Gender ideology and breadwinning patterns among couples: a focus on the Japanese society

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Outline

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▶ Japan web-survey data from Social Stratification and Social Psychology Project

▶ Item Response Theory Model (Nakai and Pennoni, 2020)

▶ Results

▶ Japanese cross-sectional data of the Social Stratification and Social Mobility (SSM) surveys on breadwinning patterns from 1995 to 2015 (40 years)

▶ Latent class model with socio-demographic characteristics (Pennoni and Nakai, 2019)

▶ Results

Introduction

▶ Japan ranked 121st among 153 countries in the gender gap rankings in 2019, Italy placed 76th (World Economic Forum)

▶ Japan has low female representation in the cabinet, only 15% of senior and leadership position are held by women in the business field

▶ In the areas of education and health the gender gap has been mostly eliminated

▶ We refer to a questionnaire made for a web-survey whose data are used to examine how people are classified in terms of people's subjective traits

▶ Recently the growing inequality in the society, increases the interpersonal tensions and strains

Survey design

▶ Web-based survey administered in December 2018 by a specialized company in Japan

▶ Sample size of 2,898 individuals (1,476 men and 1,422 women) aged between 20 and 64

▶ Survey requests were sent by email inviting individuals to participate according to certain demographic quotas such as: gender, prefectural census population and age distribution

▶ All items are of multiple choice type, with six categories on the following scale:
  • 1 satisfied/agree;
  • 2 somewhat satisfied/agree;
  • 3 neither satisfied nor dissatisfied/agree nor disagree;
  • 4 somewhat dissatisfied/disagree,
  • 5 dissatisfied/disagree,
  • 6 don't know

Social Stratification and Social Psychology Survey

▶ Responses to 54 different questions are available. The questions can be grouped in 13 dimensions: to detect some recent sociological aspects of the Japanese society such as eudaimonia (sense of meaning of life), social attitudes and ideology patterns (McConahay, 1986)

▶ We propose a statistical model able to account a multidimensional structure of fourteen different life domains: satisfaction, patriotism, social exclusion, anxiety, fatalism, relationships, system justification, social dominance, opinion on inequality, authoritarianism, gender ideology, political opinion and religious attitudes

Application: Multidimensional structure

▶ Set of items (54) according to the following 13 dimensions

Dimension	Item								
1 dissatisfaction	1	2	3	4					
2 racism	5	6	7	8	9				
3 social exclusion	10	11	12	13	14	15			
4 anxiety	16	17	18						
5 fatalism	19	20	21	22	23	24	25		
6 poor relationships	26	27							
7 system justification	28	29	30	31					
8 social dominance	32	33	34	35	36	37	38	39	40
9 inequalities	41	42	43						
10 authoritarianism	44	45	46	47	48	49			
11 gender ideology	50	51							
12 political opinion	52	53							
13 religious	54								

Authoritarianism and Gender ideology

▶ Among 54 questions the following are those related to authoritarianism (6 items) and gender ideology (2 items)

Authoritarian traditionalism

44	One should always respect your elders⋆
45	Children should obey to their parents' intension⋆
46	One should always show respect to those in authority⋆
47	It generally works out best to keep on doing things the way they have have been done before⋆
48	People who question the old and accepted ways of doing things usually just end up causing trouble⋆
49	In this complecated world, the only way to know what to do is to rely on leaders andexperts⋆

Gender ideology

50	Men should work outside the home and women should maintain the home⋆
51	Husbands should do household chores and chidcare

Social Stratification and Social Psychology Survey

▶ Through the survey the following covariates are also available:
- Employment status
- Marital status
- Education
- Housing
- Age
- Income
- Japanese geographical regions: Hokkaido, Tohoku, Kanto, Chubu, Kansai, Chugoku, Shikoku, Kyushu

Method of analyses

♦ We denote by Y_{ij} the univariate response variable for individual i to item j, $i = 1, \ldots, n$, $j = 1, \ldots, J$ having l_j categories denoted by $0, \ldots, l_j - 1$

♦ In the multidimensional item questionnaire there are D traits measured for each subject and we assume a vector of latent variables Θ_i of dimension D for the of latent traits (personal characteristics)

▶ Each set of items contributes to measure a distinct trait

Item Response Theory model

▶ Item Response Theory is a psychometric approach to evaluate the attributes of measurement instruments and to provide estimates of suitable model parameters (Rasch, 1960)

▶ A model named one parameter graded response model has been proposed by Samejima (1969, 1996) to account for ordered responses

