No More Babies without help?
Spousal Division of Labor and Fertility Intentions in Taiwan

Yen-hsin Alice Cheng and Chen-Hao Hsu

Institute of Sociology, Academia Sinica
Taipei, TAIWAN

During the last decades of the 20th century, period total fertility levels in numerous developed countries have fallen to lowest-low levels of 1.3 children or lower (Kohler, Billari, & Ortega, 2002). Such a phenomenal shift to very low levels of childbearing has been attributed to fertility postponement caused by women's educational and occupational advancements. While many western countries have witnessed a reversal of fertility levels with the weakening of tempo-effect, many countries have experienced very limited fertility rebound. Some typical cases include East Asian advanced economies and the Southern European countries. A number of demographers have argued that gender equality is at the core of such phenomenon. For instance, McDonald (2000) has pointed out that very low levels of fertility reflect a disjuncture in gender equality in individual- vs. family-oriented institutions (McDonald, 2000). That is, as women progress socioeconomically outside the family in obtaining higher education and having occupational success, they often still shoulder the bulk of domestic works when it comes to running the household and caring for the young and the elderly.

Persistence in unequal division of household chores between spouses has been often linked to sustained low fertility in many countries where traditional gender norms prevails (Anderson and Kohler 2015, Esping-Andersen 2009, McDonald 2000). Demographers have described such a phenomenon as a "stalled gender revolution" and argued that with more egalitarian division of domestic labor, fertility tends to rise to more demographically sustainable levels, as exemplified by the Nordic countries (Goldscheider, Bernhardt, & Lappegård, 2015). An emerging literature has investigated whether division of labor within the family affects fertility intentions and behaviors, yet such attempts have mostly been made in western countries (Kan & Hertog, 2017). Empirical research that examined how fertility is linked to spousal characteristics and division of labor has been scanty in East Asia—a region that has by far most plagued by sustained lowest-low fertility in the world. This study aims to fill the void in research by investigating how husbands' share of domestic chores (including childcare and housework) and couple characteristics (i.e., age and educational pairing, wives' share of total income and working hours, etc.) affect wives' fertility intentions in Taiwan. This would improve our understanding of why fertility rates have been more resistant to reverse in social contexts that have been more traditional in gender relationships.

Data and Methods

Data

This study uses the 2016 Survey of Women's Marriage, Fertility, and Employment (WMFE) data. The WMFE data is a cross-sectional survey data that collects nationally representative sample of Taiwanese women aged 15 years old and above. Since its -inception in 1979, the survey has been conducted for18 waves, either annually (from 1979 to 1988) or at irregular intervals (mostly of every three or four years since the 1990 wave). The total sample size of the 2016 waves is 27,634 respondents, and 14,788 of them are married women.

Women were asked to report the total time spent on doing three to four different kinds of household chores (i.e., childcare, housework, elderly care, care for other family members) since the 1993 survey. Reports from husbands regarding the total time spent on each of these chores were only available for the first time in 2016. To be specific, this research investigates the relationship between couples' division of domestic work and their childbearing intentions. Our research sample is all married couples where wives were in their reproductive ages (15-49 years old) in 2016, which includes 6,037 observations. Since one of the main purposes of this study is to examine the effect of husband's share in housework and childcare on wives' reproductive intentions, we further restrict the subsample to families at parity one or above and with at least a child under 18 years of age. This further restricts the sample to 4,641 cases. The final analytical sample consists of 3,564 couples, after excluding couples with no information either on husbands' demographic characteristics (382 cases) or on couple's division of labor in childcare (695 cases).

Variables and Measurements

The question related to individual's fertility intention was phrased as: "How many children do you expect to have in the future?" Each interviewee reported her and her husband's expected number of additional sons and daughters. Since the aim of this study is to explore the driving force behind a woman's intention of further childbearing, regardless of how many births she will actually have, a dichotomous variable of wanting at least one more child (coded as 1) and wanting no more children (coded as 0) was generated.

Regarding key explanatory variables, the average daily hours spent on domestic work by a wife was composed of a set of questions reported by a respondent: (1) total time spent on childcare; (2) household chores; (3) caring for the elderly; and (4) caring for other relatives. For husbands' contribution to domestic work, we calculated a husband's share in childcare by dividing his reported total hours by the total hours spent by both partners combined. The same calculation applies to the other two variables regarding a husband's share in household chores and husband's share in these two domestic works combined.

