How Japan's 1986 *Equal Employment Opportunity Law* Had Different Effects in the Short-Term and Long-Term*

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Abstract

This study examines how Japan's 1986 *Equal Employment Opportunity Law (EEOL)* influenced the employment and wages of women relative to men, particularly focusing on university-educated women in the early and later stages of their careers. Using a regression discontinuity (RD) design and microdata from the decennial Japanese National Census conducted between 1990 and 2020, it is shown that while it improved the employment and wages of women relative to men in the short term, the long-term effects were negligible. We found that while the EEOL increased the probability that women in their 20s would be employed and reduced their probability of being married or full-time homemakers, these effects disappeared as their careers progressed into their 30s, 40s, and 50s. Moreover, analysis of payroll records shows that the EEOL reduced the gender wage gap of women in their 20s but not later. We infer that the significant household responsibilities faced by women such as housework and childcare offset the labor market effects of the EEOL in the long term. This suggests that while legal remedies may create positive short-term effects, a longer-term solution to gender inequality in Japan requires a more fundamental cultural transformation, especially of the division of roles within the household.

Keywords: Equal Employment Opportunity Law (EEOL); Women's Employment; Gender Wage Gap; Family Formation.
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1 Introduction

To combat a persistent gender gap in employment and wages, a number of countries have enacted laws prohibiting gender-based discrimination in hiring, promotion, and pay. These include the 1963 *Equal Pay Act* in the United States, 1970 *Equal Pay Act* in the UK, 1976 *Council Directive 76/207/EEC* in the European Community, and 1986 *Equal Employment Opportunity Law (EEOL)* in Japan. Although these long-standing laws have attracted much academic interest, the outstanding literature has not yet reached a consensus on their effectiveness.[1] Taking the US Equal Pay Act of 1963 as an example, Goldin (2006) in her 2006 Ely Lecture argues that legislative changes such as the removal of marriage barriers and the enactment of anti-discrimination laws did meaningfully contribute to the changes in gender roles that occurred during the 1960s and 1970s. In contrast with this positive view, Blau and Kahn (2017) in their review of the literature argue that the 1964 legislation had no discernible impact on narrowing the gender wage gap, as the gender pay ratio remained flat through the late 1970s and early 1980s. Meanwhile, Bailey et al. (2024) revisit the combined effects of the Equal Pay Act and Title VII of the Civil Rights Act, which also requires equal employment opportunities, on women's labor market outcomes in the 1960s and find that the anti-discrimination legislation had a substantial impact.[2] Possibly contributing to the different conclusion of this latter study from previous research was its different methodology, exploiting the heterogeneous impacts of federal law due to pre-existing conditions across states or industries, which demonstrates the importance of research design.

The current study examines the impact of the 1986 *Equal Employment Opportunity Law (EEOL)* in Japan. The law was enacted despite strong opposition from business since it prohibited the common early-1980s practice of making career-track jobs available only to men. Despite this resistance, lawmakers and bureaucrats of the Ministry of Labor pushed the proposal because the enactment of anti-discrimination laws was a condition for ratifying the *Convention on the Elimination of All Forms of Discrimination against Women* that the United Nations General Assembly

[1] Beller (1982a), Beller (1982b), and Moran (1970) explore the effects of these U.S. laws observed in the 1970s.

[2] While Holzer and Neumark (2000a) state that there is no strict legal separation between Affirmative Action and Equal Employment Opportunity (EEO) legislation, EEO primarily enforces compliance with laws that prohibit discriminatory practices in employment, while Affirmative Action can encompass broader efforts like targeted recruitment, training, and diversity-enhancing practices. Holzer and Neumark (1999) and Holzer and Neumark (2000b) show that in terms of performance, no evidence was found that women and minorities hired under Affirmative Action perform significantly worse compared to white men. Moreover, even in cases where hiring qualifications are slightly lower, actual job performance often shows no notable differences.

had adopted in 1979. At the time, the Japanese government viewed ratifying this treaty as necessary to improve Japan's international reputation (Yokoyama, 1996). Accordingly, the EEOL was implemented in 1986 and prohibited Japanese companies from engaging in gender-based human resource management in such areas as recruitment, promotion, retirement, training opportunities, and job assignments. However, while the law covers many aspects of a firm's personnel decisions, it allegedly has been most effective in removing the entry barriers into career-oriented tracks for women graduating from university. The enactment of the law, combined with the particular importance in Japan of job entry timing and conditions for university graduates, sets up an environment to implement a regression discontinuity (RD) design, which compares the labor market outcomes of university graduates who graduated before and after the enactment of the law. This allows us to overcome difficulties experienced in other studies of isolating the effect of legislation from other changes that have occurred.

We draw on 10% sampling data from the quinquennial Japan National Census to examine the discontinuity in labor market outcomes between the cohort who graduated from schools just before and after the enactment of the EEOL. We find that among university graduate women in 1990, approximately four years after graduation, the probability of working for the cohort marginally affected by the new law (those who had searched for positions starting in 1986) discontinuously increased by about 3 percentage points more than for the cohort who were marginally not affected, whose average employment rate was 78%. We do not find such an impact on employment among non-university graduate women or men of any educational background. Further, the significant increase in the employment rate for university graduate women is mirrored by a decrease in their marriage rate. Four years after university graduation, the marriage rate of the marginally treated cohort was 28%, whereas that of the marginally non-treated cohort was 36%. In sum, the enactment of the EEOL increased the employment rate of university graduate women and delayed their marriage timing up to four years after university graduation.

The significant impact of the EEOL on university graduate women immediately after graduation, however, was not long-lasting over their careers. Our analysis of the 2000 and 2010 National Censuses shows that the discontinuity of the employment rate between the treated and non-treated cohort is not statistically significant, implying that the treatment effect disappeared 14 and 24 years after university graduation.

In addition to our analysis of the impact of the EEOL on women's employment rate and marriage rate using National Census data, we also used payroll data from the Basic Survey of Wage Structure to analyze the impact of the EEOL on the gender wage differential. As with the employment analysis, we implemented an RD analysis by defining cohorts affected by the enactment of the EEOL as the treatment group and those not affected as the control group. Among university graduates in 1990, four years after the enactment of the EEOL, the gender wage gap of the treated cohort was about 0.02 log points whereas that of the pre-treated cohort was about 0.10 log points. Thus, the enactment of the EEOL substantially contributed to narrowing the gender wage differential in the early career stage of university-educated women. However, consistent with the findings from our employment analysis, the impact on the wage gap completely disappeared in 2000 and 2010, 14 and 24 years after graduation.

Overall, our cohort-based RD analysis shows that the enactment of the EEOL narrowed the gender-based employment and wage gaps for university graduates in their early career stage at least up to four years after graduation, and this positive impact on women's career progression also delayed marriage. However, this initial positive career impact had completely dissipated by mid-career, 14 and 24 years after university graduation, and the marriage rate of the treated cohort, accordingly, also converges to that of the control cohort. The lack of a persistent effect is probably due to the sociocultural context in Japan whereby these women undoubtedly faced tradeoffs between career progression and family formation. Discrimination in task assignment and promotion, combined with social pressure based on traditional gender norms, presumably led to these women choosing family formation over career progression. In other words, while the Japanese EEOL initially helped improve the status of university graduate women, the legislation was not strong enough to overcome the traditional gender norm that hindered their career progression afterward.

This paper contributes to the literature in several ways. First, we implement a cohort- based research design to assess the impact of anti-gender-discrimination legislation based on the setting that the EEOL had a particularly strong impact at career entry. This cohort RD approach, combined with repeated cross-section data, allows us to assess the impact of antidiscrimination law on employment and wage outcomes over the career stage. Numerous studies on scarring effects, which are in contexts different from this study, consistently report that the business cycle at the entry to the labor market has a persistent effect on subsequent labor market outcomes

(Kahn, 2010; Genda et al., 2010; Altonji et al., 2016; Wachter, 2020; Rothstein, 2023). Our study is the first application of cohort-based RD to assess the impact of antidiscrimination legislation and, given the prevalence of the scarring effect across countries and time periods, this method should be applicable to a wide range of cases.

Second, this study sheds light on the dynamic effect of anti-discrimination laws on women's employment and wages over their life cycle. Much of the existing literature assesses the average impact of antidiscrimination laws on employment and wages of women across age groups (Manning, 1996; Neumark and Stock, 2006; Blau and Kahn, 2017; Bailey et al., 2024), while a different strand of literature reports that the crucial role of family formation and heavier family responsibilities placed on women's shoulders are important sources of the gender gap in employment and wages (Kleven et al., 2019; Cortés and Pan, 2023; Kleven et al., 2024). Given the reported importance of life events on the gender gap, the impact of antidiscrimination law on the gender gap can well be different across life stages, and this paper indeed sheds light on the heterogeneous impacts of antidiscrimination laws over the life cycle.

