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Family Background, Private Tutoring, and Children's Educational Performance in Contemporary China

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Abstract

The prevalence of private tutoring is often noted in the literature on education in East Asia. Empirical evidence concerning the causes and consequences of private tutoring, however, is sparse, especially for China. In this article, we draw upon data from the 2010 China Family Panel Studies to explore whether children's tutoring experiences are influenced by family background and whether private tutoring benefits children's educational performance. Our empirical analyses show that higher parental education, higher family income, and fewer siblings are all associated with a higher likelihood of private tutoring and higher levels of spending on it. Furthermore, private tutoring and spending on tutoring are predictive of higher verbal and math performances, although the difference in math performance between children who received private tutoring and those who did not is statistically insignificant after controlling for family background.

Introduction

In a discussion of the relationship between families and schools, the late American sociologist James Coleman (1987) noted that Asian-American parents usually bought two copies of a textbook—one for their kids and another for themselves—so as to better help their children succeed in school. Does this have anything to do with the well-documented phenomenon of Asian-American students performing better academically than their non-Asian counterparts? (Goyette and Xie 1999; Hsin and Xie 2014). If there is a link, it may be because Asian-American parents, as well as parents in Asia, consider personal effort more important than innate ability for children's educational success and therefore invest more in their children's learning activities (Stevenson and Stigler 1992; Hsin and Xie 2014).

Past research in the literature on parents' investment in children's education has mainly focused on investment either within private households or in school settings (e.g., Lareau 2002; Goyette 2008). To promote children's educational performance, however, parents may also take advantage of learning opportunities outside of homes and schools (Park, Byun, and Kim 2011). In this article, we focus on Chinese parents' investment in their children's

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private tutoring. Investment in private tutoring is a good indicator of parental effort regarding extracurricular educational resources. In fact, although frequently labeled "shadow education" (Bray 1999; Stevenson and Baker 1992) and thus considered auxiliary to formal schooling, private tutoring is widely practiced. One literature review based on studies from twenty-three countries and regions shows that the rate of participation in private tutoring at certain levels of education ranges from 25 percent to 90 percent (Dang and Rogers 2008). In East Asian regions, private tutoring is especially common. For example, Kuan (2011) found that 46 percent of grade 9 students in Taiwan had undertaken examinination-targeted cram schooling (buxiban) for math in 2003. Data collected from Hong Kong in 2011 reveal that 54 percent of grade 9 students reported having had some tutoring experience (Bray et al. 2014). In South Korea, eight out of ten students received at least one form of private tutoring (Park, Byun, and Kim 2011). As family income improved in these regions, investment in tutoring increased (Russel 1997; Kim and Lee 2010; Bray et al. 2014; Kuan 2011).

Private tutoring has also been expanding rapidly in China in recent years (Lei 2005; Xue and Ding 2009; Tsang, Ding, and Shen 2010), although the extent of this expansion has yet to be determined. Xue and Ding (2009) reported that more than 60 percent of primary and junior high students experienced private tutoring based on data collected from urban areas in twelve provinces in 2004, but a more recent study based on a regional sample of grade 12 students in Jinan of Shandong found that only about 20 percent were receiving such help (Zhang 2013). The large gap between these two figures indicates that China is a spatially heterogeneous country, such that estimates based on regional data could be vastly different from those at the national level.

Previous research has already demonstrated the importance of understanding the social determinants and consequences of private tutoring (e.g., Zhang 2013; Zhang 2014; Xue, Wang, and Wu 2014). However, since these studies have all been based on regional data, we do not know whether their highly inconsistent results are generalizable (e.g., Lee, Kim, and Yoon 2004; Park and Lee 2005; Zhang 2013). To the best of our knowledge, our study is the first attempt to systematically examine the social determinants and consequences of private tutoring in contemporary China based on nationally representative data.

Building on earlier research on private tutoring in China, we address two research questions. First, to what extent do children's tutoring experiences depend on family socioeconomic status? Second, does investment in private tutoring pay off in terms of children's educational performance?

Below, we begin with a review of the previous literature on private tutoring. Next, we discuss the development of China's educational system over the past decades and its implications for private tutoring. We then describe the data set and variables we use, show our empirical results, and conclude with a discussion of our major findings.

