Government Bans, Household Spending, and Academic Performance: Evidence from Private Tutoring in China*

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Abstract

This paper studies China's nationwide ban on private academic tutoring for students in compulsory education. Using a novel nationally representative household panel survey on education expenditure from 2017 to 2023, we find that the ban was associated with a substantial decline in private tutoring spending, but also a significant increase in in-school education spending. Households in the lower and middle tiers of the income distribution responded to the ban with lower private academic tutoring spending and students from these families were less likely to be ranked at the top of the class. Further analysis reveals that (i) 87.5 percent of private academic tutoring facilities exited the market after the ban, (ii) the declines in private tutoring expenditures were concentrated among urban households, and (iii) highly educated parents may turn to home tutoring as a substitute to private tutoring. Our findings highlight the substitution toward alternative forms of academic support under the ban and the heterogeneous impacts of the policy.

JEL Codes: I28, I24, K23, D10
Keywords: Government Bans, Private Tutoring, Household Spending and Investment, Education Policy, Double Reduction Policy

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1 Introduction

The private coaching and tutoring services have become increasingly rampant due to the competition intensity of school admissions and the rise in education demand unmet by public schooling (Dawson, 2010). At the same time, concerns are arising regarding the over-investment in private education by parents, which may impose negative education external-ities on the society (Kim, Tertilt and Yum, 2024) and increase both financial and academic burdens of families and students (Mori and Baker, 2010). To address these issues, several education author-ities have implemented relevant regulations. Researchers have explored the impacts of regulating private tutoring on mental health, online shopping behavior, employment, and fertility intentions (Meng et al., 2025; Zhao, Shi and Wang, 2024; Liu, Wang and Chen, 2022; Huang et al., 2025). How-ever, due to data limitations, the impacts of private tutoring regulation on household education spending and student academic performance remain unclear.

This paper is the first to use nationally representative survey data to examine the impact of a government ban on the private tutoring sector in China. In 2021, China introduced a private tutoring ban, which restricted new entry into private tutoring and prohibited all existing private tutors from providing for-profit academic tutoring services to students in *compulsory education* (i.e., primary and middle school). The goal of the regulation was to alleviate academic pressure on students and to reduce household spending on private academic education. In this paper, we examine the impacts of the private tutoring ban on household education expenditures and student academic performance. We also investigate whether the policy led to heterogeneous effects across household attributes.

We employ a difference-in-differences design to study the impacts of this regulation. Since the policy targeted tutoring services to students in *compulsory education* (primary and middle school), we use high school students as the control group and examine the differential responses to the policy between students in primary or middle school and students in high school. We also show that our results are robust to matching treatment and control groups using Coarsened Exact Matching (CEM).

Our primary dataset is the China Institute for Educational Finance Research – Household Survey (CIEFR-HS). CIEFR-HS is a unique nationally representative household survey panel on edu-

cation activities and expenditures in China. It includes comprehensive information on household spending across different types of educational activities (both in-school and out-of-school) and contains data on parent-reported student academic performance. The detailed demographic and socioeconomic characteristics at the student and household levels in this data provide us the best chance to control for unobservables. Moreover, this dataset ranges from 2017 to 2023, allowing us to observe how education spending changes within a household both before the private tutoring ban and afterwards.

We find that, compared with high school students, those in compulsory education decreased spending on out-of-school (private) academic tutoring and increased spending on in-school education services. This substitution between private and public education investment is consistent with findings in Yuan and Zhang (2015). This led to a relative increase in total education expenditures for compulsory education students. Then, we find that households in the lower and middle tiers of the income distribution responded to the ban with lower private academic tutoring spending, compared to those in the higher tier of the income distribution. At the same time, students from non-high-income families were less likely to be ranked at the top of the class after the policy was implemented.

Additionally, we further unpack the observed reductions in private tutoring spending. First, we document that the private tutoring ban represents a massive institutional shock to the private tutoring sector. Using a novel web-scraped data from major digital platforms in China, we find 87.5 percent of private academic tutoring firms exited the market between May 2019 and June 2023. Second, we show that the observed declines in private academic tutoring participation, time, and expenditures were concentrated among urban households, whereas rural households experienced only limited changes. Finally, we find evidence that, following the private tutoring ban, students with college-educated mothers had lower education spending than students whose mothers did not attend college. This result suggests the potential substitution toward home-based tutoring by more educated parents following the regulation.

Lastly, we run a variety of robustness checks. We use CEM to ensure sample balance between households with students in compulsory education and those in high school. We also address the potential sampling concern caused by the COVID-19 pandemic. Additionally, we construct an alternative identification strategy by exploiting variation in age 5 to 14 population in each city. We

show that our main results are robust to the above tests.

Related Literature. Our paper contributes to multiple bodies of literature. The first studies the empirical impact of government bans. A variety of literature under this topic have used detailed survey data (Adda, Berlinski and Machin, 2012; Carpenter and Nguyen, 2021; Bhutta, Goldin and Homonoff, 2016; Friedberg, Hynes and Pattison, 2021). These studies have documented the role of product substitution and complementarity, and how these relationships may affect the outcomes of the bans (Adda, Berlinski and Machin, 2012; Carpenter and Nguyen, 2021; Conlin, Dickert-Conlin and Pepper, 2005; Gao and Petrova, 2022; Bhutta, Goldin and Homonoff, 2016). Balia, Brau and Nieddu (2023) conclude that such prohibition regulations can be successful if the ban is properly targeted to specific groups that are exposed to particular high-risk settings. Additionally, (Friedberg, Hynes and Pattison, 2021) emphasize the heterogeneous effects of bans among different groups.

The literature examining the effects of bans in the education sector is more limited. Most of these studies have used third-party data sources, such as search engine keywords data and scraped online platform data (Liu, Wang and Chen, 2022). They have focused on outcomes including mental health, employment, and fertility intention (Zhao, Shi and Wang, 2024; Huang et al., 2025; Meng et al., 2025). One of the main contributions of this paper is the introduction of a comprehensive individual survey panel up to 2023 on household expenditures in both public and private education. This dataset allows us to thoroughly examine the impacts of prohibiting private tutoring and the heterogeneity across household income. Our findings indicate that the private tutoring ban led to an increase in in-school education spending and it is associated with lower spending on private academic tutoring and worse academic performance among students from non-high-income families.

Our research also builds upon the economic analysis of educational investment and externalities. Based on Akerlof (1976), people may overinvest in education when their private gains are larger than social gains. Ramey and Ramey (2010) argue that college slot scarcity leads to such externality in educational investment in the U.S. Appropriate policy instruments can be used to eliminate the market failure caused by this externality. Kim, Tertilt and Yum (2024) uses a quantitative model to study the counterfactual effects of government policies on private investment in education. They conclude that a pro-natal transfer or an education investment tax can reduce

private education expenditures and effectively eliminate education externality.

Outside the education sector, there is a growing body of research on externalities and related policy interventions. Environmental economists have evaluated environmental regulations that are designed to deal with pollution externalities. These studies consider multiple policy instruments, such as quantity regulation with tradable emission permits, standards, and corrective taxes (Buchanan and Tullock, 1975; Carlson et al., 2000; Deschênes, Greenstone and Shapiro, 2017; Ellerman and Montero, 1998; Fowlie, Holland and Mansur, 2012; Hahn and Stavins, 2011; Montgomery, 1972; Schmalensee and Stavins, 2019). This paper empirically examines whether policy interventions like entry restrictions and non-profit requirements of private education services could reduce private investment in education and mitigate excessive investment in private education.

Lastly, our paper contributes to the recent literature specifically looking at private tutoring regulation in China (Zhao, Shi and Wang, 2024; Liu, Wang and Chen, 2022; Huang et al., 2025; Meng et al., 2025). Within this literature, our paper is most closely related to Liu et al. (2025), who study the effects of the private tutoring ban in China and find that the private tutoring ban resulted in an increase in private tutoring enrollment and household tutoring expenses. This differs substantially from our paper in a number of ways. First, they use data from an online survey conducted in 2023 so their analysis is based on cross-sectional data and may be subject to selection bias due to the online survey format. By contrast, our analysis is performed using a nationally representative household survey panel conducted by the China Institute of Educational Finance Research from 2017 to 2023, which allows us to examine how education expenditures change within a household over time and minimizes concerns on selection bias. Additionally, they exploit variation in the frequency of relevant keywords appeared in local official documents and online news articles as shifters in policy's intensity because they do not observe pre- and post-policy outcomes. In our paper, as the policy specifically targeted students in compulsory education, high school students become a natural comparison group. We further match the compulsory education and high school students based on several key household and student characteristics to ensure the comparability.

The remainder of the paper is organized as follows. In Section 2, we discuss the institutional background and enforcement of the private tutoring ban. Section 3 describes our data source and empirical strategy. Section 4 presents our results on household education expenditures and

heterogeneous effects across household income and student academic performance. Section 5 unpacks the reductions in private tutoring spending by examining the potential factors contributing to it. Section 6 conducts several robustness checks. Section 7 concludes the paper.

2 Institutional Background

2.1 Private Tutoring Regulations

Over the past several decades, households have substantially increased their investments in children's education, accompanied by a marked rise in students' academic pressure. This trend is consistent with the quantity–quality tradeoff framework proposed by Becker and Lewis (1973), which posits that declining fertility allows parents to allocate greater resources per child. In many East Asian countries, this dynamic has been particularly pronounced: rapid declines in fertility have coincided with escalating educational expenditures and growing concerns over student well-being. As a result, parental investments in human capital have become both more intensive and more psychologically burdensome for children.

In response to rising academic pressure on students and financial burdens on families, several East Asian countries have introduced education policies aimed at alleviating these concerns. Japan, for example, implemented significant reforms in the 1970s under the umbrella of "Yutori education", which reduced both instructional hours and curricular content in the formal school system.[1] However, the absence of regulatory oversight over the private tutoring sector undermined the reform's intended effects. As formal schooling became less rigorous, demand for out-of-school educational services surged, effectively shifting the academic burden rather than reducing it (Entrich, 2017).

By contrast, South Korea has adopted a more direct approach to regulating private tutoring since the 1980s. In 1980, the government enacted a blanket ban on private tutoring. However, the policy led to unintended consequences: concerned parents turned to underground markets, causing tutoring prices to soar (Dawson, 2010). Following a constitutional court ruling, the ban was lifted in 2000. The Korean government then pivoted toward improving the quality of public education as a substitute for private tutoring, but this approach failed to curb demand. From 2006

[1] See https://en.wikipedia.org/wiki/Yutori_education.

to 2009, a further policy restricted all private tutoring activities after 10 p.m. Yet empirical evidence suggests the policy did not reduce overall participation or expenditures. Instead, it prompted a shift toward more expensive one-on-one or small-group tutoring formats (Choi and Cho, 2016; Lee, Lee and Jang, 2010).

Reducing students' academic burden has been a central objective of education policy in China since the 1950s. In the early decades (1950–1970), reforms primarily emphasized physical health and overall well-being. By the 1980s, concerns over exam-oriented education began to surface, and the goal of achieving high admission rates increasingly shaped educational priorities. During the 1990s and early 2000s, policy focus shifted toward promoting a more holistic liberal arts education. Reforms during this period concentrated on the formal school system and included restrictions on homework hours, the elimination of non-essential examinations, a reduction in competition-based assessments, and revisions to curricula and instructional materials. However, these school-based reforms coincided with the rapid growth of the private tutoring industry, particularly in areas related to standardized test preparation and school admissions. As a result, policy attention gradually expanded beyond the school system. Over the past decade, Chinese education authorities have increasingly focused on regulating the private tutoring sector, reflecting a broader effort to reduce educational pressure and deter the commercialization of academic achievement outside formal schooling.

In 2013, China's Ministry of Education implemented a reform aimed at alleviating student stress by lowering the difficulty level of in-school instructional materials. However, because high-stakes admission examinations remained largely unchanged, this policy created a widening mismatch between classroom content and exam expectations. As a result, parents increasingly turned to private tutoring services to supplement their children's preparation, fueling further growth in the shadow education sector and ultimately undermining the policy's intended effect.

