Trends of Job Stability in Japan

Daiji Kawaguchi, Hitotsubashi University, RIETI, TCER and IZA
Yuko Ueno, Organisation for Economic Co-operation and Development

March 6, 2010

This manuscript is very preliminary and not for citation.

1. Introduction

Newspaper articles and TV programs frequently report downsizing of well-known companies, outsourcing of jobs to developing countries and increase of workers under flexible contractual arrangements. These reports create an impression that job stability in developed countries are falling and create unsecured feeling among workers. In contrast to the pile of anecdotal evidence for the declining job stability, researchers have not reached a consensus about the long term trends of job stability in several developed countries. They reach somewhat different conclusions because of the difference of the concepts and measurements of job stability and the difference of the data set they rely on. The book edited by Neumark (2000) includes studies based on different methodologies and data in the US and Neumark summarized the included studies as they point to the declining job stability but its quantitative degree is not very significant.

The bond between firms and workers in Japan is perceived to be stronger than that of the US and the long term evolution of its strength has attracted much attention in recent years. Hashimoto and Raisian (1985) was the first rigorous work that provided results of an intensive examination on Japan's long-term employment relationship in comparison with the relationship in the US. They estimated fifteen-year job retention rates by using Japanese employment surveys and concluded that they were considerably higher in Japan than those in the US among all age categories of male employees for the 1962-1977 period.

Recent studies follow up how this stronger tie between firms and employees in Japan evolved in this three decades. Ono (2010) examined various concepts and methodologies to estimate lifetime employment by using several different data sources and concluded that only to a limited segment of the labor force, which corresponded to around 20 percent of the total labor force, is under the life-time employment today. He also discussed that while some indicators including the share of the core workforce, and full-time employment suggest a decline in lifetime employment, the others (e.g. the

proportion of lifetime workers) show an upward trend or no change.

Kambayashi and Kato (2008) employed the Employment Status Survey (ESS) and examined the changes in ten-year job retention rates before and after the Bubble Burst. Regarding the "lifetime employment" (i.e. (i) being hired as a regular employee and (ii) being employed immediately following school graduation), their findings revealed that the system remained almost stable through the period of stagnation after the Bubble Burst, particularly among the male college graduates. On the other hand, they also found that the rates of regular employees fell significantly from the 1982-1992 period to 1992-2002 period. In particular, certain subsets of the Japanese labor force, including female regular employees of mid-career hires, or high-school graduates, experienced significant changes in the job retention rates compared with the other categories of employees.

Shimizutani and Yokoyama (2009) followed up the study by Chuma (1998) and used BSWS. They argued that both the mean and variance of the years of tenure for full-time permanent workers grew between 1990 and 2003. They decomposed the factors for the changes in the distribution of tenure years and concluded that their changes after the 1990s were mainly linked to the changes in the impact of worker and firm attributes on the tenure years, instead of distributional change in those attributes. They also observed a divergence in tenure length among permanent full-time workers through the same period.

Faber (2007) compared the job stability in the US and Japan. He first reported that the average years of job tenure conditional on workers' age is longer in Japan than in the US in the early 2000s. He then compared the trends of job stability of two countries and concluded that US job stability had significantly declined, but Japanese job stability had not declined among permanent regular workers. He reports that Japanese employers became more relying on part-time employment for attaining flexibility. The data availability did not allow him to produce comparable figures for the US and Japan.

Overall, the studies based on BSWS generally point out that the job stability of regular employees have been stable while the fraction of non-regular employees without job security have increased (Chuma(1998) and Shimizutani and Yokoyama (2009)). On the contrary, the study based on ESS reports the declining job stability among a part of regular employees as well as the increase of non-regular employees (Kambayashi and Kato (2009)).

This paper documents the secular change of job stability based on micro data of both ESS and BSWS. Using the method used by Farber (2007) to analyze US data to compare the secular change of job stability with the US. The analysis based on ESS and

BSWS draw different pictures on the secular trends of job stability in Japan.

The analysis based on ESS implies the secular decline of average years of job tenure among the workers born after 1945. Workers who were born in 1970 have 20 percent shorter years of job tenure than workers who were born in 1945 and this decline is quantitatively similar to the US as reported by Farber (2007). On the contrary, the analysis based on BSWS implies that the average years of job tenure among male workers does not change except for the workers who are born after the mid 1970s who presumably entered the labor market after the Japanese long-term stagnation. Female analysis based on ESS indicates the average years of job tenure compared with the 1945 born cohort had declined after the birth cohort of the 1960s. In contrast, the average job tenure had increased until the birth cohort of the 1972, and declined afterward. In sum, the analysis based on ESS reports the gradual decline of job stability among male workers born after 1945 and female workers born after 1960. On the contrary, the analysis based on BSWS implies a constancy of job stability among male workers and a increase and decrease of it among female workers.

The discrepancy of the results based on ESS and BSWS is attributable to the difference of the sampling schemes of both surveys. ESS is a household survey that is comparable to the Current Population Survey in the US, whereas BSWS is an establishment survey that records individual workers' years of job tenure based on payroll records of establishments. The comparison of ESS and BSWS reveals that the sampling of BSWS establishments are biased toward larger scale firms in manufacturing sectors. An Adjustment of the difference of the sampling probability of a establishment by firm sizes and industries is found to contribute to reduce the discrepancy, but it does not fill the gap. The sampling procedure of BSWS tends to include establishments with longer business histories and the establishments' payroll records are more likely to include directly hired workers with traditional employment contracts. We conclude that the difference of the sampling structure of ESS and BSWS creates the discrepancy of the results. In sum, Japanese workers enjoy higher job stability than the US counterparts but both workers have experienced the quantitatively similar decline of job stability as far as the analysis are based on comparable household surveys and a consistent method.

The rest of the paper is organized as follows. Section 2 introduces two data sets, ESS and BSWS, in detail. Section 3 reports the change of the average years of job tenure by birth cohort based on ESS and BSWS. Section 4 discusses the discrepancy of the results based on ESS and BSWS and attempts to fill the gap of analysis based on two surveys using reweighting procedure. Section 5 summarizes the findings of the analysis and derives its implications.

2. Two Data Sets on Job Tenure

Two datasets are exploited in this study to examine the change in job tenure distributions in last two decades. The first data set used in this study is micro data from the Employment Status Survey (ESS, *Shugyo Kozo Kihon Chosa*) for the years 1982, 1987, 1992, 1997, and 2002. The ESS is conducted every 5 years on household members age 15 or older in approximately 440,000 households dwelling in sampled units that cover the complete population.[1] The survey collects information on household members and each member's labor force status on October 1 of each survey year.

This study utilizes micro data and extracts information on age, educational attainment, employment status, and the years of tenure with current employer.[2] If the workers are doing more than one job, they are requested to provide information with regards to their major jobs. The file contains about 1 million individuals with a half-million males and a half-million females for each year that the survey was conducted. The analysis sample is restricted to those ages 20-64. The sample only includes employed workers, which excludes self-employed and family workers. The sample is further restricted to observations with a valid age, educational background, and employment status. Those without job tenure conditioned on being employed are dropped.

Data on how long workers have been with their current employer is available both in the Basic Survey of Wage Structure between 1989 and 2006 for every June, and the Survey on Employment Structure as of 1 October of 1987, 1992, 1997, and 2002. We limit our analysis on workers who have already graduated school, are currently employed, and called either regular workers, temporary workers, daily workers, or executive officials. We also limit the analysis for workers who were born between 1922 and 1984, to exclude the sample who had already reached the usual retirement age (i.e. 60 years old) at the point of the earliest survey (1982), and also to exclude those who had not yet reached the age of high-school graduation (i.e. 18 years old) at the point of the latest survey (2002). As a result, our analysis sample includes workers born in the six decades from the 1920s and 1970s[3].

---

[1] Foreign diplomats, foreign military personnel and their dependents, persons dwelling in camps or ships of the Self Defense Force, and persons serving sentences in correctional institutions are excluded.

[2] For 2002, the year and month of starting date with current employer is recorded.

[3] The 1970 decade includes workers born between 1980 and 1984.

The second data set used in this study is micro data from the Basic Survey on Wage Structure (BSWS, *Chingin Kozo Kihon Chosa*), compiled annually by the Japanese government between 1989 and 2006. This survey is conducted in June of every year and includes observations randomly chosen from almost all regions and industries in Japan except for agriculture. The annual number of observations is approximately 1.5 million workers from 60-70 thousand establishments. The sample includes all establishments with 10 or more employees in both private and public sectors and all establishments that belong to private firms with 5 to 9 employees.

The establishments in the sample are randomly chosen in proportion to the size of prefectures, industries, and number of employees from the Establishment and Enterprise Census (EEC hereafter), which lists all establishments in Japan.[4] In addition to filling an establishment survey, the randomly selected establishments are asked to randomly extract their workers' information from their payroll records at individual worker level.[5] The establishment and individual files were merged using an establishment identification number.