Private Tutoring as a Form of Informal Schooling

A very large literature has consistently documented the effects of family socioeconomic status on children's educational outcomes (Blossfeld and Shavit 1993; Raftery and Hout 1993; Lucas 2001; Bowles and Gintis 2002; Alon 2009). Socioeconomically advantaged

families are believed to have both more economic resources and more willingness to invest in children's education (Becker 1991). One question that is not often asked in the previous literature is, what forms do these educational investments actually take?

At the risk of over-simplification, we characterize the prior literature in terms of two major forms of educational investment. One important form is within-household investments, such as accumulating cultural capital (Lareau 2002), expecting and encouraging children to obtain more education (Sewell and Hauser 1975; Goyette and Xie 1999; Davis-Kean 2005), and supervising and helping children with their academic tasks (Guryan, Hurst, and Kearney 2008; Gimenez-Nadal and Molina 2013). The other form is investment in formal schooling. For example, parents choose good schools (Goyette 2008; Goldring and Phillips 2008) and communicate with their staff and teachers in order to facilitate their children's learning (Stevenson and Baker 1987).

The focus on either within-household investment or formal schooling investment has left another form of educational investment understudied—private tutoring. Although sometimes labeled "shadow education" (Stevenson and Baker 1992; Bray 1999), private tutoring has grown in importance globally as a significant parental investment strategy (Bray 1999; Bray and Kwo 2013) that emerged on the market to meet the differential needs of parents and children. When children lag behind, their parents may pay for private tutoring to help them catch up; when children are performing well, their parents may hire tutors to help them further gain a competitive edge over peers. In some East Asian societies, such as Japan and South Korea, where competition for higher and better quality educational opportunities is intense, private tutoring is considered a "third sector besides home and school" (Park, Byun, and Kim 2011) in children's education.

Access to private tutoring depends on children's socioeconomic conditions. For example, Buchmann (2002) found that Kenyan children from wealthy families were more likely than other children to participate in tutoring courses outside of school. Korean parents with higher education are also more likely than less educated parents to arrange private tutoring activities for their children (Park, Byun, and Kim 2011). Similar findings are also documented in Japan (Stevenson and Baker 1992), Hong Kong (Bray and Kwok 2003), the United States (Buchmann, Condron, and Roscigno 2010), and some urban areas of China (Xue and Ding 2009).

Although empirical studies have invariably found support for a positive link between family socioeconomic status and private tutoring, whether or not private tutoring benefits children's educational outcomes is still debated (Lee, Kim, and Yoon 2004; Park and Lee 2005; Zhang 2013). Some researchers believe that the relationship between private tutoring and children's education may depend on specific cultural or educational contexts, (Oswald, Baker, and Stevenson 1988; Park, Byun, and Kim 2011), and that whether private tutoring benefits Chinese children's education needs to be studied empirically. So far, no research has systematically examined the effects of private tutoring on Chinese children's education with nationally representative data. We aim to fill this gap by analyzing nationally representative data on children from the 2010 baseline survey of the China Family Panel Studies (CPFS) (Xie and Hu 2014).

Our study improves upon previous research in four respects. First, we base our analyses on more recent, nationally representative data collected in 2010 China. Second, we systematically examine the relationship between family background and children's private tutoring experiences and the effects of private tutoring on children's educational performance. Third, in measuring private tutoring, we focus not only on the binary choice of tutoring attendance vs. non-attendance, but also on the amount spent on private tutoring. Fourth, educational performance is measured through two standardized tests, which overcomes grading inconsistencies across different schools and/or by different teachers.

Private Tutoring in Contemporary China

Our empirical research is situated in the educational context of contemporary China. Before we proceed to the data analysis, let us provide a broad sketch of China's educational system and its implications for private tutoring. For simplicity, we could divide the main body of the Chinese school system into two parts: compulsory and post-compulsory. Compulsory education consists of six years of primary school and three years of junior high school, while post-compulsory education begins with three years of senior high school and extends to college and beyond. Compulsory education is free, with the objective of homogenizing compulsory educational resources for students from different socioeconomic backgrounds. For example, the Revised Compulsory Educational Act of the People's Republic of China in 2006 banned the practice of distinguishing between keypoint and non-keypoint schools (or classes) (Article 22), with local governments imposing explicit penalties for violations (Article 57) (National People's Congress 2006). In addition, in light of the uneven development of compulsory education across regions, the government has made a persistent effort, by strengthening the "nearby enrollment" principle, to limit parents' ability to mobilize family resources to select better schools for their children (Wu 2008; Li 2007).[1]