In response to the persistent academic pressure and escalating private education expenditures, the State Council introduced the *Double Reduction Policy* in July 2021, marking a significant regulatory shift. The policy imposed a comprehensive ban on for-profit academic tutoring in core school subjects for students in compulsory education. It prohibited the establishment of new tutoring businesses and required existing providers — regardless of class size or organizational structure — to cease operations or convert to non-profit status. In effect, it became illegal to offer paid

instruction in core academic subjects outside the formal school system. Enforcement was delegated to local authorities, with penalties imposed on violators primarily through a centralized government reporting and monitoring system.[2] The policy's stated objectives were twofold: to reduce the academic burden on students and to limit household expenditures on private tutoring.[3] It represents one of the most aggressive attempts by a national government to regulate the private tutoring industry and to reshape the broader education ecosystem. Importantly, the policy was introduced without little prior signaling and came as a complete surprise to the public. One immediate consequence was a sharp decline in the stock prices of Chinese education companies following the announcement of the *Double Reduction Policy*.[4]

Although the regulation did not explicitly differentiate enforcement intensity across tutoring formats, some types of private tutoring were likely more affected than others. One-on-one tutoring sessions, for example, may have been less susceptible to detection and intervention due to their lower visibility and smaller participant base. In contrast, large-group classes and firm-organized sessions faced greater scrutiny, given their scale and higher likelihood of being reported. Institutional providers, in particular, were more exposed to regulatory oversight and thus faced a higher probability of penalties compared to individual tutors operating informally.

This paper examines the impact of the *Double Reduction Policy* on the private tutoring market. Notably, because China's compulsory education system covers only grades 1 through 9, the regulatory restrictions—such as the entry ban and non-profit requirement—did not apply to tutoring services aimed at high school students.[5] We leverage this institutional distinction to estimate the effects of the policy, comparing outcomes across affected and unaffected segments of the tutoring market.

2.2 In-School Tutoring

In China, some schools offer in-school academic tutoring outside regular class hours. These sessions are typically held five days a week for two hours per day and are most often structured as supervised independent reading led by school teachers. In some cases, they also involve group-

[2] See Section 2.3 for details on enforcement mechanisms.
[3] See https://en.wikipedia.org/wiki/Double_Reduction_Policy.
[4] See, for example, https://www.nytimes.com/2021/07/26/business/china-private-education.html.
[5] See https://en.wikipedia.org/wiki/Compulsory_education_in_China.

based homework assistance. Although participation is not mandatory, student attendance rates are high: recent estimates suggest that approximately 84 percent of students participate in these sessions (Gong and Gao, 2023).

About one-third of schools offer in-school tutoring free of charge, while the remaining two-thirds charge a nominal fee. The average cost is approximately 2 RMB (≈ 0.3 USD) per hour — substantially lower than the cost of private tutoring.[6] In contrast, our data indicate that private academic tutoring costs an average of 61 RMB (≈ 8 USD) per hour. As the supply of private tutoring has contracted following the 2021 regulatory reforms, many schools have expanded their after-school academic offerings to meet residual demand.

In summary, in-school tutoring provides a substantially more affordable — though typically lower quality — alternative to private tutoring. Importantly, in-school academic tutoring is not subject to the regulatory restrictions imposed by the *Double Reduction Policy*.

2.3 Enforcement of Private Tutoring Bans in China

> *"Anyone who, in violation of national regulations, establishes a private school (including other private educational institutions) without authorization shall be ordered to cease operations and refund collected fees by the local education administrative department or the human resources and social security administrative department of the county-level or higher local people's government, in coordination with relevant departments such as public security, civil affairs, or market regulation. In addition, the organizer shall be fined not less than one time and not more than five times the amount of the illegal gains."*
>
> — *Articles 64 & 65, Law of the PRC on the Promotion of Private Education*[7]

The regulation explicitly stipulates that organizers of illegal private educational activities are subject to financial penalties. In this subsection, we document the enforcement of the private tutoring ban by presenting evidence on administrative penalties imposed on violators. We compile a dataset from publicly available administrative records in Zhejiang Province, covering all reported

[6] Based on Gong and Gao (2023), the average fee for one semester of in-school tutoring is 392 RMB (≈ 54 USD). A semester typically spans 19 weeks, or roughly 190 hours, yielding a cost per hour of about 2.06 RMB (≈ 0.3 USD).

[7] The above paragraph is google translated to English.

cases of illegal tutoring activities between 2021 and 2023.[8] Each record includes information on the date and location of the case, a description of the violation, the amount of the fine, and the identity of the penalized entity. In Appendix A6, we present examples of administrative penalty records in Zhejiang Province regarding the illegal private tutoring activities.

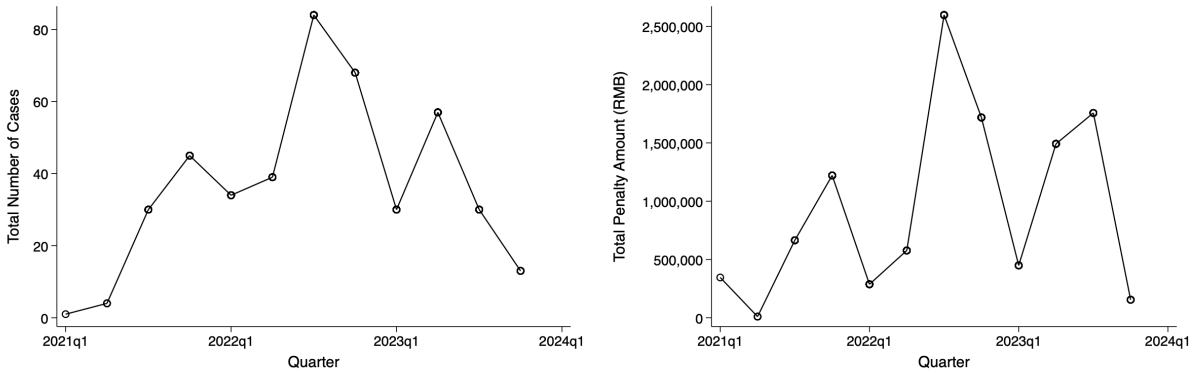
The enforcement data reveals that penalties are primarily determined by two factors: the amount of illicit revenue generated and the frequency of violations. In most cases, organizers are required to reimburse parents for the illegally collected fees and to pay an equivalent amount as a fine to the government. Consequently, larger classes associated with higher revenue face larger penalties. Repeat offenders incur progressively larger fines, reflecting cumulative enforcement actions based on violation history.

Figure 1 presents the total number of enforcement cases and the aggregate monetary penalties imposed for illegal private tutoring activities in each quarter from 2021 to 2023. Both the number of cases and the total value of fines surged in the third quarter of 2021, coinciding with the implementation of the *Double Reduction Policy*, and more than doubled over the following year. Enforcement activity peaked during the summer of 2022 before declining in 2023. This decline likely reflects the widespread exit of private tutoring providers by that time.

Over the entire period, authorities in Zhejiang Province issued 435 enforcement actions, resulting in total penalties amounting to 11,274,086 RMB ($\approx$ 1,573,440 USD). Of these cases, 63 percent involved institution-based tutoring providers, while the remaining 37 percent targeted individual tutors. While both types of organizers were subject to penalties, institutions likely faced greater regulatory scrutiny.

The strong regulatory enforcement is directly linked to household responses in private tutoring spending. In the following sections, we describe the data sources and the econometric framework used to examine effects of the ban on household education spending.

[8] Zhejiang is one of the most populated and economically prosperous provinces in China, with a population of over 64 million people.



(a) Total Number of Cases

(b) Total Amount of Penalty

Figure 1: Penalty Records on Illegal Private Tutoring Activities in Zhejiang Province

3 Data and Empirical Strategy

3.1 China Institute of Educational Finance Research — Household Survey

A central challenge for empirical research on private tutoring regulations is the lack of comprehensive, detailed data on individual education expenditures. Due to the legal penalties associated with private tutoring, price and sales information from the supply side is largely unavailable. Tutoring services vary widely in terms of pricing, class size, and organizational structure, and there is substantial heterogeneity in household preferences and constraints across China. As a result, most existing empirical studies rely on third-party data sources that are often limited in scope or granularity. One of the key contributions of this paper is the introduction of a novel dataset: a national panel survey on household investments in both public and private education.

We design and implement a nationally representative household survey panel on education expenditures: the China Institute of Educational Finance Research — Household Survey (CIEFR-HS). The survey has been conducted biennially since 2017 and covers thousands of households with students in all grades across 29 provinces in China.[9] CIEFR-HS is the first national survey in China that provides detailed household-level data on educational expenditures, particularly those related to private tutoring. It is one of the chapters under the China Household Finance Survey (CHFS), whose main purposes are to collect comprehensive micro-level data on Chinese

[9]Due to the COVID-19 pandemic, the third wave of the survey was conducted in two parts: the first in 2021, prior to the implementation of the *Double Reduction Policy*, and the second in 2022, after the policy took effect. In Section 6, we show that our main conclusions hold after excluding the data from 2021 and 2022.

households and to understand their financial behaviors and demographic patterns. Since the dataset covers both the pre- and post-policy periods, it is particularly well suited for our analysis of the private tutoring ban's impacts on household education expenditures.

The dataset includes rich information on household spending in both in-school and out-of-school educational activities. For private tutoring, we observe not only total expenditures but also disaggregated details on the tutoring provider (e.g., institutions versus individual teachers), class size, and hours spent. In addition, we observe comprehensive demographic and socioeconomic characteristics at the student and household levels, including student age and gender, school quality, public school attendance, only-child status, parental education, rural/urban residence, and household income.

Student academic performance is reported by parents on a five-point scale, ranging from 1 (top) to 5 (others), corresponding to top, above average, average, below average, and others, respectively. In China, students in grades 1 through 12 have at least one parent-teacher meeting per semester, and parental attendance is expected. These meetings serve as a primary channel through which parents receive detailed information about their child's academic performance, including subject-specific and overall rankings. As a result, parents are generally well informed about their children's relative standing in school. One potential concern is that parent-reported academic performance may not constitute a fully objective measure. However, this will not impose serious threats on our empirical framework and identification as long as the policy did not induce a differential change in the measurement errors (i.e., parent's definition on these rankings did not change abruptly before and after the policy) between the treated and control samples.

Our analysis sample consists of nationally representative households with children in grades 3 through 12 across 29 Chinese provinces, spanning the period from 2017 to 2023. We restrict the sample to students in in grades 3 through 12 to improve comparability in household education spending. Households with younger children, particularly those in grades 1 and 2, tend to report significantly lower levels of spending on academic private tutoring, likely reflecting the relatively low academic pressure at earlier stages of schooling. During the first survey wave in 2017, some parents misinterpreted the expenditure categories and mistakenly reported total education spending, including both in-school and out-of-school components, under the in-school category. Given this misinterpretation, we exclude in-school spending data from 2017. In subsequent survey

waves, we revised the survey questions and instructions to ensure parents correctly understood the definitions of each category. We applied the same approach to ensure accurate reporting of academic tutoring hours.

Additionally, we argue that parents truthfully report their educational expenditures for several reasons. While the CIEFR-HS focuses specifically on household educational expenditures, the CHFS – the broader survey in which the CIEFR-HS is embedded – covers a wide range of household spending categories (e.g., real estate investments, automobile purchases, and financial investments). Therefore, systematic misreporting of education spending is unlikely. Second, the legal penalties associated with the private tutoring ban are imposed on providers rather than parents, so there is no direct incentive for households to conceal their tutoring participation or spending information. Finally, although the survey collects detailed household and individual characteristics, it is conducted anonymously and contains no personally identifiable information. The respondents are asked to describe the nature of tutoring services (e.g., subject, class size, and organizer), but they do not necessarily disclose the identity of the tutor. These design features minimize the risk that parents would misreport tutoring participation or expenditures under the private tutoring regulation.

3.2 Descriptive Evidence

Table 1 reports the summary statistics for the analysis sample, which includes 36,118 students in grades 3 through 12 from 2017 to 2023. Demographic characteristics are broadly similar between households with children in compulsory education (i.e., primary and middle school) and those with children in high school. Household income and all education expenditures are deflated to 2016 Chinese RMB. We observe an increase in the proportion of mothers with education levels above high school following the implementation of the *Double Reduction Policy* in 2021. This pattern likely reflects the entry of more recent child cohorts in the later survey waves, combined with the rapid expansion of college enrollment in China during the early 2000s. There was also a decrease in the share of only child, which reflected the termination of China's one-child policy in 2015, and an increase in the share of rural households during this period. We control for all these characteristics in the main regressions, and further adopt Coarsened Exact Matching (CEM) as a

Table 1: Summary Statistics

	Compulsory Education (CE)		High School (HS)	
Sample Size: 36,118	Pre-2021	Post-2021	Pre-2021	Post-2021
Demographics				
Female	0.461	0.456	0.476	0.484
Age	12.471	12.513	17.562	17.508
Only Child	0.328	0.277	0.442	0.392
Public School	0.908	0.922	0.858	0.833
Household Income	80,800	80,490	79,661	76,219
Mother Education > HS	0.284	0.357	0.302	0.325
Rural Area	0.423	0.446	0.358	0.436
Main Outcome Variables				
Any Tutoring	0.372	0.271	0.294	0.164
Academic Tutoring	0.302	0.167	0.257	0.129
Non-Academic Tutoring	0.163	0.153	0.083	0.047
Total Education Spending	4,833	4,077	9,325	8,181
Out-of-School Education Spending	2,701	1,962	2,846	2,203
Academic Tutoring Spending	2,023	1,281	2,469	1,755
Non-Academic Tutoring Spending	678	681	377	448
In-School Education Spending	2,054	2,115	6,584	5,978
Academic Perform. (Top of Class)	0.167	0.157	0.137	0.124
Academic Perform. (Above Average)	0.276	0.291	0.298	0.289
Academic Perform. (Average)	0.413	0.422	0.455	0.472
Academic Perform. (Below Average)	0.126	0.105	0.101	0.103
Observations	19,756	7,020	6,682	2,660

Notes: Household income and all education expenditures are denominated in RMB and deflated to real 2016 values. Reported academic performance ranking ranges from 1 to 5, corresponding respectively to top, above average (excluding top), average, below average (excluding bottom), and others. These classifications are mutually exclusive. Table A1 reports more detailed summary statistics by each survey wave.

robustness check for all our results.

