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Marriage, Family Structure, and Time Spent on Housework in Japan

by

Atuko Ueda

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Atsuko Ueda*

University of Tsukuba
Institute of Policy and Planning Sciences

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Abstract

This paper investigates the determinants of how much time is spent on housework in relation to marriage and other family structures. An empirical model based on economic theory is estimated as a Tobit model using a national time use survey in Japan. The estimation result suggests that marriage increases women's housework hours but decreases men's, and that cohabitation with parents or a young couple reduces the housework hours of singles or the elderly. Also, a trade-off between market work hours and housework hours and a positive effect of demands for care of family members on housework hours are found.

Keywords: housework, time use, Japan

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*Correspondence: University of Tsukuba, Institute of Policy and Planning Sciences, 1-1-1 Tennodai, Tsukuba, Ibaraki 305-8573, Japan (email: ueda@shako.sk.tsukuba.ac.jp)

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1. Introduction

In the last two decades, Japan has experienced a considerable change in marital behavior, a decline in the fertility rate, and rapid aging of the population. Many people have delayed marriage or even declined to get married at all as argued by Raymo (1998). From 1975 to 1995[1], the percentage of never-married men in their thirties rose from 10.4% to 30.1%. Even for those who got married, the average age of first marriage rose from 24.7 to 26.5 in case of women, and from 27.0 to 28.5 in case of men. Furthermore, the annual number of divorces has nearly doubled. It is not only young couples but also middle-aged couples who get divorced; the percentage of those divorcing at age 40 or older increased from 18.9% to 35.2% out of all divorces, and the percentage of divorced and still unmarried persons in their forties increased from 2.5% to 4.8%. Marrying late (or not at all) has resulted in the decline of the total fertility rate from 1.91 to 1.42, since the percentage of births to unmarried mothers was still as low as 1.2% of the total birth rate in 1995.

At the same time, the family structure has become more diversified. The percentage of those living alone increased from 3.9% to 9.0%; the percentage of those in mother-only families increased from 3.6% to 5.1%, and the percentage of those in father-only families increased from 0.6% to 0.9%. The percentage of those in nuclear families has even declined from 58.1% to 56.9% despite a decline of traditional extended families with grandparents or other relatives. As for aging, the ratio of the elderly at the age of 65 or older has risen from 8.5% to 13.3%. The ratio of those living alone or only with their spouse rose from 21.1% to 39.8% among the elderly due to the decline of extended families.

The change in marital and childbearing behavior has often been explained as a consequence of an increase in the labor force participation of women who are getting more opportunities for paid work at wages more equal to those of men (Osawa, 1993; Atoh, 1991). This economic independence

[1] In this section, numbers related to family type are compiled from the 1995 *Population Census of Japan,* and numbers related to marriage, child birth, and divorce are from the *Vital Statistics 1996 Japan.* Although the former survey states that de facto marriage is included in the "married" status in the questionnaire, this type of marriage is not widely practiced in Japan.

of women has helped them to become aware of remaining drawbacks to marriage such as unequal roles in domestic activities even in dual-earner families, social pressure on wives to have children and to take care of the elderly parents of the husband, and other aspects of family life biased toward the husband's family and relatives (Atoh, 1991). The *1997 National Survey on Lifestyle and Preferences* reported that 31.4% of women agreed that "an increase in the burden of housework and childcare" is a disadvantage of marriage. In international comparisons, the time spent on housework by Japanese men is "strikingly lower than any other country" (Juster and Stafford, 1991) irrespective of the job status of the wife (Ueda, 1999). As a result, time use patterns of women depend heavily on life events such as marriage or childbirth, while few changes in the time use patterns of men are observed from the time they graduate from school to the time they retire (Amano, 1994).

The purpose of this paper is to investigate the allocation of time to housework and the determinants of how much time is spent as related to marriage and other aspects of family structure from a time use survey in Japan. Previously, the time spent on housework has been studied mostly as the division of household labor between men and women as a whole, or between married men and women, particularly from dual-earner families, due to the increase of women joining the labor force. In the field of economics, time allocation has been integrated into economic theory following seminal works by Becker (1965) and Gronau (1973, 1986) that consider home production along with housework. Empirical studies based on this framework has been made using data in advanced countries (Graham and Green, 1984; Gronau, 1976, 1977; Hill and Stafford, 1974, 1980; Kooreman and Kapteyn, 1987; Solberg and Wong, 1992; Ueda, 1999). Also, much of the literature has empirically studied determinants of the housework hours of married women (and sometimes married men) in the fields of home economics and sociology (Coverman, 1985; Ericksen et. al, 1979; Kiker and Ng, 1990; and many others as reviewed by Shelton and John, 1996). These studies have found that there is a trade-off between market work hours and housework hours, that demands for family care increase housework hours, and that more equal income and better education may result in equal housework hours between men and women. However, the time use of singles or single parents, and

thus the effect of marriage, has often been beyond the scope of these studies.

