Time-inconsistency and the Delay of Childbirth[1]

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Abstract

I hypothesize that time inconsistent preferences cause the delay of childbearing, and empirically examine the hypothesis.

Using the Japanese micro-data from Osaka University's Preference Parameters Study, I use the Cox proportional hazard model of the conditional probability that individual gives birth to a child in a year. As results, women and men who have time inconsistent preferences face a lower hazard of giving birth to the first child than those who have time consistent preferences, especially, for wives born before 1959 and wives with a high school degree or less.

Further estimations of logit and probit models show that if men have time inconsistent preferences, their wives' probability of giving birth to the first child is greater than men who have time consistent preferences, while OLS estimations give no significant effect of time inconsistent preferences on the number of children ever born.

From the above, I conclude that one reason for the delay of childbearing is people have time inconsistent preferences.

1. Introduction

Declining total fertility rate is a widely recognized trend in many developed countries at least over the past few decades, decreasing on OECD country average from 2.67 in 1970 to 1.70 in 2011.[3] On low fertility the most important issue from the behavioral economic point of view is whether or not individuals have children as much as they intend to. In fact, D'Addio and d'Ercole (2005) suggest negatively that women generally have fewer children than they actually want and that the gap between desired and observed fertility rates is higher in countries where fertility rates are lower in OECD countries.

My idea for explaining why people have fewer children than they intended is time-inconsistent preference. If a young woman has discount rates which are higher over the short time horizon than over the long time horizon, she may decide now that she will have a baby by age 35, because late child-bearing entails higher risk for both mother and child. However, later when she comes closer to the age, she yields to procrastination and immerses herself in her career enhancement.

If I can make clear whether or not time inconsistent preference plays any role in fertility behavior, we will have clear justification for family policy. Those with time inconsistent

[3] OECD (2012), OECD Family Database, OECD, Paris (www.oecd.org/social/family/database)

preference will feel regret looking back into their decisions to delay childbearing. This is because they fail to optimize their fertility behavior, and thus they bring losses on themselves. In contrast, if people can behave time consistently, then there will be no conflict between short term and long term, and thus the concept of the delay of childbearing will be redundant.

In this paper I hypothesize that time inconsistent preferences cause the delay of childbearing. Then, I empirically examine the hypothesis using the Japanese micro-data from wave 2011 of Osaka University's Preference Parameters Study.

2. Data and Sample Selection

I use micro-data from the Preference Parameters Study of Osaka University's 21st Century COE Program, "Behavioral Macrodynamics Based on Surveys and Experiments," and its Global COE project, "Human Behavior and Socioeconomic Dynamics." Using two-stage stratified random sampling, the study began throughout Japan in February 2003 with 2000 males and females aged from 20 to 69 years and has been carried out every year since then. The drop–off, pick–up method is used in the study. Our survival analysis uses data from waves 2011 of the survey, which contains information on their 1st to 8th children's birth year and month. In wave 2011, the survey had 4,934 respondents out of 5,316 respondents of the prior wave 2010 (92.8%

response rate).

I take the following steps in selecting our sample from the micro-data from the Preference Parameters Study. First, of 4,934 respondents, I select women providing information on their birth year and men who providing that on their spouse's birth year since I set the onset of childbearing occurred at women's age 15 years, arriving at a sample of 2,121 women and 1,576 men, which is used for nonparametric analysis. Then, I eliminate the individuals who did not provide the necessary information, which yields a sample of 1,300 women and 1,187 men for semi-parametric analysis.

3. Nonparametric Analysis

In this section I conduct nonparametric analysis, where I make no assumption on the functional form of the hazard function.

I calculate the estimator of Kaplan-Meier of the survivor function, which is shown in Figures 1 and 2. In Figure 1 I plot two survivor curves of women to compare those who have time inconsistent preferences (n = 396) versus those who do not (n = 1,725). As expected, I see that childbearing of the first child seems to occur at a slower rate for women who have time inconsistent preferences than women who do not. The median survival times are 12 years (27 years old) for women who have time inconsistent preferences and 11 years (26 years old) for women who do not. The restricted means, defined as an integral from zero to infinity of the survivor function, are 12.37 years for women who have time inconsistent preferences and 11.80 years for women who do not. Unfortunately the respective 95% confidence intervals overlap, suggesting that there aren't significant differences in the means.

To formally test the equality of the survivor functions, I perform the log-rank test, which rejects the null hypothesis that the survivor functions of women who have time inconsistent preferences and women who do not are the same (p-value is 4.22%). The p-value from the Wilcoxon test is 0.63%.

In Figure 2, for men who have time inconsistent preferences (n = 367) and men who do not (n = 1,209) I plot the survivor curves of the childbearing of their spouses. The median survival times are 12 years (27 years old) for both men who have time inconsistent preferences and men who do not. The restricted means are 12.90 years for men who have time inconsistent preferences and 12.26 years for men who do not. There aren't significant differences in the means. Both the log-rank test and the Wilcoxon test reject the null hypothesis with the p-value of 1.16% and 1.01%, respectively.

