A cohort analysis of male and female employment in Japan *

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Abstract

This article uses repeated cross sectional data to study the labor force experiences for cohorts of prime-aged men and women in Japan. From the late 1980s to the early 2000s, participation in regular, full-time employment fell for less educated men and women. The cohorts who finished schooling in the late 1990s and early 2000s experienced a severe decline in regular employment at young ages, although this phenomenon was concentrated for single men and women and not for the married. Part-time work has become increasingly common for women of recent cohorts.

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1. Introduction

How labor force participation of men and women has evolved over time is a topic that attracts much attention in labor economics. Yet little research has been done to understand the recent trends in labor force behavior in Japan. In this article, I document trends in labor force participation of prime-aged men and women in Japan by tracing cohort experiences. In doing so, attention is paid to the following three aspects: (1) differences in cohort experiences in participation in regular, full-time work and part-time work, (2) differences in participation by educational attainment, and (3) the effects of the Equal Employment Opportunity Law (EEOL) for men and women on women's participation.

Numerous studies have analyzed women's participation in Japan. Many of them use cross sectional data; Ogawa and Ermisch (1996), Nagase (1997), Sasaki (2002), and Nawata and Ii (2004) are examples. Previous studies that conducted cohort-based analysis of labor force participation by women include Abe (2001) and Fukuda (2006).[1] Abe (2001) uses cohort data from the repeated cross sectional data of the Employment Status Survey (ESS, Shugyo Kozo Kihon Chosa) from 1982 to

[1] In analyzing the development of female-male wage convergence, Kawaguchi and Naito (2006) tabulate the full-time employment ratio and estimate cross sectional regressions predicting full-time employment for men and women. Their analysis, however, is not based on cohorts.

1997 to study the determinants of women's participation in paid employment. Fukuda (2006) uses annual data from 1968 to 2004 to decompose female labor force participation rates into cohort, age, and period effects by employing a Baysian framework. The data used by Abe (2001) and Fukuda (2006) do not distinguish at least one of the following aspects: (1) employment status (regular or part-time), (2) educational attainment, and (3) marital status. In this article, I report the participation patterns disaggregated by employment status (regular or part-time) for the pair of birth year, education, age, and marital status. In addition to distinguishing regular and part-time employment, disaggregation by education and marital status reveals patterns that are not seen in more aggregated data.

A cohort analysis of male labor supply behavior is presented in this article. In Japan, male labor supply over the lifecycle has not been analyzed as much as female labor supply has been.[2] Declining participation by less educated men has been pointed out by Juhn, Murphy, and Topel (1991, 2002) and Juhn (1992) for the United States.[3] In Japan, male participation behavior is mostly examined for the young population (age 34 or less) or for the old population (age 55 or over). In particular,

[2] I am unaware of any previous study that examines cohort experiences of employment by prime-age males in Japan.

[3] Del Boca and Pasqua (2003) report similar patterns for married men in Italy in the 1990s.

falling regular full-time employment for young men and women has attracted attention as the "freeter" or the "NEET" (Not in Education, Employment, or Training) problem.[4] As shown in this article, however, the deterioration of employment is not limited to young men and women: it has occurred for older men as well since the mid-1990s. Furthermore, the fall in employment has occurred mostly for unmarried men and women.

2. Data and definitions

The data used in this article are from the ESS, which is a large scale cross sectional survey.[5] Two different sets of data from the ESS are used: the aggregate published data and the resampled microdata.[6] The published data are available for four points in time for years 1987 to 2002, which allows me to assess the cohort experience for 15 years. The microdata enable me to examine the pattern by marital

[4] An important exception is Genda (2006), who shows that non-employment has become common for less educated men aged 35-49.

[5] The ESS is conducted every five years by the Ministry of Public Management, Home Affairs, Posts and Telecommunications of Japan. In 2002, the survey was conducted for adults in 440,000 households; the size of the original sample was 1.05 million persons aged 15 and over.

[6] The published tables of the aggregated data provide estimates of population by sex, age group, education, and labor force status.

status but are available only for three points in time from 1992 to 2002.[7] Using the published data and the cell-mean data created from microdata, it is possible to construct pseudo-panel data that follow cohorts defined by birth year and education.[8] In order to confine attention to those who finished schooling and are below the mandatory retirement age, the analysis here uses the sample of men and women aged 20-54.

Two measures are used for gauging participation in the labor market: the regular employment ratio and the part-time employment ratio. In Japan, employment as a regular full-time employee and employment as a non-regular employee (typically, a part-time worker) are quite different in terms of wages, hours, fringe benefits, and working conditions (Ogawa and Ermisch, 1996; Houseman and Osawa, 1998).

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[7] Disaggregation by marital status is not possible in the published data because labor force status statistics by education-age-marital status are not contained in the published tables. The ESS was conducted before 1987 as well, but for those years, published tables do not report the disaggregation for employment status (regular vs. part-time). For that reason, I did not use them in this article.

[8] In the ESS, respondents are asked to indicate their level of completed education by choosing one of the following four categories: junior high school graduate (9 years of compulsory schooling), senior high school graduate (12 years of schooling), junior college graduate (usually 14 years of schooling, including some vocational and technical schools), and university graduate (16 years or more of schooling, including graduate education).

Therefore, the regular (full-time) employment ratio and the part-time employment ratio are examined separately. Furthermore, unlike most previous research, I include executives of private corporations in the set of regular employees. Corporate executives are included because many are promoted to the position from regular employees and because many of those promoted are university graduate men. The measures for regular employment and part-time employment are defined as follows:

$$\text{Regular Employment Ratio} = \frac{\text{Number of Regular Employees}}{\text{Population}}, \qquad (1)$$

$$\text{Part-time Employement Ratio} = \frac{\text{Number of Part-time Employees}}{\text{Population}}, \qquad (2)$$

where the "Number of Regular Employees" is the sum of regular employees and executives. These two measures are calculated for each cohort-education-age group pair, using the ESS data.[9] [10] The age group is defined in 5-year intervals in the published versions of the ESS, so age and birth year here are grouped by 5-year intervals. Note that the two measures above are calculated as shares of the population of each cohort-education-age pair. These measures are derived for those who finished

[9] Part-time workers in the numerator of equation (2) include both part-timers and arbeit workers in the ESS. Part-time workers in the ESS correspond to those who are called part-timers in the workplace. Therefore, part-time workers include non-regular employees whose working hours are relatively long.

[10] To obtain the regular employment ratio in 1992 and 1997, I used resampled microdata because the number of executives is not reported in the published tables for these years.

schooling; those who are in school are excluded both from the numerator and from the denominator.[11]

The analyses below are done separately for the four education groups. It is important to note that the educational attainment of the population has improved for more recent cohorts. The pattern of this change is shown in Table A1. The proportion of junior high school graduates is 37.5 percent for men born from 1938 to 1942, while it is 7.7 percent for men born from 1973 to 1977; the same proportion fell even more dramatically for women (from 42.1 percent to 4.5 percent). The proportion of university graduates increased for both men and women. However, the proportion of university graduates among the male population stayed at similar levels for the three cohorts born between 1963 and 1977 (around 35 percent).

3. Cohort patterns of participation behavior

In this section, I report general patterns of cohort experiences of labor force

[11] Including those aged 20-24 in the analysis does not mean that I assume people finish schooling by age 20. Because of the exclusion of those who are in school, the data for university graduates for the 20-24 age group under-represent the population of (potential) university graduates, since many of potential university graduates in this age interval are still in school; the same problem is less likely to occur for other education groups. However, since the following analyses are done separately for each level of education and not for the pooled population of all education groups, this procedure is not likely to create a severe problem in the analysis.

behavior by simple tabulations of cohort profiles, separately for men and women and the level of educational attainment. The raw tabulation reveals patterns that have not been well understood in previous research.