▶ An extended version of this model named multidimensional latent class graded item response theory model has been proposed by Bartolucci *et al.* (2016)

▶ We employ this model in order to disentangle the effects of socio-demographics characteristics on the probability to have certain latent traits

Model estimation

▶ We parameterize the probabilities that define the weights of each latent class to include the effects of the covariates

◆ The log-likelihood function is maximized through the Expectation-Maximization algorithm alternating two steps

◆ The choice of the number of latent classes k is made on the basis of the information criteria: Akaike Information Criteria (Akaike, 1973) and Bayesian Information Criteria (Schwarz, 1976)

◆ We choose the suitable number of subpopulations for which we observe the maximum relative decrease of the index

Application: Results

▶ The best model among those estimated with a number of latent classes ranging from 1 to 13 has $k = 3$ latent classes

▶ The estimated class weights are the following : $\hat{\pi}_1 = 0.34$, $\hat{\pi}_2 = 0.47$, $\hat{\pi}_3 = 0.19$

▶ The estimated trait's levels for each dimension are depicted in the following figure
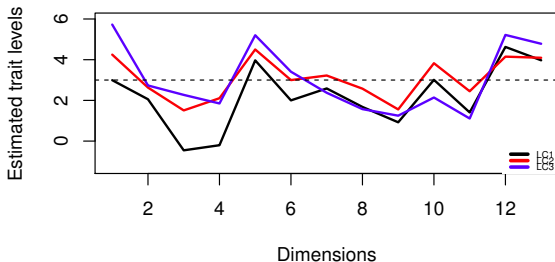
Application: results

▶ Response categories above the third (neither agree nor disagree) are detected for the following dimensions: 1 dissatisfaction, 5 fatalism, 12 political opinion, and 13 religion

▶ Some research on cross-cultural differences in response style reported that, compared to North Americans and European people, East-Asian, especially Japanese, exhibit more ambivalent and moderate responding
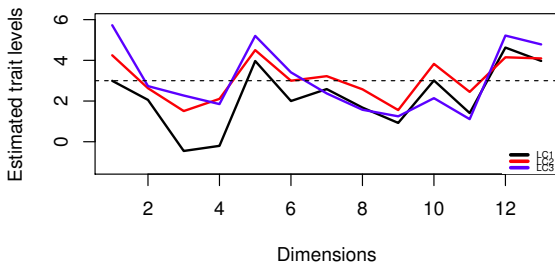
Application: Estimated trait's levels

▶ People in latent class 2 (LC2) show more moderate responses

▶ People in LC2 show low values for dimension 11 gender ideology

▶ People in LC3 show highest values for dissatisfaction, fatalism and politics
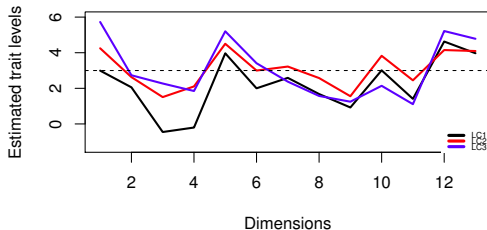
Application: results

▶ Individuals grouped in LC1 are relatively satisfied with their life, own education and the area they live

▶ They reject various modes of intergroup inequality, show some disagreement with authoritarianism and traditionalism as well as gendered division of labour

▶ LC2 groups respondents that are moderately satisfied with own life but relatively dissatisfied with Japanese society, and they agree to some extent with traditionalism

Application: results

▶ Almost half of Japanese are allocated in LC2 having the highest conditional probability for response category 2 (neither agree nor disagree)

▶ LC3 shows the pattern of responses of those being relatively dissatisfied with own life as well as with Japanese society

▶ Individual in LC3 are pessimistic and fatalistic. However, at the same time, they show the most tolerant and open-minded attitudes, they are tolerant toward the ethnic minorities, and take a liberal gender role attitudes to advance gender equality

Application: posterior probabilities

- A straight interpretation of the effects of covariates is possible by considering the estimated posterior probabilities

- Males, self employed, married and higher educated individuals living alone especially in Tohoku region have the highest probability to be classified in LC1