This paper first examines the time spent on housework according to sex and family type (such as single, couple, single-parent, and the elderly), and next estimates the determinants of the time spent to examine the effects of marriage and other aspects of family structure on housework hours. The empirical model is based on economic theory of home production. The model is estimated using microdata from the *1996 Survey on Time Use and Leisure Activities* in Japan. The estimation result suggests that marriage increases women's housework hours but decreases men's, and that cohabitation with parents or a young couple reduces the housework hours of singles or the elderly. Also, the trade-off between market work hours and housework hours and the positive effect of demands for care of family members are found as in previous studies.

2. Data

The analysis uses microdata from the *Survey on Time Use and Leisure Activities* (STU), which has been conducted as a national survey every five years in Japan. The survey employs the time-diary method and classifies activities into 20 categories. The survey collects time-diary of all family members age 10 or older as well as family information such as housing and each family member's characteristics such as age, education, and job status. In the 1996 STU, almost 270,000 family members in 99,000 households record their activities. One family member usually recorded over an assigned two day period (that is, two samples per family member) during the first week in October. The selected sample includes 426,822 observations out of 514,105 observations, after omitting students and family members age 19 or younger. About half of the observations are on weekdays (Monday-Friday), and the rest are on weekends (Saturday and Sunday).

The selected sample is classified according to family type as follows.

"Single" includes a childless, unmarried person age 20-59. Singles living alone and those living with parents are subclassified.

Table 1: Sample Numbers by Family Type

age	family type	marital status	family	men	women	total
20-59	all	all	all	145,674	156,832	302,506
	single	unmarried	with parents	19,415	17,870	37,285
			living alone	8,867	6,835	15,702
	single-parent	unmarried	with children	320	2,336	2,656
	couple	married	childless	18,133	22,360	40,493
			with children	58,284	58,595	116,879
60-	the elderly	all	all	54,570	69,746	124,316
		married	couple only	22,611	18,481	41,092
		unmarried	living alone	2,270	9,451	11,721
		married	with young-couple	10,417	9,564	19,981
		unmarried	with young-couple	2,045	12,312	14,357

"Couple" includes a married person age 20-59[2]. Childless couples and those with children are subclassified. These couples may or may not live with their parent(s).

"Single-parent" includes an unmarried person age 20-59 who is living only with his or her children (age 19 or younger). Families consisting of grandparent(s), a single-parent, and children are not included.

"the Elderly" includes a person age 60 or older. Those living alone, living with a spouse, and living with a young couple (often a son and his wife) are subclassified.

"The elderly" is defined as those age 60 or older because most Japanese companies (including public organizations) set the retirement age at 60; after retirement, some of "the elderly" work full-time or part-time, often at affiliated companies or organizations, while others do not work at all.

The sample is further grouped according to sex as described in Table 1. Unclassified observations include, for example, extended families with relatives other than the couple's parents, married men living alone for business[3], or single-parents living with their own parent(s).

[2]Detail analysis on spousal time allocation of housework is given by Ueda (1999).

[3]According to the 1996 STU, married men living apart from the families for more than 3 months for business purposes constitute 9.1% of men living alone, or 1.4% of all married men. The time use of this type of men is out of the scope of this paper.

3. Time Allocation to Housework by Family Type

Figures 1 and 2 present average housework hours and market work hours[4] per day in a week according to sex and family type; housework includes childcare, shopping, nursing, and other narrowly-defined housework; market work includes commuting as well as paid work. In the case of singles, those working full-time are selected. Job status is classified into 3 types in the case of wife and single-parent mother: full-time (regular employment), part-time (other work, including part-time employment, self-employment, or work at a small family business[5]), and non-working. Although most of the men ages 20-59 work full-time, men working full-time is included as a separately category for the purpose of comparison with women.

3.1. Time use at ages 20-59

Overall, women spend much more time on housework than men do, although housework hours of women vary depending on marital status, the existence of children, and job status in accordance with market work hours. Married mothers working full-time spend the longest amount of time on work (the total of market work and housework); on average, they spend nearly ten and a half hours per day in a single week, including weekends. The next groups are single-parent mothers working full-time, childless wives working full-time, and single-parent fathers working full-time; on average, they spend 9 and half hours or more on work. Among men, single-parent fathers spend the longest amount of time on work, and childless husbands spend the shortest time. Among women, married mothers working full-time work the longest, and childless housewives work the least.

<**Singles**> Singles living alone spend more time on housework than those living with parents. Single women spend more time on housework and less time on market work than single men, and

[4]Housewives sometimes, if not often, spend time on market work; some of them might work at small family business without payment.

[5]76% of wives employed part-time and 70% of wives working as self-employed earn less than one million yen a year (in which case income tax is exempted as the wife is considered a dependent of the husband), while 65% of full-time employed wives earn more than two million yen (*1994 Employment Status Survey Japan*). Therefore, workers other than those employed full-time are classified as part-time workers here.

thus, there is not a big difference in the average total number of work hours between men and women. Why do single women spend more time on housework than men do? It is possible that the reason due to differences in preference between men and women or varying degrees of skill in doing housework between the two, but it is also possible that women have more time to spend on housework because the market work hours of women are shorter than those of men, or that women do more housework to save money because women earn less than men. Still, single women spend the less time on housework than any other type of women.

