The Impact of Women's Family Empowerment on Private Tutoring Expenditure: Evidence from CFPS

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Abstract

Private tutoring expenditure is an important part of household expenditure, and many studies have discussed its influencing factors. This paper attempts to analyze it from the perspective of women's family empowerment as generally mothers are more involved in children's education than fathers (NHES, 2001). When women have a higher level of empowerment, family decisions like private tutoring are more likely to reflect their preference. Thus, we believe that higher level of women' s empowerment can increase the household expenditure on private tutoring as well as the probability of tutoring occurrence. It also has different impacts on children in different age groups, and has the greatest impact on children aged from 12-15. This paper will verify these two hypotheses with Logit and Tobit models using data from China Family Panel Studies (CFPS).

I Introduction

In response to the growing competition and the increase of household income, private tutoring expenditure has become an important household expenditure in China. The demand from parents and students for tutoring drives the rapid expansion of the tutoring market and the development of private tutoring industry is in full swing. Over the past decade, the total number of education-related enterprises has increased from 780,000 to 4.12 million, with 560,000 new education-related enterprises in 2019 and nearly 520,000 in the first 11 months of 2020. According to the estimation of China Industry Information Network, the size of Chinese private tutoring market will reach 768.9 billion yuan in 2022, which is 2.6 times of the market size in 2013, and will continue to grow at fast pace in the next few years.

Private tutoring, most of the time, is regarded as a supplement to formal schooling. It can not only help children who fall behind to catch up, but also help those who perform well to keep a competitive edge over peers. As it weighs a larger and larger proportion on household expenditure, questions about its influencing factors arise. A

number of studies attempted to document the effects of family socioeconomic status on children's tutoring experiences (Buchmann, 2002; Li and Liu, 2011) because socioeconomically advantaged families are believed to have more economic resources and more willingness to invest in children's education (Becker, 1991). However, most of these studies focused on household level factors, including parents' education levels, household income and family size. Relatively less research has focused on within-couple level factors and examined the effect of spouses' relative socioeconomic status on private tutoring.

Women's family empowerment has been discussed since it was formally proposed at the International Conference on Population and Development (ICPD) in 1994. The distribution of family power is an important topic in this field as it further determines major family decisions. Previous studies have shown that women's family empowerment can play a certain role in children's education. Therefore, this paper tries to explore whether women's family empowerment will have an impact on children's private tutoring experiences and gains insight into questions such as how does the women's family empowerment affect household expenditure on private tutoring, and to what extent? Does it increase the probability of tutoring occurrence? Which age group of children is effected most?

To investigate the impact of women's empowerment on private tutoring, this paper adopts women's empowerment as the core explanatory variable and household private tutoring expenditure as the response variable. Notice that women's family empowerment is an abstract concept which is difficult to observe directly, so we use the answers to several questions about the decision-making power of men and women in the CFPS database to reflect the women's family empowerment. Meanwhile, the introduction of other control variables increases the reliability of the results. Our main findings reveal that women's empowerment increases the occurrence probability of private tutoring. For every one unit increase in the women's empowerment, the probability of private tutoring increases by 1.48%, and private tutoring expenditure will increase by 8.46%. Moreover, the women's family empowerment has the most significant influence for children aged from 12 to 15. The results show that for each additional unit of women's family empowerment, the probability of participating in private tutoring will increase by 2.40% and the expenditure will increase by 14.00%.

The structure of the paper is as follows: Section II offers the literature review; Section III discusses research hypotheses and models; and Section IV presents the data and summary statistics; Section V presents the results and robustness checks. Section VI concludes and poses some further implications.

II Literature Review

As a supplement of school education, private tutoring accounts for an increasing proportion of household expenditure. Many researchers focus on the impact of family socioeconomic status on private tutoring expenditure. Xue (2015) emphasized that private tutoring expenditure is positively correlated with family socioeconomic status. Students with better family socioeconomic backgrounds, coming from large and medium-sized cities are more likely to have tutoring experiences. Su and Liu (2020) found that there is an obvious relationship between preschool children's household education expenditure and family socioeconomic status. In addition, some other factors are also proved to have a significant impact on household education expenditure, such as parents' education levels, parental expectation on children's education and household registration status (hukou) (Gu and Yang, 2013). These factors are selected as control variables in our models. Moreover, researchers show that family well-being will improve when mothers have more decision-making power in the family. For example, Duflo (2012) proposed that women's empowerment is beneficial to economic development; Chen et al. (2015) found that microfinance is beneficial to women's anti-poverty by increasing their initiative and feasible ability.