Covariates	Latent class 1	Latent class 2	Latent class 3
Male	0.39	0.42	0.19
Female	0.32	0.53	0.15
Occupation 1	0.34	0.54	0.12
Occupation 2	0.36	0.43	0.20
Occupation 3	0.44	0.38	0.18
Occupation 4	0.35	0.43	0.22
Marital status 1	0.42	0.46	0.12
Marital status 2	0.24	0.52	0.24
Marital status 3	0.38	0.41	0.21
Education 1	0.26	0.45	0.29
Education 2	0.30	0.49	0.20
Education 3	0.40	0.46	0.14
Housing 1	0.39	0.46	0.15
Housing 2	0.30	0.49	0.21
Housing 3	0.27	0.56	0.18

Application: posterior probabilities

Covariates	Latent class 1	Latent class 2	Latent class 3
Age 1	0.29	0.49	0.22
Age 2	0.26	0.56	0.18
Age 3	0.28	0.53	0.19
Age 4	0.33	0.52	0.15
Age 5	0.32	0.48	0.19
Age 6	0.41	0.43	0.16
Age 7	0.44	0.39	0.17
Age 8	0.58	0.34	0.08
Income 1	0.32	0.44	0.24
Income 2	0.37	0.44	0.19
Income 3	0.31	0.54	0.15
Income 4	0.44	0.47	0.08
Income 5	0.29	0.51	0.19
Family members 1	0.27	0.51	0.22
Family members 2	0.43	0.41	0.16
Family members 3	0.35	0.49	0.16
Family members 4	0.34	0.51	0.15
Family members 5	0.36	0.46	0.18
Hokkaido	0.44	0.41	0.16
Tohoku	0.30	0.50	0.21
Kanto	0.35	0.48	0.18
Chubu	0.36	0.47	0.17
Kansai	0.38	0.49	0.13
Chugoku	0.37	0.43	0.19
Shikoku	0.39	0.44	0.17
Kyushu	0.34	0.48	0.18

Application: Posterior probabilities

▶ Self-employed, married with at least two family members, highly educated, with a relative high income are mainly allocated in LC1

▶ They tend to bolster and justify aspects of the societal status quo, therefore they express more satisfaction with the status quo

▶ Single individuals, unemployed, never married and with just one member in the family, with a basic level of education and a very low income are mainly allocated in LC3

▶ People living in Tohoku block (the northernmost region of Japan's main island) show the highest probability of being allocated in LC3

Breadwinning patterns

A latent class analysis towards stability and changes in breadwinning patterns among coupled households

Introduction

▶ We examine:

  ◇ changes in the past four decades of the Japanese couples ' breadwinning patterns

  ◇ how latent trait representing spousal breadwinning types is associated with socio-economic statuses and demographic characteristics

▶ We use survey data collected in Japan covering 40 years

▶ We account for the inclusion probabilities of sampling units in the likelihood function employed to estimate the model's parameters

▶ We account for missing responses under the missing at random assumption in order to make predictions at individual level

Data

▶ Four waves of cross-sectional data

⋄ Social Stratification and Social Mobility (SSM): 1985, 1995, and 2005

⋄ Stratification and Social Psychology (SSP) 2015

⋄ National representative respondents: Men and Women

⋄ Aged 20-69 (1985, 1995, 2005 SSM), 20-64 (2015 SSP)

⋄ Response rates: 67.9% (1985), 66.0% (1995), 44.1% (2005), and 43.0% (2015)

Breadwinning patterns

▶ The increasing rate of labor force participation of women does not necessarily mean that economic inequality within couples is changed

▶ Instead, dual-earner households does not liberate women from their traditional gender role, especially in the strong male breadwinner society like that in Japan

Breadwinning patterns

▶ The couple's income provision-role type is defined according to the following categories:

  ◇ 1 husband sole provider

  ◇ 2 husband provides majority (husband's income: 60%)

  ◇ 3 equal providers (wife's income: 40%-60%)

  ◇ 4 wife provides majority (wife's income: 60%)

  ◇ 5 wife sole provider

Data: observed frequencies

▶ Observed and missing frequencies of the response (weighted with
  survey weights for years 2015 and 2005): (1) "husband sole provider",
  (2) "husband provides majority", (3) "equal providers", (4) "wife provides
  majority", (5) "wife sole provider"

◇ We observe some changes of breadwinning patterns among married
  couples over the past four decades: The proportion of the
  households with husbands as sole provider has declined from 42.9%
  in 1985 to 22.9% in 2015.