Education spending is defined as the sum of out-of-school and in-school education expenditures. Out-of-school spending consists of two components: academic and non-academic private tutoring. Academic private tutoring refers to instruction in core school subjects, while non-academic tutoring includes extracurricular activities such as music, dance, painting, and sports. In-school education spending primarily includes tuition and costs associated with after-class tutoring. Given that approximately 90 percent of students in our sample attend public schools, where tuition fees are relatively stable over time, most of the observed variation in in-school education spending reflects changes in after-school tutoring expenses rather than tuition costs.

Prior to the implementation of the private tutoring ban, approximately one-third of house-

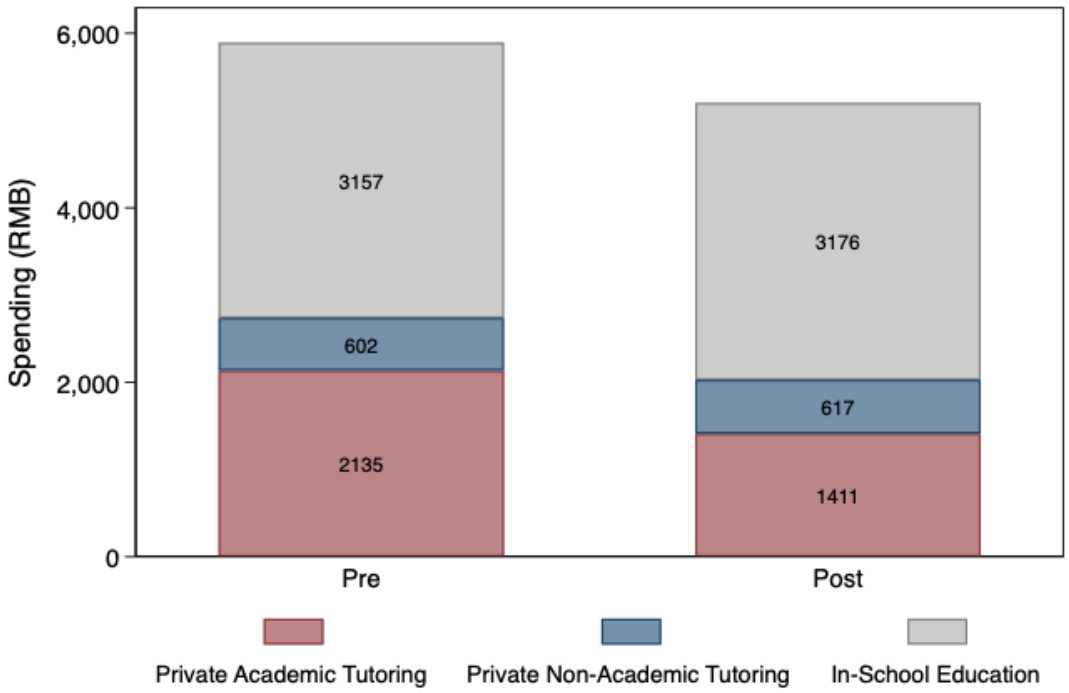


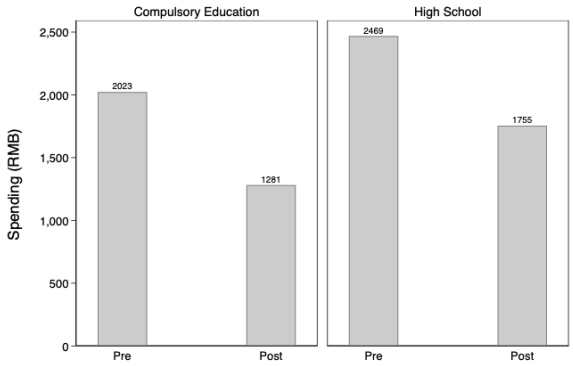
Figure 2: Household Average Annual Education Expenditures

Note: All education expenditures are denominated in RMB and deflated to real 2016 values.

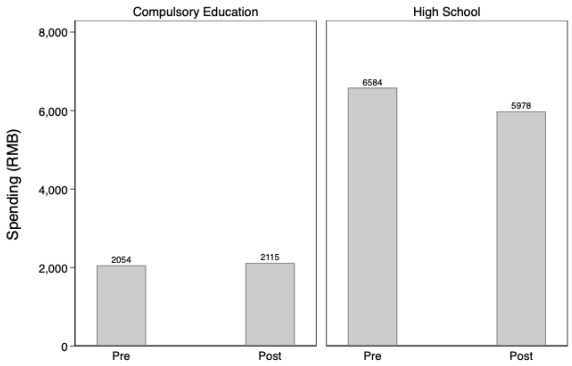
holds participated in private academic tutoring, with annual average expenditures exceeding 2,000 RMB per household. Following the policy's introduction, we observe a sharp decline in both the participation rate in academic tutoring and the corresponding household spending. In contrast, participation in non-academic tutoring declined only slightly. These patterns indicate an overall reduction in total out-of-school education spending.

Figure 2 shows household average annual expenditures before and after the private tutoring ban. Total education spending includes private academic tutoring, private non-academic tutoring, and in-school education. Household average annual spending on private academic tutoring decreased from 2,135 RMB before the policy to 1,411 RMB afterward. At the same time, there were almost no changes in private non-academic tutoring spending and in-school education spending. That is, the reduction in private academic tutoring spending directly led to a decline in total education spending following the policy.

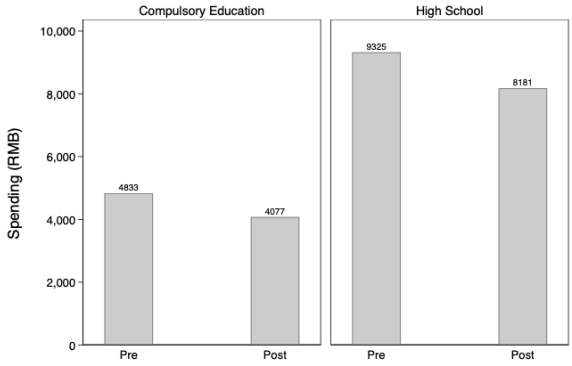
As the private tutoring ban focused only on compulsory education, we look at households with compulsory education students and those with high school students separately. From the



(a) Private Academic Tutoring Spending



(b) In-School Spending



(c) Total Education Spending

Figure 3: Household Education Expenditures by Grade Levels

Note: All education expenditures are denominated in RMB and deflated to real 2016 values.

lower panel in Table 1, we observe that the declines in spending and participation are observed for both households with children in compulsory education and those with high school students. Nonetheless, in-school education spending slightly increased for households with primary and middle school students and sharply decreased for those with high school students. This points toward the possibility that households substitute private tutoring with in-school academic support in response to the policy. In general, in-school education spending is higher for high school students than for those in compulsory education, as high school is not part of the compulsory education system and tuition fees tend to be higher.

Similarly, Figure 3 compares households average education expenditures by children's grade levels before and after the policy. For households with children in compulsory education, average

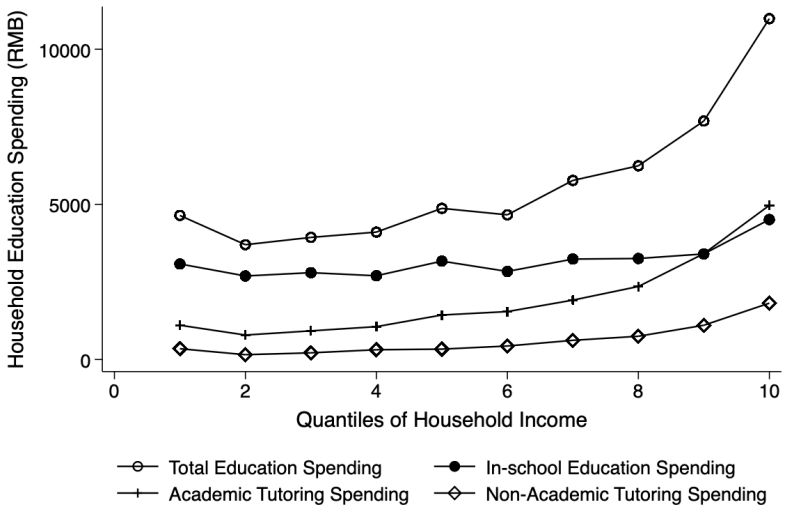


Figure 4: Household Education Spending by Income

Note: For each province-year, households are categorized into each income percentile separately. All education expenditures are denominated in RMB and deflated to real 2016 values.

spending on private academic tutoring fell from 2,023 RMB before the policy to 1,281 RMB afterward, representing a 37 percent reduction. Meanwhile, households with high school student saw a relatively smaller decline of 29 percent, with average spending decreasing from 2,023 RMB pre-policy to 1,281 RMB post-policy. The reduction in average private academic tutoring expenditures was larger among households with compulsory education students compared to households with high school students.

In contrast, average spending on in-school spending did not change much for households with children in compulsory education while it decreased after 2021 for households with high school children. Additionally, these patterns translate into differential changes in average total education spending between households with children in compulsory education and those with high school children, as shown in Panel (c).

Given the variation in household education spending by income, it is interesting to see whether spending patterns also differ across income levels. Figure 4 presents average household education spending by income percentile. We observe that household spending on academic private tutoring increases with income nonlinearly, as does the total education spending. In particular, households in the top 20 percent of the income distribution spend much more than others below. Put differently, households in higher income brackets allocate significantly more resources to aca-

demic tutoring, resulting in substantially higher overall education expenditures. In contrast, in-school education spending exhibits relatively little variation across household income percentiles. This is because approximately 90 percent of students in our sample attend public schools, where tuition fees are relatively stable over time and largely uniform across institutions. This evidence implies the heterogeneity in household income regarding private academic tutoring spending and total education spending. It also inspires us to examine the heterogeneous effects of the private tutoring ban across household income in Section 4.2.

In summary, the descriptive evidence shows that household average spending on private academic tutoring substantially declined after the private tutoring ban was implemented. Meanwhile, households with students in compulsory education and those with high school students showed distinct patterns of change in private academic tutoring spending, in-school education spending, and overall education spending. This motivates our identification strategy. We also find that household education expenditures differ across income levels, particularly between households in the top 20 percent of the income distribution and those in lower income groups. This provides support for our heterogeneity analysis. In the next subsection, we introduce the empirical strategy that we use to formally investigate these patterns.

3.3 Empirical Strategy

We employ a difference-in-differences framework to estimate the effect of the *Double Reduction Policy*. Because the policy specifically targeted students in compulsory education, we use high school students as a comparison group and examine the differential changes in outcomes between students in primary or middle school (grades 3-9) and those in high school (grades 10-12). Our identification strategy relies on the assumption that, in the absence of the policy, trends in education expenditures for students in grades 3-9 and grades 10-12 would move in parallel over time.

Using high school students as the comparison group entails both strengths and limitations. As discussed in Section 2, the *Double Reduction Policy* applies only to students in compulsory education; private tutoring services for high school students are not subject to the regulatory restrictions. This institutional distinction makes high school students a natural control group for identifying the policy's effect on students in primary and middle school. However, the policy may have gen-

erated spillover effects on high school students, as some private tutoring companies that were forced to exit the market had previously offered services to both compulsory education and high school students. If the above spillover effects exist, we may have underestimated the impacts of the private tutoring ban. That said, high school students remain a valuable comparison group, as they help account for the general impact of the COVID-19 pandemic on education expenditures. In our analysis, we assume that the pandemic did not generate differential impacts on education expenditures between compulsory education students and high school students within the same province and year.

