefficient α_1 . All coefficients on $I[A_i \geq c]$ and their standard errors are multiplied by 100 unless otherwise specified, so that they can be interpreted as changes in percentage points.

In all specifications, we include a dummy for being exactly at the age cutoff in months ($I[A_i = c]$) because we cannot observe the exact date of birth or retirement. According to a survey conducted by the Ministry of Health, Labor and Welfare, some firms define the date of mandatory retirement as the end of the month when the worker reaches the retirement age, and other firms define it as the exact day on which the worker reaches the retirement age. Since age in months is constructed by subtracting the birth date (in months) from survey date (also in months), the age at exactly on the age cutoff mechanically include both individual just below and above the threshold.

Further, as a robustness check, we also add regional unemployment rates because the unemployment rate may affect those below and above 60 differently and also can be correlated with the post-cutoff dummy. In fact, controlling for regional unemployment rates does not change the estimates substantially. To account for potentially common

unobserved shocks within the same age cells, the standard errors are clustered at the age in month in all specifications, following Lee and Card (2008).

4.2 Estimation of relative changes in the retirement age by cohort

After establishing the abrupt change of employment at the age of 60 in a RD framework, we next examine whether the EESL had a long-term impact on employment at early 60s. Following Mastrobuoni (2009), we estimate relative changes in the retirement age by cohort. Specifically, we estimate the following equation (2) using the sample of men born in 1938–1947 in the basic questionnaire:

$$y_i = \sum_{a=59}^{65} 1(A_i = a)(\alpha_a + \sum_{b \neq 1945} \beta_{a,b} 1(B_i = b)) + \gamma X_i + \varepsilon_i \dots (2)$$

y_i represents one of the outcome variables (either a dummy for labor force participation or employment). A_i is the age in year of individual i , and B_i is his year of birth. Coefficients $\beta_{a,b}$ represent the difference in cumulative distribution function of retirement age at age a between cohort born in b and cohort born in 1945, the baseline cohort. X_i represents explanatory variables other than age×cohort dummies; specifically, regional unemployment rates and 9 regional dummies.⁸

Under an assumption that a person never comes back to the labor force or employment once retired,⁹ a plot of $\alpha_a + \beta_{a,b}$ over age a can be interpreted as the cumulative distribution function of the retirement age for each cohort born in year b .

⁸ 9 regions are Hokkaido, Tohoku, Minamikanto, Kitakanto and Koshin, Tokai, Hokuriku, Kinki, Chugoku, Shikoku, and Kyushu. We have also tried using unemployment rates of 50-59 year old men instead of unemployment rate of the entire labor force. The results are very similar.

⁹ This assumption may be too restrictive for the cases of employment, because some people may become unemployed temporarily and then employed again. Even so, the ratio of individuals whose y_i is equal to zero can be interpreted as the lower bound of the ratio of ever-retired individuals. $\text{Pr}(\text{employed} | \text{not employed 1 year ago})$ calculated from the special questionnaire is about 12% for 60-year-old men and 4% for 65-year-old men.

Furthermore, as shown in Mastrobuoni (2009), under an additional assumption that the probability of retirement before 59 is the same across cohorts,¹⁰ $T(b) = \sum_{a=59}^{65} \beta_{a,b}$ can be interpreted as the difference in the retirement age of cohort born in year b compared to the baseline cohort born in 1945.

5. Results

5.1 Changes in employment status at around 60

We first graphically compare the labor market outcomes between cohorts affected and unaffected by EESL revision to examine the effect of “mandated” continuous employment.¹¹ The revision of the EESL implemented in 2006 affected cohorts who reach 60 after the time of implementation. Thus the first cohort affected by the revision is those born in 1946. Below, we compare cohorts born in 1943–1945 (unaffected cohorts) and cohorts born in 1946–1948 (affected cohorts).

Figure 1 plots the average of selected outcome variables over age in months for the two groups of cohorts. Panels A and B in Figure 1 visually show that cohorts affected by the EESL revision are more likely to stay in the labor force and to be employed after the age of 60 than cohorts not affected by the EESL. While the labor force participation rate and employment rate before the age of 60 are similar across the two cohort groups, the decline at the age of 60 became less pronounced for the cohorts affected by the EESL revision. Specifically, labor force participation rate of 61 years olds increased from

¹⁰ This assumption seems to be reasonable because, as shown in Panel A and B in Figure 1, labor force participation and employment up to 60 are very similar across cohorts.

76.4% for cohorts born in 1943–45 to 80.2% for the cohort born in 1946–48. Similarly, employment rate increased from 71.5% to 75.4%.

Furthermore, labor force participation and employment of the group born after 1946 stay higher until around the age of 64 than the group born before 1946. This pattern suggests that the positive effect of the obligation of continuous employment on labor force participation and employment persists for a couple of years beyond 60. Panel C also shows that the group born after 1946 are less likely to be unemployed than the group born before 1946.¹² It is reassuring that Panel D confirms no change in self-employed, who should not be affected by the EESL.

Figure 2 plots the labor force participation rate (Panel A) and the employment to population rate (Panel B) at the ages of 50, 55, 59, 60 and 61 (all defined in year, not month) over the birth-year cohort. The labor force participation rate is almost the same across cohorts until the age of 59, reassuring that there is no systematic difference across cohorts in their fifties. In contrast, there is a clear increase in the labor force participation rate at 60 and 61 for cohorts born in 1946, and labor force participation remain high for cohorts born after 1946. A similar pattern is observed for employment.

5.2 Size of the change in employment status around 60

To formally gauge the size of the jumps at the age of 60, we estimate equation (1) for cohort groups born between 1938 and 1950. We pool two adjacent cohorts who have

¹² Appendix Figure A2 presents the same figures as Figure 1 that limits the range of cohort into 1 year (i.e., 1945 vs. 1946). These graphs show a very similar pattern as Figure 1. Also to confirm that there was no macroeconomic shock around 2006, Appendix Figure A3 plots labor force participation and employment for the same time period as Figure 1 for cohorts who are around age 50 (i.e., cohorts 10 years younger than those in Figure 1). It is reassuring that there is no visibly discrete change at the age of 50.

the same pension eligibility age *and* the same age until which employers are legally obliged to continue employment, so that we have the sample size large enough to obtain stable estimates. Note that, while cohorts born in 1945 and 1946 have the same pension eligibility age, they face different age until which employers are legally obliged to continue employment. Thus, we do not pool these adjacent cohorts.

Table 5 summarizes the estimated jumps at the age of 60 for employment outcomes for cohort groups separately. Column (1) shows that labor force participation drops by roughly 4–6 percentage point for cohorts born before 1946, while the estimated drops shrink to about 2–3 percentage point for cohorts born after 1946, who are affected by the revised EESL. Specifically, the difference between the estimated jumps for cohorts born in 1945 (–5.61) and 1946 (–3.09) are statistically significant at the 5 percent level (t statistics = 2.04). Column (2) shows that the estimates do not change much when we control for regional unemployment rates.

Similarly, column (3) shows that, while the employment to population ratio drops at the age of 60 by roughly 10–12 percentage point for cohorts born before 1946, the estimated drops become 6–7 percentage points for cohorts born after 1946. The estimated drop at 60 for cohort born in 1946 is larger than that of cohorts born in 1945 by 4.53 (= –7.03– (–11.56)) percentage point, and this difference is statistically significant at the 1 percent level (t statistics = 3.16). Again, controlling for regional unemployment rates in column (4) do not affect the estimates much. These results confirm the observation from Panel A and B in Figure 1 that the EESL revision actually increases employment and labor force participation among men who have just reached the age of 60.

Columns (5) and (6) examine the effect of EESL revision on self-employed, who should not be affected. While some of the estimates for cohorts before born in 1946 shows a decline at age 60, the estimates are very small in magnitude compared to the case of labor force participation and employment, and sometimes show the opposite signs.

5.3 Estimated relative changes in the retirement age

Thus far, we have shown that the revision of the EESL has brought substantial changes in men's employment status at the age of 60. This section quantify how much the revision of the EESL increase labor force participation and employment *beyond* the age of 60 by estimating the relative changes in the retirement age by cohort.