The unit of analysis is an individual worker with relevant information from the establishment to which he/she belongs. Among the variables related to workers' characteristics, job tenure with the current firm in June is available. Specifically, the survey instrument asks a respondent of an establishment to fill the years of tenure at the company to which the establishment belongs for each randomly selected worker from the establishment payroll record. Other variables include age, sex, educational attainment, full-time/part-time status, type of work or job, employment status (with or without permanent status), several measures of wages in June, bonus payment in the last year, working days/hours, as well as the firm's attributes, including the number of permanent workers (*Joyo Rodo Sha*),[6] firm size, industry, and location.

---

[4] This list is revised every 2-5 years. Of the years relevant to our analysis, the lists were revised in 1986, 1991, 1994, 1996, 1999, and 2001. The BSWS 1989-1992 sample is randomly picked from the 1986 EEC list, the 1993-1995 sample is from the 1991 list, the 1996-1997 sample is from the 1994 list, the 1998-2001 sample is from the 1996 list, and the 2002-2003 sample is from the 1999 list. While the sampling is based on the same list, about half of the establishments are chosen in two consecutive years, but only about 1/10 of the establishments in the sample are picked at the time of the list revision. We should recognize the large discontinuity of the analysis sample at the times of the list revision: 1993, 1996, 1998, and 2002.

[5] A person in charge of personnel matters in each establishment was asked to randomly choose a number of workers from its pool of employees based on the given instructions for random sampling, including the sampling probability, which depended on the establishment's size and industry.

[6] Those workers who satisfy one of the following three criteria are classified as permanent workers: 1. on contracts that do not clearly specify a contractual time period, 2. on contracts that last more than a month, or 3. on contracts that last less than a month, but on which the workers worked 18 or more days in the last two months. This classification includes part-time workers if one of the criteria above is satisfied.

Table 1 contains summary statistics on age by decade of birth and by sex. To keep consistency with the previous analysis (Farber (2006)), we limit the sample to the workers aged between 20 and 64. The earlier birth cohorts have predominantly older workers and the more recent cohorts have predominantly younger workers. No single birth cohort covers the entire age spectrum. By comparing Tables for male and female, both mean and standard deviation of ages for each cohort is quite similar for men and women. Although it is not possible to completely characterize an age distribution from this information, there are not any significant differences between men and women for all cohorts at least with regards to the mean and standard deviation among the samples of the employed.

One of the potential factors which might affect the distribution of tenure among age cohorts is the education years. Through the periods of the surveys, we should note that the average education years had increased to a certain extent both for men and women. This would directly lead to the shift of tenure distribution to the left-hand side, as the timing for workers to participate the labor force would be delayed accordingly. Such tendency is expected to have a significant impact for the shape of the entire tenure distribution, as most people used to find a permanent job upon graduation in Japan.

Table2 summarizes the proportion of workers by years of education, by sex and age cohort. As we expect, the figures for 9-11 years of education fairly decreased among more recent age cohorts of both male and female employees. The share of employees with 12 education years (i.e. high school graduates) is the greatest, but those of employees with even longer years of education (for example, university graduates) also increased among more recent cohorts for both sexes. The drastic changes started around the 1950 birth cohort, and among women, the majority of high-school graduates started to be substituted by college graduates. When we will see the changes in employee tenures by age cohort, we will take into account of the impacts of longer years of education.

Although both datasets are designed to be surveys based on random sampling, attention might be required to compare the results from each of them, as samples are collected in quite different processes. In addition, as explained earlier, the coverage of data is not exactly the same: small-size establishments (i.e. those with 1-4 workers) are not covered in BSWS, while the workers at such establishments are included in ESS samples. Focusing on industry and firm-size distribution, Table3 compares the distribution of the samples by industry and by firm-size of employers, between ESS and BSWS. We can see differences in them; for example, the share of manufacturing and finance sectors are greater than ESS, while much smaller regarding construction and

retail/wholesale sectors. Not only the industry distribution, but also the average tenures are not necessarily consistent between two datasets. The same holds for firm-size distribution; for example, the share of the workers working at firms with more than 1000 employees tends to be greater in BSWS than in ESS.

3 Average Years of Job Tenure by Birth Cohorts

3.1 Basic Results

Our goal is to estimate the change of mean job tenure by birth cohorts conditional on ages of workers exploiting the structure of repeated cross-section data. Aged workers have longer years of job tenure on average, thus workers of earlier birth year cohort have longer years of job tenure on average. By referring to the linear estimation model proposed by Farber (2006), we estimate the following linear model of the natural logarithm of tenure to estimate the change of average job tenure by birth cohort conditional on the ages of workers:

$$\ln(T_{ijk}) = C_j + A_k + \varepsilon_{ijk} , \quad (1)$$

where T_{ijk} is tenure years for employee i in birth cohort j aged k, C_j is a birth year indicator, and A_k is a years-of-age indicator. Year dummy variables are not included to attain the identification. The logarithmic specification embodies the same implicit assumption that proportional cohort effects on mean tenure are constant across ages and equivalently that the proportional age effects on mean tenure are constant across birth cohorts, as Farber (2006). When these assumptions are violated, the cohort effects averaged over age distribution and the age effects averaged over cohort distribution are estimated. In our estimation, we set the birth cohort as long as one year, as we observe several year-specific factors which might affect the mean tenure among employees and the sample size is large enough to estimate individual birth cohort effect with precision.

We estimate the model in equation (1) separately for men and women using OLS. The estimated cohort effects on mean tenure, normalized at zero for the 1945 birth cohort, are converted to percentage differences in mean tenure relative to the 1945 birth cohort as $100 \times \left[\exp(\widehat{C_j} - \widehat{C_{1945}}) - 1\right]$. These percentage differences derived from the estimation with BSWS are plotted in Figure 2 Panels A and B, and they show a general trend of decline for male and female. The patterns of decline are slightly different from male to female workers. In the former case, from the birth cohorts 1922 to around 1944, age specific mean tenure gradually increased as a general trend (approximately 35% increase at the largest), but it decreased by about 40% between 1945 and 1981 birth

7

cohorts. On the other side, in the later case, age specific mean tenure stays around almost the same level between 1922 and 1944 birth cohorts (with slight increase such as around 10%), and declining trend is quite obvious from around 1958 birth cohort. The decreasing rate is almost the same as male ones between the similar birth cohorts; it decreased by about 42% between 1945 and 1981 birth cohorts for female workers' case. There are a couple of general interpretations of the above results.

Firstly, the increasing trend of the tenure among 1922-1944 birth-year cohorts of male workers is assumed to imply the fact that the long-term employment system had become popular among Japanese firms around the period 1950-1960 that corresponds to the period when those birth cohorts first entered the labor market as new graduates. Secondly, similar to the US case discussed in Farber (2006), the birth cohorts after 1945 for female workers could have increased their commitment to the labor force with the lower rates of withdrawal from the labor force in the child-bearing years, but such trends are not particularly obvious from the estimation result. We could observe the general decline in long-term employment opportunities for birth cohorts after 1950, while such trend might have been offset by the other impacts, such as the further increase in female commitment to the labor force (i.e. relative increase in the number of females whose tenures are relatively short).

In addition to the increased presence of women in the labor force, there are other important changes that could be related to the decline in mean tenure, similar to the US case. For example, we could point out the impact from the increase in average educational attainment after the WWII period.

Thirdly, we could also observe the general decline in the mean tenure years among male workers for birth cohorts after 1945. These results are not necessarily consistent with the conclusions of the previous studies. As discussed, both Kambayashi and Kato (2008) and Shimizutani and Yokoyama (2009) concluded that the long-term employment system remains stable with some exceptions observed among a certain worker group. To see the robustness of our results, we examined the relative tenure by birth cohorts using a different data source.

Figure 2 Panels A and B also report the estimation results of (1) when we employed BSWS for the corresponding period (1989-2004). The results are surprisingly different, particularly for the birth year cohorts after 1950 both for male and female workers. The relative tenure of male workers stays almost around the same level for 1945-1975 birth-year cohorts. Further, that of female workers had an increasing trend among 1950-1972 birth cohorts (e.g. around 15 percent increase).

We would argue that these differences are mainly caused by the difference in the

coverage of two data sources. As discussed in the previous section, we regard ESS covers the tenure of the wider labor force. For example, (i) only ESS covers the workers who work at a small establishment with 1-4 regular employees, (ii) BSWS might not cover new establishments that are not included in EEC, which is updated in two-five years' frequency. In addition, (iii) while the tenure of the dispatched or contract workers is registered as that of non-permanent workers at the current workplace in ESS, it could be either insufficiently captured or recognized as that of permanent workers or non-permanent workers at temporary agencies in BSWS. As a whole, we consider that ESS would provide more precise picture of the current developments in the tenure of Japanese workers because of its wider and more accurate coverage than BSWS.

To conclude, with regards to the mean tenure years, they drop continuously for all birth cohorts born after the WWII, both for male and female workers. From the comparison of the two estimation results, we can preliminarily argue that such changes could have been caused by (i) greater share of small-sized employers, (ii) greater share of firms recently established, and (iii) greater share of dispatched or contract workers among the recent birth cohorts. On the contrary, the mean tenure of male workers at relatively bigger establishments tends to stay stable among the birth cohorts after 1945.