Research on the private tutoring ban has used other identification strategies. Zhao, Shi and Wang (2024) and Liu, Wang and Chen (2022) exploit variation in the release dates of official documents across cities to identify policy impacts; however, this method cannot address expectation effects, as tutoring providers and parents would have anticipated the implementation as soon as the State Council in China introduced the *Double Reduction Policy* in July 2021. Similarly, Liu et al. (2025) measure policy intensity using the frequency of relevant keywords in cities' official documents or online news articles. Huang et al. (2025) use the number of children aged 5 to 14 in each city as shifters in policy intensity. By contrast, our paper takes advantage of the household-level panel data on education expenditures and directly uses high-school students as the comparison group.

In our analysis, we directly control for variation related to the pandemic by constructing a COVID-19 index based on the number of confirmed cases for each province-year. Additionally, we include a measure of local high school competitiveness — defined as the ratio of middle school graduates to new high school enrollments at the province-year level — to account for regional differences in academic pressure and school transitions (Liu et al., 2025).

The main econometric model takes the following form:

$$Y_{igt} = \alpha_t + \mu_g + \beta Post_t \times CompulsoryEduc_g + \Gamma X_{it} + \epsilon_{igt} \tag{1}$$

where Y_{igt} is the outcome of interest for student i in grade g and year t. $Post_t$ is a dummy variable that is equal to 1 for years after 2021 and 0 for years before 2021. $CompulsoryEduc_g$ is also a dummy variable that indicates whether the student observation is in compulsory education

grades. $Post_t \times CompulsoryEduc_g$ is an interaction term that is equal to 1 for post-2021 compulsory education students, and 0 otherwise. α_t, μ_g are year and grade level fixed effects, respectively. X_{it} is a vector of individual and family characteristics, as well as the COVID-19 index and high school competitiveness index. Individual and family characteristics include age, gender, rural/urban residence, parental education, family income, and public school attendance, school quality, and only-child status. Standard errors are clustered at the grade level.[10] The coefficient of interest is β, representing the difference-in-differences estimates of the policy's effects on students in compulsory education.

4 Household Education Spending and Student Academic Performance

In this section, we examine the impacts of the *Double Reduction Policy* on household education spending and student reported academic performance. We also investigate the heterogeneous effects by household income levels. Finally, we look into the effects on 1-on-1 private academic tutoring as a potential explanation of the observed heterogeneity across income.

4.1 Household Education Spending

Academic and non-academic tutoring spending. Table 2 shows the differential responses to the policy between compulsory education students and high school students, in terms of academic and non-academic tutoring. For academic and non-academic tutoring respectively, there are three outcome variables: a student participation dummy, spending, and hours spent on the corresponding tutoring. Compared to high school students, those in compulsory education were significantly less likely to attend private academic tutoring following the ban, and both their expenditures and hours spent on academic tutoring dropped. This pattern is largely driven by the sharp decline in the post-policy supply of private academic tutoring services, which we will discuss in Section 5.1.[11] In addition, as shown in Columns 5 and 6, we observe spillover effects on non-academic tutoring, despite the fact that the policy did not explicitly target such activities. Taken together, the

[10] Due to the small number of clusters, we also report robust standard errors for the main regressions in Table A4 and Table A5.

[11] Note that there are fewer observation counts in Column 3 because we exclude data on academic tutoring hours in 2017 to ensure accurate reporting. Similar approach is applied for 2017's data on in-school education spending.

Table 2: Effects on Private Academic, Non-Academic Tutoring Spending and Hours

	Academic Tutoring			Non-Academic Tutoring		
	(1) Dummy	(2) Spending	(3) Hours	(4) Dummy	(5) Spending	(6) Hours
Post × CE	-0.035	-358.108	-14.016	0.008	-150.888	-10.164
	(0.005)	(73.371)	(7.341)	(0.007)	(35.182)	(0.862)
Observations	36,118	36,118	24,669	36,118	36,118	36,118

Notes: Standard errors clustered at the grade level. Control variables include age, gender, rural/urban residence, parental education, family income, public school attendance, school quality, only-child status, COVID-19 index, and a measure of high school competitiveness. Year and grade fixed effects are also included. All education expenditures are denominated in RMB and deflated to real 2016 values. We exclude academic tutoring hours in 2017 to ensure accurate reporting within our sample.

results suggest that the *Double Reduction Policy* may have induced broader contraction in private tutoring, affecting both academic and non-academic domains.

Table A2 presents a pre-post analysis of changes in education spending after the implementation of the private tutoring ban. Among households with children in compulsory education, we observe significant declines in academic private tutoring spending. Households with high school students did not see that decline. Most estimates on non-academic tutoring, in-school education, and total education spending are not significant.

Out-of-school and in-school education spending. Since households did not significantly increase spending on non-academic tutoring following the policy, it is natural to ask whether the reduction in academic tutoring expenditures was accompanied by increases in other forms of education investment. Table 3 reports the effects of the policy on out-of-school education spending, in-school education spending, and total education spending. Recall that out-of-school education spending is the sum of expenditures on academic and non-academic private tutoring. After the private tutoring ban, average annual out-of-school education spending decreased by 509 RMB ($\approx$ 71 USD), while average annual in-school education spending increased by 840 RMB ($\approx$ 118 USD). These results suggest that, on average, households substituted spending on private tutoring with spending on in-school educational services after the policy was introduced. This resulted in a 292 RMB ($\approx$ 41 USD) increase in total education spending for households with compulsory education students. Therefore, while students in compulsory education spent fewer hours and less money in private academic tutoring, their total time and spending devoted to academic tutoring may not

Table 3: Effects on Out-Of-School, In-School, and Total Education Spending

Spending	(1) Out-of-School Education	(2) In-School Education	(3) Total Education
Post × CE	-508.996	839.937	291.773
	(80.443)	(23.445)	(73.705)
Observations	36,118	24,669	24,669

Notes: Standard errors clustered at the grade level. Control variables include age, gender, rural/urban residence, parental education, family income, public school attendance, school quality, only-child status, COVID-19 index, and a measure of high school competitiveness. Year and grade fixed effects are also included. All education expenditures are denominated in RMB and deflated to real 2016 values. In-school education spending in 2017 is excluded from the analysis because, during the first survey year, respondents mistakenly reported total education expenditures (combining both in-school and out-of-school spending) as in-school spending alone. After 2017, we revised the survey questions and instructions to prevent this error.

have declined significantly, as some of that reduction may have been offset by in-school tutoring sessions.

In Table A3, we focus specifically on the effects on in-school spending and report estimates for tuition, in-school academic tutoring spending, and in-school non-academic tutoring spending in Columns 1 through 3, respectively.[12] Since in-school spending and tuition are generally much higher for high school students, the COVID-19 pandemic might have generated differential impacts on tuition for high school and compulsory education students.[13] Table A3 presents evidence consistent with this claim: there was a relative increase in tuition spending (by 686 RMB) for students in compulsory education after the policy. Nevertheless, the increase in in-school spending observed in Table 3 is not entirely attributed to changes in tuition spending. We also find a large relative increase in in-school academic tutoring spending (by 460 RMB) for compulsory education students, while observing a decrease in non-academic tutoring spending (by 573 RMB). These estimates support our findings that students and families shift their spending from private tutoring toward in-school academic tutoring activities.

[12] Note that these results are subject to data limitations and are estimated from a much smaller sample.

[13] As shown in Table 1, the average annual in-school spending was 2,054 RMB for students in compulsory education and 6,584 RMB for high school students before 2021.

Table 4: Heterogeneous Effects on Education Spending

	(1) Academic Tutoring	(2) Non-Academic Tutoring	(3) Out-of-School Education	(4) In-School Education	(5) Total Education
Post × CE × High-Inc	670.933	-309.543	361.390	493.221	317.454
	(53.189)	(62.450)	(34.223)	(164.855)	(363.270)
Observations	36,118	36,118	36,118	24,669	24,669

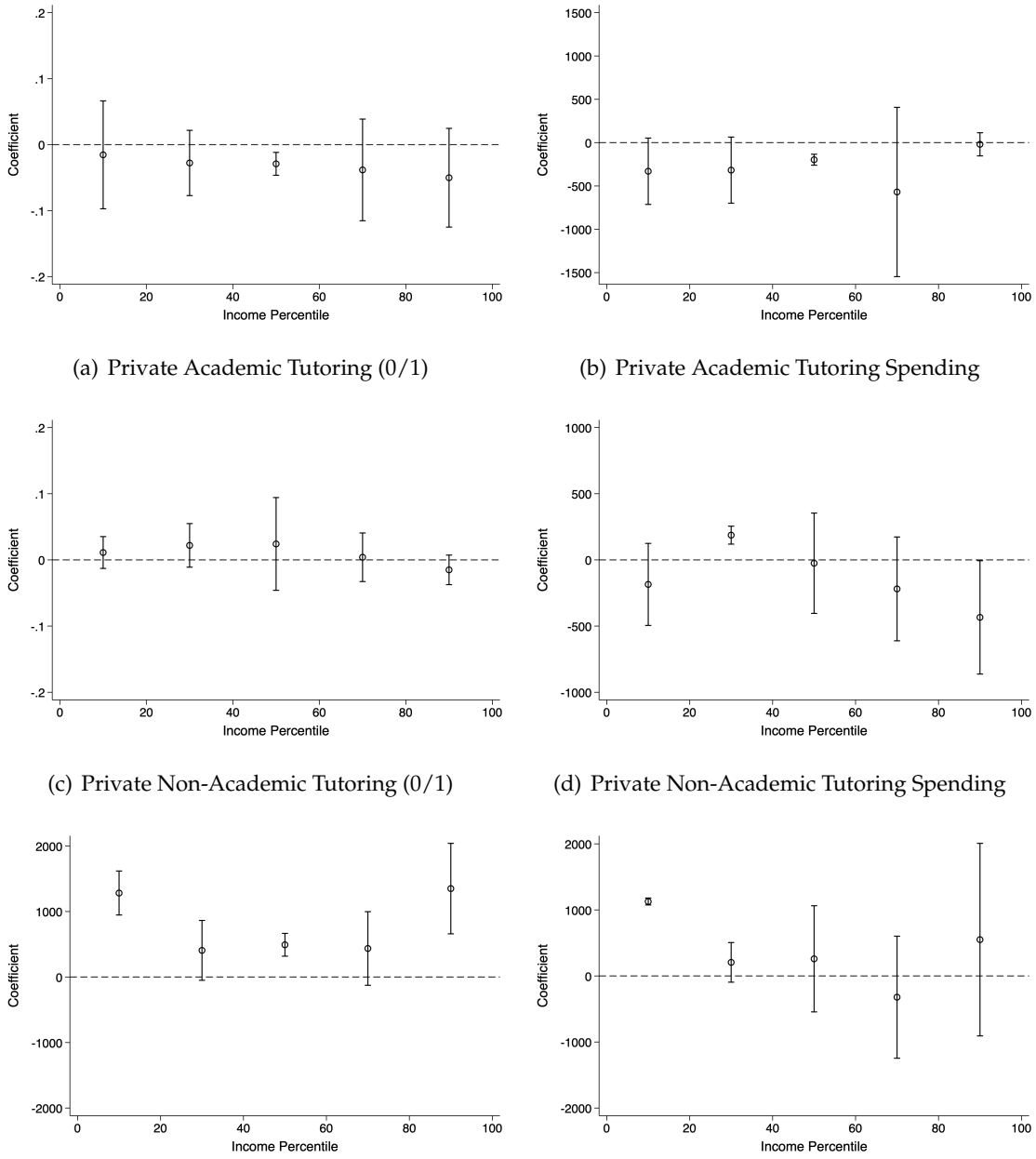
Notes: Standard errors clustered at the grade level. Control variables include age, gender, rural/urban residence, parental education, family income, public school attendance, school quality, only-child status, COVID-19 index, and a measure of high school competitiveness. Year and grade fixed effects are also included. All education expenditures are denominated in RMB and deflated to real 2016 values. In-school education spending in 2017 is excluded from the analysis because, during the first survey year, respondents mistakenly reported total education expenditures (combining both in-school and out-of-school spending) as in-school spending alone. After 2017, we revised the survey questions and instructions to prevent this error. High-income households refer to households within the top 20 percent of the income distribution in a province-year.

4.2 Heterogeneity across Household Income

As noted in the previous section, spending on private academic tutoring varies across households with different income levels. Different income groups may also exhibit heterogeneous responses to the private tutoring ban. To examine it, we implement the following approach. For each year and each province, we rank households based on their income and divide the sample into five equal-sized groups according to their position in the joint income distribution. We categorize households into the bottom 20 percent, 20th-40th percentiles, 40th-60th percentiles, 60th-80th percentiles, and top 20 percent. We then estimate the policy effects separately for each income group using a difference-in-differences specification similar to those in the main analysis.

