MAINTAINING INEQUALITY IN CONSUMPTION: GOVERNMENT LED EDUCATION PROCESS FAIRNESS AND SHADOW EDUCATION PRODUCT CONSUMPTION

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Abstract

This study examines whether government initiatives aimed at promoting educational equity in China may be weakened or counteracted by forces that sustain or recreate educational inequality. Although recent policies such as the cancellation of demonstration schools and the implementation of the "double reduction" policy seek to reduce disparities, theories of Maximally Maintained Inequality (MMI) and Effectively Maintained Inequality (EMI) suggest that socioeconomically advantaged families often adopt strategic behaviors to preserve their competitive edge. Using data from the 2014–2015 China Education Panel Survey (CEPS), this study analyzes 10,751 eighth-grade students and employs both OLS and Probit regression models to assess how educational costs and educational balance influence families' choices regarding shadow education products. The results indicate that even when opportunities appear more equal, high-SES families continue to obtain advantages through selective and resource-driven participation in shadow education, thereby sustaining existing inequalities. Furthermore, policies intended to reduce educational costs and promote fairness have unintentionally encouraged greater consumption of shadow education services, leading to new forms of inequality. These findings highlight that government-driven efforts to achieve educational equity may be undermined by persistent consumption-based mechanisms of inequality, suggesting that current reforms may be insufficient to fully realize equitable educational outcomes.

INTRODUCTION

The Global Education Monitoring (GEM) Report has highlighted that more than 250 million people of school age are still out of school globally, with the out-of-school population decreasing by only 1 per cent from 2015 (UNESCO, 2024). Educational equity is a fundamental goal and policy of educational modernization, and also an important theme of educational reform for a considerable period of time. Plato once put forward the idea of education for all that transcends social classes, and Confucius also advocated the concept of equality of 'education for all without discrimination'; The United Nations is also actively advocating and committed to promoting global education equity. The Chinese government has always pursued fairness in educational outcomes, and currently, on the premise of achieving fairness in the starting point of education, the government is further promoting fairness in the educational process.

In July 2021, the General Office of the Communist Party of China Central Committee and the General Office of the State Council issued the "Opinions on Further Reducing the Homework Burden and Extracurricular Training Burden of Students in Compulsory Education", proposing the "double reduction", which means reducing the homework burden and extracurricular training burden of students in compulsory education. On March 18, 2021, the Ministry of Education and six other departments issued the "Guidelines for Quality Evaluation of Compulsory Education", which clearly stated the need to strictly control the number of exams, not disclose exam scores and rankings, implement balanced class arrangement, and not differentiate between key classes, fast and slow classes, all of which are mandatory requirements. In the county-level compulsory education quality evaluation system, key examination points have also been proposed, such as "not assigning admission targets to schools, not simply evaluating schools, principals, and teachers based on admission rates", "not organizing key schools", "not disclosing or hyping up the top scorers in the middle and high school entrance examinations", and "not evaluating admission rates solely based on admission rates". The Chinese government hopes to achieve educational equity through these measures.

Swedish educator Husen divides educational equity into three dimensions: first, starting point fairness, which means that everyone can realize the right to education (including enrollment, school selection, urban mobility, etc.); second, process fairness, which means providing equal opportunities and conditions for learners to receive education (including classrooms, textbooks, and teacher class culture); third, result fairness, The chances of educational success and educational outcomes for learners are equal or basically equal (including student academic achievement, educational acquisition, evaluation, employment, etc.). The theme of this paper is whether the current Chinese government's leadership in educational process fairness can achieve educational outcome fairness.

In fact, on the one hand, it is the government's efforts in educational equity, and on the other hand, there is a force to maintain educational inequality to counter it. Maintaining educational inequality refers to the fact that the socially advantageous class is still obtaining more educational opportunities through their existing advantageous resources

(such as higher family economic status), and the acquisition of more educational opportunities in turn enables them to maintain and protect their advantages in social distribution (Raftery& Hout, 1993). It is important to note that this class competition is evolving in the context of educational expansion. As policies promote universal access to basic education, families are engaging in competition over the quality of education by pursuing extracurricular activities. This phenomenon has garnered attention in the academic community, where it is referred to as 'shadow education' (Bray, 1999). Such supplementary educational services, which are funded by private individuals, are becoming an important vehicle for sustaining educational inequality.

The Maximum Maintenance of Inequality theory (MMI) shows that when the total number of educational opportunities increases (e.g. the expansion of colleges and universities), the advantaged class will be the first to seize higher quality educational resources (e.g. key universities) in order to maintain its competitive advantage. The Effective Maintenance of Inequality (EMI) theory, on the other hand, suggests that when opportunities are universalized at the basic level (e.g. full coverage of compulsory education), inequality shifts to competition over the quality of education (e.g. differences in school facilities between urban and rural areas and access to out-of-school tutoring). This study investigates whether socio-economic factors will lead families to seek alternative avenues, such as shadow education, to maintain educational advantages.

This paper uses quantitative methods to analyze and study from two perspectives: the cost of education and the educational environment. It is found that due to the gift and selection nature of high-quality educational resources, families have the motivation to pursue educational inequality. After the educational process is equal, families will further pursue the consumption of shadow education to maintain inequality.

LITERATURE REVIEW

Unequal Consumption and Maintenance of Education
Theoretical Review

In discussing the issue of educational choice under mainstream educational equity, Coleman and other scholars published the famous report "Equality of Educational Opportunity" (Coleman et al, 1966), which proposed the following four classic conditions for educational equality:

(1) Free education provision

(2) Unified curriculum

(3) Cross-class mixed enrolment

(4) Balanced regional resources

Among these four conditions, as far as China is concerned, (2) providing a common curriculum has been achieved, because nine-year compulsory education is mandatory by the government, and its curriculum content is completely the same except for some ethnic minorities; (4) Providing equality within a specific region has also been achieved through

the cancellation of demonstration schools and fast and slow classes. Therefore, the other two conditions that serve as prerequisites have become crucial.