In Figure 1, the regular employment ratios of men are plotted against age, separately by the cohorts defined by education and birth year. The ratios for men fell for all education groups in 1997 and 2002 when the Japanese economy experienced a severe recession, and the decline was especially large in magnitude for junior high school graduate men.[12] For all education groups, the regular employment ratios for ages 20-29 are much lower for those born after 1973 than the same rates for earlier cohorts. Those born after 1973 lost employment from the early stages of recession in the mid-1990s. It has been pointed out that during the recession in the late 1990s, young workers lost regular employment (Genda, 2003), and Figure 1 suggests that such a phenomenon continued in the early 2000s. In the early 2000s, job loss also occurred for older men with less education. The disparities in the regular employment ratio existed before the recession but widened quickly during it.

Cohort profiles for women's participation measures are shown in Figure 2

[12] Juhn et al. (2002) report that nonparticipation by less skilled men in the United States continued to increase from 1967 to 2000.

(regular employment) and Figure 3 (part-time employment). It is well known that the female labor force participation profile in Japan is M-shaped in a cross section. It is also a common understanding that the dip in the middle is deeper in Japan than in other developed countries (Nakamura and Ueda, 1999; Abe and Oishi, 2007).

Figure 2 indicates that the regular employment ratios are much higher for university graduates than for senior high school graduates. The regular employment ratios for the cohorts of university graduate women born after 1963 have increased. For university graduate women born between 1963 and 1972, the regular employment ratio at age 25-29 is about 10 percent higher than that of the university graduate cohort born between 1958 and 1962. Cohorts born in 1963 or after are the ones for whom the EEOL was enacted at the time they finished their 4-year university education, and I refer to those women as the post-EEOL cohorts.[13] Increases in regular employment are not observed for the post-EEOL cohorts of senior high school graduates and junior college graduates. However, even for the post-EEOL cohorts with university

[13] For educational groups other than university, the birth years of the cohorts that finished schooling in 1986 (the year of EEOL enactment) are 2-7 years later than the post-EEOL cohorts of university graduates. However, because cohorts are defined by 5-year intervals, the post-EEOL cohorts are approximately in the same birth year group for university, junior college, and senior high school graduates.

education, the regular employment ratio around age 40 is not much higher than earlier cohorts of women with university education. The cohort profiles of regular employment after age 40 are virtually flat, implying that net reentry into the labor market after interruptions (due to childbirth or child rearing) does not take place as regular employment. Finally, the cohorts who finished schooling in the late 1990s experienced a severe decline in regular full-time employment, as men of the same cohort also experienced.

The inclusion of executives in the regular employment category has certain implications. If the numerator of the regular employment ratio does not include executives, the ratio falls significantly with age for university graduate men and women aged 40 and over. When executives are included in the numerator, however, the fall is small or nonexistent. Furthermore, disparities across educational groups are larger for the measure that includes executives because the proportion of executives in the population is much higher for university graduates than other education groups, especially for men.

The part-time employment ratio profiles for women are shown in Figure 3. The most notable fact is the clear cohort effects in part-time profiles. Later cohorts are much more likely to engage in part-time work, compared with previous cohorts, for all education groups. The increase in part-time work occurs in middle age, as it is a typical form of reentry into the labor market for middle-aged women. It is also notable that the proportion of part-time employment in the population stays almost constant for women aged 45 to 54. In the aggregate, retirement from part-time work does not take place until age 54. University graduate women are much less likely to work as part-timers than senior high school graduates are, which is in line with the previous literature (Nagase, 1997). It has been commonly understood that women with university education have two distinct patterns of labor force participation: a persistent participation in paid employment or a complete exit from the labor market after marriage or childbirth (Higuchi, 1991; Wakisaka and Tomita, 2001). Nonetheless, part-time work has become increasingly prevalent among highly educated women of later cohorts.

4. Regression analysis of published data for 1987-2002

In this section, I report results from regression analysis that parsimoniously summarizes the profiles shown in Figures 1-3. Separate regressions are estimated for the different educational groups because Figures 1-3 clearly indicates that patterns in employment ratios differ significantly for different levels of education. The possible explanatory variables are cohort, age, and time. Restrictions have to be made to fit the data because the cohort, age, and time effects are linearly dependent. I include age effects and cohort effects because, for many of the groups, the time effects do not seem to be large. For the regular employment ratio of university graduate men, junior college graduate women, and university graduate women and the part-time employment ratio of women (for all four educational groups), this specification summarizes the data reasonably well. For the regular employment ratio of junior high school graduate men and women, an alternative specification that includes year effects fits the data better.[14] However, in order to compare the coefficients of different educational groups, it is not useful to change the set of explanatory variables (a subset of age, cohort, and year effects) across groups because the inclusion of year dummies affects the coefficients on age dummies and cohort dummies, making comparison

[14] While R^2 coefficients are over 0.95 for many of the specifications reported in Tables 1-5, those for the regular employment ratio of junior high school graduates in Tables 1 and 2 take low values (less than 0.72). For the regular employment ratio of junior high school graduates, the business cycle effects (the fall in regular employment in years 1997 and 2002) are large, and the age plus cohort effects (reported in column (1) of Table 1 and column (1) of Table 2) do not explain the variation in the data well. Including year dummies (and excluding age dummies or cohort dummies) improves the fit because, in 2002, the regular employment ratio fell for all cohorts of junior high school graduates. These simple specifications improve the fit over the specifications reported in Tables 1 and 2. Results from regressions that include year effects are reported in Appendix B.

between groups difficult.[15]

Since the published data report only the estimates of the population and the number of workers, I cannot obtain the sampling variance of the dependent variable. Therefore, the regressions are weighted by the population estimates for each cell. The error term is expected to be heteroscedastic, since the dependent variables are participation probabilities. Therefore, I report standard errors that are robust to arbitrary form of heteroscedasticity.

4.1. Regression results for regular employment ratio for men

Table 1 contains results from regressions that use the regular employment ratio for men as the dependent variable.[16] The coefficients of the cohort dummies indicate that the 1973-1977 birth cohort experienced a decline in the regular employment ratio for all education groups. The coefficient for this variable is negative and statistically significant, but the magnitude is much larger for the less

[15] Furthermore, adding year effects and age effects for senior high school graduate and university graduate men is tricky because, as Figure 1 shows, the regular employment ratio has a trend of going down for almost all cohorts. To describe this pattern, it is possible either to assign year dummy coefficients that decline for recent years, or to assign age effects that decline with age.

[16] Because the number of men with 14 years of education (junior college) is not large, I do not report results for this group in Tables 1 and 4.

educated. Compared with the coefficient for university graduates, the one for junior high school graduates is 85 percent larger in absolute value (columns (1) and (3)). The recession in the late 1990s and the early 2000s had severe adverse impacts on employment for less educated men. This pattern resembles the increase in nonemployment among less educated men in the United States as reported in Juhn et al. (1991, 2002). Consistent with the patterns in Figure 1, the coefficients of age dummies indicate that the regular employment ratio for men declines with age.

4.2. Regression results for regular and part-time employment for women

Next, I turn to the results for the regular employment ratios for women. Table 2 contains the results for four educational groups. The cohort effects are mostly small in magnitude, except for positive effects for university graduate women born between 1963 and 1972 (the earliest post-EEOL cohorts). In line with the patterns shown in Figure 2, the positive effect of the post-EEOL cohorts is small for less educated women. In the regressions for university graduates, the cohort dummies for those born before 1962 have coefficients close to zero or negative (compared with the base group of the 1953-1957 birth cohort), indicating that the EEOL did not increase regular employment for women with university education who graduated before its enactment. Even for university graduate women, the positive impact is small for the 1973-1977 cohort. The higher participation in regular employment did not continue during the recession period of the late 1990s.[17] While the coefficients of a dummy for the cohort born from 1973 to 1977 are all negative for the groups with less than junior college education, the magnitude is smaller than the estimates for men reported in Table 1. The coefficients of age dummies suggest that for senior high school, junior college, and university graduate women, the regular employment ratio after age 35 is almost at the same level: the coefficients of age dummies are close to zero, where the base group for age dummies is those aged 40-44. This is in contrast to the pattern of the regular employment ratio for men, where a slight fall with age is observed. While there is a large decline in regular employment for women around age 35, it is likely that those who continue regular employment to that age continue working as regular employees until their mid-50s.