The findings are presented in Figure 5. There are no significantly differential impacts on tutoring participation across income groups. However, we observe that households below top 20 percent of the income distribution reduced spending on private academic tutoring, while households within the top 20 percent were not affected regarding their private academic tutoring spending. Nearly all households increased in-school education spending, with the largest growth observed among the top and bottom income quintiles. Total education spending became higher for households in the bottom 20 percent of the income distribution.

To further examine the differential changes in private tutoring and education spending between high-income households and others following the policy, we employ a triple differences estimator. We interact $Post_t$ (an indicator for whether the policy has been implemented or not in



(a) Private Academic Tutoring (0/1)

(b) Private Academic Tutoring Spending

(c) Private Non-Academic Tutoring (0/1)

(d) Private Non-Academic Tutoring Spending

(e) In-School Education Spending

(f) Total Education Spending

Figure 5: Heterogeneous Effects on Private Tutoring by Household Income Percentiles

Note: Standard errors clustered at the grade level. For each province-year, households are categorized into each income percentile separately. Control variables include age, gender, rural/urban residence, parental education, family income, public school attendance, school quality, only-child status, COVID-19 index, and a measure of high school competitiveness. Year and grade fixed effects are also included. All education expenditures are denominated in RMB and deflated to real 2016 values. In-school education spending in 2017 is excluded from the analysis because, during the first survey year, respondents mistakenly reported total education expenditures (combining both in-school and out-of-school spending) as in-school spending alone. After 2017, we revised the survey questions and instructions to prevent this error.

year t), $CompulsoryEduc_g$ (an indicator for compulsory education students), with $HighInc_{it}$ (an indicator for household i being in the top 20 percent of the income distribution of household i's province in year t). β_1, the coefficient of the interaction term $Post_t \times CompulsoryEduc_g \times HighInc_{it}$ measures the policy's differential impacts on outcome variables Y_{igt} among high-income households, relative to households in the middle and lower tiers of the income distribution. We include the same fixed effects and controls as in the main analysis. The model takes the following form:

$$\begin{aligned} Y_{igt} =& \alpha_t + \mu_g + \beta_1 Post_t \times CompulsoryEduc_g \times HighInc_{it} + \Gamma X_{it} \\ &+ \beta_2 Post_t \times CompulsoryEduc_g + \beta_3 Post_t \times HighInc_{it} \\ &+ \beta_4 CompulsoryEduc_g \times HighInc_{it} + \epsilon_{igt} \end{aligned} \tag{2}$$

Table 4 presents the triple differences estimates. We observe that following the private tutoring ban, compulsory education students in high-income households experienced significantly higher spending on academic private tutoring and in-school education, relative to those in middle- and lower-income households. This is consistent with findings in Figure 5. There was a relative decrease in non-academic tutoring among the high-income households, but overall these households spent significantly more on out-of-school education activities.

Taken together, these results reveal that the *Double Reduction Policy* led to a decline in private academic tutoring expenditures and a corresponding increase in in-school spending for students in compulsory education, compared with high school students. The heterogeneity analysis suggests that the observed reductions in private academic tutoring spending were primarily driven by households outside the top income bracket. High-income households were not significantly affected by the regulation. Building on this, we next investigate whether these differential effects on private tutoring across income groups are also reflected in students' academic performance.

4.3 Student Academic Performance

In this subsection, we examine how the private tutoring ban impacted students' academic performance. We have shown that middle- and low-income households experienced relatively larger reductions in private academic tutoring spending following the ban. This raises the question of whether their children's academic performance was also disproportionately affected. To examine

this, we study heterogeneity in the policy's effects on student academic performance across the household income distribution. We use both the difference-in-differences specifications (Equation 1) separately for each income group and the triple-differences estimator (Equation 2).

Table 5 presents the estimates. In Columns 1 through 4, the dependent variables are indicators representing whether students are reported to be ranked as the "top of class", "above average", "average", or "below average", based on their academic performance within class.[14] That is, the dummy variable is equal to one if the student's academic performance ranking falls within the corresponding range specified by the dummy. In Panels A and B, we report difference-in-differences estimates separately for households in the low- and middle-, and high-income tiers of the distribution. In Panel C, we report the tripe-differences results. The coefficients suggest that the ban led to a lower proportion of students ranked in "top of class" for students in low- and middle-income families, relative to those in high-income families.

Meanwhile, students from these families were also less likely to rank in the "below average" range. This suggests that the ban on private tutoring have disadvantaged high-achieving students, while providing an advantage to lower-achieving students from households with lower incomes. High-performing students from non-high-income families, who often rely on private tutoring and do not have access to it under the ban, lost that support and their performance declined. On the other hand, low-performing students from high-income families, who do not have a strong incentive to compete with their pairs through private tutoring, also lost access to the easily accessible source of academic support and were performing worse than before. Overall, these results are consistent with the patterns in Figure 5.

The evidence from Figure 5 and Table 5 suggests that low- and middle-income households reduced spending on private academic tutoring following the ban, and their kids were less likely to stay at the "top of class" as a result. These patterns reveal that households in the low- and middle-income tiers were disproportionately affected by the *Double Reduction Policy*, in comparison to those at the top of the income distribution.

Effects on 1-on-1 private tutoring. The findings that high-income families did not reduce private tutoring expenditures after the ban and avoided declines in their children's academic performance likely reflect their financial and resource advantages. To understand this pattern, we

[14] These academic performance categories are mutually exclusive.

Table 5: Heterogeneous Effects on Reported Student Academic Performance

	(1) "Top of Class"	(2) "Above Average"	(3) "Average"	(4) "Below Average"
Panel A: Low- & Middle-Income HH				
Post × CE	-0.004	0.019	0.007	-0.028
	(0.001)	(0.013)	(0.009)	(0.003)
Observations	28796	28796	28796	28796
Panel B: High-Income HH				
Post × CE	0.022	-0.009	-0.026	-0.002
	(0.011)	(0.017)	(0.014)	(0.002)
Observations	7,322	7,322	7,322	7,322
Panel C: Triple Diff-in-Diffs				
Post × CE × High-Inc	0.029	-0.029	-0.029	0.023
	(0.011)	(0.029)	(0.019)	(0.006)
Observations	36,118	36,118	36,118	36,118

Notes: Standard errors clustered at the grade level. Control variables include age, gender, rural/urban residence, parental education, family income, public school attendance, school quality, only-child status, COVID-19 index, and a measure of high school competitiveness. Year and grade fixed effects are also included. We rank households based on their income levels within each year and each province, and we categorize them into groups according to their rankings in the joint income distribution. High-income households refer to households within the top 20 percent of the income distribution in a province-year.

take advantage of the detailed information on private tutoring in our data and look at the effects of the regulation among different private tutoring class sizes. In particular, we compare household participation and expenditures on 1-on-1 private academic tutoring and group private academic tutoring.

In Table 6, we report the impacts of the policy on 1-on-1 private tutoring participation, spending on 1-on-1 private tutoring, and spending on large-class private tutoring. We have a smaller sample for this analysis due to missing values in the tutoring class size. From Panel A, we observe that the private tutoring ban was associated with a small reduction in the participation and spending on 1-on-1 private academic tutoring. In contrast, the expenditures on group private academic tutoring class (i.e., with more than one student) saw a substantial decrease following the regulation.

Panel B further examines whether there are differential responses between high-income families and others regarding 1-on-1 private academic tutoring. For this purpose, we employ a triple

Table 6: 1-on-1 vs. Group Private Academic Tutoring: Effects on Participation and Spending

	Class Sizes		
For academic private tutoring:	(1) 1-on-1 Dummy	(2) 1-on-1 Spending	(3) Large-Class Spending
Panel A: Diff-in-Diffs			
Post × CE	-0.057	-512.001	-1616.105
	(0.028)	(891.155)	(445.937)
Observations	5,826	5,826	5,826
Panel B: Triple Diff-in-Diffs			
Post × CE × High-Inc	0.137	3193.682	2048.309
	(0.009)	(445.460)	(253.751)
Observations	5,826	5,826	5,826

Notes: Standard errors clustered at the grade level. Control variables include age, gender, rural/urban residence, parental education, family income, public school attendance, school quality, only-child status, COVID-19 index, and a measure of high school competitiveness. Year and grade fixed effects are also included. All education expenditures are denominated in RMB and deflated to real 2016 values. In this table, our sample becomes smaller due to some missing values in the tutoring class size. High-income households refer to households within the top 20 percent of the income distribution in a province-year.

difference-in-differences estimator (Equation 2). The results indicate that, following the regulation, compared to households in the low- and middle-income tiers, high-income households significantly increased participation rate by 13.7 percentage points and expenditures by 3,194 RMB ($\approx$ 449 USD) annually on 1-on-1 private academic tutoring classes. Despite the overall reductions in group tutoring spending, high-income households also increased spending on group private tutoring class following the ban.

The above evidence suggests that high-income households may continue to access private academic tutoring through 1-on-1 sessions, which are less likely to be detected and intervened. However, households with lower income levels face multiple constraints that may limit their ability to do so. In 2022, the average hourly price for a 1-on-1 private academic tutoring session was 176 RMB ($\approx$ 24 USD), nearly 95 percent higher than the price of group tutoring sessions. Furthermore, as tutoring providers moved underground to evade regulatory enforcement, the search for private tutors became increasingly difficult. High-income households may hold information advantage and face fewer frictions to search in this process. This can explain the differences in spending on group tutoring class between high-income households and others. These financial and infor-

mation barriers imposed substantial restrictions on families in the low- and middle-income tiers, which were further intensified by the private tutoring ban. In contrast, wealthier households, with greater willingness to pay, were better positioned to shift toward more exclusive forms of tutoring, characterized by smaller class sizes and higher costs. Therefore, the differential impacts regarding 1-on-1 tutoring are likely a key factor underlying the worse academic performance among students from low- and middle-income households relative to those from high-income households following the private tutoring regulation.

5 Unpacking the Reductions in Private Tutoring Spending

In this section, we further unpack the observed reductions in private tutoring spending from three distinct perspectives: (1) the collapse of private tutoring supply, (2) heterogeneous responses between urban and rural households, and (3) substitution from private tutoring to home tutoring.

5.1 Collapse of Private Tutoring Supply

This subsection documents the policy's impact on the supply of private tutoring. While the *Double Reduction Policy* is widely understood to have disrupted the tutoring industry, we aim to empirically substantiate and measure the magnitude of this disruption. Quantifying the policy's impact helps establish it as a significant institutional shock and provides important context for interpreting its downstream effects on households and students.

Data Collection. We construct the dataset on private tutoring supply by web scraping DianPing (the Chinese version of Yelp) and Gaode Maps. This dataset contains the names and locations of all nationwide tutoring facilities in 2019 (i.e., two years before the policy's implementation), and an indicator for whether each facility remained open in 2023 (i.e., two years after the policy's implementation). It provides information on the supply of private tutoring services pre- and post-policy intervention.

Before the private tutoring ban was implemented, the "Tutoring and Educational Training" section of DianPing aggregated information on tutoring facilities across all cities in China, including facility names, specific addresses, customer reviews, and category classifications (such as academic tutoring for school advancement, music or art training, vocational training, etc.). In

May 2019, we collected information on approximately 186,200 academic tutoring facilities from DianPing. These institutions were distributed across 31 provinces (including municipalities), 324 prefecture-level cities, and 2,246 districts and counties nationwide. Subsequently, after the policy was carried out, likely due to regulatory restrictions, DianPing shut down its "Tutoring and Educational Training" section and users could no longer find any search results within this section.

To understand the changes in the tutoring sector after the private tutoring ban, we further utilize data from Gaode Maps. Based on the geographic information of academic tutoring institutions we collected on Dianping, we identify the retention of each tutoring facility in June 2023 using the Point of Interest service (also known as POI Search) provided by Gaode Maps Open Platform. The POI service is a type of Web API that allows users to search for location information using text-based keywords, which can include structured addresses. By passing the addresses collected from DianPing as search keywords into the POI Search API, we obtain the corresponding business names associated with those addresses. Then, if the business name returned by Gaode Maps for a given address matches the business name collected from DianPing, we consider the facility to have remained in operation; otherwise, we treat it as being shut down.[15]

Results. In Figure 6, we present the number of private academic tutoring facilities by Chinese provinces and municipalities in 2019 and 2023. In May 2019, there were 188,980 private academic tutoring institutions in the country. By June 2023, only 23,621 of these institutions remained in operation, indicating an 87.5 percent decrease compared to 2019. According to China's Ministry of Education, the number of private academic tutoring institutions was reduced by 87.1 to 95.6 percent following the policy.[16]

The evidence confirms massive exits of private tutoring businesses following the *Double Reduction Policy*, likely representing one of the primary drivers of the observed reductions in household private tutoring spending.