In China, these two conditions are gradually being realized under the trend of educational equity: education costs not only include tuition fees, but also textbook costs and opportunity costs. Through the implementation of policies such as scholarships, this cost is gradually decreasing, ensuring that (1) providing a certain level of free education can be achieved in some regions; Compared to the previous imbalance in education quality, families with higher incomes and social status tend to attend specific schools. With the advancement of educational equity, families with different incomes and social status have begun to appear in the same school. (3) Children from diverse backgrounds are also starting to attend the same school in some regions.

This advancement of formal equality has been shown to catalyse a shift in the field of educational competition. As curriculum content and regional resources converge, advantaged families find it difficult to maintain their educational advantage through explicit pathways (e.g. choosing a school). The focus of competition is therefore shifted to the reproduction of differences in the quality of education. The Effective Maintenance of Inequality (EMI) theory posits that universal access to fundamental opportunities serves as a catalyst for the transition of inequality mechanisms towards the quality dimension (Lucas, 2001). In this process, shadow education, as a complementary service to marketized education, has become a new tool for families to construct an implicit competitive advantage.

It is important to note that China is currently implementing measures to reduce the direct costs of education through scholarship policies (1) and promoting mixed attendance across classes through initiatives such as zoning enrolment (3). This deepening of institutional equity has objectively reduced the space for traditional educational competition, yet further fueled household demand for shadow education consumption. Empirical studies have demonstrated that extracurricular tutoring programs are significantly and positively correlated with family socioeconomic status when intra-classroom disparities in instruction are constrained by policy (Zhang & Xie, 2016). This finding lends further support to the theoretical framework of the theory of maximizing maintenance of inequality (MMI), which posits that advantaged social classes invariably convert educational opportunities into capital for the purpose of class reproduction through novel strategies (e.g., the procurement of high-quality tuition services) (Raftery & Hout, 1993).

On this basis, the present paper adopts a stance of cautious pessimism regarding the proposition that 'modernization of education inevitably leads to substantive equality'. This is not to deny the effectiveness of such policies, but rather to point out that when policies of formal equality (e.g. uniform curricula, regional equalization) dissolve explicit inequalities, families may reconstruct implicit barriers through market-based pathways such as shadow education. For instance, while the discrepancy in facilities between key and non-key schools has been reduced by policy intervention, the stratification of educational opportunities by out-of-school tutors persists in exacerbating disparities in

educational outcomes (Xue et al., 2008). It is imperative to be vigilant against the unintended consequence of the process of educational equity, which can be summarized as follows: the cycle of 'equalization policy → shifting playing field → new patterns of inequality'.

Maintaining conditions for educational inequality

Whether it is to access educational opportunities (MMI) or educational quality (EMI), they are all aimed at maintaining educational inequality, and the motivation for maintaining educational inequality is mainly manifested in two conditions: selectivity and selection. In other words, if these two conditions disappear, families will not engage in behaviors that maintain educational inequality.

(1) Selective distribution of resources

Schultz (1964) explored the role of education in the growth of human capital and believed that education is a form of self-investment that can increase one's own production capacity. The higher the quality of education received, the higher the human capital and income.

If higher quality education does not require selection and is accessible to everyone, then there will be no competition among people. However, higher quality education is scarce and requires assessment to have the opportunity to obtain it, thus giving people the motivation to maintain inequality. Families with higher disposable incomes maintain educational inequality in order to obtain a higher quality education and ultimately a higher income.

(2) Public compensation for costs

The Chinese government has continuously increased education donations in recent years, increasing investment in higher education and improving the quality of higher education; The cancellation of miscellaneous fees for compulsory education has reduced the cost of primary education. This leads to an increase in returns and a decrease in costs of education investment.

However, if the expected cost of receiving high-quality education is not lower than the expected income, people still have no motivation to maintain educational inequality, which requires the inclusion of " Public compensation for costs " as a condition for maintaining educational inequality.

While obtaining higher income, there are also greater costs associated with receiving more education: Becker (1991) believes that schools are specialized institutions engaged in educational production, and tuition and miscellaneous expenses are direct costs, while the income given up during the study period is indirect costs. This means that, in the context of receiving more education and obtaining predictable higher income, the cost of education is reduced, which is a " Public compensation for costs" from the government and an important motivation for families to increase education investment.

However, the policy effect is characterized by significant class heterogeneity. For households with higher disposable incomes, the capital released by cost reductions can be rapidly converted into shadow education spending. Conversely, low-income households,

despite benefiting from policy measures, are subject to opportunity cost pressures (e.g. students' early entry into the labor market) and encounter challenges in participating equally in extracurricular educational competition (Zhang & Xie, 2016).

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Therefore, facing the high expected income of receiving higher quality education and the current low cost of education, people have the motivation to maintain educational inequality. After basic education has partially met the conditions for equality, people have shifted their focus towards purchasing shadow education products to maintain inequality.

Behavior of maintaining educational inequality - purchasing shadow education products

When mainstream education opportunities are unfair, people can pursue better mainstream education; After the fairness of mainstream education opportunities, people begin to pursue shadow education beyond mainstream education to ensure that they receive higher education than their peers. However, since shadow education products require payment for purchase, this unfairness can only be achieved by consumers, which is named as the CMI theory (Consumption Maintained Inequality). The CMI theory posits a novel paradigm of reproduction within the contemporary education system, wherein the privileged class facilitates the conversion of economic capital into educational advantage through the acquisition of commodified educational services (e.g., extracurricular tutoring).

After meeting the conditions of educational equality (2) and (4), people receive the same education in the region. To obtain higher quality education, people need to increase the probability of passing the assessment by maintaining educational inequality. Shadow education, as a supplement to mainstream education, is a motivation for individuals to receive shadow education to increase the probability of passing the assessment. Shadow education serving exams has become the main way to maintain inequality (Bray,1999). Since obtaining higher quality education is equivalent to receiving a government gift, people can even invest an equivalent amount of money into shadow education.

In China, due to the emergence of fair starting points in primary and secondary education, individuals have begun to pursue other methods to maintain educational inequality, leading to the emergence of shadow education consumption. There is currently an unfair education process in China caused by shadow education consumption, which maintains the unfairness of educational outcomes through consumption. Extracurricular tutoring and training institutions have already impacted the school education system (Xue Haiping, 2016; Pei Changgen et al., 2018) and have played a restraining role in promoting equal educational outcomes (Li Jiali, 2017; Liu Baozhong, 2018).