Table 3 contains the regression results for the women's part-time employment ratios. The patterns here are very different from regular employment. The cohort dummies show a clear pattern that the later cohorts are much more likely to work part-time than previous cohorts. It is notable that the coefficients of cohort dummies

[17] Note that those born after 1973 finished a 4-year college education after 1995.

exhibit a clear upward trend across cohorts: they never decline and keep increasing for cohorts born later. The coefficients of age dummies indicate that part-time employment increases significantly around age 35-44 for all educational groups. Together with the results for regular employment, it is clear that the increase in labor force participation by middle-aged women in Japan is driven by the increase in part-time employment.

5. Disaggregation by marital status from 1992 to 2002

The published data used in the last section are not disaggregated by marital status. For the years 1992, 1997, and 2002, the resampled microdata sets are available, which makes it possible to obtain participation measures by marital status in addition to the disaggregation by sex, age, and education. The disaggregation by marital status reveals that substantial differences exist in participation behavior between the married and unmarried.[18]

[18] Disaggregation by marital status in plotting cohort profiles can be problematic because marriage is an endogenous decision: see Goldin (1990, pp.19-21). However, what disaggregation reveals is far more important than problems associated with doing it, as shown below. Furthermore, it is of interest to observe the age and cohort patterns for the middle-aged separately by marital status; for them, marital status does not change as much as it does for young men and women.

Figures 4, 5, and 6 show the participation patterns by marital status for men's regular employment, women's regular employment, and women's part-time employment, respectively. For men, the patterns of cohort differences are quite different from the ones that aggregate married and single men. The fall in regular employment observed for junior high school graduates is mostly the phenomenon for unmarried men; for married junior high school graduates, the fall in regular employment in year 2002 is much smaller than for the unmarried. It is also striking that the decline in regular employment for those born between 1973 and 1977 occurred for unmarried men only. For married men, there is no significant decline for this cohort. The statistical significance of these patterns is tested by regression analysis below.

For married women with senior high school education or more, the regular employment ratios are almost at the same level for all cohorts. For married women with junior high school education, a decline in regular employment is observed for cohorts born after 1958. For single women with less education, the regular employment ratios fell uniformly for later cohorts. For university graduate single women, the regular employment ratios do not seem to have increased for the post-EEOL cohorts. This suggests the following interpretation for the increase in regular employment for the post-EEOL cohorts of women with university education (Figure 2 and Table 2): the EEOL did not advance regular employment of married female university graduates, nor did it increase regular employment of single female university graduates. The increase in women's regular employment occurred because more university-educated women delayed or chose not to marry and continued to work as regular employees. This hypothesis is examined by regression analysis below.

6. Regression analysis by marital status

In this section, regression results using the data disaggregated by marital status are reported. The regressions are estimated by a two-step procedure, where the first step is to calculate participation measures for cells defined by cohort, age, education, and marital status and the second step is to relate the cell-level data to explanatory variables.[19] A slight modification in the regression specification (from those in Tables 1-3) is made here: the cell-mean observations are weighted by the inverse sampling variance of the participation measures. This is possible because the cell-level observations are obtained from microdata.

[19] This type of two-step estimation procedure is used in Card and Krueger (1992) and Card and Lemieux (2001). The grouped-data estimation is used widely in analyzing labor supply behavior (Angrist, 1991; Devereux, 2004; Blau and Kahn , 2007).

Table 4 contains results from separate regressions by marital status and education for the regular employment ratio of men. The notable differences in cohort effects are that the decline in regular employment for those born from 1973 to 1977 found in Table 1 is the phenomenon for single men. For married men, the coefficient of this variable is close to zero (for senior high school graduates and university graduates) or negative but much smaller in magnitude than it is for singles (for junior high school graduates).

Table 5 reports the regression results for women's regular employment by marital status and reveals notable differences. A dummy for the cohort born from 1973 to 1977 has a statistically significant negative impact for single women who are not university graduates. However, the decline for this cohort is much smaller for married women. The estimates in Table 2 suggest that the fall in regular employment was not as severe for women as it was for men, but for recent cohorts of less educated single women, regular employment fell significantly (columns (2), (4), and (6)). The coefficients of cohort dummies for the regressions of university graduate women (columns (7) and (8)) indicate that cohort effects are rather small for this group. The increase in regular employment observed for the post-EEOL cohorts for all university graduate women (column (4) of Table 2) is not seen when the regressions are estimated by marital status. Therefore, the EEOL did not advance married women's regular employment, nor did it advance single women's regular employment. It simply changed the composition of marital status among women with university education. The coefficients of cohort dummies in columns (2), (4), and (6) indicate that, for educational groups other than university graduates, the regular employment ratio for post-EEOL cohort single women actually *fell* to a large extent. The regressions for women's part-time employment ratios are estimated by marital status (results are not shown). The pattern of estimates for part-time employment ratios of married women is generally similar to those from aggregate data reported in Table 3.

7. Conclusion

This article has shown that the regular employment ratio fell for less educated men and women in Japan during the period of recession in the late 1990s. The fall in regular employment is concentrated on less educated single men and women. The cohorts who finished schooling in the late 1990s and early 2000s experienced a severe decline in regular employment at young ages. However, this phenomenon is concentrated for single men and women and not for the married.

It is possible to argue that, since the proportion of junior high school graduates has fallen dramatically in the past, the decline in regular employment ratios reflects the change in the average “quality” of junior high school graduates. This might be true to a certain extent: indeed, the proportion of junior high school graduates fell from 21 percent for men born from 1948 to 1952 to less than 10 percent for men born from 1958 to 1977 (Table A1). However, it cannot be the whole story because the fall in the regular employment ratios for junior high school graduate men occurred significantly in year 2002 and not before. The explanations based on the cohort differences in “quality” cannot account for the sudden fall in 2002 for almost all age groups of junior high school graduate men and women. In addition, the educational composition for men born from 1973 to 1977 is similar to the cohorts born 10 years earlier (except for the small differences in the proportions of junior college graduates and senior high school graduates), while the employment outcomes for the 1973-1977 birth cohort were much worse than they were for the 1963-1967 birth cohort. Cohort quality proxied by the university advancement rate cannot explain the significantly negative cohort effect for the 1973-1977 birth cohort.

The cohort analysis identifies the effect of the EEOL on women’s employment 16 years after its enactment. The analysis by marital status reveals that the improvement in regular employment for women with university education is the result of compositional change due to delay in or decline of marriage. The regular employment ratio did not go up for either married or single women of the post-EEOL cohorts. Since the enactment of the EEOL, more women with university education have married late or stayed unmarried, which has resulted in an increase in the regular employment ratios for the post-EEOL cohorts of university graduate women. For educational groups other than university graduates, the regular employment ratio for post-EEOL cohort single women actually *fell*. The EEOL did not advance the employment prospects of less educated women.[20]

Part-time employment has increased steadily for cohorts of women born later. There seems to be no particular period (year) effect for women's part-time employment. Since the regular employment ratios for women are virtually constant after age 35, the increase in part-time employment is the primary reason for the increased women's labor force participation during middle age in Japan.

Appendix A

The educational composition of each birth cohort is shown in Table A1. The

[20] Edwards (1988) predicted that the Japanese EEOL would not have much effect in advancing the economic status of women. The results presented in this article may, at least partially, be consistent with that expectation.

figures are derived from the ESS in 2002. Data from other years show very similar patterns of educational distribution for each cohort.

Appendix B

In this appendix, regression estimates for alternative specifications that include year dummies as explanatory variables are reported. This specification explains the data better for junior high school graduate men and women. For men, the specification that includes year effects and cohort effects (no age effects) fits the data well. For women, the age effects are quite obvious, while the cohort effects seem to be small, so age effects and year effects are included. This specification provides a better fit than the ones reported in Tables 2 and 5. The estimates from these regressions for the sample of junior high school graduates are shown in Table B1. Since including year and age dummies does not yield a better fit for married junior high school graduate women over the one in column (1) of Table 5, results for this group are not reported. As Table B1 shows, compared with the base year of 1992, the regular employment ratios are a little lower (2-6 percent) in 1997 and much lower (7-17 percent) in 2002 for junior high school graduates. On the other hand, including year effects makes the coefficient on a dummy for the 1973-1977 cohort less negative, compared with the ones in Tables 1, 2, 4, and 5. Because the data here are restricted to ages 20 to 54, the oldest cohort (born 1938-1942) does not have observations for the year 2002. Therefore, a negative and large (in absolute value) coefficient for the year 2002 makes the coefficients of cohort dummies for recent cohorts less negative. In fact, the coefficient for the 1973-1977 birth cohort for junior high school graduate married men is positive and statistically significant when year dummies are included (column (2) of Table B1).