Third, this study also contributes to the relatively meager literature assessing Japan's 1986 EEOL by integrating two disparate threads of the literature. Abe (2010) finds that highly educated women who entered the labor market after the enactment of the EEOL are more likely to be in regular full-time employment, but did not experience wage gains relative to their male counterparts, while Abe (2011) finds that the cohorts of women who graduated from university after the EEOL married later or were less likely to marry than previous cohorts. The findings that EEOL cohorts of university-educated women were more likely to be employed and less likely to marry are similar to this study, though the observed impact on wage effects is different. Because Abe (2010, 2011) used a single cohort defined over a five-year range, disentangling the impacts of EEOL from the long term convergence in employment and wages is difficult. Our study overcomes this limitation by exploiting the sharp discontinuity created by policy intervention, which allows for the trends in gender gaps in employment and wages to be identified across different cohorts.

2 Background

2.1 Japan's 1986 *Equal Employment Opportunity Law (EEOL)*

In December 1979, *the Convention on the Elimination of All Forms of Discrimination against Women* (CEDAW) was adopted at the 34th United Nations General Assembly. In 1980, concerns about Japan's international reputation prompted the Japanese government to sign CEDAW. However, to ratify it, Japan was required to address gender inequality issues in three areas: nationality, education, and employment.

With respect to employment, CEDAW Article 11 specifically outlined the obligations of signatory countries,[3] which included ensuring equal rights for men and women in promotion, job security, all benefits and conditions related to employment, and access to training. It also explicitly prohibited dismissal based on maternity or parental leave as well as discriminatory dismissal based on marital status. In Japan, it was recognized that for CEDAW ratification, appropriate domestic legal measures needed to be implemented to ensure equal opportunities and treatment for men and women in employment.

Discussions on the topic had been ongoing for some time. Before CEDAW was adopted in 1980, deliberations had already begun in the spring of 1978 at the Women's Labor Subcommittee of the Women's and Minors' Problems Council, an advisory board to the Minister of Labor, on measures to ensure equal employment opportunities and treatment for men and women. These discussions, set against the backdrop of a global movement toward gender equality inspired by International Women's Year, included consideration of a possible legal framework but it was not until the 1980s after CEDAW was adopted that domestic debates on legal enactment gained momentum. In Japan, where gender norms were deeply rooted, there was strong opposition, particularly among business organizations, to treating women the same as men in employment. After considerable difficulties, a draft bill was finalized and submitted to the Diet in May 1984. The Diet deliberations were also contentious, and the bill was not passed until the end of the 1984 session, but it was carried over to the following year's Diet deliberations, and was finally approved in May 1985.

The enacted *Law of Equal Opportunity and Treatment between Men and Women in Employment* (EEOL) was announced on June 1, 1985, and came into effect on April 1, 1986. The purpose

[3]The explanation in this section is based on Akamatsu (2003) and Iki (2011).

clause of the law explicitly states that its aim is to promote equal opportunities and treatment for men and women in the field of employment in accordance with the principles of equality under the law as guaranteed by the Japanese Constitution. Specific provisions prohibiting discrimination are also stipulated, including prohibition of discriminatory treatment against women in areas such as major formal training programs (excluding practical training), welfare benefits related to financial advantages, and retirement, resignation, and dismissal. Furthermore, dismissals on the grounds of marriage, pregnancy, childbirth, or maternity leave are also prohibited. However, in its initial form, the law required only that employers "make efforts" to provide equal opportunities and treatment for men and women in recruitment, hiring, placement, and promotion. The EEOL is still in effect today, but has undergone several amendments over the years, including changes to convert items that previously only required employers to make efforts into mandatory requirements.

This study uses Japan's enactment of EEOL as the policy shift in our Regression Discontinuity (RD) design methodology. Women's birth year and quarter is the forcing variable, and it is crucial that this variable has not been manipulated. As explained below, the main analysis sample of this study is women born between April 1961 and March 1967 who performed job searches three years before and after the introduction of EEOL. As explained above, the enactment and implementation of EEOL stemmed from the 1979 adoption of CEDAW, so it is unlikely that parents in the mid-1960s could have anticipated this and manipulated the timing of pregnancies. Therefore, the assumption that the forcing variable used in this study has not been manipulated is reasonable.

2.2 Employment of Women in Japan before EEOL

The working situation of Japanese women in the mid- to late 1970s around a decade before EEOL was implemented shifted dramatically after EEOL. In 1974, while the number of employed women had increased to 19.7 million, or 37.8% of Japanese workers, the treatment of women in corporate employment management often differed from that of men. For instance, many Japanese companies had adopted a mandatory retirement system and, in 1974, 29.5% of companies with a retirement age system had gender-specific retirement ages.[4] Additionally,

[4]In 1973, all companies set the retirement age for men at 55 or older but only 27.1% of companies set the retirement age for women at 55, with the majority setting it below 55. Moreover, 7.9% had adopted retirement policies applicable only to women, including mandatory retirement upon marriage or pregnancy and childbirth (Ministry

64.6% of Japanese establishments had occupations or departments where women were not assigned, 10.9% did not provide training or education programs to women, and 25.0% offered no opportunities for women to advance or be promoted. Furthermore, women's average monthly wages in companies with 30 or more employees amounted to 114,067 yen in 1975, which was only 55.8% of men's wages of 204,295 yen ($1 = 150 JPY).[5]

Focusing now on highly educated women, by 1979, only 12.9% of Japanese female workers were graduates of junior colleges, technical colleges, or universities, indicating that highly educated women made up only a small fraction of the Japanese workforce,[6] and among these, female university graduates were particularly few. Before the EEOL prohibited gender-based employment practices, Japanese companies managed their employees by separating roles into core positions for men and auxiliary positions for women. At that time, women with high school or junior college education were primarily employed in women's auxiliary roles. Meanwhile, female university graduates, who made up only 7.1% of the female labor force and were part of a small elite group, endured an especially challenging task in securing employment because the roles expected of women in companies were auxiliary in nature.[7] Evidence supporting this includes a survey conducted among graduates of a Japanese women's university[8] revealing that, among those who graduated between 1968 and 1985 prior to EEOL implementation, 57.8% agreed or somewhat agreed with the statement that there was no position in the companies for four-year university graduates of women at the time of their graduation.[9]

Lastly, regarding Japanese society's attitudes toward gender roles at the time, the per- centage of Japanese people who agreed with statements such as "Married women should be at home" or "After giving birth, married women should be at home" was 70.6% in 1978, reflecting a conservative perspective toward the social role of women. In contrast, this figure decreased to 36.9% in 2018.[10] While this shows that there still remains a substantial number of people with conservative views on gender roles in Japan, it also indicates that such attitudes were much more prevalent in the late 1970s.

of Labor, "Employment Management Survey 1974," and the Bureau for Women and Minors, Ministry of Labor, (1974) "The Current Situation of Working Women").

[5]The Bureau for Women and Minors, Ministry of Labor, (1974) "The Current Situation of Working Women."

[6]Japan Bureau of Statistics, "Employment Structure Survey, 1979."

[7]In 1974, only 7.1% of female new graduates were university graduates, compared to 34.1% of their male counterparts (Ministry of Education, "Basic School Survey 1974").

[8]Survey on Work and Life of Japan Women's University's Graduates, 2015. See Hara et al. (2015) for details.

[9]In contrast, among the cohort who graduated between 2001 and 2014, only 1.5% agreed with this statement.

[10]NHK Broadcasting Culture Research Institute, "The Japanese Value Orientations Survey, 1973–2018."

3 Econometric Framework

3.1 Data

This study utilizes 10% sampling data from the Japanese National Census conducted in 1990, 2000, 2010, and 2020. As the aim of the National Census is to understand the actual conditions of individuals and households in Japan in order to provide foundational data for public policy, it is a complete enumeration survey. The first survey was conducted in 1920 and since then it has been carried out every five years by The Japan Bureau of Statistics, with the most recent data being from the 2020 survey.

This study, which uses a Regression Discontinuity (RD) design, primarily focuses on university-educated women because previous studies suggest that women with four-year college degrees were a small, elite group and were likely not included in typical employment management practices (Wakisaka, 2011). Japan has the unique employment practice of simultaneous recruiting of new graduates in which students search for jobs during the final academic year of their terminal educational institution. Thus, women who would fully benefit from the EEOL would have been those who began their job search after its implementation on April 1, 1986, thereby making career choices based on the premise of EEOL. Note that in Japan the fiscal/academic year begins in April and ends in March of the following year, so EEOL officially took effect in the 1986 fiscal year (FY1986). Therefore, individuals whose final academic year of study was during or after FY1986 are classified as the treatment group while those whose final academic year was in or before FY1985 are classified as the control group (See Table A1 in the Appendix).

In Japan, individuals typically graduate from university at age 22, and cohorts vary little by age. Therefore, those graduating from university in FY1986 were predominantly born in FY1964. Since the 1990 National Census surveyed on birth year and quarter, we were able to use individuals born in the first quarter of FY1964 (April–June 1964) as the cutoff point. The analysis sample includes individuals born within three years before and after this cutoff point, so the main analysis sample is those born between FY1961 and FY1966.