Therefore, on the one hand, the government continuously strives to implement educational equity, and on the other hand, families strive to pursue educational inequality. When the conditions for educational equality proposed by Coleman (1966) (2) and (4) are met, conditions (1) provide a certain level of free education, and (3) children from different backgrounds have a higher level of satisfaction in attending the same school, and people are more motivated to maintain educational inequality. The perpetuation of this situation is frequently facilitated by families who possess the financial resources to procure shadow education products, thereby ensuring their children's access to these opportunities. In contrast, low-income groups frequently face limitations in their ability to engage in such competitive pursuits due to their constrained financial circumstances.

Shadow education consumption under the reduction of education costs

The concept of educational costs belongs to the field of educational economics, and this term emerged in the late 1950s and early 1960s with the emergence of educational economics. T. W. Schultz (1964) proposed in "The Economic Value of Education" that education costs mainly includes the cost of providing educational services and the opportunity cost, the former mainly comes from the government and families, and the latter is formed by the educated giving up their work remuneration. Wang (1996) further subdivided this from the perspectives of the burden subject, cost occurrence, performance, cost connotation, cost form, cost measurement, and cost occurrence time. Among them, compared to costs that can be measured by currency, the opportunity cost of non-monetary forms can be analyzed in three dimensions: explicit, implicit, and psychological (Wang Yijun et al，2019).

Due to the subjective judgment of opportunity cost and the possibility that the government may force households to bear this cost, the subsequent discussion will focus on explicit education costs. The increase in education costs will lead to an increase in household costs, which in turn will result in a decrease in net profits for households. Therefore, the probability of choosing not to receive education will increase. The study by Ding (2013) and Xue (2016) pointed out that the economic status of the family exerts a certain degree of influence on the structure of education expenditure. Furthermore, they contend that there are significant disparities in the 'selectivity' of education expenditure among families in different income groups, with middle- and high-income families exhibiting a greater propensity to convert savings from the mainstream cost of education into shadow investment in education.

Yang (2018) cited a research report from the Social Survey Center of China Youth Daily in 2006 and pointed out that the high cost of education at that time "had become an important reason for poverty among urban and rural residents", and thus became an important reason for the emergence of the "new theory of useless reading" before the turn of the century. However, the current fiscal expenditure on education continues to increase. During the 12th Five Year Plan period, the growth rates of public fiscal budget education investment as expenditure and tuition fee collection as income were 16.67% and 3.60%, respectively, leading to a decreasing cost of receiving mainstream education.

There is considerable class heterogeneity in the impact of such cost reductions on education consumption, primarily in the sense that middle- and high-income households are more financially resilient to converting education savings into shadow education inputs. Due to the income effect, a decrease in the cost of mainstream education can lead individuals to expect to purchase more mainstream education. This change in cost is not only reflected in the immediate decrease in mainstream education costs, but also in the long-term decrease in expected mainstream education costs, which motivates individuals to purchase more shadow education products to increase their chances of obtaining more mainstream education.

On the one hand, this is due to the long-term reduction in the cost of mainstream education, which has led to an increase in personal willingness to acquire it. On the other hand, the immediate reduction in mainstream education costs provides the possibility of budget constraints for purchasing shadow education products - specifically, if education costs is too high, individuals will prefer mainstream education and have no extra budget to purchase shadow education products; With the reduction of education costs, especially the cancellation of tuition fees during compulsory education and even the provision of free textbooks and subsidies for boarding students' living expenses for economically disadvantaged school-age children and adolescents, the reduction of education costs has made it possible for individuals to purchase shadow education products. Therefore, this type of educational cost mainly manifests as the cost of immediate education.

With the accumulation of family wealth, parents could create a better educational environment for their children, which also stimulates the demand for shadow education (Kang, 2023). Many researchers have found a correlation between participation in extracurricular tutoring and socio-economic status (such as Verdis 2002; Murawska & Putkiewicz 2006; Smyth 2009). Meanwhile, some scholars believe that as family wealth accumulates, parents have the ability to create a better educational environment for their children, which also drives the demand for shadow education. Therefore, we hypothesize:
H1 The lower the cost of immediate education, the higher the likelihood and quantity of individuals purchasing shadow education products.

Fairness in the educational environment and the choice of shadow education

When the government takes measures to narrow the quality gap between primary and secondary education, higher education still allows for disparities, namely the existence of "different types and levels of higher education." The requirement in the "Double First Class" initiative implemented in 2015 to "promote a group of high-level universities and disciplines to enter the world's top tier or top tier" indicates that there is a gap in China's allowance for higher education.

This conflicts with the fairness of primary and secondary education: one of the important purposes of receiving primary and secondary education is to receive better higher education, and when facing the contradiction between fairness and unfairness in primary and secondary education and higher education, how should families choose the form of primary and secondary education?

In primary and secondary education, families with higher socio-economic status are often able to attend better schools due to their economic, social, and cultural advantages. However, this advantage is beginning to be lost under educational equity, a large number of families with relatively lower social levels have the same educational resources as families with higher socio-economic status. At this time, in order to maintain educational inequality, families with higher socio-economic status will pursue higher education quality and more education quantity. However, due to the equal opportunities to access mainstream education resources, the distribution of the quality of mainstream education resources among schools has also begun to converge. Families with higher socio-economic status can only shift their focus to shadow education: shadow education can enable children from families with higher socio-economic status to receive higher quality and more quantity of education, thereby increasing the probability of passing exams. Therefore, under educational equity, families with higher socio-economic status will first purchase shadow education products. And disadvantaged families are also unwilling to accept the reality of reduced probability of passing exams brought about by externalities, so they also begin to purchase shadow education products under the influence of families with higher socio-economic status.

The choice of shadow education is a subjective behavior of families, and its key is that when families subjectively believe that there is educational equity in their environment, in order to achieve the goal of unfairness and form their own effective educational inequality, they will purchase shadow education products. At present, there is a collective understanding among parents that "they cannot let their children fall behind the starting line". "Watching others' children attend tutoring classes makes parents anxious. They always feel that if they do not attend tutoring classes or hire tutors, their children will learn much less than others, and even attribute a slight decline in their children's grades to not participating in extracurricular tutoring education" (Peng, 2011).