<Couples> In this subsample, 34% work full-time, 27% work part-time, and 39% are housewives in the case of wives, while 91% of husbands are full-time employees. Time use of single men and that of husbands is pretty similar, while women face a considerable difference in time use according to marriage, childbirth, and job status.

In the case of women working full-time, the average hours of market work are shortened by almost half[6], and those of housework become one and 1/3 hours longer each after marriage and also after the birth of child. Wives working full-time work the longest, and housewives work the shortest irrespective of the existence of children. The total work hours of wives working part-time is almost equivalent to the average for all types of job status combined.

In a comparison of husbands and wives, husbands spend less than half an hour on housework, while wives without children working full-time spend two and a half hours and those with children spend four hours. In total, the averages number of work hours is almost equal between husband and wife if the job status of the wife is neglected. However, on averages, when working full-time with children, wives work more than one and a half hours longer than husbands.

<Single-parents> In this subsample, 65% of single-parent mothers work full-time, 23% of them work part-time, and 12% of them do not work at all, while 80% of single-parent fathers work

[6]Why is the market work time of wives shorter than that of single women? One possible explanation is that women working long hours tend to quit their jobs when marriage or after the birth of child. Some may be successful in moving to a section requiring less overtime work in a company at the expense of a reduction in income.

full-time as employees.[7] It is interesting that, when working full-time, the time use of single-parent mothers seems to be similar to that of childless wives rather than married mothers. Single-parent fathers spend almost three times the amount of time on housework as married fathers, but still spend far less time than wives or single-parent mothers. In total, single-parent fathers and mothers working full-time spend almost equal amount of time on work.

3.2. Time use of the elderly

Among the elderly, on average, wives living only with their husbands work the longest, and single men living with a young couple work the shortest. Women always work more total hours than men in the same type of family, although men living alone and women living alone spend almost the same time on total work. Among elderly men, those living alone spend the longest time on housework of all types of elderly men. Elderly women still spend more time on housework when living with their husbands. Housework hours are shortened by living with a young couple.

3.3. Marriage and work hours

A comparison of average work hours according to sex and family type suggests some interesting features of time use according to changes in marital status in the life cycle. A single woman working full-time and living alone will lose almost one hour of free time after marriage if she continues to work full-time, while a man loses only 10 minutes or less after marriage. She will lose an additional 50 minutes for child care, which is twice that of the loss for her husband.

If a wife working full-time is divorced retains custody of her children, she will get nearly 40 minutes of additional free time, while her ex-husband working full-time will get only 10 minutes of additional free time in spite of living without children (note that, in Japan, it is rare for a divorced

[7] This does not necessarily mean that the other 20% of single-parent fathers are part-time employees. It is possible that fathers who can control their own work time, like the self-employed, are more likely to choose living with children without a grandmother's help. Note that single-parents living with their own parents are not included. A divorced mother who has custody of her children often goes back to her parents' home particularly when the parents can afford to take care of the divorced daughter and grandchildren. Also, a single-parent father working full-time often lives with his parents to receive help with childcare. Unfortunately, this type of family is not identified as a single-parent family due to difficulty in data structure.

couple to share child care). If it is the father who retains custody, he will lose nearly 40 minutes, and his ex-wife will gain one and 3/4 hours of free time.

After age 60, wives still work almost two hours longer than husbands on average. A husband will spend an additional 50 minutes on housework after the death of his wife, while a wife will reduce the time spent on housework by an hour and a half after the death of her husband if she lives by herself.

4. An Empirical Model of Housework Hours

As looked at above, time allocation to housework varies across sex, family structure, and job status in relation to market work hours. This section provides an analytical framework based on economic theory to investigate determinants of housework hours.

4.1. Theoretical Background and the Empirical Model

Consider an individual's utility maximization problem as follows.

$$\begin{aligned} \max \quad & u(c, l; x) \\ s.t. \quad & \\ & c = g(k, y; z) \\ & T = h + k + l \end{aligned}$$

where $u()$ is a utility function, c is consumption from home production, l is leisure time, x is individual characteristics, k is housework hours, y is income, z is family structure, $g()$ is a function of the consumption allocated to her from home production of the household, h is market work hours, and T is total hours available to her. Hours allocated to each activity, consumption, and income must be non-negative.