There are several covariates we used in this study as control variables. First, a couple's parity status from parity one to parity four and above were specified. Secondly, the age of a woman was grouped into six categories: 15-24, 25-29, 30-34, 35-39, 40-44, and 45-49. A

dichotomous variable indicating whether a woman's highest educational level was tertiary (coded as 1) or not (coded as 0) was also created. Respondents with degrees from junior colleges, universities, or post-graduate programs were considered as tertiary-educated. Two additional variables regarding the relative age and educational level of the spouses were also generated: spousal age differences and educational pairing. Information on spousal age differences is coded into 4 categories: within one year, husband older for 2-5 years, husband older for 6 years and more, and wife older for 2 years and more. Spousal educational pairing is coded into 4 categories: same level, husband higher for one level, husband higher for at least two levels, wife higher for one level, and wife higher for at least two levels. A variable indicating the sex of existing children is also included to take into account son preferences prevailed in Confucian and patrilineal culture has been confirmed to affect women's progression to higher-order births (Basten & Verropoulou, 2015; Thornton & Lin, 1994). Finally, two additional control variables for a women's relative economic standing in the family were included: (1) the percentage of a wife's contribution in monthly total couple income; (2) a wife's share in total weekly working hours of the two partners[1]. Both variables are scaled from 0 to 100.

Analytical Strategies

Descriptive statistics on the variables included in this study were first presented, which is followed by analyses that explore the factors associated with husbands' share of domestic chores. Next, couple characteristic and division of labor were analyzed to see how they jointly affect the fertility intentions. Finally, counterfactual analyses with propensity score matching were also used to explore whether fertility intentions would be higher if wives with limited housework and childcare help from their partners receive more input from husbands.

Preliminary Findings

Women's role incompatibility has been documented in many studies as one key factor why many lowest-low fertility societies struggle for a fertility reversal (Brewster & Rindfuss, 2000). However, research on such issue regarding domestic division of labor has been a relatively recent investigation. This study set out to explore the factors that affect husbands' greater involvement in domestic chore sharing, and its impact on transition to higher-order birth for women of different parity statuses. Our analyses prove that exploring spousal characteristics in socio-demographic traits and work-sharing reveal a nuanced picture of what

[1] We initially included the employment status of a woman as a control in the trial model. However, including this variable in our models for fertility intention could cause multicollinearity because it was highly correlated with the variable regarding a wife's share in household income ($\rho_{X,Y}$=0.86) and with the one for a wife's share in total working hours ($\rho_{X,Y}$=0.69). Moreover, results from the likelihood ratio test indicated that adding the variable as a predictor did not result in a statistically significant improvement in model fit (the p-value associated with the chi-squared was as high as 0.80 and above). Since the two variables representing a women's relative economic status in the family were theoretically more instructive, we excluded the employment status of a women in our final models to address the collinearity issue.

happens at home that lead to differential fertility outcomes between couples.

Overall, the results are consistent with that found in previous research (Craig & Mullan, 2011), showing that a man who is much better educated than his wife tends to dedicate more time in childcare. In addition, our findings from Taiwanese couples indicate that tertiary-educated and economically empowered women are more likely to have husbands who take on a greater share of housework (both in terms of chore sharing and childcare). Such results resemble those of the mainstream theories, which argue that the advancement of women's relative socio-economic status at home generally leads to a more egalitarian division of domestic labor (Brines, 1994; Greenstein, 2000; Gupta, 2006; Schneider, 2011).

When it comes to fertility intentions, the analyses show that the fertility-enhancement effect is only observed for husbands' greater involvement with childcare but not with domestic chore. It underscores the importance of egalitarian division of childrearing works for new parents when intensive care for newborns is needed. This finding is in line with the patterns reported by prior studies done in European countries with more traditional gender dynamics (Cooke, 2004, 2009). In addition, such support from husbands is particularly helpful for tertiary-educated women who are more likely to have double burden from work and family. When wives feel that they are not alone with the advent of a newborn, the likelihood of progressing to second births becomes higher and having a bigger family seems more feasible. This result also resonate with those that found fathers' greater involvement in childcare matters more for the fertility intention among working mothers (Miettinen, Lainiala, & Rotkirch, 2015; Pinnelli & Fiori, 2008). Finally, our counterfactual analyses indicate that the positive impact of a husband's input into childcare on his wife's fertility intention is mostly restricted to parity-one couples, but not those of higher parities. Such finding has also been reported in a number of low-fertility settings, such as Finland and Italy (Miettinen et al., 2015; Pinnelli & Fiori, 2008). Furthermore, in Taiwan such a fertility-enhancement effect of childcare-sharing from fathers was mainly driven by tertiary-educated women who are more likely to form unions with helping partners.

