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A comparative study on the rates of promotions to managing positions

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ABSTRACT

Both Korea and Japan are countries that are well known for showing a strong persistence of their traditional gender role attitudes and behaviors. Thus, we have observed very large gender gaps in wage and economic statuses in both countries. For example, as of 2010, the proportion of women in management ranks was only about 10% for both Korea and Japan while it ranged from 43% for the United States to 30% for Germany. We used RIETI's Survey for Japan and Occupational Wage Survey (OWS) in 2009 for Korea that had been operated by Korea's Ministry of Labor from 1990 to 2013 as multiple cross-sectional data. For decomposition purposes, we adopted the DiNardo-Fortin-Lemieux (DFL) method to examine the disparity in the promotion rates (Yamaguchi 2011; 2014; 2015). We decomposed the disparity in promotions into two parts: one that can be explained by human capital including age, educational level, and employment duration; and another part that cannot be explained by human capital. In 2009, the unexplained portion in Japan was 70% for *kakaricho* (task group heads) and 79% for *kacho* (section heads). The closest year for comparison purposes available in OWS for Korea was 2004, and the unexplained portions were 62% and 67% for kakaricho and kacho, respectively. Based on this, we deduce that the glass ceiling, which is invisible above human capital, was possibly more serious in Japan compared to Korea. However, the result from 1990-2013 OWS revealed that the unexplained disparity portion in promotions to managers (kakaricho and higher) in Korea has increased since 2004, from 72% to 84%, and it might be possible that the magnitude of the glass ceiling is quite similar in the two countries. Further studies need more comparable data to draw stronger conclusions.

Keywords: Gender inequality, Glass ceiling, Decomposition, Occupational wage survey, Korea, Japan

JEL Classification: C1; J3; J7

Introduction: Are there glass ceilings in Japan and Korea?

According to an International Labor Office 2015 statistic (ILO 2015), among OECD countries Japan and Korea showed highest gender inequalities in the proportion of managerial positions. Figure 1 revealed that Japan and Korea are easily distinctive among OECD countries with highest gender inequalities. In order to understand this abnormal gender inequalities, we need to decompose the disparity. The disparity might be the result from the gap in human capital between sexes or it might not be explained by human capital gap men and women. Depending on the sources of the disparity, the strategy for improving gender equality could be quite different. If the human capital such as education and experience is the basis of the inequality, we need to launch policies to improve the accumulation of the human capital of women. However, if the source is not human capital gap but glass ceiling, we want to examine and change the practices of promotion in firms.

[figure 1 about here]

Glass ceiling phenomenon refers to that an invisible glass ceiling blocks the entry of women into the high levels positions in firms or organizations. All previous studies didn't employ the same operational definitions on the high levels of positions, though. For example, Barretto and others (Barretto, Ryan, and Schmitt 2009) examined the gender gap in the very highest positions while other researchers probed the slowing down of the entire career progress of typical working women (Padavic and Reskin 2002). Although the empirical criterion for the high levels in the organizations could be different, the minimum proposition from the glass ceiling hypothesis is that gender gap will grow with hierarchy: gender gap after controlling for human capital factors is widened in higher positions. In this study, we examined this proposition by using counter-factual decomposition method of DiNardo-Fortin-Lemieux (DFL) proposed by Yamaguchi (2014).

Data

We used the Occupational Wage Survey for the glass ceiling in Korea. The Occupational Wage Survey (OWS) is an annual business establishment survey conducted since 1970 by South Korea's Ministry of Labor. The dataset contains detailed information on individual workers' earnings, hours worked, educational attainment, actual labor market experience, occupation,

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industry, and region. The surveyed establishments must employ at least ten workers and were selected by a stratified random sampling method. Because they exclude workers in small enterprises, the self-employed, family workers, temporary workers, and public sector workers, the surveys represent approximately one-half of South Korea's total nonagricultural labor force. The samples for each year are randomly drawn from the original surveys. The surveys cover all industries up through 1986. After 1986, agriculture, forestry, hunting, and fishing are excluded. This change in sampling procedure does not appear to cause a significant change in the types of nonfarm enterprises covered by the survey (from the description on ICPSR 2015). We included multiple-year cross-sectional data from 1990 to 2013 over twenty-four year period to examine the trend of the glass ceiling in Korea.

The International Comparative Study of Work-Life Balance conducted by the RIETI in 2009 was employed to examine Japanese gender gap. The survey collected data from Japan, Great Britain, the Netherlands, and Sweden. Only Japanese and British surveys collected fata from employers and their employees. The survey for the other two countries are employer surveys. The Japanese survey collected data from 10,000 private sector firms with 100 or more employees, and 10 random regular employees from each firm.