The "theater effect", specifically referring to "shadow education", can be understood as: if the majority of students in the class use their spare time to participate in extracurricular training institutions, in order to maintain a roughly similar learning progress with everyone, the remaining students who have not received "shadow education" will also actively participate in it to avoid potential backwardness. (Feng, 2018; Xue & Xu, 2022). This phenomenon conforms to the theoretical core of effectively maintaining inequality: the key to exam-oriented education is not to pursue how excellent one is, but to pursue how much one is better than others. If others start acting, naturally one must also start taking action; If others do not take action, one must take action to maintain inequality with others. As a result, the behavior of purchasing shadow education products under educational equity has begun to emerge. Therefore, the purchase of shadow education products by families is an effective way to maintain inequality and avoid educational equity. This behavior is more influenced by the educational environment in which children live, to the extent that this subjective feeling can be defined as a discriminatory behavior of the family subject towards the surrounding group: it is better to pay the cost than to maintain the same level as them. Based on this, this paper discusses the mechanism of

shadow education under mainstream educational equity from the perspectives of dynamic population mobility and static cultural capital.

The Role of Population Mobility in the Mechanism of Shadow Education under Educational Equity

Educational equity policies have been instrumental in establishing institutional safeguards to ensure the educational mobility of migrant children. However, concurrently, population migration across various geographical regions has given rise to the emergence of competitive tensions between the local population and those considered to be outsiders. It is evident that such competing perceptions, which are predicated on group identity, have the capacity to transcend the physical compartmentalization of the traditional household registration system, thereby forming group boundaries that are characterized by a kernel of regional cultural identity (Zhang, 2014). Therefore, the identity gap between locals and outsiders begins to form due to regional disparities and increases with the proportion of outsiders.

This contradiction will create a motivation for both locals and outsiders to change the status quo: locals are unwilling to only receive mainstream education because it will make the quality and quantity of education their children receive the same as outsiders. In order to circumvent the relative weakening of their children's educational advantages, locals reject the mainstream education model that may 'level' educational resources, while outsiders seek compensatory development through the purchase of shadow education products in order to eliminate the potential competitive gap.

This behavior of purchasing shadow education products can psychologically satisfy an individual's definition of identity, and its root lies in the influx of foreign populations, presenting a phenomenon of "the more immigrants, the more obvious these contradictions" (Chen & Zhang, 2015). Based on this, therefore, we hypothesize:

H2 Under educational equity, the higher the proportion of local population in a school, the lower the likelihood and quantity of purchasing shadow education products.

The mechanism of cultural capital convergence in shadow education under educational equity

With the enhancement of educational equity, the backgrounds of families in schools have begun to diversify, and even traditional private primary and secondary schools that can be enrolled by paying fees have begun to use computer lottery for enrollment in some areas, with 40% or even 100% used for computer allocation. In this context, the cultural capital of different families of students in the same learning environment begins to diverge.

The term 'cultural capital convergence' is employed to denote the gradual homogenization of the student body within the same educational institution in terms of values, educational concepts, cultural practices, and other dimensions. Bourdieu (1997) proposed that cultural capital mainly includes three types: object cultural capital, identity cultural capital, and institutional cultural capital. Among them, objectified cultural capital exists as a material object and has modifiability in the short term. The long-term

characteristics of physical cultural capital and institutionalized cultural capital lead to their relatively fixed static characteristics.

The study demonstrates that the perceived intensity of intergroup competition is positively associated with the degree of cultural capital heterogeneity. The degree of exclusion of the local population by outsiders is determined by the population ratio, while the sense of competition triggered by differences in cultural capital is determined by the degree of cultural capital dispersion within the group. Due to equal access to education, the tradition of parents with similar cultural backgrounds in schools is beginning to be broken, and families with various cultural capital backgrounds begin to exist in the same school. The phenomenon of status maintenance anxiety emerges when families with substantial cultural capital recognize the potential erosion of their cultural authority. This anxiety does not stem from direct discrimination; rather, it is a precautionary reaction to the potential devaluation of cultural capital.

Compared to the environment of cultural capital convergence, different families under the trend of cultural capital convergence have the same mainstream education. This makes it easier for families with dominant cultural capital to panic about the development of their own children and choose shadow education to ensure educational inequality. Due to the natural cultural authority background of families with advantageous cultural capital, this "power makes individuals with more cultural capital in a certain field become objects of imitation and learning for other members in that field, and the type of cultural capital they possess has a demonstrative effect on other members (Yao, 2005)." Their purchase of shadow education products can lead to disadvantaged cultural capital families imitating and becoming exemplary "opinion leaders" (Zeng et al., 2017). Therefore, using cultural capital representing personal knowledge, skills, and social status as a means of discussing the influence of cultural capital on shadow education choices within schools. Therefore, we hypothesize:

H3 Under educational equity, the higher the degree of convergence of family cultural capital within a school, the lower the likelihood and quantity of purchasing shadow education products.

METHODS

Data

The present study employs baseline data from the China Education Panel Survey (CEPS) 2014-2015, which was implemented by Renmin University of China using stratified three-stage probability sampling. In the first stage of the study, the county was utilized as the sampling unit, and 28 county-level units were randomly selected nationwide based on the population's average years of schooling and the proportion of the mobile population (no other stratification variables were included); in the second stage, 112 schools were randomly selected from these; and in the third stage, 438 eighth-grade classes were selected for whole-cluster sampling, resulting in a final tracking sample of 10,751 junior high school students.

The survey targets students, parents, homeroom teachers, main subject teachers, and school leaders, comprehensively collecting basic data related to the education process at various levels, including local education policies, school curriculum structure, family education environment, and family school relationships. It is important to note two aspects of the study that may have affected the results. Firstly, there is a lack of data regarding shadow education expenditure, which could potentially introduce measurement bias. Secondly, the sampling design focuses on county differences, which may limit the ability to detect variations in cultural capital differentiation within megacities.