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Table 1. Summary statistics of the characteristics of all 3,564 couples

Variables		
Key variables		
Intention of childbearing (wanting at least one more child in the future)	0.13	(0.33)
Wife's total hours in domestic works	6.21	(3.59)
Husband's share in household chores and childcare	21.68	(14.36)
Husband's share in household chores	21.78	(18.05)
Husband's share in childcare	20.93	(18.73)
Socio-demographic covariates		
Parity status		
Parity 1	29.01	
Parity 2	54.52	
Parity 3	14.39	
Parity 4+	2.08	
Women's age		
15-24	1.54	
25-29	5.92	
30-34	19.64	
35-39	31.48	
40-44	26.52	
45-49	14.90	
Spousal age difference		
within 1 year	32.10	
Husband>Wife (2~5 year)	38.22	
Husband>Wife (6 year+)	23.79	
Wife>Husband (2 year+)	5.89	
Gender of existing child(ren)		
Had at least a son	73.77	
Never had a son	26.23	
Wife's level of education		
Non-tertiary	51.52	
Tertiary	48.48	
Spousal educational difference		
Similar degree	52.10	
Husband>Wife (1 level)	20.17	
Husband>Wife (2+ level)	6.17	
Wife>Husband (1 level)	15.54	
Wife>Husband (2+ level)	6.00	
Wife's income share	27.82	(26.04)
Wife's share in working hours	34.66	(27.24)

Table 2. OLS regression models for husband's share in domestic work hours

	Husband's share in chores + childcare		**Husband's share in chores**		**Husband's share in childcare**	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Parity status (ref.= parity 1)						
parity 2	-1.988***	-1.349**	-3.180***	-2.555***	-1.423+	-0.804
	(0.559)	(0.511)	(0.704)	(0.676)	(0.729)	(0.701)
parity 3	-3.843***	-1.832*	-4.567***	-2.558**	-3.556***	-1.531
	(0.788)	(0.729)	(0.992)	(0.964)	(1.028)	(1.000)
parity 4+	-4.587**	-0.808	-6.645**	-3.010	-3.540	0.114
	(1.727)	(1.585)	(2.174)	(2.098)	(2.252)	(2.175)
Wife's Age group (ref.= age 30-34)						
15-24	-2.203	0.113	-2.726	-0.533	-2.534	-0.140
	(2.006)	(1.834)	(2.525)	(2.426)	(2.616)	(2.515)
25-29	-1.831	-0.468	0.333	1.579	-2.136	-0.801
	(1.127)	(1.028)	(1.419)	(1.360)	(1.470)	(1.410)
35-39	0.775	0.335	0.246	-0.129	0.965	0.550
	(0.693)	(0.631)	(0.872)	(0.835)	(0.903)	(0.865)
40-44	-0.527	-1.402*	-0.423	-1.208	-1.630+	-2.428**
	(0.720)	(0.658)	(0.906)	(0.870)	(0.939)	(0.902)
45-49	-0.988	-2.408**	0.915	-0.253	-3.217**	-4.497***
	(0.833)	(0.762)	(1.048)	(1.009)	(1.086)	(1.046)
Spousal age difference (ref.=within 1 year)						
Husband>Wife for 2-5 years	-0.476	0.295	-0.295	0.482	-0.877	-0.122
	(0.575)	(0.526)	(0.724)	(0.696)	(0.750)	(0.721)
Husband>Wife for 6 years	-0.706	0.818	0.198	1.866*	-1.811*	-0.217
	(0.652)	(0.611)	(0.820)	(0.809)	(0.850)	(0.838)
Wife>Husband for 2 years	0.568	1.657+	0.457	1.435	0.899	1.903
	(1.077)	(0.981)	(1.355)	(1.297)	(1.404)	(1.345)
Tertiary educated wife (ref.=non-tertiary wife)		3.575***		4.295***		4.106***
		(0.487)		(0.644)		(0.667)
Spousal education diff (ref.=same education)						
Hus>Wife (1 level)		-0.374		-0.617		-0.051
		(0.575)		(0.760)		(0.788)
Hus>Wife (2+ levels)		1.383		2.253+		2.390+
		(0.936)		(1.238)		(1.284)
Wife>Hus (1 level)		-0.896		-0.624		-1.577+
		(0.640)		(0.847)		(0.878)
Wife>Hus (2+ levels)		-0.277		-1.245		-0.973
		(0.981)		(1.298)		(1.346)
Wife's income share		0.145***		0.128***		0.123***
		(0.013)		(0.018)		(0.018)
Wife's working hours share		0.081***		0.065***		0.080***
		(0.013)		(0.017)		(0.018)
Constant	23.921***	14.510***	24.271***	15.451***	23.781***	14.763***
	(0.729)	(0.800)	(0.918)	(1.059)	(0.951)	(1.098)
N	3564	3564	3564	3564	3564	3564
R^2	0.0123	0.184	0.0102	0.0967	0.0130	0.0981