Analysis: DFL decomposition

We decomposed the gender difference in the proportion of managerial positions based on DiNardo-Fortin-Lemieux(DFL) method (1996) based on the following equation where X refers to gender and Y refers to the proportion of managers among regular workers.[1]

$$Y_{X=1} - Y_{X=0} = \frac{\text{\# of female managers}}{\text{\# of female regular employes}} - \frac{\text{\# of male managers}}{\text{\# of male regular employes}}$$

DFL method decomposes the gender difference in Y into the 'explained' and 'unexplained' components, by using propensity-score weighing, by the realization of a counterfactual situation where X becomes statistically independent of human capital variables.

In case where we consider a counterfactual situation where women (X=1) come to have the identical human capital of men (X=0), the propensity-score weights for women is given as follows. We assume:

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[1] The part comes from the discussion of Yamaguchi (2014).

$Y_{0i} = \phi(\theta_0, V_i) + \varepsilon_1$ for men,

$Y_{1i} = \phi(\theta_1, V_i) + \varepsilon_0$ for women, and

$Y_{obs,i} = XY_{1i} + (1 - X)Y_{oi}$ for the observed Y. Then

$$E(Y_1 \mid X = 1) = \int_V E(Y(\theta_1) \mid V) f(V \mid X = 1) dV = E(Y_{obs} \mid X = 1)$$

$$E(Y_0 \mid X = 0) = \int_V E(Y(\theta_0) \mid V) f(V \mid X = 0) dV = E(Y_{obs} \mid X = 0)$$

,where V is the covariate for human capital.

The counterfactual mean for women with men's V is given

$$E(Y_1 \mid X=0) \equiv \int_V E(Y(\theta_1) \mid V) f(V \mid X = 0) dV$$

$$= \int_v \omega(V) E(Y(\theta_1) \mid V) f(V \mid X = 1) dV = E_\omega(Y_{obs} \mid X = 1),$$

where E_ω denotes the weighted mean with weights,

$$\omega(V) = \frac{f(V \mid X = 0)}{f(V \mid X = 1)} = \frac{p(X = 1)p(X = 0 \mid V)}{p(X = 0)p(X = 1 \mid V)}$$

Hence, $E(Y_{obs} \mid X = 1) - E(Y_{obs} \mid X = 0) = E(Y_1 \mid X = 1) - E(Y_0 \mid X = 0)$

$= \{E(Y_1 \mid X = 1) - E(Y_1 \mid X = 0)\} + \{E(Y_1 \mid X = 0) - E(Y_0 \mid X = 0)\}$

$= \{E(Y_1 \mid X = 1) - E_\omega(Y_1 \mid X = 0)\} + \{E_\omega(Y_1 \mid X = 0) - E(Y_0 \mid X = 0)\}$

$= \{$explained inequality$\} + \{$unexplained inequality$\}$, which is the DFL decomposition.

Also note that

$$\omega(V)P(x=1,V) = \frac{P(V \mid x = 0)}{P(V \mid x = 1)} P(x = 1)P(V \mid x = 1) = \frac{P(V \mid x = 1)}{P(V \mid x = 0)} P(x = 0, V).$$

We also adjust weights to have an average of 1.0 for the ratio estimation for the managerial positions.

$$\omega^*(V_i) = \frac{N_1 \omega(V_i)}{\sum_{k=1 \mid X = 1}^{N_1} \omega(V_k)}.$$

The unexplained gender inequality on the proportion of managerial positions is then given as:

$\bar{Y}^W(\omega^*) - \bar{Y}^M$, where ω^* indicates the weighted average.

Results: glass ceiling?

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Table 1 summarizes unexplained portion of gender inequality in Japan by using 2009 RIETI survey. Two interesting facts are revealed. First, as we add more human capital covariates, the unexplained portion shrinks, which means that some portion of gender inequality in managerial positions could be explained by gender inequality in human capital. But even after doing counter-factual treatment with age, education, and employment duration, the unexplained portion still remains 70% to 80%. Second, as we move from Kakaricho position to Kacho one, we can see about 10% bigger unexplained portion. Although we could not examine Bucho position since we do not have enough number of female Bucho in the data, the current result implies the possible glass ceiling or pipe leaking even from the middle manager positions in the Japanese firms among regular workers.