We estimate equation (2) to calculate $T(b) = \sum_{a=59}^{65} \beta_{a,b}$, the estimated changes in retirement age of cohorts born in year b relative to cohort 1945. Table 5 reports the estimated $T(b)$ for cohorts born in 1938–1947. Cohorts born in 1946 and 1947 stay significantly longer in labor force and employment than cohorts born before. The point estimates for cohort 1946 imply that more than one in six men became to stay another year after the implementation of the revised EESL compared to the baseline cohort. The same trend is observed for employment as well. Our results show that the revision of the EESL indeed delayed retirement of men in the affected cohorts.¹³ Interestingly, cohorts born before 1942 retired earlier than cohorts born in 1943–45. As we discuss in the Appendix, this might be due to the rise in pension eligibility age. Nonetheless, the size of the change in labor force participation due to the EESL revision is much larger than this change.

¹³ For robustness check, we add controls for education using cohorts born 1942-1946 in the special questionnaire. The results remain qualitatively the same.

5.4 Heterogeneous responses by firm size

Here, we explore the heterogeneous effect of EESL by firm sizes by examining the change in the worker share by firm size. As explained in Section 2, re-employment after the age of 60 had been already common in small companies even prior to the EESL revision in 2006, thus the EESL is expected to have a larger effect for larger firms. Another reason to expect a larger effect of the EESL revision for large firms is that large firms need an explicit rule for retirement and re-employment because they have substantial number of workers who reach 60 every year. Once a firm has a rule, it has to make an explicit change to the rule according to the revised EESL. Small firms, which could make a discrete and ad-hoc decision each time one of its workers reach the retirement age, may not have to do so.

Figure 3 shows the worker share by firm size. Specifically, we limit the sample to men employed by private companies and divide them into the following 3 categories: (A) employed by a small firm with less than 100 employees, (B) employed by a middle-sized firm with 100–499 employees, and (C) employed by a large firm with 500 or more employees. Each sub-graph in Figure 3 plots the ratio in population over age in months.

Panel A shows that many employees of small firms continue to work after the age of 60 even before the EESL revision. As expected, the change after the EESL revision is negligible. In Panel B, there is a decline in the ratio right after the age of 60 for the cohorts born before 1946, but the same dip is not observed for the cohorts born 1946 or after. Thus, there seems to be a modest effect of the EESL, although the graph is noisy.

Turning to Panel C, there is a clear decline in the share right after the age of 60 for the cohorts born in 1943–1945. That is, many employees in large firms retire at the age of 60 before the EESL revision. Such a sharp decline still exists for the cohorts born after 1946, but the decline became much smaller. Roughly speaking, the EESL revision made about a quarter of employee at large firms stay in employment.

5.5 Mobility of elderly workers

So far, we have shown that the EESL revision actually increased the employment of men in their early 60s. This subsection investigates whether the EESL revision reduced the mobility of other workers in their early sixties. Since the EESL revision prompted the employment by the same employer beyond the age of 60, it may crowd out the employment opportunities of other elderly workers who would have switched employers.

Figure 4 plots the proportion of workers who remain with the same employer since the age of 59, and that of workers who work at a different job, over age. The graph in the left column of Figure 4¹⁴ confirms that more workers stay in the same employer after the age of 60 in the affected cohorts (i.e., born 1946 or later) than the older cohorts. Taking average over 61 years and 0–11 month olds, the ratio of remaining the same employer since 59 years old increased by 5.5 percentage point, from 51.4% for those born in 1943–45 to 56.8% for those born in 1946–48. Since the increase in total employment rate of the same cohorts during the same period is 3.9 percentage points, the increase in employment due to the EESL revision can be fully explained by the increase in staying incumbents who used to retire before the revision.

¹⁴ Note that the sample includes who were not employed at the age of 59, thus the ratio at exactly 59 years old is not 100%.

The right column of Figure 4 shows the proportion of workers who work at a different employer than one by which they were employed at the age of 59. Again, taking average over 61 years and 0–11 month olds, the ratio of workers who work at a different employer than one by which they were employed at the age of 59 is 19.2% for those born in 1943–45 and 18.1% for those born in 1946–48. The decrease in the ratio of workers who switch employers is very small, suggesting that the increase in staying incumbents did not crowd out new hires of the elderly.

6 Concluding remarks

Aging population imposes enormous pressure on the stability of social security system. One way to maintain the social security system is to ensure that the elderly continue to stay in employment longer. To understand the effectiveness of such a policy, we examine the revision of the EESL in Japan, which legally obliged employers to introduce a system to continue employment up to the pension eligibility age.

We find that the revision actually increased the employment rate of men in the affected cohorts in their early 60s. This result indicates that the limited labor demand is likely to be a binding constraint for policies attempting to promote employment among older workers. Furthermore, the increase in workers who remain in the same employer does not lead to a decline in the number of workers who switch employers. This result suggests that the increase in staying incumbents does not hinder the mobility of elderly workers who left other employers.

Lastly, it is important to emphasize that it had not been prohibited to hire workers older than the mandatory retirement age of 60 even before the revision of the EESL.

Therefore, the increase in employment after the EESL revision can be viewed as a distortion brought to the market by a government intervention. If the EESL actually forces employers to hire workers whom they would not hire otherwise, there must be some adjustment in response to this forced employment. Apparently, the EESL does not seem to have any discernible costs to elderly workers. Then, who bear the costs? Examining what kind of adjustment employers make and who were affected – e.g. whether firms limit new hires or induce quitting before the age of 60 – is left as the avenue for future work.

References

- Abe, Yukiko.** 2011. "Employees' Pension Benefits and the Labor Supply of Older Japanese Workers, 1980s-1990s." *Aging Issues in the United States and Japan*, Seiritsu Ogura, Toshiaki Tachibanaki and David Wise eds. The University of Chicago Press, pp.273-305.
- Behaghel, Luc and David M. Blau.** 2012. "Framing Social Security Reform: Behavioral Responses to Changes in the Full Retirement Age." *American Economic Journal: Economic Policy*, 4(4): 41–67.
- Behaghel, Luc, Bruno Crépon, and Béatrice Sédillot.** 2008. "The perverse effects of partial employment protection reform: the case of French older workers." *Journal of Public Economics* 92: 696–721.
- Clark, Robert L., and Naohiro Ogawa.** 1992. "Mandatory retirement and earnings profiles in Japan." *Industrial and Labor Relations Review*, 45: 258–266.
- Ishii, Kayoko and Masako Kurosawa.** 2009. "Pension Reform and the Labor Supply Effect for Elderly Males." *The Japanese Journal of Labour Studies*, 589: 43–64. (in Japanese).
- Krueger, Alan B. and Jorn-Steffen Pischke.** 1992. "The effect of social security on labor supply: a cohort analysis of the notch generation." *Journal of Labor Economics*, 10(4): 412–437
- Lazear, Edward P.** 1979. "Why Is There Mandatory Retirement?" *Journal of Political Economy*, 87: 1261–1284.
- Lee, David S., and David Card.** 2008 "Regression Discontinuity Inference with Specification Error." *Journal of Econometrics*, 142(2): 655–674.
- Manoli, Day and Andrea Weber.** 2012. "The Effects of Increasing the Early Retirement Age on Social Security Claims and Job Exits." *Mimeo*.
- Mastrobuoni, Giovanni.** 2009. "Labor Supply Effects of the Recent Social Security Benefit Cuts: Empirical Estimates Using Cohort Discontinuities." *Journal of Public Economics*, 93: 1224–33.
- Neumark, D. and J. Song,** 2013. "Do stringer Age Discrimination Laws Make Social Security Reforms More Effective?" *mimeo*, University of California, Irvine.
- Neumark, David and Wendy Stock.** 1999. "Age Discrimination Laws and Labor Market Efficiency." *Journal of Political Economy*, 107(5): 1081–1125.

Oishi, Akiko and Takashi Oshio. 2000. "Social Security Wealth and Retirement Decision." *The Japanese Journal of Social Security Policy*, 35 (4), pp. 405-419.