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Very preliminary

Appendix C
Extension: Considerations for endogeneity of marriage

In the following, I develop a simple framework to test whether the pattern of falling regular employment ratio for single men and women is understood as an outcome of selection into marriage.

For each education group, let θ_a represent the proportion of married people for age group a, and let $r_{j,a}$ represent the regular employment ratio of age a and marital status j, where j takes M (married), S(single), CM (continuously married), NM (newly married), and CS (continuously single). The group M at age a+5 is the sum of CM and NM. The NM group consists of those who got married between age a and a+5.

Assumptions

The following assumptions are made to form a test procedure.

Assumption 1. Those who got married before age a_0 remain married at age a_0+5.

Assumption 2. Those who got married before age a_0 do not change regular employment status between age a_0 and age a_0+5.

Assumption 3. Those who were single at age a_0 and remain single at age a_0+5 do not change regular employment status between age a_0 and age a_0+5.

Accounting relationships

As "accounting" relationships of the regular employment ratios of married and single people of age a+5, the following two equations hold for each sex, age, and education group:

$$r_{a+5,M} = \frac{\theta_a}{\theta_{a+5}} \cdot r_{a+5,CM} + (1 - \frac{\theta_a}{\theta_{a+5}}) \cdot r_{a+5,NM,M} = \frac{\theta_a}{\theta_{a+5}} \cdot r_{a,M} + (1 - \frac{\theta_a}{\theta_{a+5}}) \cdot r_{a+5,NM,M}, \quad (1)$$

$$r_{a+5,S} = \frac{1-\theta_a}{1-\theta_{a+5}} \cdot r_{a,S} - (\frac{\theta_{a+5} - \theta_a}{1-\theta_{a+5}}) \cdot r_{a,NM,S}, \quad (2)$$

where the subscript at the end of $r_{a+5,NM}$ (the regular employment ratio of the newly married) distinguishes whether the $r_{a+5,NM}$ comes from the "equation for the married" (Eq. (1)), or "equation for singles" (Eq. (2)). Eq. (1) says that the regular employment ratio at age a+5 is the weighted average of the regular employment ratio of continuously married and that of the newly married. The weights are derived from the proportion of married people for each sex, education, and birth year groups, given Assumption 1. The second equality of Eq. (1) comes from Assumptions 1 and 2: because I assume away divorce (Assumption 1), the CM group at age a+5 consists of people who were married at age a, and since the continuously married people do not change employment status, $r_{a+5,CM} = r_{a,M}$.

Eq. (2) says that the regular employment ratio for singles at age a+5 is the regular employment ratio for those who were single at age a minus the regular employment ratio of the "leavers" (the newly married, who leave the single population between age a and a+5), with appropriate weights attached. Due to Assumption 3, r's in the RHS of Eq. (2) are the values at age a, instead of those at age a+5.[1]

Assumptions 2 and 3 may not be valid, because employment status is

[1] To take into account the changing labor force status of the CS group, Eq (2) is modified as $r_{a+5,S} = \frac{1-\theta_a}{1-\theta_{a+5}} \cdot r_{a,S} - (\frac{\theta_{a+5} - \theta_a}{1-\theta_{a+5}}) \cdot r_{a,NM,S} + (r_{a+5,CS} - r_{a,CS})$, where the $(r_{a+5.CS} - r_{a.CS})$ term captures the change in the regular employment ratio for the CS group as the group ages. The term $(ra_{a+5,CS} - ra_{a,CS})$ equals zero due to Assumption 3.

determined as endogenous choice and could change over time. If it were possible to derive the regular employment ratio at age a+5 separately depending on the marital status of 5 year earlier (at age a), it would be possible to account for the impact of changing labor force behavior for the population of fixed marital status (relax Assumptions 2 and 3). However, such information is usually unavailable in cross sectional data, as the case of the ESS data used in this paper.

Another justification for Assumptions 2 and 3 is that some assumptions have to be made to express the idea that "those who are employable are more likely to get married." If people change employment status after marriage, the notion of "employable" is not well established, in the sense that the degree of employability changes at marriage.

For the expressions in Eq. (1) and Eq. (2), r's and θ's are observable in repeated cross sectional data, except for $r_{a,NM,M}$ and $r_{a,NM,S}$. These are the regular employment ratio of newly married individuals, imputed from two different accounting equations: one from the equation for the married, and the other for the equation for singles. From the "married equation," the regular employment ratio of "joiners" is derived, while the "single's equation," that for "leavers" is derived.

Test of the assumptions and the compositional change hypothesis

The above model is based on the notion that the falling regular employment for singles as they age is the result of compositional change of married and single populations. It assumes away the possibilities that employment status changes over time (either for fixed marital status, or upon marriage). If the Assumptions 1-3 above are correct and newly married individuals do not change labor force behavior upon marriage, then the two regular employment ratios for the newly married that are imputed from the two equations should be close, leading to the following hypothesis:

Hypothesis 1: *Compositional Change*. $r_{a,NM,M} = r_{a,NM,S}$.

The hypothesis does not hold when Assumptions 1-3 are not correct, or the newly married individuals change employment status. For example, suppose women leave regular employment within 5 years after marriage. Then, those who leave the single population have a high regular employment ratio, while those who join the married population have a low regular employment ratio ($r_{a,NM,M} < r_{a,NM,S}$). For another example, suppose the labor market conditions changed in such a way that the employment prospects for singles deteriorated more than those for the married, during the 5 years I examine (a violation of Assumption 3). Then the accounting relation of Eq. (2) is not valid. Other violations of assumptions may lead to the rejection of Hypothesis 1. For instance, divorce, which is assumed away by Assumption 1, might have non-negligible impacts.

To form a test statistic for the joint test of Hypothesis 1 and Assumptions 1-3, it is necessary to account for the sampling errors of the r's and θ's. Since $r_{a,NM,M}$ and $r_{a,NM,S}$ are nonlinear functions of r's and θ's, the delta method is used to calculate their standard errors. The standard errors for the difference ($r_{a,NM,M} - r_{a,NM,S}$) is calculated by taking into account that the same θ's appear in both Eq. (1) and (2).

Empirical results

In an empirical analysis, I confine attention to sample in which a+5 is between 25 and 39 (5 year interval), because selection into marriage are most applicable for this age group. Another concern for the empirical analysis is that the data may not support the theoretical restrictions that $0 \le r_{a,NM,M} \le 1$ and $0 \le r_{a,NM,S} \le 1$. In such cases, some of the assumptions are likely to be false, or the sampling error is large. I confine attention to the cases where these restrictions are satisfied. Table C1 reports results the cases where these restrictions are met. For men, Hypothesis 1 is not rejected for most of the cases, although it is rejected for the junior high school graduate men aged 30 or over. Therefore, the hypothesis of stable employment status plus the compositional change is consistent with the data for men. In other words, fall in the regular employment ratio for single men as they age can be understood as more employable men get married and leave the set of singles.

For women, Hypothesis 1 is rejected for most cases, in the direction that $r_{a,NM,M} < r_{a,NM,S}$. The likely reason for the rejection is that the employment status changes before and after marriage. It is difficult to argue that compositional change due to marriage plays any role for women, because leavers from singles have a high regular employment ratio but the same individuals have a low regular employment ratio after marriage.

The pattern of women's $r_{a,NM,M}$ and $r_{a,NM,S}$ is of independent interest. The values of $r_{a,NM,M}$ do not seem to increase for recent cohorts, suggesting that married women of recent cohorts are no more likely to keep working in regular employment after marriage, compared with previous cohorts. Recent cohorts entered the labor market at times when the EEOL has been in effect. The EEOL does not seem to have advanced women's regular employment on this dimension.