In comparison with compulsory education, post-compulsory education is not free and selects students based on their academic ability. After completing compulsory education, students have to take an entrance examination to compete for limited educational opportunities at higher levels. Moreover, post-compulsory schools tend to be more stratified, with teaching quality often being associated with threshold admission scores (Li et al. 2012). For example, in 2009, a total of 2,305 colleges were registered in China, among which, only 112 were in the allegedly higher quality "211 program," which received more financial support from the government (Li et al. 2012). These elite institutions of higher education accept students with higher test scores and yield higher earnings for students later in life (Li et al. 2012).

Intense competition at higher levels encourages parents to invest in children's education in the earlier school years (Ramey and Ramey 2010). Economic analyses confirm that early investment in children is the most efficient form of investment for their later development (Heckman 2006). As we mentioned above, compulsory education in China attempts to ensure that all students in the compulsory stage enjoy relatively homogeneous and almost free formal schooling opportunities. In this context, the private tutoring market has emerged

[1]According to the "nearby enrollment" principle, parents could only enroll their children in primary and middle schools in the areas where they live. For an overview of the government policies enforcing the "nearby enrollment" principle from 1986 to 2006, see Li (2007, pp. 37–43).

in China as a potential investment venue for Chinese parents. The tutoring market provides differential tutoring services to meet the needs of students from various family backgrounds. Is private tutoring beneficial for children's education in China? Does more spending on tutoring lead to better educational performance in China? The research reported in this article constitutes the first attempt to use nationally representative data in China to tackle these questions.

Analytical Strategy

We examine how Chinese children's tutoring experiences relate to family background and how they affect educational performance. Extending prior research, we focus not only on children's binary choices between attending or not attending tutoring, but also on within-group quantitative differences in spending on tutoring for those children who have been tutored. For this purpose, we construct two analytical samples. The first sample includes children who were privately tutored and those who were not. The second sample includes only those tutored and thus is a subsample of the first sample. For brevity, we label the two samples the "full sample" and the "tutored sample," respectively.

We use the full sample to compare those tutored with those not tutored. In the tutored sample, we then examine differences in amounts spent on private tutoring. Following prior research (Park, Byun, and Kim 2011), we expect to find that family socioeconomic status is positively associated with tutoring attendance as well as amount spent on tutoring, and we also expect to find that both private tutoring attendance and spending on tutoring have positive effects on children's educational performance.

We separate our empirical evidence into two parts. First, we present evidence on the relationship between family background and children's private tutoring. For our full sample, we estimate a binary logistic regression to predict the likelihood of children's private tutoring attendance from their family background characteristics. For our tutored sample, we use the same covariates to predict spending on children's private tutoring in the logarithm form.

Second, we examine the effects of private tutoring on children's educational performance. For both the full sample and the tutored sample, we estimate three nested Ordinary Least Squares (OLS) models. Specifically, we first model the effect of private tutoring by controlling only for children's personal traits and residential information. We then further control for such family socioeconomic status factors as parental education, household income, and sibship size. Finally, we also control for children's prior academic performances as reported by parents. Thus, we test whether private tutoring has net effects on education after we control for family background and prior academic performance. To account for dependency due to the cluster nature of the China Family Panel Studies (CFPS) data we use in the study (Xie and Hu 2014; Xie and Lu forthcoming) and the possibility of a sampled family including multiple siblings, we use the Huber-White adjustment (Huber 1967; White 1980) for the standard error estimation in our regression results.

Data and Measures

Data

We base our empirical analyses on a nationally representative sample of children from the CFPS. Its stratified, multi-stage sampling strategy ensures that the CFPS sample represents 95 percent of the total population in China in 2010 (Xie 2013; Xie and Hu 2014). Notice that the CFPS oversampled cases from five "big" provinces to allow for province-level or cross-province comparisons (Xie and Lu forthcoming). We obtained a resampled subsample from the original cases in the five big provinces and combine it with all the cases from the other provinces to form our final sample for analysis.

