Marriage Market Signaling and Women's Occupation Choice

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Introduction

- Occupation segregation
  - In 2009, 33.2% women work in heavily female occupations (Blau et al.,2013) gender in broad occupation
  - In 2010, occupation explains 33% of the gender wage gap (Kahn and Blau, 2017)
- Childcare mainly done by women childcare time by gender
- Caregiving occupations - lower pay, more women, better children outcome, higher marriage rate

Introduction

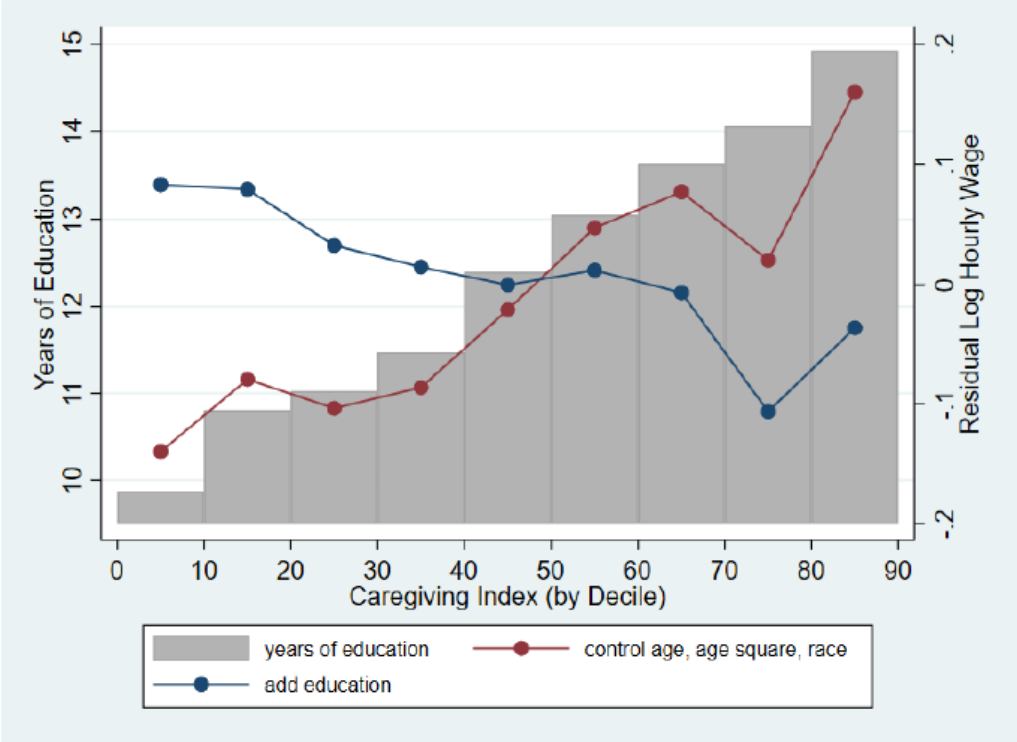

Figure 2: Caregiving index, education, and hourly pay

Note: Data from NLSY79 and O*NET. On the left y-axis, bars represent years of education averaged within each decile. On the right y-axis, lines represent the residual log of hourly pay averaged within each decile. The red line controls only age, age square, and race. The blue line further controls for years of education and actual working experience

Introduction

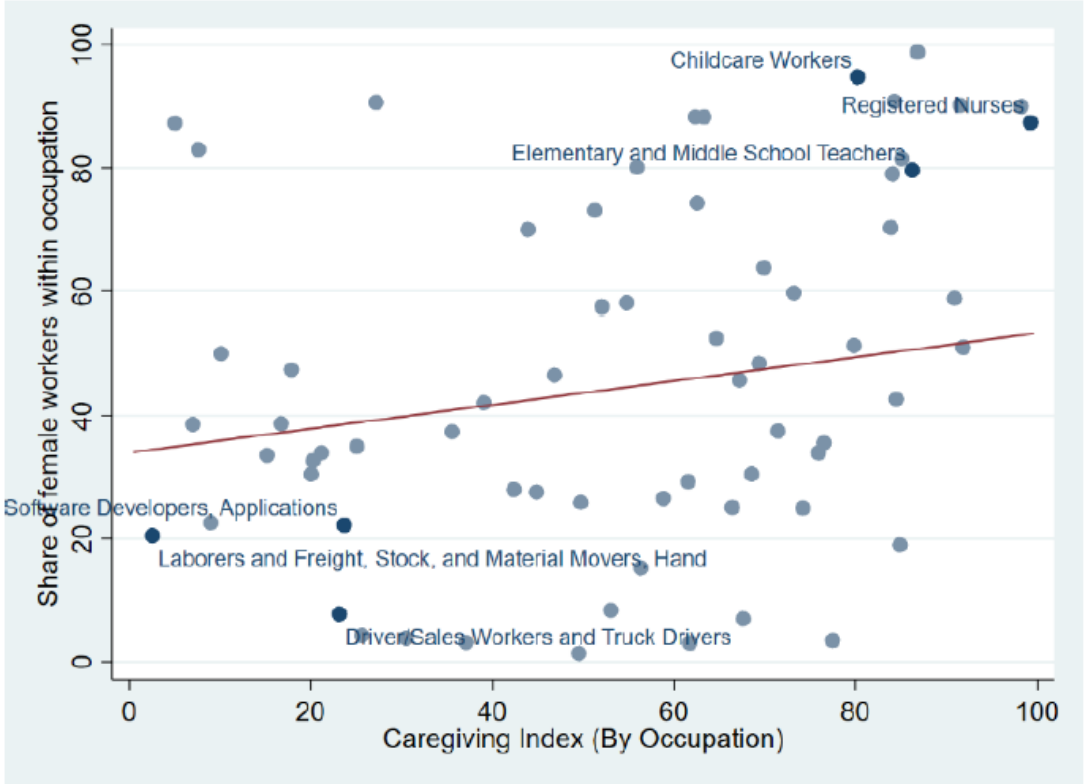

Figure 1: Caregiving index and share of female workers, 2020

Note: Data from the Bureau of Labor Statistics and O*NET. Only occupations with at least 500,000 workers are kept.

Introduction

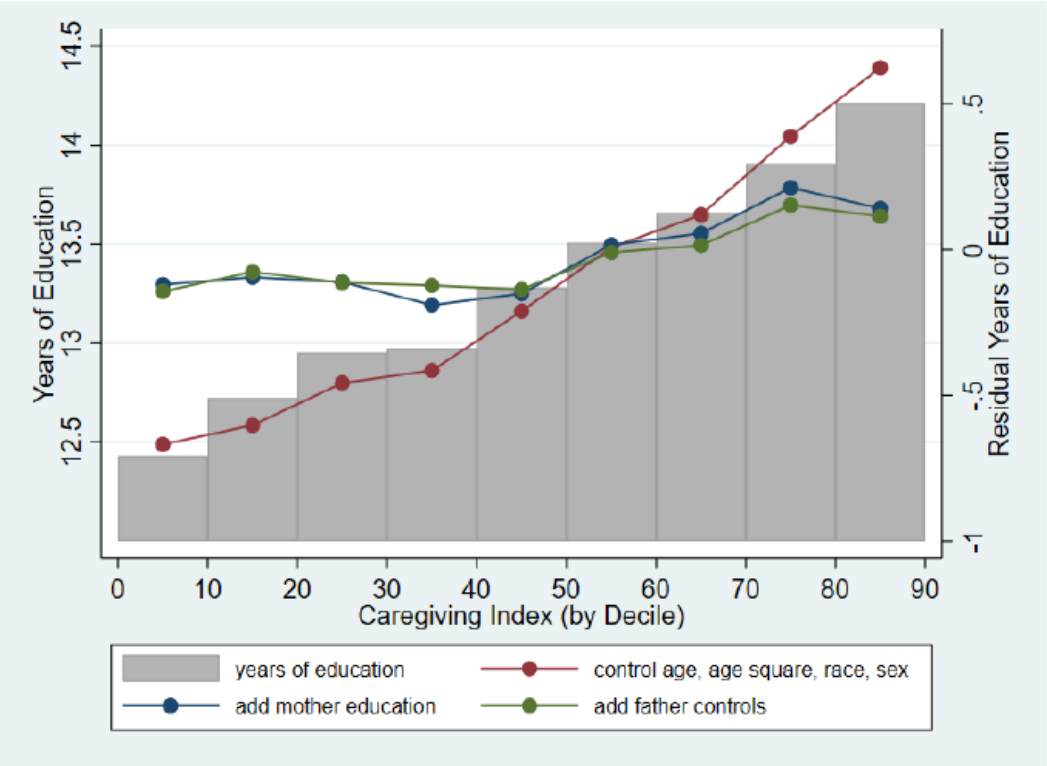

Figure 3: Mother caregiving index and children outcome

Note: Data from NLSY79 and O*NET. Mothers' caregiving index of occupations are measured while their children are under 13. Children's years of education are measured at the time of last interview for those who are at least 18. On the left y-axis, bars represent children's years of education averaged within each decile. On the right y-axis, lines represent children's residual log of years of education averaged within each decile. The red line controls only age, age square, race and sex. The blue line further controls for years of education for mothers while children are under 13. The green line further adds father's education, father's caregiving index, and the log of household income within the same period.