Income provision-role categories (%)						
Years	**1**	**2**	**3**	**4**	**5**	*Missing*
2015	22.9	42.2	11.8	5.3	0.6	17.2
2005	33.6	28.1	6.9	1.6	1.0	28.7
1995	38.2	37.8	6.2	1.2	0.7	16.0
1985	42.9	36.7	6.7	1.2	0.1	12.4

Socio-economic features

▶ Wife's education:
  ◇ Less than high school, high school, 2-year college, 4-year college or more

▶ Wife's age (quantiles)

▶ Husband's age (quantiles)

▶ Number of children:
  ◇ none, one, two, three or more

▶ Husband income level (quantiles)

▶ Couples' relative education:
  ◇ homogamy: husband and wife have equal education
  ◇ hypergamy: husband's educational level is higher than wife
  ◇ hypogamy: wife's educational level is higher than husband

▶ Size of the place of living: very large, large, medium, small, rural

Latent class model

▶ Let Y_{ij} be the observed derived variable for individual $i, i = 1, \ldots, n$ on the $j, j = 1, \ldots, r$ ordered category

▶ We assume an underlying unobserved variable denoted as U_i for individual $i, i = 1, \ldots, n$

▶ The model is a semi-parametric model since the latent variable has a discrete distribution left unspecified with k finite discrete support points (a semi-parametric finite mixture model results)

▶ A first set of parameters is given by conditional probability of each response category given the latent variable

$$\phi_{j|u} = p(Y_j = y | U = u), \quad u = 1, \ldots, k, \, j = 1, \ldots, r.$$

Latent Class model parameters

▶ Let $\boldsymbol{X}$ be the vector of time-specific individual covariates

▶ A baseline category logit model is specified

$$\log \frac{p(U = u | \boldsymbol{X} = \boldsymbol{x})}{p(U = 1 | \boldsymbol{X} = \boldsymbol{x})} = \log \frac{\pi_{u|\boldsymbol{x}}}{\pi_{1|\boldsymbol{x}}} = \beta_{0u} + \boldsymbol{x}' \boldsymbol{\beta}_{1u}, \quad u = 2, \ldots, k,$$

- where β_0 is an intercept specific of each latent class

- $\boldsymbol{\beta}_{1u}$ is the vector of parameters defining the influence of the covariates on the distribution of the latent variable.

- The log-likelihood is maximized through the **Expectation-Maximization** algorithm (Dempster *et al.* 1977)

Some Results

▶ The Akaike information criterion (Akaike, 1973) favours the model with 2 latent classes. This is confirmed for each wave 2015, 2005, 1996, 1985

▶ The estimated **breadwinners segmentation** defines a group of traditional couples (U_T) and the group of New couples (U_N)

▶ They persist across the four waves covering the past 40 years

	Income provision-role categories	1	2	3	4	5
	Latent classes					
2015	U_T	1.000	0.000	0.000	0.000	0.000
	U_N	0.179	0.578	0.161	0.074	0.008
2005	U_T	1.000	0.000	0.000	0.000	0.000
	U_N	0.214	0.586	0.145	0.033	0.022
1995	U_T	1.000	0.000	0.000	0.000	0.000
	U_N	0.312	0.568	0.093	0.018	0.010
1985	U_T	1.000	0.000	0.000	0.000	0.000
	U_N	0.359	0.526	0.096	0.018	0.002

Results: covariates

▶ Some estimated effects of the socio-demographic features (for each wave, $\hat{\boldsymbol{\beta}}$) are the following

		1985	1995	2005	2015
	$\hat{\beta}_0$	1.129^{**}	2.506^{**}	1.377^{*}	3.777^{**}
Husband age	1	-0.081	-0.180	0.106	0.349
	3	0.147	-0.324	0.846^{**}	0.613
	4	1.324^{**}	-0.373	0.441	0.776
	5	1.234^{**}	-0.668	0.434	-0.599
	6	1.223^{**}	1.018	-0.314	-0.331
	7	1.730^{**}	-2.512^{**}	-0.630	0.599
	8	0.612	-2.571^{**}	-0.480	-1.299
	9	0.030	-3.784^{**}	-0.305	-1.412
	10	-0.124	$-4.280^{\dagger}$	0.167	0.428
Wife age	1	$-0.709^{\dagger}$	-0.462	-0.451	-1.039^{**}
	3	0.414	0.452	-0.272	-0.437
	4	0.238	0.729	0.334	-0.877
	5	0.413	2.723	0.133	-0.498
	6	0.198	2.738^{**}	0.221	0.271
	7	-0.508	2.945^{**}	-0.176	-0.411
	8	-0.338	2.133^{**}	-0.819	1.284
	9	-0.920^{**}	1.998^{**}	-1.077	-1.045
	10	-0.995^{**}	1.841^{**}	-1.473^{*}	-1.425
Wife education	1	0.550^{**}	0.309	0.034	-1.085^{**}
	3	-0.399	-0.011	-0.131	0.115
	4	-0.407	0.515	0.050^{*}	0.471