It would be beneficial for us to examine the further details of the behavior of tenure years, as the analysis above treats various workers without controlling the factors that might have affected workers' tenure. In particular, we will focus on two factors: (i) education, and (ii) contract type (permanent/non-permanent)

3.2 Controlling for Years of Education

In order to assess whether changes in educational composition of the labor force can account for the decline in mean tenure, we estimated an augmented version of the regression model for the mean tenure in equation (1) such as the followings:

$$\ln(T_{ijk}) = ED_i\gamma + C_j + A_k + \varepsilon_{ijk} , \quad (2)$$

where ED_i is a vector dummy variables indicating educational attainment and γ is a vector of associated coefficients. This provides a summary across educational categories of the percentage change in the mean tenure relative to the 1945 birth cohort $100 \times [\exp(\hat{C}_j - \hat{C}_{1945}) - 1]$ controlling for educational distribution over time. The estimation result based on is reported in Figure 3, but the analysis result is limited to ESS because BSWS does not record educational background of part-time workers. After adjusting the impact from the changes of the educational attainment, the general

decreasing trend after 1945 up to the most recent birth cohorts seems to show almost the same pattern, by comparing Figure 3 and Figure 2. The decrease rate stays almost the same level (i.e. 38% between 1945 birth cohort and 1981 birth cohort). Although the general trend is almost similar, the decreasing rate is even greater for female workers, with the control of the changes in educational attainment. For example, between the birth cohorts 1945 and 1981, without controls for educational distribution changes, the decreasing rate is 42%, while with the control, it is 48%. This implies the changes in the distribution of educational attainment have actually worked in an opposite direction to the expected one. In other words, while the longer educational attainment would directly imply shorter mean tenure, in case of women it had contributed to make mean tenure longer among recent birth cohorts. This might mean the longer attainment even led to make positions for female workers more stable, or possibly to make them committed to the labor force to further extent.

  In addition to the changes in the educational attainment, there might also be the fact that the recent birth cohorts are more likely to spend several years to look for a job that fits well, instead of finding a permanent job upon graduation. This leads to shift the whole tenure distribution to the left-hand side, and to decrease the mean tenure levels for every birth cohort.

3.3 Proportion of Permanent-Regular / Non-Permanent-Regular Workers

    The second and more important factor that could account for the decline in the mean tenure after the birth cohort 1945 would be the increase in the share of non-regular employees in Japanese case. We define permanent-regular workers as those who are employed, working either as a regular worker or an executive official, under regular contracts. On the other hand, non-permanent-regular workers include all other types of workers. It corresponds to those who are employed, working either as a temporary/daily worker or a permanent worker, and categorized as part-time workers (including both *Paat* and *Arubaito*), temporary workers, or contract workers. We divide the sample into permanent-regular workers and non-permanent-regular workers, and re-estimated (1) by sex.

    Before making comparison between two estimation results, to examine if the proportion of permanent-regular workers have really declined and to what extent over different birth cohorts, we estimated the probability of being a permanent-regular worker on the birth-cohort indicators by sex, with the control for ages. The model is

$$PD_{ijk} = C_j + A_k + \varepsilon_{ijk} \quad (3)$$

where PD is an indicator for a permanent-regular worker. From model (3), we could estimate the birth cohort effects on the probability of being a permanent-regular worker with the control for ages (we call them relative fraction of permanent regular workers). Figure 4 Panel A shows the estimation results for men using both ESS and BSWS and Figure 4 Panel B corresponds to those for women. The shapes are somewhat different by sex, but both of them are declining among the recent birth cohorts. For example, ESS results for male shows that relative fractions were slowly rising for the age cohorts between 1923 and 1940, then stay around the same level until the birth cohorts of 1960. Regarding the more recent cohorts, relative fractions decline at a remarkably rapid pace, particularly between 1970 and 1980.

By comparing Figure4 Panels A and B, we could see that the declining speed among male workers is much slower than the speed among female workers, and it started from the recent birth cohorts (i.e. 1970 birth cohorts and later). This might be related to the fact that female workers tended to participate in the work force the more as non-permanent-regular workers among the more recent birth cohorts. The drastic decline for both male and female workers after 1970 birth cohorts could be related to the bad macroeconomic conditions when they left the university and looked for the job. Female workers could have been affected to a greater extent, facing greater difficulties to find a job as a permanent worker than male workers. In both Figure 4 Panels A and B, BSWS and ESS results show the similar trends among cohorts, while the relative tenure of both elderly and recent cohorts are estimated to be higher with BSWS results than ESS cases.

As we have observed that there are rapid increases in the relative fraction of non permanent-regular workers in the recent birth cohorts, we could assume this trend might have affected the average tenure by birth cohort, as they are likely to have higher turnovers than permanent-regular workers. To see if this holds, we re-estimate relative tenure of each birth cohort by dividing the data into two groups; i.e. permanent-regular workers and non permanent-regular workers.

The re-estimation result of (1) is included in Figure 5 Panels A (male) and B (female) for permanent-regular workers and in Figure 6 Panels A (male) and B(female) for non permanent-regular workers. For male workers, the trend of relative tenure by birth cohort is almost similar for "all workers" (Figure 2 Panel A) and "permanent-regular", as the large proportion of workers are permanent-regular workers. On the other side, the trend of relative tenure is mostly coincides with that of non permanent-regular workers for female workers (Figure 2 Panel B). The results indicate that the relative average tenure is declining among recent cohorts even among permanent-regular workers.

11

Therefore, our conjecture that the increase in the proportion of non permanent-regular workers among recent cohorts would explain the shorter average tenure does not necessarily hold particularly for male workers' case.

We should note that the estimation results look different between ESS and BSWS in all cases. For male permanent-regular workers, the relative tenure is estimated to be lower for the cohorts earlier than 1950, and higher for those of the later cohorts, although the basic trend across cohorts basically looks similar. The trends of non-permanent male workers look different between ESS and BSWS results, as the declining trend among recent cohorts is obvious in ESS but not so much in BSWS results. The trend of permanent female workers looks similar but BSWS estimates show greater increase in average tenure among birth cohorts later than 1960 (Figure 5B), while that of non-permanent female workers shows the opposite results; BSWS results indicate that the tenure became relatively longer among later birth-year cohorts, while ESS results show that it became shorter among them.

As discussed in earlier section, part of these differences between ESS and BSWS may have been caused by the difference in data coverage. If there are any consistent relationship between i) birth cohorts, ii) data coverage, and iii) tenure length, it might explain the discrepancy between ESS and BSWS estimation results to some extent. For example, if (i) the share of workers employed at new establishments, (ii) that of workers employed at very small establishments, or (iii) that of workers in non-manufacturing sectors have been increasing among younger cohorts, then they are worker groups who are not/less likely to be covered in BSWS compared with ESS. Assuming such workers tend to have short tenure, the sample coverage would be able to explain the observed discrepancies.

By comparing male and female results, we should note the difference observed in permanent workers. Although the general trend among cohorts seemed to be similar (i.e. generally increasing) (Figure 2 Panels A and B), the results for female permanent workers show an increasing trend except for the most recent cohorts. The increasing trend may imply the stronger commitment to the labor force among women as permanent-regular workers after the WWII. At the same time, we could also think of the demand-side factors for the recent decline of both sexes. For example, firms have come to hire more permanent-regular workers with short-contract terms after around the mid 90's, and many young workers, both male and female, were absorbed into such posts. We assume the recent declining trend for non permanent-regular workers derived from ESS results might be related to the fact that such contracts had come to be formed as a contract worker or dispatched worker, whose tenure is even more unstable compared to

the rest of non-permanent-regular workers (e.g. part-time workers).

The difference between ESS and BSWS estimation results for female workers might be interpreted as the difference in employment behaviors between medium/large establishments and small ones. With regards to the permanent regular female workers, the relative tenure has increased for 1950-1970 birth cohorts particularly at establishments with a certain size and beyond. The trend of non-permanent regular female workers is the opposite, which might indicate that the status of such workers have become more unstable than before particularly for workers employed at very small establishments or at certain industry sectors.

In the next section, we examine to what extent such difference in the coverage of the two surveys can explain the discrepancy in the estimation results of relative tenure.