The maximization problem indicates that individual welfare depends on how much home production she consumes and how much leisure time she enjoys, and that the preference may be

affected by individual characteristics such as age or education. The first constraint indicates her share of home production using purchase outside the family and housework hours, like meal services at home which require ingredients for the food and cooking time. If she lives alone, both home production and consumption are produced simply from spending from her own income and from her housework hours. However, if she lives with her family, both of the input and the allocation of the output must depend on the family structure z. The second constraint comes from the time budget allocated to market work, housework, and leisure. If her market work hours and wages (which mainly depend on her job status) and thus her earnings and other income are pre-selected, the problem can be rewritten as

$$\max_{k} \quad u(g(k, y; z), T - h - k; x)$$

Then, the optimal amount of housework time is determined by

$$k = f(y, k, z, x) \qquad ...(1)$$

where $f()$ is a some function. As an empirical specification, equation (1) is linearized and estimated. However, equation (1) is likely to be censored (that is, the dependent variable k equals zero) for a considerable portion of the sample, particularly in the case of men and singles in Japan (as described in the next section). In this case, estimates by OLS may be biased. Therefore, equation (1) should be estimated as a Tobit model. The uncensored percentage, which indicates the percentage of those whose housework hours is not zero, is noted in each estimation result.

4.2. Variables

Variable definitions are as follows. Definitions of housework hours as the dependent variable and market work hours (WORK TIME) are the same as before. Income (INCOME) is the log of family income generated from 12 income ranks using the middle values of each rank (unfortunately, the STU does not ask individual income or earnings). Family income is considered separately according to family type in some cases as follows; in the subsample of singles, INCOME[PARENT] is used

for those living with parents, and INCOME[OTHER] is used otherwise; in the subsample of the elderly, INCOME[YOUNG] is used for those living with a young couple, and INCOME[OTHER] is used otherwise. The reason is that the family income of those living by themselves indicates their own income, while the income of singles living with parents or that of elderly couples living with a young couple are likely to include the income of these family members.

As for family structure, dummy variables indicating the existence of a spouse (SPOUSE), the youngest child at age 5 or younger (CHILD 0-5), the youngest child ages 6-17 (CHILD 6-17). Also, PARENTS indicates that singles live with parents, and YOUNG COUPLE indicates that the elderly lives with a young couple. If one nurses a family member (mostly an elderly parent) who requires other's help in daily activities such as taking a meal or using the bathroom at home (CARE[HOME]) or elsewhere (CARE[NOT HOME]), more time is expected to be spent on housework than in other cases. Note that these dummy variables are zero for those living with family members who require nursing but leaving these nursing activities to the rest of the family members. A dummy variable for living in metropolitan areas (BIG CITY) is also employed.

As for individual characteristics, age (AGE) and educational levels are selected. Based on the 12-year high-school education system, dummy variables of 9-year mandatory education (MANDATORY), junior-college level education (JUNIOR COLL), and university or higher (UNIVERSITY) are considered.

5. Determinants of Housework Hours

5.1. Marriage, Family, and Housework Hours under Age 60

Table 2 reports the estimation result using observations of those ages 20-59 on weekdays by sex to see the effects of marriage and other aspects of family structure on housework hours. According to the result, effects of market work and a single's cohabitation with parents on housework hours are significantly negative, and effects of better education and family demands for care of children and the elderly are significantly positive. Effects of marriage, age, and living in metropolitan areas are

Table 2: Estimation Result (ages 20-59)

	Women		Men	
Constant	208.36	(5.06) **	81.89	(7.84) **
WORK TIME	-0.474	(0.003) **	-0.295	(0.004) **
INCOME	-0.36	(1.11)	-10.14	(1.81) **
PARENTS	-37.39	(1.89) **	-51.52	(2.95) **
SPOUSE	123.36	(1.97) **	-27.26	(3.19) **
CHILD 0-5	125.26	(2.25) **	46.19	(3.46) **
CHILD 6-17	80.39	(1.57) **	19.19	(2.66) **
CARE[HOME]	69.03	(3.80) **	59.91	(6.71) **
CARE[NOT HOME]	26.27	(4.18) **	48.90	(7.91) **
AGE	1.11	(0.07) **	-0.52	(0.12) **
MANDATORY	-8.68	(1.81) **	-5.83	(2.82) *
JUNIOR COLL	6.16	(1.64) **	0.75	(4.04)
UNIVERSITY	5.30	(2.46) *	12.19	(2.45) **
BIG CITY	3.55	(1.29) **	-7.55	(2.06) **
log-L	-328,630		-67,134	
sample	58,437		54,668	
uncensored %	86.5%		15.6%	

*:5% level. **:1% level. Standard errors are in parentheses.

significantly positive in the case of women, while these effects are significantly negative in the case of men. The effect of family income is significantly negative in the case of men, but insignificant in the case of women.

According to these estimates, marriage leads to more than two additional hours of housework of women, while it reduces nearly half an hour of men's housework hours, other factors being unchanged. If one lives with parents before marriage, housework hours after marriage will increase more than two and a half hours for women, and will also increase 24 minutes for men[8]. Also, having children leads to women spending 3 or 4 times of the amount of time on housework as men.

