Long-Term Effects of Coeducational Industrial Arts and Home Economics Classes

Hiromi Hara¹ Núria Rodríguez-Planas²

¹Japan Women's University & TCER

²City University of New York, Queens College & IZA

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Outline

Introduction

- 2 Educational Policy Change in 1990
- Empirical Framework
- 4 Validity Check of Using RDD Framework

5 Results



Gender Equality at Home Matters

- Despite the great convergence in men's and women's lives, especially in the labor market (Goldin 2014), women continue to shoulder a disproportionate burden at home.
- Gender disparities in the division of domestic work hold back women's professional careers.
- Wives' greater involvement in household chores and child care may also affect the hiring and promotion decisions of employers regarding women, stalling gender convergence in the labor market.

Gender Inequality in Japan

- While more than 70% of Japanese women aged 15 to 64 worked in 2018, only 44% did as regular workers (on a full-time permanent contract). reure
- Japan has one of the highest disparities in the division of domestic work. figure
- Japan is one of countries which have well-defined social norms about the traditional gender role. figure

"Industiral Arts & Home Economics" Education

- In JHS, "industrial arts and home economics (IA-HE, *gijyutsu-katei*)" has been a required subject for both boys and girls since 1958.
- IA: wood shop, metal shop, electronics, & horticulture
- HE: food, clothing, childcare, & homemaking





IA-HE Education in Japan's JHS

- *Currently*, boys & girls have to study both HE and IA areas for the same # of hours together. (HE: home economics, IA: industrial arts)
- Previously, girls had to study mainly HE and boys had to study mainly IA, in addition, they were taught during the same period but in different places — a school shop and a HE room.
- The policy change of coeducation of IA-HE in 1990. \longrightarrow Cohorts born after FY1977

Research Question

- Did the coeducation of IA-HE cause behavioral changes among men and women within and outside the household?
- = The long-term consequences of the educational reform over 30 years ago.

Coeducation & Gender Norms

- A situation in which girls are required to study HE areas and boys are IA areas separately might cause them to accept separate gender roles.
- On the other hand, a situation in which both boys and girls are required to study IA and HE together might cause them to accept the same gender roles.

If the Coeducation Relaxes Gender Norms:

- Men increase home production (HP) or personal time at the expense of work time.
- Women decrease HP time and increase personal or work time.
- Women take more seriously their professional career.
- Their behavioral changes could affect fertility.

Relevant Literature

- Dahl, Kotsadam, and Rooth (2018) study a field experiment whereby females are recruited to some Norwegian military squads but not others during an 8-week boot camp to see if men adopt more egalitarian attitudes.
- Dhar, Jain and Jayachandran (2018) study an evaluation of a school-based randomized program that engaged 7th to 10th grade students in India in classroom discussions about gender equality to see if it impacts gender attitudes produces more gender-equal behavior.

 \longrightarrow Positive effects of these interventions on reshaping gender attitudes, but the short-term effects.

Empirical Framework



- Oc-education of IA-HE in 1990.
 - **1** Treatment: Post-1977 cohort, Control: Pre-1977 cohort
 - Porcing variable: birth year
 - Outoff: 1977
 - **3** School year: year t = from April in t to March in t + 1
- Outcomes
 - Men's home production time & share of home production within a couple
 - Women's working style & wage
 - O The # of children
 - 4 Attitudes toward the traditional gender roles
- Data: Japanese time use survey (Survey on Time Use and Leisure Activities by the Statistics Bureau of Japan)

Main Result

- Men who studied IA-HE together w/ girls are more likely to do home production than men who did not.
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- Women who studied it together w/ boys are more likely to work intensively in the LM.