4. Estimation Method

To investigate the effects of time inconsistent preferences on childbearing, I will use the Cox proportional hazard model, where the covariates shift the baseline hazard functions multiplicatively. Here the hazard function, $h(t)$, is the probability that individual *i* gives birth to a child in a year *t*, conditional upon she (or his wife) not giving a child to the beginning of the year. Then, the hazard function is modeled as,

$$h(t|\mathbf{x}_i) = h_0(t)\exp(\mathbf{x}_i\boldsymbol{\beta}_x) \tag{1}$$

where h_0 is the baseline hazard given no particular parameterization and $\boldsymbol{\beta}_x$ is the regression coefficients to be estimated.

Our main covariate is a binary variable *time-inconsistency*$_i$, which indicates whether or not respondents have time-inconsistent preferences. The study asked the respondents to answer questions that aimed to measure the respondents' discount rates. In one of the questions, the respondents were asked to hypothetically choose to receive *X* yen today (Option "A") or *Y* yen in seven days (Option "B") for each of nine choices. The amount *X* varies from 3,000 yen to 3,008 yen and the amount *Y* from 2,996 yen to 5,951.[4] In another question, they are asked to choose to receive *X* yen in 90 days from today or *Y* yen in 97 days from today in the same way. By

[4] Approximately $1=100 yen.

comparing these two questions, I can judge whether or not the respondents have time-inconsistent preferences, and construct a binary variable *time-inconsistency*$_i$, which is equal to one if the discount rate is high in the near horizon, but low in the far horizon, and zero otherwise. I eliminate the respondents who wavered between Option "A" and Option "B".

Furthermore, people can have time preferences in the other direction, that is, the discount rate is low in the near horizon, but high in the far horizon. This is the situation where people are patient now but impatient in the future. For time preferences in this direction, I construct a binary variable *reverse time inconsistency*$_i$. The base category for these two variables is the respondents with conventional time consistent preferences.

$\mathbf{x}_i$ includes covariates for controlling, wife's marriage age, wife's marriage age squared, husband's and wife's highest level of education, husband's and wife's numbers of siblings, whether or not husband's and wife's mothers were working when husband and wife were 15 years old, wife's birth cohort in 10-year intervals, 10 regional blocks and the size of municipalities respondents live. I also include predicted husband's and wife's annual earned income before taxes but including bonuses (and business income) when they got married.

5. Estimation Results

Table 1 reports that for women I have statistically significant hazard ratio for *time-inconsistency*$_i$ of .860. That is, women who have time inconsistent preferences face a hazard of giving birth to the first child 14% lower than women who have time consistent preferences. For men I also have statistically significant hazard ratio for *time-inconsistency*$_i$ of .885. That is, male respondents who have time inconsistent preferences face a hazard of wife's giving birth to the first child 11% lower than those who have time consistent preferences.

I conducted same estimations for the hazard of giving birth to from the second to the eighth children, setting the onset of childbearing at the time of the previous child's birth. However, I do not have any statistically significant hazard ratio for *time-inconsistency*$_i$.

Estimations by Wife's Birth Year Cohort

I conduct estimations separately by wife's birth year (wives born before 1959 and after 1960). In Table 2 for wives born before 1959 I have statistically significant hazard ratios for *time-inconsistency*$_i$ of .814 for women and .811 for men. That is, when wives born before 1959 women and men who have time inconsistent preferences face a hazard of their own or wives' giving birth to the first child 19% lower than those who have time consistent preferences. However, I do not have statistically significant hazard ratios for wives born after 1960.

Estimations by Wife's Education

Next I conduct estimations separately by wife's highest level of education (those with a high school degree or less and those with a college degree or more). In Table 3, for wives with a high school degree or less I have statistically significant hazard ratios for *time-inconsistency*$_i$ of 0.837 for women. That is, women who have time inconsistent preferences face a hazard of giving birth to the first child 16% lower than those who have time consistent preferences. However, I do not have statistically significant hazard ratios for wives with a college degree or more.

6. Further Estimations for Late Childbearing and Number of Children Ever Born

In this section I want to explore how time inconsistent preferences affect the probability of late childbearing and the number of children ever born. In the followings, assuming that women's childbearing age is age 49 and under, I use sample of women of fifty or older and men with wives of fifty or older.

First, I conduct estimations of the probability of late childbearing. Although the most commonly definition of late childbearing is pregnancies of the first child over age 35, in Japan, before 1992 Japan Society of Obstetrics and Gynecology had indicated *elderly primiparae* by women who are pregnant for the first time thirty or older. Therefore, the dependent variable *late childbearing* equals 1 if a woman has their first child before she turns age thirty and otherwise equals 0.

I fit the models of logit and probit. I create a table of results (Table 4). In the table for men I have positive and significant coefficients of *time-inconsistency*$_1$ of .610 for logit estimation and of .386 for probit estimation, respectively. I compute the associated marginal effects at the mean as .0683 for logit and .0893 for probit, respectively. That is, if men have time inconsistent preferences, their wives' probability of giving birth to the first child 6.8 to 8.9 percent greater than men who have time consistent preferences, holding other variables at their mean. I also conducted the same estimations of late childbearing of age thirty five, but I do not have any significant coefficient of *time-inconsistency*$_1$.