Care of the elderly increases the housework hours of men (if they are involved with it) as well as women. Although university education is likely to encourage men to spend time on housework, the negative effect of high family income in the case of men may reduce this effect because high

[8]Note that these figures can be applied only when housework hours are positive before marriage; if the highly censored percentage of the housework hours of men is considered, the majority of men's housework hours can be consistently zero across marriage.

family income is correlated to high degree of education for the husband. In light of generational differences, inequality between men and women becomes less in the younger generation because young men spend more time and young women spend less time on housework than older people do. The effect of whether one is living in metropolitan areas is not well explained here. This effect is re-examined by family type in the next section.

5.2. Estimation Result under age 60 by Family Type

Table 3 presents the estimation result for ages 20-59 on weekday by sex and family type: single, couple, and single-parent. Two different models (1) and (2) are estimated in the case of singles.

<**Singles**> About half of the women and more than four out of five men spent no time on housework at all at the time of the survey date. The estimation result suggests that an increase in market work hours, cohabitation with parents, or living in metropolitan areas reduces housework hours. It also suggests that older singles spend more time on housework than the younger ones irrespective of sex. High family income reduces women's housework hours but increases men's in model (1), but this effect is found only when one lives with parents as in model (2). The effects of education are insignificant irrespective of sex.

Why does cohabitation with parents reduce the housework hours of singles? It is natural to explain that parents (namely one's mother) take care of the housework of the single child even after graduation from school. It is not difficult to explain that cooperation in housework activities or parents' home which is full of convenient electrical appliances reduces the child's housework hours, but this explanation does not apply for those who spent no time on housework. Rather, the positive effect of age supports the first explanation because parents expect older singles to be more independent of parental support than younger ones[9]. However, it is also possible that younger ones are more active in utilizing various conveniences for single life than older ones. Similarly,

[9] Additional estimation of singles by age group suggests that cohabitation with parents increase the housework time of single women in their forties.

Table 3: Estimation Result by Family Type (ages 20-59)

	Women								Men							
	Single (1)		Single(2)		Couple		Single-Parent		Single (1)		Single (2)		Couple		Single-Parent	
Constant	118.77	**	74.10	**	391.35	**	358.88	**	-24.81		-15.65		147.79	**	-109.44	
	(11.91)		(17.10)		(7.96)		(34.81)		(14.78)		(19.71)		(12.93)		(154.40)	
WORK TIME	-0.329	**	-0.331	**	-0.512	**	-0.333	**	-0.246	**	-0.246	**	-0.319	**	-0.285	**
	(0.006)		(0.006)		(0.003)		(0.019)		(0.008)		(0.008)		(0.006)		(0.067)	
INCOME	-5.86	*	-		-0.34		-0.93		9.95	**	-		-5.08		56.42	
	(2.72)				(1.69)		(7.84)		(3.39)				(2.84)		(29.99)	
INCOME[PARENT]	-		-11.92	**	-		-		-		11.76	**	-		-	
			(3.18)								(4.26)					
INCOME[OTHER]	-		8.64		-		-		-		7.06		-		-	
			(4.82)								(5.33)					
PARENTS	-37.45	**	34.29		-		-		-94.17	**	-111.55	**	-		-	
	(4.80)		(20.26)						(4.99)		(25.29)					
CHILD 0-5	-		-		116.67	**	29.14	*	-		-		24.33	**	29.50	
					(2.79)		(11.77)						(4.28)		(38.50)	
CHILD 6-17	-		-		89.07	**	-		-		-		13.89	**	-	
					(2.10)								(3.56)			
CARE[HOME]	-		-		60.95	**	-		-		-		58.59	**	-	
					(5.92)								(10.63)			
CARE[NOT HOME]	-		-		20.03	**	-		-		-		50.62	**	-	
					(5.93)								(11.20)			
AGE	2.76	**	2.72	**	-0.61	**	-0.96		1.64	**	1.66	**	-3.03	**	1.43	
	(0.18)		(0.18)		(0.11)		(0.69)		(0.22)		(0.22)		(0.19)		(2.41)	
MANDATORY	-5.40		-1.50		-3.35		-49.51	**	2.83		2.47		-9.57	*	-39.02	
	(5.86)		(5.95)		(2.72)		(10.68)		(5.94)		(5.97)		(4.35)		(31.12)	
JUNIOR COLL	3.35		3.62		13.79	**	-12.23		1.20		1.04		3.05		-17.85	
	(3.45)		(3.45)		(2.11)		(11.21)		(6.25)		(6.25)		(5.77)		(59.62)	
UNIVERSITY	0.49		0.57		17.45	**	27.76		-6.75		-6.65		15.28	**	-47.61	
	(5.09)		(5.09)		(3.11)		(22.20)		(4.71)		(4.71)		(3.26)		(35.99)	
BIG CITY	-7.94	**	-7.79	*	6.56	**	6.17		-11.50	**	-11.50	**	-4.31		6.35	
	(3.07)		(3.07)		(1.74)		(8.25)		(3.86)		(3.86)		(2.86)		(27.86)	
log-L	-29,798		-29,792		-189,083		-4,986		-13,844		-13,844		-34,465		-395	
sample	9,066		9,066		30,390		856		10,756		10,756		28,729		119	
uncensored %	48.4%		48.4%		96.8%		93.6%		17.1%		17.1%		15.2%		48.7%	

*:5% level. **:1% level. Standard errors are in parentheses.

metropolitan areas seem to have more convenient or attractive places (such as restaurants) than other local areas, and thus, those living in metropolitan areas spend less time on housework (by eating out, for example).

