

Husband's Domestic Work Participation and Female Fertility: Empirical Research based on Chinese General Social Survey (CGSS)

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Abstract: In recent years, the national total birth rate has been maintained at a low level, and the micro-level individual and family characteristics have increasingly become the main reason for determining the fertility of Chinese women. This paper will use the data of China National Comprehensive Social Science Research Center (CGSS) in 2017 to study the relationship between husband's domestic labor participation and women's reproductive behavior by negative binomial regression. The study found that the husband's domestic labor participation is closely related to women's reproductive behavior.

1. Introduction

Since the 21st century, China's fertility level has been significantly lower than the replacement level, and the downward trend is very obvious, low fertility rate has come. In order to actively respond to population aging and promote balanced population development, China formally implemented the universal two-child policy in 2016 [1]. However, according to data released by the National Bureau of Statistics, the number of births per year has not risen sharply since the implementation of the comprehensive two-child policy in 2016, and is decreasing year by year. The number of births in 2017, 2018, 2019 and 2020 is 17.23 million, 15.23 million, 14.65 million and 12 million, respectively. The data show that the number of births in 2020 is more than 5 million less than three years ago, the lowest number of new births and birth rates since the founding of New China. According to the seven censuses, the total fertility rate (TFR) in 2020 is 1.3, which is higher than that of the five censuses (1.22) and the six censuses (1.18), but no exception is less than 1.5, which belongs to the very low fertility rate. Therefore, we draw a qualitative conclusion: China has fallen into the 'ultra-low fertility trap' in the 21st century [2]. On 31 May 2021, the CPC Central Committee announced the deployment of a three-child policy.

Demographers, after examining the situation in western developed countries where fertility transitions were completed earlier and experienced very low fertility levels, put forward a gender equity theory explaining low fertility levels, emphasizing the differences and conflicts experienced by women within and outside the family, as well as the lagging transformation of traditional male gender concepts, and their relationship with women's reproductive behavior [3]. With the change of women's status brought by the miniaturization of family, the spread of western values, the expansion

of education and the change of labor market, Chinese women's reproductive behavior is increasingly affected by the gender relations in family members [4]. On the basis of gender equity theory, this paper uses CGSS2017 data and negative binomial regression analysis method to study the relationship between husband's domestic labor participation and female reproductive behavior from the perspective of husband's individual characteristics.

Gender equity theory believes that whether the development of gender equity in the two fields of work and family is coordinated is the key to explain the change of fertility rate. The theory points out that in recent years, women have made great progress in education and occupation compared with men, but in the family field, the development of gender equity is still lagging behind, which leads to the continuous decrease of fertility rate in many countries [5].

Many sociological and demographic empirical studies have linked the gender division of housework to reproductive behavior. Some scholars use the national survey data of American families to study, found that the proportion of women involved in domestic labor and the probability of having two children is U-shaped relationship, that is, when the proportion of women's domestic labor is less than 54 % or more than 85 %, the possibility of having two children is higher [6]. In a recent study, McDonald pointed out that gender equity theory derived from Western countries can also explain the low fertility phenomenon in East Asian society [7]. Empirical studies in Japan have also found that there is a positive correlation between husband sharing housework and fertility outcomes [8].

McDonald's gender equity theory has aroused widespread concern in academia. On this basis, Goldscheider and other scholars further put forward the two-stage theory of gender development. In the first stage of gender development, women's education level has increased rapidly, and labor participation rate and economic independence have also improved significantly. However, at this stage, the development of gender equity in the family field is slow, so women also need to bear heavy housework and the responsibility to care for children at work, and the resulting work-family conflict makes women lack the motivation to have children. However, in the process of gender development in the second stage, the gender equity in the family field has been improved, and men began to share domestic labor and participate in parenting, which will alleviate women's work-family conflict and improve their fertility desire. The fertility rate at the national level will also rise [9].