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Educational Policy Change in 1990

- Japan has a national education system
- The most important guideline for schools: the **Government Guidelines for Education**. (*Gakusyu-Shidou-Youryou*)
- The Guideline is determined separately for 1) elementary, 2) junior high, 3) senior high, 4) schools for the blind, 5) schools for the deaf, & 6) schools for the disabled.
- It provides the legally binding national curriculum standards for each type of school.
- The Guideline revision for JHS of 1989 = Policy change in 1990

IA-HE Education in JHS before the Policy Change

- Industrial arts (shop class): 9 subject areas wood shop I & II; metal-shop I & II; machinery I & II; electronics; & horticulture
- Home economics: 8 subject areas clothing I, II, & III; food I, II, & III; homemaking; & nursing
- Before the policy change:
 - Gender Segregated: The Guideline distinguished b/w boys and girls to emphasize gender traits.
 - Boys: 5 areas from IA & 1 area from HE
 - Girls: 5 areas from HE & 1 area from IA
 - Boys and girls took classes separately.

After the Policy Change

- Regulated **not** to make a difference in subject area b/w boys and girls
- Boys & girls have to study the same & more than 7 subject areas from both IA and HE
- For example, both have to study "wood shop I" & "food I" together in their 7th grade

Who is the Treatment Group?

- The revised Guideline was determined to enter full effect in FY1993.
- However, the transition period was set b/w FY1990–1992 for the smooth transition to the new Guideline.
- Therefore, from FY1990, the new Guideline was applied to all JHS students.

 $\sqrt{$ "FY" indicates fiscal/school year.

= In Japan, a fiscal year starts in April and ends in March of the following year.





Notes: The green cells indicate co-education of HE. FY indicates school year/fiscal year.

Jump to Size of Treatment

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Data

- Japanese time use survey (JTUS) in 2016 (Syakai-Seikatsu-Kihon-Chosa)
 - Comprehensive and reliable household (HH)
 survey data on daily patterns of time allocation w/
 a large sample size
 (around 76,000 households & 177,000 HH members
 10 yrs old and over)
- Each HH member was required to answer for two straight days within the survey period (Oct 15–23), however, not everyone responded for two days
- 350,744 days (male: 166,429 days, female: 184,315 days)

Data (cont.)

- The 24 hours in a given day are divided into 96 time segments of 15 minutes each, such as 0:00-0:15, 0:15-0:30, ...
- Each respondent selects an activity from the list of 20 categories (sleeping, working, housework, etc.) printed in advance for each 15-minute time segment.
- We can get the fairy exact amount of time use

Categories of Time Use

- Home production (HP)
- Work-related activities: work, commute, job training
- Leisure: rest & relaxation, TV, radio, newspaper, & magazine, hobby, sports, volunteering & social services, etc.
- Life-support activities: sleep, personal up-keep, meals, etc.

HP: Main Outcome Variable of Time Use

- Home production consists of
 - 1) housework (cooking, doing dishes, cleaning, doing laundry, etc.)
 - 2) childcare
 - 3) caregiving for sick kids & the elderly
 - 4) grocery shopping
 - 5) travel time for home production (except for commuting time to school & work)
- Time for home production (**minutes**)
- Husband's share of home production within a couple
 (%)
- Solution Housework, childcare, and other (3), 4), and 5))

Analysis Sample

Married individuals

- Analyzed by gender and by weekday and weekend
- Cutoff point: FY1977 (April in 1977)
- The cohorts before & after 3 years around the cutoff (the 1974–1980 cohorts)
 - Men: 3,564 weekday sample & 6,371 weekend sample
 - Women: 4,589 weekday sample & 7,712 weekend sample

Other Variables (Except for Time Use)

- Regular employment
- Non-regular employment
- Self-employment
- Unemployment
- Income
- Total number of children

We use 2016 JTUS at the individual level. Restricting the sample to married individual with non-missing labor market outcomes leaves us with 5,393 men and 6,251 women.