This is the first nationwide and sustained large-scale tracking survey project in China that starts from the middle school stage, strictly follows the principle of probability sampling, and represents the student population in school. It can comprehensively reflect the development status of basic education during the period of social transformation in China. Therefore, using this database to test the hypotheses of this chapter has a certain degree of validity.

Variable
Outcome variable: Shadow education product selection

The outcome variable of this study is the purchase of shadow education products by students. We use two indicators to measure the purchase of shadow education products.

First, whether students purchase shadow education products (ShadEduc), and examine the purchase of shadow education products from a "quality" perspective, The corresponding questions for CEPS are the binary variable "Q1: What have you usually done during winter and summer vacations in the past year - attending tutoring classes (related to coursework)" (yes=1, no=0); Q2: From Monday to Friday, your usual extracurricular activity schedule is to attend extracurricular classes (related to coursework), and Q3: on weekends, you usually attend extracurricular classes (related to coursework). We reassign the last two variables based on the time spent attending extracurricular tutoring classes within a week (hours) and obtain a continuous variable with a value of 0-10 (hours). The option limit of 10 hours is determined by the questionnaire design.

We will summarize these three types of variables for data processing. If all three variables have values of 0, it is defined as students not purchasing shadow education products. As long as one variable has a value other than 0, it is defined as students purchasing shadow education products. Assign a value of 1 if any of the following conditions are satisfied, otherwise 0: ①Q1=1 (participation in summer and winter holidays); ②Q2>0 (weekday participation); ③Q3>0 (Weekend participation). In the end, we obtained a binary variable indicating whether students purchase shadow education products (yes=1, no=0).

The second is the duration of students purchasing shadow education products (ShadEduc_t), which examines the purchasing situation of shadow education products from the perspective of "quantity". Defined as how many hours of shadow education products students purchase in a week, two variables are used: "From Monday to Friday, your usual extracurricular activity time (hours) is arranged - attending extracurricular

tutoring classes (related to coursework)" and "On weekends, your usual daily time - attending extracurricular tutoring classes (related to coursework) (hours)". After summing up, the values are reassigned based on the time (hours) you attend extracurricular tutoring classes within a week, obtain a continuous variable with a value of 0-10 (hours), where the larger the value, the longer the time spent attending extracurricular tutoring classes within a week.

The descriptive statistical results of all studied variables used in this paper are presented in Table 1

Table. 1 Descriptive Statistics of All Studied Variables

Variable	Obs	Mean	Std. dev.	Min	Max
ShadEduc	10,903	0.5040814	0.5000063	0	1
ShadEduc_t	9,801	1.282114	2.064099	0	10
educost	10,751	0.7797746	2.716103	0	99.999
educost_n	10,751	0.7065981	2.719531	-6.25	99.999
schlocal	10,317	0.8201623	0.2215382	0.03	1
schidsedu_sd	10,752	1.616948	0.2897948	0.9343532	2.189795
schidsoccu_sd	10,752	2.941272	0.8252622	1.188131	4.492275
homework	9,858	2.050213	1.163954	1	4
stprhoccu	9,448	7.783129	3.375273	1	13
stprhedu	9,578	4.580601	2.039555	1	9
steco	9,499	2.811349	0.6108392	1	5
politics	9,553	0.1742908	0.3793792	0	1
schrank	10,751	3.950423	0.8633399	1	5
stsex	10,280	0.5279183	0.4992442	0	1

Numerically speaking, 50.415% of students chose to purchase shadow education products, with an average purchase time of 1.28 hours per person. Among all students who purchase shadow education products, the average purchase time is 2.54 hours. In terms of total payment for mainstream education, 50.28% of students do not need any fees, and due to the existence of scholarships, the average cost of mainstream education has been reduced from 779.8 yuan to 706.6 yuan; In terms of student sources, 82.02% of the school's student sources are local; In terms of parental education level, their average education level is between vocational/technical schools and vocational high schools, with a standard deviation of 1.61 in the same school and an overall standard deviation of 2.04. It can be seen that the difference in parental education level between schools is greater than that within schools; In terms of parental occupation, the average occupational level is 7.78, with a standard deviation of 2.94 in the same school and an overall standard deviation of

3.38, indicating that the difference in parental occupation between schools is greater than within schools.

In terms of parents checking homework, the average number of times they check their children's homework per week ranges from 1-2 days to 3-4 days. In terms of family economic status, the average economic status is close to moderate; In terms of political outlook, 82.57% of surveyed parents are from the masses; In terms of school ranking, the average level of schools is close to the upper middle level; In terms of gender, 52.79% of the surveyed students are male.

Research Methods

The present study adopts a hierarchical modelling strategy, which is outlined as follows:

The model setting and variable interpretation

The models adopt a unified system of mathematical expressions:

$$ShadowEd_i = \beta_0 + \beta_1 CoreVar_i + \sum_{k=1}^{n} \gamma_k Control_{ki} + \varepsilon_i$$

The use of the term '*ShadowEd*' is indicative of the decision to participate in shadow education in the ith sample (dummy variable) or the length of participation (continuous variable). The term '*CoreVar*' is indicative of the core independent variable (cost/local/culture). The term '$\sum Control$' is employed to denote the group of control variables, which comprises the individual, family and school levels. The term 'ε_i' is used to denote a random disturbance term that obeys a standard normal distribution.

Model construction and estimation methods

Firstly, to test hypothesis 1, models 1 and 2 were constructed.

$$ShadEduc_i = \xi_0 + \xi_1 cost_i + \sum control + \varepsilon_i \qquad (1)$$

$$ShadEduc\_t_i = \xi_0 + \xi_1 cost_i + \sum control + \varepsilon_i \qquad (2)$$

Among them, cost represents the cost of immediate education, and the cost of immediate education as the dependent variable can be divided into two categories: mainstream education cost (educost) and the net cost of mainstream education for students (educost_n). The inclusion of control variables was executed through a stratified inclusion strategy. Initially, individual characteristics were incorporated, followed by the gradual integration of family capital (Xue Haiping's five-dimensional framework). Ultimately, environmental factors, such as school ranking, were considered in the analysis. The control variables have been discussed in section 3.2.3 and will not be further elaborated here.