Next, I conduct OLS estimations of the number of children ever born, but I do not have any significant coefficient of *time-inconsistency*$_1$.

7. Conclusion

The results of the analysis with the Cox proportional hazard model support the hypothesis that one reason for the delay of childbearing is time inconsistent preferences. The ground of the argument is as follows.

For both women and men, those who have time inconsistent preferences face a lower hazard of their own or spouses' giving birth to the first child than those who have time consistent preferences (Table 1). Furthermore, I have different results depending on wife's birth year cohort and education: on the one hand, when wives born before 1959 if they or their husbands have time inconsistent preferences, they face a lower hazard of giving birth to the first child than those who have time consistent preferences (Table 2) on the other hand when wives have a high school degree or less, if they have time inconsistent preferences they face a lower hazard of giving birth to the first child than those who have time consistent preferences (Table 3). These suggest that there is a possibility that time inconsistent preferences is one factor in the delay of childbearing, especially when wives born before 1950s and have high school or less education.

References

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Figure 1: Kaplan-Meier estimates for hyperbolic discounters versus non-hyperbolic discounters (women, n = 2,121)

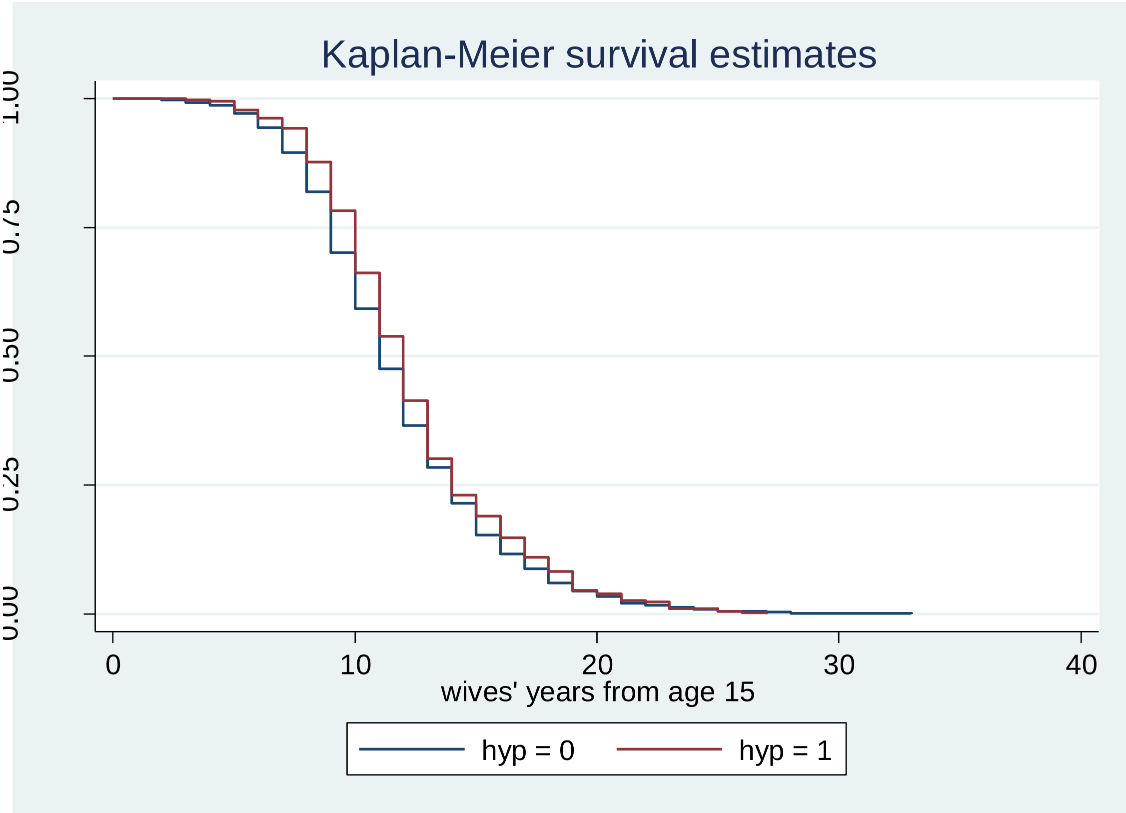

Figure 2: Kaplan-Meier estimates for hyperbolic discounters versus non-hyperbolic discounters

(men, n = 1,576)