[15]This approach may introduce some measurement error. For example, some facilities may have relocated and continued operating at a new address; some may still be at the original address but have changed to a more discreet name; and some newly opened institutions may not be captured by our dataset.

[16]See https://news.youth.cn/gn/202209/t20220909_13988908.htm

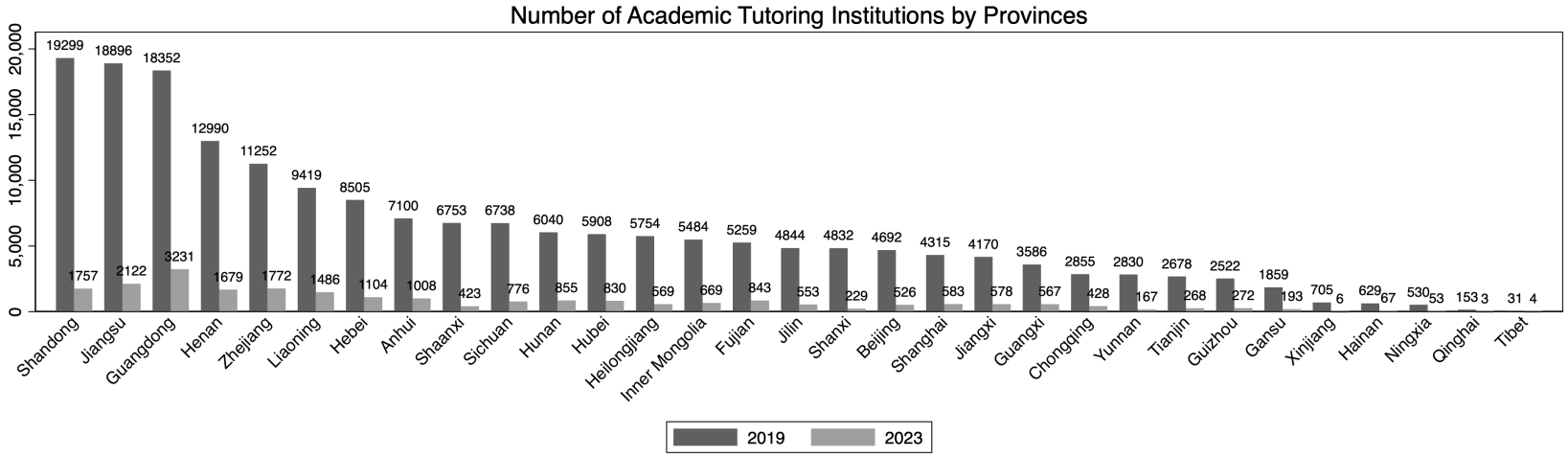


Figure 6: Number of Private Academic Tutoring Institutions by Provinces in 2019 and 2023

5.2 Heterogeneity between Urban and Rural Households

Urban and rural families present very different patterns in education spending, especially regarding private tutoring expenditures. In our sample period, urban families on average spend 3,038 RMB (≈ 427 USD) annually on private academic tutoring, compared to only 406 RMB (≈ 57 USD) among rural families. Given this distinction, we now study the heterogeneous impacts of the private tutoring ban between urban and rural households.

We split the sample into rural and urban households and perform the analysis on each subsample separately. Table 7 shows that urban families with compulsory education students reduced spending on private academic tutoring by 668 RMB (≈ 94 USD) a year after the implementation of the private tutoring ban, relative to urban families with high school students. Additionally, private academic tutoring time fell by nearly 26 hours per year for these households. However, we do not observe significant changes among rural households in their participation, spending, or time devoted to private academic tutoring activities following the policy's implementation.

Urban households with compulsory education students therefore experienced a significant decline in total out-of-school education spending following the policy, as shown in Table 8. In comparison, rural households with compulsory education students saw a small increase in out-of-school education expenditures, primarily from an increase in private non-academic tutoring activities. In-school education spending rose for households with compulsory education students in both urban and rural areas, with a slightly larger rise observed among urban households. This is in line with urban families being more affected by the private tutoring ban and spending more on in-school tutoring as an alternative to private tutoring. Eventually, these result in a substantial difference in the changes of total education spending between urban and rural households, as indicated by Column 3. Rural families with kids in compulsory education spent significantly more in education after the policy, while urban families did not see a significant change.

The heterogeneous effects on private tutoring spending between urban and rural households can be explained by several factors. Due to the intense competition for school admissions in cities, households in urban areas generally have much higher demand for private academic tutoring. In response, urban areas offer substantially more private tutoring services, especially through private tutoring firms. This leads to large gaps in private tutoring spending between urban and

Table 7: Urban vs. Rural Families: Effects on Private Tutoring Activities

	Academic Tutoring			Non-Academic Tutoring		
	(1) Dummy	(2) Spending	(3) Hours	(4) Dummy	(5) Spending	(6) Hours
Panel A: Rural Families						
Post × CE	-0.006	115.424	3.292	0.026	134.380	3.666
	(0.006)	(80.657)	(5.805)	(0.003)	(18.916)	(0.333)
Dep. Mean	0.14	406	36	0.05	115	9
Observations	15,046	15,046	10,555	15,046	15,046	15,046
Panel B: Urban Families						
Post × CE	-0.052	-667.871	-25.884	0.009	-254.158	-19.009
	(0.006)	(110.210)	(8.973)	(0.012)	(54.257)	(0.621)
Dep. Mean	0.34	3038	78	0.20	957	35
Observations	21,072	21,072	14,114	21,072	21,072	21,072

Notes: Standard errors clustered at the grade level. Control variables include age, gender, rural/urban residence, parental education, family income, public school attendance, school quality, only-child status, COVID-19 index, and a measure of high school competitiveness. Year and grade fixed effects are also included. All education expenditures are denominated in RMB and deflated to real 2016 values. We exclude academic tutoring hours in 2017 from the analysis to ensure accurate reporting within our sample.

Table 8: Urban vs. Rural Families: Effects on Education Spending

Spending	(1) Out-of-School Education	(2) In-School Education	(3) Total Education
Panel A: Rural Families			
Post × CE	249.804	755.461	1094.633
	(61.825)	(134.826)	(169.912)
Dep. Mean	521	2772	3320
Observations	15,046	10,555	10,555
Panel B: Urban Families			
Post × CE	-922.029	889.805	-188.552
	(79.909)	(102.394)	(70.591)
Dep. Mean	3394	3458	7382
Observations	21,072	14,114	14,114

Notes: Standard errors clustered at the grade level. Control variables include age, gender, rural/urban residence, parental education, family income, public school attendance, school quality, only-child status, COVID-19 index, and a measure of high school competitiveness. Year and grade fixed effects are also included. All education expenditures are denominated in RMB and deflated to real 2016 values. In-school education spending in 2017 is excluded from the analysis because, during the first survey year, respondents mistakenly reported total education expenditures (combining both in-school and out-of-school spending) as in-school spending alone. After 2017, we revised the survey questions and instructions to prevent this error.

rural households. In fact, prior to the regulation, urban families on average spent 3,284 RMB (≈ 461 USD) per year on private academic tutoring, whereas rural families spent only 461 RMB (≈ 65 USD). This imposes limitations to the impacts of the private tutoring ban on further reducing private tutoring spending among rural families.

Additionally, this heterogeneity may reflect different enforcement level of the private tutoring ban. In China, the administrative systems in cities are notably different from those in rural villages. Urban governments tend to have more resources, clearer institutional frameworks, and stronger regulatory oversight, whereas in rural areas governance is often more informal and decentralized. Consequently, enforcement of the private tutoring ban may be stronger in urban areas compared to rural areas. This may also help explain why the observed reduction in private tutoring expenditures was concentrated among urban households.

5.3 Substitution from Private Tutoring to Home Tutoring

Another important question is, whether parents turn to other forms of tutoring as a replacement of private tutoring under the *Double Reduction Policy*. One possibility is home tutoring, in which parents take on the role of tutoring their own children at home. The feasibility of home tutoring depends largely on parental education level, as more educated parents should be better equipped to provide home tutoring to their children. If households substitute toward home tutoring, we would expect to observe larger reductions in private tutoring spending among households with better educated parents. In this subsection, we aim to test this hypothesis by investigating the heterogeneity across parental education.

To this end, we first divide students into three groups based on maternal education: (i) below high school, (ii) high school degree, and (iii) college or above. We use mother's education as the relevant measure because mothers are generally more involved in parenting than fathers (Guryan, Hurst and Kearney, 2008). Then we apply a difference-in-differences estimator similar to those in the main analysis, to each student group respectively.

Figure 7 presents the results. Students with more more educated mothers exhibited significantly lower participation in private academic tutoring following the ban, although the magnitudes of the decrease are similar across maternal education levels. We also observe students whose

mothers hold a college degree showed weakly lower spending on private academic tutoring. For in-school education, students whose mothers obtained a college degree experienced smaller increases in spending after the ban, compared to students whose mothers did not attend college.

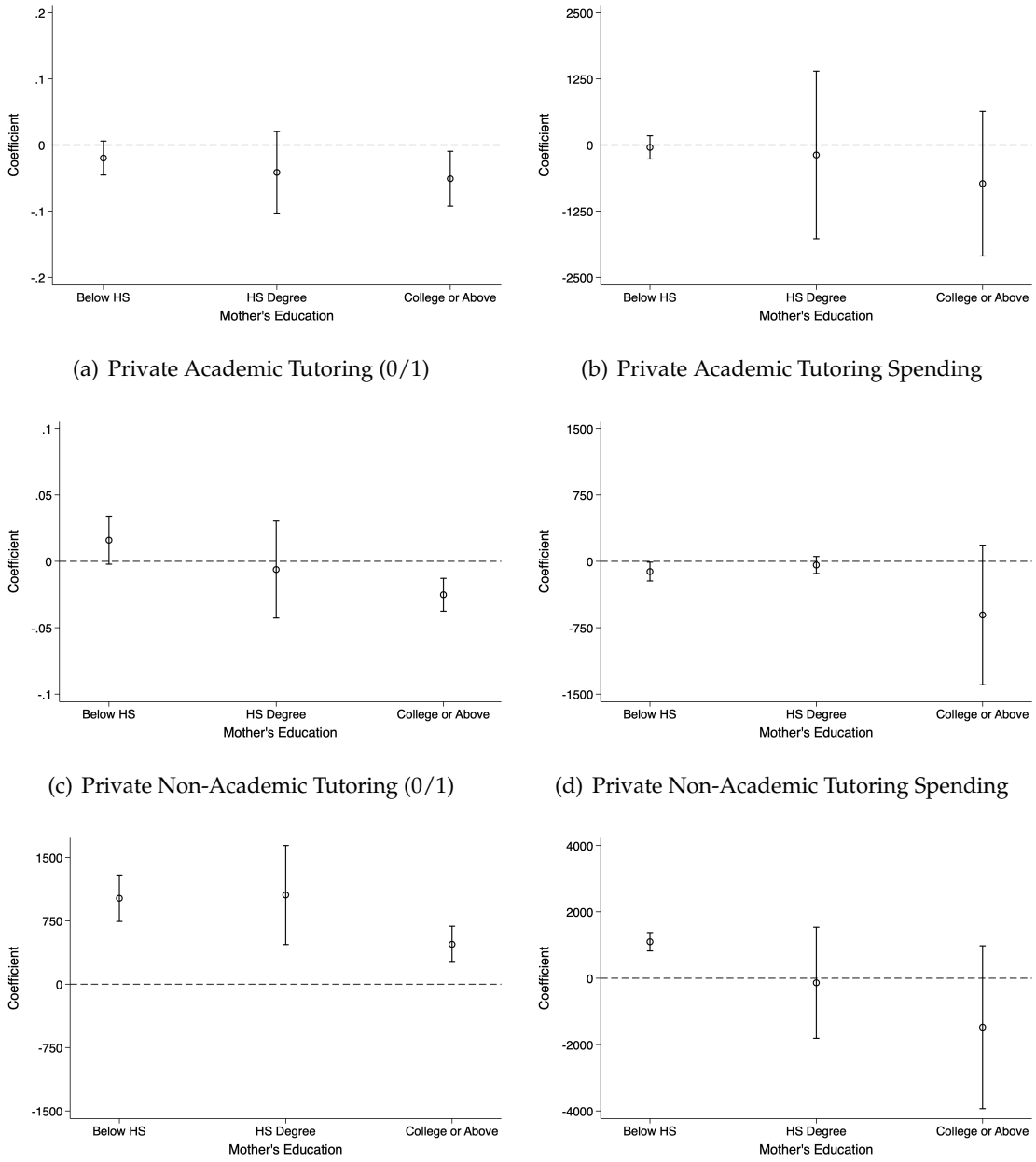
While we cannot provide direct evidence on home tutoring due to data limitation, this pattern suggests the potential substitution toward home-based tutoring among more educated households following the private tutoring ban. It also indicates that, under the constraints imposed by the ban, parents with higher education levels may be better positioned to compensate for the loss of external academic support by directly teaching their children at home. This pattern aligns with existing evidence on the relationship between parental education and parental time spent with children. In particular, Guryan, Hurst and Kearney (2008) document that higher-educated parents devote substantially more time on "educational" child care, including teaching children, helping children with homework, and similar activities.