Significance at 10%(†), 5%(*), 1%(**). One category is taken as baseline

Results: covariates

▶ We show the percentages of predicted couples in U_T

		1985	1995	2005	2015
	$\hat{\beta}_0$	1.129^{**}	2.506^{**}	1.377^{*}	3.777^{**}
Relative education	1	-0.459^{**}	-0.476^{**}	-0.609^{**}	0.328
	2	$0.785^{\dagger}$	1.051^{**}	0.323	0.887^{*}
Preschool children	1	-	-2.114^{**}	-0.970^{**}	-2.485^{**}
Number of children	1	0.639	-0.621	0.133	-0.464
	2	-0.216	-0.559^{**}	-0.331^{**}	-0.479^{*}
	4	0.444	0.707^{**}	0.149	0.149
Size of the place of living	1	-	-	0.048	-0.164
	3	-	-	0.129	-0.379
	4	-	-	0.223	0.236
	5	-	-	0.438^{*}	0.853
Husband income	1	-0.019	0.256	0.380	0.772
	2	0.877	0.300	0.110	0.952
	4	0.291	-0.253	0.184	0.333
	5	0.255	-0.061	0.131	0.072
	6	-0.241	-0.673^{**}	0.061	-0.547
	7	0.030	-0.434^{**}	-0.272	-0.427
	8	-0.684^{*}	-1.038	-0.657^{**}	-1.479^{**}
	9	-0.810^{*}	-0.078	-0.671^{**}	-1.221^{**}
	10	-0.975^{**}	-0.538	-0.632^{**}	-1.265^{**}
Couples predicted in U_T		31.0%	22.2%	21.5%	11.21%

Significance at 10%(†), 5%(*), 1%(**). The missing category is taken as baseline.

Covariates

	Categories						
Covariates	1	2	3	4	5	6	7
Preschool children	1						
Relative education	1	2					
Wife education	1	2	3	4			
Size of the place	1	2	3	4	5		
Number of children	0	1	2	$\geq$ 3			
2015							
Husband age	$\leq$ 34	(34, 39]	(39, 43]	(43, 46]	(46, 50]	(50, 54]	(54, 58]
Wife age	$\leq$ 32	(32, 37]	(37, 40]	(40, 44]	(44, 47]	(47, 51]	(51, 55]
Husband income	$\leq$ 175	(175, 275]	(275, 325]	(325, 375]	(375, 425]	(425, 500]	(500, 600]
2005							
Husband age	$\leq$ 34	(34, 40]	(40, 45]	(45, 50]	(50, 54]	(54, 57]	(57, 61]
Wife age	$\leq$ 32	(32, 37]	(37, 42]	(42, 47]	(47, 51]	(51, 55]	(55, 58]
Husband income	$\leq$ 175	(175, 225]	(225, 275]	(275, 375]	(375, 425]	(425, 500]	(500, 600]
1995							
Husband age	$\leq$ 33	(33, 38]	(38, 42]	(42, 45]	(45, 48]	(48, 52]	(52, 56]
Wife age	$\leq$ 31	(31, 35]	(35, 40]	(40, 43]	(43, 46]	(46, 49]	(49, 53]
Husband income	$\leq$ 150	(150, 250]	(250, 350]	(350, 400]	(400, 500]	(500, 600]	(600, 700]
1985							
Husband age	$\leq$ 32	(32, 36]	(36, 39]	(39, 42]	(42, 46]	(46, 49]	(49, 53]
Wife age	$\leq$ 29	(29, 33]	(33, 36]	(36, 39]	(39, 44]	(44, 48]	(48, 51]
Husband income	$\leq$ 130	(130, 190]	(190, 250]	(250, 310]	(310, 350]	(350, 430]	(430, 480]

The presence of a preschooler is coded as a binary variable with respect to children's age 0-6. Couples' relative education is measured by two categories: 1 husband has higher education than wife, 2 wife has higher education than husband. Wife's education: 1 less than high school, 2 high school, 3 two-years college degree, 4 four-year college degree or higher. Size of the place of living: 1 major cities; 2 > 200,000; 3 (100,000, 200,000]; 4 $\leq$ 100,000; 5 small towns and villages. Husband's income is measured in ten thousand yen a year.