Schnalzenberger, Mario and Rudolf Winter-Ebmer. 2009. "Layoff tax and employment of the elderly." *Labour Economics*, 16: 618-624.

Shannon, M. and Grierson, D. 2004. "Mandatory Retirement and Older Worker Employment." *Canadian Journal of Economics*, Vol. 37, No. 3. pp. 528-551

Von Wachter, Till. 2002. "The End of Mandatory Retirement in the US: Effects on Retirement and Implicit Contracts." *Center for Labor Economics Working Paper No. 49*, University of California Berkeley.

Yamamoto, Isamu. 2008. "*Konenreisha Koyo Anteiho Kaisei no Kokabunseki* (Analyses of the effects of the EESL revision)." in Yoshio Higuchi and Miki Seko Eds, *Nihon-no Kakei Kodo no Dynamism IV: Seido Seisaku noHenko to Shugyo Kodo*, Keio University Press. (in Japanese).

Appendix: Japan's Public Pension System and Gradual Rise in Eligibility Age

Japan's public pension system consists of three subsystems, and everyone at age 20–60 is mandated to enroll in one of them: Employee's Pension for employees of private companies, Mutual Aid Pension for public servants, and National Pension for others.¹⁵

People who have enrolled only in the National Pension are supposed to receive so called “basic” benefits from the age of 65. Enrollees of Employee's Pension or Mutual Aid Pension pay extra premium, which is proportional to their earnings, and they are supposed to receive extra benefits after retirement.

More specifically, the benefits for Employee's Pension Plan consist of the basic part, which are determined only by the number of months that the person had paid the contribution, and the proportional part, which is proportional to the amount of premiums paid in the past. The basic part is designed to be equivalent to the basic benefit of National Pension Plan, except that the eligibility age for National Pension benefits has been 65 since the introduction of the system in 1961, whereas the eligibility age for Employee's pension benefits had been 60 until 2001.

The pension reform plan enacted in 1994 announced that the eligibility age for basic part of Employee's Pension would be raised from 60 to 65. The timing of the change for male is summarized in the right columns of Table 2 in the main text. For female, the reform on pension eligibility age is going to take place 5 years after the change for male. The same reform was implemented to Mutual Aid Pension Plan for public sector employees, except that there is no delay in timing of rises for female.

¹⁵ In Japanese, Employee's Pension, Mutual Aid Pension, and National Pension are called *Kosei Nenkin*, *Kyosai Nenkin*, and *Kokumin Nenkin*, respectively.

In the meantime, the eligibility age for the proportional part has remained 60 until 2013, although it is also supposed to be raised to 65 by 2025. According to the Annual Report of Social Security, the monthly benefit of the basic part is about 56,000 yen, and the average monthly benefit of the proportional part is about 93,000 yen, though the amount of the proportional part varies a lot depending on the earnings before retirement. Although it is possible to receive pension benefits while working, the amount of monthly pension benefit is reduced as earnings of the recipient increases.¹⁶

Appendix Figure A1 plots the labor force participation rate and the employment to population ratio of the following three cohorts: born in 1939–40, 1941–42, and 1943–44. The eligibility age for the basic pension for these three cohorts is 60, 61, and 62, respectively as shown in Table 2 in the main text. Although there is no visible difference between cohorts born in 1939–40 and 1941–42 for both outcome variables, there is a slight increase in labor force participation and a clearer increase in employment for cohorts born in 1943–44.

The lack of changes between cohorts born in 1939–40 and 1941–42 may be because workers who actually retired can claim unemployment benefit by pretending to be seeking for a job. The unemployment benefits typically pays a half of the previous salary up to 150 days, and this could help retired workers to partially fill the loss of basic pension benefit for one year. Note that it is not allowed to receive both the old age pension and unemployment benefits simultaneously. Thus, if the amount of

¹⁶ Specifically, if the sum of pension benefit and earnings exceeds 280,000 yen/month, (the sum of pension benefit and earnings – 280,000 yen)/2 is subtracted from the pension benefit. Furthermore, the sum of pension benefit and earnings exceeds 460,000 yen, (the sum of pension benefit and earnings – 460,000 yen) is subtracted, i.e., the sum of pension benefit and earnings never exceeds 460,000 yen. In addition, until 2004, all recipients with positive earnings received 20% reduction in their pension benefit, regardless of their earnings.

unemployment benefit exceeds the basic part of the pension, which is quite likely, the actual loss of benefit is only about half a year.

However, when the gap between the retirement and the eligibility for full pension benefit became two years, the unemployment benefit is not likely to be enough to cover the gap. This may be the reason why labor force participation and employment increased for cohorts born in 1943–44. Another potential reason of the higher employment rate for the cohorts born in 1943–44, especially at the ages of 63 and 64, is the abolition of the 20% reduction rule for pension recipients with positive earnings. Yet, compared to Figure 1 in the main text, the changes in the outcomes are smaller than the case of the EESL revision.

Table 1: Major revisions of Elderly Employment Stabilization Law and related pension reforms; 1986-2011

year	Employment		Pension	
	Contents	Cohort affected	Contents	Cohort affected
1986	Obligation to make an effort not to set the mandatory retirement age younger than 60	1926-		
1990	Obligation to make an effort to continue employment after mandatory retirement age	1930-		
1994	Announcement that mandatory retirement younger than 60 would be prohibited from 1998		Announcement of the gradual rises in eligibility age of Old-age Basic Pension from 2001	
1998	Mandatory retirement younger than 60 became illegal Obligation to make effort to continue employment until age 65	1938-		
2001			The eligibility age of Old-age Basic Pension started to rise (by one year of age in every two years until 2013)	1941-
2004	Announcement that continuing employment until the pension eligibility age would be legally mandated from 2006.		Revision of Old-age Employees' Pension earnings test to encourage labor supply.	
2006	Legal obligation to continue employment until the pension eligibility age	1946-		

Table 2: Legal lower limit of mandatory retirement age and age until which employers are obliged to continue employment

Cohort born	Legal lower limit of mandatory retirement age	Age until which employers are legally obliged to continue employment	Eligibility age of Old-age Employee's Basic Pension
1938	60	60	60
1939	60	60	60
1940	60	60	60
1941	60	60	61
1942	60	60	61
1943	60	60	62
1944	60	60	62
1945	60	60	63
1946	60	63	63
1947	60	64	64
1948	60	64	64
1949	60	65	65
1950	60	65	65

Table 3: Summary statistics**A. From basic questionnaire**

	All	By cohort groups		
	1938–1950	1938–1940	1941–1945	1946–1950
Sample size	800,943	189,939	315,356	295,648
Labor force	76%	73%	73.9%	80.5%
Employed	71%	68%	69.2%	76.0%
Unemployed	5%	5%	4.7%	4.5%
Self employed	16.0%	18%	15.8%	15.6%

B. From special questionnaire

	All	By cohort groups	
	1943–1948	1943–1945	1946–1948
Sample size	95,412	43,941	51,471
Labor Force	77.0%	74.5%	79.2%
Employed	72.6%	70.1%	74.9%
Regular staffs	38.4%	36.5%	39.9%
Non-regular staffs	17.8%	17.4%	18.1%
Unemployed	4.4%	4.5%	4.3%
Education			
High school or less	70.1	72.4	68.2
Jr. college	4.6	4.2	5.0
4yr college or more	20.1	18.5	21.4
Never go to school	0.2	0.2	0.1
Unknown	5.0	4.8	5.2

Note: Data come from Labour Force Survey. The sample is limited to 58-65 years old male.