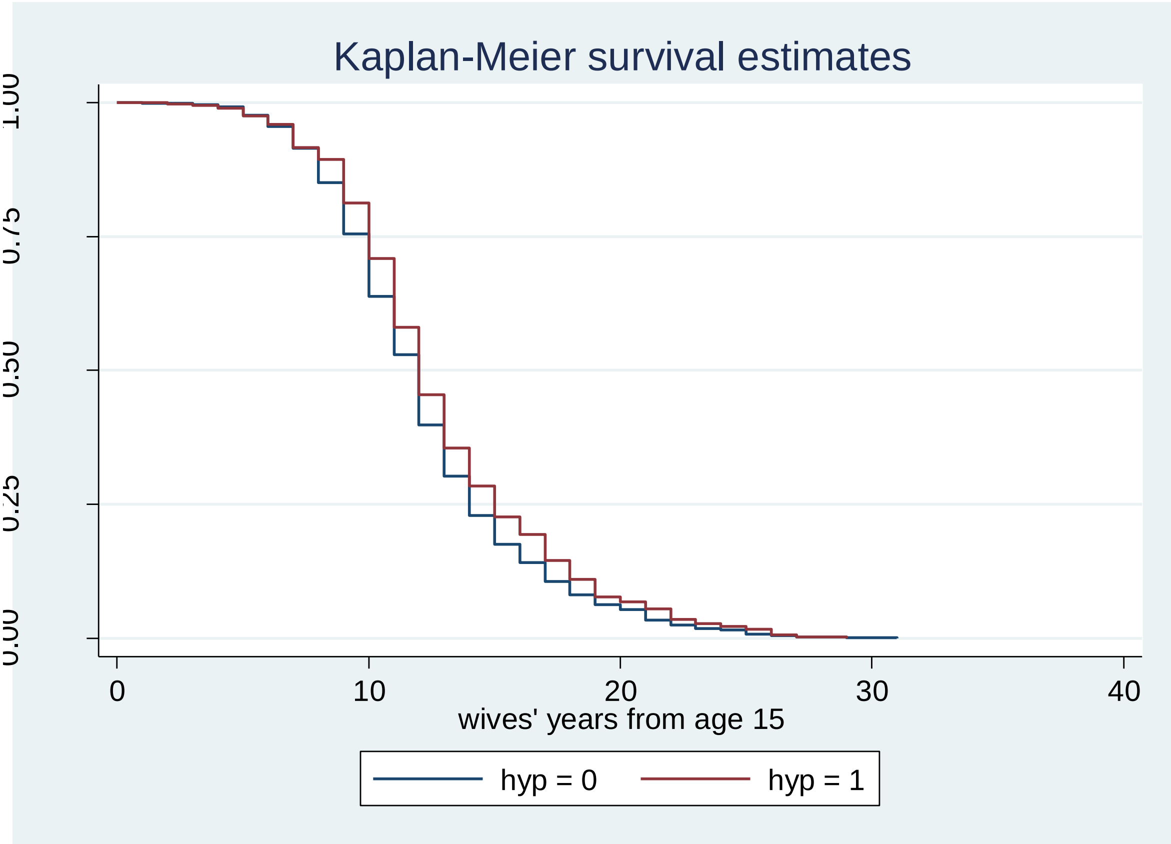

Table 1

	Haz. Ratio (Std. Err.)			
	women		men	
Time inconsistency	0.8602	**	0.8854	*
	(0.0635)		(0.0642)	
Reverse time inconsistency	1.1362		0.9617	
	(0.0989)		(0.0911)	
Wife’s marriage age	0.4687	***	0.4592	***
	(0.0171)		(0.0314)	
Wife’s marriage age^2	1.0091	***	1.0104	***
	(0.0005)		(0.0012)	
Husband’s annual earned income (million yen)	0.9789		0.9969	
	(0.0178)		(0.0187)	
Wife’s annual earned income (million yen)	1.0115		0.9832	
	(0.0232)		(0.0231)	
Wife’s education: Junior high school	1.2364		1.0956	
	(0.1649)		(0.1348)	
College	1.0096		0.8677	*
	(0.0727)		(0.0655)	
University	0.8506	*	0.9428	
	(0.0782)		(0.0971)	
Graduate	1.0473		1.0292	
	(0.3153)		(0.4729)	
Husband’s number of siblings	1.0338		1.0675	***
	(0.0240)		(0.0265)	
Wife’s number of siblings	1.0202		1.0021	
	(0.0289)		(0.0275)	
H’s mother was working when H was 15 years old	0.9580		0.9173	
	(0.0586)		(0.0614)	
W’s mother was working when W was 15 years old	1.0355		1.2507	***
	(0.0657)		(0.0857)	
“Do you want to have a child in the future?”	1.3148		0.9715	
	(0.2224)		(0.1595)	
Wife’s_birth_year cohort 30’s	1.0474		0.8776	
	(0.2309)		(0.2302)	
40’s	0.9752		0.8997	
	(0.0944)		(0.0889)	
60’s	0.8538	**	0.8923	
	(0.0652)		(0.0724)	
70’s	1.0710		0.9951	
	(0.0930)		(0.0926)	
80’s	2.2192	***	1.5392	**
	(0.3665)		(0.3228)	
The size of municipalities: ordinance-designated city	1.0920		0.8061	***
	(0.0797)		(0.0626)	
less than 100,000 pop	1.1623	**	1.0237	
	(0.0880)		(0.0805)	
town and village	1.1813		0.9954	
	(0.1249)		(0.1151)	
Regional block: Hokkaido	0.8652		1.1210	
	(0.1340)		(0.1861)	
Tohoku	1.1176		1.2868	*
	(0.1492)		(0.1677)	
Koshinetsu	1.3311	**	0.8619	
	(0.1926)		(0.1274)	
Hokuriku	1.3683	*	0.5365	***
	(0.2335)		(0.1111)	
Tokai	1.1571		1.2276	**
	(0.1062)		(0.1187)	
Kinki	1.2972	***	1.2895	***
	(0.1129)		(0.1170)	
Chugoku	1.5651	***	1.2560	*
	(0.2042)		(0.1693)	
Shikoku	1.5960	***	1.0942	
	(0.2589)		(0.1822)	
Kyushu	0.8652		1.1116	
	(0.1340)		(0.1195)	
Number of obs	1300		1187	
LR chi2(32)	905.91		658.64	
Prob > chi2	0.0000		0.0000	
Log likelihood	-7670.7728		-6990.1984	