Table 1: Descriptive Statistics of HP Time (1974–1976 cohorts)

	Men	Women
Home Production		
Weekdays (per day)		
Time (min)	37.09 (95.40)	344.20 (234.80)
Share (%)	8.03 (16.7)	92.58 (16.70)
Weekends (per day)		
Time (min)	106.50 (162.20)	354.30 (222.40)
Sharee (%)	18.7 (23.6)	81.08 (24.2)
Each Activity on Weakands (min)		
	22.24 (61.07)	101 20 (112 00)
Childeare	22.24(01.07)	194.30(143.90)
Othor	34.00 (104.70)	00.39 (139.20)
Other	49.08 (90.95)	93.41 (100.20)

Source: 2016 JTUS. Notes: These statistics indicate the mean (with SD in parentheses).

Table 2: Des Stat for Fertility and LM outcomes (1974–1976 cohorts, per individual)

	Men	Women	
Fertility			
Has children	0.89 (0.32)	0.87 (0.33)	
Total number of children	2.50 (1.61)	2.60 (1.71)	
Has children $<$ 10 years old	0.57 (0.50)	0.51 (0.50)	
Number of children < 10 years old	0.87 (0.90)	0.75 (0.87)	
Labor Market Outcomes			
Regular worker	0.82 (0.38)	0.25 (0.43)	
Non-regular worker	0.03 (0.17)	0.45 (0.50)	
Self-employment	0.14 (0.35)	0.07 (0.25)	
Non-work	0.01 (0.09)	0.23 (0.42)	
Annual income (in Yen)	509.80 (234.30)	191.30 (165.00)	
High-wage occupation	0.66 (0.47)	0.43 (0.495)	

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Check for Manipulation

Figure 1: Marriage Rate by Birth Year (FY)



Source: 2016 JTUS Note: The weekend sample. "0" indicates the cutoff point (1977). "-5" = 1972, "5" = 1982.

Check for Manipulation of Forcing Variable

Theoretically, manipulation does not happen to the forcing variable; men's & women's birth year.

- The policy change is for JHS education.
- In Japan, we enroll in JHS when we are 13 years old.
- No one can predict the educational policy change in 13 years.
- Timing of having a child cannot be influenced by the policy change which takes place 13 years later.

Figure 2: Manipulation Test of Forcing Variable (Cattaneo, Jansson, and Ma (2019))



Source: 2016 JTUS

Note: The gray zone shows a 95% confidential interval. "0" indicates the cutoff point (1977).

Check for Endogenous Sorting

Table 3: Balance Test (Weekend Sample)

Own age	Own years of education	Household members	Spouse's age	Spouse's years of education	Lives in prefec- ture with high MW
Panel A.	Men				
-0.041*	-0.098	-0.002	-0.029	-0.069*	-0.011
(0.019)	(0.104)	(0.031)	(0.196)	(0.030)	(0.010)
Panel B.	Women				
0.002	0.001	0.052	-0.048	-0.147	0.002
(0.027)	(0.052)	(0.049)	(0.161)	(0.089)	(0.007)

Note: Each column represents the coefficient of $Post_{1977}$ from a regression ($Y_i = \alpha + \tau Post_{1977} + [(1 - Post_{1977}) \times birthyear_i] + [Post_{1977} \times birthyear_i] + X'_i \gamma + \epsilon_i)$ using a 3-year bandwidth RD model with prefecture and day of the week dummies. * indicates p<0.10.

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Results of HP Time

Figure 3: Home Production Time (Men, min.)



Source: 2016 JTUS

Note: The analysis sample is the 1972–1982 cohorts, and "0" indicates the cutoff point (1977).



Figure 4: Home Production Time (Women, min.)



Source: 2016 JTUS

Note: The analysis sample is the 1972–1982 cohorts, and "0" indicates the cutoff point (1977).

Figure 5: Husband's Share of HP within a Couple (%)



Source: 2016 JTUS Note: The analysis sample is the 1972–1982 cohorts, and "0" indicates the cutoff point (1977).