Table 4: RD Estimates at Age 60

Cohort	LFP		Employed		Self-employed		N
	(1)	(2)	(3)	(4)	(5)	(6)	
1939–1940	-4.63*** (0.63)	-4.75*** (0.63)	-10.30*** (0.76)	-10.46*** (0.74)	-0.25 (0.98)	-0.30 (0.93)	34,040
1941–1942	-4.35*** (0.75)	-4.25*** (0.59)	-12.50*** (0.82)	-12.34*** (0.70)	-1.81** (0.91)	-1.82** (0.80)	36,506
1943–1944	-3.95*** (0.69)	-4.04*** (0.73)	-9.63*** (0.76)	-9.77*** (0.71)	0.06 (0.95)	0.06 (0.95)	33,697
1945	-5.61*** (1.09)	-5.62*** (1.09)	-11.56*** (1.22)	-11.57*** (1.20)	-2.53*** (0.93)	-2.53*** (0.94)	11,992
1946	-3.09*** (0.61)	-3.22*** (0.63)	-7.03*** (0.79)	-7.19*** (0.78)	0.30 (0.97)	0.27 (0.96)	16,925
1947–1948	-2.63*** (0.51)	-2.46*** (0.44)	-6.27*** (0.93)	-6.00*** (0.80)	-0.49 (0.76)	-0.61 (0.72)	43,642
1949–1950	-2.03*** (0.67)	-2.10*** (0.71)	-6.64*** (0.94)	-6.74*** (0.88)	-0.01 (0.57)	0.08 (0.61)	39,156
Exact age dummy	X	X	X	X	X	X	
Unemployment rate		X		X		X	

Note: Data are taken from basic questionnaire of Labour Force Survey. Each cell is the estimate from separate estimated regression discontinuities at age 60. The specification is a linear in age, fully interacted with dummy for age 60 or older among people between ages 59-61, and controls listed at the last rows. The exact age dummy is a dummy that takes one for those just at age 60. Unemployment rate is the regional unemployment rate at 9 regions in Japan. Robust standard errors clustered at age in months are in parenthesis. ***, **, * denote significance at the 1%, 5% and 10% levels respectively. All coefficients on RD estimates and their standard errors have been multiplied by 100, so they can be interpreted as percentage changes.

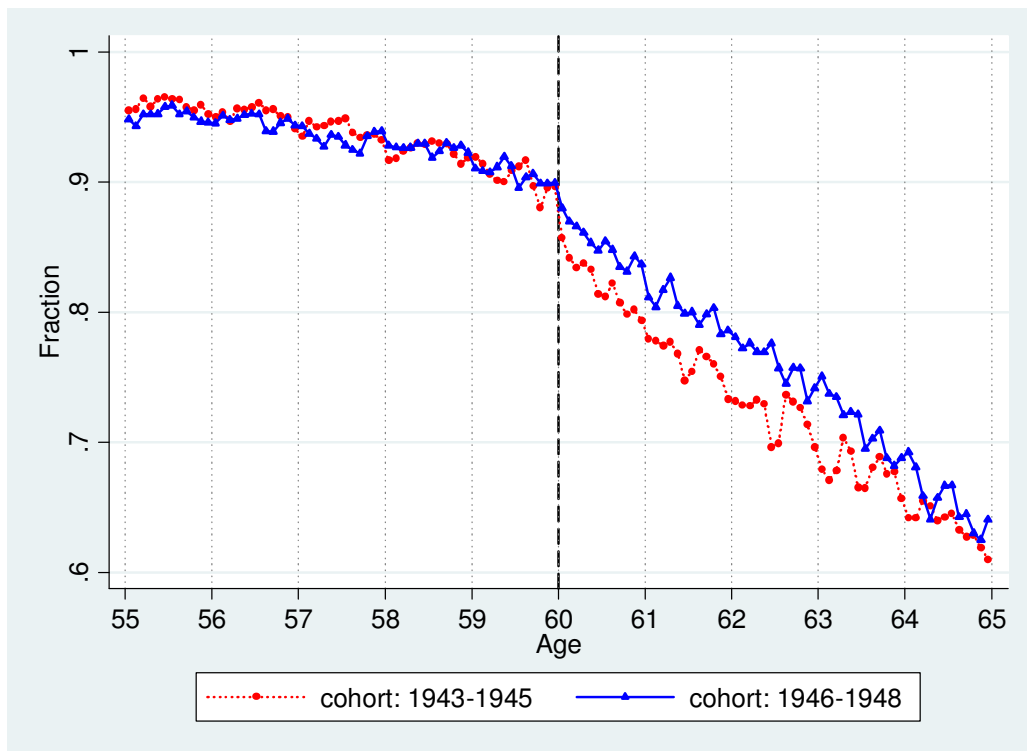
Table 5: Relative changes in retirement age

	Labor force	Employment
1938	-0.037** (0.019)	-0.151*** (0.020)
1939	-0.074*** (0.019)	-0.146*** (0.020)
1940	-0.079*** (0.019)	-0.133*** (0.020)
1941	-0.031 (0.019)	-0.083*** (0.020)
1942	-0.091*** (0.019)	-0.140*** (0.018)
1943	0.008 (0.019)	-0.025 (0.020)
1944	0.053*** (0.019)	0.026 (0.020)
1945	Base Year	
1946	0.174*** (0.018)	0.164*** (0.019)
1947	0.247*** (0.018)	0.245*** (0.019)

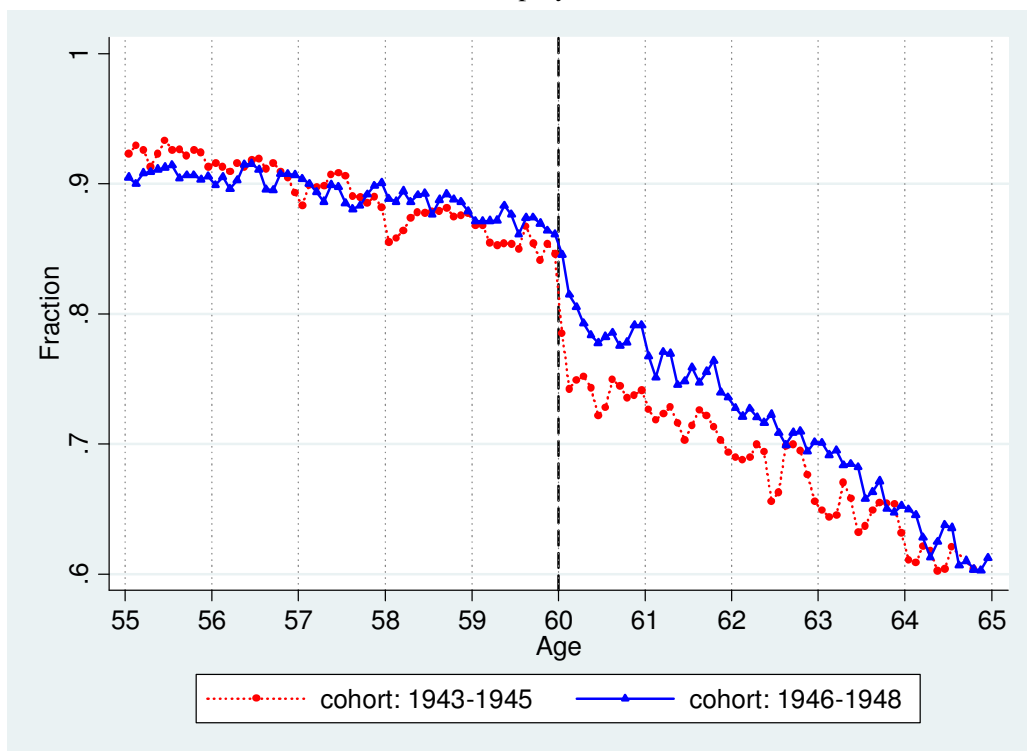
Note: Data are taken from basic questionnaire of Labour Force Survey. Each cell reports estimated relative changes of retirement age of cohort b , $T(b) = \sum_{a=59}^{65} \beta_{a,b}$ from separate regressions of equation (2) for each cohort. Standard errors are in parenthesis. ***, **, * denote significance at the 1%, 5% and 10% levels respectively, obtained from the test for $T(b) \neq 0$. Baseline is cohort born in the fiscal year 1940.