Table 1
Regression results for regular employment ratio: Men
1987-2002

	Men		
	Junior High	Senior High	University
	(1)	(2)	(3)
Dummy for born	0.021	0.012	0.033 *
1938-1942	(0.035)	(0.026)	(0.014)
Dummy for born	0.054	0.015	0.017
1943-1947	(0.029)	(0.021)	(0.015)
Dummy for born	0.015	-0.007	0.000
1948-1952	(0.028)	(0.018)	(0.008)
Dummy for born	-0.036	0.003	0.008
1958-1962	(0.031)	(0.016)	(0.007)
Dummy for born	-0.060	-0.010	0.001
1963-1967	(0.029)	(0.015)	(0.008)
Dummy for born	-0.084 *	-0.038	-0.017
1968-1972	(0.032)	(0.021)	(0.012)
Dummy for born	-0.172 **	-0.103 **	-0.093 **
1973-1977	(0.045)	(0.022)	(0.011)
Dummy for Age 20-24	0.108 *	0.047	0.037
	(0.043)	(0.024)	(0.022)
Dummy for Age 25-29	0.075	0.057 *	0.040 **
	(0.036)	(0.020)	(0.011)
Dummy for Age 30-34	0.054	0.034	0.031 **
	(0.030)	(0.017)	(0.008)
Dummy for Age 35-39	0.025	0.015	0.020 *
	(0.026)	(0.015)	(0.007)
Dummy for Age 45-49	-0.026	-0.020	-0.012
	(0.027)	(0.020)	(0.011)
Dummy for Age 50-54	-0.034	-0.035	-0.029
	(0.031)	(0.023)	(0.013)
R-squared	0.632	0.762	0.886

Notes:
Sample sizes are 26 for all specifications. Robust standard errors in parentheses.
All regression equations include a constant.
Regressions are estimated by weighted least squares, using population for
for each cell as weights.
The base group for cohort dummies is the cohort born in 1953-57.
The base group for age dummies is those aged 40-44.
* Statistically significant at the 5% level; ** at the 1% level (two-tailed tests).

Source: ESS (published version and resampled version) 1987-2002.

Table 2
Regression results for regular employment ratio: women
1987-2002

	Women			
	Junior High	Senior High	Junior College	University
	(4)	(5)	(6)	(7)
Dummy for born 1938-1942	0.028	0.002	-0.010	-0.000
	(0.033)	(0.027)	(0.012)	(0.017)
Dummy for born 1943-1947	0.030	0.010	-0.006	-0.017
	(0.030)	(0.021)	(0.013)	(0.021)
Dummy for born 1948-1952	0.007	0.002	0.006	0.004
	(0.028)	(0.019)	(0.014)	(0.015)
Dummy for born 1958-1962	-0.024	-0.005	-0.000	-0.003
	(0.028)	(0.021)	(0.016)	(0.022)
Dummy for born 1963-1967	-0.037	0.017	-0.011	0.050
	(0.023)	(0.023)	(0.019)	(0.029)
Dummy for born 1968-1972	-0.050 *	0.021	0.016	0.074 *
	(0.021)	(0.024)	(0.021)	(0.030)
Dummy for born 1973-1977	-0.094 **	-0.050	-0.050 *	0.010
	(0.022)	(0.034)	(0.022)	(0.032)
Dummy for Age 20-24	0.097 **	0.373 **	0.467 **	0.352 **
	(0.027)	(0.026)	(0.023)	(0.036)
Dummy for Age 25-29	0.005	0.097 **	0.214 **	0.185 **
	(0.027)	(0.026)	(0.017)	(0.031)
Dummy for Age 30-34	-0.024	-0.029	0.007	0.004
	(0.027)	(0.021)	(0.016)	(0.023)
Dummy for Age 35-39	-0.011	-0.027	-0.015	-0.009
	(0.027)	(0.020)	(0.013)	(0.017)
Dummy for Age 45-49	0.015	0.014	0.010	0.000
	(0.026)	(0.019)	(0.013)	(0.014)
Dummy for Age 50-54	0.000	-0.003	0.011	0.002
	(0.026)	(0.021)	(0.011)	(0.022)
R-squared	0.720	0.978	0.994	0.977

Notes:
Sample sizes are 26 for all specifications. Robust standard errors in parentheses.
All regression equations include a constant.
Regressions are estimated by weighted least squares, using population for
for each cell as weights.
The base group for cohort dummies is the cohort born in 1953-57.
The base group for age dummies is those aged 40-44.
* Statistically significant at the 5% level; ** at the 1% level (two-tailed tests).

Source: ESS (published version and resampled version) 1987-2002.

Table 3
Regression results for part-time employment ratio: Women
1987-2002

	Junior High	Senior High	Junior College	University
	(1)	(2)	(3)	(4)
Dummy for born 1938-1942	-0.091 **	-0.131 **	-0.126 **	-0.079 **
	(0.006)	(0.005)	(0.014)	(0.012)
Dummy for born 1943-1947	-0.050 **	-0.086 **	-0.086 **	-0.053 **
	(0.006)	(0.003)	(0.005)	(0.005)
Dummy for born 1948-1952	-0.017 *	-0.040 **	-0.045 **	-0.024 **
	(0.006)	(0.003)	(0.005)	(0.005)
Dummy for born 1958-1962	0.008	0.031 **	0.034 **	0.021 **
	(0.010)	(0.002)	(0.007)	(0.002)
Dummy for born 1963-1967	0.046 *	0.055 **	0.038 **	0.028 **
	(0.015)	(0.003)	(0.008)	(0.003)
Dummy for born 1968-1972	0.086 **	0.080 **	0.047 **	0.026 **
	(0.015)	(0.005)	(0.011)	(0.005)
Dummy for born 1973-1977	0.125 **	0.143 **	0.088 **	0.042 **
	(0.021)	(0.005)	(0.013)	(0.009)
Dummy for Age 20-24	-0.175 **	-0.287 **	-0.201 **	-0.090 **
	(0.018)	(0.006)	(0.012)	(0.012)
Dummy for Age 25-29	-0.179 **	-0.249 **	-0.170 **	-0.087 **
	(0.019)	(0.003)	(0.011)	(0.004)
Dummy for Age 30-34	-0.104 **	-0.182 **	-0.147 **	-0.084 **
	(0.008)	(0.002)	(0.008)	(0.004)
Dummy for Age 35-39	-0.047 **	-0.079 **	-0.074 **	-0.043 **
	(0.006)	(0.002)	(0.004)	(0.003)
Dummy for Age 45-49	0.005	0.020 **	0.036 **	0.031 **
	(0.003)	(0.002)	(0.005)	(0.005)
Dummy for Age 50-54	0.005	0.014 **	0.023 **	0.020 **
	(0.003)	(0.003)	(0.006)	(0.006)
R-squared	0.973	0.998	0.985	0.967

Notes:
Sample sizes are 26 for all specifications. Robust standard errors in parentheses.
All regression equations include a constant.
Regressions are estimated by weighted least squares, using population for each cell as weights.
The base group for cohort dummies is the cohort born in 1953-57.
The base group for age dummies is those aged 40-44.
* Statistically significant at the 5% level; ** at the 1% level (two-tailed tests).

Source: ESS(published version) 1987-2002.