4. Filling the Gap between ESS and BSWS
4.1 Differences in Estimation Results and Data Coverage

As discussed in the previous section, by comparing ESS and BSWS results, differences in relative tenure of permanent workers are particularly obvious among recent cohorts. In addition, relative tenures show decreasing trends from elderly cohorts to recent ones to a greater extent in ESS case than in BSWS case for non-permanent regular workers. We considered two possible explanations for such findings: i) increase of workers with particularly short tenure, after controlling age, among recent cohorts, which is particular in ESS and not in BSWS and ii) increasing discrepancy in the sample coverage between ESS and BSWS among recent cohorts regarding workers with short tenures.

i)   Shift of the tenure distribution among recent cohorts

The discrepancy of ESS and BSWS results could result from a possibility that BSWS fails to capture the workers with particularly short years of tenure because of their contractual form. If this is the case, the distribution of tenure estimated from ESS should have fatter left-tail than the one from BSWS. We examined whether such difference of the distribution is actually observed by comparing the distributions of the residuals derived from the estimation (1) from ESS and BSWS, among two different birth cohorts. Figure 7 (male) and Figure 8 (female) describe residual distribution by sex, derived from ESS and BSWS estimations, for birth cohorts of 1945-1950 and 1965-1970. The shapes of the ESS and BSWS residual distributions of the birth cohorts of 1945-1950 look quite similar for both male and female cases, while the distributions of those of 1965-1970 cohorts are thicker around the left-hand side (i.e. left-skewed) for male and female in ESS than in BSWS. The results provide us an intuitive explanation

13

why the relative tenures are estimated as lower among recent cohorts in ESS estimation than in BSWS one.

ii)   Increase in the sample discrepancy among recent cohorts

We assume that such differences may have been caused by the missing samples that tend to have short tenures from BSWS, which are covered by ESS. As discussed in i) above, the recent cohorts in ESS samples are more likely to have shorter tenure than BSWS ones, after the control of age effects. Based on the earlier findings from Table 3, we focus on the differences in industry and firm-size distribution between two datasets. We therefore create a weight for a sample to be included in BSWS from the combined dataset of ESS and BSWS. Specifically, we construct following weight to recover the industry and firm-size distribution in BSWS using ESS:

$$ w_i = \frac{P(BSWS = 1|x_i)}{1 - P(BSWS = 1|x_i)} \cdot \frac{1 - P(BSWS = 1)}{P(BSWS = 1)} \ , \qquad (4) $$

where BSWS is an indicator variable that takes one if the observation is from BSWS and zero if the observation is from ESS. The vector x_i includes 81 group dummy variables constructed from 9 industry categories and 9 firm-size categories. The probability to included in BSWS, which is $P(BSWS = 1|x_i)$ is estimated by a linear probability model applied to the pooled data of ESS and BSWS for each year. The estimation of linear probability model does not violate the notion of probability because the model is a saturated model.

 We expect that weight distribution shifts to the left for the ESS samples of the recent survey years implying that more observations only appear in ESS but not in BSWS. Figure 9 shows the distributions of estimated weights by sex for years 1987 and 2002. We observe significant fraction of observations with zero weight that correspond to the observations that appear in ESS but not in BSWS. From the Figure, it is not quite obvious whether our assumption that the weight distribution would be skewed to the left for 2002 samples than 1987 ones (i.e. more samples which are not/less likely to be covered by BSWS exist in 2002 survey than in 1987 survey) holds.

 In summary, we consider that the above examination results at least would not deny the possibility for the sampling discrepancy to explain the differences in the estimation results of relative tenure between ESS and BSWS. We then examine relative tenures, adjusting the differences in sampling frequency for the ESS case.

4.2 Estimation Results Based on ESS with Weights

Figures 10 and 11 show the results of the estimation (3) by using i) ESS, ii) BSWS, and iii) ESS with weights by sex for permanent-regular and non permanent-regular workers each. Regarding the results for male permanent-regular workers, the results from the third estimation almost trace the first estimation results, with slight adjustment in the direction closer to the second one (Figure 10). Thus even after adjusting sample weights, the estimation results still exhibit almost the same level of discrepancy as before. This indicates that the difference between ESS and BSWS results have not been caused by the difference in the industry and firm-size structure among samples of the two surveys, as this factor can explain the difference to a very limited extent. This could have been caused by the survey structure of BSWS, which might tend to capture only a certain group of workers within establishments, causing the higher estimation results for the average tenure length than those of ESS.

For the female permanent-regular workers, all the estimation results show quite similar results for birth cohorts before around 1960, and show discrepancies for the rest of the later cohorts, while the discrepancy has been adjusted substantially with the third estimation (Figure 10). We could assume the sample coverage difference explains the discrepancy between ESS and BSWS results for female permanent-regulars, although there is still discrepancy remaining, even after the adjustment of industry and firm-size structures.

Figure 11 shows the results for non-permanent regular workers. The adjustment of ESS samples by weights does not reduce the discrepancy between ESS and BSWS, and it simply traces the ESS results without weights. This result implies that in case of non-permanent regular workers, the difference in industry or firm-size distribution among samples of the two surveys has not been a cause of the different estimation results: those who are surveyed in BSWS tend to have an increasing (female) or stable (male) trend of average tenure by birth cohorts, while those covered in ESS tend to have a decreasing trend.

To summarize, we found that there are still substantial differences in the average tenure between adjusted ESS and BSWS among male permanent regular workers, as well as non-permanent regular workers of all cohorts. Assuming ESS sample indeed represents the whole population of Japan, the above results indicate certain factors for BSWS to fail to capture the recent cohorts of permanent regular workers with short tenures through their sampling process. One of such factors might be the sampling process of workers at each establishment by using payroll records.[7] The workers of BSWS are

---

[7] As explained in Footnote2, the respondents are instructed to use payroll records to provide their

designed to be randomly selected among all workers enrolled in payroll books, while the worker selection process at an establishment level might not be perfectly random for reasons such as: i) the payroll books are supposed to be created each time employees are paid- most workers are paid regularly (e.g. monthly) at the same timing, while there may be a group of workers under the contract that makes them get paid on an irregular basis- such workers might not be likely to be covered in the sampling process, ii) there might be multiple number of payroll books per establishment, and some of the books may be kept and updated by the section that are not the same as the one that is responsible to respond to the BSWS.

These are just conjectures that require further evidences, while we can at least conclude that we should not solely dependent on BSWS to discuss recent trends in employees' average tenure in Japan, as the survey may not represent the whole workforce, particularly missing certain types of workers with short tenures. Among others, we would like to highlight our findings from the ESS that the average tenure is decreasing among recent cohorts for both permanent-regular and non permanent-regular workers, and both for male and female workers.

5. Concluding Remarks

This study examined the trends of job stability in Japan based on two independent government micro data, Employment Status Survey (ESS, *Shugyo Kozo Kihon Chosa*) and Basic Survey of Wage Structure (BSWS, *Chingin Kozo Kihon Chosa*).

The analysis based on two samples renders different pictures on the trends of job stability among male workers. The ESS results indicate the secular decline of job stability after the 1945 born cohort for male workers, while the BSWS results indicate its stability until the 1970 birth cohort. Both surveys indicate particularly clear decline of job stability after the 1970 birth cohort. One of the major factors of such trend is the increase in the proportion of non-permanent regular workers. In general, they have higher turnovers than permanent-regular workers. The relative fraction of non-permanent regular workers has greatly increased among birth cohorts after 1970. The relative tenure for male permanent regular workers has the gradual declining trend for the birth cohorts after 1950. As a background for such decline, we can point out factors such as (i) increase in the proportion of workers employed at small-sized and/or newly established firms, and (ii) increase in the proportion of workers employed in the

responses for BSWS. The employees' payroll records are available from a payroll book. The Labor Standards Act of Japan states the obligation of employers to create a payroll book for each establishment and to register all employees in the book, with their characteristics including the wages, work hours each time they are paid (Section 108).

industry sector such as service industry, whose turnover is relatively greater than the other sectors.

Analysis of two surveys indicate different trends of average tenure among female workers. While the BSWS analysis indicates the increase of average tenure by the 1970 born cohort, the ESS analysis indicates secular decline after the 1945 born cohort. Results based on both surveys indicate the relative fraction of non-permanent regular workers has increased among birth cohorts after 1970. Among permanent regular workers, the stability declined after the 1960 born cohort based on ESS analysis and after the 1970 cohort based on BSWS. Among non permanent-regular workers, ESS analysis exhibits secular decline of job stability, while BSWS exhibits slight increase of job stability.

In sum, analysis based on ESS indicates secular decline of job stability, but analysis based on BSWS indicates the decline of job stability by a small amount or constancy of it. The difference of the results could well explained by the sampling structure of two surveys. ESS is a household survey that randomly pick households, while BSWS adopts a two-step sampling procedure that picks establishments at the first stage and instruct the human resource managers to randomly pick individual workers from their payroll record. The sampling procedure of BSWS arguably drops the workers whose job stability have declined.

Applying the method by Farber (2007) to ESS, which is a household survey comparable to US Current Population Survey, renders a similar degree of secular decline of job stability found by Farber (2007) based on CPS. Countries both sides of pacific share the experience of declining job stability regardless of numerous differences in labor market institutions. This finding suggests that a fundamental change of global economic environment, such as technological progress or deepening international dependence, drives the decline of job stability. Unpacking the factor behind a common decline of job stability both in Japan and the US is left for future investigation.

Reference

Hiroyuki Chuma (1998) "Is Japan's Long-Term Employment System Changing?" In Isao Ohashi and Toshiaki Tachibanaki eds., Internal Labour Markets, Incentives and Employment. London: Macmillan.

Henry Farber (2007) "Labor Market Adjustment to Globalization: Long-Term Employment in the United States and Japan" Working Paper #519 Princeton University

Industrial Relations Section.