Table 3. Odds ratios of logit regression models predicting the intention of wanting more children among women at parity-one and above

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Wife's total hours in domestic works (chore+childcare+elderly+other)	1.090*** (0.019)	1.101*** (0.022)	1.102*** (0.022)	1.077*** (0.018)	1.095*** (0.022)	1.094*** (0.022)	1.085*** (0.019)	1.099*** (0.022)	1.102*** (0.022)
(1) Husband's share in total **chore**+**childcare**	1.012** (0.005)	1.009+ (0.005)	0.995 (0.008)						
(1)*Tertiary educated wife			1.023* (0.009)						
(2) Husband's share in **chore**				1.006+ (0.003)	1.003 (0.004)	0.999 (0.006)			
(2)*Tertiary educated wife						1.006 (0.007)			
(3) Husband's share in **childcare**							1.008* (0.004)	1.005 (0.004)	0.993 (0.006)
(3)*Tertiary educated wife									1.021** (0.008)
Parity status (ref.= parity 1)									
parity 2	0.056*** (0.009)	0.056*** (0.009)	0.055*** (0.009)	0.056*** (0.009)	0.056*** (0.009)	0.056*** (0.009)	0.056*** (0.009)	0.055*** (0.009)	0.055*** (0.009)
parity 3	0.036*** (0.014)	0.039*** (0.016)	0.039*** (0.015)	0.036*** (0.014)	0.039*** (0.016)	0.039*** (0.015)	0.036*** (0.014)	0.039*** (0.015)	0.038*** (0.015)
parity 4+	0.025*** (0.026)	0.029*** (0.030)	0.027*** (0.028)	0.026*** (0.026)	0.029*** (0.030)	0.028*** (0.029)	0.025*** (0.026)	0.028*** (0.029)	0.027*** (0.028)
Wife's Age group (ref.=30-34)									
15-24	3.123** (1.135)	3.778*** (1.402)	3.701*** (1.370)	3.189** (1.156)	3.816*** (1.415)	3.793*** (1.408)	3.123** (1.138)	3.774*** (1.403)	3.730*** (1.384)
25-29	3.206*** (0.703)	3.337*** (0.740)	3.299*** (0.732)	3.170*** (0.694)	3.324*** (0.736)	3.323*** (0.737)	3.200*** (0.701)	3.339*** (0.740)	3.296*** (0.731)
35-39	0.550*** (0.086)	0.552*** (0.087)	0.542*** (0.086)	0.551*** (0.086)	0.554*** (0.087)	0.553*** (0.087)	0.549*** (0.086)	0.552*** (0.087)	0.541*** (0.085)
40-44	0.156*** (0.033)	0.152*** (0.033)	0.147*** (0.032)	0.153*** (0.033)	0.150*** (0.032)	0.149*** (0.032)	0.155*** (0.033)	0.152*** (0.033)	0.148*** (0.032)
45-49	0.053***	0.052***	0.049***	0.052***	0.051***	0.050***	0.054***	0.052***	0.051***