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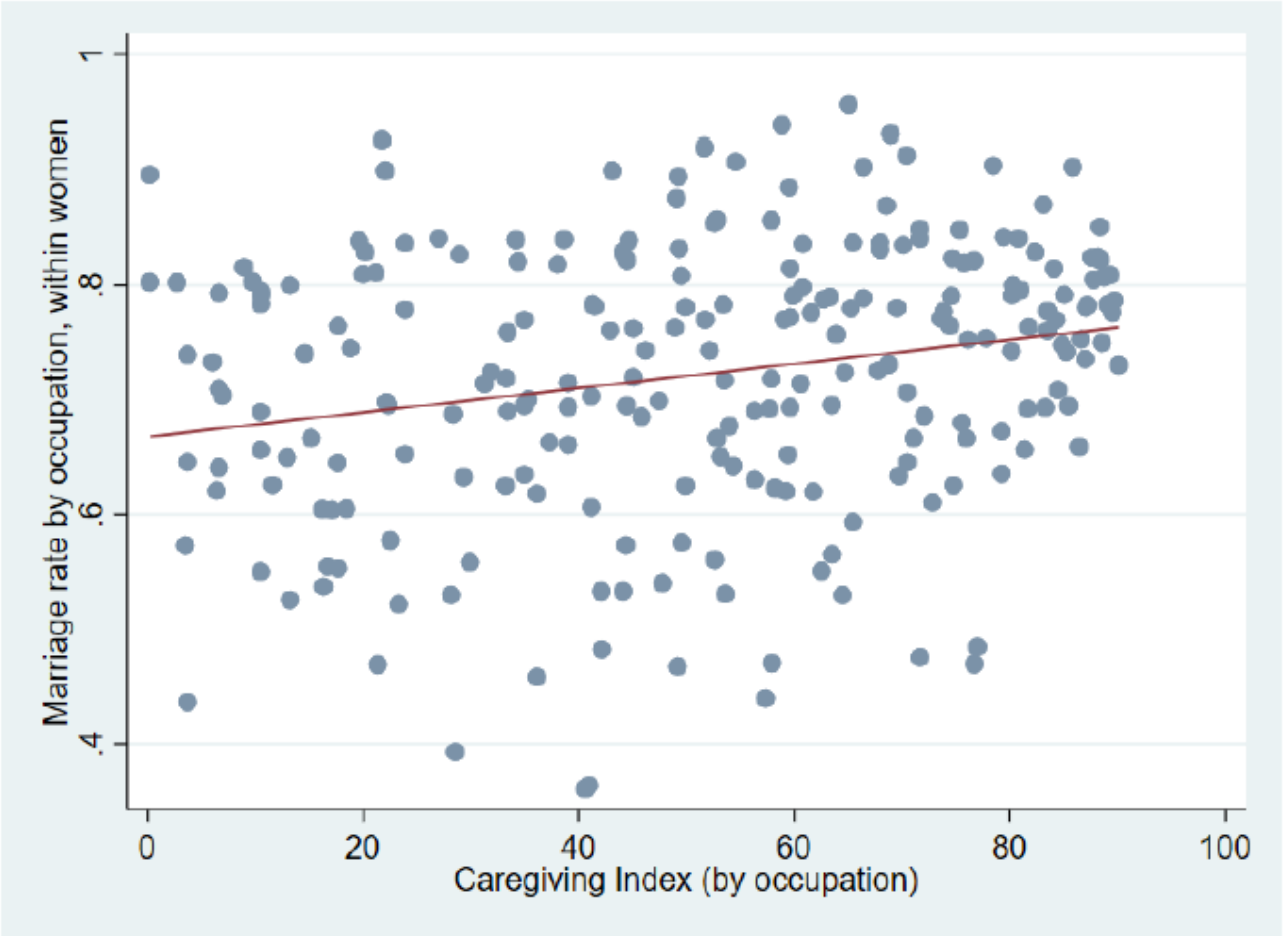

Figure 4: Caregiving index and marriage rate for women

Note: Data from NLSY79 and O*NET. All occupations with fewer than 20 women are dropped.

Contribution & Main Results

- Contribution
  - Develop a new model in which women choose caregiving occupations to signal their preference of taking care of children, which is desirable on the marriage market
  - The model generates unique predictions on marriage rate, divorce rate, sex ratio and women's occupation choice
  - These predictions are confirmed empirically using longitudinal data, policy shock and instrumental variables
- Main Results
  - Women signal their born preference by working in caregiving occupation
  - Higher divorce rate $\rightarrow$ fewer women work in caregiving occupations
  - Higher sex ratio $\rightarrow$ more women work in caregiving occupations
  - Higher marriage rate among women working in caregiving occupations

Literature Review

- Preference
  - flexibility of working hours (Flabbi and Moro 2012, Boler et. al. 2018)
  - stability (Wiswall and Zafar 2018)
  - risk of death (DeLeire and Levy 2004)
  - competition (Buser et. al. 2014)
- Discrimination and gender norms
  - discriminative employers (Kuhn and Shen 2013, Akerlof and Kranton, 2000)
  - childcare, career path, and gender norm (Barigozzi et. al. 2018)
- Human capital
  - investment (Becker 1985)
  - childbirth and skill depreciation (Adda et. al. 2017)
  - social skills (Cortes. et. al. 2018)
- Signing to potential mates
  - Bursztyn et. al. (2017): "acting wife"

Key Features of Model

- Women are vertically differentiated in born preference of childcare
- Caregiving women are desired by men
- Imperfect information on marriage market
- Occupations differ in their caregiving levels
- Positive marriage surplus shared within certain matches
- Women signal through occupation choice on the marriage market

Equilibrium

- Women's problem:

$$\max_{\mathrm{O}\in\{\mathrm{c,n}\}} \underbrace{2\mathrm{W}(\mathrm{O})}_{\text{wage}} - \underbrace{2\mathrm{C}(\mathrm{A},\mathrm{O})}_{\substack{\text{mismatch}\\ \text{cost}}} + \underbrace{(2-\lambda)\sum_{\mathrm{B}\in\{\mathrm{T,M}\}} \Pr(\mathrm{B},\mathrm{O},\rho,\alpha,\beta)\mathrm{U_F}(\mathrm{B},\mathrm{O})}_{\text{expected gain from marriage}}$$

- Perfect Bayesian Equilibrium
- Pooling equilibrium parameter range
  - all type-C women work in caregiving occupation
  - share θ of type-N women work in caregiving occupation
- Share of women working in caregiving occupation $\mu = \alpha + (1-\alpha)\theta$

Model-Predictions

- Prediction 1: Higher λ, lower μ
  - When divorce rate is higher, fewer women work in caregiving occupation
- Prediction 2: Larger ρ, higher μ
  - When sex ratio is higher, more women work in caregiving occupation
- Prediction 3: Higher marriage rate for women working in caregiving occupations
  - Caregiving is a desirable trait & stable match

Data-O*NET

- O*NET
  - comparable occupation data since 2003
- Caregiving Index – vary by occupation
  - Assisting and Caring for Others & Training and Teaching Others full list
  - importance scale (1 not important - 5 very important)
  - re-scale to 0-10, average of two dimensions, rank and take percentile
- Three measures
  - Caregiving index: 0-100, larger, more caregiving
  - Caregiving dummy: 1 if index between 50 and 100, otherwise 0
  - Caregiving quartile: fourth quartile if index between 75 and 100
- Alternative measures
  - level scale instead of importance scale
  - knowledge file (33 categories)
    - education and training, therapy and counseling, and psychology

Top and Bottom 10 caregiving occupations

Table 1: Top and Bottom Caregiving Occupations

Top 10 caregiving occupations	Bottom 10 caregiving occupations
Preschool and Kindergarten Teachers	Avionics Technicians
Other Teachers and Instructors	Upholsterers
Occupational Therapists	Tire Builders
Registered Nurses	Furniture Finishers
Licensed Practical and Licensed Vocational Nurses	Rail-Track Laying and Maintenance Equipment Operators
Elementary and Middle School Teachers	Graders and Sorters, Agricultural Products
Personal Care Aides	Electrical Power-Line Installers and Repairers
Special Education Teachers	Food and Tobacco Roasting, Baking, and Drying Machine Operators and Tenders
Dental Assistants	Pile-Driver Operators
Respiratory Therapists	Tool and Die Makers