Results: covariates

▶ Having preschool children shows negative signs, indicating respondents with babies tend to belong to Traditional Couples

▶ Having young children has been constantly related to the greater likelihood that the respondents are in couples where husband is the sole provider

▶ It is partly because of gender stereotype on wife's employment and on family roles in Japan

▶ Childcare has become an important policy issue in Japan as well as in many countries, but still there is a large number of children on waiting lists for childcare centers.

Results: covariates

▶ Women's higher education does not have effect

▶ Concerning the relative educational level of the couple we notice
  that hypergamous couples where husband is educated more than his
  wife heighten a couple's likelihood of having traditional,
  non-egalitarian marriage practices

▶ Having tertiary education does not show a higher probability towards
  a new type of couple, than lower educational levels. This leads to low
  economic returns to investment in education for women in Japan.

▶ Husband's high incomes determine a lower probability towards New
  Couples

▶ When the levels of husband's income are enough to maintain a
  family and run their home, wives tend to accept to be economically
  dependent and stay at home

Results: Maximum A-Posteriori probabilities

▶ Frequencies for couples predicted in latent class of traditional families (U_T) according to the estimated posterior probabilities

▶ We notice that a substantial proportion of the respondents (61% in 2015) has preschool children. Households with wife in younger birth cohorts are more likely to be families

		Survey years			
	Categories	1985	1995	2005	2015
Husband age	1	19.1	27.9	18.9	25.5
	2	19.3	15.1	17.0	19.5
	3	15.9	8.7	5.6	10.1
	4	4.0	3.5	4.3	3.2
	5	1.0	1.4	2.6	9.9
	6	3.2	0.1	8.3	4.7
	7	2.2	1.1	13.2	1.0
	8	6.6	2.4	10.3	1.0
	9	13.6	18.2	13.1	14.7
	10	10.1	21.6	6.7	1.5
Wife age	1	17.3	30.3	20.7	29.4
	2	6.1	16.1	12.4	11.6
	3	5.8	8.4	9.6	11.9
	4	4.3	2.6	3.3	11.9
	5	5.1	0.0	4.6	5.5
	6	4.5	0.1	7.2	1.1
	7	11.1	0.1	10.1	5.8
	8	12.6	6.2	10.5	0.0
	9	14.5	17.1	12.7	11.3
	10	18.5	19.0	8.8	11.6

▶ Frequencies for couples predicted in latent class of traditional families (U_T) according to the estimated posterior probabilities

		Survey years			
	Categories	**1985**	**1995**	**2005**	**2015**
Husband income	**1**	4.3	4.6	7.6	0.0
	2	0.8	5.1	7.4	5.3
	3	9.5	16.9	8.3	10.2
	4	7.6	20.1	16.4	5.8
	5	6.1	14.4	9.6	10.0
	6	10.1	14.0	9.3	18.1
	7	4.7	6.9	12.0	11.0
	8	19.9	6.8	8.3	12.5
	9	13.3	3.2	10.2	11.9
	10	23.6	7.9	10.9	15.2
Wife education	**1**	15.6	20.2	14.5	8.4
	2	61.1	55.6	53.8	58.1
	3	13.1	17.4	20.4	20.4
	4	9.0	6.0	10.8	20.9
Relative education	**1**	46.0	44.8	43.3	34.4
	2	4.7	5.3	6.4	10.0
Preschool children	**1**	—	51.0	35.5	61.1
Number of children	**0**	6.2	6.2	4.9	4.9
	1	7.3	28.7	24.7	40.9
	2	16.1	51.5	50.7	38.9
	3	4.7	13.6	19.7	14.9
Size of the place of living	**1**	—	—	22.7	33.1
	2	—	—	26.7	27.0
	3	—	—	19.8	23.4
	4	—	—	21.7	13.6
	5	—	—	9.1	2.9

Results: posterior probabilities

▶ We expected that the younger couples support gender egalitarian values more and this would be reflected in gender equality in couples earnings structures.

▶ The twentieth century gave rise to profound changes in traditional gender roles as argued by Inglehart and Norris (2003) although the force of this "rising tide" has varied among rich and poor societies

▶ We found that households with wife in younger birth cohorts are more likely to be traditional families

Results

▶ It is still not normative for young married women to share equal financial responsibilities within household. This is partly due to the chronic shortages of regular childcare arrangements

• We observe that (U_T) is mainly characterized by relative young households living in big cities, generally with husband having income of more than 4,250,000 yen a year, wives having high school education and husband's education that is higher than that of the wife, with one or more preschool children

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