The National Census of Japan records individuals' highest level of education in categories, with the top category being "university and graduate school graduates." However, of those who graduated from university in FY1986, the proportion of women who pursued graduate

studies was only 3.3%, while for men, it was only 7.1%.[11] Since the terminal degree for the majority of women and men in this top category was a baccalaureate degree, but even those who pursued graduate studies are also university graduates, for simplicity, this category will henceforth be referred to as "university graduates."

In Japan, most high school graduates complete their education at age 18. However, when applying for university, students who fail the entrance exams during their final year of high school have no opportunity to enter university immediately after graduation but may attempt again to do so in the year following their high school graduation. As a result, there is a certain number of university graduates who do not graduate at the standard age of 22. The Ministry of Education surveyed data for students enrolling in universities in FY1984 (those born in FY1965), finding that the immediate enrollment rate after high school graduation of women into universities or two-year/technical colleges was 32.6%, and if including those who graduated from high school in previous years, the overall enrollment rate was 32.8%, with only a 0.2-point difference.[12] This indicates that most women enrolled in university immediately after high school graduation, and it is reasonable to assume that the same applied to our FY1983 cutoff cohort of the previous year (those born in FY1964).[13] As the treatment group of college-educated women can be sharply identified in our sample, the use of an RD framework is valid for this analysis.

The primary data used in this study comes from 1990, which reflects the situation four years after the implementation of the EEOL. In 1990, Japan's population was 123.61 million, while the sample size of the 10% sampling data from the 1990 Population Census was 17,070,017, of which 8,747,335 were women. By excluding agricultural, forestry, and fishery workers as well as non-Japanese nationals, the sample size was reduced to 8,245,000. When further restricting the sample to women born between FY1961 and FY1966, our analysis period of interest, the sample size decreased to 585,363. Restricting it further to university graduates and excluding those with missing values for labor-related variables, the final sample size for university-educated women was 61,222. This reduction in sample size highlights the difficulty of con-

[11] Ministry of Education, Basic School Survey.

[12] Ministry of Education, Basic Survey on School. It did not survey those enrolling in universities in FY1983 (those born in FY1964).

[13] In contrast, for men, the immediate enrollment rate into universities, two-year/technical colleges, or similar institutions was 26.6% while the overall enrollment rate, including those from previous years, was 38.3%. This demonstrates that a certain number of men deferred university enrollment by taking "blank" years.

ducting similar analyses with other data and serves as another advantage of using the National Census.

The analysis samples for female high school and two-year/technical college graduates were constructed in the same manner as above, with final sample sizes of 312,145 and 177,788, respectively.[14] Since the graduation age differs depending on the level of education, the treatment and control groups also vary. Details on the analysis sample of high school and two-year/technical college graduates are summarized in Table A1 in the Appendix.

This study also utilizes the 10% sampling data from the 2000, 2010 and 2020 National Census to examine the medium- to long-term effects of the EEOL. By constructing the sample in the same manner as with the 1990 data, the number of university-educated women born between FY1961 and FY1966 is 58,918 in the 2000 data, 49,788 in 2010, and 52,986 in 2020.

3.2 Econometric Model

Our model utilizes a Regression Discontinuity (RD) design in which treatment status (beginning the job search after EEOL enactment) is a deterministic and discontinuous function of time. Quarter-year of birth (Di) is the forcing variable that determines whether individual i is exposed to full treatment or not, and it is normalized to 0 at the cutoff, which is the first quarter of FY1964 (April-June 1964).

The empirical specification is:

$$Y_i = \alpha + \beta Post_{EEOL} + \gamma[Post_{EEOL} \times f(D_i)] + \delta f(D_i) + \sum_{k=2}^{47} \mu_k(\pi_k) + \epsilon_i, \tag{1}$$

where Y_i is the outcome variable related to work for individual i. $Post_{EEOL}$ is a dummy variable taking a value of one for all individuals who began their job search after the EEOL (FY1986), and zero for those who did it before the EEOL (FY1985). In addition to prefecture k fixed effects $\sum_{k=2}^{47} \mu_k(\pi_k)$ which capture structural differences across prefectures. In our baseline specification, $f(D_i)$ is a linear function.

[14] For men, the corresponding sample sizes were 290,635 for high school graduates, 58,903 for two-year/technical college graduates, and 164,509 for university graduates.

4 Descriptive Evidence and Manipulation of the Running Variable

4.1 Descriptive Statistics

Table 1 summarizes the differences in the averages of employment and marriage-related variables by the pre-EEOL and post-EEOL cohorts, using data from 1990. Here, the focus is on university graduates. The pre-EEOL cohort consists of individuals born between FY1961 and FY1963 who job-hunted in the three years prior to the year the EEOL was implemented, while the post-EEOL cohort consists of those born between FY1964 and FY1966 who job-hunted in the three years following EEOL implementation.

For women, the employment rate increased significantly, from 70.4% for the pre-EEOL cohort to 88.8% for the post-EEOL cohort, showing a difference of 18.3 percentage points. Correspondingly, the proportion of women not in the labor force decreased from 27.4% for the pre-EEOL cohort to 8.9% for the post-EEOL cohort, reflecting a similar difference of 18.5 percentage points. Additionally, the proportion of married women also changed significantly, from 51.3% of university-educated women in the pre-EEOL cohort to only 12.9% for the post-EEOL cohort, a decrease of 38.4 percentage points. This data suggests that in the early career stage, the implementation of EEOL increased women's employment rate and reduced the number of married women who left the workforce to become full-time homemakers.

For men, on the other hand, the employment rate remained consistently high, with 98.2% for the pre-EEOL cohort and 97.6% for the post-EEOL cohort. While the difference of 0.6 percentage points is statistically significant, it is very small and not economically meaningful, no doubt an artifact of the strong statistical power of the test. Similar small differences are observed for the unemployment rate and the proportion of those not in the labor force. However, the proportion of men who were married dropped significantly, from 31.3% in the pre-EEOL cohort to 6.7% in the post-EEOL cohort, as with women, a substantial decrease of 24.6 percentage points. Since it is typical in Japan for men and women of the same generation to marry, this decline in the marriage rate for men is likely related to the decline in the marriage rate for women.

4.2 Check of Manipulation of the Running Variable

A crucial identification assumption of our RD design is that assignment to the treatment group around the threshold is random and that the running variable (birth year-quarter) is continuous near the cutoff. In this study, the likelihood of prior manipulation of the running variable is considered to be very low because our sample consists of university graduates born between FY1961 and FY1966, approximately 20 years before the promulgation of the EEOL in 1985. It is thus highly unlikely that parents had manipulated the timing of pregnancies. Nonetheless, we examined the distribution of the running variable for university-educated men and women born between FY1961 and FY1966, shown in Figure A1 in the Appendix. No discontinuities were observed near the cutoff point, which is the first quarter of FY1964.

5 The Effect on Employment

5.1 Overall Employment

Figure 1 reports the probability of being employed by birth cohorts as defined by birth quarter in 1990, and Table 2 reports the estimated discontinuities at the thresholds. As shown in Panel (A), we find no impact of EEOL on the employment probability of women who had graduated from high school (0.001, with 0.007 s.e.) and Panel (C) shows no effect among 2-year/technical college graduates (0.008, with 0.008 s.e.). In contrast, however, Panel (E) shows that the probability of being employed discontinuously increases at the threshold, with the estimated size of the jump reported in Panel (C) of Table 2 being 3.8 percentage points, with a standard error of 0.007. Further, this increase in employment probability is concentrated among employees, with the increase in self-employment fairly limited (Panel (B) of Table 3). Note that a 3.8 percentage point increase in the employment rate is substantial, given that the employment rate of the cohort just before the threshold was about 28%. This statistically significant and economically significant increase in the employment rate is the result of the decrease in the number of women out of the labor force by almost the same amount as reported in Column (3) of Panel (C) in Table 2. Further decomposition of the out-of-labor-force category, reported in Panel (A) of Table 3, reveals that the majority of the decrease is accounted for by a reduction in engagement in housework. Thus, four years after graduation, those women who graduated university

immediately after the implementation of the EEOL in FY1986 were about 14% more likely to work than those who graduated just before, in FY1985. This increase in the employment rate suggests that the EEOL indeed caused firms to hire more university graduates.

The results for men reported in Columns (5) to (7) in Panels (A) to (C) of Table 2 show that the estimated treatment effects are either not statistically significant or close to zero and thus not economically meaningful even when statistically significant. The lack of significant effects for men provides further assurance that the estimated effect for university- graduated women is not an artifact of a discontinuous shock to a specific cohort that is common to both men and women.

5.2 The analysis by Industry and Occupation

To help understand further the 3.8 percentage point increase in the employment rate of the treated cohort of university-educated women as shown in Table 2, we next performed a more fine-grained examination of the effect of the EEOL on the ratio of university graduates by industry. Although the National Census has 14 industry categories, Table A2 reports the results of only the ten most salient industries with sample sizes more than 100.[15] The results for 1990 reported in Panel (a) show that statistically significant increases in the employment rate are observed for the retail, service and public sectors of 1.0, 1.8 and 0.4 percentage points, respectively. This result shows that additional employment of university-educated women was created in the industries where the baseline female ratio was already high, meaning the industries where many women were already employed.