There are some theoretical explanations for the factors influencing the power distribution of husband and wife. One is the resource theory, which emphasizes that the distribution of family power depends on the relative resources of husband and wife. Family power would lean to the more "resourceful" spouse who has better income, education, and social status. The second explanation, the theory of cultural norms, emphasizes that the power distribution of husband and wife depends not only on the relative resources of the couple but also on the specific culture environment. The third is the theory of love and need, which holds that the spouse who gives higher value to the marriage or provides more resources to the other spouse will be in the a weaker position of power; while the spouse who gives less affection can control and use its resources more freely and effectively, thus occupying the dominant position of power.

In modern families, mothers usually pay more attention to their children's education than fathers do. There is a view that men and women are not only fundamentally different in bearing offspring, but also in raising and nurturing their children. In some studies, women are thought to be more concerned with family welfare than men. Families with the same education level of the mother tend to spend more on children's education than those with the same education level of the father (Becker G S., 1985). Yi et al. (2016) analyzed the relative resources index in the family, including the proportion of the wife's disposable income in the total disposable income of the couple, the age difference between the husband and the wife, and the ratio of the wife's education years to the husband's education years. They found that there is no significant correlation between the wife's relative income and household education expenditure, but the

relative age difference is negatively correlated with the household education expenditure, and the wife's relative years of education is positively correlated with household education expenditure. Fernandez et al. (2017) studied the influence of decision-making power between husband and wife on household education expenditure, and found that when the decision-making power is fully controlled by one spouse, it will have a negative impact on education expenditure. From the perspective of relative resources, Chen (2015) used three indicators: relative education level, relative income, and relative occupational class to measure the relative resources of husband and wife. He found that these three indicators have significant effects on women's family empowerment.

The past decade has witnessed the improvement in women's political status, economic status, and the change of family division. The resources possessed by women have gradually increased, so the resources gap between men and women has been narrowed. This international phenomenon of women's empowerment raises new questions about its impact on education. Will it affect household education expenditure? In this study, we focus on private tutoring and use data from CFPS to empirically analyze whether and how women's family empowerment affects the household expenditure on private tutoring. Our study extends previous research by analyzing the effect of spouses' relative socioeconomic status at within-couple level because to our knowledge, most studies analyzed the effect of family socioeconomic status at household level. Our second contribution is to further verify the impact of women's family empowerment on children's tutoring experiences, incorporating relative resources indicators into women's family empowerment indicator to conduct robustness checks.

III Empirical Strategy

A. Research Hypotheses

Studies have shown that mothers in the family have a significant impact on children's education (Pei et al., 2018). Mothers with higher education levels consider education as a long-term investment and tend to invest more in their children's education, so do mothers with higher positions and higher incomes. The resource theory believes that family power depends on the resources owned by each family member, and the relative resources of husband and wife determine their relative family power, which has been confirmed by many empirical studies (Xiao, 2013). Women with a higher level of empowerment can shift family decision-making in favor of their own preferences. Based on the analysis above, hypothesis one is proposed:

Higher level of women's family empowerment can increase the household expenditure on private tutoring and the probability of tutoring occurrence.

Studies have shown the relationship between mother's education and chidren's academic achievement, some of them focus on early childhood period, aging from 3-6 (Mo,

2007), whereas some of them focus on middle childhood period, aging from 6-12 (Magnuson, 2007). However, the comparison of mother's effect on different age groups of children is unclear. Additionally, middle school students aged from 12-15 learn much more difficult knowledge, which may demand more private tutoring classes than other age groups. So we propose hypothesis two:

The level of women's family empowerment has different impacts on different age groups, and has the greatest impact on children aged from 12-15.

B. Models

The dependent variable we selected is average private tutoring expenditure. Since a considerable number of the expenditure data are zero, so the expenditure is censored at zero yuan per household. To deal with the censored data, Tobit model (as shown in (2)) is more appropriate than OLS model because OLS gives inconsistent estimation. In addition, Logit model can be used to estimate the probability of tutoring occurrence. Households with private tutoring behavior are assigned to be 1, otherwise, households are assigned to be 0, as shown in (1):

$$P(occur_i = 1|w\_e_i, X_i) = \alpha_1 + \gamma_1 \cdot w\_e_i + X_i\beta_1 + \epsilon_i \tag{1}$$

$$ln(expenditure_i) = \alpha_2 + \gamma_2 \cdot w\_e_i + X_i\beta_2 + \epsilon_i \tag{2}$$

where $expenditure_i$ is the is the average private tutoring expenditure of household i; P_i is the probability of tutoring occurrence. The regressor of primary interest, w_e_i, represents the indicator of women's family empowerment. The vector X_i includes other controlling variables that affect the probability and expenditure of private tutoring. α_1, α_2 are constant terms, γ_1, γ_2, β_1 and β_2 are parameters that need to be estimated.