Note: Data from O*NET, based on year 2003

Distribution of Caregiving Index

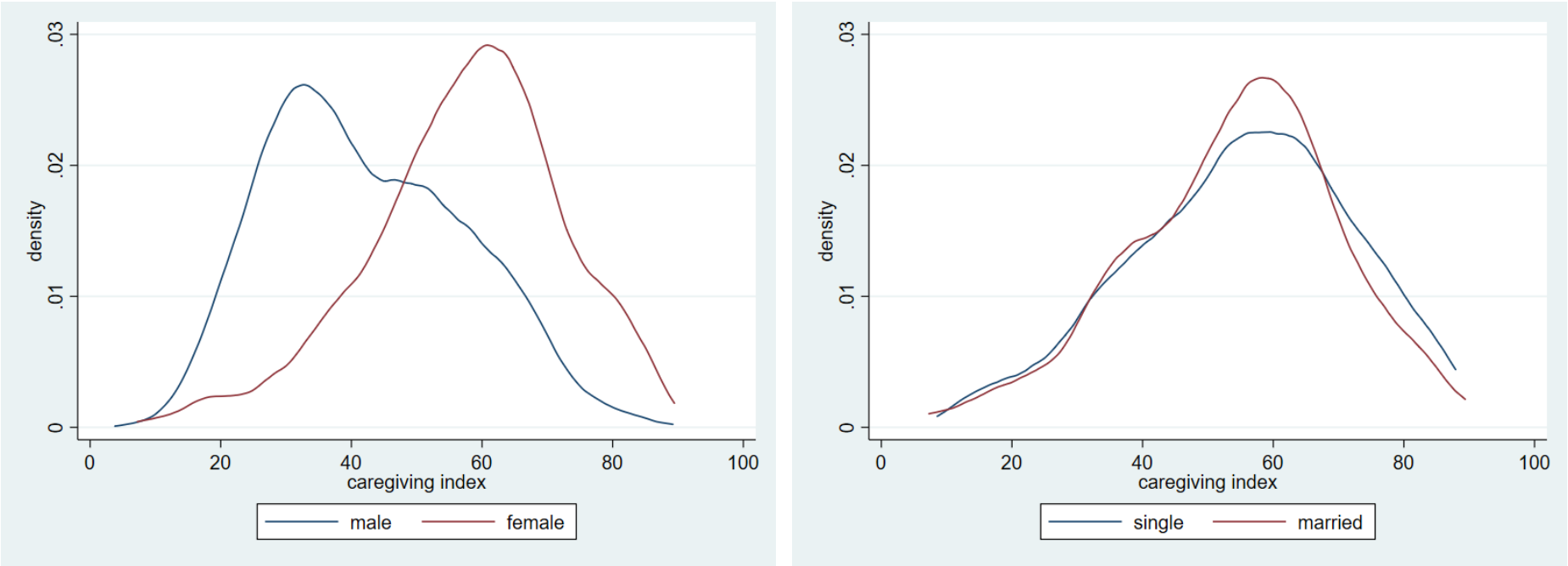

Figure: Caregiving index density by gender (left) and within women by marital status (right)

Empirical

- Part 1: higher divorce rate leads to fewer women working in caregiving occupation
- Part 2: higher sex ratio leads to more women working in caregiving occupation
- Part 3: women in caregiving occupation has higher marriage rate
- Appendix: caregiving occupation with better children outcome
- Appendix: caregiving occupations pay lower wage

Prediction 1: divorce rate

- Unilateral Divorce Law (UDL)
  - features divorce upon request of one spouse, regardless consent or behavior of the other
  - most states adopted around 1970-1980s
  - follow Voena(2015) and Stevenson(2007) on defining adoption years of unilateral divorce law state adoption year
  - follow Voena(2015) on property division law classification
  - mixed evidence on unilateral divorce law and divorce rate, but there is much evidence towards decline of marriage duration (Wolfers, 2006)
  - In my model, shorter marriage duration is equivalent to higher λ
- Current Population Survey - 1968-2000
  - yearly representative sample
  - geography information

Prediction 1: divorce rate

- Current Population Survey, 1968-2000

$$\mathrm{C_{ist}} = \alpha + \beta \mathrm{Uni_{st}} + \beta_{\mathrm{p}} \mathrm{Propy_{st}} + \beta_{\mathrm{X}} \mathrm{X_{ist}} + \delta_{\mathrm{s}} + \delta_{\mathrm{t}} + \varepsilon_{\mathrm{ist}}$$

  - individual i, state s, year t
  - C_{ist} caregiving measure
  - Uni_{st} whether adopted unilateral divorce law
  - $Prop_{st}$ property division law regime
  - X_{ist} controls variables: age, age square, race
  - fixed effect: state, year

Prediction 1: divorce rate

Table 5: Unilateral divorce law and women's occupation choice

	Index	Dummy					
	All single	All single	Old single	Young single	Stevenson controls	Extra controls	Industry controls
Treated	-0.828	-0.0231*	-0.00594	-0.0263**	-0.0267**	-0.0264**	-0.0178**
	(0.660)	(0.0135)	(0.0269)	(0.0123)	(0.0119)	(0.0114)	(0.00767)
Property Regime	Y	Y	Y	Y	Y	Y	Y
Year	Y	Y	Y	Y	Y	Y	Y
State	Y	Y	Y	Y	Y	Y	Y
Observations	132,949	132,949	14,523	118,426	118,426	118,426	117,507
R-squared	0.011	0.015	0.021	0.017	0.045	0.048	0.286

Note: Standard errors (clustered at states) in parentheses. *** p<0.01, ** p<0.05, * p<0.1. In column 1, the dependent variable is the caregiving index while in column 2 through 7, the dependent variable is the caregiving dummy. In column 1 and column 2, all single women are included. In column 3, only single women over 38 are included. In column 4 through column 7, only single women under 38 are included. Column 4 is the baseline result, where only age, age square, and race are included. In column 5 through column 7, variables that might change after the adoption of unilateral divorce law for newly married couples (as shown in Stevenson 2007) are further controlled, including years of education, whether there are any young children (under age of 13) in the household, local (defined by state and year) female labor participation rate, and full-time or part-time job. In column 6 and column 7, yearly income from wage and salary, yearly total personal income from all sources, local unemployment rate (gender-specific), usual hours worked are further included. In column 7, industry and industry by year fixed effect are further included.

robust by birth cohort | age at policy change | control occupation features | traditional/modern states

Prediction 1: divorce rate

Table 6: Unilateral divorce law and occupation choice in young workers, by gender and marital status

	Dummy			
	Single Female	Married Female	Single Male	Married Male
Treated	-0.0263**	0.000786	-0.00766	0.00776
	(0.0123)	(0.00693)	(0.00744)	(0.00679)
Property Regime	Y	Y	Y	Y
Year	Y	Y	Y	Y
State	Y	Y	Y	Y
Observations	118,426	157,489	151,537	234,785
R-squared	0.017	0.086	0.043	0.167

Note: Standard errors (clustered at states) in parentheses. *** p<0.01, ** p<0.05, * p<0.1. In columns 1 and 3, only age, age square, and race are included. In columns 2 and 4, variables that might change after adoption of unilateral divorce law for newly married couples (as shown in Stevenson 2007) are further controlled, including years of education, whether there are any young children (under age of 13) in the household, local (defined by state and year) labor participation rate (gender-specific), and full-time or part-time job.