Table 2 summarizes the data used for the analysis of Korean glass ceiling. The analysis starts with 174,309 cases in year 1990 for full-time employed, white collar workers in the firms that had 100 or more employers. Figure 2 illustrates the trend of the glass ceiling in Korea for those years. Three facts are revealed from the figure. First, the unexplained portion after counter-factual treatment for human capital including age, duration of employment, educational level, and three interaction terms between each pair of human capital factors, the range of unexplained gender inequality for managerial positions falls between 75% to 85% except year 2007 when the portion was 62% (yellow line). This is somewhat corresponding to Japanese portion, which is 70% for Kakaricho and 80% for Kacho. Since Korean managerial position included Bucho and higher, the numbers seems strikingly similar. Second, as women goes up the higher positions in the firm, from Kakaricho (grey line) to Kacho (orange line) to Bucho (blue line), they face higher unexplained portion just like Japanese women. This quite fist to the glass ceiling picture although we do not have the data for the very high managerial positions. It is also interesting somehow the unexplained portion was quite similar between Kakaricho position and Kacho position until 1997. There seems little improvement in gender equality with regard to promotion to managerial positions in firms over the last quarter century in Korea.

Discussions and Implications

There have been many empirical studies to examine glass ceilings in various countries. For the United States, many studies confirmed that the gender inequality does not increase as women goes up to higher positions in the firm and thus could not find the existence of glass ceiling (Morgan 1998; Weinberger 2011; Wright, Baxter, Birkelund 1995). Since the findings of Morgan's research in 1998 strongly suggested that the higher inequality among women in higher

positions (and thus among older women) resulted not from glass ceiling but from cohort differences (higher gender inequality among older cohorts), many following studies confirmed little glass ceiling in the USA. Weinberger (2011) concluded that gender gap in earnings is determined by factors already present early in the career. Also Wright and his co-authors also found little evidence for the glass-ceiling hypothesis that barriers to upward promotions for women in authority hierarchies are greater than the barriers they face in getting into hierarchies in the first place (1995) in seven countries: the United States, Canada, the United Kingdom, Australia, Sweden, Norway, and Japan.

However more recent studies showed possible support for the glass ceiling over Europe. Albrecht and his co-authors successfully showed that even after extensive controls for gender differences in age, education, sector, industry, and occupation, the glass ceiling effect was persistent to a considerable extent in Sweden (Albrecht, Bjorklund, and Vroman 2003). Also a study examined eleven European countries by using the European Community Household Panel from 1995 to 2001 and found that gender gap in earnings typically widened toward the top of the wage distribution, which strongly suggest the existence of glass ceiling (Arulampalam, Booth, and Bryan 2007). So, we do not have consistent evidence for European countries but more recent data and studies tend to confirm the existence of glass ceiling in Europe.

How about Japan or Korea? Wright's study in 1995 that examined the glass ceiling effect among seven countries including Japan confirmed that gender inequality in workplace authority was highest in Japan (Wright, Baxter, Birkelund 1995. However, they could not test the glass ceiling effect in Japan because there were no women in middle management positions or above in the Japanese 823 respondents. There has been little research on Korean glass ceiling by using reliable data based on robust method. This study is the exception in the sense that it tries to compare glass ceiling between Japan and Korea based on the common method of DFL decomposition. Although we have only one year data for Japan and thus, are not quite confident for the comparison, but the extent of the unexplained gender inequality seems to be strikingly similar in two countries. Furthermore, in both countries women seem to face steeper inequality as they move up to higher managerial positions: glass ceiling. Based on multiple cross-sectional data over twenty four years, we can also conclude that the magnitude of glass ceiling tend to remain the same in Korea. We suspect that this is not due to simple cohort difference as argued by Morgan (1998) but to the actual glass ceiling because our data ranges over twenty four years and showed little changes: little difference between different cohorts. Also we believe more Korean women are frustrated from glass ceiling nowadays with compared to previous cohorts since most young women are now equipped with the same levels of human capital as men in Korea.