Table 3. (continued)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Spousal age diff (ref.=within 1 yr)									
Hus>Wife_2~5yr	0.752+	0.781	0.771+	0.757+	0.786	0.785	0.745+	0.779	0.774
	(0.116)	(0.122)	(0.120)	(0.117)	(0.122)	(0.122)	(0.115)	(0.121)	(0.121)
Hus>Wife_6yr+	0.495***	0.557**	0.559**	0.486***	0.554**	0.556**	0.495***	0.558**	0.559**
	(0.089)	(0.103)	(0.103)	(0.087)	(0.102)	(0.103)	(0.089)	(0.103)	(0.103)
Wife>Hus_2yr+	1.265	1.281	1.282	1.269	1.291	1.281	1.266	1.286	1.303
	(0.319)	(0.325)	(0.327)	(0.320)	(0.328)	(0.326)	(0.319)	(0.326)	(0.332)
Never had a son	2.101***	2.056***	2.079***	2.094***	2.052***	2.060***	2.110***	2.062***	2.083***
(ref.=had at least a son)	(0.277)	(0.273)	(0.277)	(0.276)	(0.272)	(0.274)	(0.278)	(0.274)	(0.277)
Tertiary educated wife		1.613**	0.962		1.640***	1.434+		1.631***	1.051
(ref.=non-tertiary wife)		(0.236)	(0.242)		(0.240)	(0.314)		(0.238)	(0.231)
		1.613**	0.962		1.640***	1.434+		1.631***	1.051
Spousal educ diff (ref.=similar educ)									
Hus>Wife (1 level)		1.050	1.054		1.045	1.045		1.043	1.043
		(0.181)	(0.182)		(0.180)	(0.180)		(0.179)	(0.180)
Hus>Wife (2+ level)		1.692+	1.734*		1.693+	1.705+		1.705+	1.739*
		(0.476)	(0.487)		(0.475)	(0.479)		(0.478)	(0.486)
Wife>Hus (1 level)		0.895	0.881		0.890	0.887		0.894	0.880
		(0.174)	(0.172)		(0.172)	(0.172)		(0.173)	(0.171)
Wife>Hus (2+ level)		0.852	0.867		0.846	0.854		0.843	0.852
		(0.220)	(0.224)		(0.218)	(0.221)		(0.218)	(0.220)
Wife's income share		0.996	0.995		0.997	0.997		0.996	0.996
		(0.004)	(0.004)		(0.004)	(0.004)		(0.004)	(0.004)
Wife's working hours share		1.008*	1.009*		1.008*	1.008*		1.008*	1.009*
		(0.004)	(0.004)		(0.004)	(0.004)		(0.004)	(0.004)
N	3,564	3,564	3,564	3,564	3,564	3,564	3,564	3,564	3,564
Pseudo R^2	0.412	0.418	0.420	0.410	0.417	0.418	0.411	0.418	0.420
chi2	1132.469	1149.514	1155.917	1128.509	1147.299	1147.979	1130.056	1148.420	1155.633

Note: Standard errors in parentheses. 2016 married couple with at least one kid under age 18 and with wives aged 15-49 (1,077 cases with missing data excluded)

Table 4. Estimates from propensity score matching models with women's childbearing intention as the outcome variable

	Observed (Treated)	Counter-Factual (Controls)	ATT	Std. Err.	Nt/Nc
Treatment: Husband shares more than 20% of total hours spent in childcare					
All couples					
All parity	0.1327	0.1194	0.0133	(0.0123)	1,726/1,825
Parity 1	0.3854	0.3361	0.0493*	(0.0345)	519/505
Parity 2 and above	0.0242	0.0291	-0.0049	(0.0071)	1,200/1,321
Non-tertiary-educated wives					
All parity	0.0924	0.0878	0.0046	(0.0144)	779/1,046
Parity 1	0.2990	0.2735	0.0255	(0.0479)	194/245
Parity 2 and above	0.0241	0.0239	0.0001	(0.0090)	587/803
Tertiary-educated wives					
All parity	0.1681	0.1522	0.0159	(0.0205)	946/770
Parity 1	0.4424	0.3740	0.0684*	(0.0497)	321/258
Parity 2 and above	0.0245	0.0378	-0.0133	(0.0116)	613/512

Note: *p < 0.10; Nt = number of treated, Nc = number of controls. Results were estimated from the Kernel matching method. The average treatment effects of the treated (ATT) measures percentage point differences of fertility intention between the treated and control groups.