We next cut the increase of employment among university graduates in 1990 through the lens of occupation. The National Census records 10 occupational categories; however, we dropped agriculture, forestry, and fishery workers from our analysis sample. Therefore, Table A3 presents the results of nine occupational categories. The results show that among 3.8 percentage increase, the 1.5 percentage point was absorbed in professional occupation and 1.6 percentage points in clerical occupation. These results reassure that additional employment of university graduate women were created in the female predominant jobs.

[15] The results of agriculture, forestry, fishery, and mining industries are not reported.

6 The Effect on Marriage

Our employment analysis shows that the EEOL promoted the employment of university-educated women, but participation in the labor market and household responsibilities are thought to be tradeoffs, so we next examined how the EEOL affected marriage timing. Column (4) of Table 2 reports the effect of EEOL on the probability of marriage, and we see that the impact among high school graduates as shown in Panel (A) is negligible. On the other hand, Panel (B) shows that the probability of marriage for women who had graduated from two-year/technical colleges decreased by 3.3 percentage points, compared to an average marriage rate of the non-treated cohort of about 38% (in Table 1). This decrease in the probability of marriage is interesting given that the EEOL did not increase the employment probability of two-year/technical college graduate women in a statistically significant manner. The results for university-educated women reported in Panel (C) further shows that the marriage probability of the EEOL cohort drops by as much as 8.7 percentage points compared to the average marriage probability of the nontreated cohort of 51.3 (in Table 1). It is noteworthy that the impact on marriage probability is larger than the impact on employment of 3.8 percentage points. In general, this analysis of the marital status of women shows that the positive impact EEOL had on employment was absorbed by a decrease in marriage probability, confirming that a tradeoff exists between employment and family formation for women.

Moving from the effect of the EEOL on the marital probability of women, its impact on men is reported in Column (8) of Table 2. According to panels (A) and (B), the marriage rate of the EEOL-treated cohort is not different from the nontreated cohort for high school graduates and two-year/technical college graduates. On the other hand, as reported in Panel (C), the marriage rate of the EEOL-treated cohort drops by 3.3 percentage points compared with the nontreated cohort among men who are university graduates. This drop accounts for about 40% of the drop in the marriage rate of university-educated women, but this attenuated impact is consistent with the fact that men in Japan typically marry women of the same age or slightly younger.

In sum, the analysis in this section of employment and marriage which draws on the National Census shows that the enactment of the EEOL was effective in promoting the employment of university-educated women, particularly in jobs predominantly occupied by women,

up to four years after university graduation, with the increase in employment offset by a decrease in marriage and housework engagement. However, the employment-enhancing and marriage-suppressing effects disappear for university-educated women 14 years after graduation and remain absent 24 years after graduation. Meanwhile, even four years after graduation, no EEOL impact is found among less educated women who are less likely to be in career-track positions. In sum, the EEOL was effective in promoting the employment of university-educated women in their mid-20s, but this initial short-term impact had completely dissipated by their mid-30s, most probably because those women faced the inevitable trade-off between career and family formation and, faced with discrimination in the workplace and social pressure from traditional gender norms, they chose family responsibilities.

7 Gender Wage Gap

7.1 Data and RD Design Framework

To gain a deeper understanding of the analysis results, this study also examines whether the EEOL reduced the gender wage gap. As the National Census does not include wage information, our wage gap analysis instead utilizes employer-employee-matched microdata from the Basic Survey on Wage Structure (BSWS) by the Japanese Ministry of Labour. The BSWS is the pre-eminent government statistical dataset on wages in Japan, providing the most reliable data on employee wages and collecting information on all major industries by surveying both employers (establishments) and employees. It has been conducted every year since 1948, but the microdata prior to 1990 only remains for 1980 and 1985, so this study uses the BSWS conducted in June 1990, four years after the promulgation of the EEOL.

Using the BSWS has the following advantages. First, for the BSWS, employers (i.e. HR departments in establishments) both respond to the employer survey directly and then also complete the employee survey by referring to employee payroll records, meaning that because employees do not self-report wages and working hours but, rather, the employer reports them, the dataset avoids a common concern about potential response errors for these crucial variables. Second, variables such as monthly wages, overtime payments, bonuses, monetary benefits, working hours, and overtime hours are surveyed nominally, not by categories or ranges. Because we can obtain the exact amounts, this avoids any top-coding problem. Lastly, the

dataset represents well the wages of Japanese workers because it is a large-sample dataset with more than one million data points.

For our analysis, the sample is limited to full-time workers because the 1990 BSWS collects information on the academic background of full-time workers but not part-time workers. The hourly wage is calculated as (monthly scheduled wage + bonus per month) ÷ (monthly scheduled hours).[16] The monthly scheduled wage includes a base wage plus family, housing, and commuting allowances.

Regarding wages, it is assumed that the EEOL would affect those who were already working in the year of its enactment, FY1986. Therefore, the threshold is set for individuals who entered employment in FY1986, which corresponds to those born in FY1963 and were 26 years old at the end of June 1990. To construct the analysis sample, individuals within three years of this threshold are included, with those aged 23–26 (born in FY1963–FY1966) being the treated group and those aged 27–29 (born in FY1960–FY1962) untreated.

The original sample size of the 1990 BSWS is 1,258,097, which we restricted to full-time workers, yielding a dataset of 1,167,039. We further limited the sample to university graduates between 23 and 29 years old in July 1990 and excluded those with missing values for the hourly wage variable. In addition, since the minimum age for university graduation in Japan is 22 years old,[17] if years of tenure are larger than age - 22, this would be considered incorrect and so data that met this condition were excluded. After these restrictions, our analysis sample size was reduced to 43,808.

The RD regression equation is as follows:

$$\begin{aligned} Ln(hourlywage)_i = \alpha + \beta_1(Post_{EEOL} \times female) + \beta_2 Post_{EEOL} \\ +\beta_3 f(D_i) + \beta_4 female + \beta_5(f(D_i) \times female) + u_{it}, \end{aligned} \tag{2}$$

where i is individual, and u is the error term. Year of birth (D_i) is the forcing variable that determines whether individual i is exposed to full treatment or not, and it is normalized to 0

[16] In Japan, the labor compensation system is relatively distinctive. Full-time employees (or, more precisely, "regular" employees who work on a non-temporal permanent basis as opposed to "non-regular" employees who work on a time-limited contract) typically receive substantial bonuses twice a year that are regarded as a key component of their total earnings. Unlike the performance-based bonuses prevalent in the U.S., Japanese bonuses are generally linked to profit-sharing (Freeman and Weitzman, 1987) and/or length of service (Hart and Kawasaki, 1995; Hashimoto, 1979).

[17] Early graduation was almost nonexistent at the time.

at the cutoff, which is FY1963 (April 1963 - April 1964). In our specification, $f(D_i)$ is a linear function. The coefficient of interest is $\hat{\beta}_1$, and a positive value indicates a decrease in the gender wage gap.

7.2 Regression Results

Before reporting the RD regression results, we first present Figure 3 which plots the logarithmic hourly wages of women and men for cohorts within three years before and after the cutoff point for 1990, 2000, and 2010. At the early career stage in 1990, a reduction in the gender wage gap is observed at the cutoff point. However, by 2000 and also in 2010, corresponding to 14 and 24 years into their careers, the gender wage gap reduction effect appears to have completely disappeared.

Table 5 presents the RD regression results, $\hat{\beta}_1$ and $\hat{\beta}_2$, using Eq (2), and the coefficient of interest is $\hat{\beta}_1$ here. Column 1 presents the results for 1990, showing that the EEOL reduced the gender wage gap by 5.1% at a 5% level of statistical significance at the early career stage of three years after employment. However, as seen in Columns 2 and 3, no gender gap-reducing effects of the EEOL are observed at the later career stages in 2000 and 2010, which is consistent with what was observed visually in Figure 3.

The differing outcomes observed between the early and later career stages can be interpreted as follows. In their 20s at the early stage of their careers, more university-educated women were enabled by the EEOL to enter career-track positions alongside men, leading to a reduction in the gender wage gap. However, by their 30s and 40s, women increasingly faced greater household responsibilities due to marriage and child-rearing. As a result, many women in career-track positions left the labor market. Of those who remained, many either transitioned to non-career-track positions or shifted to non-regular employment after taking a career break. In this way, the EEOL was able to assist university-educated women at the beginning of their careers but was not able to solve the career/household tradeoff faced by these women as their life course unfolded, caused by Japan's strict sociocultural traditions regarding gender roles. This explains why the narrowing of the gender wage gap in 1990 was short-lived, with the effect disappearing by 2000 and 2010.

8 Conclusion

Using the large-sample dataset of Japan's National Census and a regression discontinuity (RD) design, this study analyzed whether the implementation of *the Equal Employment Opportunity Law (EEOL)* in April 1986 in Japan affected the employment of university-educated women and the wage gap between men and women. Since the law primarily aimed to prohibit gender-based differences in recruitment, job assignment, promotion, and retirement, its enactment meant that career-track jobs, which had previously been available exclusively to men, must also be made accessible to women.