It is puzzling why family income has a negative effect in the case of women but a positive effect in the case of men. One possible explanation might be found in that it is daughters (but not sons) who are asked to do housework in order to cut down expenses or to help working mothers in low-income families, while sons in high-income families can afford to enjoy housework for pleasure (for example, cooking or shopping). Other explanations may be found, however.

<Couples> The rate of wives who spent no time on housework is as low as 3%, while 85% of husbands do not report doing housework (including child care, shopping, and nursing) at all. Demands for child care and care of the elderly increase the housework time of both wife and husband. The effect of age is negative (which may be related to the effect of children's age[10]), and the effect of better education is positive for both. Wives living in metropolitan areas spend more time (while singles spend less time) on housework than those living in local areas. This phenomenon can be related to the scarcity of day care facilities and childcare support by relatives in metropolitan areas. In the sample as a whole in Table 2, it seems that the positive effect of metropolitan areas on the housework time represents the effect for married women, while the negative effect in the case of men seems to be represent the effect for single men.

<Single-Parents> Nearly half of single-parent fathers and most single-parent mothers spend at least some time on housework. Effects of market work hours and 9-year mandatory education are negative, and the effect of the existence of preschool children is positive for mothers. It is only the effect of market work hours that is significant in the case of fathers.

Despite the fact that family income is likely to indicate the income of single-parents for this

[10]The effect of age of the wife is estimated as positive and that of the husband is negative when the age of the youngest child is considered (Ueda, 1999) instead of dummy variables for preschool and school-age children. Here, these dummy variables are used for the purpose of comparison to single-parents due to data limitations.

family type, the effect of income is insignificant. This result suggests that it is single-parent fathers as well as single-parent mothers who do not necessarily spend money to reduce housework hours. However, half of these fathers spend no time on housework, so the question remains as to who takes care of the housework, such as the cooking for the children. School-age children might be responsible for doing some housework, but the estimation result does not indicate that single-parent fathers with preschool children spend more time on housework than those with school-age children. One possible explanation is that fathers with preschool children may accept help from a grandmother or other relatives living nearby.

5.3. Estimation Result for the Elderly

Table 4 presents the estimation result for the elderly. More than 30% of elderly men are involved in housework; the rate is almost twice that of married men under age 60. Like singles, family income is used in model (1), and family income when living with a young couple (INCOME[YOUNG]) or otherwise (INCOME[OTHER]) is used in model (2).

The result suggests that, irrespective of sex, effects of market work hours, living with a young couple, aging, and the low level of education are negative, and the effect of care of the elderly is positive. The effect of the existence of a spouse is positive in the case of women, but negative in the case of men, as found in the estimation of those under age 60. High family income increases housework hours if living with a young couple, and it decreases men's housework hours otherwise.

It seems that much of the housework of elderly parents is transferred to the young couple. The men's estimate of care of the elderly is considerably large compared to women's; in addition to nursing activities, an elderly man who nurses his wife seems to spend additional time on daily housework.

The effect of family income is significantly positive when living with a young couple in model (2) irrespective of sex. One reason may be that high family income sometimes arises from a full-time dual-earner young couple who needs help from elderly parents with housework activities, including

Table 4: Estimation Result for the Elderly

	Women (1)		Women (2)		Men (1)		Men (2)	
Constant	817.24	**	833.71	**	332.92	**	354.11	**
	(14.18)		(14.48)		(22.03)		(22.57)	
WORK TIME	-0.400	**	-0.401	**	-0.371	**	-0.369	**
	(0.006)		(0.007)		(0.008)		(0.008)	
INCOME	7.21	**	-		-3.79		-	
	(1.69)				(2.74)			
INCOME[YOUNG]	-		25.73	**	-		23.12	**
			(3.64)				(6.80)	
INCOME[OTHER]	-		2.37		-		-8.88	**
			(1.89)				(2.98)	
SPOUSE	67.77	**	68.63	**	-74.85	**	-74.25	**
	(2.56)		(2.56)		(5.02)		(5.02)	
YOUNG COUPLE	-67.04	**	-161.44	**	-51.04	**	-182.84	**
	(2.87)		(16.70)		(4.85)		(30.83)	
CARE[HOME]	87.37	**	87.50	**	154.61	**	154.90	**
	(5.53)		(5.53)		(8.43)		(8.43)	
CARE[NOT HOME]	76.38	**	76.91	**	153.51	**	152.99	**
	(8.70)		(8.70)		(13.40)		(13.40)	
AGE	-8.78	**	-8.79	**	-3.77	**	-3.82	**
	(0.17)		(0.17)		(0.26)		(0.26)	
MANDATORY	-8.85	**	-8.88	**	-15.10	**	-15.53	**
	(2.42)		(2.42)		(3.78)		(3.78)	
JUNIOR COLL	-3.29		-2.58		11.64		11.81	
	(6.15)		(6.15)		(7.78)		(7.77)	
UNIVERSITY	-17.43		-16.48		-9.97		-8.43	
	(10.42)		(10.42)		(6.46)		(6.46)	
BIG CITY	-2.12		-2.39		-5.03		-4.95	
	(2.44)		(2.44)		(3.64)		(3.64)	
log-L	-144,028		-144,011		-48,155		-48,145	
sample	25,685		25,685		20,309		20,309	
uncensored %	82.8%		82.8%		31.1%		31.1%	