IV Data and Summary Statistics

A. Data

Our analysis uses data from 2014 China Family Panel Studies (CFPS), a nationally representative, biennual longitudinal survey of Chinese communities, families, and individuals. The CFPS is a project launched by the Institute of Social Science Survey (ISSS) of Peking University, China. We focus on households with children and exclude those with no father or mother records. To obtain more observations, we replace the income of all individuals who are inactive in the labor market with value zero. The sample consists of 3530 households and 20 variables, including two response variables, one core explanatory variable and 17 control variables.

B. Variables

1. Response Variables

The response variable for Logit model is an occurrence dummy; and the response variable for Tobit model is the average private tutoring expenditure. Since the CFPS database does not directly provide this data, so we average private tutoring expenditure over all children coming from the same household to generate this data. The number of children variable is obtained according to the personal id, household id in the database. The occurrence dummy is then generated based on average private tutoring expenditure. Occurrence dummy is equal to 1 for households having positive average private tutoring expenditure, equal to 0 for households having zero average private tutoring expenditure.

2. Core Explanatory Variable

The core explanatory variable is the level of women's family empowerment. This variable is not directly provided and needs to be constructed by ourselves. We believe that answers to five of the questions in the survey epitomize the distribution of family power. The five questions are listed as follows:

(1) "who is the household expenditure allocation decision maker?";
(2) "who is the savings, investment, insurance decision maker?";
(3) "who is the house purchase decision maker?";
(4) "who is the children discipline decision maker";
(5) "who is the high price consumer goods decision maker?".

Interviewees are required to report the personal id of the decision maker in his/her household. This data is collected at the household level. If the personal id matches a female person, the weight is 1. If the personal id matches a male person, the weight is 0. Adding five weights together, we obtain the level of women's family empowerment for each household, ranging from 0 to 5.

3. Control Variables

As private tutoring expenditure is a part of household expenditures, this paper selects control variables from three aspects: family characteristics, parent characteristics and children characteristics. Family characteristics include household income (yuan), household property value (yuan), travel expenses (yuan), number of children, family size and urban status (1 urban, 0 rural). Parent characteristics include father's income (yuan), mother's income (yuan), father's years of education, mother's years of education, father's age, mother's age, father's hukou, mother's hukou (hukou is a system of household registration used in mainland China. 1 for agriculture and 3 for non-agriculture). Children characteristics include the first child's age, the first child's gender (1 for male and 0 for female), parental expectation on child's education (2-8, primary school - Ph.D.).

C. Summary Statistics

As shown in Table 1, the average level of women's family empowerment is 1.881, which reflects the fact that nowadays, women's status is still low, men still hold the dominant position of power in Chinese families. The mean value of the average private tutoring expenditure over all children within one household is 555.435. A large range of the expenditure is observed across different households, from 0 to 36500.

For family characteristics, the means of the household income, household property value, travel expenses are 54690.511, 336866.464, and 739.997, with standard deviations of 64272.209, 690457.703 and 3058.774, respectively. The mean value of family size is 3.474, and the mean number of children per household is 1.496, so most couples have one or two children in 2014. For parent characteristics, the mean of father's income is more than twice as many as the mean of mother's income. Father's average year of education is also slightly longer than mother's. Father and mother's hukou status is relatively balanced. For children characteristics, the mean age of the first child is 8.614, with standard deviation of 4.486, indicating most children in our sample aged from 4 to 13. Another information we obtain is that given the mean age of fathers and mothers, on average, the father has his first child at the age of 28 and the mother has her first child at the age of 26. Finally, Chinese parents are famous for their high expectation on children's academic achievement. From our data, most parents expect their first child to get at least college or Bachelor's degrees.