**Figure 1: Age Profiles of Employment Status
for Cohorts born Before and After 1946**

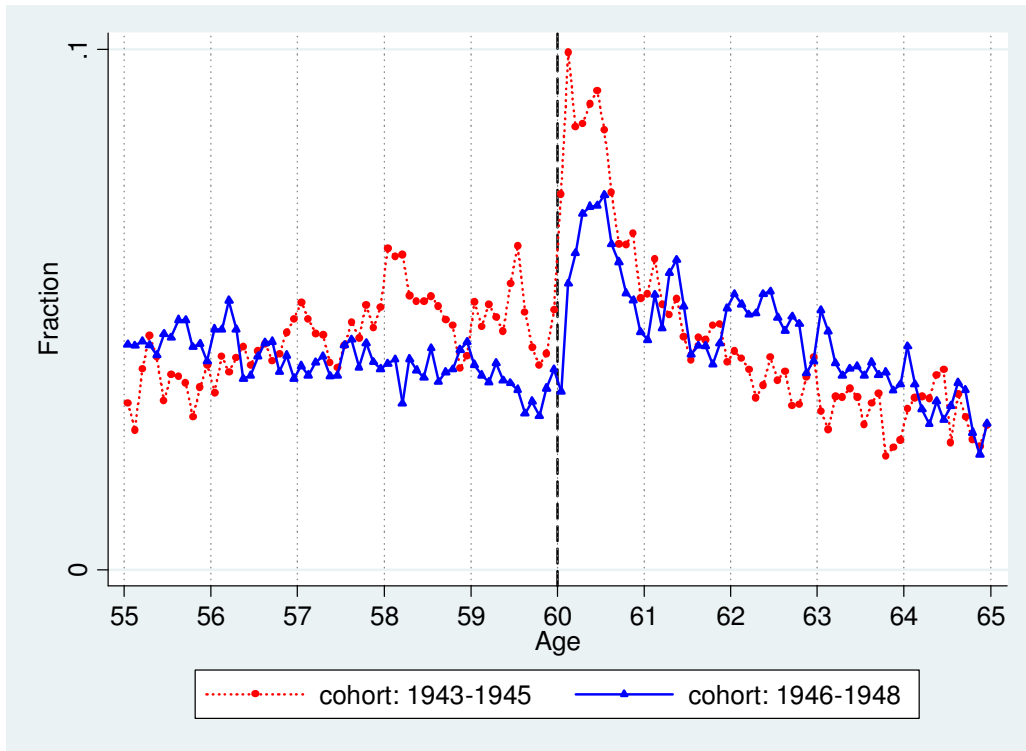
A. Labor force participation



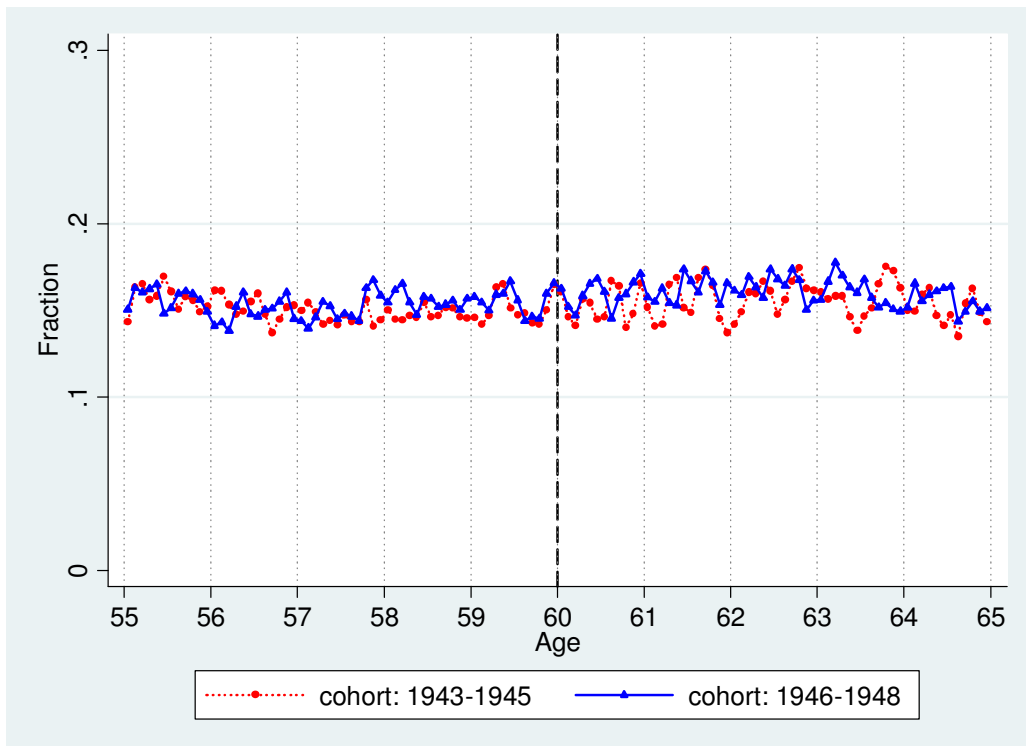
B. Employed



C. Unemployed

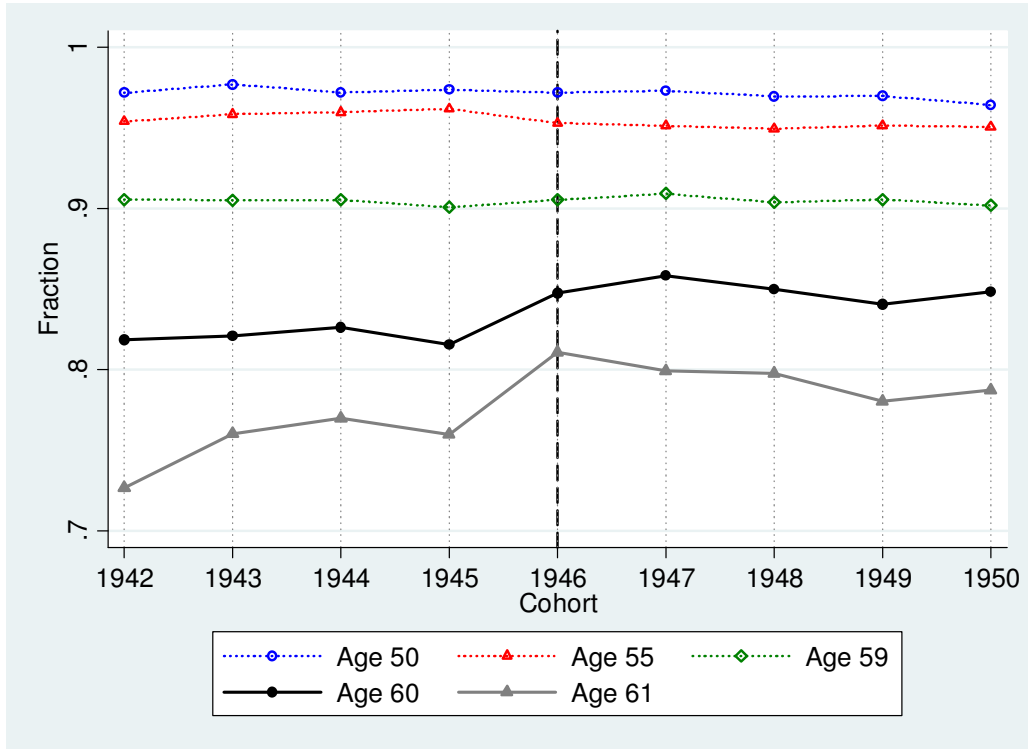


D. Self-employed

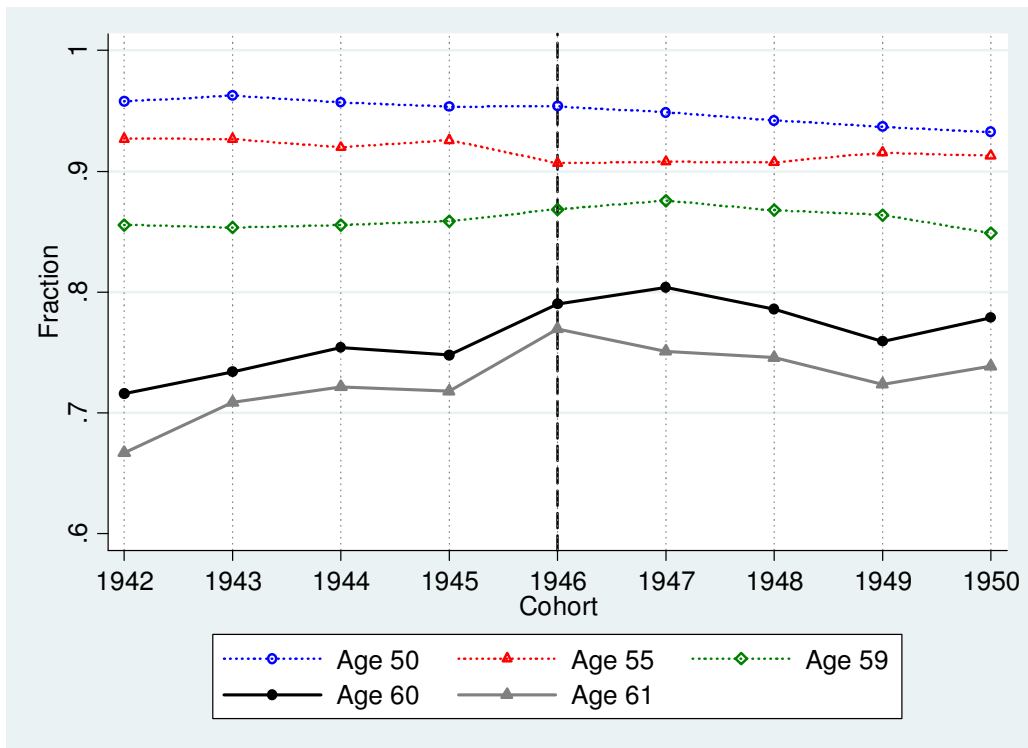


Note: Data come from the basic questionnaire of Labour Force