Masanori Hashimoto and John Raisian (1985) "Employment Tenure and Earnings Profiles in Japan and the United States", *American Economic Review*, Vol. 75, No. 4, pp. 721–735.

Ryo Kambayashi and Takao Kato (2009) "The Japanese Employment System after the Bubble Burst: New Evidence" Columbia University CJEB Working Paper Series 268.

Chiaki Moriguchi and Hiroshi Ono (2004) "Japanese Lifetime Employment: A Century's Perspective," EIJS Working Paper Series 205, The European Institute of Japanese Studies.

David Neumark (2000) *On the job: Is Long-term Employment a Thing of the Past?* Russell Sage Foundation

Hiroshi Ono (2010) "Lifetime Employment in Japan: Concepts and Measurements." *Journal of the Japanese and International Economies*, Forthcoming.

Satoshi Shimizutani and Izumi Yokoyama (2009) "Japan's Long-Term Employment Practice Survived? Developments Since the 1990s," *Industrial and Labor Relations Review*, vol. 62, No. 3, pp. 313-326.

Table 1: Distribution of Age by Birth Cohort、BSWS

Male

	ESS				BSWS			
Birth Years	Age Mean	Age S.D.	Age Min	Age Max	Age Mean	Age S.D.	Age Min	Age Max
1922-1929	60.69	2.21	57	64	62.44	1.31	60	64
1930-1939	56.23	4.35	47	64	57.31	3.50	50	64
1940-1949	48.99	6.02	37	62	50.75	5.05	40	64
1950-1959	39.99	6.14	27	52	42.06	5.38	30	54
1960-1969	30.83	5.51	20	42	32.02	5.23	20	44
1970-1984	25.12	3.39	20	32	25.50	3.56	20	34
Total	41.23	11.67	20	64	40.24	11.44	20	64

Female

	ESS				BSWS			
Birth Years	Age Mean	Age S.D.	Age Min	Age Max	Age Mean	Age S.D.	Age Min	Age Max
1922-1929	60.75	2.21	57	64	62.42	1.32	60	64
1930-1939	55.89	4.39	47	64	57.15	3.54	50	64
1940-1949	48.97	5.82	37	62	50.66	4.97	40	64
1950-1959	40.91	5.94	27	52	42.78	5.25	30	54
1960-1969	30.11	5.97	20	42	30.73	5.83	20	44
1970-1984	24.47	3.28	20	32	24.39	3.33	20	34
Total	39.96	11.87	20	64	38.59	12.34	20	64

Table 2: Distribution of Years of Education by Birth Cohort, BSWS

Male

	ESS					BSWS		
	years of education					years of education		
Birth Years	16-	12	13-15	16-	9-11	9-11	12	13-15
1922-1929	46.19	36.05	8.04	9.72	49.9	36.16	4.54	9.4
1930-1939	39.19	42.52	2.87	15.42	41.05	45.05	2.16	11.75
1940-1949	25.87	49.62	3.54	20.98	25.67	52.96	2.93	18.44
1950-1959	12.98	49.86	5.92	31.25	11.31	53.62	5.09	29.99
1960-1969	6.7	51.86	9.98	31.46	3.8	50.62	8.53	37.05
1970-1984	7.9	54.04	15.34	22.71	3.27	53.57	13.88	29.28
Total	18.55	49.46	6.9	25.09	14.18	51.9	6.63	27.28

Female

	ESS					BSWS		
	years of education					years of education		
Birth Years	16-	12	13-15	16-	9-11	9-11	12	13-15
1922-1929	57.28	37.77	3.82	1.13	59.53	34.82	4.3	1.36
1930-1939	49.95	43.37	4.6	2.08	51.25	43.6	3.67	1.48
1940-1949	29.82	56.89	9.31	3.98	29.67	60.67	7.19	2.47
1950-1959	11.7	59.16	20.65	8.5	12.36	65.59	16.63	5.42
1960-1969	3.61	53.12	31.53	11.74	2.18	53.93	31.45	12.43
1970-1984	3.39	44.61	39.01	12.99	1.19	44.27	39.87	14.67
Total	17.98	53.06	21	7.96	13.22	53.93	23.98	8.87

Table 3: Industry and Firm Size Distribution (Comparison between ESS and BSWS)

Male	1987				2002			
	ESS		BSWS		ESS		BSWS	
(Industry)	Share	Tenure	Share	Tenure	Share	Tenure	Share	Tenure
Mining	0.31	14.31	0.00	8.78	0.14	14.95	0.00	16.00
Construction	14.28	13.25	1.65	12.68	14.75	14.64	0.66	14.26
Manufacturing	27.51	13.89	46.21	12.67	24.77	15.45	42.09	13.79
Public Utilities	1.22	17.76	1.42	12.63	1.13	19.39	2.68	13.76
Communication & Transport	11.16	14.31	10.86	12.86	11.01	13.09	9.15	13.54
Wholesale & Retail	17.04	11.62	13.31	12.54	17.23	13.16	11.98	13.58
Finance & Insurance, Real Estate	3.81	13.56	8.22	12.39	3.36	14.87	6.03	14.20
Service	18.03	12.40	18.33	12.30	20.19	13.02	27.20	13.35
Other services	6.63	16.99	0.00	8.67	7.42	18.99	0.22	14.17
Total	100.00	13.43	100.00	12.58	100.00	14.46	100.00	13.65

Note: Share (%), Tenure (years, average)

Female	1987				2002			
	ESS		BSWS		ESS		BSWS	
(Industry)	Share	Tenure	Share	Tenure	Share	Tenure	Share	Tenure
Mining	0.07	10.74	0.00	3.86	0.04	13.47	0.00	3.00
Construction	3.86	8.71	1.60	6.84	3.74	11.60	0.59	8.62
Manufacturing	28.76	7.38	45.47	6.97	18.36	9.93	40.30	7.96
Public Utilities	0.29	8.67	1.51	6.76	0.25	11.98	2.62	7.86
Communication & Transport	2.60	10.73	9.39	6.98	3.66	6.74	8.42	7.97
Wholesale & Retail	24.92	6.21	14.06	6.78	27.72	7.35	12.91	7.58
Finance & Insurance, Real Estate	5.72	6.11	8.76	6.49	4.71	8.42	6.26	7.81
Service	31.18	8.41	19.21	6.75	37.57	9.15	28.67	7.67
Other public services	2.59	12.24	0.00	8.25	3.95	10.46	0.24	7.24
Total	100.00	7.61	100.00	6.85	100.00	8.82	100.00	7.82

Male	1987				2002			
(Firm size)	ESS		BSWS		ESS		BSWS	
Number of employees	Share	Tenure	Share	Tenure	Share	Tenure	Share	Tenure
1-4	6.62	12.68	-	-	7.32	15.10	-	-
5-9	8.92	12.01	15.69	12.35	8.77	13.18	14.45	13.56
10-29	14.81	11.52	22.53	12.29	14.97	12.14	18.36	13.32
30-99	15.46	11.51	19.21	12.36	15.46	11.82	19.40	13.45
100-299	11.90	11.96	12.81	12.60	12.72	12.94	14.12	13.44
300-499	4.52	12.64	4.86	12.72	5.10	13.92	5.65	13.70
500-999	5.06	13.34	5.15	12.74	5.77	15.02	5.90	13.85
1000-	19.10	15.84	19.74	13.23	17.55	17.02	22.12	14.24
Government	13.61	17.52	-	-	12.33	19.10	-	-
Total	100.00	13.47	100.00	12.58	100.00	14.48	100.00	13.65

Female	1987				2002			
(Firm size)	ESS		BSWS		ESS		BSWS	
Number of employees	Share	Tenure	Share	Tenure	Share	Tenure	Share	Tenure
1-4	9.73	7.60	-	-	8.37	11.43	-	-
5-9	10.92	7.54	16.00	6.86	9.93	9.45	14.90	7.71
10-29	17.14	6.98	23.13	6.82	16.03	7.93	18.71	7.89
30-99	17.17	6.63	19.93	6.82	17.04	7.33	19.31	7.87
100-299	12.52	6.78	12.58	6.93	13.48	7.74	14.34	7.79
300-499	4.11	6.79	4.76	6.79	5.01	7.95	5.35	7.92
500-999	3.95	6.58	4.95	6.68	4.99	7.79	5.90	7.80
1000-	12.75	6.97	18.65	6.93	13.43	7.69	21.49	7.79
Government	11.72	12.30	-	-	11.72	13.38	-	-
Total	100.00	7.62	100.00	6.85	100.00	8.85	100.00	7.82