Table 1: Summary Statistics

	mean	sd	min	max
Average private tutoring expenditure	555.435	1 984.252	0	36 500
Women's empowerment	1.881	2.006	0	5
Household income	54 690.511	64 272.209	0	1 800 000
Household property value	336 866.464	690 457.703	0	12 700 000
Travel expenses	739.997	3 058.774	0	50 000
Father's income	18 777.281	26 971.848	0	380 000
Mother's income	8 360.369	17 123.813	0	270 000
Father's years of education	8.922	3.841	0	19
Mother's years of education	8.015	4.376	0	22
Father's age	36.420	7.160	17	76
Mother's age	34.511	7.069	17	76
Father's hukou	1.491	0.861	1	3
Mother's hukou	1.454	0.838	1	3
Number of children	1.496	0.761	1	8
First child's age	8.614	4.486	0	15
First child's gender	0.510	0.500	0	1
Parental expectation on child's education	5.841	1.094	2	9
Family size	3.474	1.317	2	10
Urban status	0.448	0.497	0	1

V Main Results

A. Women's Empowerment and Hypothesis 1

As shown in Table 2, the level of women's family empowerment significantly influences the family decision on whether children participate in private tutoring. From the perspective of marginal effect, when the women's family empowerment increases by one unit, the probability of participating in private tutoring will increase by 1.48%. Similar to the Logit results, the level of women's family empowerment also has a significant positive impact on the level of private tutoring expenditure. When it increases by one unit, the household expenditure on private tutoring will increase by 8.46%, which verifies Hypothesis 1. The results show that in a family, the higher the level of women's empowerment, the more inclined they are to let their children take private tutoring classes, and it is accompanied by a higher cost. Besides, mothers are more willing to look for high-quality educational resources to improve their children's competitiveness.

In addition, the logarithm of household income, the logarithm of family's travel expenses, the logarithm of fathers' income, father's and mother's years of education, the type of father's hukou, the age of the first child, and the classification of urban and rural areas all positively affect the incidence of private tutoring as well as the tutoring expenditure. The family size has a negative effect on tutoring occurrence and expenses. These effects are all statistically significant at 5% significant level.

Family's travel expenses can reflect family's living standards and the quality of life, and these will increase the household expenditure on private tutoring. Higher income of the father increases the disposable income of the whole family. The household then are more capable to invest in children's education. Parents with more years of education will make them pay more attention to their children's education, which leads to more spending on education. In general, we believe that households in developed areas care more about children's education, which is the reason why father's hukou will affect the children's tutoring expenditure. Similarly, households in urban areas tend to spend more on education. Moreover, older children will face more important entrance exams, so education expenditure will be larger. There is a negative relationship between family size and private tutoring expenditure. We think the reason is that the one-child policy is almost universal and strictly implemented in Chinese cities, so households with more children are more concentrated in backward areas, and they have lower education expenditures.

Table 2: Basic Regression and Marginal Effects

	Logit		Tobit	
	Tutoring occurrence		Average private tutoring expenditure	
	Coefficient	Marginal effect	Coefficient	Marginal effect
Women's empowerment	0.0975***	0.0148***	0.3855***	0.0846***
	(0.0227)	(0.0034)	(0.0889)	(0.0194)
ln(household income)	0.0711***	0.0108***	0.2832***	0.0622***
	(0.0254)	(0.0039)	(0.0946)	(0.0207)
ln(household property value)	0.0188	0.0029	0.0773	0.0170
	(0.0130)	(0.0020)	(0.0502)	(0.0110)
ln(travel expenses)	0.0959***	0.0146***	0.3868***	0.0849***
	(0.0149)	(0.0023)	(0.0577)	(0.0127)
ln(father's income)	-0.0211**	-0.0032**	-0.0844**	-0.0185**
	(0.0095)	(0.0014)	(0.0366)	(0.0080)
ln(mother's income)	0.0123	0.0019	0.0492	0.0108
	(0.0105)	(0.0016)	(0.0406)	(0.0089)
Father's years of education	0.0368**	0.0056**	0.1530**	0.0336**
	(0.0162)	(0.0025)	(0.0639)	(0.0140)
Mother's years of education	0.0744***	0.0113***	0.3124***	0.0686***
	(0.0154)	(0.0023)	(0.0603)	(0.0132)
Father's age	-0.0218	-0.0033	-0.0823	-0.0181
	(0.0146)	(0.0022)	(0.0568)	(0.0125)
Mother's age	0.0218	0.0033	0.0893	0.0196
	(0.0148)	(0.0023)	(0.0575)	(0.0126)
Father's hukou	0.1675**	0.0537**	0.7290**	0.1600**
	(0.0753)	(0.0254)	(0.2953)	(0.0649)
Mother's hukou	0.0900	0.0282	0.3510	0.0770
	(0.0748)	(0.0242)	(0.2934)	(0.0645)
Number of children	0.0109	0.0017	-0.2213	-0.0486
	(0.0702)	(0.0107)	(0.2777)	(0.0610)
First child's age	0.1993***	0.0303***	0.8339***	0.1830***
	(0.0164)	(0.0024)	(0.0652)	(0.0140)
First child's gender	-0.0904	-0.0138	-0.3876	-0.0851
	(0.0907)	(0.0138)	(0.3516)	(0.0771)
Parental expectation on child's education	0.0249	0.0038	0.1076	0.0236
	(0.0435)	(0.0066)	(0.1699)	(0.0373)
Family size	-0.1195***	-0.0182***	-0.4950***	-0.1086***
	(0.0386)	(0.0059)	(0.1512)	(0.0331)
Urban status	0.5007***	0.0774***	2.1979***	0.4823***
	(0.1040)	(0.0163)	(0.4128)	(0.0900)
Constant	-5.5615***		-22.6432***	
	(0.5720)		(2.2633)	
Observations	3,530	3,530	3,530	3,530