Note: Micro-data from the Preference Parameters Study, wave 2011. Robust standard errors are in parentheses. The level of significance at 1% is ***, 5% is **, and 10% is *.

Table 2

	Wives born before 1959				Wives born after 1960			
	women		men		women		men	
Time inconsistency	0.8138	*	0.8112	*	0.9949		1.0447	
	(0.0929)		(0.0932)		(0.1029)		(0.1012)	
Reverse TI	1.0649		0.9694		1.2822	**	0.9612	
	(0.1340)		(0.1297)		(0.1612)		(0.1371)	
Wife’s marriage age	0.4757	***	0.3794	***	0.3929	***	0.4816	***
	(0.0238)		(0.0336)		(0.0472)		(0.0573)	
Wife’s marriage age^2	1.0088	***	1.0137	***	1.0121	***	1.0090	***
	(0.0007)		(0.0015)		(0.0022)		(0.0021)	
H’s annual earned income (million yen)	1.0002		1.0156		0.9628		0.9638	
	(0.0254)		(0.0264)		(0.0256)		(0.0283)	
W’s annual earned income (million yen)	0.9982		0.9970		1.0032		0.9710	
	(0.0368)		(0.0364)		(0.0312)		(0.0317)	
Wife’s education: Junior high school	1.2179		1.0218		1.1387		1.4467	
	(0.1892)		(0.1465)		(0.3363)		(0.3771)	
College	1.2147	*	0.8602		0.8949		0.8529	
	(0.1433)		(0.1049)		(0.0840)		(0.0862)	
University	0.9241		1.0372		0.7490	**	0.8404	
	(0.1394)		(0.1670)		(0.0907)		(0.1194)	
Graduate	1.1734		1.1550		1.0131		0.9572	
	(0.8524)		(1.1773)		(0.3420)		(0.5093)	
Husband’s number of siblings	1.0898	***	1.0773	**	0.9133	**	0.9997	
	(0.0321)		(0.0330)		(0.0397)		(0.0474)	
Wife’s number of siblings	1.0156		1.0052		1.0658		0.9835	
	(0.0371)		(0.0339)		(0.0498)		(0.0493)	
H’s mother was working when H was 15	0.9596		0.9423		0.9695		0.9360	
	(0.0869)		(0.0881)		(0.0850)		(0.0954)	
W’s mother was working when W was 15	1.0445		1.2390	**	1.0853		1.2116	*
	(0.0974)		(0.1228)		(0.1012)		(0.1212)	
“Do you want to have a child in the future?”	1.2446		1.1711		1.5990	*	0.8698	
	(0.2992)		(0.2425)		(0.4172)		(0.2451)	
Wife’s_birth_year cohort 30’s	1.0712		0.9892					
	(0.2442)		(0.2665)					
40’s	0.9604		0.8947					
	(0.0993)		(0.0941)					
60’s					0.3842	***	0.5391	***
					(0.0671)		(0.1181)	
70’s					0.4848	***	0.6202	**
					(0.0848)		(0.1379)	
80’s					(omitted)	***	(omitted)	
Size of municipalities: ordinance-designated city	1.1664		0.9285		0.9660		0.6803	***
	(0.1289)		(0.1068)		(0.0965)		(0.0733)	
less than 100,000 pop	1.1325		1.1697		1.1897	*	1.0089	
	(0.1289)		(0.1367)		(0.1252)		(0.1117)	
town and village	1.2858	*	1.3788	*	1.0837		0.7405	*
	(0.1956)		(0.2275)		(0.1677)		(0.1278)	
Regional block: Hokkaido	0.7643		0.8445		1.1330		1.4044	
	(0.1693)		(0.1923)		(0.2563)		(0.3541)	
Tohoku	1.0967		1.4241	*	1.1194		1.2638	
	(0.2159)		(0.3062)		(0.2100)		(0.2106)	
Koshinetsu	1.2091		0.6096	**	1.6550	**	1.3939	*
	(0.2434)		(0.1371)		(0.3595)		(0.2746)	
Hokuriku	2.0948	***	0.8150		0.8397		0.3004	***
	(0.5255)		(0.2497)		(0.2066)		(0.0879)	
Tokai	1.1581		1.3530	**	1.1203		1.0613	
	(0.1601)		(0.1881)		(0.1426)		(0.1498)	
Kinki	1.3108	**	1.4439	***	1.2982	**	1.0907	
	(0.1712)		(0.1948)		(0.1558)		(0.1385)	
Chugoku	1.8015	***	0.9159		1.4164	*	1.6654	***
	(0.3501)		(0.1882)		(0.2579)		(0.3031)	
Shikoku	2.2590	***	0.8634		1.2484		1.2226	
	(0.5329)		(0.2108)		(0.2883)		(0.2871)	
Kyushu	1.0375		1.2447		1.2524		0.9431	
	(0.1622)		(0.1911)		(0.1736)		(0.1492)	
Number of obs	612		568		688		619	
LR chi2(29)	393.62		322.65		529.11		385.38	
Prob > chi2	0.0000		0.0000		0.0000		0.0000	
Log likelihood	-3177.9758		-2929.4718		-3597.3818		-3225.1609	