Since the dependent variable in Model 1 is a dummy variable, Probit regression is used, while Model 2 uses OLS regression. Models 3 (Probit) and 4 (OLS) utilise the core

independent variable of schlocal. The proportion of local students has been shown to affect educational balance through the 'dilution effect' and the 'cohort effect' of the allocation of educational resources. This phenomenon is reflected in a monocultural environment for schools with a local student population of over 75 per cent, and in a multicultural capital collision for schools with a local student population of under 50 per cent.

To test hypothesis 2, models 3 and 4 were constructed.

$$ShadEduc_i = \xi_0 + \xi_1 local_i + \sum control + \varepsilon_i \qquad (3)$$

$$ShadEduc\_t_i = \xi_0 + \xi_1 local_i + \sum control + \varepsilon_i \qquad (4)$$

Local represents the proportion of local students in the teaching environment they are in, which is used to measure the degree of equal access to education. Construct the proportion of local student population (schlocal) as the core independent variable, which is the proportion of students in the county (district) to the total number of students. Since the dependent variable of Model 3 is a dummy variable, Probit regression is used, while Model 4 uses OLS regression.

However, this does not mean that most schools with local students are not "balanced". The source of students in a township high school comes from the local township, which does not mean that the high school is unbalanced. However, with the development of equal access to education, schools with a wide source of students can better reflect the goal of balanced education policies. Currently, with the cancellation of the key secondary school system and the further implementation of the policy of allowing children of migrant workers to enjoy the same education as local students, schools with a wider source of students can better reflect the essence of equal access to education and represent the direction of future development compared to schools with a single source of students.

To test hypothesis 3, models 5 and 6 were constructed.

$$ShadEduc_i = \xi_0 + \xi_1 culture_i + \sum control + \varepsilon_i \qquad (5)$$

$$ShadEduc\_t_i = \xi_0 + \xi_1 culture_i + \sum control + \varepsilon_i \qquad (6)$$

Among them, culture represents the degree of convergence of family cultural capital. Constructing family cultural capital, using the highest educational level of parents （schidsedu_sd）as physical cultural capital and the highest occupation of parents （schidsoccu_sd）as institutional cultural capital. The highest standard deviation of educational qualifications for all parents in the same school is defined as the degree of convergence of physical and cultural capital, and the highest occupational standard deviation of all parents in the same school is defined as the degree of convergence of institutional and cultural capital. Among them, a smaller standard deviation indicates a convergence of cultural capital within the school, while conversely, it is defined as

divergence. Since the dependent variable of Model 5 is a dummy variable, Probit regression is used, while Model 6 uses OLS regression.

Empirical basis for methodological choice

The merits of Probit regression are as follows: in comparison with the Logit model, the Probit model's assumption of a standard normal distribution is more suited to the latent variable characteristics of educational decision-making. The application of the Likelihood Ratio Test (LR test) indicates that the AIC value of the Probit model is 7.2% lower than that of the Logit model. Furthermore, the marginal effect is distributed more evenly within the reasonable interval of [0.1, 0.6].

Limitations and corrections of OLS: Notwithstanding the potential for heteroskedasticity (White's test p=0.032), the following enhancements have been implemented. To eliminate the effect of heteroskedasticity, it is necessary to employ Huber-White robust standard errors. In addition, Box-Cox transformation is required to ensure that the length of participation variable satisfies the assumption of linearity. Finally, the Variance Inflation Factor (VIF) must be less than 3.5 to exclude the interference of multiple covariance.

RESULT AND DISCUSSION

An Empirical Test on the Immediate Education Cost and the Choice of Shadow Education Products

In order to verify Hypothesis 1, Through analyzing the impact of immediate education cost on the choice of shadow education products and conducting the corresponding regression analysis. Gross remission (educost) is defined as the total cost of mainstream education that is paid by the household, including tuition fees, textbooks and other mandatory expenses. In contrast, net remission (educost_n) is the actual financial burden of the total cost after the deduction of grants. The distinction between the two is that gross remission is indicative of the perceived intensity of financial pressure on the household, whereas net remission characterizes the actual ability to pay subsequent to the policy intervention. The results are presented in Table 2:

Table. 2 The Influence of Immediate Education Cost on Shadow Education Product Selection

	ShadEduc		ShadEduc_t	
Variable	Regression 1	Regression 2	Regression 3	Regression 4
total payment reduction 2	-0.1839***		-0.1340***	
	(0.0382)		(0.0340)	
net tuition fee reduction 2		-0.1335***		-0.0740**
		(0.0375)		(0.0339)

	ShadEduc		ShadEduc_t	
homework	0.2686***	0.2736***	0.2338***	0.2355***
	(0.0208)	(0.0208)	(0.0191)	(0.0193)
Controls	Yes	Yes	Yes	Yes
Constant	-2.7173***	-2.7761***	-0.9218***	-0.9707***
	(0.1953)	(0.1957)	(0.1754)	(0.1759)
Observations	8,201	8,116	8,147	8,063
Pseudo R2	0.0983	0.0975	-	-
Prob > chi2	0.0000	0.0000	-	-
R^2	-	-	0.1114	0.1096
Prob.>F	-	-	0.0000	0.0000

As illustrated in Table 2, the financial burden of education exerts a substantial inhibitory influence on the engagement in shadow education. Each $1,000 reduction in total cost (educost) increases the probability of participation by 3.2 per cent (β=-0.032, $p<0.01$), and the same reduction in net cost (educost_n) brings a 2.1 per cent increase in probability (β=-0.021, $p<0.05$) This discrepancy can be attributed to the fact that the educost reflects the perceived economic pressure on the family, while the educost_n reflects the actual burden after the implementation of the financial assistance policy.

Regression 1 and regression 2 in Table 2 show that regardless of the net cost of mainstream education (educost_n) or educost, the regression coefficient of education cost on shadow education product purchase (ShadEduc) is significantly negative ($p < 0.05$). This indicates that the reduction of the cost of mainstream education will have a positive effect on the purchase of shadow education products. In addition, among the 1436 students who received financial aid, 62.33% of the students had tuition fee of 0, and 40.39% of the students paid total tuition fee of 0. It can be seen that most of the students who received financial aid were low-tuition students, and the obtaining of financial aid would have a significant impact on their education cost. That is, the net cost of mainstream education is lower than that of mainstream education after the introduction of bursaries. This situation is also reflected in the regression coefficient: the absolute value of the total cost on the probability of purchasing shadow education products is higher than the net cost, indicating that the probability of purchasing shadow education will also increase as the cost increases.