Note: *p<0.1; **p<0.05; ***p<0.01

B. Women's Empowerment and Hypothesis 2

As shown in Table 3, for different age groups, tutoring expenditure for children aged from 0 to 3 in most families are zero, so we do not take this kind of data into consideration. As shown in Table 3, the level of women's family empowerment has a significant effect on the participation and spending of private tutoring for children aged 6-12 and 12-15. From the perspective of marginal effect, for each additional unit of women's family empowerment, the probability of participating in private tutoring will increase by 1.61% and the expenditure will increase by 9.88% for 6 to 12 years old children. For each additional unit of women's family empowerment, the probability of participating in private tutoring will increase by 2.40% and the expenditure will increase by 14.00% for 12-15 years old children. We can observe that the level of women's family empowerment has the greatest impact on private tutoring for children aged from 12 to 15, which verifies Hypothesis 2.

Table 3: Marginal Effects of Different Age Groups

	Logit			Tobit		
	Tutoring occurrence			Average private tutoring expenditure		
	age 3-6	age 6-12	age 12-15	age 3-6	age 6-12	age 12-15
Women's empowerment	0.0019	0.0161**	0.0240***	0.0060	0.0988**	0.1400***
	(0.0032)	(0.0066)	(0.0077)	(0.0189)	(0.0390)	(0.0443)
ln(household income)	0.0008	0.0132*	0.0165**	0.0066	0.0791*	0.0998**
	(0.0033)	(0.0079)	(0.0078)	(0.0189)	(0.0437)	(0.0435)
ln(household property value)	0.0008	0.0013	0.0050	0.0030	0.0073	0.0324
	(0.0019)	(0.0041)	(0.0042)	(0.0108)	(0.0237)	(0.0238)
ln(travel expenses)	0.0012	0.0163***	0.0228***	0.0094	0.1005***	0.1199***
	(0.0019)	(0.0043)	(0.0058)	(0.0113)	(0.0252)	(0.0311)
ln(father's income)	-0.0003	-0.0045	-0.0037	-0.0005	-0.0301*	-0.0200
	(0.0014)	(0.0028)	(0.0032)	(0.0080)	(0.0162)	(0.0181)
ln(mother's income)	-0.0018	0.0012	0.0036	-0.0090	0.0109	0.0164
	(0.0015)	(0.0031)	(0.0035)	(0.0090)	(0.0181)	(0.0202)
Father's years of education	0.0054*	0.0108**	0.0028	0.0292*	0.0665**	0.0103
	(0.0029)	(0.0050)	(0.0051)	(0.0171)	(0.0294)	(0.0292)
Mother's years of education	0.0052*	0.0141***	0.0199***	0.0332**	0.0903***	0.1267***
	(0.0028)	(0.0046)	(0.0049)	(0.0162)	(0.0266)	(0.0282)
Father's age	-0.0029	-0.0046	-0.0069	-0.0128	-0.0247	-0.0480*
	(0.0024)	(0.0042)	(0.0050)	(0.0132)	(0.0244)	(0.0286)
Mother's age	0.0004	0.0055	0.0050	0.0006	0.0266	0.0327
	(0.0023)	(0.0042)	(0.0050)	(0.0128)	(0.0246)	(0.0290)
Father's hukou	0.0239	0.0196	0.1372**	0.0546	0.1135	0.3955**
	(0.0245)	(0.0456)	(0.0619)	(0.0570)	(0.1311)	(0.1627)
Mother's hukou	-0.0043	0.0390	0.0755	-0.0104	0.1042	0.2327
	(0.0173)	(0.0457)	(0.0613)	(0.0543)	(0.1274)	(0.1666)