Note: Micro-data from the Preference Parameters Study, wave 2011. Robust standard errors are in parentheses. The level of significance at 1% is ***, 5% is **, and 10% is *.

Table 3

	Wives with HS or less education				Wives with College or more education			
	women		men		women		men	
Time inconsistency	0.8365	*	0.8894		0.9042		0.9142	
	(0.0859)		(0.0850)		(0.0996)		(0.1058)	
Reverse TI	1.0861		0.9252		1.1970		1.0359	
	(0.1243)		(0.1104)		(0.1673)		(0.1748)	
Wife's marriage age	0.4969	***	0.4269	***	0.3638	***	0.5562	***
	(0.0219)		(0.0327)		(0.0297)		(0.0903)	
Wife's marriage age^2	1.0084	***	1.0118	***	1.0126	***	1.0063	**
	(0.0007)		(0.0013)		(0.0013)		(0.0028)	
H's annual earned income (million yen)	0.9538	*	1.0304		1.0027		0.8988	***
	(0.0242)		(0.0248)		(0.0272)		(0.0291)	
W's annual earned income (million yen)	1.0150		1.0297		0.9822		0.9443	*
	(0.0363)		(0.0373)		(0.0319)		(0.0320)	
Wife's education: Junior high school	1.1299		1.1255					
	(0.1558)		(0.1445)					
College					0.8529		0.6100	
					(0.2647)		(0.2882)	
University					0.6384		0.7294	
					(0.1987)		(0.3405)	
Graduate								
Husband's number of siblings	1.0321		1.0445	***	1.0280		1.1066	**
	(0.0286)		(0.0316)		(0.0473)		(0.0521)	
Wife's number of siblings	1.0448		1.0068		0.9711		1.0328	
	(0.0352)		(0.0333)		(0.0533)		(0.0514)	
H's mother was working when H was 15	0.9917		0.8775		1.0040		1.0473	
	(0.0822)		(0.0758)		(0.0970)		(0.1221)	
W's mother was working when W was 15	1.0196		1.2755		1.0965		1.1523	
	(0.0884)		(0.1157)		(0.1091)		(0.1279)	
"Do you want to have a child in the future?"	1.3423		0.9851		0.9531		1.0563	
	(0.2866)		(0.1907)		(0.2727)		(0.3435)	
Wife's_birth_year cohort 30's	1.0125		1.0076		1.2696			
	(0.2637)		(0.2734)		(0.5981)			
40's	0.8688		0.9910		1.5312	**	0.7691	
	(0.1002)		(0.1161)		(0.2792)		(0.1601)	
60's	0.8998		0.9042		0.7536	**	0.8378	
	(0.0944)		(0.0975)		(0.0903)		(0.1120)	
70's	1.1976		1.1096		0.8876		0.7891	
	(0.1453)		(0.1409)		(0.1148)		(0.1176)	
80's	2.7984	***	1.4480		1.7487	**	1.3014	
	(0.6054)		(0.4032)		(0.4653)		(0.4333)	
Size of municipalities: ordinance-designated city	1.0488		0.8460		1.1924		0.8022	*
	(0.1082)		(0.0865)		(0.1321)		(0.1020)	
less than 100,000 pop	1.0990		1.0325		1.3158	**	1.0282	
	(0.1087)		(0.1045)		(0.1601)		(0.1372)	
town and village	1.3061	*	1.1374		0.8449		0.7136	*
	(0.1794)		(0.1667)		(0.1535)		(0.1452)	
Regional block: Hokkaido	0.8699		1.0680	***	1.0264		1.2496	
	(0.1707)		(0.2075)		(0.2755)		(0.4336)	
Tohoku	0.9809		1.2585	*	1.6741	**	1.5085	**
	(0.1641)		(0.2169)		(0.3878)		(0.3161)	
Koshinetsu	1.0732		0.8705	**	2.5675	***	1.1591	
	(0.1978)		(0.1584)		(0.6280)		(0.3034)	
Hokuriku	1.4162	*	0.5132	*	0.7935		0.5494	
	(0.2908)		(0.1317)		(0.2689)		(0.2165)	
Tokai	1.1105		1.2703		1.2697		1.1102	
	(0.1356)		(0.1603)		(0.1881)		(0.1780)	
Kinki	1.2442	*	1.2810		1.2537	*	1.2515	
	(0.1528)		(0.1581)		(0.1613)		(0.1783)	
Chugoku	1.6417	***	1.4219		1.5738	**	1.2111	
	(0.3016)		(0.2640)		(0.3054)		(0.2453)	
Shikoku	1.7965	***	1.2278		1.5637	*	0.6574	
	(0.3910)		(0.2584)		(0.3917)		(0.1934)	
Kyushu	1.0122		1.1811		1.4804		0.9754	
	(0.1400)		(0.1642)		(0.2279)		(0.1722)	
Number of obs	742		718		558		469	
LR chi2(29)	489.86		392.88		401.82		246.15	
Prob > chi2	0.0000		0.0000		0.0000		0.0000	
Log likelihood	-3982.2213		-3870.5414		-2820.9327		-2342.4823	