Therefore, according to the gender equity theory and the two-stage theory of gender development, this paper puts forward a set of opposite assumptions: the original assumption is that 'the husband undertakes less housework, the higher the female fertility behavior'; the alternative hypothesis is that 'the husband undertakes more housework, and the higher the female fertility behavior is'.

2. Data and Methods

2.1 Data Sources

The data used in this paper come from China General Social Survey (CGSS), which is the earliest national, comprehensive and continuous academic survey project in China. CGSS is a systematic and comprehensive survey of data collection at multiple levels of society, community, family and individual. This article uses CGSS 2017 data and uses 2015 data for simple comparison. This paper adopts the method of negative binomial regression. After data processing, the samples meeting the conditions were 1213 (2017) and 534 (2015).

The main independent variables used in this paper are husband's household labor participation(household), age, nationality, household registration(reg), income, education level(ed), fertility preference(pre), fertility expectation(exp), and the number of children(child) is used to measure women ' s fertility behavior [10]. (The data processing software in this paper is IBM SPSS Statistics 23 and StataSE-64.)

What needs to be explained is: 1) In the questionnaire of 2017 and 2015, the description of the

problem of domestic labor participation is different. In 2017, the frequency of cooking dinner, washing clothes, cleaning homes, repairing indoors and outdoors, and purchasing daily necessities were asked; In 2015, the time for housework on weekdays and weekends was asked. 2) The article classifies the blue print accounts, residents accounts and military accounts into urban accounts. 3) There was no direct description of fertility preferences in 2015, and the questions in the questionnaire were described as ‘If there were no policy constraints, you would like to have several sons’ and ‘If there were no policy constraints, you would like to have several daughters’. The authors subtracted the two values and defined them as ‘boy preferences’ when the results were positive; when the result is negative, it is defined as ‘girl preference’; when the result is zero, it is defined as ‘boys and girls are the same’.

2.2 Negative Binomial Regression Model (NB)

Firstly, the dependent variable in this paper is the count variable. Secondly, the author conducts the Omikhon test on the dependent variable. Through Equation (1), it is calculated that: $o = -11.7$, and the absolute value of discrete statistics is greater than 1.96. Therefore, the dependent variable is over-discrete. In addition, the proportion of the zero value of the dependent variable in the total sample is 3.2 %. Therefore, the negative binomial regression model is used for basic estimation. The variable selection standard of the model simulation is the independent variable with high level of visibility.

$$o = \sqrt{(n-1)/2} * (s^2 - \bar{x}) / (\bar{x}) \quad (1)$$

Negative binomial regression model is:

$$\ln(\mu) = \text{intercept} + b_1 X_1 + b_2 X_2 + \dots + b_m X_m \quad (2)$$

$$\mu = \exp(\text{intercept} + b_1 X_1 + b_2 X_2 + \dots + b_m X_m) \quad (3)$$

It should be noted that μ is an exponential function of independent variables, $\mu + k\mu^2$ is a negative binomial variance and $k \geq 0$ is a discrete parameter.

3. Analysis of Effect

3.1 Multi-collinearity Diagnostics

Table 1: Variance Inflation Factor

Model	Collinearity Statistics	
	Tolerance	VIF
1		
(Constant)		
household	.986	1.014
age	.783	1.277
nationality	.982	1.018
reg	.633	1.580
income	.837	1.194
edu	.561	1.783
pre	.974	1.027
exp	.955	1.047

In order to improve the accuracy of model simulation and exclude the independent variables with close linear relationship between each other, the authors performed multi-collinearity diagnostics for

the independent variables needed for analysis before modeling. Normally defined, when $0 < VIF \leq 5$, no collinearity. It can be seen from Table 1 that the variance inflation factors of each variable are 1.014, 1.277, 1.018, 1.580, 1.194, 1.783, 1.027, 1.047. All these values are in the range of noncollinearity. so there is no obvious collinearity between each variable, which can be used for model fitting at the same time.

3.2 Analysis of Fitting Results of Negative Binomial Regression Model (NB)

Table 2 only includes the variable of housework participation. The results show that housework participation is positive at the 1 % significant level, indicating that husband's housework participation will significantly enhance women's fertility behavior.