pre-trend ddd

Prediction 1: divorce rate

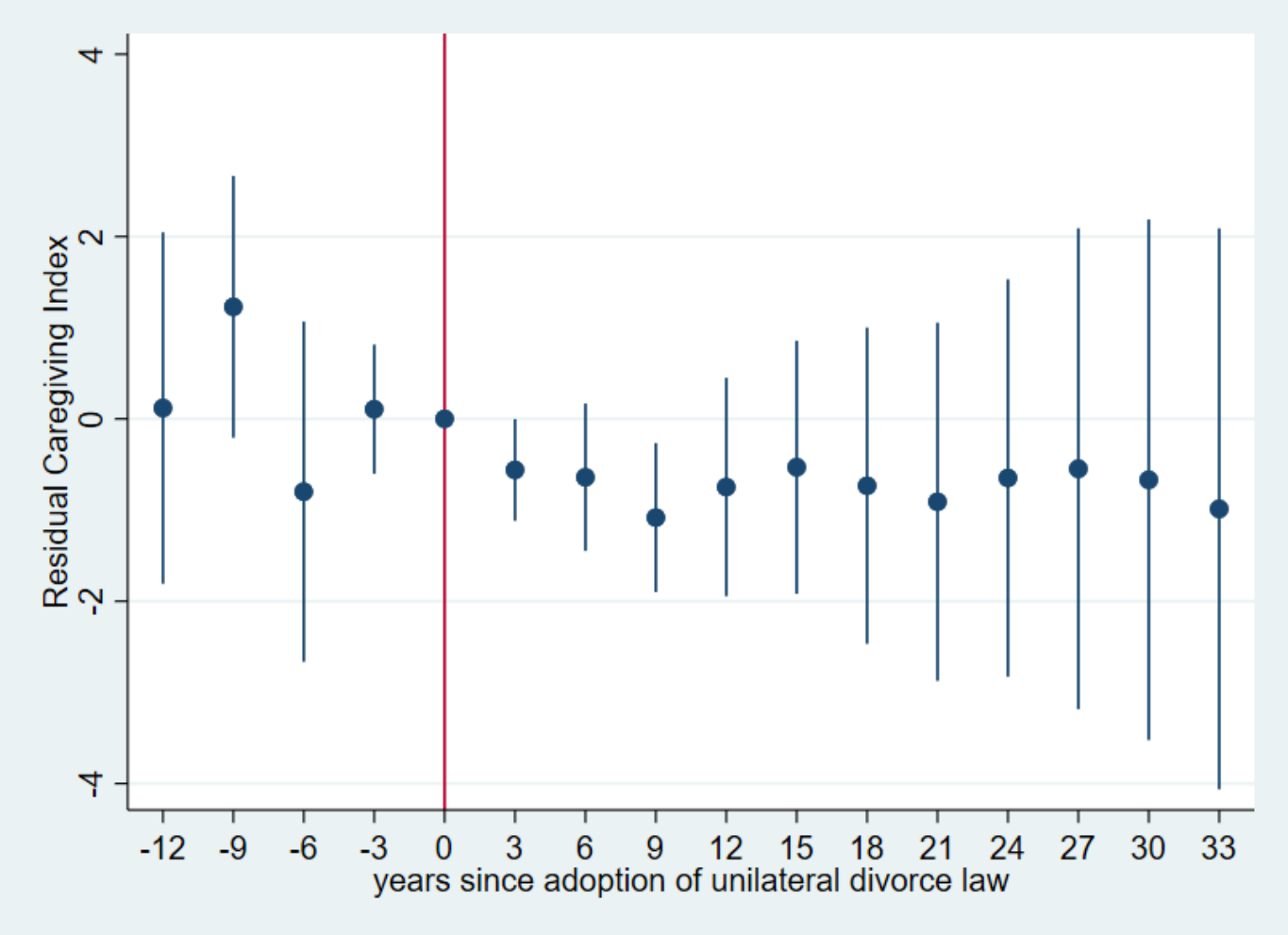

Figure: Adoption of unilateral divorce law and dynamic impacts

Prediction 2: sex ratio

- Immigration shock
  - First-gen immigration shock, second-gen immigration outcomes
- Instruments: predicted sex ratio & predicted immigration flow
  - follow Angrist(2002) and Lafortune(2013)
  - Three-steps
    - calculate historical shares in each state by country-of-birth
    - allocate new immigrants to states based on historical shares by country-of-birth
    - summing over ethnic group
  - new immigrants locate according to immigration from same country-of-birth, but marry within larger ethnic groups ethnic groups
  - advantages: ethnic-state-cohort (immigration period); not same generation; historical shares; immigration policy
- Decennial Censuses - 1891-1930 & 1951-1970
  - decennial sample & full-count
  - immigration information (place-of-birth, immigration year, parents' place of birth)

Prediction 2: sex ratio

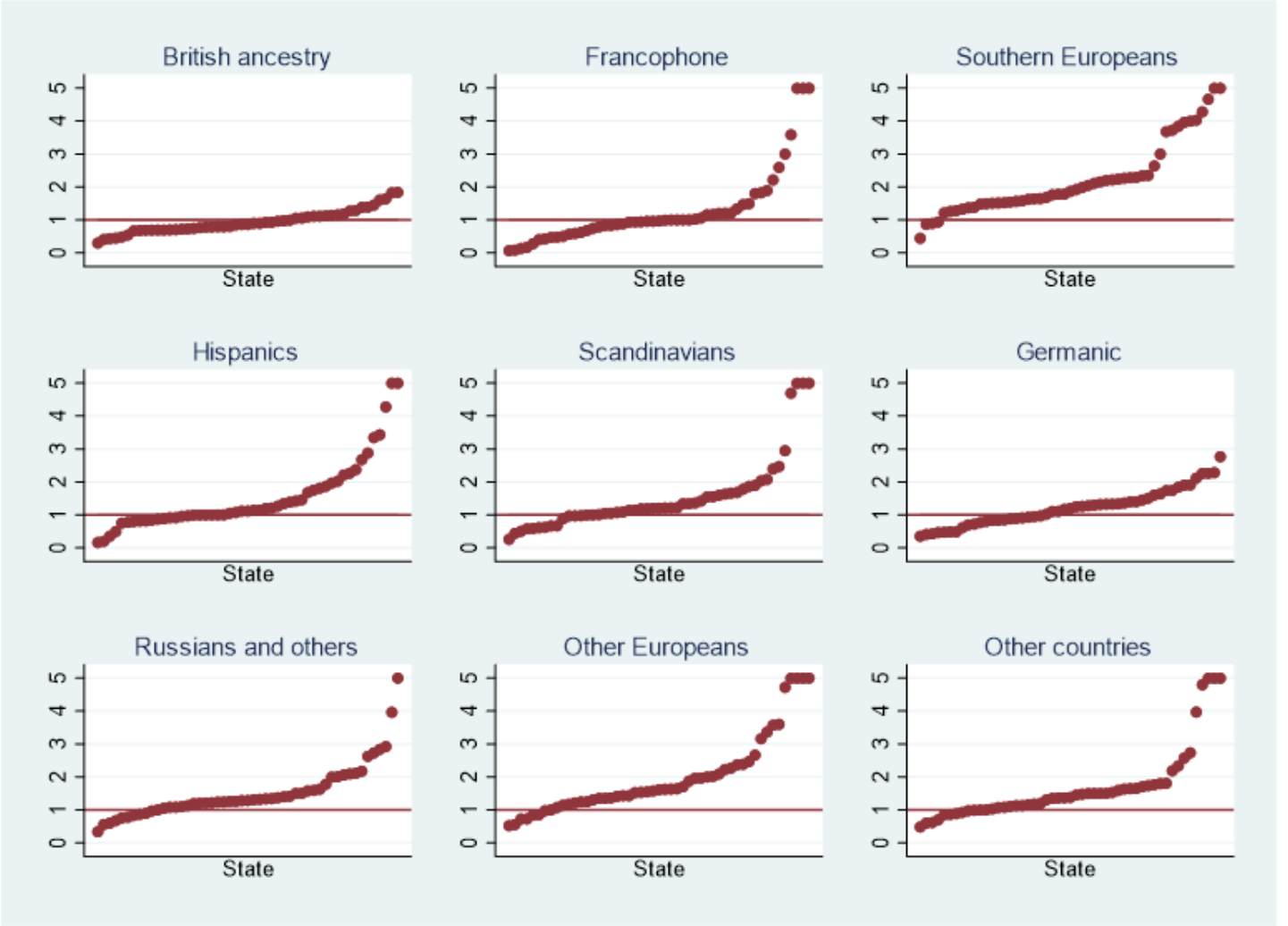

Figure: Sex ratio of new immigrant flows 1890-1930 & 1950-1970

Note: To narrow y-axis range, in scatter graph sex ratio is upper-bounded at 5 (less than 5% observations have sex ratio higher than 5)

Prediction 2: sex ratio

- Decennial Censuses, 1891-1930 & 1951-1970

$$\frac{N^m_{jst}}{N^f_{jst}} = \alpha + \gamma_1 \frac{\widehat{N^m_{jst}}}{\widehat{N^f_{jst}}} + \gamma_2 \left(\widehat{N^m_{jst}} + \widehat{N^f_{jst}} \right) + \gamma_X X_{ijst} + \delta_j + \delta_s + \delta_t + \delta_{js} + \delta_{jt} + \delta_{st} + \nu_{ijst}$$

$$C_{ijst} = \alpha + \beta \frac{N^m_{jst}}{N^f_{jst}} + \beta_X X_{ijst} + \delta_j + \delta_s + \delta_t + \delta_{js} + \delta_{jt} + \delta_{st} + \varepsilon_{ijst}$$

  - individual i, state s, immigration period t, ethnic group j
  - C_{ijst} caregiving measure
  - X_{ijst} controls variables: age dummies, whether mother foreign, whether father foreign
  - fixed effect: state, ethnic group, immigration period, double interaction

Prediction 2: sex ratio

Table 16: First-stage

	Sex-ratio	
	Flow	Stock
Predicted Sex Ratio	0.622***	0.384***
	(0.167)	(0.107)
Predicted Flow	-0.000780	-0.00116***
	(0.000519)	(0.000207)
Observations	134,066	134,066
Joint F-test	6.660	15.55

Note: Standard errors (clustered at states) in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The F-test shows the F-stat for excluded instruments. Here control variables include age dummies, whether mother is born in foreign country and whether father is born in foreign country. Fixed effects include state, immigration period, ethnic groups, and double interaction between these three variables. In column one, the sex ratio is calculated within new immigrants. In column two, the sex ratio is calculated based on the foreign stock.

All women

Prediction 2: sex ratio

Table 17: 2SLS – Young Cohort

	Index	Dummy			
	Single Female	Single Female	Married female	Single male	Married male
Stock Sex Ratio	13.38***	0.244***	0.0576	-0.0840	0.00161
	(4.621)	(0.0797)	(0.0825)	(0.131)	(0.00810)
Observations	134,066	134,066	53,481	193,253	253,167

Note: Standard errors (clustered at states) in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Here control variables include age dummies, whether mother is born in foreign country and whether father is born in foreign country. Fixed effects include state, immigration period, ethnic groups, and double interaction between these three variables.