*:5% level. **:1% level. Standard errors are in parentheses.

childcare. Otherwise, high income reduces men's housework hours but not women's, as found in the case of those under age 60.

6. Concluding Remarks

This paper has examined allocation of time to housework and its determinants as related to marriage and other family structures from a time use survey in Japan. Unequal domestic labor division between husband and wife, even in full-time dual-earner families may be a reason of recent increase of late- or non-marriage, the decline of the fertility rate, and the increase of divorce.

The data analysis and Tobit estimation reveal that marriage, childcare, and care of the elderly increase the housework hours of women even when they are working full-time. In particular, marriage seems to transfer housework duty from husband to wife even in dual-earner families where most of the husbands spend almost no time on housework. It goes without saying that marriage and having children offer various social advantages and pleasure in our life. In addition, marriage often increases family income for women given income inequality between men and women. However, at least in light of domestic duty, women spend much more time than men in serving family members. A single woman working full-time for a weekly average of 52.5 hours for 5.5 days a week, she spends nine and a half hours on market work and commutation and one hour on housework on the days she work. Then, if she spends two more hours on housework after getting married and two more hours after childbirth as predicted by estimates, she has only nine and half hours for sleeping, taking her three daily meals, taking a bath, reading the newspaper, watching TV, enjoying social life, and relaxing on weekdays. It seems natural that a single woman who wants to continue her career hesitates to get married and have children. An investigation of the effect of remained unequal housework duty on women's marital and childbearing behavior remains for future analysis.

References

Amano, Haruko. 1994. Shogai moderu betsu ni mita danjo no seikatsu jikan [Time use of men and women according to life-stage models] *Seikatsu Keizaigaku Kenkyu* 10: 125-142

Atoh, Makoto. 1991. Jinko shosanka no haikei to sono tenbo [The background and outlook of fertility decline]. *Nihon Rodo Kenkyu Zasshi* 381: 2-11

Becker, Gary S. 1965. "A Theory of the Allocation of Time." *Economic Journal* 75: 493-517

Coverman, Shelley. 1985. "Explaining Husband's Participation in Domestic Labor." *The Sociological Quarterly* 26-1: 81-97

Ericksen, Julia A., William L. Yancey, and Eugene P. Erickson. 1979. "The Division of Family Roles." *Journal of Marriage and the Family* 41:301-313

Graham, John W., and Carole A. Green. 1984. "Estimating the Parameters of a Household Production Function with Joint Products." *Review of Economic Statistics* 66-2: 277-282

Gronau, Reuben. 1986. "Home Production - A Survey." in Orley Ashenfelter and Richard Layard (eds.) *Handbook of Labor Economics*, North-Holland

Gronau, Reuben. 1977. "Leisure, Home Production, and Work - the Theory of the Allocation of Time Revisited." *Journal of Political Economy* 85-6: 1099-1123

Gronau, Reuben. 1976. "The Allocation of Time of Israeli Women." *Journal of Political Economy* 84-4 part 2: S201-S220

Gronau, Reuben. 1973. "The Intrafamily Allocation of Time: The Value of the Housewives' Time." *American Economic Review* 63-4: 634-651

Hill, C. Russell, and Frank P. Stafford. 1980. "Parental Care of Children: Time Diary Estimates of Quantity, Predictability, and Variety." *Journal of Human Resources* 15-2: 219-239

Hill, C. Russell, and Frank P. Stafford. 1974. "Allocation of Time to Preschool Children and Educational Opportunity." *Journal of Human Resources* 9-3: 323-341

Juster, F. Thomas, and Frank P. Stafford. 1991. "The Allocation of Time: Empirical Findings, Behavioral Models, and Problems of Measurement." *Journal of Economic Literature* 29: 471-522

Kicker, B.F. and Ying Chu Ng. 1990. "A Simultaneous Equation Model of Spousal Time Allocation." *Social Science Research* 19: 132-152

Kooreman, Peter and Arie Kapteyn. 1987. "A Disaggregated Analysis of the Allocation of Time within the Household." *Journal of Political Economy* 95-2: 223-249

Osawa, Machiko. 1993. *Keizai Henka to Joshi Rodo* [Economic Changes and Women's Labor Force Participation]. Tokyo: Nihon Keizai Hyoronsha