Figure 1: Odds of men vs. women in managerial positions among OECD countries
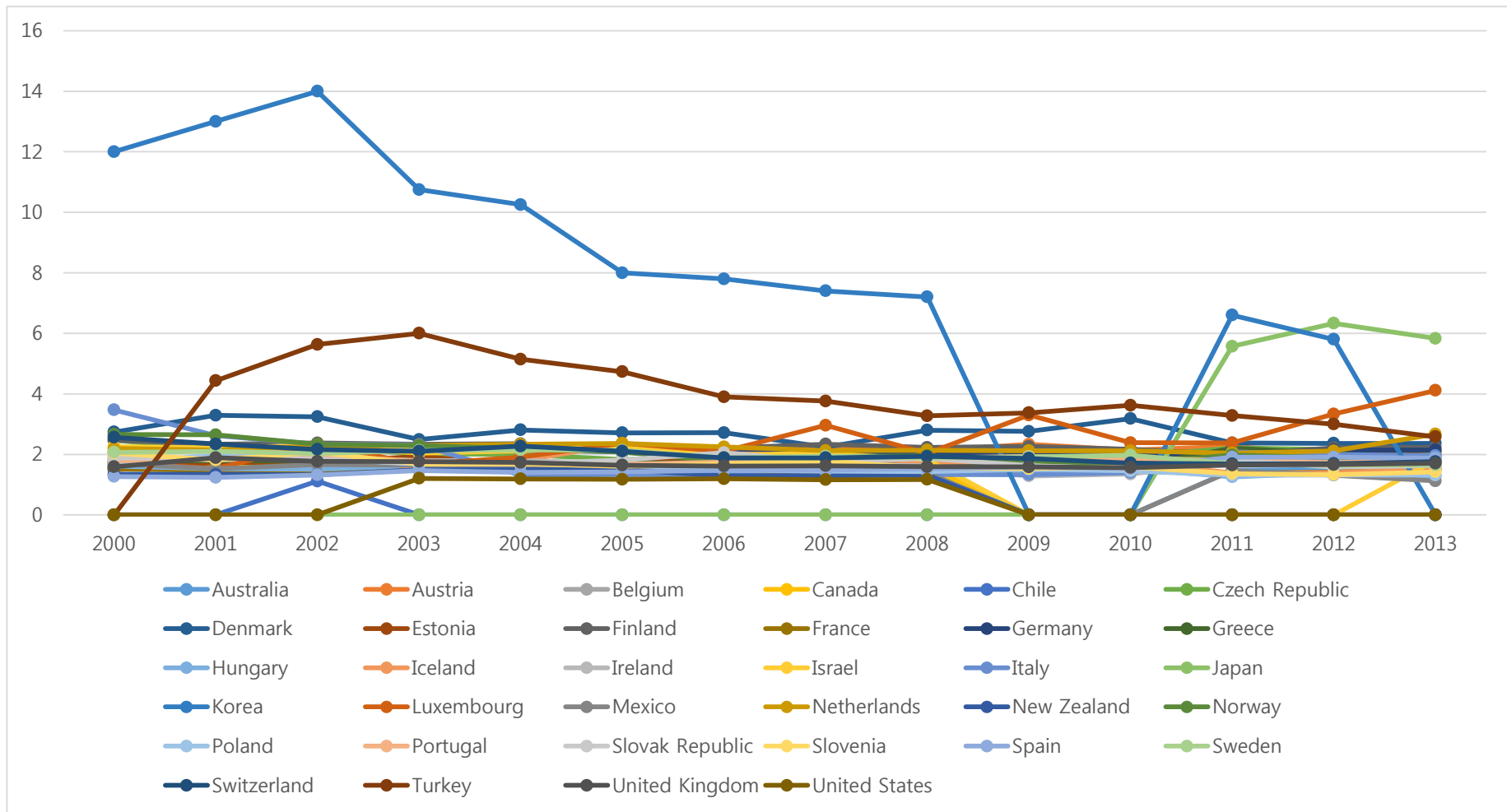
Sourece: Adapted from ILO 2015. Values not available data in specific years were coded as zero.

Table 1. Explained portion of gender difference in Japan 2009

	Kacho			Kakaricho		
	difference	unexplained	explained	difference	unexplained	explained
sample	-0.3	100.0	0.0	-0.5	100.0	0.0
model 1	-0.3	91.8	8.2	-0.4	82.7	17.3
model 2	-0.3	93.2	6.8	-0.4	92.5	7.5
model 3	-0.3	80.6	19.4	-0.3	71.4	28.6
model 4	-0.3	79.0	21.0	-0.3	69.7	30.3

Model 1: covariates include only age

Model 2: covariates include education for each age, P(education | age)

Model 3: covariates include education by age, P(age X education)

Model 4: covariates include education by age, and employment duration P(age X education, duration)

Table 2. Number of observations for each year in OWS over 24 years

year	1990	1991	1992	1994	1995	1996	1997	1998	1999	2000	2001
# of observations	174,309	181,908	171,359	197,912	192,135	200,454	197,749	186,981	224,239	229,626	234,031
year	2002	2003	2004	2005	2006	2007	2008	2010	2012	2013	
# of observations	166,715	165,170	111,126	234,820	243,896	232,426	252,137	255,176	263,175	271,189	

* Data for 1993, 2009, 2011 were not used due to non-convergence of logistic regression estimation for counter-factual treatment.

** From 2002, the data does not differentiate regular workers from irregular workers. Analyses were done for both regular and irregular workers altogether.