Number of children	-0.0018	-0.0378*	0.0051	-0.0155	-0.3308***	-0.0695
	(0.0125)	(0.0208)	(0.0226)	(0.0727)	(0.1234)	(0.1309)
First child's age	0.0509***	0.0273***	-0.0283**	0.2871***	0.1841***	-0.1434*
	(0.0101)	(0.0085)	(0.0139)	(0.0618)	(0.0501)	(0.0794)
First child's gender	0.0204	-0.0383	-0.0374	0.1166	-0.2259	-0.2275
	(0.0137)	(0.0262)	(0.0310)	(0.0788)	(0.1528)	(0.1771)
Parental expectation on child's education	-0.0004	-0.0126	0.0188	-0.0164	-0.0557	0.1212
	(0.0072)	(0.0127)	(0.0141)	(0.0409)	(0.0749)	(0.0809)
Family size	-0.0085	-0.0162	-0.0340***	-0.0656*	-0.0909	-0.2199***
	(0.0057)	(0.0118)	(0.0130)	(0.0343)	(0.0683)	(0.0755)
Urban status	0.0477**	0.1453***	0.0354	0.2315**	0.9126***	0.3066
	(0.0187)	(0.0301)	(0.0357)	(0.0913)	(0.1786)	(0.2082)
Observations	608	1,336	1,170	608	1,336	1,170

Note: *p<0.1; **p<0.05; ***p<0.01

C. Robustness Checks

Research has shown that women's status is significantly influenced by the resources they own. Therefore, we incorporate the relative resource index into women's family empowerment variable and generate a modified version. Using the modified women's empowerment to conduct robustness checks.

The first step is to construct the relative resources index. Using relative values rather than absolute values is because some researchers believe that the relative resources of husband and wife determine their relative family power. Given that socioeconomic resources are represented by income, education level and hukou status, we generate three indicators, relative income, relative years of education, and relative hukou status. Relative income = mother's personal income - father's personal income; relative years of education = years of education of mother - years of education of father; relative hukou = mother's hukou - father's hukou (where agriculture is 1 and non-agricultural is 3). We set several thresholds to assign different weights. Take relative income as an example, if the relative income is less than -500, the weight is 0; if the relative income is between -500 to 500, the weight is 0.5; if the relative income is larger than 500, the weight assigned is 1. The detailed structure for constructing relative resources index is shown in Table 4.

Table 4: Construction of Relative Resources Index

variable	value	weight
Relative income	< -500	0
	$-500 \sim 500$	0.5
	>500	1
Relative years of education	<0	0
	$= 0$	0.5
	>0	1
Relative hukou status	≤ 0	0
	>0	1

The next step is to add weights to the level of women's empowerment. We create a new variable, namely modified women's empowerment, and run Logit and Tobit models again for robustness checking. As shown in Table 5, the modified level of women's family empowerment still has a significant positive impact on the probability of tutoring occurrence and the private tutoring expenditure. The overall marginal effects of women's empowerment for Logit and Tobit models are quite similar as previous results in Table 2. The marginal effects of different age groups are also similar as the results in Table 3. Our findings remain robust when relative resources index is included. Hypothesis 1 and 2 are verified again.