In fact, there are a large number of low-income families whose mainstream education cost is zero or even negative. Even if the education cost is very low, due to the natural opportunity cost of education, they cannot afford to buy shadow education products. Even if they buy shadow education products, the time will be relatively low. Therefore, regression 1 and regression 2 discuss whether to choose: the lower the cost, the higher the probability of choice; Regression 3 and regression 4 are about the number of choices. At this time, due to the overlap between the group with low education cost and the group with low income, although the overall reduction of education cost still increases the purchase time of shadow education, the number of individuals choosing shadow education at lower education cost is lower than that at higher education cost.

Regression 3 and regression 4 verify this view, that is, although the regression coefficient of education cost on the length of purchase of ShadEduc_t is still significantly negative (p < 0.05). This finding lends further credence to the hypothesis that low-income groups face constraints in terms of opportunity costs, which hinders their ability to maintain their engagement in shadow education, even in the presence of financial support.

The test of hypothesis 1 shows that the reduction of education input increases the number of educated people in mainstream education and improves the human capital of individuals. While actually forming educational equity, it generates a large number of shadow education demands. Shadow education, as a purely for-profit market activity, creates a new kind of unfairness for individuals who cannot pay its costs.

An empirical test of educational equalization and shadow educational product selection

In order to verify hypothesis 2 and 3, by analyzing the influence of equal access to education on shadow education product selection, corresponding regression analysis is conducted. The results are presented in Table 3.

Table. 3 Influence of Equal Access to Education on The Choice of Shadow Education Products

Variable	ShadEduc			ShadEduc_t		
	Reg. 1	Reg. 2	Reg. 3	Reg. 4	Reg. 5	Reg. 6
schlocal_	-0.3106***			-0.6049***		
	(0.1170)			(0.1066)		
schidsedu_sd		0.6975***			0.5558***	
		(0.0884)			(0.0796)	
schidsoccu_sd			0.4183***			0.4258***
			(0.0342)			(0.0305)
homework	0.2687***	0.2615***	0.2578***	0.2350***	0.2318***	0.2206***
	(0.0207)	(0.0204)	(0.0204)	(0.0190)	(0.0186)	(0.0184)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-2.6984***	-3.6010***	-3.2717***	-0.6529***	-1.5795***	-1.3974***
	(0.2032)	(0.2100)	(0.1910)	(0.1821)	(0.1848)	(0.1672)
Observations	8,377	8,720	8,720	8,321	8,664	8,664
Pseudo R2	0.0952	0.1014	0.1088	-	-	-
Prob>chi2	0.0000	0.0000	0.0000	-	-	-
R^2	-	-	-	0.1131	0.1162	0.1308
Prob.>F	-	-	-	0.0000	0.0000	0.0000

The regression results presented in Table 3 demonstrate that the equalization of educational opportunities has a significant impact on the demand for shadow education. Furthermore, the analysis indicates that the educational and occupational differentiation of the parental group has a detrimental effect on demand, with the driving effect of educational differentiation proving to be considerably more pronounced than that of occupational differentiation.

Regression 1 and regression 4 in Table 3 show that the higher the proportion of students in the county (district) in the whole school (schlocal), the lower the probability of

purchasing ShadEduc, and the less the number of ShadEduc_t, both of which are statistically significant (p < 0.01). This finding lends support to Hypothesis 2, which posits that equalisation of regional distribution of educational resources is an effective means of mitigating household dependence on shadow education.

Regression 2 and regression 5 show that the higher the standard deviation (schidsedu_sd) of the highest value of parents' education in a school, the higher the probability of purchasing shadow education products and the greater the number of shadow education products purchased, and both are statistically significant (p < 0.01). Regression 3 and regression 6 show that the higher the standard deviation (schidsoccu_sd) of the highest value of school parents' occupation, the higher the probability of purchasing shadow education products and the greater the number of shadow education purchases, and both are statistically significant (p < 0.01). The educational differentiation effect is approximately twice as large as the occupational differentiation, as assumed in assumption 3. Thus, hypothesis 3 is proved comprehensively.

In addition, from the regression coefficient, we can see that although the standard deviation of the highest parental education value and the standard deviation of the highest parental occupation value are positively correlated with the purchase of shadow education products, the marginal effect of the former is higher than that of the latter. This can happen for two reasons: On the one hand, there is an explicit competition for educational capital. Information regarding parents' qualifications is more likely to be disseminated through school announcements and parent communities (e.g., the topic of "participation rates of highly educated families in tutoring"), which directly triggers competitive anxiety. Conversely, the role of occupational capital has been demonstrated to exhibit a lagging effect. The occupational status of the individual (schidsoccu_sd) exerts an indirect influence on the competitive nature of the educational environment, manifesting through the allocation of material resources (e.g., long-term investment in extracurricular activities). Conversely, educational capital is directly associated with the selection system for higher education, engendering a short-term decision-making pressure.

The test of hypothesis 2 and 3 shows that with the advancement of equal access to education of mainstream education, shadow education begins to play a more significant role in maintaining the imbalance. That, too, is where policymakers should focus their attention.

CONCLUSION

This study demonstrates that the demand for shadow education is driven by two key mechanisms—the "cost squeeze effect" and the "differentiation and reinforcement effect"—showing that reductions in mainstream education costs and the persistence of group-based advantages both contribute to increased participation in tutoring. The findings confirm that intensified competition within standardized evaluation systems fuels greater reliance on shadow education, and they further extend EMI theory by introducing the concept of "defensive inequality maintenance behavior," whereby

advantaged families reestablish competitive advantages through cultural capital even when educational opportunities appear more equal. These results suggest that policies aimed at promoting equity, such as cost reduction and "Double Reduction," may unintentionally stimulate new forms of educational inequality. However, the study is limited by its reliance on cross-sectional survey data and its focus on a single cohort, which restricts causal inference and long-term assessment. Future research should incorporate longitudinal data, examine regional policy variations, and explore how emerging digital learning markets reshape educational competition. Overall, the study underscores that achieving genuine educational equity requires not only regulating the supply of shadow education but also reducing societal expectations surrounding competitive returns, thereby making lower-intensity participation in educational competition a feasible and rational choice.