Table 2: Negative Binomial regression (Model 1)

child	Coef.	z	P> z	[95% Conf. Interval]
household	.0074199	3.05	0.002	.0026591 .0121808
_cons	.372893	7.67	0.000	.2776461 .4681399

Table 3 adds other individual characteristic variables on the basis of household labor participation. According to the parameter estimation results, through Formula (2) and Formula (3), the model is:

$$\mu = \exp \left\{ \begin{array}{l} -0.2914 + 0.0058 \text{housework} - 0.2531 \text{account} \\ + 0.014 \text{age} + 0.206 \text{desire} - 0.0208 \text{education} \end{array} \right\}$$

Table 3: Negative Binomial regression (Model 2)

child	Coef.	z	P> z	[95% Conf. Interval]
household	.0057785	2.95	0,003	.0019407 .009616
age	.0140348	12.94	0.000	.0119091 .016160
nationality	.0201122	0.43	0.668	-.0718615 .112085
reg	-.2530606	-7.64	0.000	-.3180163 -.18810
income	-2.14e-07	-1.58	0.115	-4,79e-07 5.17e-0
edu	-.0207745	-3.92	0.000	-.031157 -.01039
pre	.0003746	0.03	0.979	-.0277912 .028540
exp	.2059805	8.72	0.000	.1596801 .252280
_cons	-.2913978	-2.64	0.008	-.5076883 -.075107

The results show that household labor participation is still positive at 1 % aboriginal level, so the original hypothesis can be rejected and the alternative hypothesis can be accepted. It is believed that the increase of husband's household labor participation significantly increases the number of children. Except for family labor participation, the four independent variables of household registration, age, fertility expectation and education level were all significant at 0.01 level. The increase of urban household registration and education significantly reduced the number of children, and the increase of age and higher fertility expectation significantly increased the number of children.

In the model, -0.2914 is a constant value; 0.0058 indicated that the husband's housework time increased by 1 unit, and the average number of female children increased by 0.0058 . -0.2531 indicates that the average number of births with urban household registration is 0.2513 less than that with rural household registration; 0.014 The average age increases by 1 unit and the average number of children born to women increases by 0.014 .

Table 4 shows the regression results of the 2015 data. We can see that the participation of housework is still significantly positively correlated with the number of children at the 1 % level.

Table 4: Negative Binomial regression (Model 3)

child	Coef.	z	P> z	[95% Conf. Interval]
household	.0292651	3.29	0.001	.0118525 .0466777
_cons	.5400818	14.27	0.000	.4658842 .6142795

3.3 Robustness Test

3.3.1 Replacement of Measurement Methods

In order to verify the robustness of negative binomial regression results, this paper replaces different measurement methods for regression analysis of data. The regression models used in this paper are Ordinary Least Squares regression (OLS) and Poisson regression.

It can be seen from Table 5 that in the OLS estimation results, the regression coefficient of husband's household labor participation is significantly positive at the 1 % level, which is consistent with the above negative binomial regression results.

Table 5: OLS Model

child	Coef.	t	P> t	[95% Conf. Interval]
household	.0101945	3.52	0.000	.0045151 .0158738
age	.0238635	13.31	0.000	.0203455 .0273816
nationality	.030302	0.33	0.738	-.1472749 .2078789
reg	-.4362586	-7.74	0.000	-.5468105 -.3257068
income	-2.90e-07	-1.05	0.296	-8.34e-07 2.54e-07
edu	-.0245079	-2.47	0.014	-.0439679 .005048
pre	.0013725	0.06	0.956	-.0474021 .0501472
exp	.3430368	8.80	0.000	.266581 .4194926
_cons	.3430924	1.87	0.062	-.0171802 .7033651

It can be seen from Table 6 that the regression coefficient of husband's housework participation is still positive at 1 % level in Poisson estimation, which further proves the robustness of negative binomial regression results.