Raymo, James M. 1998. "Later Marriage or Fewer? Changes in the Marital Behavior of Japanese Women." *Journal of Marriage and the Family* 60: 1023-1034

Shelton, Beth A. and Daphne John. 1996. "The Division of Household Labor." *Annual Review of Sociology* 22: 299-322

Solberg, Eric J., and David C. Wong. 1992. "Family Time Use: Leisure, Home Production, Market Work, and Work Related Travel." *Journal of Human Resources* 27-3: 485-510

Statistics Bureau, Government of Japan. 1998. *1996 Survey on Time Use and Leisure Activities.* Japan Statistics Association

Ueda, Atsuko. 1999. "Intrafamily Time Allocation of Housework: Evidence from Japan." University of Tsukuba, Discussion Paper Series no. 820 (http://infoshako.sk.tsukuba.ac.jp/ tosho//dp820.pdf)

Figure 1: Average Work Hours: ages 20-59

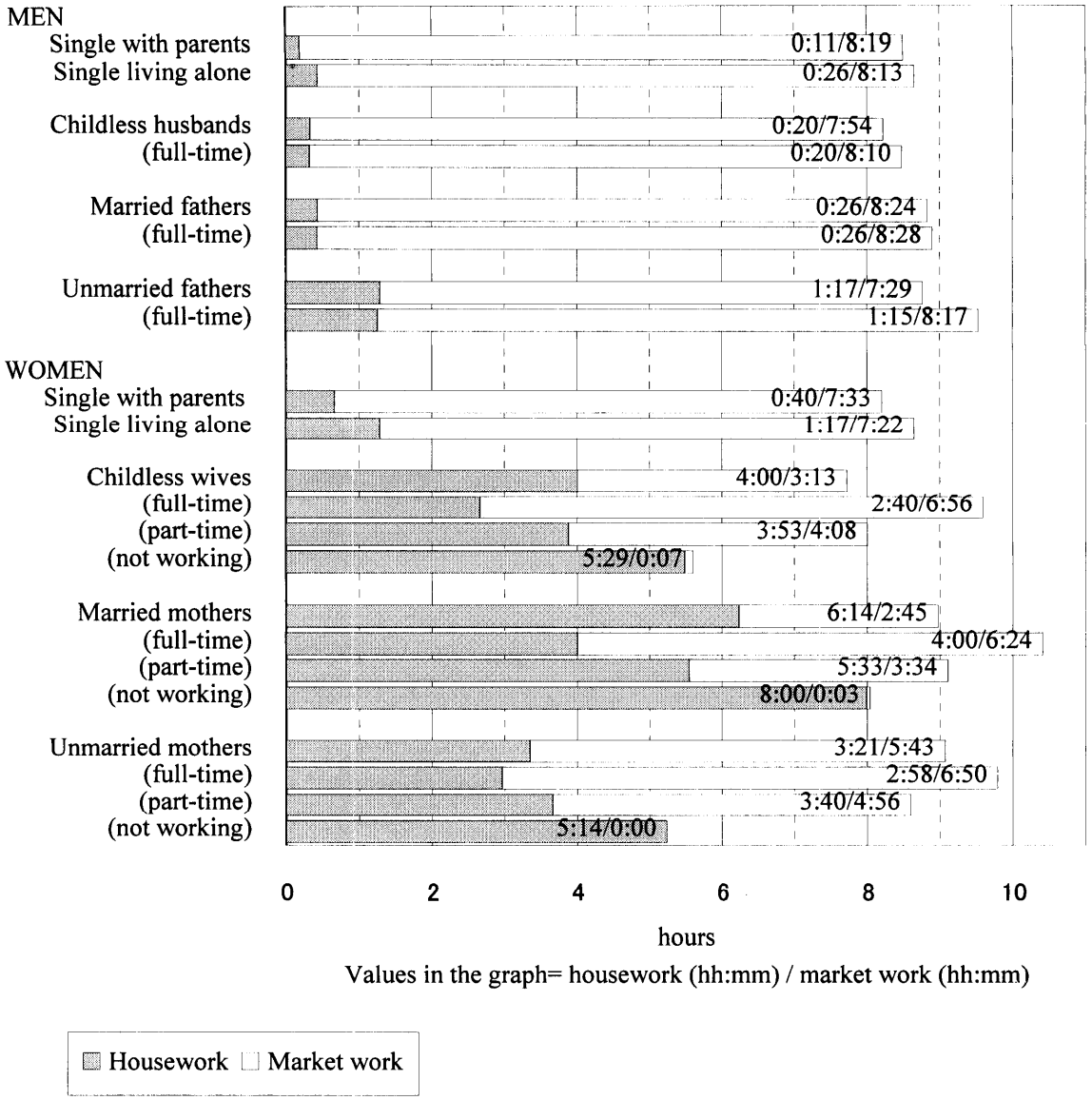

Figure2: Average Work Hours of the Elderly