Table 17: 2SLS – Old Cohort

	Index	Dummy			
	Single Female	Single Female	Married female	Single male	Married male
Stock Sex Ratio	8.933	0.122	-0.0304	0.00652	0.0221
	(7.811)	(0.136)	(0.175)	(0.00669)	(0.0351)
Observations	36,017	36,017	97,227	49,223	379,707

Note: Standard errors (clustered at states) in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Here control variables include age dummies, whether mother is born in foreign country and whether father is born in foreign country. Fixed effects include state, immigration period, ethnic groups, and double interaction between these three variables. Here the old cohort includes women between age 34 and 48, and men between age 36 and 50.

high-low endogamy | high-low skill | different samples | different specifications

Prediction 3: marriage rate

- National Longitudinal Survey of Youth 1979 - 1979-2018
  - track respondents who are 14-21 in 1979 (total 12686)
  - detailing information (e.g. marriage preference)

$$Y_i = \alpha + \beta C_i + \beta_E E_i + \beta_X X_i + \delta_t + \varepsilon_i$$

  - individual i, year t
  - Y_i age of first marriage
  - C_i caregiving measure – use first job ever while single
  - E_i expected age of marriage – asked in first survey within single
  - X_i control variables – averaged within all years while single
    - AFQT, age, age square, education, whether full-time job, race, BMI group, yearly overall income, hourly pay
    - fixed effect: year

Age at First Marriage

Table: Caregiving and age of first marriage (expected age of first marriage controlled)

	Women			Men		
	Index	Dummy	Quartile	Index	Dummy	Quartile
Index	-0.0288**			0.0139		
	(0.0124)			(0.0125)		
Dummy		-0.563			0.447	
		(0.435)			(0.488)	
Quartile 4			-2.059**			0.715
			(0.996)			(1.506)
Quartile 3			-0.814			0.273
			(0.816)			(0.639)
Quartile 2			-0.555			-0.181
			(0.840)			(0.549)
Year Fixed	Y	Y	Y	Y	Y	Y
Observations	3,040	3,040	3,040	3,663	3,663	3,663
R-squared	0.407	0.406	0.406	0.301	0.301	0.301

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. In column 3 and 6, the least caregiving occupations (the first quartile) is used as the reference group.

Not control expected age of marriage
Naive marriage rate

Conclusion

- Women signals her childcaring preference by opting into caregiving occupations despite of lower pay
- With higher divorce rate, fewer women sort into caregiving occupations
- With higher sex ratio, more women sort into caregiving occupations

Thank you!

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Caregiving occupations pay lower wage

- NLSY, specification
  - $Y_{it} = \alpha + \beta Caregiving_{it} + \beta_X X_{it} + \delta_i + \delta_t + \delta_{ind} + \varepsilon_{it}$
  - respondent i, year t
  - fixed effect: year, individual, industry
  - controls variables:
    - always included: education, actual working experience, marital status, number of kids, whether full-time job, and hours usually work per week
    - dropped with year and individual fixed effect: AFQT, age, age square, sex, and race of respondent
    - occupational: routine task, non-routine (math) task, and social skill intensity or cognitive, communication, and manual intensity

Caregiving occupations pay lower wage

Table 3: Hourly Pay and Occupation Caregiving Index

	ln(hourly pay)			
	England (2002)	Caregiving Index		
Caregiving	-0.0381***	-0.0038***	-0.0028***	-0.0023***
	(0.0115)	(0.0001)	(0.0001)	(0.0001)
Year Fixed	Y	Y	Y	Y
Individual Fixed	Y	N	Y	Y
Industry Fixed	Y	N	N	Y
Observations	69,952	92,407	95,454	95,454
R-squared	0.5826	0.3130	0.5394	0.5559

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

dummy subgroup dummy subgroup collapse

Occupation as valid signal

number of children

- NLSY mother and child, mother's occupation measured over relevant child ages relevant age range of each measurement
  - $Y_{it} = \alpha + \beta Caregiving_{it} + \beta_X X_{it} + \delta_t + \varepsilon_{it}$
  - child i, year t
  - fixed effect: year
  - controls variables:
    - family: net family income
    - mother: AFQT, age, age square, education, whether full time, number of years working while child measure is relevant, mother's habit (for habit questions)
    - father: education, caregiving index of his current occupation
    - child: sex, race, age, age square

Occupation as valid signal

Table 6: Mother occupation caregiving index and children outcome

Panel A: Child Health (all ages)						
	Overall health rating	Whether need treatment	Whether need medicine	Whether need equipment		
Caregiving	0.0211**	-0.000583	0.00348	-0.000184		
(dummy)	(0.00970)	(0.00258)	(0.00267)	(0.00147)		
Observations	16,822	40,491	39,979	39,232		
R-squared	0.037	0.009	0.018	0.005		
Panel B: Child Ability (Percentile)						
	Motor and social	Location memory	Behavioral problem	Picture vocabulary	verbal memory words	Verbal memory story
Caregiving	3.460***	1.435	-1.769***	0.984**	2.529***	2.754**
(dummy)	(0.727)	(1.484)	(0.338)	(0.425)	(0.946)	(1.266)
Observations	7,079	1,490	31,937	16,250	3,682	2,180
R-squared	0.050	0.036	0.081	0.338	0.094	0.047
Panel B – continued: Child Ability (Percentile)						
	Math	Cognitive stimulation	emotional support	reading recognition	reading comprehension	
Caregiving	1.293***	3.582***	2.138***	1.180***	0.897***	
(dummy)	(0.332)	(0.299)	(0.319)	(0.338)	(0.338)	
Observations	27,656	39,477	37,070	28,865	24,749	
R-squared	0.235	0.220	0.160	0.199	0.272	
Panel C: Child Habit						
	Whether smoke	Smoke frequency	Whether drink	Drink frequency	Whether marijuana	Marijuana frequency
Caregiving	-0.00308	0.0594	0.0171**	0.0197*	0.000242	0.0860*
(dummy)	(0.00669)	(0.0717)	(0.00678)	(0.0111)	(0.00350)	(0.0510)
Observations	11,912	1,153	12,903	10,421	12,084	893
R-squared	0.102	0.141	0.089	0.046	0.042	0.251

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. For Panel C, mother's habit is also controlled (e.g. whether smoke, smoking frequency, and age of first smoke).