Table 6: Poisson regression

child	Coef.	z	P> z	[95% Conf. Interval]
household	.0057785	2.95	0.003	.0019407 .0096164
age	.0140348	12.94	0.000	.0119091 .0161604
nationality	.0201122	0.43	0.668	-.0718615 .1120859
reg	-.2530607	-7.64	0.000	-.3180164 -.188105
income	-2.14e-07	-1.58	0.115	-4.79e-07 5.17e-08
edu	-.0207745	-3.92	0.000	-.031157 -.010392
pre	.0003746	0.03	0.979	-.0277912 .0285405
exp	.2059805	8.72	0.000	.1596801 .2522809
_cons	-.2913978	-2.64	0.008	-.5076884 -.0751073

3.3.2 Subsample Regression

Because the influence of husband's housework participation on women's reproductive behavior may be different in different groups, this paper makes a sample regression of the data according to the urban and rural groups and age groups. In the age group, the article defines: when reg is 1, it

represents the agricultural household; when reg is 2, it represents the urban household; age \leq 30 years old is the relatively young group, and age $>$ 30 years old is the relatively elderly group. The regression results are shown in Table 7.

Table 7: Subsample regression

If reg==1						
child	Coef.	t	P>t	[95% Conf.	Interval]	
household	0.0070047	1.56	0.120	-0.0018331	0.0158425	
If reg==2						
child	Coef.	t	P>t	[95% Conf.	Interval]	
household	0.0135916	3.83	0.000	0.0066157	0.0205675	
If age \leq 30						
child	Coef.	t	P>t	[95% Conf.	Interval]	
household	0.0248137	2.21	0.030	0.0024185	0.0472089	
If age $>$ 30						
child	Coef.	t	P>t	[95% Conf.	Interval]	
household	0.010359	3.31	0.001	0.0042259	0.0164921	

The regression results show that the husband's participation in housework significantly increases the fertility behavior of urban women, but has no significant impact on rural residents, which may be due to different fertility concepts in urban and rural areas. The impact of husbands participation in domestic work on women's reproductive behaviour is evident in all age groups.

4. Conclusions and discussion

Under the background of low fertility in China, women's reproductive behavior is affected by many factors. This paper explores the relationship between husband's domestic labor participation and women's reproductive behavior under the individual characteristics of the family. The data show that the negative binomial regression results verify the hypothesis that 'the husband undertakes more housework, the higher the female reproductive behavior'. It can be seen that husband's participation in housework is closely related to female fertility behavior. Men's participation has increased fertility mainly because it reduces women's family burden and promotes gender equality between husband and wife, thereby increasing the likelihood of having more children.

Based on the above analysis, the article suggests that at the national level, the reproductive system suitable for men should be explored, rather than focusing solely on women. This paper analyzes the data and finds that the husband's family labor participation significantly increases the fertility behavior of urban women, while urban men are mainly engaged in non-agricultural activities, leisure time and other aspects are obviously not as rich as rural men. Therefore, the state should take into account this aspect in the formulation of fertility policies in order to better improve women's fertility behavior. At the social level, we should improve the people's understanding of the value of housework, strengthen the publicity and education of male housework participation, so that the people's cognition of housework has changed, and fully realize the importance of husband's housework participation. As the relevant literature points out, male participation is the key to the change of fertility rate in contemporary society.

This paper discusses the current situation of low fertility in China from the perspective of gender equity under the background of low fertility level. Because the independent variables considered in this paper are the individual characteristics of husbands, there are many other factors that affect the fertility behavior of Chinese women. The analysis of this paper also has some defects, first of all, in

addition to the husband's time to participate in domestic work, gender relations within the family should be multidimensional measurement [11]. For example, the decision-making power of different family affairs and the interaction mode between husband and wife [12]. At the same time, limited by the data, this paper used to analyze the types of domestic labor contains less categories, may deviate from the actual total time and arrangement of domestic labor; in the analysis of the distribution of domestic labor, it can also be considered to distinguish between different types of domestic labor, the accessibility of related services available on the market [13]. Moreover, due to the limited data, the article data lack of time variables, unable to conduct further research.

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