Tutoring Supply and Household Education Spending: Evidence from Private Tutoring Bans in China*

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Abstract

This paper studies China's nationwide ban on private academic tutoring for students in compulsory education and examines its effects on the supply of tutoring services, parental education investment, and distributional outcomes. First, using data collected from two major digital platforms, we document that 87.5 percent of private academic tutoring facilities exited the market following the ban. Then, using a novel nationally representative household panel survey on education expenditure, we compare students in compulsory education to high school students, who were not directly affected by the ban. We find that the ban led to a reduction in out-of-school tutoring spending but an increase in in-school education spending, resulting in an overall increase in total education expenditure. Moreover, middle-income households responded to the ban with lower education spending relative to both low- and high-income households, and students from these families reported worse academic performance. Further analysis suggests that households shifted away from tutoring institutions toward individual tutors and substituted large-group classes with more expensive one-on-one tutoring. These patterns point to reduced access to affordable tutoring options under the ban.

Keywords: Government Bans, Private Tutoring, 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 (Ramey and Ramey, 2010) 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 would impose negative education externalities on the society (Kim, Tertilt and Yum, 2024) and increase both financial and academic burdens of families and students (Mori and Baker, 2010). Recently, to address these issues, several education authorities have implemented relevant regulations. Researchers have explored the impacts of regulating private tutoring on mental health, online shopping behavior, employment, and fertility intentions (Zhao, Shi and Wang, 2024; Liu, Wang and Chen, 2022; Huang et al., 2024; Meng et al., 2024). However, due to data limitations, the extent of these regulations' effectiveness of reducing tutoring and their potential distributional impacts remain unclear.

This paper studies a nationwide government ban on the private tutoring sector. Using a dataset that we collect from two major platforms and a unique comprehensive survey panel on education expenditure, we study the policy's impact on private tutoring supply, household education spending, and its distributional effects. We find that the ban resulted in a sharp decline in private tutoring supply but it did not reduce the total education spending by households when accounting for in-school education expenses. The ban introduced a shift toward smaller individual-organized tutoring classes, and affected middle-income households and their children disproportionately.

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 was to alleviate academic pressure on students and to reduce household spending on private academic education. The policy became a huge shock to the private tutoring industry. Using a new web-scraped data from major platforms in China, we find that 87.5 percent of private academic tutoring institutions exited the market between May 2019 and June 2023, which is consistent with statistics released by the government.

We employ a difference-in-differences design to study the impact of this policy on household education spending. 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.

To implement the research design, we use data from the China Institute for Educa-

tional Finance Research – Household Survey (CIEFR-HS) and find significant changes in household education spending behaviors following the policy. First, 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 of compulsory education students.

Second, we find competition effects across class organizers and class sizes. Households spent less on academic tutoring organized by tutoring institutions after the ban, compared to those organized by individual tutors. Household spending on one-on-one tutoring substantially increased relative to spending on larger tutoring classes. Simultaneously, there was no change in the extensive margin for one-on-one academic tutoring. This suggests that private tutoring may move underground to evade regulation, which raised the difficulties in finding such services.

Finally, we show that the private tutoring ban had heterogeneous impacts across household income and parental education. Middle-income households responded to the ban with lower education spending compared to both low- and high-income households, and students from these households reported worse academic performance. In particular, a lower proportion of students from middle-income households reported top rankings in their class. Moreover, following the ban, we observe a lower education spending by parents with a college degree relative to those without a college degree.

Related Literature. Understanding the impacts of government bans is crucial for assessing their social and economic consequences. A wide variety of literature under this topic have used survey data to examine effects of bans (Adda, Berlinski and Machin, 2012; Carpenter and Nguyen, 2021; Bhutta, Goldin and Homonoff, 2016; Friedberg, Hynes and Pattison, 2021). Generally, product substitution and complementarity should be accounted for in the design of a ban; otherwise unintended consequences may occur (Adda, Berlinski and Machin, 2012; Carpenter and Nguyen, 2021; Conlin, Dickert-Conlin and Pepper, 2005; Gao and Petrova, 2022; Bhutta, Goldin and Homonoff, 2016). Such prohibition policies can be successful when the ban is properly targeted to specific groups that are exposed to particular high-risk settings (Balia, Brau and Nieddu, 2023). Additionally, heterogeneous impacts of bans may result in both benefits and harms to different types of individuals (Friedberg, Hynes and Pattison, 2021). Consistent with findings in this literature, we show that prohibiting private tutoring leads to a shift toward in-school education and introduces heterogeneity across household demographics.

Our research also builds upon the economic analysis of externalities and the policy

studies to address them. 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 education externality in the U.S. Policy instruments can be implemented to eliminate market failure caused by education externality. Kim, Tertilt and Yum (2024) uses a quantitative model to study the counterfactual effects of several 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. They also provide empirical evidence of the externality of private education investment (i.e., Changes in private education spending by high-income households lead to similar changes among low-income households). Additionally, such externalities and related policy interventions are observed in other sectors. For example, environmental economists have studied environmental regulations that are designed to deal with pollution externalities. These policy instruments include 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 decrease private investment in education and address over-investment in private education.