Within the literature on China's private tutoring regulation, existing studies find that the tutoring ban increased parents' attention toward family education (Zhao, Shi and Wang, 2024; Liu, Wang and Chen, 2022). Our findings extend this literature by demonstrating that the effect on family education may vary by parental education.

6 Robustness Checks

This section conducts several robustness checks for our main empirical results. First, we use Coarsened Exact Matching (CEM) to match treatment and control groups to further ensure they are comparable on a comprehensive set of household and child characteristics. The method allows us to have a more balanced sample. Then, we repeat our main analysis but drop the 2021-2022 data to avoid potential confounding factors from disruptions of the survey sampling during the COVID-19 pandemic. Finally, we construct an alternative identification strategy by exploiting variation in the number of children aged 5 to 14 in each city. We examine whether our main results hold under this alternative identification strategy.

Coarsened Exact Matching. From Table 1, we see that some demographic variables differ across households with compulsory education students and those with high school students, which may raise concerns on the comparability between the two groups. We address this is-



(a) Private Academic Tutoring (0/1)

(b) Private Academic Tutoring Spending

(c) Private Non-Academic Tutoring (0/1)

(d) Private Non-Academic Tutoring Spending

(e) In-School Education Spending

(f) Total Education Spending

Figure 7: Heterogeneous Effects on Private Tutoring by Mother's Education

Note: Standard errors clustered at the grade level. Students are divided into three groups based on maternal education: below high school, high school degree, and college or above. Control variables include age, gender, rural/urban residence, parental education, family income, public school attendance, school quality, only-child status, COVID-19 index, and a measure of high school competitiveness. Year and grade fixed effects are also included. All education expenditures are denominated in RMB and deflated to real 2016 values. In-school education spending in 2017 is excluded from the analysis because, during the first survey year, respondents mistakenly reported total education expenditures (combining both in-school and out-of-school spending) as in-school spending alone. After 2017, we revised the survey questions and instructions to prevent this error.

Table 9: Coarsened Exact Matching: Effects on Private Tutoring Activities

	Academic Tutoring			Non-Academic Tutoring		
	Dummy	Spending	Hours	Dummy	Spending	Hours
Post × CE	-0.042	-423.891	-21.715	0.013	1.741	-2.217
	(0.007)	(39.170)	(6.840)	(0.007)	(15.865)	(0.472)
Observations	30,872	30,872	21,208	30,872	30,872	30,872

Notes: Standard errors clustered at the grade level. Control variables include age, gender, rural/urban residence, parental education, family income, public school attendance, school quality, only-child status, COVID-19 index, and a measure of high school competitiveness. Year and grade fixed effects are also included. All education expenditures are denominated in RMB and deflated to real 2016 values. We exclude academic tutoring hours in 2017 to ensure accurate reporting within our sample.

sue by following Iacus, King and Porro (2012) and adopting a Coarsened Exact Matching (CEM) estimator to construct the control group. CEM estimators prioritize sample balance at the expense of sample size. This method helps mitigate the selection issues and gives us the best chance of identifying households and students who are comparable on unobservables.

We match the treatment and control groups based on seven key household and student characteristics. Specifically, the CEM estimator matches households with compulsory education students and those with high school students if they fall into the same bin for the following attributes respectively: student gender, public school attendance, household income, mother's education, rural/urban residence, only-child status, and province. We use one bin for each province code and use the default binning algorithm on the rest of the variables. The above procedures drop 15% of the unmatched observations, leaving us with 30,872 observations for this analysis.

Tables 9 and 10 present the outcomes and they show that our main conclusions are robust to the CEM estimator. In particular, participation, spending, and hours devoted to private academic tutoring all declined for households with compulsory education students following the private tutoring ban. Relative to households with high school students, their out-of-school education spending dropped and in-school education spending increased, leading to an increase in the total education spending. At the same time, the ban is associated with relatively higher private tutoring spending, significantly higher proportion of students ranked at both "Top of Class" and "Below Average" from high-income families, compared to those from low- and middle-income families. We also observe that, compared to the main analysis, the magnitudes of the CEM estimates increase and their statistical significance strengthens.

Table 10: Coarsened Exact Matching: Effects on Education Spending and Academic Performance

Panel A: Effects on Education Spending				
Spending	Academic Tutoring	Non-Academic Tutoring	In-School Education	Total Education
Post × CE	-423.891	1.741	550.017	179.366
	(39.170)	(15.865)	(45.106)	(8.580)
Observations	30,872	30,872	21,208	21,208
Panel B: Heterogeneous Effects on Education Spending				
Spending	Academic Tutoring	Non-Academic Tutoring	In-School Education	Total Education
Post × CE × High-Inc	866.527	-39.686	-366.494	499.304
	(176.176)	(63.579)	(208.573)	(317.773)
Observations	30,872	30,872	21,208	21,208
Panel C: Heterogeneous Effects on Reported Student Academic Performance				
	"Top of Class"	"Above Average"	"Average"	"Below Average"
Low- & Middle-Income HH				
Post × CE	0.004	0.011	0.019	-0.041
	(0.001)	(0.014)	(0.004)	(0.007)
Observations	25,833	25,833	25,833	25,833
High-Income HH				
Post × CE	0.034	0.002	-0.036	-0.007
	(0.007)	(0.018)	(0.015)	(0.000)
Observations	4,428	4,428	4,428	4,428
Triple Diff-in-Diffs				
Post × CE × High-Inc	0.033	-0.003	-0.057	0.030
	(0.011)	(0.001)	(0.010)	(0.006)
Observations	30,261	30,261	30,261	30,261

Notes: Standard errors clustered at the grade level. Control variables include age, gender, rural/urban residence, parental education, family income, public school attendance, school quality, only-child status, COVID-19 index, and a measure of high school competitiveness. Year and grade fixed effects are also included. All education expenditures are denominated in RMB and deflated to real 2016 values. In-school education spending in 2017 is excluded from the analysis because, during the first survey year, respondents mistakenly reported total education expenditures (combining both in-school and out-of-school spending) as in-school spending alone. After 2017, we revised the survey questions and instructions to prevent this error. High-income households refer to households within the top 20 percent of the income distribution in a province-year.

Dropping 2021-2022 sample. One limitation of our analysis arises from the data collection process. Due to pandemic-related restrictions and travel difficulties, the third survey wave was

Table 11: Robustness Check: Drop 2021-2022 Sample

Spending	(1) Academic Tutoring	(2) Non-Academic Tutoring	(3) Out-of-School Education	(4) In-School Education	(5) Total Education
Post × CE	-416.889	-209.599	-626.488	773.224	-13.412
	(151.635)	(30.598)	(141.727)	(85.475)	(86.120)
Observations	29,705	29,705	29,705	18,256	18,256

Notes: Standard errors clustered at the grade level. Survey years 2021-2022 are not included in this table. Control variables include age, gender, rural/urban residence, parental education, family income, public school attendance, school quality, only-child status, COVID-19 index, and a measure of high school competitiveness. Year and grade fixed effects are also included. All education expenditures are denominated in RMB and deflated to real 2016 values. In-school education spending in 2017 is excluded from the analysis because, during the first survey year, respondents mistakenly reported total education expenditures (combining both in-school and out-of-school spending) as in-school spending alone. After 2017, we revised the survey questions and instructions to prevent this error.

conducted over two years, 2021 and 2022. As a result, some households were surveyed in 2021 (reporting on expenditures from 2020), while others were surveyed in 2022 (reporting on expenditures from 2021). Although we treat the 2021 and 2022 survey samples as distinct in our empirical analysis, potential geographic differences in respondent composition between the two years may introduce bias.

To address this concern, we conduct an additional robustness check by excluding the 2021 and 2022 survey waves and re-estimating our main specifications using only the 2017, 2019, and 2023 waves. Table 11 reports the results. The dependent variables in Columns 1 through 5 are household spending on private academic tutoring, non-academic tutoring, out-of-school tutoring, in-school education, and total education, respectively. Overall, the results are consistent with our main findings, suggesting that the estimates are not driven by sampling variation between the 2021 and 2022 survey rounds.

Alternative identification by exploiting variation in age 5-14 population across cities. Following Huang et al. (2025), we adopt an alternative identification strategy that exploits variation in the number of children aged 5–14 in each city in 2020 as shifters of policy exposure. The intuition is that the private tutoring ban primarily targeted children in compulsory education; thus, cities with a larger population of school-age children were more strongly affected. Huang et al. (2025) use this approach to estimate the impact of the ban on labor demand and document a sharp decline in online job postings by tutoring firms after the policy. We employ the same identification

Table 12: Robustness Check: Exploiting City-Level Age 5-14 Population

Spending	(1) Academic Tutoring	(2) Non-Academic Tutoring	(3) Out-of-School Education	(4) In-School Education	(5) Total Education
Post × Population aged 5-14 (in million)	-498.123 (113.033)	88.530 (62.489)	-409.593 (134.826)	-65.654 (94.496)	-564.243 (177.133)
Observations	24,413	24,413	24,413	17,479	17,479

Notes: Robust standard errors in parentheses. Control variables include age, gender, rural/urban residence, parental education, family income, public school attendance, school quality, only-child status, COVID-19 index, and a measure of high school competitiveness. Year and grade fixed effects are also included. All education expenditures are denominated in RMB and deflated to real 2016 values. In-school education spending in 2017 is excluded from the analysis because, during the first survey year, respondents mistakenly reported total education expenditures (combining both in-school and out-of-school spending) as in-school spending alone. After 2017, we revised the survey questions and instructions to prevent this error.

strategy to examine the effects of the tutoring ban on household education expenditures. Specifically, we construct a continuous difference-in-differences estimator by interacting the post-policy indicator with the city-level population of children aged 5–14, as reported in the 2020 Census.[17] The specification includes the same set of fixed effects and demographic controls as in the main analysis. Finally, we restrict the sample to families with children in compulsory education.

Results are presented in Table 12. The estimates show the average effect of the policy on cities with one million more compulsory-education-age children. Using this alternative identification strategy, we also find that there was a substantial decline in private academic tutoring spending as well as a decline in out-of-school education spending following the private tutoring ban. Additionally, the magnitudes of these estimates are similar to those in the main analysis. While cities with more compulsory-education-age children did not see a significant change in in-school education spending, overall, results based on this alternative identification strategy align with those from our main analysis.

7 Conclusion

This paper studies China's nationwide ban on private academic tutoring for students in compulsory education. Using a novel nationally representative household panel survey on education

[17] We match 91.2% of our sample to the Census population data, resulting in 24,413 observations for this analysis. The unmatched cases correspond to directly administered regions.

expenditure from 2017 to 2023, we find that the ban was associated with a substantial decline in private tutoring spending and an increase in in-school education spending. Households in the lower and middle tiers of the income distribution responded to the ban with lower private academic tutoring spending and students from these families were less likely to be ranked at the top of the class. Then, we further unpack the observed reduction in private academic tutoring spending. We find that: (i) 87.5 percent of private academic tutoring facilities exited the market after the ban, (ii) the decline in private tutoring expenditures was concentrated among urban households, and (iii) students with college-educated mothers participated significantly less in private academic tutoring and spent weakly less on it than students whose mothers did not attend college. We also show that our findings hold under a variety of robustness checks.

Nearly one-third of households in China previously participated in private academic tutoring. The *Double Reduction Policy* was introduced with the intention of restricting household expenditures on private tutoring and alleviating students' academic burdens. In the ideal scenario, all households would reduce their reliance on private tutoring, without adverse consequences for students' academic outcomes. However, our findings indicate a more complex pattern. While the policy succeeded in reducing participation and spending on private academic tutoring, it also coincided with increases in in-school education expenditures and total household education spending. These results suggest that households may have shifted toward other forms of educational investment in response to the regulation, rather than uniformly reducing their overall education-related expenditures.