Survey, and the markers represent the averages of outcomes at age in month.

Figure 2: Cohort Comparison at the Same Age
A. Labor force participation

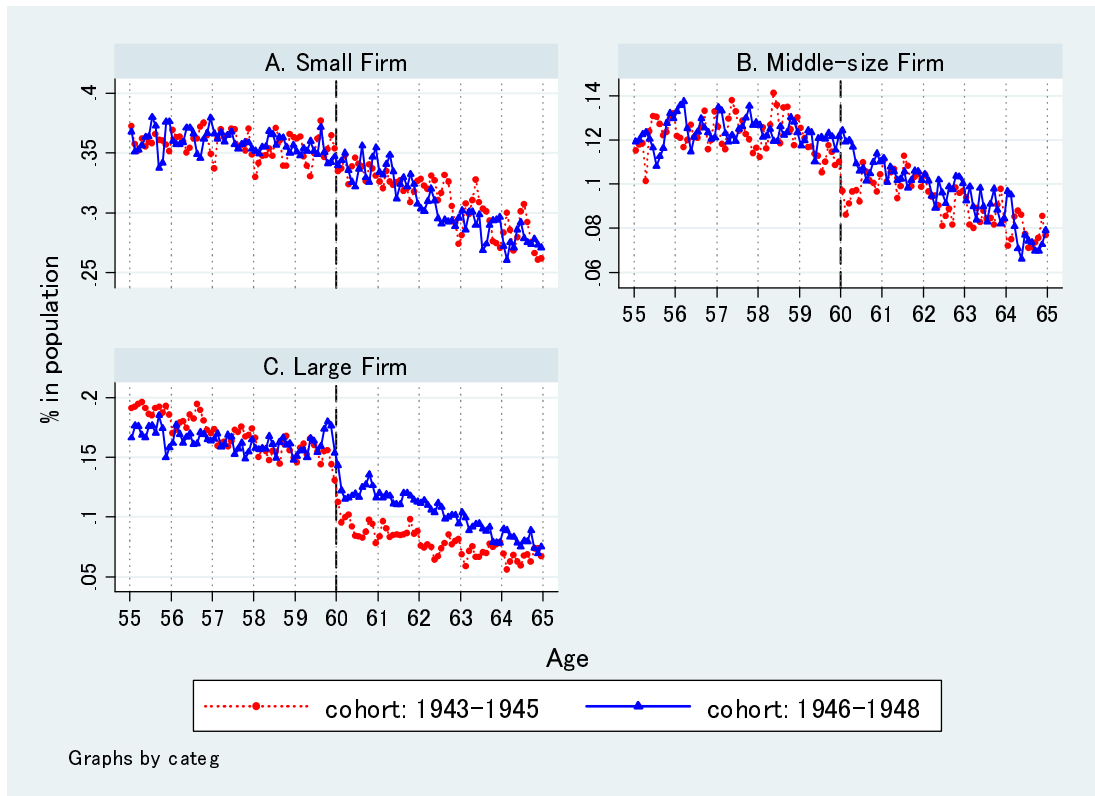


B. Employed



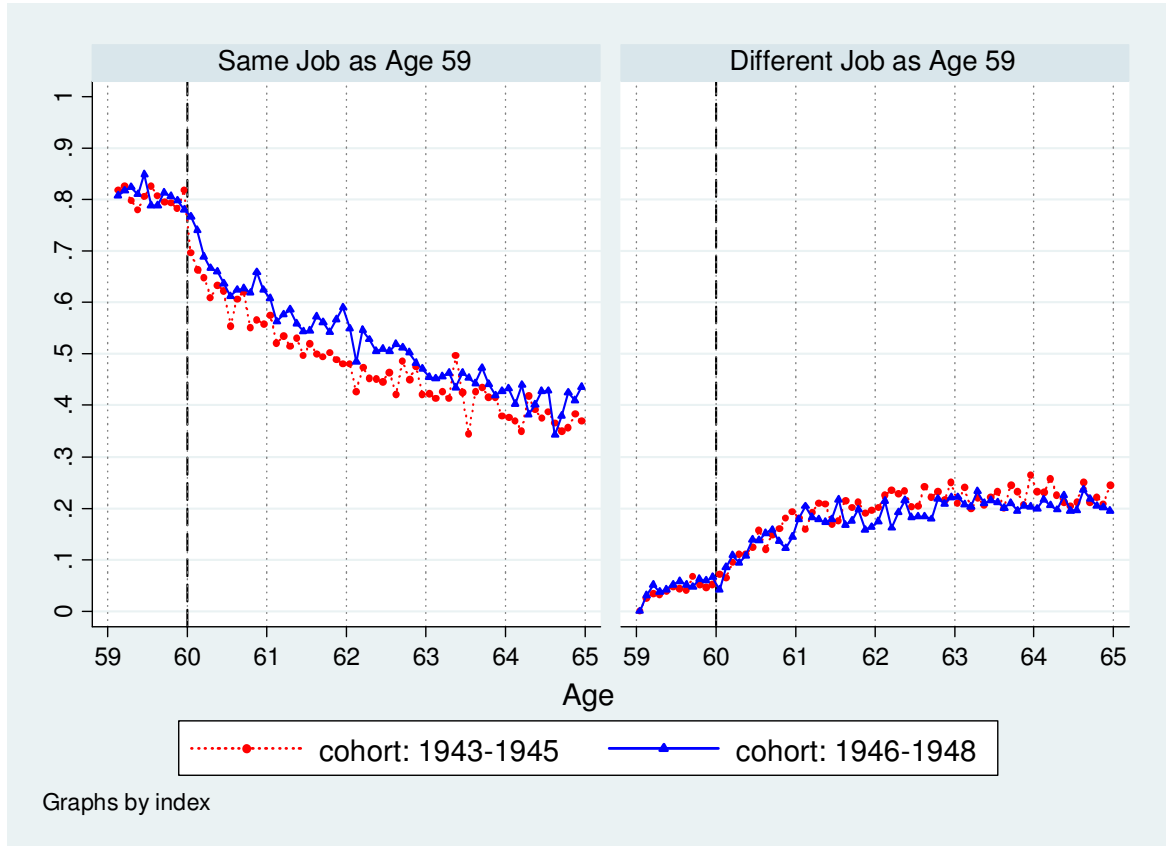
Note: Data are taken from basic questionnaire of Labour Force Survey. The markers represent the averages of outcomes at age in year instead of months.