adult outcome

Appendix

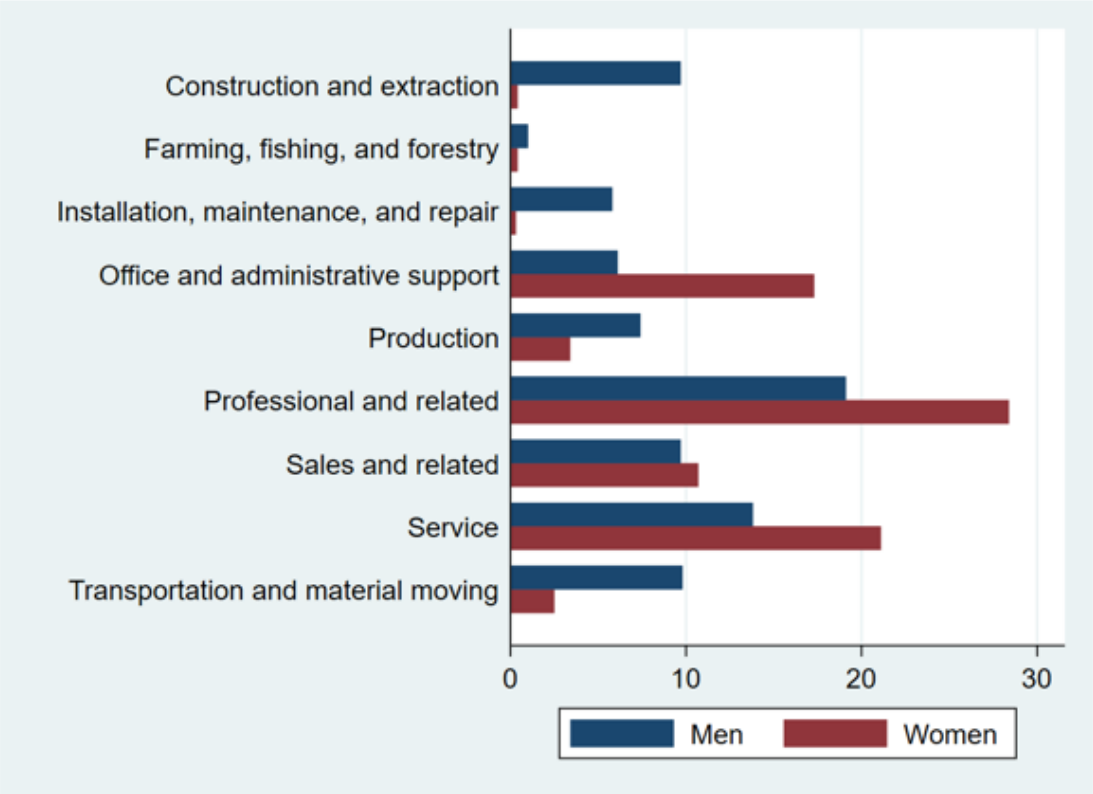

Figure: Share of workers in broad occupations, by gender

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Appendix

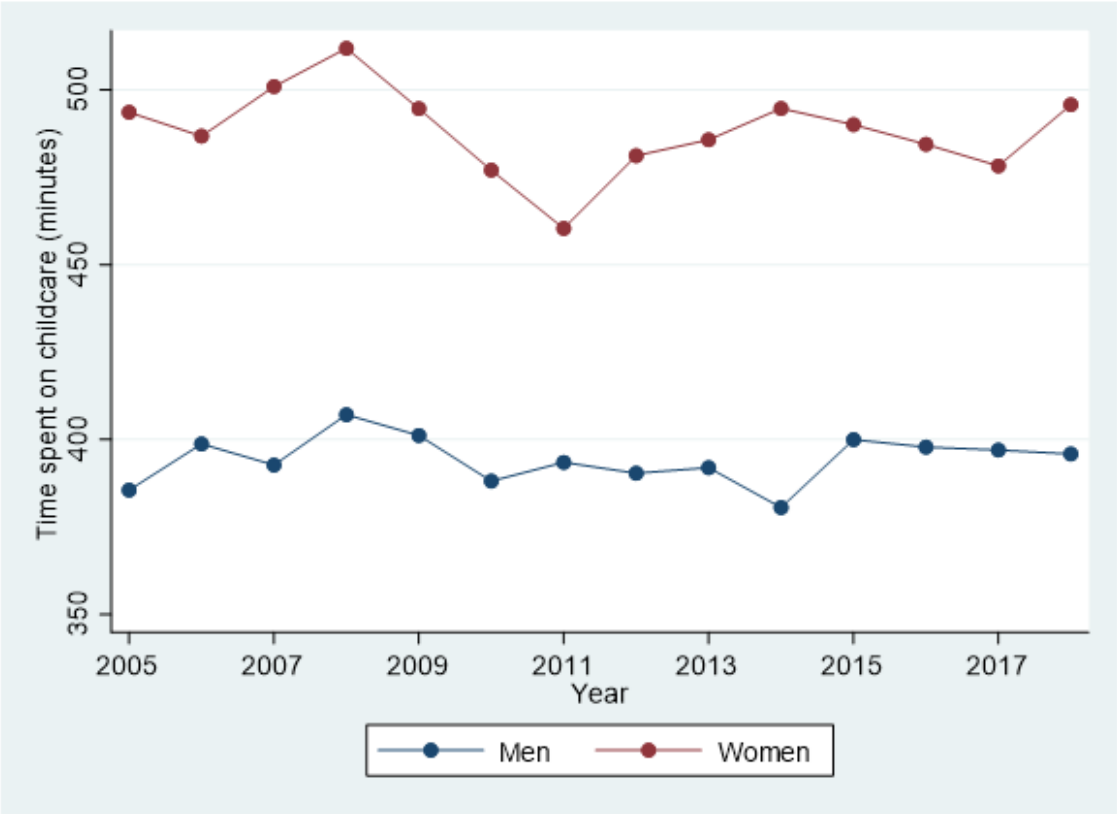

Figure: Time spent on childcare per day by gender (in minutes), 2005-2018

Note: Data from American Time-Use Survey

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Appendix

- Range of U with partial-pooling equilibrium

$$\frac{4\alpha\left(W_n - W_c + \tau\right)}{\rho\beta(2-\lambda)} < U < \frac{4\left(W_n - W_c + \tau\right)}{\alpha\rho\beta(2-\lambda)}$$

  - Intuition: U within a proper range for $0 < \theta < 1$
    - U too large, all women sort into caregiving occupation – complete pooling equilibrium
    - U too small, no type-L women sort into caregiving occupation – seperating equilibrium
- Relative size of type-T men and women in caregiving occupation

$$\rho\beta < \alpha + (1-\alpha)\theta$$

  - Intuition: there are "not enough" type-T men for all caregiving occupation women

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Appendix

Table A2: Full list of categories specified in Generalized Work Activities file[1]

Analyzing Data or Information	Judging the Qualities of Things, Services, or People
Assisting and Caring for Others	Making Decisions and Solving Problems
Coaching and Developing Others	Monitor Processes, Materials, or Surroundings
Communicating with Persons Outside Organization	Monitoring and Controlling Resources
Communicating with Supervisors, Peers, or Subordinates	Operating Vehicles, Mechanized Devices, or Equipment
Controlling Machines and Processes	Organizing, Planning, and Prioritizing Work
Coordinating the Work and Activities of Others	Performing Administrative Activities
Developing Objectives and Strategies	Performing General Physical Activities
Developing and Building Teams	Performing for or Working Directly with the Public
Documenting/Recording Information	Processing Information
Drafting, Laying Out, and Specifying Technical Devices, Parts, and Equipment	Provide Consultation and Advice to Others
Establishing and Maintaining Interpersonal Relationships	Repairing and Maintaining Electronic Equipment
Estimating the Quantifiable Characteristics of Products, Events, or Information	Repairing and Maintaining Mechanical Equipment
Evaluating Information to Determine Compliance with Standards	Resolving Conflicts and Negotiating with Others
Getting Information	Scheduling Work and Activities
Guiding, Directing, and Motivating Subordinates	Selling or Influencing Others
Handling and Moving Objects	Staffing Organizational Units
Identifying Objects, Actions, and Events	Thinking Creatively
Inspecting Equipment, Structures, or Material	Training and Teaching Others
Interacting With Computers	Updating and Using Relevant Knowledge
Interpreting the Meaning of Information for Others	

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Appendix

Table 4: Hourly Pay and Occupation Caregiving Groups

	ln(hourly pay)			
	Dummy	Quartile 2	Quartile 3	Quartile 4
Panel A: All				
Caregiving	-0.0457***	-0.0546***	-0.0829***	-0.1568***
	(0.0051)	(0.0053)	(0.0070)	(0.0095)
Observations	95,454	95,454	95,454	95,454
R-squared	0.5547	0.5558	0.5558	0.5558
Panel B: Single Women				
Caregiving	-0.0441***	-0.0460***	-0.0822***	-0.1095***
	(0.0099)	(0.0138)	(0.0159)	(0.0200)
Observations	17,764	17,764	17,764	17,764
R-squared	0.6194	0.6195	0.6195	0.6195
Panel C: Married Women				
Caregiving	-0.0739***	-0.0895***	-0.1400***	-0.2002***
	(0.0133)	(0.0161)	(0.0199)	(0.0244)
Observations	20,233	20,233	20,233	20,233
R-squared	0.5743	0.5753	0.5753	0.5753
Year Fixed	Y	Y	Y	Y
Individual Fixed	Y	Y	Y	Y
Industry Fixed	Y	Y	Y	Y

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

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	Dummy		
	All	Single women	Married women
Caregiving	-0.3476***	-0.1687***	-0.2828***
	(0.0216)	(0.0269)	(0.0310)
Observations	9,502	3,395	3,610
R-squared	0.4322	0.3789	0.4335

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Table 7: Mother occupation caregiving index and children outcome as adults

Panel A: Adult Health				
	Whether receive help	Depression percentile	Self-esteem percentile	Control percentile
Caregiving	0.00298	-0.899*	0.856*	1.226**
(dummy)	(0.00273)	(0.489)	(0.471)	(0.564)
Observations	47,650	15,337	15,582	11,337
R-squared	0.017	0.022	0.050	0.019
Panel B: Adult outcome				
	ln(yearly income)	Education (in years)		
Caregiving	0.0111	0.161***		
(dummy)	(0.0136)	(0.0115)		
Observations	31,678	153,783		
R-squared	0.552	0.244		

Panel C: Adult Habit						
	Whether smoke	Smoke frequency	Drink frequency1	Drink frequency2	Whether marijuana	Marijuana frequency
Caregiving	-0.00421	-0.0878***	0.0106	0.0485*	0.00176	0.00188
(dummy)	(0.00551)	(0.0300)	(0.0271)	(0.0253)	(0.00516)	(0.0468)
Observations	23,901	10,838	6,779	39,481	27,943	5,665
R-squared	0.084	0.232	0.080	0.137	0.071	0.255

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. For Panel C, mother's habit is also controlled (e.g. whether smoke, smoking frequency, and age of first smoke).

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Occupation as valid signal

- NLSY, among single women, first job ever
  - $Y_{ot} = \alpha + \beta Caregiving_o + \beta_X X_{ot} + \delta_t + \varepsilon_{ot}$
  - occupation o, year t - first job ever while single
  - fixed effect: year
  - controls variables averaged in each occupation-year cell:
    - AFQT, age, education, whether full-time job, race group, BMI group, yearly overall income, hourly pay
    - number of children desired

Occupation as valid signal

Table 5: Child decision and occupation choice

	Child decision				
	Index	Dummy	Quartile 2	Quartile 3	Quartile 4
Panel A:					
	Have at least one child				
Caregiving	0.000601***	0.0321***	0.0577	0.0820**	0.109***
	(0.000222)	(0.0108)	(0.0373)	(0.0356)	(0.0367)
No. of children desired	Y	Y	Y	Y	Y
Year Fixed	Y	Y	Y	Y	Y
Observations	2,923	2,923	2,923	2,923	2,923
R-squared	0.459	0.460	0.460	0.460	0.460
Panel B:					
	Number of children				
Caregiving	0.00133***	0.0567**	0.0231	0.0484***	0.0449***
	(0.000483)	(0.0228)	(0.0173)	(0.0165)	(0.0172)
No. of children desired	Y	Y	Y	Y	Y
Year Fixed	Y	Y	Y	Y	Y
Observations	2,926	2,926	2,926	2,926	2,926
R-squared	0.461	0.460	0.461	0.461	0.461