Table 5: Robustness Checks

	Logit			
	Tutoring occurrence			
	Coefficient	Marginal Effect	age 6-12	age 12-15
[Modified] women's empowerment	0.0926***	0.0141***	0.0154**	0.0221***
	(0.0222)	(0.0034)	(0.0065)	(0.0075)
ln(household income)	0.0709***	0.0108***	0.0132*	0.0164**
	(0.0254)	(0.0039)	(0.0079)	(0.0078)
ln(household property value)	0.0188	0.0029	0.0012	0.0051
	(0.0130)	(0.0020)	(0.0041)	(0.0042)
ln(travel expenses)	0.0954***	0.0145***	0.0163***	0.0227***
	(0.0149)	(0.0023)	(0.0043)	(0.0058)
ln(father's income)	−0.0154	−0.0023	−0.0035	−0.0022
	(0.0094)	(0.0014)	(0.0028)	(0.0031)
ln(mother's income)	0.0085	0.0013	0.0005	0.0026
	(0.0104)	(0.0016)	(0.0031)	(0.0035)
Father's years of education	0.0456***	0.0069***	0.0122**	0.0048
	(0.0165)	(0.0025)	(0.0051)	(0.0052)
Mother's years of education	0.0658***	0.0100***	0.0126***	0.0181***
	(0.0157)	(0.0024)	(0.0047)	(0.0050)
Father's age	−0.0219	−0.0033	−0.0046	−0.0069
	(0.0146)	(0.0022)	(0.0042)	(0.0050)
Mother's age	0.0220	0.0033	0.0055	0.0050
	(0.0148)	(0.0023)	(0.0042)	(0.0050)
Father's hukou	0.1862**	0.0600**	0.0259	0.1479**
	(0.0751)	(0.0256)	(0.0459)	(0.0623)
Mother's hukou	0.0692	0.0216	0.0315	0.0638
	(0.0748)	(0.0239)	(0.0455)	(0.0610)
Number of children	0.0099	0.0015	−0.0380*	0.0046
	(0.0702)	(0.0107)	(0.0208)	(0.0226)
First child's age	0.1997***	0.0304***	0.0275***	−0.0287**
	(0.0164)	(0.0024)	(0.0085)	(0.0138)
First child's gender	−0.0923	−0.0140	−0.0385	−0.0378
	(0.0907)	(0.0138)	(0.0262)	(0.0310)
Parental expectation on child's education	0.0250	0.0038	−0.0126	0.0189
	(0.0435)	(0.0066)	(0.0127)	(0.0141)
Family size	−0.1201***	−0.0183***	−0.0161	−0.0343***
	(0.0386)	(0.0058)	(0.0118)	(0.0130)
Urban status	0.5016***	0.0776***	0.1456***	0.0359
	(0.1044)	(0.0163)	(0.0301)	(0.0357)
Constant	−5.6492***			
	(0.5741)			
Observations	3,530	3,530	3,530	3,530

	Tobit			
		Average private tutoring expenditure		
	Coefficient	Marginal Effect	age 6-12	age 12-15
[Modified] women's empowerment	0.3698***	0.0812***	0.0961**	0.1294***
	(0.0869)	(0.0190)	(0.0383)	(0.0432)
ln(household income)	0.2832***	0.0622***	0.0796*	0.0995**
	(0.0946)	(0.0207)	(0.0437)	(0.0436)
ln(household property value)	0.0766	0.0168	0.0069	0.0324
	(0.0501)	(0.0110)	(0.0237)	(0.0238)
ln(travel expenses)	0.3848***	0.0845***	0.0999***	0.1192***
	(0.0577)	(0.0127)	(0.0252)	(0.0312)
ln(father's income)	−0.0616*	−0.0135*	−0.0242	−0.0112
	(0.0366)	(0.0080)	(0.0161)	(0.0180)
ln(mother's income)	0.0341	0.0075	0.0069	0.0108
	(0.0405)	(0.0089)	(0.0181)	(0.0201)
Father's years of education	0.1887***	0.0414***	0.0757**	0.0221
	(0.0651)	(0.0143)	(0.0299)	(0.0298)
Mother's years of education	0.2778***	0.0610***	0.0814***	0.1156***
	(0.0616)	(0.0135)	(0.0271)	(0.0291)
Father's age	−0.0827	−0.0181	−0.0249	−0.0479*
	(0.0568)	(0.0125)	(0.0244)	(0.0286)
Mother's age	0.0897	0.0197	0.0267	0.0329
	(0.0574)	(0.0126)	(0.0246)	(0.0290)
Father's hukou	0.8037***	0.1764***	0.1337	0.4239***
	(0.2954)	(0.0649)	(0.1313)	(0.1632)
Mother's hukou	0.2689	0.0590	0.0819	0.2022
	(0.2940)	(0.0646)	(0.1280)	(0.1672)
Number of children	−0.2241	−0.0492	−0.3319***	−0.0718
	(0.2778)	(0.0610)	(0.1235)	(0.1310)
First child's age	0.8358***	0.1835***	0.1852***	−0.1454*
	(0.0652)	(0.0140)	(0.0501)	(0.0794)
First child's gender	−0.3958	−0.0869	−0.2272	−0.2309
	(0.3515)	(0.0771)	(0.1529)	(0.1772)
Parental expectation on child's education	0.1076	0.0236	−0.0555	0.1217
	(0.1699)	(0.0373)	(0.0749)	(0.0810)
Family size	−0.4980***	−0.1093***	−0.0906	−0.2223***
	(0.1511)	(0.0331)	(0.0684)	(0.0755)
Urban status	2.1963***	0.4821***	0.9129***	0.3082
	(0.4128)	(0.0901)	(0.1786)	(0.2084)
Constant	−23.0057***			
	(2.2742)			
Observations	3,530	3,530	3,530	3,530