Figure 3 Employment Share by Firm-size, cohorts born before and after 1946



Note: Employees are classified by firm size as follows. Employed by a firm with less than 100 employees: small firm, with 100-499 employees: middle-size firm, with 500 or more employees: large firm. The markers represent the averages of outcomes at age in month.

Figure 4: Proportions of men who stay with the same employer and who moved to a different employer for cohorts born before and after 1946



Note: Data come from the special questionnaire. The markers represent the averages of outcomes at age in month.

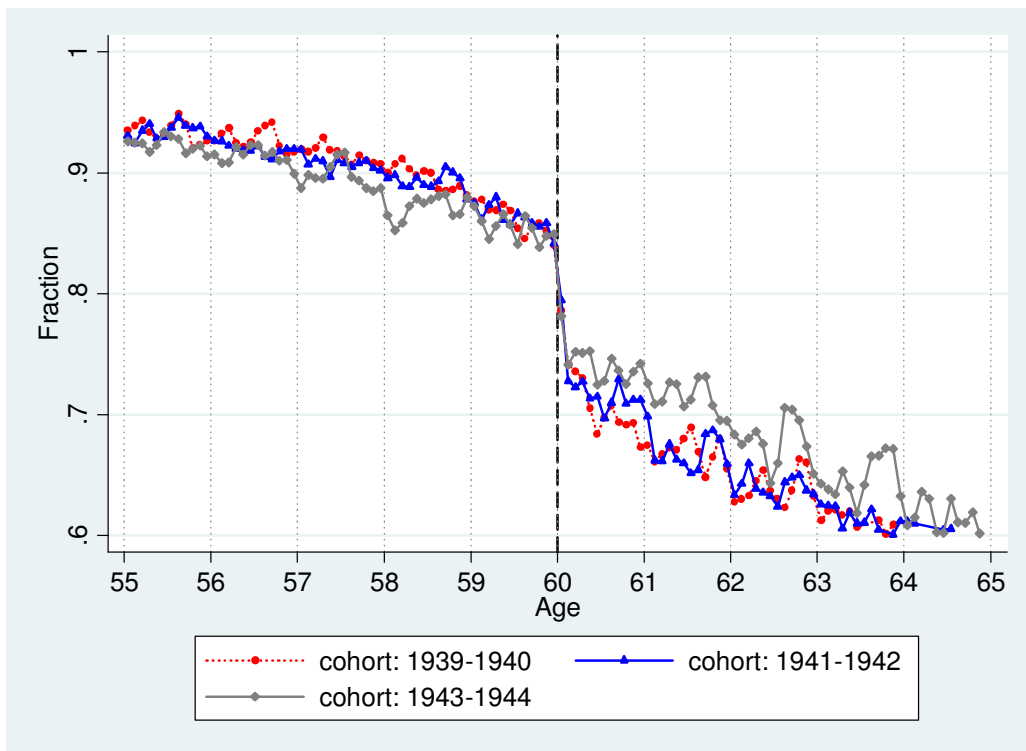
Appendix Figures and Tables

**Figure A1: Age Profiles of Employment Outcomes
for cohorts grouped by pension eligibility age**

A. Labor force participation



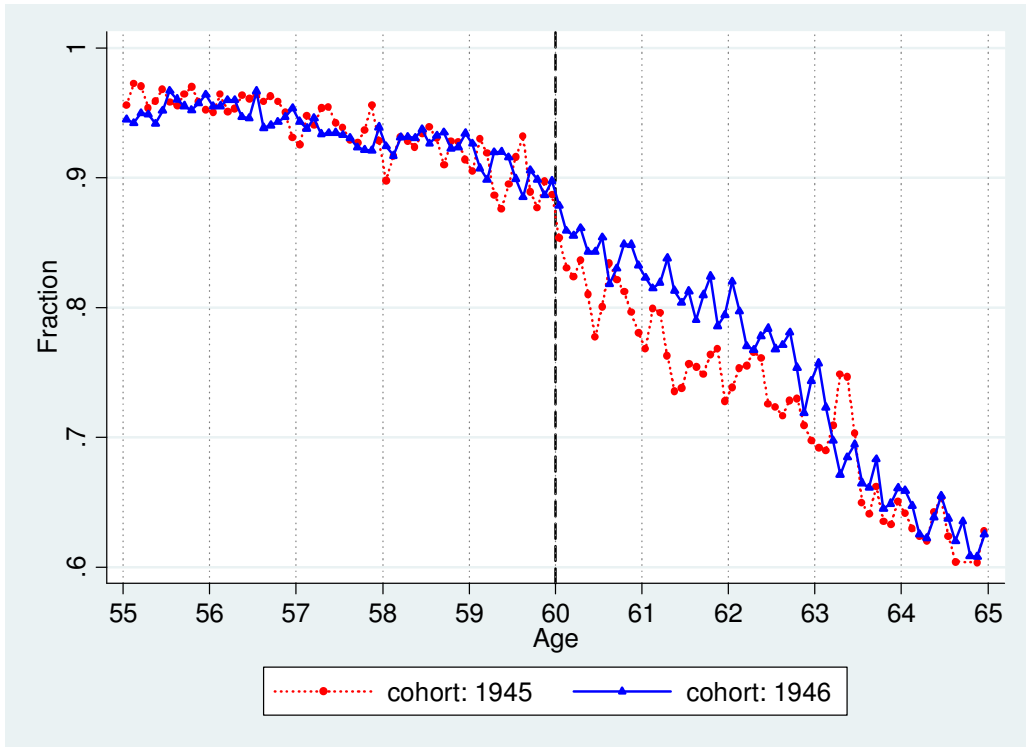
B. Employed



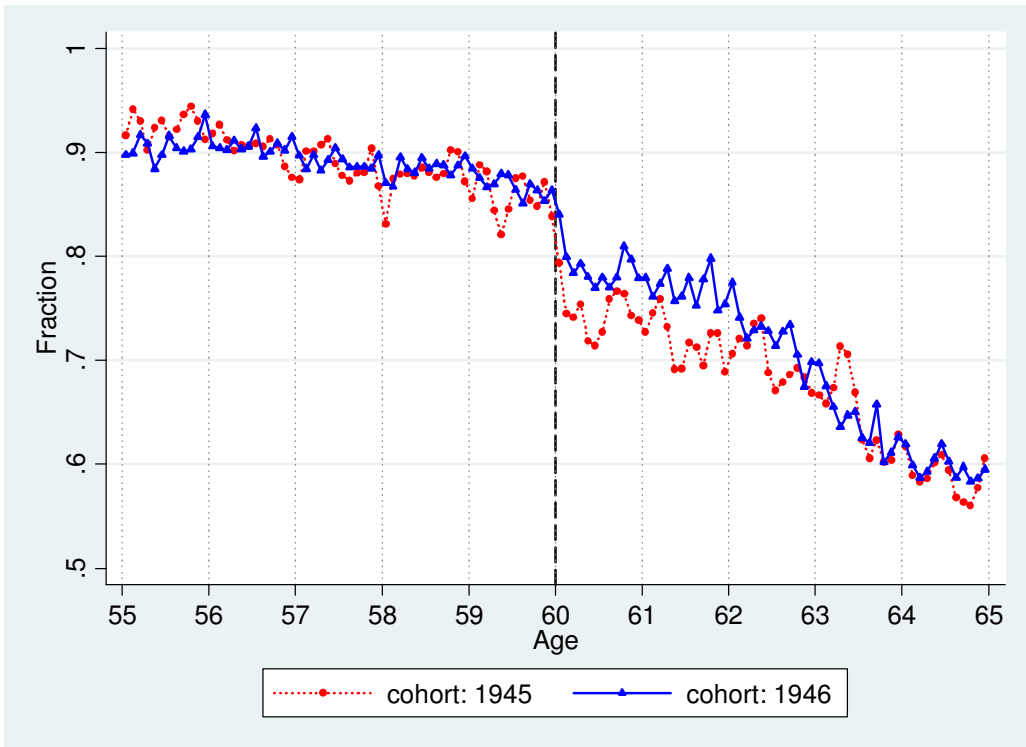
Note: Data come from the basic questionnaire. The markers represent the averages of outcomes at age in month. Pension eligibility age for cohorts born 1939-1940, 1941-1942, and 1943-1944, are 60, 61, and 62 respectively.