Figure 1: Job Tenure Distribution

Kernel density esitmation with Epachinikov kernel
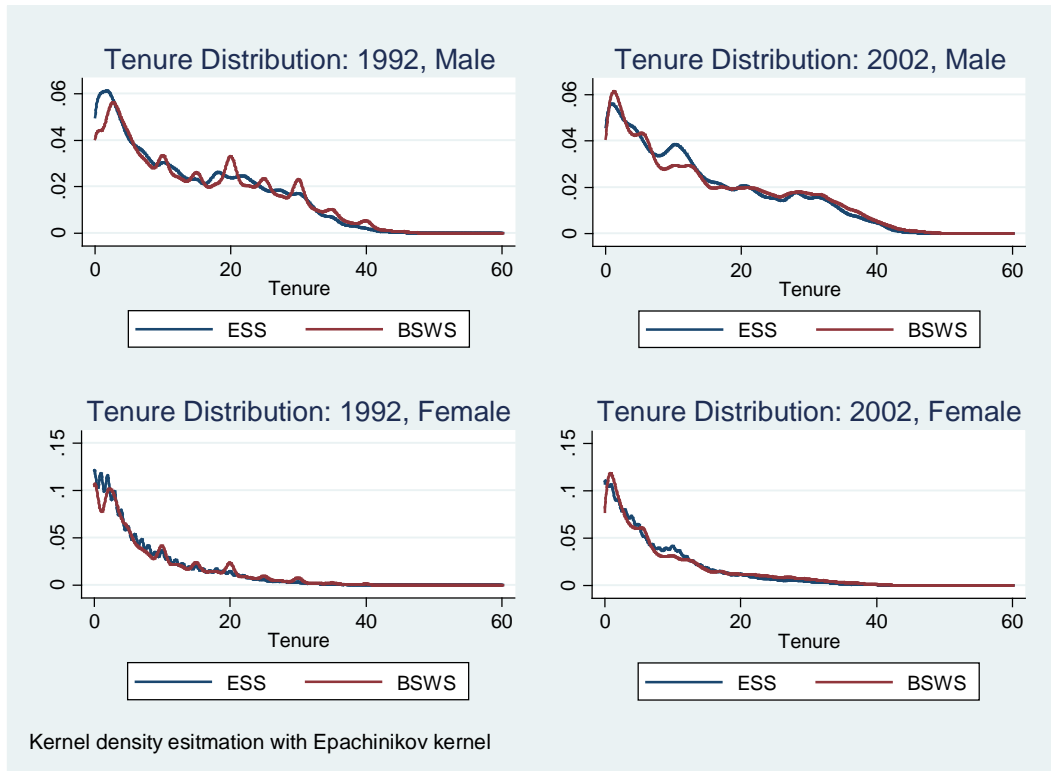
Figure 2: Relative Years of Job Tenure

Note: Age adjusted, Source: ESS 1987, 1992, 1997, 2002 and BSWS 1988-2006
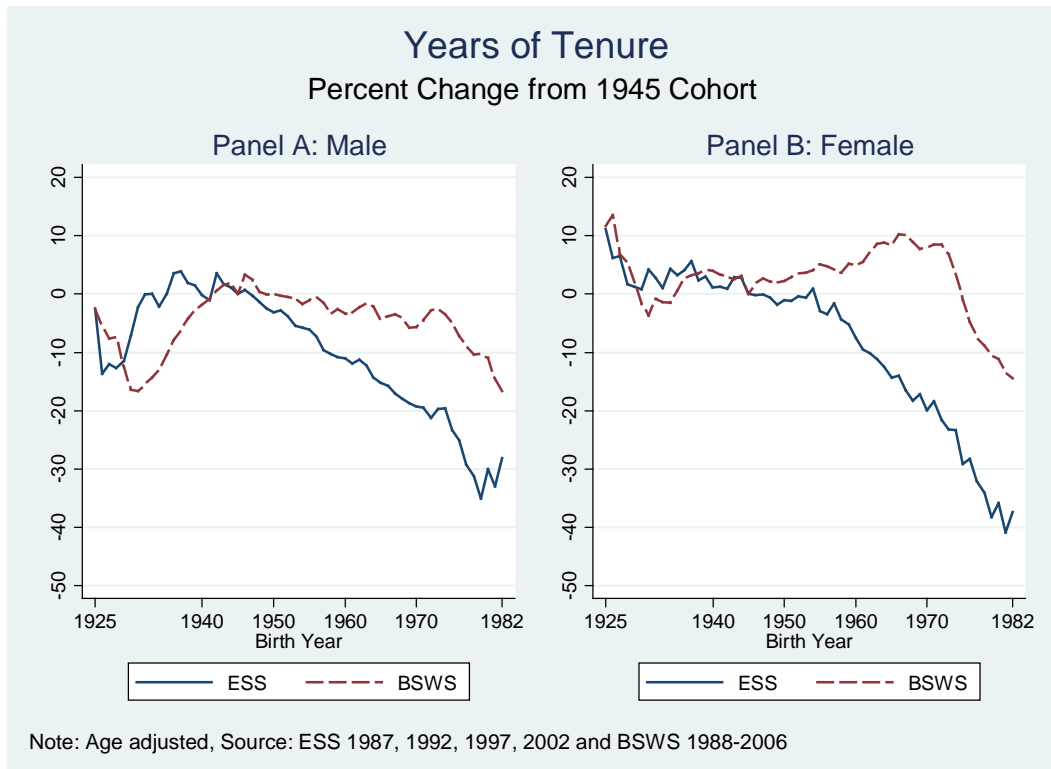
Figure 3: Relative Years of Job Tenure, Male and Female, Education Adjusted, ESS

Note: Age and education adjusted; ESS, 1987, 1992, 1997, 2002
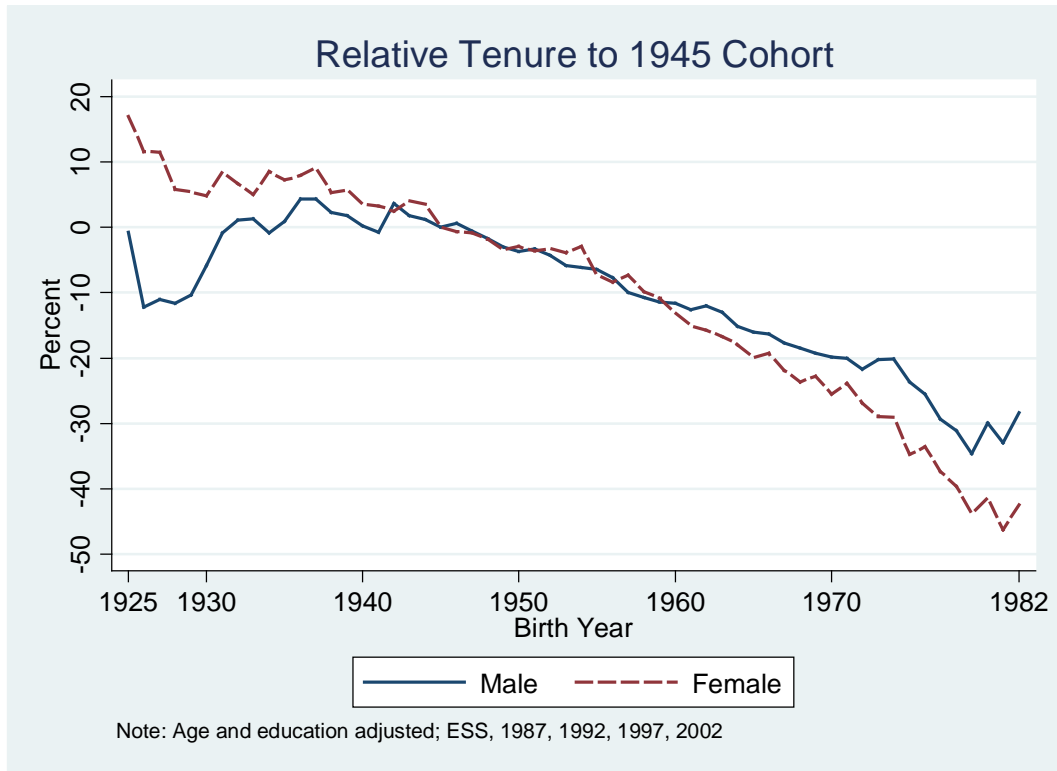
Figure 4: Percentage Change of Permanent Regular Workers