Figure 6: Men's HP Time by Activity Type (Weekends)



Figure 7: Weekend Non-Home-Production Activity Type, Men





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Figure 8: Weekend Non-Home-Production Activity Type, Women





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RDD Regression

- $Y_{i} = \alpha + \tau Post1977_{i} + [(1 Post1977_{i}) \times f_{0}(birthyear_{i})]$ $+ [Post1977_{i} \times f_{1}(birthyear_{i})] + X_{i}'\gamma + \epsilon_{i},$ (1)
 - *Y_i*: Outcomes (Time use (in min), share within a couple, labor market outcomes)
 - *birthyear*_i: birth year (forcing variable)
 - *Post*1977: a treatment dummy var takes 1 if individual *i* was born after April in 1977, otherwise 0
 - X_i: prefecture, day of week, a set of individual covariates
 - ightarrow Our coefficient of interest is $\hat{ au}$

Table 4: Results of HP time ($\hat{\tau}$, 1974–1980 cohorts)

	Panel A. Men			Panel B. Women		
	(1)	(2)	(3)	(4)	(5)	(6)
Weekdays						
Time (min)	0.437	0.477	-2.271	-10.238	-9.310	-17.852
	(2.727)	(2.809)	(3.210)	(11.609)	(13.193)	(12.900)
Share within a couple (%)	1.950**	1.536**	1.382**	-0.831	-0.999	-0.943
	(0.603)	(0.551)	(0.557)	(0.850)	(0.793)	(0.814)
Weekends						
Time (min)	19.653***	24.129***	20.481***	-15.942**	-9.773	-7.226
	(1.205)	(3.462)	(2.522)	(5.426)	(5.973)	(5.861)
Share within a couple (%)	2.389***	2.362***	2.012***	-1.293**	-1.319***	-1.003**
	(0.298)	(0.233)	(0.259)	(0.481)	(0.318)	(0.385)
Prefecture	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
Day of week	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
Years of education		\checkmark	\checkmark		\checkmark	\checkmark
Three-generation household		\checkmark	\checkmark		\checkmark	\checkmark
Total $\#$ of children			\checkmark			\checkmark
# of children under 10			\checkmark			\checkmark

Notes: SE in (). SE is clustered by prefecture & birth year. *** & ** denote $p{<}0.01$ & $p{<}0.05$ respectively.

Table 5: Weekend Time Use by Type of Activity (in minutes)

Panel A: Home Production		Panel B: Not-Home Production			
Housework	Childcare	Other	Leisure Life-Support Work- Activity Activi		Work-Related Activity
a. Men (fv=	men's birth ye	ar)			
-6.058***	13.767***	11.945***	0.592	9.312***	-29.557***
(0.986)	(3.679)	(2.175)	(1.717)	(1.544)	(2.630)
b. Wome (fv=women's birth year)					
-3.581	-7.107	-5.255**	-6.647***	9.352*	13.237***
(5.000)	(4.494)	(1.918)	(1.559)	(4.552)	(3.359)

Notes: 1. SE in (). SE is clustered by prefecture & birth year. ***, **, & * denote $p{<}0.01,$ $p{<}0.05,$ & $p{<}0.10$ respectively.

2. Life-support activity includes sleeping, eating, taking a shower, etc. Work-related activity includes working and job training.

LM Outcomes

Labor Market Outcomes

Figure 9: Working Style (Women)



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Figure 10: Income & Occupation w/ High Wage (Women)



Note: A high-wage occupation dummy variable takes a value of 1 if the average occupation wage is higher than the overall average and 0 otherwise.

Figure 11: Working Style (Men)



Note: The figure for men's not-working cannot be shown because the sample size is very small.

Figure 12: Income & Occupation w/ High Wage (Men)



Table 6: RD Estimates of Labor Market Outcomes

Regular emp	Non-regular employment	Self-employed	Not-working	Income	High wage occupation	
Panel A. Men	ı (fv=men's bir	rth year)				
-0.006	0.012	-0.001	-0.004	-0.951	0.013	
(0.011)	(0.008)	(800.0)	(0.004)	(11.875)	(0.015)	
Panel B. Women (fv=women's birth year)						
0.047**	-0.056***	-0.015*	0.024	23.641***	-0.025	
(0.017)	(0.009)	(0.007)	(0.023)	(2.237)	(0.018)	

Notes: 1. SE in (). SE is clustered by prefecture & birth year. ***, **, & * denote $p{<}0.01,$ $p{<}0.05,$ & $p{<}0.10$ respectively.