In its baseline survey in 2010, the CFPS successfully interviewed 8,990 children (ages 0–15) in 14,798 households from 635 communities in China. In addition to detailed demographic questions for each child in the sample, extensive information was gathered on variables, such as cognitive ability, daily learning habits, time and money spent on education, and communication with parents. We limit our analysis to children between the ages of 10–15 in 2010, most of whom were in grades 3 to 9 when interviewed.

Educational Performance

CFPS 2010 administered two standardized tests–a word test and a math test—to measure children's educational performance (Huang, Xie, and Xu 2015). The word test had 34 question items, while the math test had 24. For each test, a respondent is scored according to the number of questions that he/she is able to answer correctly. Thus, children's test scores range from 0 to 34, while their math scores range from 0 to 24. As the children in our sample were in different grades, which strongly affected their performance on the tests, we standardized the test scores by grade.

Private Tutoring

For each child in our sample, a parent or other adult guardian (Xie and Hu 2014) was asked about family's spending on private tutoring for the child "in the past year." With this question, we constructed two tutoring variables: tutoring attendance and spending on tutoring. Tutoring attendance, which is a binary variable, indicates whether a child was privately tutored in the past year. We consider positive spending on private tutoring to be evidence of tutoring attendance. The spending on tutoring variable is used for children who were privately tutored in the past year. Logged spending on tutoring is used in our analysis.

Family Background

In assessing the relationships between a child's family background and private tutoring experiences, we use three variables to indicate a child's socioeconomic status: parental education, family income, and sibship size. For each child, both the father's and the mother's highest levels of educational attainment were collected. Our parental education variable is equal to the higher of the two parents' educational attainments. If one parent's education is missing, we use the other parent's education. We distinguish three levels of parental education: primary and below, junior high, and senior high and above. Our family income variable refers to the annual family net income, in logarithm form. We also include

children's sibship size as an indicator of family background. The resource dilution model (Blake 1989) posits that an additional sibling of any given child dilutes the quantity of family resources and thus exerts a negative impact on that child's educational outcomes. In light of the very low fertility levels in China in recent years (Xie 2011; Peng 2011), we code more than three siblings as three siblings and treat sibship size as a continuous variable with values ranging from 0 to 3.

Proxies for Past Academic Performance

In examining the effects of private tutoring on children's educational performance, we control for the potential confounding effects of children's academic performance in the past. In CFPS 2010, parents were asked to rate their children's performances in Chinese and math in the last semester. The rating was based on a 4-point scale, where 1 =very poor and 4 =very good. We use these two rated scores for each child to proxy his or her past academic performance. These two variables are meant to proxy for academic performance *prior to* the standardized tests in CFPS 2010.

In our regression models, we also control for such demographic characteristics as sex and age. Due to the uneven development in economy and-education across regions, we also control for a dummy variable to allow for the rural-urban divide and another region variable, which categorizes children's residences as West, Middle, or East.

Empirical Results

Table 1 shows descriptive statistics for all the variables we use in this article. The mean of children's scores on each test, as we have standardized them by grade, is 0, with a standard deviation of 1. The last two rows show the percentage of children who were privately tutored "in the past year" and the mean annual spending for the tutored sample. In our full sample, 25 percent had been tutored in the past year, much lower than percentages reported not only in other East Asian societies, such as Japan, South Korea, and Hong Kong (Bray et al. 2014), but also in prior research based on regional data from urban China (Xue and Ding 2009). For the tutored sample, annual private spending on tutoring was 1,281 yuan on average. Within the tutored sample, spending was highly dispersed (SD =2,166), leaving open the possibility that spending amount affects educational outcomes.

Family Background and Private Tutoring

Based on the full sample, Table 2 examines the effects of family socioeconomic status on children's likelihood of attending private tutoring controlling for child's personal traits and residence. Logit coefficients (*B*) are reported in the first column, and standard errors (SE) in the second column. To aid explication, we also present coefficients in their odds-ratio forms in the third column. As revealed in Table 3, higher parental education levels and higher household income both predict a higher tendency to attend private tutoring. This finding is not surprising and confirms prior evidence based on regional data (Xue and Ding 2009). Sibship size, which is incorporated as an indicator of children's family socioeconomic status, has a significantly negative effect on the likelihood of tutoring attendance. Specifically, net of other family background factors and personal features, an increase of one sibling would decrease a child's likelihood of attending private tutoring by 40 percent. This

finding supports previous research showing negative effects of sibship size on educational attainment among Chinese adults (Ye and Wu 2011).