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

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Table A6: Measurement for child outcomes

measurement	explanation	Age range
Health		
Overall health rating	Mother rating of child health	0-15
Whether have health problem	Mom felt or told child needed help for mental/behavior/emotional problem	0-13
Whether need treatment	Child has condition, requires treatment by medical professional	0-13
Whether need medicine	Child has condition that requires medicine	0-13
Whether need equipment	child has condition that requires special equipment	0-13
Ability		
Motor & social percentile	motor & social development: percentile score	0-3
Location memory percentile	memory for location: percentile score	0-3
Behavioral problem percentile	behavioral problems index: total percentile score (lower is better)	4-15
Picture vocabulary percentile	Peabody picture vocabulary test (ppvt): total percentile score	4-15
Verbal memory words percentile	verbal memory for words percentile score	3-6
Verbal memory story percentile	verbal memory for story percentile score	3-6
Math percentile	Piat math percentile	6-15
Cognitive stimulation percentile	Cognitive stimulation percentile score	0-13
emotional support percentile	emotional support percentile score	0-13
reading recognition percentile	reading recognition percentile	0-13
reading comprehension percentile	reading comprehension percentile	0-13
Habit		
Whether smoke	Has child ever smoked a cigarette	0-13
Smoke frequency	How often in past 30 days smoked cigarettes	0-13
Whether drink	Has child ever drunk alcohol	0-13
Drink frequency	How often in last year gotten drunk	0-13
Whether marijuana	Has child ever used marijuana	0-13
Marijuana frequency	How often used marijuana in past 30 days on average	0-13

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Table 10: Year adopting unilateral divorce law and equitable distribution regime

State	Unilateral Divorce	Equitable Distribution		Unilateral Divorce	Equitable Distribution
Alabama	1971	1984	Montana	1973	1976
Alaska	1935	pre-1968	Nebraska	1972	1972
Arizona	1973	community	Nevada	1967	community
Arkansas		1977	New Hampshire	1971	1977
California	1970	community	New Jersey		1974
Colorado	1972	1972	New Mexico	1933	community
Connecticut	1973	1973	New York		1980
Delaware	1968	pre-1968	North Carolina		1981
District of Columbia		1977	North Dakota	1971	pre-1968
Florida	1971	1980	Ohio	1992	1981
Georgia	1973	1984	Oklahoma	1953	1975
Hawaii	1972	pre-1968	Oregon	1971	1971
Idaho	1971	community	Pennsylvania		1980
Illinois		1977	Rhode Island	1975	1981
Indiana	1973	pre-1968	South Carolina		1985
Iowa	1970	pre-1968	South Dakota	1985	pre-1968
Kansas	1969	pre-1968	Tennessee		pre-1968
Kentucky	1972	1976	Texas	1970	community
Louisiana		community	Utah	1987	pre-1968
Maine	1973	1972	Vermont		pre-1968
Maryland		1978	Virginia		1982
Massachusetts	1975	1974	Washington	1973	community
Michigan	1972	pre-1968	West Virginia	1984	1985
Minnesota	1974	pre-1968	Wisconsin	1978	community*
Mississippi		1989	Wyoming	1977	pre-1968
Missouri		1977			

Note: Information on year of introduction of unilateral divorce law and property division regime comes from Stevenson (2007) and Voena (2015). For states with empty years of policy change, it means that those states have not adopted the unilateral divorce policy until year 2000. For equitable distribution, it listed out the years that property division laws change from title-based to equitable distribution regime. "Community" means these states stick to community property regime throughout the period. One special case is Wisconsin, which switched from equitable to community property regime in 1986.

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Table 11: Unilateral divorce law and women's occupation choice within birth cohorts

	Caregiving Dummy			
	Before 1950	1950-1960	1960-1970	After 1970
Treated	-0.00867	-0.0559***	-0.0478***	-0.0133
	(0.0184)	(0.0171)	(0.0151)	(0.0133)
Property Regime	Y	Y	Y	Y
Year	Y	Y	Y	Y
State	Y	Y	Y	Y
Observations	9,229	35,447	46,049	27,701
R-squared	0.021	0.010	0.009	0.025

Note: Standard errors (clustered at states) in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Controls include age, age square, and race. Here the year fixed effect refers to the birth year of respondents.

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Table 7: Unilateral divorce law and women's occupation choice (DDD)

	Index		Dummy	
	Baseline Controls	Stevenson controls	Baseline Controls	Stevenson controls
Treated × Single	-1.313***	-0.972***	-0.0411***	-0.0346***
	(0.305)	(0.303)	(0.00987)	(0.00939)
Property Regime	Y	Y	Y	Y
Marital Status	Y	Y	Y	Y
Year	Y	Y	Y	Y
State	Y	Y	Y	Y
Marital × Year	Y	Y	Y	Y
Marital × State	Y	Y	Y	Y
Year × State	Y	Y	Y	Y
Observations	275,915	275,915	275,915	275,915
R-squared	0.016	0.104	0.016	0.070

Note: Standard errors (clustered at states) in parentheses. *** p<0.01, ** p<0.05, * p<0.1. In columns 1 and 3, only age, age square, and race are included in the control variables. In columns 2 and 4, variables that might change after the adoption of unilateral divorce law for newly married couples (as shown in Stevenson 2007) are further controlled, including years of education, whether there are any young children (under age of 13) in the household, and full-time or part-time job. Note that property division law regime and local (by state and year) labor force participation rate of women will drop out with inclusion of state-year fixed effect.

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Table 9: Unilateral divorce policy and women's occupation choice, other occupation features

	Caregiving Dummy					
	Baseline	Deming measures	Flexibility	Job Stability	Competition	Job Hazard
Treated	-0.0259**	-0.0192*	-0.0297**	-0.0215*	-0.0268**	-0.0260**
	(0.0126)	(0.00989)	(0.0126)	(0.0122)	(0.0126)	(0.0124)
Property Regime	Y	Y	Y	Y	Y	Y
Year	Y	Y	Y	Y	Y	Y
State	Y	Y	Y	Y	Y	Y
Observations	114,849	114,849	114,849	114,849	114,849	114,849
R-squared	0.015	0.444	0.080	0.067	0.022	0.016

Note: Standard errors (clustered at states) in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Controls include age, age square, and race. Column 1 is the baseline specification. Column 2 includes routine, math, and social intensity (constructed following Deming 2017). Column 3 includes work hours and time pressure. Column 4 includes job stability. Column 5 includes competition. Column 6 includes job hazard.

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Table 10: Unilateral divorce law and women's occupation choice, by traditional

	Index		Dummy	
	Traditional	Modern	Traditional	Modern
Treated	-1.235***	0.152	-0.0379***	0.00477
	(0.369)	(0.625)	(0.00789)	(0.0111)
Property Regime	Y	Y	Y	Y
Year	Y	Y	Y	Y
State	Y	Y	Y	Y
Observations	54,470	62,979	54,470	62,979
R-squared	0.017	0.009	0.023	0.013

Note: Standard errors (clustered at states) in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Controls include age, age square, and race. In columns 1 and 2, the dependent variable is caregiving index. In columns 3 and 4, the dependent variable is caregiving dummy. Columns 1 and column 3 only include the traditional states. Columns 2 and column 4 only include the modern states.

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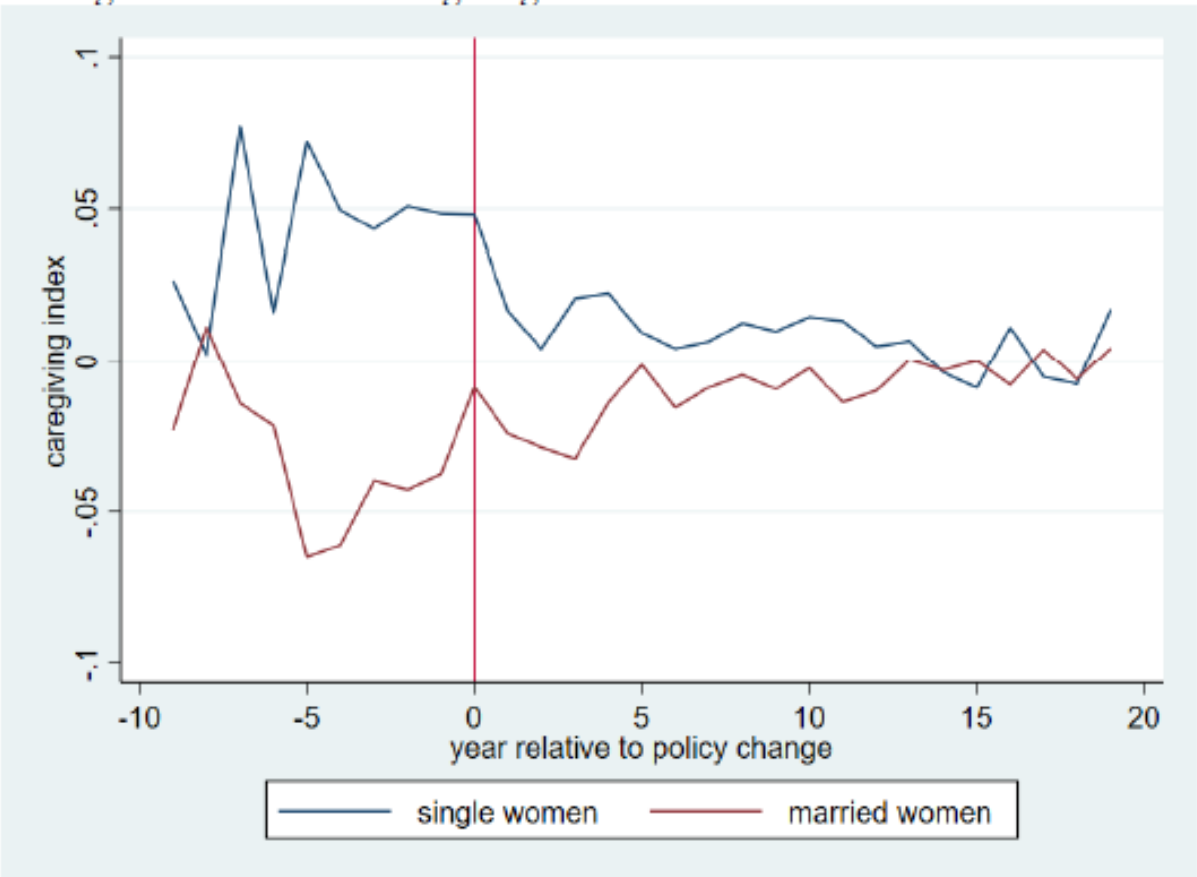
Figure C2: Residual caregiving index relative to unilateral divorce law



Note: Controls include age, age square, and race. Time is measured relative to the adoption of unilateral divorce law and one year before the adoption of unilateral divorce law is set as year zero.