Figure A2: Age Profiles of Various Employment Outcomes
(cohort 1945 vs. cohort 1946)

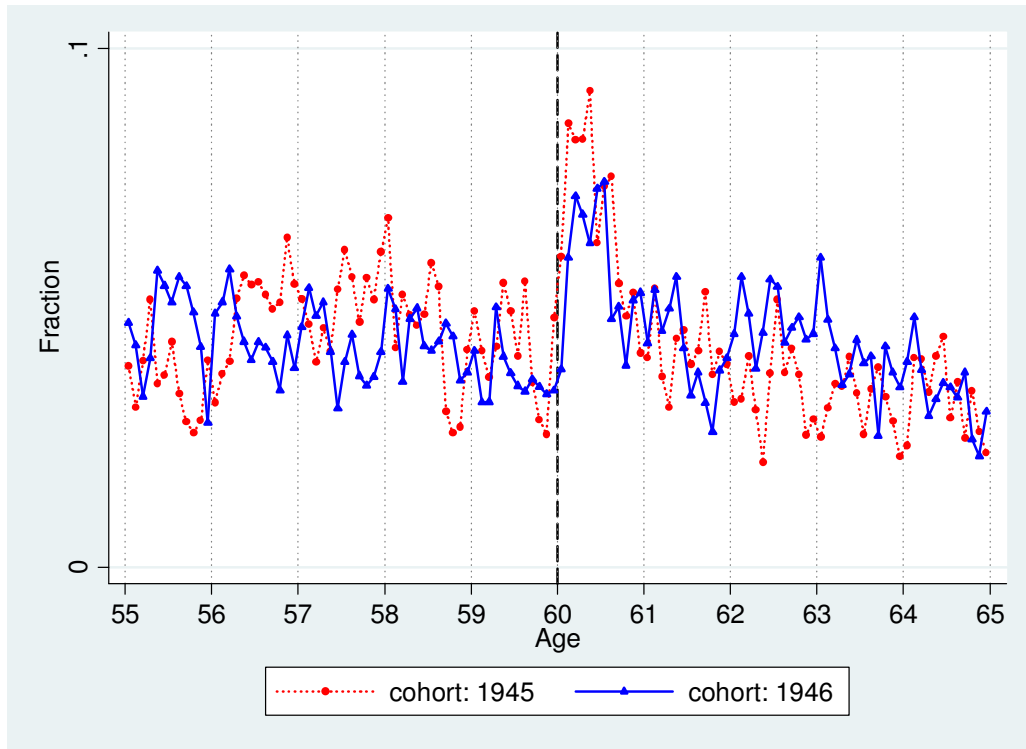
A. Labor force participation



B. Employed

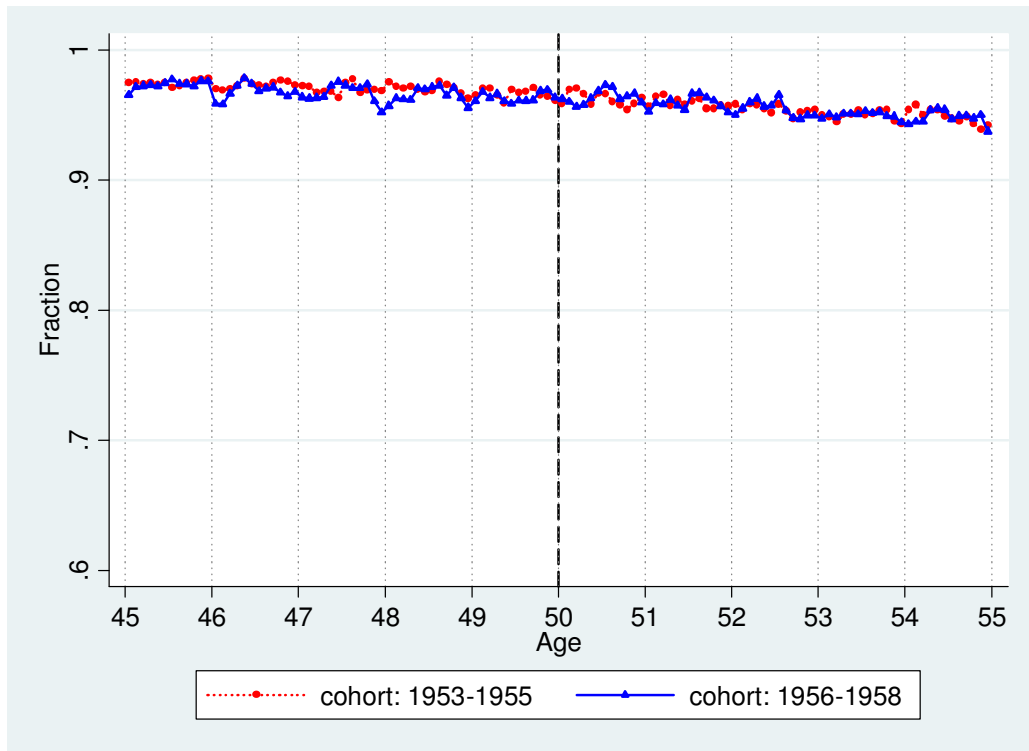


C. Unemployed

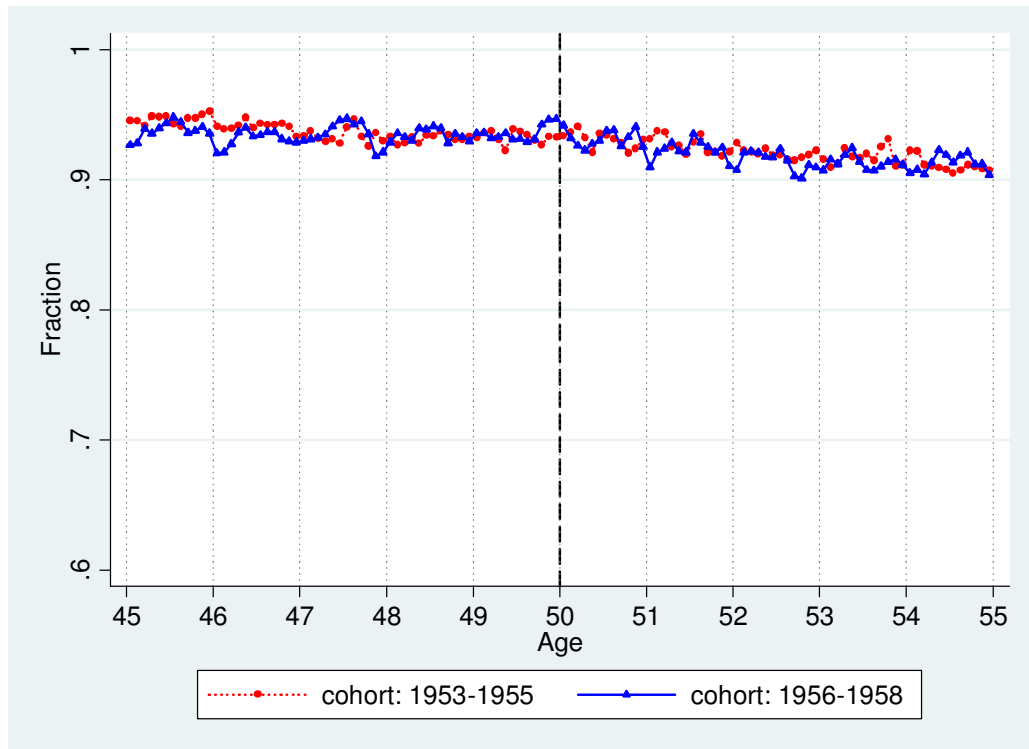


Note: Data come from the basic questionnaire of Labour Force Survey. The markers represent the averages of outcomes at age in month.

Figure A3: Age Profile of Employment Outcomes among Cohorts Who Reached 50 in Before and After the Period of EESL Revision
A. Labor force participation



B. Employed



Note: Data come from the basic questionnaire of Labour Force Survey. The markers represent the averages of outcomes at age in month.