*** From 2005, the data does not contain the names of managerial positions such as Bucho, Kacho, Kakaricho. It only tells us if the respondent is in the managerial position or not.

Figure 2. The trend of glass ceiling among regular workers in Korea from 1990 to 2013

Unexplained portion after counter-factual treatment among both regular and irregualar workers

Legend: Bucho, Kacho, Kakaricho, managerial
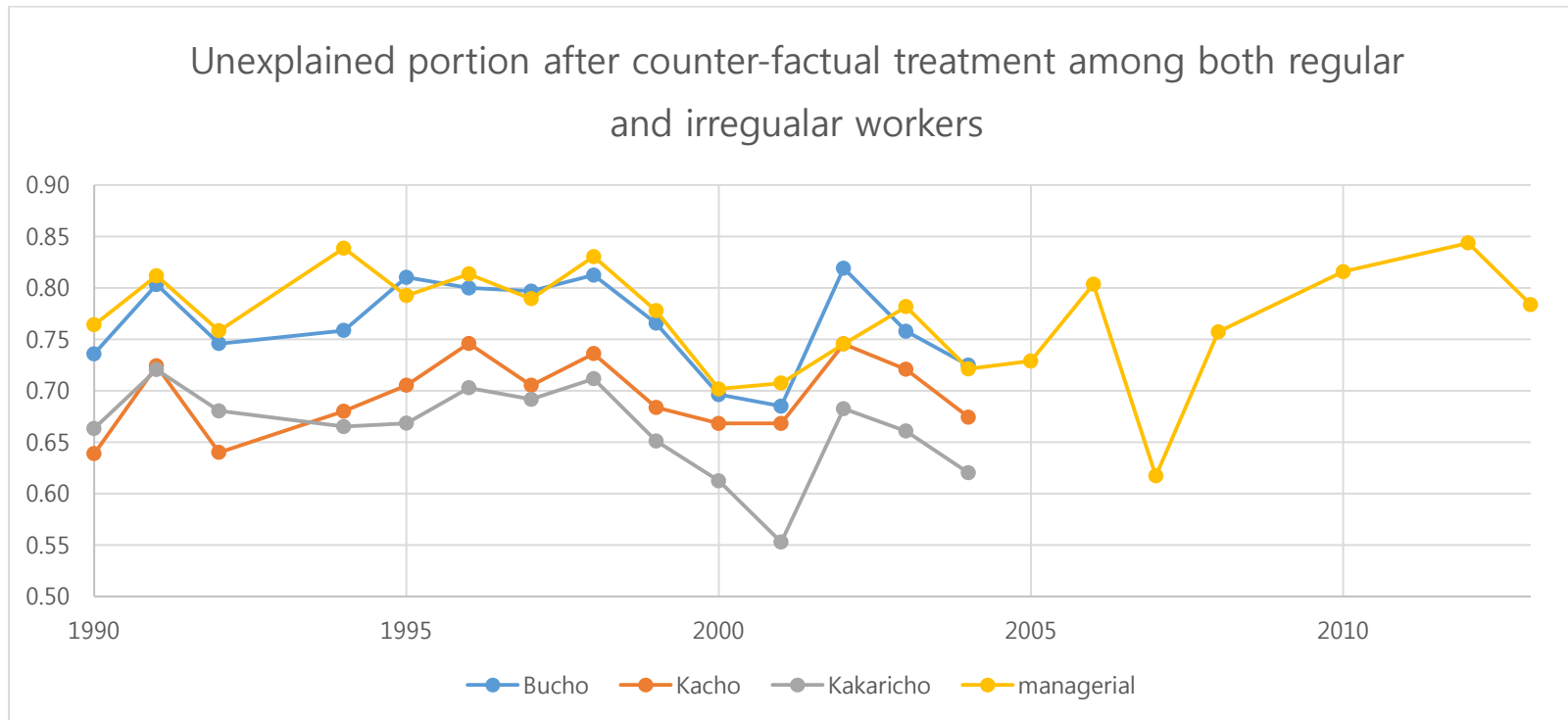
* duration at the current workplace: five categories. a) < 1 year, b) >=1 year & < 3 years, c) >= 3 years & < 5 years, d)　>=5 years & < 10 years, e)　>= 10 years
** educational level: four categories. a) junior high or lower, b) high school, c) vocational college, d) college or higher
*** age: seven categories. a) 19 or younger, b) 20 to 24, c) 25 to 29, d) 30 to 34, e) 35 to 39, f) 40 to 49, g) 50 or older
**** We included duration, education, age, duration by education, duration by age, education by age for the covariates for counter-factual treatment.

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