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Table A8: Occupation and unilateral divorce policy (DDD) across age groups

	Dummy	
	Younger	Older
Treated × Single	-0.0187**	-0.0109
	(0.00798)	(0.0138)
Marital Status	Y	Y
Year	Y	Y
State	Y	Y
Marital × Year	Y	Y
Marital × State	Y	Y
Year × State	Y	Y
Industry	Y	Y
Industry × Year	Y	Y
Observations	252,506	220,106
R-squared	0.286	0.305

Note: Standard errors (clustered at states) in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Controls include age, age square, race, years of education, wage from income and salary, yearly personal income, full or part time job as well as local labor market controls (vary by state and year), including gender-specific labor force participation rate and unemployment rate. Younger cohort includes women under age of 35, and older cohort includes women over 35.

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Table A8: Unilateral divorce policy and working as teacher or nurse for women (DDD)

	Dummy	
	Working Women	All Women
Treated × Single	-0.00869**	-0.00324***
	(0.00330)	(0.00108)
Marital Status	Y	Y
Year	Y	Y
State	Y	Y
Marital × Year	Y	Y
Marital × State	Y	Y
Year × State	Y	Y
Industry	Y	Y
Industry × Year	Y	Y
Observations	579,384	1,522,807
R-squared	0.349	0.372

Note: Standard errors (clustered at states) in parentheses. *** p<0.01, ** p<0.05, * p<0.1. In both columns, the full set of controls are included, namely age, age square, race, years of education, wage from income and salary, yearly personal income, full or part time job as well as local labor market controls (vary by state and year), including gender-specific labor force participation rate and unemployment rate. In column 1, only currently employed women are included. In column 2, women who are unemployed and not in labor force all also included.

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Table A10: Ethnic group composition

	Ethnic Group	Countries-of-birth
1	British ancestry	Australia, New Zealand, English Canada, England, Scotland, Wales, Northern Ireland, United Kingdom (n.e.c.)
2	Francophone	Belgium, Austria, European Canada, France
3	Southern Europeans	Italy, Portugal, Spain
4	Hispanics	Central America, Cuba, South America, West Indies, Mexico
5	Scandinavians	Denmark, Iceland, Finland, Norway, Sweden
6	Germanic	Austria, Germany, Switzerland, Luxembourg, Netherlands
7	Russians and others	Poland, Romania, Russian Empire
8	Other Europeans	Hungary, Czechoslovakia, Greece, Europe (n.e.c.)
9	Other countries	China, India, Japan, Korea (North and South), Iran, Maldives, Nepal, Middle East/Asia Minor, Israel/Palestine, Syria, Turkey, Africa, Atlantic Islands, Pacific Islands All other immigrants (n.e.c.)

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Table: Caregiving and age of first marriage

	Women			Men		
	Index	Dummy	Quartile	Index	Dummy	Quartile
Index	-0.0320**			0.0154		
	(0.0125)			(0.0125)		
Dummy		-0.619			0.458	
		(0.436)			(0.489)	
Quartile 4			-2.246**			0.721
			(1.003)			(1.479)
Quartile 3			-0.939			0.404
			(0.821)			(0.641)
Quartile 2			-0.653			-0.107
			(0.848)			(0.548)
Year Fixed	Y	Y	Y	Y	Y	Y
Observations	3,055	3,055	3,055	3,699	3,699	3,699
R-squared	0.397	0.397	0.397	0.296	0.296	0.296

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. In column 3 and 6, the least caregiving occupations (the first quartile) is used as the reference group.

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Table 16: First-stage – all young women (single and married)

	Sex-ratio	
	Flow	Stock
Predicted Sex Ratio	0.568***	0.377***
	(0.148)	(0.108)
Predicted Flow	-0.000666	-0.00121***
	(0.000552)	(0.000219)
Observations	185,451	185,451
Joint F-test	6.860	14.82

Note: Standard errors (clustered at states) in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The F-test shows the F-stat for excluded instruments. Here control variables include age dummies, whether mother is born in foreign country and whether father is born in foreign country. Fixed effects include state, immigration period, ethnic groups, and double interaction between these three variables. In column one, the sex ratio is calculated within new immigrants. In column two, the sex ratio is calculated based on the foreign stock.

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Robust

Table 18: Different samples

	High Endogamy	Low Endogamy
Stock Sex Ratio	0.296**	0.141*
	(0.125)	(0.0775)
Observations	51,605	82,441

Note: Standard errors (clustered at states) in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Here control variables include age dummies, whether mother is born in foreign country and whether father is born in foreign country. Fixed effects include state, immigration period, ethnic groups, and double interaction between these three variables.

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Robust

Table 18: Different samples

	High Skill	Low Skill
Stock Sex Ratio	0.370***	0.218**
	(0.125)	(0.100)
Observations	97,027	78,594

Note: Standard errors (clustered at states) in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Here control variables include age dummies, whether mother is born in foreign country and whether father is born in foreign country. Fixed effects include state, immigration period, ethnic groups, and double interaction between these three variables.

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Prediction: marriage rate

Table 8: Marriage rate and caregiving level across occupations

	Women			Men		
	Index	Dummy	Quartile	Index	Dummy	Quartile
Index	0.000578***			-3.67e-05		
	(0.000219)			(0.000154)		
Dummy		0.0228**			0.0137	
		(0.0115)			(0.0145)	
Quartile 4			0.0400**			-0.00882
			(0.0162)			(0.0236)
Quartile 3			0.0132			-0.00837
			(0.0161)			(0.0185)
Quartile 2			0.000155			-0.0382**
			(0.0173)			(0.0160)
Year Fixed	Y	Y	Y	Y	Y	Y
Observations	5,383	5,383	5,383	6,814	6,814	6,814
R-squared	0.357	0.357	0.358	0.402	0.403	0.405

Note: Standard errors (clustered at occupation) in parentheses. *** p<0.01, ** p<0.05, * p<0.1. In column 3 and 6, the least caregiving occupations (the first quartile) is used as the reference group.

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Table 14: Occupation and unilateral divorce policy (DDD)

	Index		Dummy	
	Part controls	All controls	Part controls	All controls
Treated × Single	-0.825**	-0.630*	-0.0188***	-0.0151**
	(0.385)	(0.365)	(0.00657)	(0.00632)
Marital Status	Y	Y	Y	Y
Year	Y	Y	Y	Y
State	Y	Y	Y	Y
Marital × Year	Y	Y	Y	Y
Marital × State	Y	Y	Y	Y
Year × State	Y	Y	Y	Y
Industry	Y	Y	Y	Y
Industry × Year	Y	Y	Y	Y
Observations	473,299	473,299	473,299	473,299
R-squared	0.350	0.392	0.241	0.272

Note: Standard errors (clustered at states) in parentheses. *** p<0.01, ** p<0.05, * p<0.1. In column 1 and 3, only age, age square, and race are included in the control variables. In column 2 and 4, I further control years of education, wage from income and salary, yearly personal income, and full or part time job. Note that property division law regime and local labor market controls (vary by state and year, including gender-specific labor force participation rate and unemployment rate) drop out with inclusion of state-year fixed effect.

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Prediction: sex ratio

Table 18: Different samples

	Baseline	Drop 1960	All years	Cells	Full-count	Rolling
Stock Sex Ratio	0.244***	0.233***	0.235*	0.210*	0.195***	0.223***
	(0.0797)	(0.0831)	(0.131)	(0.124)	(0.0724)	(0.0760)
Observations	134,066	116,604	138,960	1,871	134,396	134,066

Note: Standard errors (clustered at states) in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Here control variables include age dummies, whether mother is born in foreign country and whether father is born in foreign country. Fixed effects include state, immigration period, ethnic groups, and double interaction between these three variables.

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Prediction: sex ratio

Table 19: Robustness check

	Two endo	LIML	Reduced	OLS
Stock Sex Ratio	0.267**	0.244***		0.0680***
	(0.103)	(0.0797)		(0.0253)
Stock Number	0.000221			
	(0.000425)			
Predicted Sex Ratio			0.0931***	
			(0.0241)	
Predicted Flow			-0.000233	
			(0.000148)	
Observations	134,066	134,066	134,066	134,066

Note: Standard errors (clustered at states) in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Here control variables include age dummies, whether mother is born in foreign country and whether father is born in foreign country. Fixed effects include state, immigration period, ethnic groups, and double interaction between these three variables.

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