Additionally, households in the lower and middle tiers of the income distribution experienced relatively larger declines in private tutoring expenditures, and students from these households were less likely to be ranked at the top of the class compared to their peers from higher-income families. Although the private tutoring ban restrict the supply of private tutoring supply, high-income households were able to substitute toward more expensive one-on-one tutoring arrangements, which are less visible and therefore less vulnerable to regulatory enforcement. On the contrary, lower- and middle-income households, who previously relied on larger, more affordable tutoring formats, were disproportionately affected by the regulation, facing reduced access to academic support without the financial or informational resources to seek alternatives.

Moreover, under the private tutoring ban, more educated parents may be better equipped to

provide academic support at home, whereas parents with lower education levels may lack the capacity to do so. Our findings provide some support to this hypothesis: while households with higher income have shown increased education spending, households with a college-educated mother exhibited relatively lower education spending in response to the policy. This suggests that more educated parents may have substituted toward home-based instruction. Unfortunately, we do not directly observe in time spent with kids with our data. Future research could further study how the *Double Reduction policy* impacts parent investments in kids outside of private tutoring.

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A Appendix: Supplementary Materials

Table A1: Summary Statistics

	Complusory Education					High School				
	2017	2019	2021	2022	2023	2017	2019	2021	2022	2023
Demographics										
Female	0.455	0.459	0.481	0.441	0.460	0.485	0.470	0.463	0.509	0.480
Age	12.46	12.43	12.58	12.60	12.49	17.60	17.53	17.53	17.55	17.50
Public School	0.904	0.907	0.921	0.913	0.925	0.855	0.855	0.874	0.842	0.832
Household Income	88586.3	74513.6	76059.6	68612.7	83232.8	90515.9	70428.3	71185.3	75891.2	76267.1
Mother Education > HS	0.288	0.278	0.291	0.327	0.365	0.301	0.283	0.351	0.346	0.322
Rural Area	0.411	0.420	0.457	0.467	0.441	0.340	0.365	0.396	0.465	0.432
Main Outcome Variables										
Any Tutoring	0.401	0.355	0.343	0.297	0.265	0.355	0.231	0.276	0.225	0.154
Academic Tutoring	0.335	0.278	0.275	0.195	0.161	0.326	0.181	0.246	0.184	0.121
Non-Academic Tutoring	0.171	0.154	0.166	0.180	0.147	0.109	0.0576	0.0712	0.0760	0.0423
Total Education Spending	.	4822.7	4855.2	4399.6	4002.9	.	8935.2	10304.2	9461.1	7992.1
Out-of-School Education Spending	2595.2	2708.6	2923.7	1963.2	1962.3	2972.9	2457.7	3452.6	2325.5	2184.6
Academic Tutoring Spending	1940.4	2043.2	2167.2	1240.3	1290.8	2630.5	2040.1	3074.0	2163.3	1694.3
Non-Academic Tutoring Spending	654.8	665.4	756.4	722.9	671.5	342.4	417.6	378.6	162.2	490.3
In-School Education Spending	.	2114.2	1931.5	2436.4	2040.6	.	6477.5	6851.6	7135.5	5807.5
Academic Perform. (Top of Class)	0.170	0.158	0.179	0.145	0.159	0.137	0.136	0.140	0.149	0.120
Academic Perform. (Above Average)	0.288	0.278	0.249	0.259	0.298	0.291	0.304	0.303	0.245	0.296
Academic Perform. (Average)	0.403	0.416	0.427	0.443	0.417	0.457	0.454	0.452	0.499	0.468
Academic Perform. (Below Average)	0.139	0.119	0.114	0.126	0.100	0.115	0.0894	0.0928	0.101	0.103
Observations	8,417	7,625	3,714	1,317	5,703	3,032	2,610	1,040	342	2,318

Notes: This table reports the summary statistics by year and by compulsory educations status. In-school and total education spending in 2017 is excluded from the analysis because, during the first survey year, respondents mistakenly reported total education expenditures (combining both in-school and out-of-school spending) as in-school spending alone. After 2017, we revised the survey questions and instructions to prevent this error.

Table A2: Pre- and Post-Policy Comparison

Spending	(1) Academic Tutoring	(2) Non-Academic Tutoring	(3) In-School Education	(4) Total Education
Panel A: Compulsory Education				
Post	-285.953	76.994	245.543	-139.813
	(134.748)	(75.668)	(128.936)	(266.673)
Observations	26,776	26,776	18,359	18,359
Panel B: High School				
Post	186.602	33.929	627.263	504.274
	(390.457)	(102.881)	(475.754)	(741.616)
Observations	9,342	9,342	6,310	6,310

Notes: Standard errors clustered at the grade level. Control variables include age, gender, rural/urban residence, parental education, family income, public school attendance, school quality, only-child status, COVID-19 index, and a measure of high school competitiveness. Year and grade fixed effects are also included. All education expenditures are denominated in RMB and deflated to real 2016 values. In-school education spending in 2017 is excluded from the analysis because, during the first survey year, respondents mistakenly reported total education expenditures (combining both in-school and out-of-school spending) as in-school spending alone. After 2017, we revised the survey questions and instructions to prevent this error.

Table A3: Effects on In-School Spending: Tuition, Academic and Non-Academic Tutoring

	(1) Tuition Spending	(2) Academic Tutoring Spending	(3) Non-Academic Tutoring Spending
Post × CE	686.036	459.952	-573.366
	(29.255)	(172.207)	(37.333)
Observations	18,426	10,525	10,514

Notes: Standard errors clustered at the grade level. Control variables include age, gender, rural/urban residence, parental education, family income, public school attendance, school quality, only-child status, COVID-19 index, and a measure of high school competitiveness. Year and grade fixed effects are also included. All education expenditures are denominated in RMB and deflated to real 2016 values. Due to missing values in tuition spending, academic and non-academic tutoring spending, this table involves a subsample of our data.

Table A4: Effects on Private Tutoring Activities (Robust Standard Errors)

	Academic Tutoring			Non-Academic Tutoring		
	Dummy	Spending	Hours	Dummy	Spending	Hours
Post × CE	-0.035	-358.108	-14.016	0.008	-150.888	-10.164
	(0.009)	(196.264)	(5.591)	(0.007)	(103.247)	(6.584)
Observations	36,118	36,118	24,669	36,118	36,118	36118

Notes: Robust standard errors in parentheses. Control variables include age, gender, rural/urban residence, parental education, family income, public school attendance, school quality, only-child status, COVID-19 index, and a measure of high school competitiveness. Year and grade fixed effects are also included. All education expenditures are denominated in RMB and deflated to real 2016 values. We exclude academic tutoring hours in 2017 to ensure accurate reporting within our sample.

Table A5: Effects on Education Spending and Academic Performance (Robust Standard Errors)

Panel A: Effects on Education Spending				
Spending	Academic Tutoring	Non-Academic Tutoring	In-School Education	Total Education
Post × CE	-358.108	-150.888	839.937	291.773
	(196.264)	(103.247)	(254.903)	(375.265)
Observations	36,118	36,118	24,669	24,669
Panel B: Heterogeneous Effects on Education Spending				
Spending	Academic Tutoring	Non-Academic Tutoring	In-School Education	Total Education
Post × CE × High-Inc	670.933	-309.543	493.221	317.454
	(671.758)	(404.028)	(813.859)	(1240.587)
Observations	36,118	36,118	24,669	24,669
Panel C: Heterogeneous Effects on Reported Student Academic Performance				
	"Top of Class"	"Above Average"	"Average"	"Below Average"
Low- & Middle-Income HH				
Post × CE	-0.004	0.019	0.006	-0.028
	(0.010)	(0.014)	(0.015)	(0.009)
Observations	28,171	28,171	28,171	28,171
High-Income HH				
Post × CE	0.025	-0.009	-0.026	-0.001
	(0.021)	(0.029)	(0.030)	(0.018)
Observations	7,215	7,215	7,215	7,215
Triple Diff-in-Diffs				
Post × CE × High-Inc	0.031	-0.029	-0.029	0.023
	(0.023)	(0.032)	(0.033)	(0.020)
Observations	35,386	35,386	35,386	35,386

Notes: Robust standard errors in parentheses. Standard errors clustered at the grade level. Control variables include age, gender, rural/urban residence, parental education, family income, public school attendance, school quality, only-child status, COVID-19 index, and a measure of high school competitiveness. Year and grade fixed effects are also included. All education expenditures are denominated in RMB and deflated to real 2016 values. In-school education spending in 2017 is excluded from the analysis because, during the first survey year, respondents mistakenly reported total education expenditures (combining both in-school and out-of-school spending) as in-school spending alone. After 2017, we revised the survey questions and instructions to prevent this error. High-income households refer to households within the top 20 percent of the income distribution in a province-year.

Table A6: Examples of Administrative Penalty Records in Zhejiang Province

Case ID	Case Date	City	Penalized Party	Type of Organization	Penalty Amount (RMB)	Case Summary	Violation and Decision
No. 000137 [2022] Hangzhou-Xihu	12/12/22	Hangzhou	Zhu **	Individual	3,800	Zhu **, on July 8, 2022, illegally organized illegal private tutoring activities at Room 102, Unit 2, Building 11, Jialvyuan North, Xihu District, Hangzhou, Zhejiang Province.	Such conduct violated Article 12 of the *Law of the People's Republic of China on the Promotion of Private Education*. Pursuant to Article 64 of the same law, an administrative penalty of RMB 3,800 is hereby imposed.
No. 000201 [2023] Haining	5/20/23	Haining	Jinyaoshi Art Training Co., Ltd.	Firm	42,560	Haining Golden Key Art Training Co., Ltd., from January 31 to February 24, 2023, organized English subject training courses for primary school students at Rooms 301-304, Jiuhu Commercial Building, Haizhou Subdistrict, Haining City, Zhejiang Province, without obtaining a private tutoring permit. During this period, the company employed 8 teachers and enrolled 107 students, obtaining illegal income totaling RMB 42,560.	Such conduct violates Article 12 of the *Law of the People's Republic of China on the Promotion of Private Education* and constitutes an act of unauthorized operation of a private educational institution. In accordance with Article 64 of the same law, the following administrative penalties are hereby imposed: (1) an order to cease the operation of the tutoring; and (2) a fine equal to the amount of illegal income, i.e., RMB 42,560.
No. 001551 [2023] Zhuji	8/1/23	Zhuji	Xing Weilai Private Tutoring Co., Ltd.	Firm	26,400	Since April 2023, Xing Weilai Private Tutoring Co., Ltd., organized mathematics lessons for three students and collected a total fee of RMB 7,600. On June 5, Xing Weilai received a Notice of Order to cease academic tutoring operation, after which it refunded the fees. On June 14, law enforcement officers from our Bureau conducted an on-site inspection of Xing Weilai and found that it organized pre-exam tutoring sessions in mathematics and science for nine students, collecting an additional fee of RMB 1,200. On June 28, law enforcement officers from our Bureau conducted a follow-up inspection and found no ongoing subject-based educational training activities. In summary, Xing Weilai Private Tutoring Co., Ltd., illegally collected a total of RMB 8,800 in private tutoring fees.	This conduct violates Article 12 of the *Law of the People's Republic of China on the Promotion of Private Education*. It is hereby decided to impose an administrative penalty on Xing Weilai Private Tutoring Co., Ltd., consisting of a fine equivalent to three times the amount of the illegal gains. Accordingly, a fine of RMB 26,400 is imposed.
No. 000377 [2023] Shaoxing-Keqiao	10/13/23	Shaoxing	Chitu Private Tutoring Co., Ltd.	Firm	11,550	On August 9, 2023, Chitu Private Tutoring Co., Ltd., illegally operated private academic training at Rooms 322-326, Building 1, Platinum Commercial Building, Binhai Industrial Zone, Maan Subdistrict, Keqiao District, Shaoxing City for primary school students. The total amount of tutoring fees collected was RMB 11,550.	This conduct violates Article 12 of the *Law of the People's Republic of China on the Promotion of Private Education*. Pursuant to Article 64 of the same law, the following administrative penalty is hereby imposed: a fine of RMB 11,550.
No. 000864 [2023] Taizhou-Huangyan	11/10/23	Taizhou	Motong Private Tutoring Co., Ltd.	Firm	1,000	On November 7, 2023, Motong Private Tutoring Co., Ltd., conducted academic training for two students at [*address omitted for privacy*], Toutuo Town, Huangyan District, without obtaining a private tutoring permit. Tuition fees were charged at RMB 500 per month, with a total of RMB 1,000 collected.	This conduct of providing illegal academic private tutoring lessons violated Article 12 of the *Law of the People's Republic of China on the Promotion of Private Education*, constituting the illegal operation of a school or other educational institution. Given that the facts of the violation are clear, evidence is sufficient, and the Party Concerned has ceased operations and refunded the collected fees, the following administrative penalty is imposed pursuant to Article 64 of the same law: a fine of RMB 1,000.