This study examined behavioral changes at the early and later stages of careers, analyzing them separately by educational background (high school, two-year/technical college, and university graduates), with the outcomes being employment, marriage, and the gender wage gap. The analysis revealed that, at the early career stage in their 20s, the EEOL increased the employment rate of university-educated women and reduced the number of those who married and became full-time homemakers. However, these effects were not observed for high school-educated or junior college-educated women, which is not surprising, as career-track positions require a higher level of education. Furthermore, the study also found a reduction in the wage gap between university-educated men and women in their 20s.

In Japan, before the implementation of the EEOL, men and women had been subject to different employment management practices, with women positioned as workers handling auxiliary tasks —- *the female jobs*. Accordingly, the small elite group of university-educated women did not have an obvious career path, as they were not eligible for management-track positions and were often avoided in the hiring for typical female jobs or not appropriately treated in terms of employment even being hired. Therefore, the implementation of the EEOL initially had a positive impact on university-educated women.

However, as women entered the later stages of their careers in their 30s, 40s, and 50s, the impact of the EEOL on employment and marriage rates among university-educated women disappeared. Drawing on our knowledge of the sociocultural context, it can be inferred that significant household responsibilities such as housework and childcare offset the long-term effects of the EEOL in the labor market.

The same analysis was conducted for men at the early career stage, but the EEOL had no

impact on the employment of men, regardless of their educational background. This result indicates that the implementation of the EEOL, which increased employment opportunities for women, did not disadvantage men.

In sum, the EEOL had a positive short-term impact on the employment of university-educated women and in reducing the gender wage gap, so it can be credited with laying the foundation for utilizing highly educated women who have substantial human capital. However, its effects did not persist in the long term as early-career-stage women over time faced other life course events such as marriage and family. These findings suggest that gender inequality cannot be simply legislated away, for achieving gender equality in the labor market requires not only eliminating discrimination within the labor market itself but also addressing the broader cultural question of the division of roles within households.

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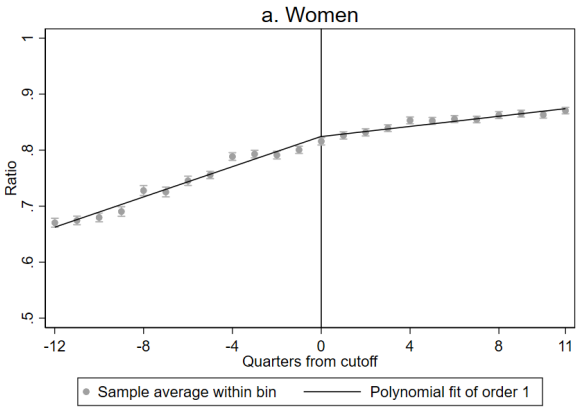
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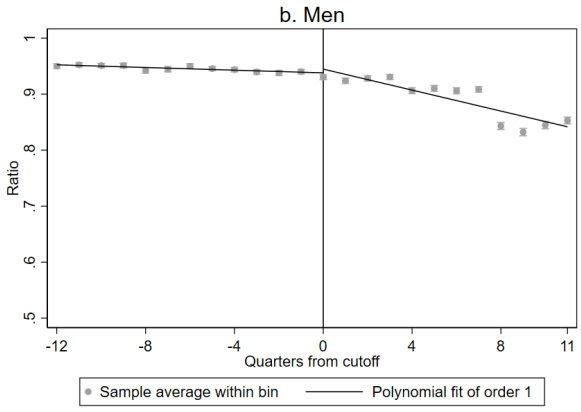
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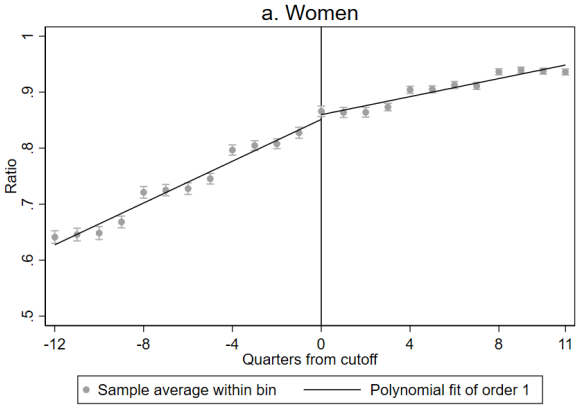
Figure 1: Employment by Gender and Academic Background (1990)



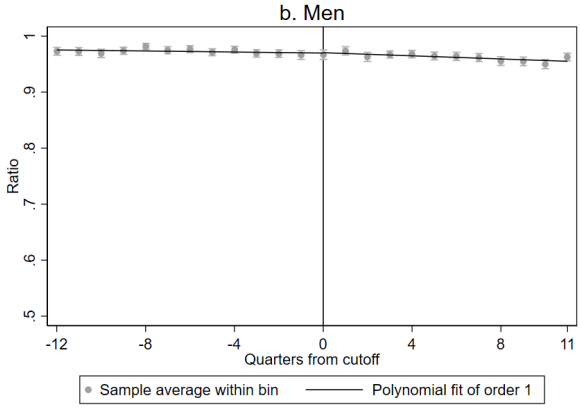
(A) Women, High School



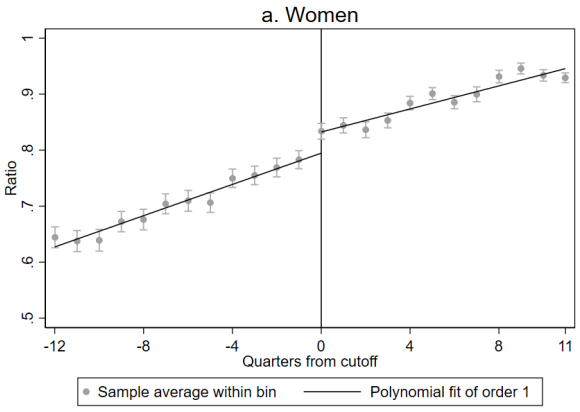
(B) Men, High school



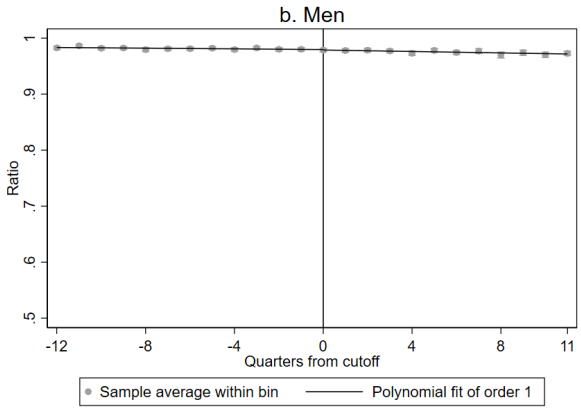
(C) Women, 2-year/Technical College



(D) Men, 2-year/Technical College



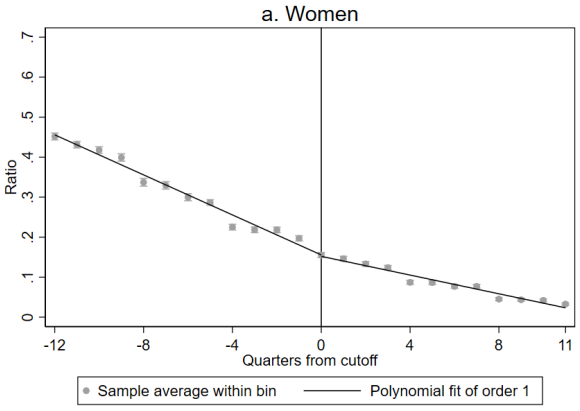
(E) Women, University



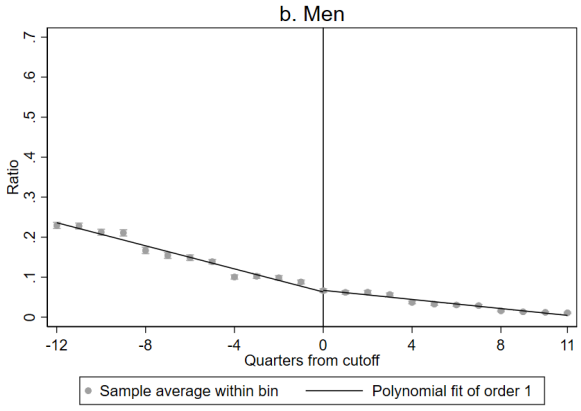
(F) Men, University

Notes. The X-axis shows the running variable (normalized quarter-year of birth). For high school graduates, the cutoff (0) is the cohort born in the first quarter of FY1968 (April–June 1968), pre-EEOL cohorts were born between FY1965 and FY1967, and post-EEOL cohorts were those between FY1968 and FY1970. For two-year/technical college graduates, the cutoff is the cohort born in the first quarter of FY1966 (April–June 1966), pre-EEOL cohorts were born between FY1963 and FY1965, and post-EEOL cohorts were between FY1966 and FY1968. For university/graduate school graduates, the cutoff is the cohort born in the first quarter of FY1964 (April–June 1964), and pre-EEOL cohorts were born between FY1961 and FY1963, and post-EEOL cohorts were between FY1964 and FY1966. The dots in the figure are the within-bin sample means, and the vertical bars on them show the 95% CI.
Source. The National Census 1990.