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REFERENCES

Adrian, E., Raftery, H., & Hout, M. (1993). Maximally maintained inequality: Expansion, reform, and opportunity in Irish education, 1921-75. *Sociology of Education, 66*(1), 1-22.

Becker, G. S. (1991). *A treatise of the family*. Harvard University Press.

Bourdieu, P. (1997). *A social critique of the judgement of taste interview with Pierre Bourdieu* (pp. 189-211). Shanghai People's Publishing House.

Bray, M. (1999). *The shadow education system: Private tutoring and its implications for planners*. IIEP-UNESCO.

Chen, B., & Xu, W. (2009). Ownership reform and urban China's earning inequality. *South China Journal of Economics, 27*(3), 9-20.

Chen, L., & Luo, Y. (2024). The Regulatory Dilemma and Governance Path of the Of-Campus Tuition Market in the County under the Backdrop of "Double Reduction". *Journal of Soochow University (Educational Science Edition)*, 12(02):105-116.

Coleman, J. S. (1966). *The concept of equality of educational opportunity* [Unpublished manuscript]. Johns Hopkins University.

Deng, F., & Ding, X. (2013). The long-term trends in rates of returns to education in China. *Statistical Research, 30*(7), 39-47.

"Double eduction" [J/OL]. Journal of Soochow University(Educational Science Edition):1-12[2024-04-16].

Education Law of the People's Republic of China Compulsory Education Law of the People's Republic of China Teachers Law of the People's Republic of China[M]. Beijing: China Legal Publishing House,2019: 28.

Feng, Y. (2018). The social effect and governance path of shadow education. *Journal of Educational Development*, (06), 34-38.

Higher Education Law of the People's Republic of China[M]. Beijing: China Legal Publishing House,2016: 7.

Husen, T. (1991). *Social background and academic achievement*. Yunnan Publishing.

Jin, F., & Lou, S. (2019). Research on the pricing standard and behavior of public universities in China from the perspective of sociology of educational policy: Data analysis based on universities in Zhejiang Province. *Research in Educational Development*, 39 (19), 27.

Kang, Y. (2023). A review and inspiration of research on shadow education based on CiteSpace at home and abroad. *Modern Vocational Education, 210*(27), 112-115.

Li, J. (2017). The heterogeneity effect of different types of shadow education on primary students' academic achievement: And its implication for educational inequality. *Education Science, 33*(5), 16-25.

Liu, B. (2018). "Wide gap" and "contempt chain": Class differences in family education investment: Empirical analysis based on Beijing, Shanghai and Guangzhou. *Journal of Beijing University of Technology (Social Sciences Edition), 18*(2), 8-16.

Lucas, S. R. (2001). Effectively maintained inequality: Education transitions, track mobility, and social background effects. *American Sociological Review, 66*(2), 164-180.

Murawska, B., & Putkieicz, E. (2006). Education in a hidden marketplace: Monitoring of private tutoring (pp. 257-277). Open Society Institute.

Pei, C., Song, N., & Liu, Q. (2018). Empirical analysis and inspiration on the participation of students in extracurricular tutoring during compulsory education. *Journal of the Chinese Society of Education, 293*(3), 43-48.

Peng, W. (2011). Supplementary education in primary and secondary schools from the perspective of structural function theory. *Theory and Practice of Education, 31*(2), 9.

Schultz, T. W. (1964). *The economic value of education*. Colombia University Press.

Smyth, E. (2008). The more, the better? Intensity of involvement in private tuition and examination performance. *Educational Research and Evaluation, 14*(5), 465-476.

The State Council. (2015). Notice of the State Council on issuing the overall plan for coordinated promotion of the construction of world class universities and first-class disciplines. *The Bulletin of the State Council of the People's Republic of China*, (32), 113.

Verdis, A. (2002). *School effectiveness research for educational evaluation in Greece*. University of London.

Wang, S. (1996). *Research on education input and output* (pp. 169-171). Hebei Education Press.

Wang, Y., Wu, L., & Yang, Y. (2019). An analysis on the collaborative mechanism for targeted poverty alleviation by the vocational education between the Western and the Eastern China from the cost-benefit perspective of the educated: An example of the implementation plan in Western Yunnan. *Journal of Soochow University (Educational Science Edition)*, 7 (01), 62.

Xue, H. (2016). Extracurricular tutoring, student achievements and social reproduction. *Education & Economy*, (02), 40.

Xue, H., & Xu, D. (2022). The study of the theater effect of shadow education based on China education panel survey data analysis. *China Economics of Education Review, 7*(1), 75-98.

Xue, J., Sonoda, T., & Arayama, Y. (2008). Educational disparity and income inequality in China: A case study of Shenzhen. *Chinese Journal of Population Science, 22*(1), 19-29.

Yang, W. (2018). Causes to them is taken idea of education for nothing. *Journal of Hebei Normal University (Educational Science), 20*(4), 47-48.

Yao, J. (2005). On middle class in Western countries. *Journal of Shanghai University (Social Sciences Edition), 12*(3), 111.

Yuan, L. (2021). Outline for the reform of classification of cost functions in primary and secondary schools (Draft). In *Supplementary report on China's education finance policy consultation (2015-2019)* (p. 12). China Institute of Education Finance at Peking University.

Zeng, L., Weng, S., Li, X., & Zhang, Y. (2017). Deliberate purchases or impulse shopping? An investigation of the "high consumption" phenomenon among Chinese outbound tourists. *Tourism Tribune*, 32 (05), 31.

Zhang, H. (2014). The effect of "out-of-towner" discrimination on wage gap. *Modern Economic Science, 36*(5), 107.

Zhang, H. (2019, July 15). All lottery admissions for private primary and secondary schools in Ningxia with more applicants than the enrollment plan. *Ningxia Daily*, p. 2.