We now turn to the tutored sample to examine the effects of family socioeconomic status of spending on tutoring. OLS regression results in Table 3 show that family socioeconomic status (regardless of whether it is measured by parental education, household income, or sibship size) further affects spending on tutoring among those who have attended private tutoring. Other coefficients are also consistent with those for our full sample in Table 2. In brief, our empirical evidence in Tables 2 and 3 confirm that children's tutoring attendance and spending on tutoring are affected by family socioeconomic status.

Private Tutoring and Educational Performance

In this section, we ask whether private tutoring affects children's educational performance. We use the full sample to examine group differences in educational performance between those who were tutored and those who were not, and we use the tutored sample to explore the effects of spending on tutoring on educational performance.

Table 4 shows the results of OLS regression analyses that use tutoring attendance to predict children's scores on word and math tests. All the models in this table have controlled for children's sex, age, and residence. We begin by looking at the first three regressions (M1–M3) with the word test scores as the dependent variable. Model 1 is our baseline model, which shows that on average, children who had participated in private tutoring in the past year scored 0.285 standard deviations higher than those who had not. Model 2 adds variables of family socioeconomic status to Model 1, showing that a substantial part of the tutoring attendance effect in Model 1 could be explained by family socioeconomic status. Although greatly reduced, the effect of tutoring attendance on word test scores remains statistically significant. In Model 3 of Table 4, we further control for children's past Chinese performance, and the effect of tutoring attendance on word test scores remains significant, at a 0.14 standard deviation in magnitude.

The last three columns in Table 4 present the estimated effects of tutoring attendance on children's math test scores. Model 4 also shows tutoring attendance to be significantly related to better performance in math. However, as demonstrated in Model 5, after controlling for family background, the positive effect of tutoring attendance on math score decreases substantially and becomes statistically insignificant. Model 6 further includes children's math performance in the last semester, and the coefficient of tutoring attendance remains insignificant. We will return to this finding when we discuss the effect of spending on tutoring on math performance for our tutored sample.

In Table 5, we present the estimated regression coefficients of private spending on tutoring on children's two test scores based on the tutored sample. Again, Models 1–3 predict the word test as the outcome variable, and Models 4–6 the math test. We begin with the regression results of the word test scores as shown in the first three columns. Model 1 shows that with age, sex, and residence controlled for, an increase in annual spending on private tutoring is positively associated with a child's word test score. Model 2 adds family background variables to Model 1, showing the extent to which family background may

explain the relationship between word test scores and spending on tutoring. Model 3 further includes a child's Chinese performance in the last semester. The estimated effect of spending on tutoring on word test scores in Model 1 remains statistically significant in both Models 2 and 3, despite a substantial reduction in magnitude after family background and prior Chinese performance are controlled for.

Models 4–6 in Table 5 show the effects of spending on tutoring on math test scores for the tutored sample. Within the group of children who were privately tutored in the past year, higher spending on tutoring is predictive of better performance on the math test. Although the effect on the math test score of tutoring attendance is not significant after we control for family background, as shown in Models 5 and 6 in Table 4, we observe a significantly positive relationship between spending on tutoring and math test scores even when family background and child's prior math performance are included. In contrast, we observe significantly positive effects of both tutoring attendance (full sample) and spending on tutoring (tutored sample) on child's word test score. These results make sense, as math is thought to require more disciplined training than verbal skills (Downey, von Hippel, and Broh 2004). In our case, while the tutoring attendance measure compares average differences between children who receive private tutoring and those who do not, the amount of spending on private tutoring more precisely captures the degree of this involvement. That is, the amount of spending allows us to estimate the quantitative effect of the amount of private tutoring on math performance.