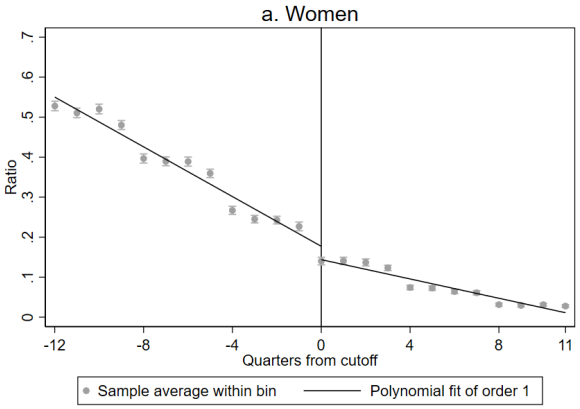
Figure 2: Being Married by Gender and Academic Background (1990)



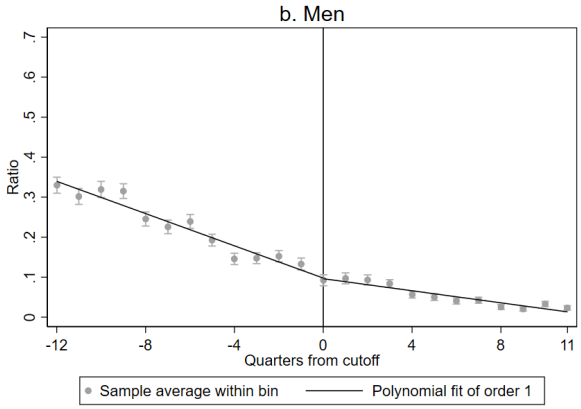
(A) Women, High School



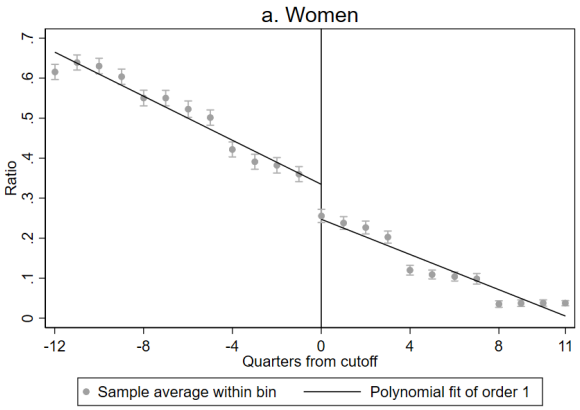
(B) Men, High School



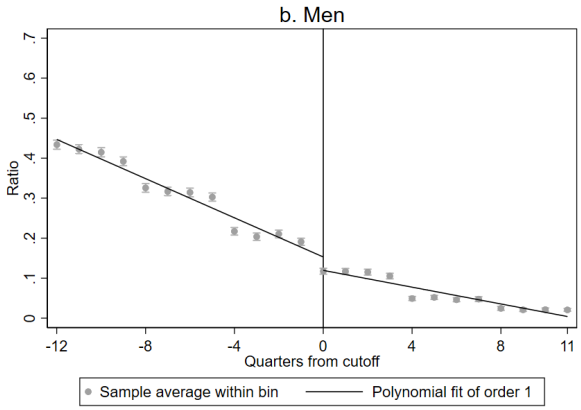
(C) Women, 2-year/Technical College



(D) Men, 2-year/Technical College



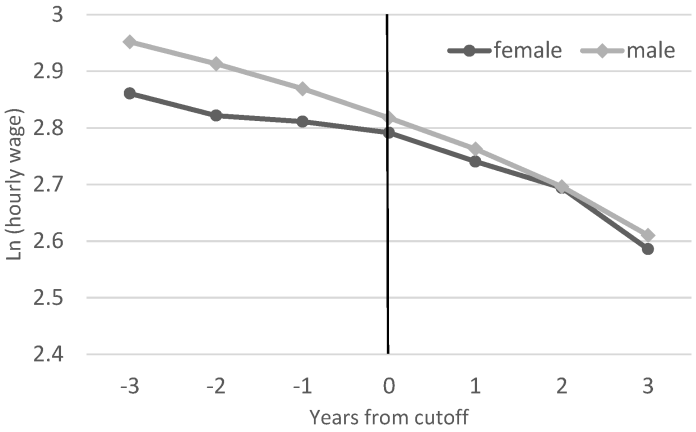
(E) Women, University



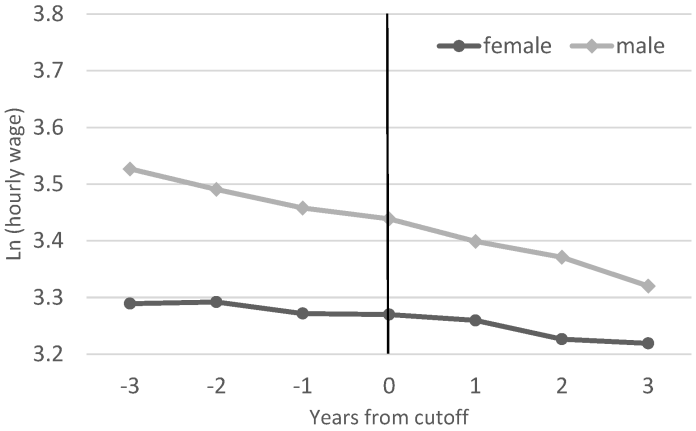
(F) Men, University

Notes. The same as in Figure 1.
Source. The National Census 1990.

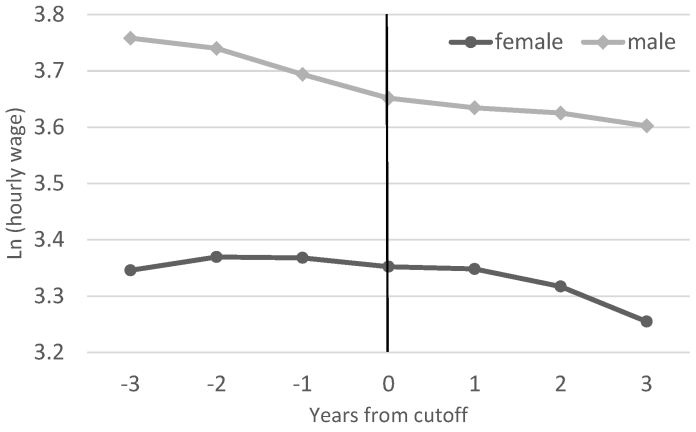
Figure 3: Gender Wage Gap (University, 1990, 2000, and 2010)



(A) 1990



(B) 2000



(C) 2010

Notes. The X-axis indicates the number of years from the cutoff. 0 indicates the cutoff, which is the cohort born in FY1963 and whose age was 26 years old as of the end of 1990. The Y-axis indicates a cohort's average of $ln(hourlywage)$.
Source. BSWS 1990, 2000, and 2010.

Table 1: Descriptive Statistics by Academic Background (1990, Average Per Cohort)

		Pre-EEOL cohorts	Post-EEOL cohorts	Difference in means		% change	Pre-EEOL cohorts	Post-EEOL cohorts	Difference in means		% change
		Women (1990)					Men (1990)				
A. High School											
Employed		0.739	0.849	0.110	***	14.9	0.946	0.892	-0.053	***	-5.6
		(0.439)	(0.358)				(0.227)	(0.310)			
	N	156,037	156,108				141,876	148,759			
Unemployed		0.0379	0.049	0.011	***	29.6	0.043	0.064	0.021	***	50.1
		(0.191)	(0.216)				(0.202)	(0.245)			
	N	156,037	156,108				141,876	148,759			
Not in Labor Force		0.224	0.102	-0.121	***	-54.0	0.012	0.044	0.032	***	271.8
		(0.417)	(0.303)				(0.108)	(0.204)			
	N	156,037	156,108				141,876	148,759			
Married		0.315	0.0886	-0.226	***	-71.7	0.154	0.035	-0.119	***	-77.3
		(0.464)	(0.284)				(0.361)	(0.184)			
	N	154,928	155,517				140,468	148,754			
B. 2-year/Technical College											
Employed		0.731	0.907	0.176	***	24.1	0.973	0.962	-0.011	***	-1.1
		(0.443)	(0.291)				(0.163)	(0.191)			
	N	86,517	91,271				28,110	30,793			
Unemployed		0.029	0.027	-0.001	*	-4.6	0.023	0.032	0.009	***	38.4
		(0.167)	(0.163)				(0.150)	(0.176)			
	N	86,517	91,271				28,110	30,793			
Not in Labor Force		0.240	0.066	-0.174	***	-72.5	0.004	0.006	0.002	***	40.7
		(0.427)	(0.248)				(0.065)	(0.077)			
	N	86,517	91,271				28,110	30,793			
Married		0.378	0.073	-0.304	***	-80.4	0.226	0.052	-0.175	***	-77.4
		(0.485)	(0.261)				(0.418)	(0.221)			
	N	86,062	90,569				27,855	30,470			
C. University											
Employed		0.704	0.888	0.183	***	26.0	0.982	0.976	-0.006	***	-0.6
		(0.456)	(0.316)				(0.134)	(0.154)			
	N	30,171	31,051				88,605	75,904			
Unemployed		0.022	0.023	0.001		6.4	0.014	0.019	0.005	***	33.8
		(0.147)	(0.151)				(0.118)	(0.136)			
	N	30,171	31,051				88,605	75,904			
Not in Labor Force		0.274	0.089	-0.185	***	-67.5	0.004	0.006	0.001	***	30.9
		(0.446)	(0.284)				(0.065)	(0.075)			
	N	30,171	31,051				88,605	75,904			
Married		0.513	0.129	-0.384	***	-74.9	0.313	0.067	-0.246	***	-78.6
		(0.500)	(0.335)				(0.464)	(0.250)			
	N	30,072	30,881				88,099	75,427			

