The Influence of Extracurricular Tutoring on Academic Performance: Based on Cfps Data

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Abstract: With the continuous development and progress of China's social economy, shadow education gradually emerged and evolved in the past 20 years. The social debate on shadow education has never stopped. From the perspective of economics, we can use the input and output of shadow education to measure the advantages and disadvantages of students' participation in extra-curricular classes. Based on the data of 2014 Chinese Family Panel Studies (CFPS), this paper uses the multiple Logit regression model to analyze the impact of shadow education expenditure on academic performance. The results show that expenditure on shadow education has a significant positive impact on students' scores in mathematics and Chinese. The influence of shadow education expenditure on students' mathematics performance is more significant than that on Chinese.

1. Introduction

With the development of China's economy and society, people pay more and more attention to education. In recent years, it is very common for students of all ages to take part in extra-curricular tutoring classes. According to the report released by The Chinese Society of Education, in 2016, the market scale of extracurricular counselling industry exceeded 800 billion yuan; the number of students exceeded 137 million; the number of tutors was about 7-8.5 million. At the same time, the report shows that about 36.7% of students in our country took part in extracurricular counselling, and the proportion was as high as 70% in Beijing, Shanghai, Guangzhou, Shenzhen and other major cities. [1]

Many factors lead to the demand for shadow education in Chinese families. First of all, the rapid economic growth in the past few decades has resulted in more and more disposable income for Chinese families. Second, the one-child policy allows parents to spend more money on one child. Thirdly, the fierce social competition and the perception of employment pressure of people, especially the parents of students, further promote the development shadow education. Finally, in China, the competition of college entrance examination is fierce and has high stakes. It has caused huge pressure on high school students who want to attend high-quality universities. This pressure also has a joint effect, making the middle school entrance examination a test with high stakes.[2] In addition, the uneven distribution of educational resources between regions and schools also forces individual families to use shadow education to gain or maintain their competitive advantages.

Subjectively, students and parents generally believe that shadow education is conducive to improving students' academic performance, so parents are willing to pay for children to participate in shadow education. However, it is worth noting that this view may be induced and publicized by various after-school education counselling institutions. From an academic point of view, researchers around the world have not reached a completely consistent conclusion on whether shadow education can promote students' learning effects. One view is that shadow education can improve students' academic performance. It can further expand students' abilities in many aspects, provide more detailed guidance for students, and find out problems that are ignored by school teachers due to the limited time. Teachers in mainstream schools explain the general situation for students, while tutors after school can help students deepen their understanding and master knowledge points. Dang takes the hourly extra-curricular tuition fee stipulated by the government as a tool variable, and

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estimates the impact of extra-curricular tuition fee on the performance of Vietnamese students in primary and secondary schools by the Tobit and ordered Probit model. The results show that there is a positive and significant relation between the extra-curricular tuition fee and the performance ranking.[3] On the contrary, some studies also found that the relationship between shadow education and students' academic performance is not obvious, or even the shadow education has a negative impact on academic performance. The research of Korean scholars found that for Korean students in junior and high schools, the increase of extra-curricular tuition expenditure cannot obviously improve their academic performance. Specifically, 10% increase in spending would only increase test scores by 0.03 standard deviation or 1.1% test scores.[4] This point of view is put forward by Korean scholars based on the education situation and data in Korea. This study believes that the influence of shadow education on academic performance is not the same under different national conditions. The conclusion of Korean scholars cannot prove that the relationship between shadow education and academic performance is not obvious in China; the conclusion can only be used as a reference.

In China, based on the data of International Student Assessment Program, PISA2012 Shanghai, some scholars analyzed the influence of extracurricular tutoring on students' mathematics performance by using the multi-level linear model and the reweighted propensity score matching method. It is found that extracurricular mathematics tutorial has a positive effect on students' mathematics performance; participation in scientific extracurricular classes can also promote mathematics performance; but extracurricular Chinese tutorial has a significant negative impact on their mathematics performance.[5] At the same time, another group of domestic scholars use the survey data of 19 cities in China to estimate the influence of primary school students' extra-curricular tutoring expenditure on their academic performance by using the method of instrumental variables. The results show that the extra-curricular tutoring expenditure has a significant impact on primary school students' mathematics performance, but has no significant impact on their language performance.[6]

In addition to the impact of different subjects on the influence of shadow education expenditure on academic performance, some scholars also pointed out that to study the impact of shadow education on students' academic performance, we need to consider many factors, including the teaching content of shadow education, teachers' teaching methods, the definition of students' learning intensity, students' original learning performance, students' individual efforts, the learning atmosphere of their classes and other factors. Different from the general conclusion of “yes or no”, the results of extra-curricular tutoring are also related to the amount of extra-curricular tutoring. Scholars in Taiwan believe that moderate extra-curricular tutoring can help to improve the academic performance of high school students and increase the probability of attending public universities, but excessive tutoring can reduce the academic performance of high school students and the probability of attending public universities. [7]

People's quality is the knowledge, skill personality and internal driving force expressed by different ways, in which knowledge can be measured by academic achievements to a certain extent. Quality drives the labour force to produce excellent work performance; most of the current teenagers will eventually become the labour force after they grow up. The popularity of shadow education in the society, the government's repeated prohibitions on all kinds of extra-curricular classes, parents' investment of a large number of family assets in shadow education, and students' investment of plenty of time in various tutoring classes mean that in the real society, parents generally believe that shadow education is effective. Does the shadow education do affect students' performance? How does shadow education affect students' performance? Can families invest in shadow education more effectively? This study tries to explore the impact of shadow education on academic performance by analyzing empirical data.