Table 4
Regression results for regular employment ratio by marital status: Men
1992-2002

	Junior High		Senior High		University	
	Married	Single	Married	Single	Married	Single
	(1)	(2)	(3)	(4)	(5)	(6)
Dummy for born	0.049	0.105 *	0.008	0.094	0.017	0.062
1943-1947	(0.020)	(0.042)	(0.014)	(0.052)	(0.006) *	(0.044)
Dummy for born	0.010	0.067	-0.011	0.040	-0.001	0.013
1948-1952	(0.018)	(0.033)	(0.011)	(0.036)	(0.004)	(0.028)
Dummy for born	-0.028	-0.088	0.003	-0.018	0.017	-0.023
1958-1962	(0.026)	(0.040)	(0.012)	(0.032)	(0.004) **	(0.021)
Dummy for born	-0.043	-0.160 *	0.004	-0.068	0.018	-0.045
1963-1967	(0.034)	(0.048)	(0.015)	(0.037)	(0.005) **	(0.022)
Dummy for born	-0.095	-0.217 **	-0.013	-0.128 *	0.015	-0.082 *
1968-1972	(0.043)	(0.056)	(0.019)	(0.039)	(0.006) *	(0.023)
Dummy for born	-0.145 *	-0.335 **	-0.021	-0.218 **	-0.007	-0.179 **
1973-1977	(0.054)	(0.062)	(0.025)	(0.042)	(0.010)	(0.025)
Dummy for Age 20-24	0.263 **	0.324 **	0.085 *	0.262 **	-0.015	0.237 **
	(0.055)	(0.062)	(0.030)	(0.042)	(0.032)	(0.025)
Dummy for Age 25-29	0.143 *	0.233 **	0.069 *	0.222 **	0.040	0.198 **
	(0.044)	(0.057)	(0.019)	(0.039)	(0.006) **	(0.024)
Dummy for Age 30-34	0.075	0.186 **	0.040 *	0.137 **	0.029	0.139 **
	(0.035)	(0.050)	(0.015)	(0.036)	(0.005) **	(0.022)
Dummy for Age 35-39	0.035	0.088	0.018	0.072	0.019	0.060 *
	(0.023)	(0.038)	(0.012)	(0.033)	(0.004) **	(0.021)
Dummy for Age 45-49	-0.033	-0.066	-0.019	-0.082	-0.012	-0.074 *
	(0.016)	(0.033)	(0.011)	(0.036)	(0.004) *	(0.028)
Dummy for Age 50-54	-0.059 *	-0.129 *	-0.040 *	-0.157 *	-0.031	-0.135 *
	(0.018)	(0.038)	(0.013)	(0.047)	(0.006) **	(0.039)
R-squared	0.902	0.895	0.950	0.954	0.989	0.983

Notes:
Sample sizes are 19 for all specifications. Standard errors are in parentheses.
All regression equations include a constant.
Regressions are estimated by weighted least squares, using the inverse sampling variance of the dependent variable as weights.
The base group for cohort dummies is the cohort born in 1953-57.
The base group for age dummies is those aged 40-44.

* Statistically significant at the 5% level; ** at the 1% level (two-tailed tests).

Source: ESS (resampled data), 1992-2002.

Table 5
Regression results for regular employment ratio by marital status: Women
1992-2002

	Junior High		Senior High		Junior College		University	
	Married	Single	Married	Single	Married	Single	Married	Single
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dummy for born 1943-1947	0.074 **	0.143 **	0.041 **	0.117 *	-0.009	0.055	-0.001	0.041
	(0.011)	(0.025)	(0.010)	(0.035)	(0.013)	(0.033)	(0.014)	(0.105)
Dummy for born 1948-1952	0.035 *	0.067 *	0.020 *	0.063	0.006	0.045	0.006	0.043
	(0.010)	(0.022)	(0.008)	(0.028)	(0.009)	(0.023)	(0.011)	(0.075)
Dummy for born 1958-1962	-0.056 **	-0.101 *	-0.026 *	-0.062	-0.031 **	-0.034	-0.039 **	0.006
	(0.015)	(0.028)	(0.009)	(0.030)	(0.008)	(0.020)	(0.009)	(0.063)
Dummy for born 1963-1967	-0.107 **	-0.153 **	-0.044 **	-0.121 *	-0.053 **	-0.101 **	-0.038 *	-0.021
	(0.018)	(0.034)	(0.010)	(0.035)	(0.009)	(0.023)	(0.012)	(0.071)
Dummy for born 1968-1972	-0.103 **	-0.281 **	-0.058 **	-0.206 **	-0.046 **	-0.134 **	-0.046 *	-0.058
	(0.022)	(0.039)	(0.013)	(0.038)	(0.011)	(0.024)	(0.015)	(0.075)
Dummy for born 1973-1977	-0.106 **	-0.371 **	-0.055 *	-0.335 **	-0.050 *	-0.229 **	-0.084 **	-0.150
	(0.027)	(0.044)	(0.018)	(0.039)	(0.015)	(0.024)	(0.022)	(0.077)
Dummy for Age 20-24	0.007	0.376 **	0.028	0.483 **	0.031	0.381 **	0.049	0.276 *
	(0.028)	(0.044)	(0.021)	(0.038)	(0.022)	(0.023)	(0.046)	(0.077)
Dummy for Age 25-29	-0.002	0.263 **	0.006	0.332 **	0.023	0.260 **	0.095 **	0.180
	(0.023)	(0.041)	(0.013)	(0.037)	(0.012)	(0.023)	(0.016)	(0.074)
Dummy for Age 30-34	0.010	0.154 **	-0.018	0.163 **	-0.018	0.139 **	0.017	0.077
	(0.019)	(0.036)	(0.010)	(0.034)	(0.009)	(0.022)	(0.012)	(0.071)
Dummy for Age 35-39	0.016	0.080 *	-0.010	0.088 *	-0.014	0.075 **	0.005	0.052
	(0.014)	(0.028)	(0.009)	(0.030)	(0.008)	(0.020)	(0.009)	(0.063)
Dummy for Age 45-49	-0.008	-0.025	0.001	-0.057	0.008	-0.066 *	0.000	-0.086
	(0.009)	(0.021)	(0.008)	(0.028)	(0.009)	(0.023)	(0.010)	(0.075)
Dummy for Age 50-54	-0.053 **	-0.086 **	-0.031 *	-0.166 **	0.004	-0.122 **	-0.009	-0.051
	(0.010)	(0.023)	(0.010)	(0.033)	(0.012)	(0.030)	(0.014)	(0.098)
R-squared	0.984	0.965	0.972	0.989	0.965	0.995	0.919	0.902

Notes:
Sample sizes are 19 for all specifications. Standard errors are in parentheses.
All regression equations include a constant.
The base group for cohort dummies is the cohort born in 1953-57.
The base group for age dummies is those aged 40-44.

* Statistically significant at the 5% level; ** at the 1% level (two-tailed tests).

Source: ESS(resampled data) 1992-2002.

Table A1: Educational distribution by birth year groups

Men

Birth years	Junior High	Senior High	Junior College	University
1938-1942	0.375	0.431	0.029	0.164
1943-1947	0.297	0.450	0.037	0.215
1948-1952	0.211	0.480	0.048	0.261
1953-1957	0.138	0.456	0.060	0.346
1958-1962	0.076	0.461	0.090	0.373
1963-1967	0.073	0.467	0.103	0.357
1968-1972	0.084	0.442	0.135	0.338
1973-1977	0.077	0.429	0.155	0.339

Women

Birth years	Junior High	Senior High	Junior College	University
1938-1942	0.421	0.483	0.068	0.028
1943-1947	0.311	0.536	0.103	0.049
1948-1952	0.198	0.580	0.157	0.066
1953-1957	0.112	0.541	0.236	0.111
1958-1962	0.049	0.517	0.306	0.128
1963-1967	0.044	0.507	0.321	0.128
1968-1972	0.053	0.450	0.348	0.149
1973-1977	0.045	0.369	0.388	0.198

Note: The figures are the share of population of each educational group for the birth year group. The figures are calculated for those who are over 25 years old.

Source: Employment Status Survey, 2002

Table B1: Alternative regression specifications for junior high school graduates

	Men			Women	
	All	Married	Single	All	Single
	(1)	(2)	(3)	(5)	(6)
Dummy for year 1987	-0.020 **	-	-	-0.027 **	-
	(0.005)			(0.005)	
Dummy for year 1997	-0.021 **	-0.015	-0.038 *	-0.023 **	-0.059 **
	(0.004)	(0.010)	(0.012)	(0.005)	(0.012)
Dummy for year 2002	-0.100 **	-0.082 **	-0.149 **	-0.073 **	-0.165 **
	(0.005)	(0.012)	(0.013)	(0.006)	(0.012)
Dummy for born 1938-1942	-0.048 **	-	-	-	-
	(0.006)				
Dummy for born 1943-1947	-0.001	-0.022	-0.044 *	-	-
	(0.006)	(0.014)	(0.020)		
Dummy for born 1948-1952	-0.007	-0.022	-0.006	-	-
	(0.004)	(0.013)	(0.016)		
Dummy for born 1958-1962	-0.011	0.008	-0.004	-	-
	(0.007)	(0.020)	(0.020)		
Dummy for born 1963-1967	-0.008	0.040	0.001	-	-
	(0.007)	(0.021)	(0.019)		
Dummy for born 1968-1972	-0.012	0.056 *	0.023	-	-
	(0.006)	(0.022)	(0.017)		
Dummy for born 1973-1977	-0.067 **	0.072 *	-0.035	-	-
	(0.007)	(0.029)	(0.020)		
Sample size	26	19	19	26	19
R-squared	0.977	0.879	0.943	0.960	0.964

Notes:
Robust standard errors in parentheses for column (1). All regression equations include a constant.
The regression is estimated by weighted least squares, using population for each cell as weights for column (1).
Regressions are estimated by weighted least squares, using the inverse sampling variance of the dependent variable as weights for columns (2)-(4).
The base year for year dummies is year 1992.
The base group for cohort dummies is the cohort born in 1953-57.
The regression for women includes age dummies as regressors; coefficients of age dummies are not reported.