Notes. * p<0.10, ** p<0.05, *** p<0.01. For high school graduates, pre-EEOL cohorts were born between FY1965 and FY1967, and post-EEOL cohorts were those between FY1968 and FY1970. For two-year/technical college graduates, pre-EEOL cohorts were born between FY1963 and FY1965, and post-EEOL cohorts were between FY1966 and FY1968. For university/graduate school graduates, pre-EEOL cohorts were born between FY1961 and FY1963, and post-EEOL cohorts were between FY1964 and FY1966. "LF" indicates Labor Force.
Sources: The National Census 1990.

Table 2: Results of RD Regression by Gender and Academic Background (1990)

(A) High School

	Women				Men			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Employed	Unemployed	Not in LF	Married	Employed	Unemployed	Not in LF	Married
Post_EEOL	0.001	0.002*	-0.003	-0.004	0.008	0.003	-0.010*	0.004
	(0.007)	(0.001)	(0.007)	(0.011)	(0.007)	(0.002)	(0.005)	(0.007)
N	312145	312145	312145	310445	290635	290635	290635	289222
R-Squared	0.037	0.006	0.045	0.112	0.028	0.011	0.026	0.062

(B) Two-year/Technical College

	Women				Men			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Employed	Unemployed	Not in LF	Married	Employed	Unemployed	Not in LF	Married
Post_EEOL	0.008	-0.001	-0.007	-0.033**	0.001	0	-0.001	-0.002
	(0.008)	(0.002)	(0.009)	(0.016)	(0.003)	(0.002)	(0.001)	(0.012)
N	177788	177788	177788	176631	58903	58903	58903	58325
R-Squared	0.073	0.002	0.083	0.174	0.004	0.003	0.002	0.092

(C) University

	Women				Men			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Employed	Unemployed	Not in LF	Married	Employed	Unemployed	Not in LF	Married
Post_EEOL	0.038***	-0.000	-0.037***	-0.087***	-0.001	0.002**	-0.001	-0.033**
	(0.007)	(0.002)	(0.008)	(0.017)	(0.001)	(0.001)	(0.001)	(0.014)
N	61222	61222	61222	60953	164509	164509	164509	163526
R-Squared	0.072	0.001	0.080	0.211	0.003	0.002	0.001	0.126

Notes. * p<0.10, ** p<0.05, *** p<0.01. For high school graduates, pre-EEOL cohorts were born between FY1965 and FY1967, and post-EEOL cohorts were those between FY1968 and FY1970. For two-year/technical college graduates, pre-EEOL cohorts were born between FY1963 and FY1965, and post-EEOL cohorts were between FY1966 and FY1968. For university/graduate school graduates, pre-EEOL cohorts were born between FY1961 and FY1963, and post-EEOL cohorts were between FY1964 and FY1966.
Sources: The National Census 1990.

Table 3: Results of RD Regression (1990, Women, University)

(A) Detailed Labor Force Status

	(1) Mainly Working	(2) Housework & Working	(3) School & Working	(4) On Leave	(5) Unemployed	(6) Housework	(7) School	(8) Other
Post_EEOL	0.047***	-0.003	-0.001*	-0.005**	-0.000	-0.038***	-0.000	0.001
	(0.010)	(0.004)	(0.001)	(0.002)	(0.002)	(0.007)	(0.001)	(0.001)
N	61222	61222	61222	61222	61222	61222	61222	61222
R-Squared	0.099	0.013	0.001	0.008	0.001	0.083	0.001	0.001

(B) Detailed Employment Status

	(1) Employee	(2) Self-employed	(3) Family Worker	(4) Home-based Worker	(5) Unknown	(6) Unemployed	(7) Not in LF
Post_EEOL	0.032***	0.004***	0.001	-0.000	-0.000	-0.000	-0.037***
	(0.008)	(0.001)	(0.001)	(0.000)	(0.000)	(0.002)	(0.008)
N	61222	61222	61222	61222	61222	61222	61222
R-Squared	0.079	0.003	0.005	0.002	0.001	0.001	0.080

Notes. Standard errors clustered by birth year-quarter are in parentheses. * p<0.10, ** p<0.05, *** p<0.01.
Pre-EEOL cohorts were born between FY1961 and FY1963, and post-EEOL cohorts were between FY1964 and FY1966. In Panel B, "LF" indicates Labor Force.
Sources: The National Census 1990.

Table 4: Results of RD Regression by Gender (1990, 2000, 2010, 2020; University)

(A) 1990

	Women				Men			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Employed	Unemployed	Not in LF	Married	Employed	Unemployed	Not in LF	Married
Post_EEOL	0.038***	-0.000	-0.037***	-0.087***	-0.001	0.002**	-0.001	-0.033**
	(0.007)	(0.002)	(0.008)	(0.017)	(0.001)	(0.001)	(0.001)	(0.014)
N	61222	61222	61222	60953	164509	164509	164509	163526
R-Squared	0.072	0.001	0.080	0.211	0.003	0.002	0.001	0.126

(B) 2000

	Women				Men			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Employed	Unemployed	Not in LF	Married	Employed	Unemployed	Not in LF	Married
Post_EEOL	0.000	-0.001	0.001	-0.010	0.003	-0.002	-0.001	0.009
	(0.009)	(0.002)	(0.008)	(0.008)	(0.002)	(0.002)	(0.001)	(0.005)
N	58918	58918	58918	58848	163861	163861	163861	163565
R-Squared	0.022	0.002	0.021	0.018	0.001	0.001	0.001	0.016

(C) 2010

	Women				Men			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Employed	Unemployed	Not in LF	Married	Employed	Unemployed	Not in LF	Married
Post_EEOL	0.001	0.004	-0.005	0.002	-0.003**	0.004***	-0.000	-0.002
	(0.006)	(0.003)	(0.006)	(0.007)	(0.001)	(0.001)	(0.001)	(0.005)
N	49788	49788	49788	49794	132135	132135	132135	132205
R-Squared	0.015	0.002	0.015	0.010	0.002	0.001	0.002	0.003

(D) 2020

	Women				Men			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Employed	Unemployed	Not in LF	Married	Employed	Unemployed	Not in LF	Married
Post_EEOL	-0.006	0.005**	0.001	-0.002	0.001	-0.001	-0.000	0.008**
	(0.004)	(0.002)	(0.004)	(0.006)	(0.002)	(0.001)	(0.002)	(0.003)
N	52986	52986	52986	52936	135708	135708	135708	135650
R-Squared	0.012	0.002	0.011	0.008	0.003	0.001	0.003	0.002

Notes. Standard errors clustered by birth year-quarter are in parentheses. * p<0.10, ** p<0.05, *** p<0.01.
Pre-EEOL cohorts were born between FY1961 and FY1963, and post-EEOL cohorts were between FY1964 and FY1966. Panel A is the same as Panel C in Table 2. "LF" indicates Labor Force.
Sources: The National Census 1990, 2000, 2010, and 2020.