Note: Age adjusted, Source: ESS 1987, 1992, 1997, 2002 and BSWS 1988-2006

23
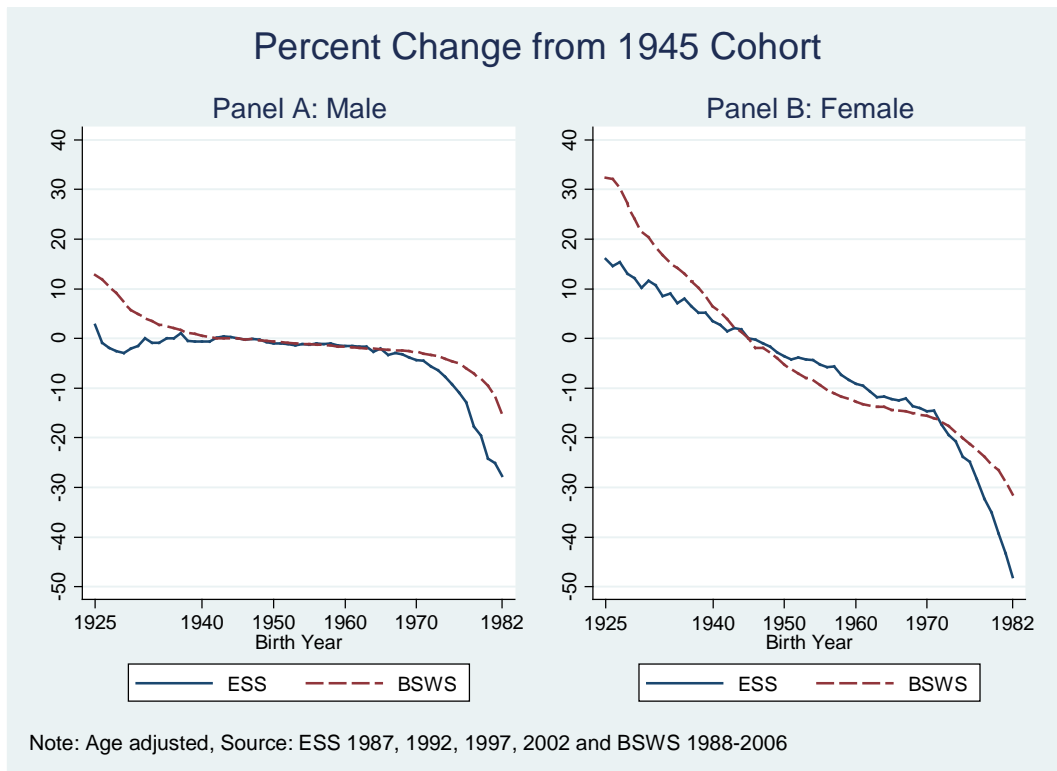
Figure 5: Job Tenure among Permanent Regular Workers

Percent Change from 1945 Cohort

Panel A: Male

Panel B: Female

Note: Age adjusted, Source: ESS 1987, 1992, 1997, 2002 and BSWS 1988-2006
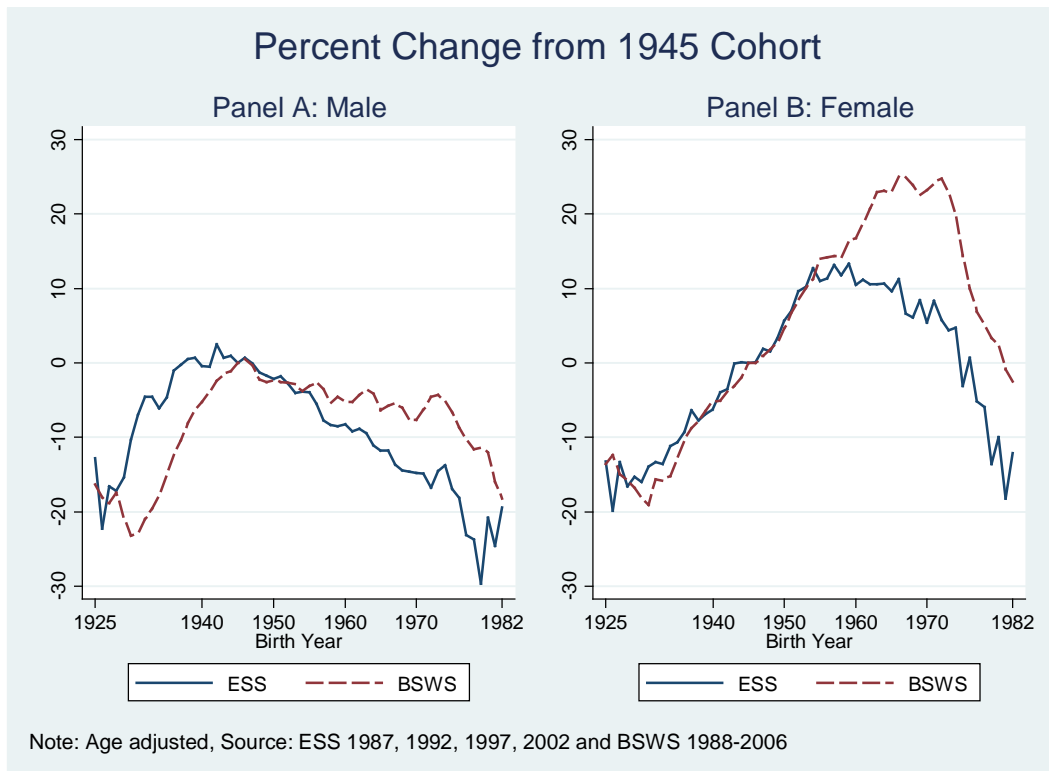
Figure 6: Job Tenure among Non- Permanent Regular Workers