* Statistically significant at the 5% level; ** at the 1% level (two-tailed tests).

Source: ESS(published version) 1987-2002 and ESS (resampled data) 1992-2002.

Table C1: Imputed regular employment ratios for the newly married and test of Hypothesis 1

Men

Education	Birth year	Age	$r_{NM,M}$	$r_{NM,S}$	t-statistic	p-value	Actual, r_M	Actual, r_S
Junior High	1963-1967	30-34	0.585	0.794	-1.011	0.312	0.730	0.567
Junior High	1968-1972	25-29	0.694	0.804	-0.857	0.391	0.767	0.565
Junior High	1968-1972	30-34	0.241	0.781	-2.157	0.031	0.659	0.518
Junior High	1973-1977	25-29	0.497	0.982	-3.181	0.001	0.672	0.407
Senior High	1958-1962	35-39	0.664	0.976	-1.649	0.099	0.852	0.754
Senior High	1963-1967	30-34	0.850	0.948	-1.510	0.131	0.878	0.759
Senior High	1968-1972	25-29	0.893	0.848	1.105	0.269	0.892	0.788
Senior High	1973-1977	25-29	0.861	0.910	-1.024	0.306	0.872	0.666
Junior College	1958-1962	35-39	0.737	0.964	-0.771	0.441	0.840	0.756
Junior College	1963-1967	30-34	0.899	0.887	0.108	0.914	0.888	0.819
Junior College	1968-1972	25-29	0.894	0.907	-0.161	0.872	0.891	0.833
Junior College	1968-1972	30-34	0.859	0.978	-0.987	0.324	0.877	0.758
Junior College	1973-1977	25-29	0.887	0.943	-0.659	0.510	0.893	0.748
University	1958-1962	35-39	0.914	0.981	-0.578	0.563	0.940	0.817
University	1963-1967	30-34	0.941	0.963	-0.380	0.704	0.948	0.875
University	1968-1972	30-34	0.936	0.997	-0.957	0.339	0.944	0.810
University	1973-1977	25-29	0.939	0.937	0.026	0.979	0.933	0.792

Table C1: Imputed regular employment ratios for the newly married and test of Hypothesis 1 (cont.)

Women

Education	Birth year	Age	$r_{NM,M}$	$r_{NM,S}$	t-statistic	p-value	Actual, r_M	Actual, r_S
Junior High	1963-1967	30-34	0.062	0.875	-1.161	0.246	0.096	0.303
Junior High	1968-1972	25-29	0.064	0.540	-4.102	0.000	0.086	0.287
Junior High	1973-1977	25-29	0.030	0.842	-2.985	0.003	0.087	0.172
Senior High	1963-1967	30-34	0.128	0.856	-10.182	0.000	0.174	0.567
Senior High	1968-1972	25-29	0.173	0.930	-19.384	0.000	0.181	0.634
Senior High	1973-1977	25-29	0.164	0.877	-15.557	0.000	0.179	0.490
Junior College	1958-1962	35-39	0.269	0.826	-2.271	0.023	0.228	0.659
Junior College	1963-1967	30-34	0.151	0.852	-9.951	0.000	0.205	0.660
Junior College	1963-1967	35-39	0.234	0.977	-2.970	0.003	0.207	0.570
Junior College	1968-1972	30-34	0.118	0.887	-10.968	0.000	0.205	0.602
Junior College	1973-1977	25-29	0.251	0.956	-15.227	0.000	0.249	0.642
University	1958-1962	35-39	0.226	0.520	-1.405	0.160	0.295	0.751
University	1963-1967	30-34	0.221	0.818	-5.978	0.000	0.309	0.724
University	1968-1972	30-34	0.213	0.912	-7.067	0.000	0.298	0.622

Source: Author's calculation from ESS 1992-2002 (resampled data).