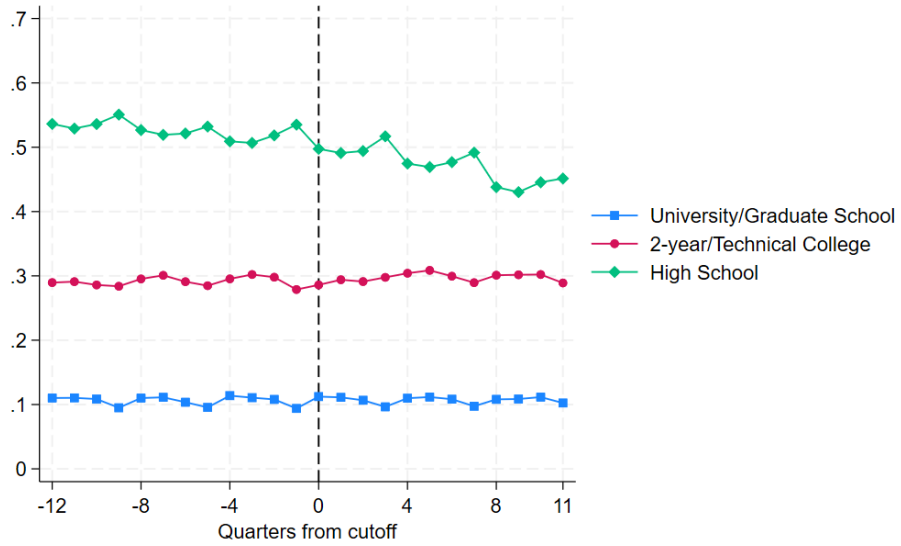
Table 5: Regression Results of Gender Wage Gap (1990, 2000, 2010, University)

	(1)	(2)	(3)
	1990	2000	2010
$Post_EEOL \times female$	0.051**	-0.013	0.015
	(0.020)	(0.009)	(0.027)
$Post_EEOL$	0.009	0.016***	0.016
	(0.017)	(0.004)	(0.009)
N	43294	53996	41512
R-Squared	0.214	0.134	0.126

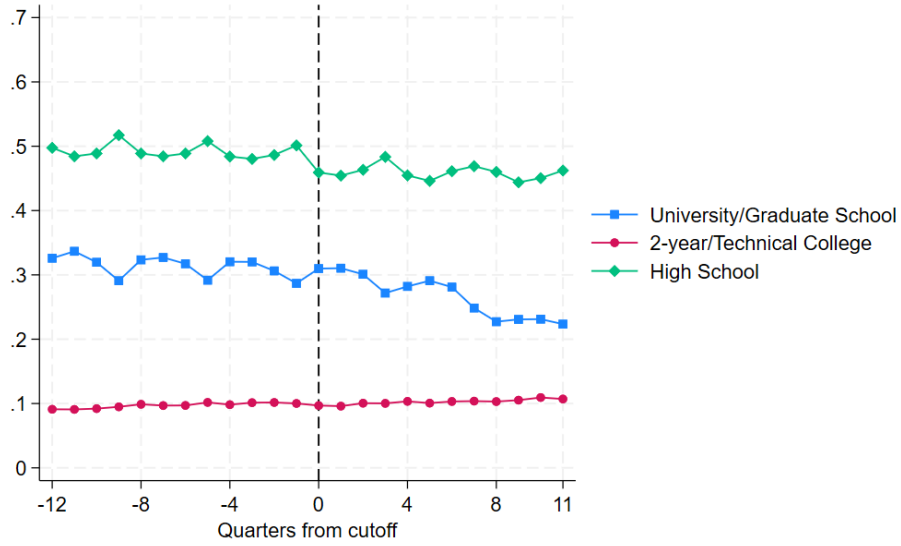
Notes. Standard error clustered by age is in parentheses. Eq. (2) is used for all regressions. * p<0.10, ** p<0.05, *** p<0.01. Post-EEOL cohort is those born in FY1963–1966.
Sources: The Basic Survey of Wage Structure 1990, 2000, and 2010.

Appendix

Figure A1: Distribution of the Forcing Variable (1990)



(a) Women



(b) Men

Notes. The Y axis indicates the proportion of individuals with each academic background within the cohort's population. Source. The National Census 1990.

Table A1: Birth Year-Quarter of Pre-EEOL and Post-EEOL Cohorts and Cutoff Point by Academic Background

	Cutoff Point (forcing var. = 0)	Pre-EEOL cohorts	Post-EEOL cohorts
A. Analysis on Work-related Variables			
High School	Q1 FY1968	Q1 FY1965 – Q4 FY1967	Q1 FY1968 – Q4 FY1970
2-year/Technical College	Q1 FY1966	Q1 FY1963 – Q4 FY1965	Q1 FY1966 – Q4 FY1968
University	Q1 FY1964	Q1 FY1961 – Q4 FY1963	Q1 FY1964 – Q4 FY1966
B. Analysis on Gender Wage Gap			
University	FY1963 (26 years old)	FY1960 – FY1962 (27–29 years old)	FY1964–FY1966 (23–26 years old)

Notes: Panel B indicates a fiscal year, and the age in Panel B is as of the end of June 1990.

Table A2: Results of RD Regression on Industry (Women, University, 1990, 2000, and 2010)

(a) 1990

	(1) Construction	(2) Manufacturing	(3) Electricity	(4) Transportation	(5) Retail	(6) Finance	(7) Real Estate	(8) Services	(9) Public	(10) Unclassified
Post_EEOL	-0.002	0.001	-0.000	0.001	0.010**	0.006	0.001	0.018***	0.004**	-0.000
	(0.002)	(0.004)	(0.001)	(0.002)	(0.004)	(0.004)	(0.002)	(0.006)	(0.002)	(0.001)
N	61222	61222	61222	61222	61222	61222	61222	61222	61222	61222
R-Squared	0.003	0.022	0.001	0.008	0.014	0.023	0.005	0.050	0.006	0.003

(b) 2000

	(1) Construction	(2) Manufacturing	(3) Electricity	(4) Transportation	(5) Retail	(6) Finance	(7) Real Estate	(8) Services	(9) Public	(10) Unclassified
Post_EEOL	-0.000	-0.008***	-0.000	0.001	0.001	0.005***	0.001	0.002	-0.000	0.000
	(0.002)	(0.003)	(0.000)	(0.002)	(0.004)	(0.001)	(0.001)	(0.007)	(0.002)	(0.001)
N	58918	58918	58918	58918	58918	58918	58918	58918	58918	58918
R-Squared	0.001	0.006	0.001	0.002	0.002	0.007	0.002	0.035	0.005	0.002

(c) 2010

	(1) Construction	(2) Manufacturing	(3) Electricity	(4) Transportation	(5) Retail	(6) Finance	(7) Real Estate	(8) Services	(9) Public	(10) Unclassified
Post_EEOL	-0.001	-0.004	-0.000	-0.001	0.003	-0.003	0.002	0.010	0.000	-0.004
	(0.001)	(0.003)	(0.001)	(0.002)	(0.005)	(0.002)	(0.001)	(0.006)	(0.003)	(0.002)
N	49788	49788	49788	49788	49788	49788	49788	49788	49788	49788
R-Squared	0.001	0.005	0.001	0.010	0.002	0.005	0.002	0.030	0.005	0.003

Notes. Notes. "Electricity" includes electricity, gas, heat supply, and waterworks; "Transportation" includes transportation and communication; "Retail" includes wholesale, retail, and restaurants; "Finance" includes finance and insurance; and "Public" is the public sector. Standard errors clustered by birth year-quarter are in parentheses.
* p<0.10, ** p<0.05, *** p<0.01.
Sources: The National Census 1990, 2000, 2010.

Table A3: Results of RD Regression on Occupation (1990, Women, University)

(a) 1990

	(1) Professionals	(2) Managerial	(3) Clerical	(4) Sales	(5) Service	(6) Security	(7) Transport	(8) Manufacturing	(9) Unclassified
Post_EEOL	0.015**	-0.001	0.016*	0.007	-0.001	0.000	-0.000	0.002	-0.001
	(0.006)	(0.001)	(0.008)	(0.005)	(0.002)	(0.001)	(0.000)	(0.002)	(0.001)
N	61222	61222	61222	61222	61222	61222	61222	61222	61222
R-Squared	0.059	0.001	0.040	0.016	0.004	0.001	0.001	0.002	0.003

(b) 2000

	(1) Professionals	(2) Managerial	(3) Clerical	(4) Sales	(5) Service	(6) Security	(7) Transport	(8) Manufacturing	(9) Unclassified
Post_EEOL	-0.002	-0.001	0.007	-0.002	0.001	-0.000	0.001	-0.003	0.000
	(0.008)	(0.001)	(0.006)	(0.003)	(0.002)	(0.000)	(0.001)	(0.002)	(0.001)
N	58918	58918	58918	58918	58918	58918	58918	58918	58918
R-Squared	0.045	0.002	0.009	0.002	0.002	0.001	0.001	0.002	0.002

(c) 2010

	(1) Professionals	(2) Managerial	(3) Clerical	(4) Sales	(5) Service	(6) Security	(7) Transport	(8) Manufacturing	(9) Unclassified
Post_EEOL	0.003	-0.002	0.003	0.001	-0.002	0.001	0.000	0.001	-0.004**
	(0.006)	(0.002)	(0.009)	(0.003)	(0.003)	(0.001)	(0.000)	(0.002)	(0.002)
N	49788	49788	49788	49788	49788	49788	49788	49788	49788
R-Squared	0.037	0.002	0.008	0.002	0.002	0.001	0.001	0.003	0.003

Notes. "Professionals" includes professionals and technical occupations, "Transport" includes transport and communication workers, and "Manufacturing" includes skilled workers, mining, manufacturing, construction, and labor workers. Standard errors clustered by birth year-quarter are in parentheses. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.
Sources: The National Census 1990, 2000, and 2010.