Conclusion

Parents are often motivated to make various forms of investment in their children's intellectual development, for example, by building a "learning friendly" family environment as well as supporting their children's formal schooling (e.g., Lareau 2011). In this article, we drew on recent data from China to extend prior research on educational investment by focusing on children's private tutoring, which is an investment outside both the household and the formal school system. Although prior studies have investigated the demands and determinants of private tutoring, few have systematically examined whether children's private tutoring experiences vary with family background and whether private tutoring is really beneficial for children's educational performance (see Park, Byun, and Kim 2011), and none of the prior empirical research used nationally representative data sets from China.

Are children's private tutoring experiences positively related to their family socioeconomic status? Our answer is an unqualified yes. According to our statistical analyses, net of children's sex, age, and residential characteristics, higher parental education, higher household income, and fewer siblings all predict a higher likelihood of private tutoring attendance and higher monetary spending on tutoring for those who were privately tutored in the past year.

Does private tutoring have a positive impact on children's educational performance? Our answer is mostly yes. Our empirical evidence shows that both attending private tutoring and the amount spent on tutoring predict higher verbal and math performances, although the difference in math performances between children who were privately tutored and those who

were not is statistically insignificant when family background characteristics are controlled for. These results underscore differences across subjects (Park, Byun, and Kim 2011). Previous research indicates that math benefits more from disciplined training than verbal ability (Downey, Von Hippel, and Broh 2004). Our results show that increased spending on tutoring could significantly promote math performance even though tutoring attendance versus no attendance has no apparent effect on math performance.

A potential criticism of our study is that the relationships we have revealed between children's private tutoring experiences and their educational performances may not be causal. For example, children's academic ability could correlate with both their private tutoring experiences and their educational performance. However, the direction of bias caused by this potential confounding factor is unclear. It is possible, for example, that low academic performance on the part of children could lead parents to seek private tutoring as a response (Buchmann, Condron, and Roscigno 2010). In this case, the bias would be in the conservative direction—making our results from regression analysis appear smaller than otherwise. Future waves of the CFPS data containing richer data on private tutoring and educational performance will enable researchers to better explore this selection issue.

Overall, our empirical results show that families of different socioeconomic statuses invest differently in their children's private tutoring and that tutoring is beneficial for children's educational performance. Our findings have important implications for educational inequality in China. Although China's educational policies try to ensure that socioeconomically advantaged and disadvantaged children study in a relatively homogeneous educational environment in their primary and junior middle schools, competition is intense through ability-based tests for slots at higher educational levels, which are stratified in quality and admission thresholds. In this educational environment, many Chinese parents may consider formal schooling inadequate if their children are to secure good places in institutions at higher levels. Thus, private tutoring emerges as an alternative means by which Chinese parents can seek to improve their children's academic competitiveness.

Because private tutoring is an educational service offered by the market, its development and pricing are determined by how well it has met the differential educational needs of families in varying socioeconomic conditions. As we have demonstrated in this article, higher socioeconomic status families are more likely to purchase private tutoring services for their children, and their spending on private tutoring tends to be higher. Thus, with the further development of private tutoring markets, unequal investment in private tutoring will become an effective mechanism for maintaining and generating educational inequality in China.

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Table 1

Descriptive Statistics for All Variables (*N*=1,935)

Variables	Mean (or %)	SD
Word test score (standardized by grade)†	0.00	1.00
Math test score (standardized by grade)†	0.00	1.00
Chinese performance in last semester	2.72	0.94
Math performance in last semester	2.66	1.00
Female (%)	49.30	
Age	12.43	1.72
Parental education (%)		
Primary and below	37.80	
Junior high	39.90	
Senior high and above	22.30	
Family income (yuan)	28,977	28,356
Sibship size	2.00	0.84
Urban (%)	43.40	
Region (%)		
West	34.40	
Middle	34.10	
East	31.50	
Tutoring attendance (%)	25.00	
Annual spendingon tutoring (yuan) ††	1,281	2,166

Notes:

† standardized test scores are calculated following the rules below: we first subtract the mean test scores within each grade level from the original scores, and then we divide the differences by the within-grade standard deviations.

†† annual spending on tutoring is calculated only for the tutored sample (*N*=483).