Note: Micro-data from the Preference Parameters Study, wave 2011. Robust standard errors are in parentheses. The level of significance at 1% is ***, 5% is **, and 10% is *.

Table 4

	Late childbearing age 30							
	Logit				Probit			
	women		men		women		men	
Time inconsistency	0.3124		0.6099	**	0.1671		0.3859	**
	(0.3089)		(0.2838)		(0.1663)		(0.1578)	
Reverse TI	0.1228		-0.2315		0.0123		-0.0749	
	(0.3709)		(0.3981)		(0.1988)		(0.2126)	
Wife's marriage age	1.4756	***	1.9738	***	0.7767	***	0.9562	***
	(0.2414)		(0.3224)		(0.1067)		(0.1606)	
Wife's marriage age^2	-0.0174	***	-0.0266	***	-0.0091	***	-0.0126	***
	(0.0036)		(0.0049)		(0.0015)		(0.0025)	
H's annual earned	0.0426		0.0158		0.0313		0.0053	
income (million yen)	(0.0734)		(0.0735)		(0.0404)		(0.0415)	
W's annual earned	-0.0659		-0.0939		-0.0450		-0.0393	
income (million yen)	(0.1042)		(0.1034)		(0.0563)		(0.0584)	
Wife's education:	-1.2210		-0.1007		-0.6835	*	-0.1412	
Junior high school	(0.8058)		(0.4754)		(0.3701)		(0.2484)	
College	-0.3592		0.5324	*	-0.2235		0.2899	*
	(0.3343)		(0.2873)		(0.1780)		(0.1601)	
University	0.3359		-0.4377		0.1664		-0.3014	
	(0.4053)		(0.4112)		(0.2183)		(0.2289)	
Graduate								
Husband's number of	-0.2996	***	-0.0909		-0.1650	***	-0.0587	
siblings	(0.1000)		(0.0933)		(0.0532)		(0.0520)	
Wife's number of	0.0126		0.0892		0.0161		0.0482	
siblings	(0.1189)		(0.1069)		(0.0615)		(0.0569)	
H's mother was	-0.0161		0.1380		0.0267		0.1145	
working when H was 15	(0.2812)		(0.2574)		(0.1539)		(0.1424)	
W's mother was	-0.0447		0.0337		-0.0396		-0.0238	
working when W was 15	(0.2721)		(0.2596)		(0.1526)		(0.1447)	
"Do you want to have a	0.7395		0.1931		0.2429		0.1191	
child in the future?"	(1.2051)		(0.5722)		(0.6323)		(0.3253)	
Wife's_birth_year	-0.7200		0.3753		-0.4361		0.2834	
cohort 30's	(0.7064)		(0.7602)		(0.3931)		(0.4038)	
40's	-0.1688		-0.2235		-0.0985		-0.0480	
	(0.3226)		(0.3727)		(0.1741)		(0.2011)	
60's	0.4607		0.0334		0.2620		0.0832	
	(0.4089)		(0.3956)		(0.2175)		(0.2185)	
Size of municipalities:	-0.0296		-0.0168		0.0413		0.0312	
ordinance-designated city	(0.3295)		(0.3503)		(0.1830)		(0.1817)	
less than 100,000 pop	-0.5430		-0.2193		-0.2900		-0.0908	
	(0.3454)		(0.3110)		(0.1880)		(0.1823)	
town and village	0.0509		0.1716		0.0267		0.0517	
	(0.4489)		(0.3832)		(0.2396)		(0.2194)	
Regional block:	0.0382		-0.6951		-0.0070		-0.3848	
Hokkaido	(0.7778)		(0.7227)		(0.3798)		(0.3712)	
Tohoku	0.6850		-0.8230		0.3382		-0.4492	
	(0.6106)		(0.5954)		(0.3190)		(0.3198)	
Koshinetsu	-0.7981		-0.6612		-0.5020	*	-0.1720	
	(0.5390)		(0.7211)		(0.2926)		(0.3952)	
Hokuriku	-0.3847		-1.1952		-0.1772		-0.7527	
	(1.2046)		(1.0446)		(0.5565)		(0.5310)	
Tokai	-0.6262		-0.6038		-0.2962		-0.3651	
	(0.5133)		(0.4212)		(0.2666)		(0.2253)	
Kinki	-0.1341		-0.3827		-0.1206		-0.2740	
	(0.3475)		(0.3337)		(0.1908)		(0.1868)	
Chugoku	-1.0147	*	-0.2243		-0.5987	**	-0.0319	
	(0.5331)		(0.6892)		(0.2860)		(0.3798)	
Shikoku			-0.3188				-0.1577	
			(0.5772)				(0.3426)	
Kyushu	0.3169		-0.1567		0.1778		-0.0478	
	(0.4268)		(0.3992)		(0.2313)		(0.2253)	
cons	-28.0116	***	-34.9343	***	-14.6997	***	-17.2401	***
	(4.2415)		(5.1939)		(1.9678)		(2.5482)	
Number of obs	665		650		665		650	
Wald chi2	117.02		126.74		137.64		154.36	
Prob > chi2	0.0000		0.0000		0.0000		0.0000	
Pseudo R2	0.3824		0.3566		0.3757		0.3404	
Log pseudolikelihood	-199.36949		-204.72638		-201.55804		-209.93412	