Next Question: Fertility

- Women gain stronger LM attachment.
- It may have increased the opportunity costs of having children for women.
- Higher men's involvement in childcare may have increased men's awareness of the full costs of having children or shifted their preferences in favor of child quality (versus quantity).

Next Q: Did the coeducation of IA-HE also affect the desired # of children and fertility outcomes?

Feyrer et al. (2008), Doepke and Kindermann (2016), Farr and Gonzlez (2019)

Fertility

Outcome Related to Fertility

- The total # of children at the survey time
- The # of children under 10 years old at the survey time
 - \leftarrow Not the completed fertility

Figure 13: Total Number of Children (at the survey point)



Source: JTUS 2016. Note: "0" indicates the cutoff point (1977).

Figure 14: Number of Children under 10 years old (at the survey point)



Note: "0" indicates the cutoff point (1977).

Table 7: Results of RD Regression

	(1)	(2)
	Total $\#$ of	# of children
	<u>children</u>	under 10 yrs old
A. Men	-0.177*** (0.024)	0.075*** (0.018)
B Women	-0.060	0.008
D. Homen	(0.090)	(0.008)

Source: JTUS 2016.

 \longrightarrow It suggests that they could have delayed fertility.

Fertility

Mechanism: Gender Norm

A potential mechanism: the coeducation affected an individual's belief on gender roles.

- Internet monitor survey, conducted from July 22-27. 2019, commissioned to Rakuten Insight, Inc.
- Married men and women born b/w April 1973 and March 1982
 - = The same cohorts as the previous analysis
- The target recovery # was set at 1,750 for each cohort by gender.
- We got responses from 31,500 people.
- Attitudes toward gender roles & socio-demographic individual characteristics

Figure 15: Disagrees with Traditional Gender Attitudes, by Gender



Source: Original Survey. Note: "Disagrees with traditional attitudes" indicates that the respondent **disagrees or somewhat disagrees** to either the proposition that "**the husband should work outside and the wife should protect the family**" or the proposition that "**if the husband has enough income, the wife should not have a job**."

Table 8: Results of Disagrees with Traditional Gender Norms

A. Men	0.013
	(0.011)

B. Women 0.031*** (0.006)

Source: Original Survey.

 \longrightarrow For women, a potential mechanism of the coeducation is through changes in their gender norms. For men, it may well be through their wives gender norms.

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Conclusion Remarks

- Co-education of IA-HE increased men's participation in home production, and more intensive participation of women in the LM.
- Might be caused by change in attitudes toward the gender role through it.
- Men delayed timing of having children.
- Education is important in forming/neutralizing the gender norms.

Appendix

Figure A1: Employment Format (2018)



Data: Japanese LFS.

▶ go back

Figure A2: Home Production Time per Week (Incl. Childcare)



Data: Eurostat (2004) "How Europeans Spend Their Time Everyday Life of Women and Men," BLS of the US "2016 American Time Use Survey," and JBS "2016 Japanese Time Use Survey." • go back 61/58 Figure A3: Ratio of Japanese having the traditional gender norm (%) (Married women should be at home?)



Data: Net go back sting Culture Research Insitute, The Japanese Value Orientations Survey (Nihonjin no ishiki chosa) .

Figure A4: Ratio of "egalitarians" (people who do \underline{NOT} have the traditional gender norm)

(If a woman earns more money than her husband, it's almost certain to cause problems (disagree, %))



Data: World Values Survey Wave 6: 2010-2014. Note: The other options are "agree," "neither," "no answer," and "don't know."