Percent Change from 1945 Cohort

Panel A: Male

Panel B: Female

Note: Age adjusted, Source: ESS 1987, 1992, 1997, 2002 and BSWS 1988-2006
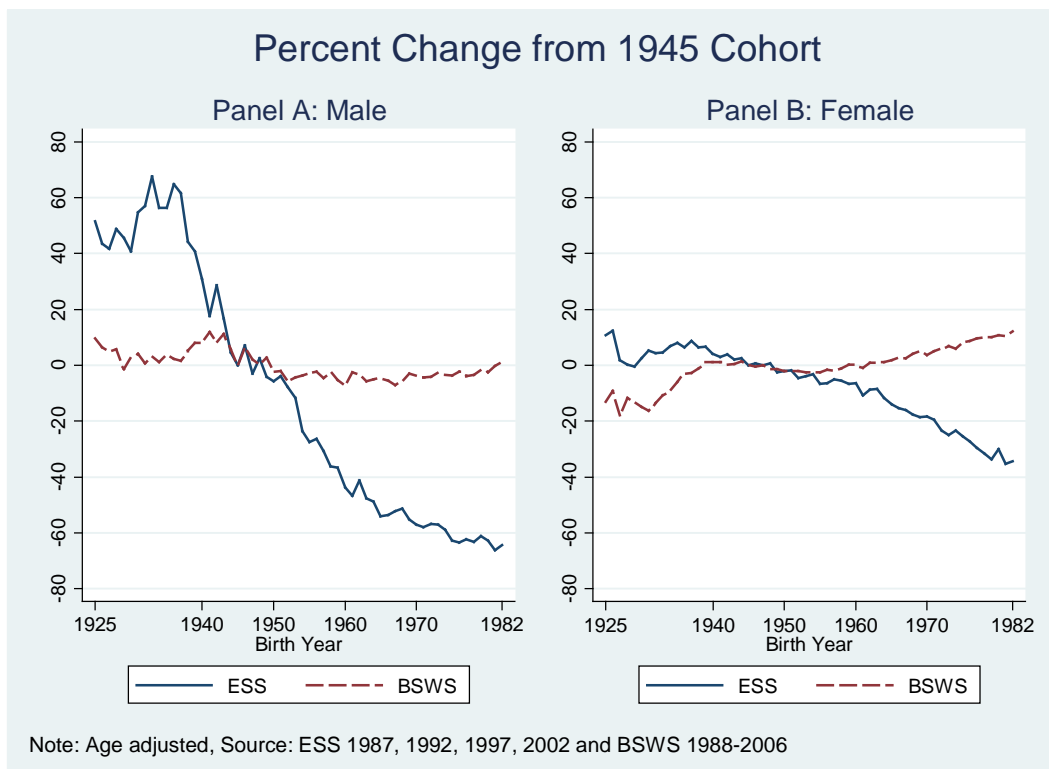
Figure 7: Residual Distribution, Male
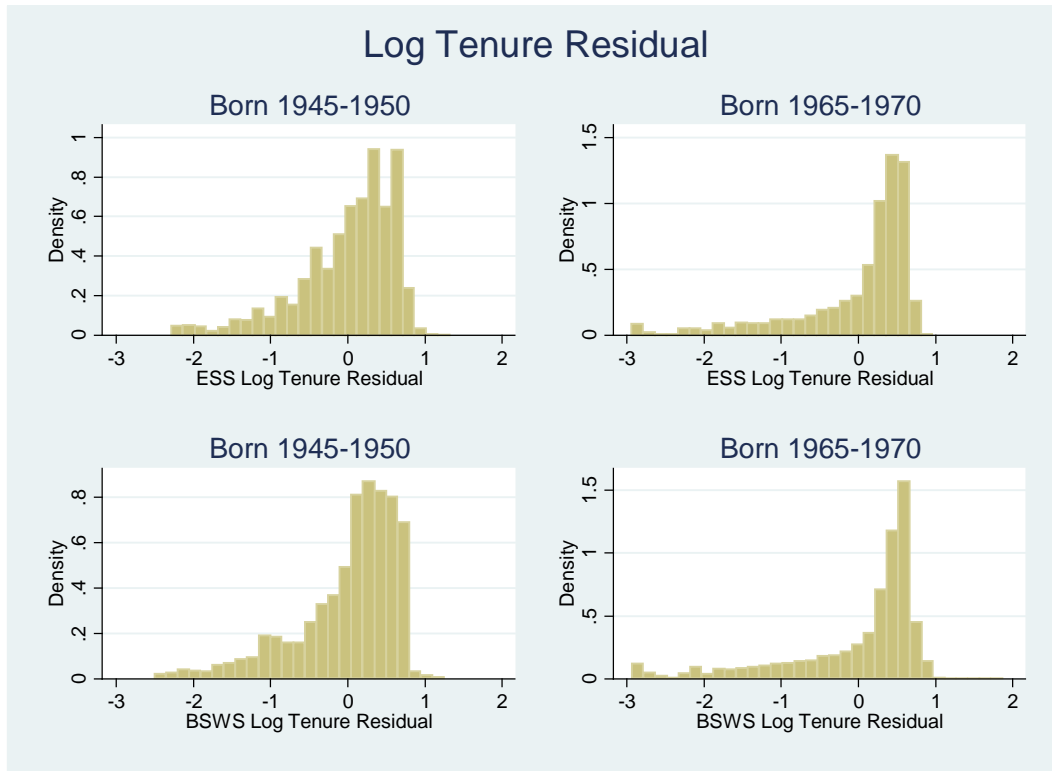
Figure 8: Residual Distribution, Female
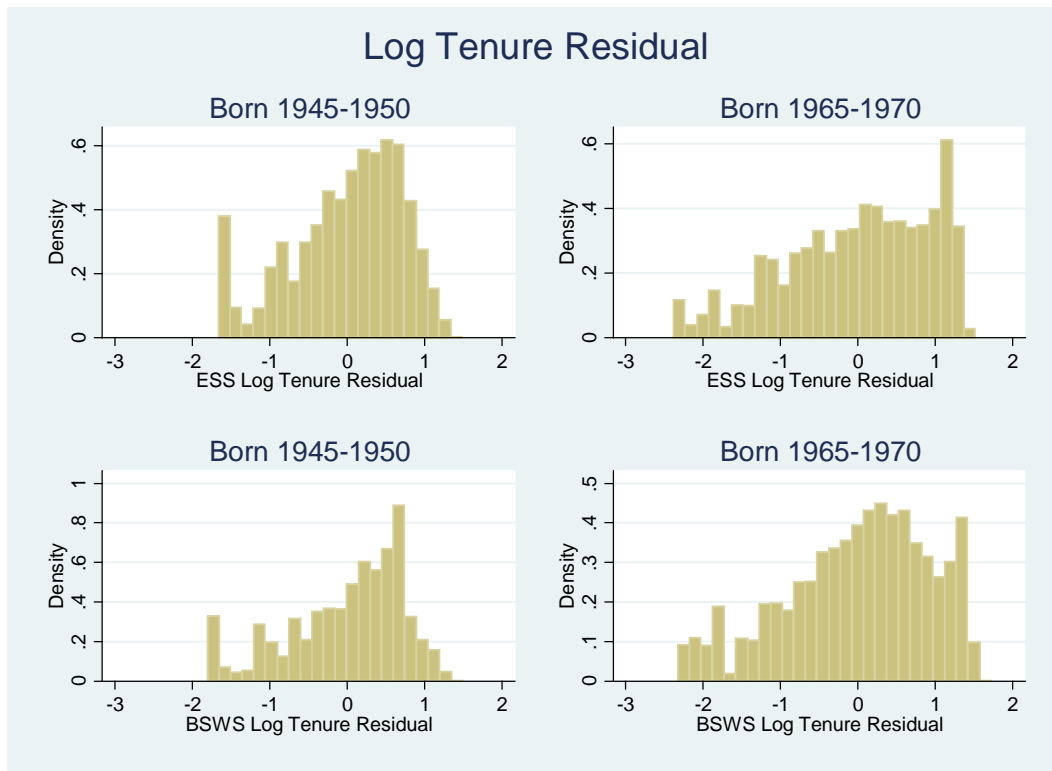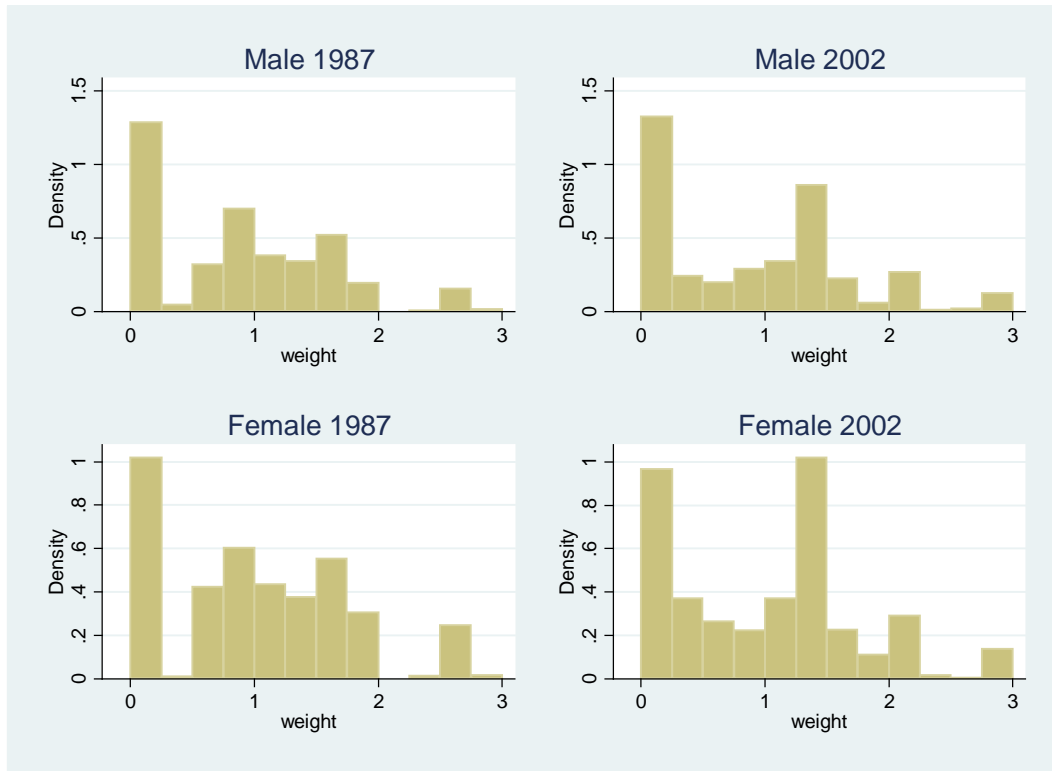
Figure 9: Weight Distribution

Figure 10: The Effect of Sampling Difference between ESS and BSWS among Permanent Regular Workers
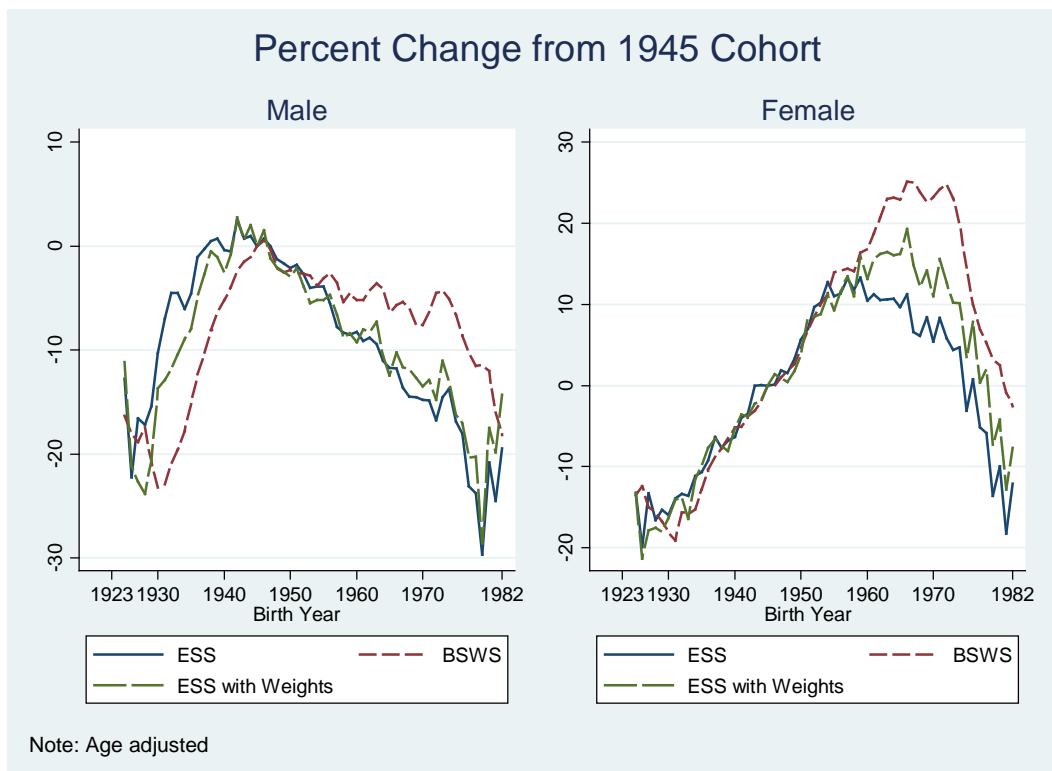
Figure 11: The Effect of Sampling Difference between ESS and BSWS among Non-Permanent Regular Workers

Note: Age adjusted