Note: *p<0.1; **p<0.05; ***p<0.01

D. Further Checks on Endogeneity

Considering that there may be endogeneity problems caused by omitted variables. For example, mother's social networks or mother's social ability is unobserved, but on the one hand, it is a reflection of socioeconomic resources; on the other hand, mothers having larger social networks can have advantage in searching private tutors. This paper adopts the method of instrumental variable (IV) to deal with the endogeneity problem. We select women's answer to the question "whether the mother should have at least one son" as a potential instrument. It is a multiple-choice question and mothers choose answer from number 1 to 5. The number indicates the degree of agreement with the statement, 1 indicates that she strongly disagrees with the statement, and 5 indicates that she strongly agrees with the statement. Answers to this question can reflect women's values because son targeting fertility behavior leads to a struggle for women, which deviates the idea of gender equality and empowering women. When a woman strongly disagrees with the son targeting fertility behavior, she may have a stronger sense of self-identity and may have greater decision-making power in the family. Hence, this variable may be highly correlated with women's family empowerment (relevance condition) and does not directly affect private tutoring (exclusive restriction).

We conduct two-stage-least square (2SLS) estimation. In the first stage, we regress the endogenous variable, women's empowerment, on the instrumental variable. From Table 6, the correlation between women's empowerment and son preference is negative and statistically significant at 5% significant level. Since the first stage F-statistic is 13.72, larger than 10, so the correlation between the instrumental variable and the endogenous variable is high. There is no weak instrument problem.

In the second stage, we run Logit and Tobit models, regress the response variables on the fitted value of the endogenous variable from the first stage. The effects of women's family empowerment are still statistically significant at 1% significant level. These results suggest that our findings are unlikely to be severely biased due to endogeneity.

Table 6: Regression with Instrumental Variable

	Stage 1	Stage 2	
	Women's empowerment	Tutoring occurrence	Average private tutoring expenditure
Women's empowerment [hat]		1.8878***	7.7611***
		(0.5516)	(2.1325)
Son preference	−0.0582**		
	(0.0240)		
Constant	1.8336***	−8.3948***	−34.2131***
	(0.4051)	(1.1121)	(4.3312)
F Statistic	13.7200*** (df = 18; 3244)		

Note: *p<0.1; **p<0.05; ***p<0.01

VI Conclusion

This paper sheds light on the impact of women's family empowerment on private tutoring expenditure and tutoring occurrence. We use Logit model and Tobit model to estimate marginal effects, incorporate relative resources index to conduct robustness checks and use the method of instrumental variable to waive endogeneity concerns. CFPS database allows us to construct women's family empowerment data, extend analysis from household level to within-couple level.

We come up with two hypotheses related to women's empowerment and private tutoring, and verify them: (i) higher level of women's family empowerment can increase the household expenditure on private tutoring and the probability of tutoring occurrence; and (ii) the impacts of women's family empowerment differs across different age groups. It has the greatest impact on children aged 12-15.

We find that the level of women's family empowerment has a significant positive impact on the probability of participating in private tutoring and the household expenditure on private tutoring. Each unit increase in the level of women's empowerment increases the probability of tutoring occurrence by 1.48%, increases the private tutoring expenditure by 8.46%. In terms of children's age, the level of women's family empowerment has a positive effect on the participation and spending of private tutoring for children aged 6-12 and 12-15. It indeed has the greatest effect for children aged 12-15. Within this age group, the probability of participating in private tutoring will increase by 2.40% and the expenditure will increase by 14.00% for each one unit increase in the women's family empowerment. Our study has a number of implications for educators and policy makers. First, our findings provide useful information for policy makers who seek gender equality in the family. Second, our results provide insights for mothers regarding the different impacts of women's empowerment on different age groups of children.

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