Note: Micro-data from the Preference Parameters Study, wave 2011. Robust standard errors are in parentheses. The level of significance at 1% is ***, 5% is **, and 10% is *.

Table 5

	Number of children ever born (Std. Err.)			
	women		men	
Time inconsistency	-0.1077		-0.0659	
	(0.0783)		(0.0732)	
Reverse time inconsistency	-0.0511		-0.1302	
	(0.0930)		(0.0876)	
Wife's marriage age	-0.0986	**	-0.1092	*
	(0.0437)		(0.0651)	
Wife's marriage age^2	0.0009		0.0011	
	(0.0008)		(0.0011)	
Husband's annual earned income (million yen)	-0.0046		-0.0114	
	(0.0191)		(0.0178)	
Wife's annual earned income (million yen)	0.0334		0.0061	
	(0.0285)		(0.0246)	
Wife's education: Junior high school	-0.1295		0.1510	
	(0.1211)		(0.1013)	
College	0.0794		0.1803	**
	(0.0819)		(0.0781)	
University	0.0892		0.0819	
	(0.1170)		(0.1116)	
Graduate	-0.4776	*	-0.9932	
	(0.2739)		(0.6948)	
Husband's number of siblings	0.0147		-0.0183	
	(0.0228)		(0.0222)	
Wife's number of siblings	0.0150		0.0096	
	(0.0284)		(0.0231)	
H's mother was working when H was 15 years old	0.0388		0.0770	
	(0.0617)		(0.0646)	
W's mother was working when W was 15 years old	0.1777	***	-0.0236	
	(0.0626)		(0.0669)	
"Do you want to have a child in the future?"	0.7131	***	0.9260	***
	(0.1856)		(0.1594)	
Wife's_birth_year cohort 20's			-0.9067	***
			(0.2438)	
30's	-0.4510	**	0.0474	
	(0.1771)		(0.1852)	
40's	-0.0433		-0.0258	
	(0.0766)		(0.0726)	
60's	0.0157		-0.0774	
	(0.0992)		(0.1051)	
The size of municipalities: ordinance-designated city	0.0595		-0.0576	
	(0.0778)		(0.0800)	
less than 100,000 pop	0.2226	***	0.1570	**
	(0.0807)		(0.0771)	
town and village	-0.0380		0.0520	
	(0.1299)		(0.1056)	
Regional block: Hokkaido	0.1557		0.1239	
	(0.1804)		(0.1611)	
Tohoku	-0.0479		-0.0316	
	(0.1510)		(0.1351)	
Koshinetsu	-0.0943		0.0304	
	(0.1318)		(0.1146)	
Hokuriku	0.0382		-0.0209	
	(0.1498)		(0.2199)	
Tokai	0.0070		-0.0185	
	(0.0951)		(0.0896)	
Kinki	0.0870		-0.0098	
	(0.0900)		(0.0950)	
Chugoku	0.2225		0.2355	
	(0.1834)		(0.1664)	
Shikoku	0.0095		-0.0887	
	(0.1611)		(0.1811)	
Kyushu	0.1174		0.1272	
	(0.1163)		(0.0991)	
cons	3.1303	***	3.2281	***
	(0.6324)		(0.9201)	
Number of obs	744		727	
F	3.69			
Prob > F	0.0000			
R-squared	0.1517		0.1887	
Root MSE	.81793		.78756	

Note: Micro-data from the Preference Parameters Study, wave 2011. Robust standard errors are in parentheses. The level of significance at 1% is ***, 5% is **, and 10% is *.