2. Data Source and Variable Description

The data of this study comes from 2014 data of Chinese Family Panel Studies (CFPS) sponsored by the “985” program of Peking University and implemented by the Institute of Social Science

Survey, Peking University. The data involved in this paper includes the basic personal information of respondent students and their families in 2014, their participation in extracurricular counselling and their scores. The situation of extracurricular counselling is reflected by the expenditure of extracurricular counselling. Students' achievement is measured by the classification of their Chinese and mathematics achievement. A total of 3053 samples were screened.

Based on the research topic, this paper defined student achievement as the explained variable. In China Family Panel Studies, data about students' scores were answered by their parents. According to their own judgment, the parents answered “excellent, good, medium and poor”. The author assigned them as 3, 2, 1 and 0 respectively. Shadow education, as the main research object of this paper, was a classified continuous variable. Personal factors were composed of two variables, namely students' education stage and students' gender. Among them, students' education stage was divided into primary school, junior high school and senior high school, which was a discrete variable with classification; students' gender was a discrete variable with classification. Other variables included parents' expectation of children's achievement, school location, and whether students were in key schools and key classes.

3. Model Setting and Result Estimation

The main purpose of parents' investment in extra-curricular tutoring is to improve students' academic performance, so that students can achieve good results in the entrance examination and other tests. But whether increasing extra-curricular tutoring expenditure can improve students' performance is an issue worth of further study. In order to study the impact of shadow education expenditure on students' performance, this paper establishes a regression model. Students' performances are explained variables, which are divided into excellent, good, medium and poor. They are ordered and multi classified variables. In terms of constructing the model, the OLogit model is built to explore the influence of shadow education variables and other variables on students' academic performance. By using the Stata statistical analysis software, models on the influence of shadow education variables and other variables on students' Chinese and math scores were constructed.

The models established in this paper are as follows:

$$Y_{Chinese} = F\ (Expenditure, Sex, Mother'edu, Expect, Education, Location, High\ school, Key\ class) \quad (1)$$

$$Y_{Math} = F\ (Expenditure, Sex, Mother'edu, Expect, Education, Location, High\ school, Key\ class) \quad (2)$$

It can be seen from table 1 that under the control of other variables, the extra-curricular tuition expenditure has a significant impact on students' Chinese and math scores. The influence of extra-curricular tuition expenditure on students' mathematics achievement is more significant than that of Chinese achievement. If parents increase extra-curricular tuition expenses, students' Mathematics and Chinese scores will be improved. At the same time, compared with the improvement of Chinese performance, extra-curricular tuition expenditure can increase mathematics scores more obviously.

Table 1 Ologit Regression Analysis.

independent variable	dependent variable	dependent variable
	Chinese	Math
Logarithm of after-school tuition expenses	0.0389*	0.0745***
	(0.0207)	(0.0211)
Control variable	…	…
LR chi2(16)	447.23	508.34
Prob > chi2	0.0000	0.0000
Pseudo R2	0.0568	0.0629

Note: Standard errors in parentheses $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$

4. Conclusion

Through the establishment of the model and empirical analysis, it can be concluded that shadow education expenditure has a positive and significant impact on academic performance, which is mutually confirmed with Schulz's theory of human capital investment and educational economics. For both liberal arts courses represented and symbolized by Chinese and science courses represented by mathematics, increasing the expenditure of shadow education outside school education can significantly improve students' performance. This means that the results of education investment are obvious and can be measured by the improvement of achievements. This conclusion explains the phenomenon of students' participation in extracurricular tutoring classes and parents' eagerness for extracurricular tutoring classes in today's society. It also explains why tutoring classes can still exist under government's discouragement and unfavourable policies.

Based on the conclusion of this study and the analysis of the actual social situation, the author puts forward following policy suggestions. First, students and their parents should treat extra-curricular tutoring rationally. Participation in extra-curricular tutoring can improve students' academic performance, but students and their parents should avoid falling into the “prisoner's dilemma”. Secondly, school education should make a difference. Compared with shadow education outside school, regular education in school plays a leading role in the whole education experience of students. The emergence of shadow education can make up for some weaknesses of school education. Regular school education can absorb the essence of extracurricular shadow education to some extent, such as opening different levels of classes for students according to their academic abilities and provide education forms which are more easily to be accepted. Finally, the government should increase the education investment in central and western regions as well as relatively poor areas, and improve the education levels and conditions of public schools in these areas. Shadow education expenditure is affected by the difference of economic level; there are differences between regions and schools. Through the combination of political and economic means, the government should fundamentally narrow the gap of teaching quality between regions and schools, so as to reduce shadow education and standardize the compulsory education. For different regions, the government should provide more education funds to areas with relatively backward economy; for schools, the government should balance the education levels of high quality schools and schools with lower education levels, and promote the cooperation between them, so as to improve the overall teaching quality. Under the circumstances that the National People's Congress constantly introduces governance policies for extra-curricular supplementary education, the author believes that to strengthen the government's investment in public basic education is also a right way.

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