Size of Treatment

The # of IA-HE classes required to take for three years (1 class = 50 min.):

- Before (FY1974 cohort): 245 classes Boys: 215–220 IA classes & 20–35 HE classes Girls: 20–35 IA classes & 215–220 HE classes
- After (FY1977 cohort): 210–245 classes Both genders: At least 70 classes for IA & HE respectively, and the rest of classes (70–105 classes) depends on school choice.



Table A1: Introduction of Home Economics Co-education in JHS in May of FY1990 (Hyogo Prefecture)

	1st year	2nd year	3rd year
	(FY1977 cohort)	(FY1976)	(FY1975)
Ν	28	13	5
Proportion	88%	41%	16%

Source: Yasuno (1991).

Note: Respondents are 32 home economics teachers who graduated from H junior college in Hyogo prefecture. Response rate is 61.5%.

Table A2: Treated Women's Husbands & Treated Men's Wives (Weekend Time Use (min.))

Panel A: Home Production		Panel B: Not-Home Production					
Housework	Childcare	Other	Leisure Life-Support W Activity A		Work-Related Activity		
a. Treated Women's Husbands (fv=wives' birth year)							
0.202	2.813	15.081***	-11.223	4.518*	-7.79		
(2.562)	(10.114)	(3.942)	(6.924)	(2.162)	(6.834)		
b. Treated Men's Wives (fv=husbands' birth year)							
-13.647***	13.392	-8.273**	-3.803	2.423	9.907		
(3.222)	(10.167)	(2.542)	(3.611)	(1.881)	(12.608)		

Notes: 1. SE in (). SE is clustered by prefecture & birth year. ***, **, & * denote p<0.01, p<0.05, & p<0.10 respectively.

2. Life-support activity includes sleeping, eating, taking a shower, etc. Work-related activity includes working and job training.

Subgroup Analysis

Table A3: Results of subgroup analysis

	Low Educated (1)	High Educated (2)	3-generation HH (3)	2-generation HH (4)	High-wage pref (5)	Low-wage pref (6)
Men						
Weekends HP	25.244**	15.382	47.85	23.750***	26.103**	18.482***
(min)	(7.549)	(11.003)	(27.051)	(1.255)	(7.778)	(1.058)
Women						
Weekends HP	-34.918***	7.948	25.371	-13.77	-24.109	-14.868***
(min)	(8.287)	(5.046)	(22.246)	(9.365)	(24.414)	(3.919)
Regular emp.	0.054	0.038**	0.123*	0.029*	-0.0004	0.051**
	(0.031)	(0.014)	(0.059)	(0.015)	(0.027)	(0.016)
Non-regular emp.	-0.055**	-0.074***	-0.196**	-0.031***	-0.049	-0.055***
	(0.020)	(0.006)	(0.078)	(0.006)	(0.029)	(0.012)
Annual income	12.420*	45.163***	39.620***	21.548***	18.381***	23.295***
	(5.525)	(7.554)	(9.621)	(3.959)	(3.216)	(2.651)

Note. HP: home production time, HH: household, pref: prefecture, emp: employment.

Brief History: Endogeneity?

- In December 1979, the 34th General Assembly of the UN adopted the Convention on the Elimination of All forms of Discrimination against Women (CEDAW, Joshi-sabetsu-teppai-joyaku)
- In order to ratify it, Japan needed to overcome gender inequality hurdles in three areas: (1) nationality, (2) employment, and (3) education (Article 10, (a) (b) (c)).
- Seemed to difficult to overcome them, and Japan once announced not to attend the signing ceremony at Copenhagen in 1980.
- Consideration to the international community \longrightarrow Co-education of IA-HE

- Japan signed CEDAW at the signing ceremony.
- Long discussion on gender inequality in the three areas.
- In 1984, the Ministry of Education created the Panel on Home Economics Education to draft the new Guideline that would eliminate gender discrimination within JHS IA-HE.
- Japan ratified CEDAW, and it went into effect in 1985.
- The new Guideline was published in 1989.
- Coeducation of IA-HE started in 1990.