Table 2

Logistic Regression of Tutoring Attendance on Family Background (Full Sample, *N*=1,935)

	B	**SE**	**e^B**	**Sig.**
Parental education				
Primary and below (omitted)				
Junior high	0.375	0.145	1.455	**
Senior high and above	0.873	0.164	2.394	***
Family income (logged)	0.235	0.079	1.265	**
Sibship size	−0.515	0.088	0.598	***
Female	0.181	0.114	1.198	
Age	0.006	0.034	1.006	
Urban	0.706	0.125	2.026	***
Region				
West (omitted)				
Middle	0.390	0.148	1.477	**
East	0.439	0.157	1.551	**
Constant	−4.223	0.876	0.015	***
Log likelihood	−940.6			
Degree of freedom	9			

Notes:

* $p < 0.05$,

** $p < 0.01$,

*** $p < 0.001$.

Table 3

Ordinary Least Squares Regression of Logged Annual Spending on Tutoring on Family Background (Tutored Sample, *N*=483)

	B	**SE**	**Sig.**
Parental education			
Primary and below (omitted)			
Junior high	0.287	0.167	+
Senior high and above	0.797	0.182	***
Family income (logged)	0.301	0.074	***
Sibship size	−0.563	0.091	***
Female	0.138	0.118	
Age	0.003	0.034	
Urban	0.413	0.148	**
Region			
West (omitted)			
Middle	0.630	0.183	***
East	0.222	0.192	
Constant	2.240	0.923	**
Log likelihood	−805.0		
Degree of freedom	9		

Notes:

+ $p<0.1$,

** $p<0.01$,

*** $p<0.001$.

Table 4

Ordinary Least Squares Regression of Children's Test Scores on Tutoring Attendance (Full Sample, *N*=1,935)

	Word test score (standardized)			Math test score (standardized)		
	M1	**M2**	**M3**	**M4**	**M5**	**M6**
Tutoring attendance	0.285*** (0.048)	0.164** (0.050)	0.141** (0.048)	0.101* (0.049)	0.016 (0.050)	0.010 (0.049)
Family socioeconomic status						
Parental education						
Primary and below (omitted)						
Junior high		0.185*** (0.052)	0.113* (0.050)		0.135* (0.054)	0.097+ (0.052)
Senior high and above		0.313*** (0.067)	0.178** (0.065)		0.201** (0.066)	0.116+ (0.065)
Family income (logged)		0.054* (0.025)	0.031 (0.024)		0.060* (0.026)	0.039 (0.025)
Sibship size		−0.176*** (0.030)	−0.129*** (0.029)		−0.118*** (0.033)	−0.092** (0.032)
Proxies for academic ability						
Chinese performance in last semester			0.321*** (0.023)			
Math performance in last semester						0.209*** (0.023)
R2	0.058	0.099	0.177	0.013	0.034	0.075

Notes: Values in parentheses are robust standard errors. All the models include such control variables as sex, age, urban, and region. Coefficients for these control variables are not reported here.

+ $p<0.1$,

* $p<0.05$,

** $p<0.01$,

*** $p<0.001$.

Table 5

Ordinary Least Squares Regression of Children's Test Scores on Logged Annual Spending on Tutoring (Tutored Sample, *N*=483)

	Word test score (standardized)			Math test score (standardized)		
	M1	**M2**	**M3**	**M4**	**M5**	**M6**
Annual spending on tutoring (logged)	0.116*** (0.028)	0.082** (0.030)	0.058* (0.029)	0.083** (0.029)	0.061+ (0.034)	0.057+ (0.034)
Family socioeconomic status						
Parental education						
Primary and below (omitted)						
Junior high		−0.016 (0.109)	−0.056 (0.104)		0.197+ (0.103)	0.181+ (0.101)
Senior high and above		0.097 (0.117)	0.040 (0.113)		0.044 (0.116)	0.018 (0.113)
Family income (logged)		0.005 (0.042)	−0.000 (0.042)		0.081+ (0.048)	0.076 (0.047)
Sibship size		−0.136* (0.061)	−0.120* (0.058)		−0.052 (0.062)	−0.036 (0.062)
Proxies for academic ability						
Chinese performance in last semester			0.265*** (0.040)			
Math performance in last semester						0.103* (0.042)
R^2	0.074	0.090	0.160	0.028	0.046	0.058

Notes: Values in parentheses are robust standard errors. All the models include such control variables as sex, age, urban, and region. Coefficients for these control variables are not reported here.

+ $p<0.1$,

* $p<0.05$,

** $p<0.01$,

*** $p<0.001$.