Figure 1. Regular employment ratio of men

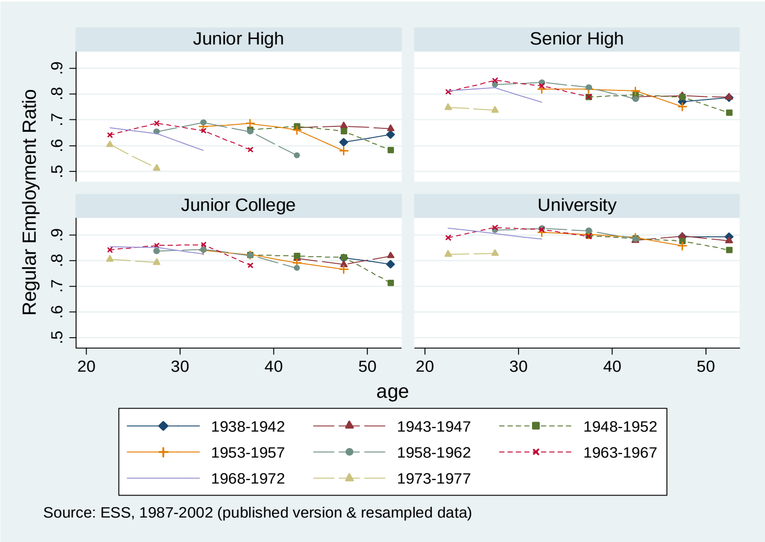


Figure 2. Regular employment ratio of women

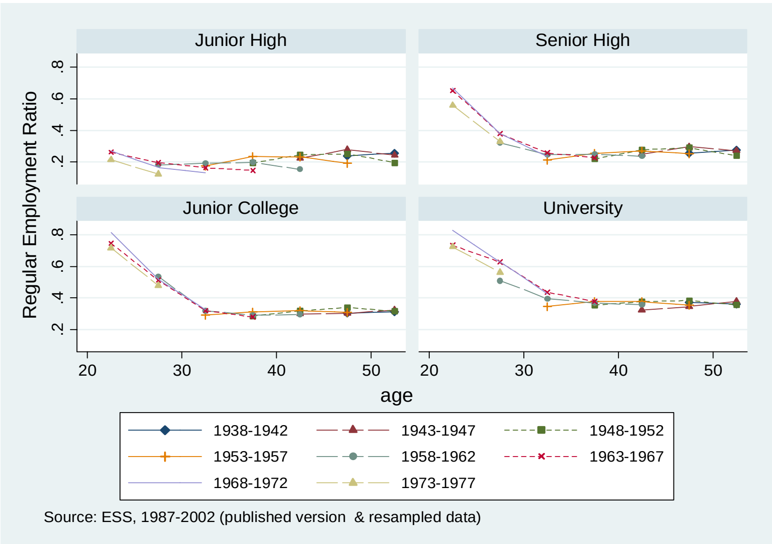


Figure 3. Part-time employment ratio of women

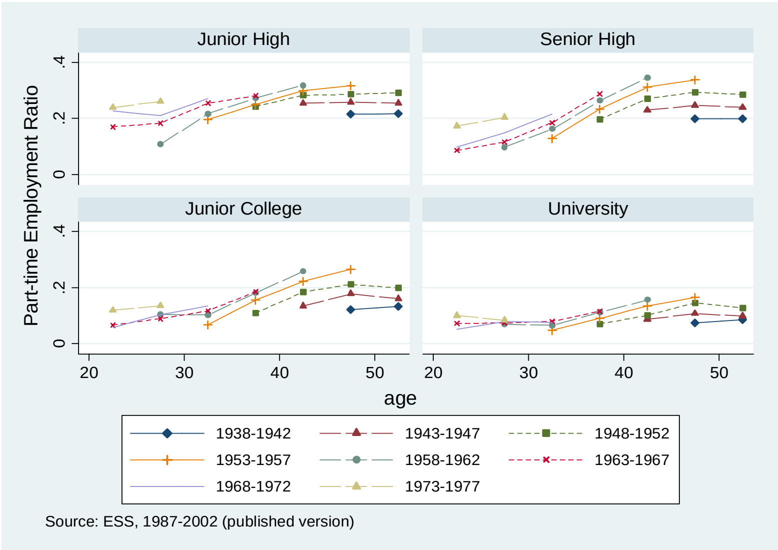
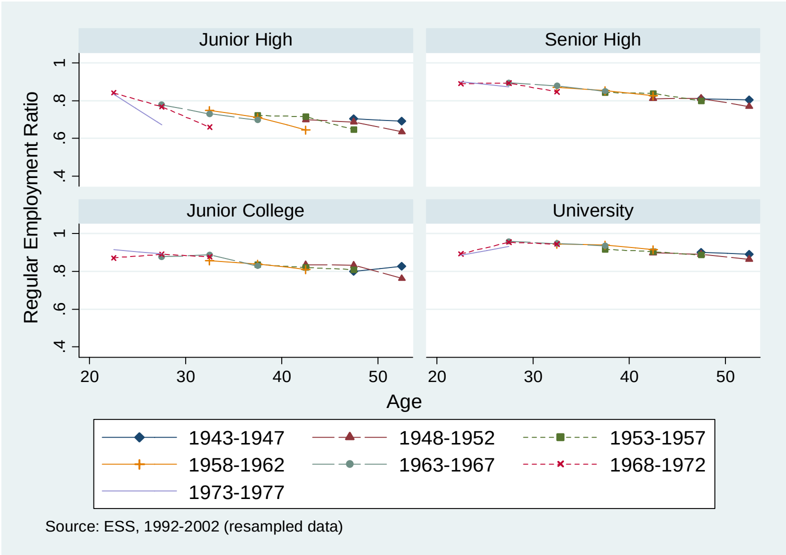


Figure 4

Regular employment ratio of married men



Regular employment ratio of single men

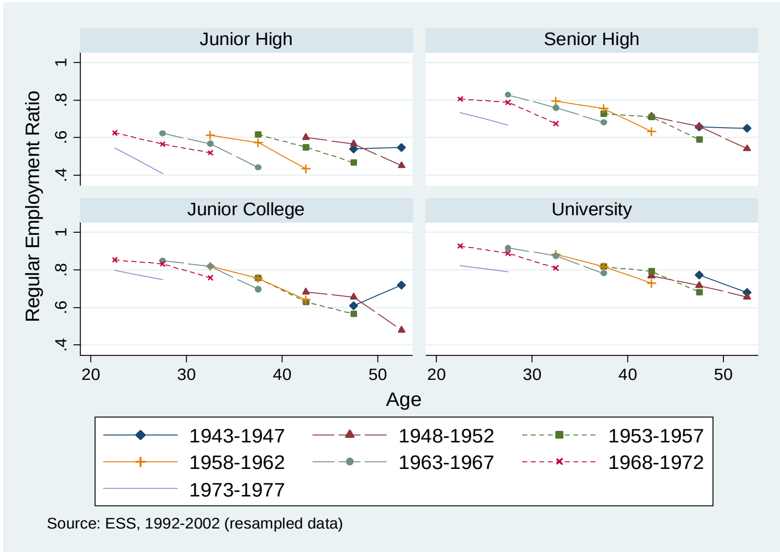
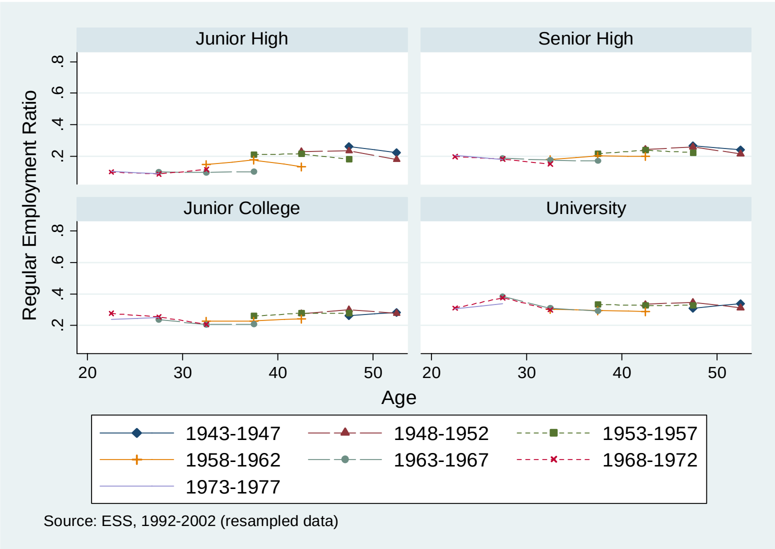


Figure 5

Regular employment ratio of married women



Regular employment ratio of single women

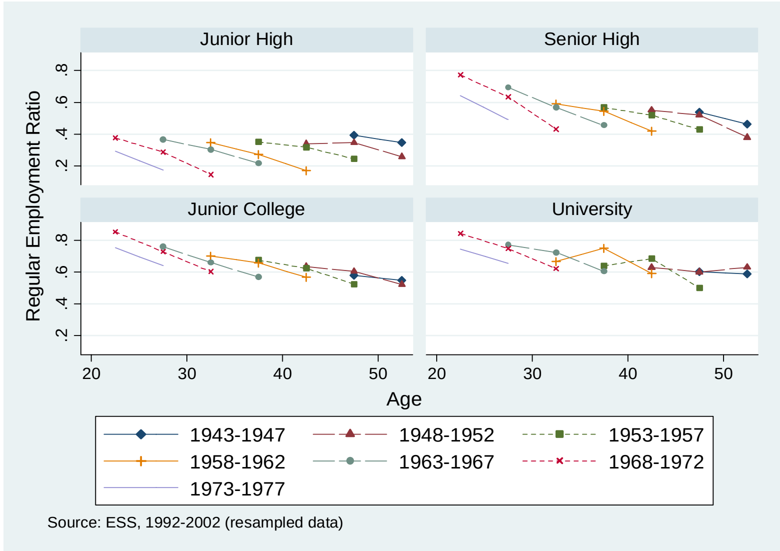
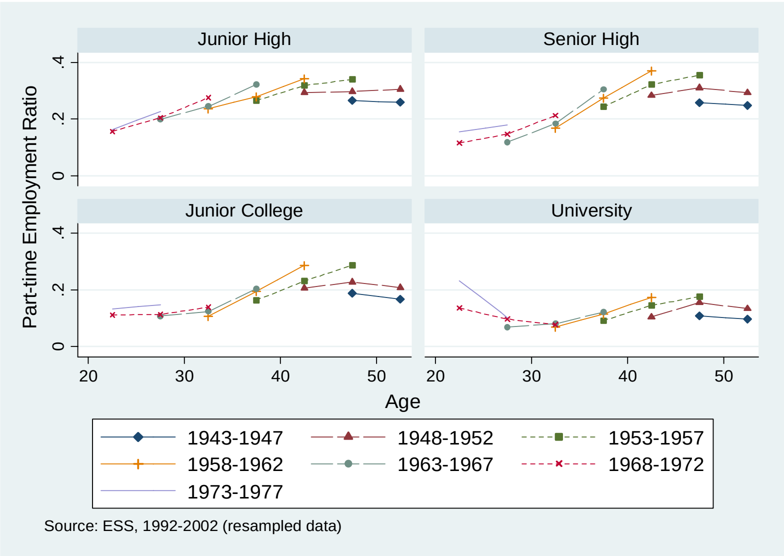


Figure 6

Part-time employment ratio of married women



Part-time employment ratio of single women