Lastly, there is a growing literature that evaluates education policies in China. Researchers have studied the impacts of private tutoring regulation on students' mental health, online purchasing behavior, employment, and fertility intention and they found such education regulation is associated with lower student anxiety, changes in learning material purchases, fewer job postings by tutoring firms, and higher fertility intentions (Zhao, Shi and Wang, 2024; Liu, Wang and Chen, 2022; Huang et al., 2024; Meng et al., 2024). Most of these studies use third-party data sources. For example, Liu, Wang and Chen (2022) use search engine keywords data and online platform sales data, and Zhao, Shi and Wang (2024) use app review data. Most closely related to our study is Liu et al. (2025), which find the *Double Reduction* policy resulted in unintended increase in private tutoring enrollment and household tutoring expenses. However, their sample is not nationally representative and their analysis is based on an online survey distributed in only 2023. In contrast, we take advantage of a novel large-scale national individual survey panel to examine the causal effects of private tutoring regulation. The granularity of our individual survey data ensures that the observed effects were driven by parents of school-age children and allows us to investigate the policy's impacts more directly and precisely.

Additionally, this paper presents several novel findings on students' academic outcome and heterogeneity. We demonstrate a significant change in students' academic performance following the policy and highlights the differential responses across the income distribution, as well as the competitive effects among class organizers and class sizes.

The remainder of the paper is organized as follows. In Section 2, we discuss the institutional background of the policy. Section 3 provides evidence of the regulation enforcement and the collapse of the private tutoring industry. Section 4 describes the survey data and the empirical strategy. Section 5 presents results on household education expenditures, heterogeneous effects across income and parental education, student academic performance, and competitive effects among tutoring organizers and sizes. Section 6 concludes.

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 tutor-

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

ing. 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 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 reshape the broader education ecosystem. Importantly, the policy was introduced without 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 institution-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. Our analysis also explores heterogeneity across household demographics and assesses competitive spillovers.

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-based homework assistance. Although participation is

[2] See Section 3.1 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.

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.

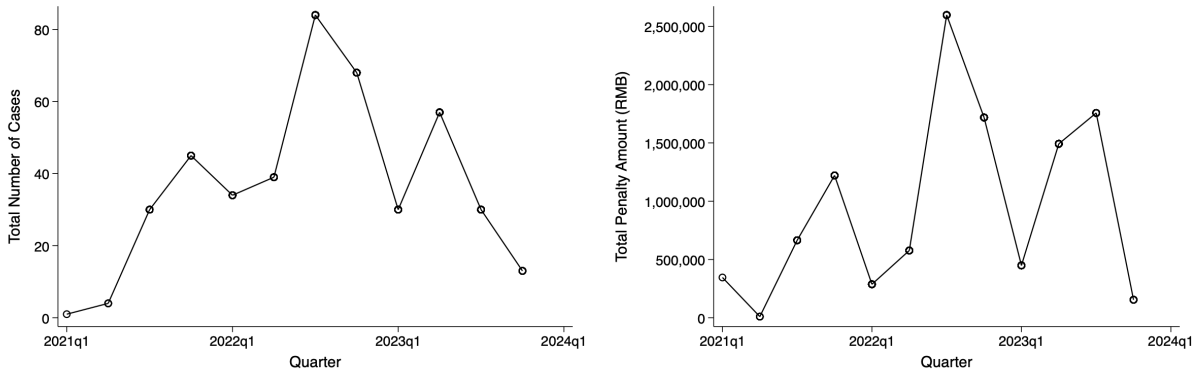
3 Changes in Tutoring Supply

This section 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. We focus on two dimensions: (i) policy enforcement, and (ii) changes in the distribution of private tutoring institutions following the regulation.

3.1 Enforcement of Private Tutoring Bans

> *"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."*

[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).



(a) Total Number of Cases

(b) Total Amount of Penalty

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

— 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 cases of illegal tutoring activities between 2021 and 2023. 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.

The enforcement data reveal that penalties are primarily determined by two factors: the amount of illicit revenue generated and the frequency of violations. 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. Moreover, 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 somewhat 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 ac-

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

tions, resulting in total penalties amounting to 11,274,086 RMB (≈ 1,573,440 USD). Of these cases, 63 percent involved institution-based tutoring providers, while the remaining 37 percent targeted individual tutors. These figures indicate that although both types of organizers were subject to penalties, institutions faced disproportionately greater regulatory scrutiny.

3.2 Collapse of the Tutoring Sector

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, and an indicator for whether each facility remained open in 2023. It provides evidence 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 institutions across cities nationwide, including institution 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 institutions from DianPing. These institutions were distributed across 31 provinces (including municipalities), 324 prefecture-level cities, and 2,246 districts and counties nationwide. However, 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 contraction of 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 the 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.[8]

[8]This approach may introduce some measurement error. For example, some institutions 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.

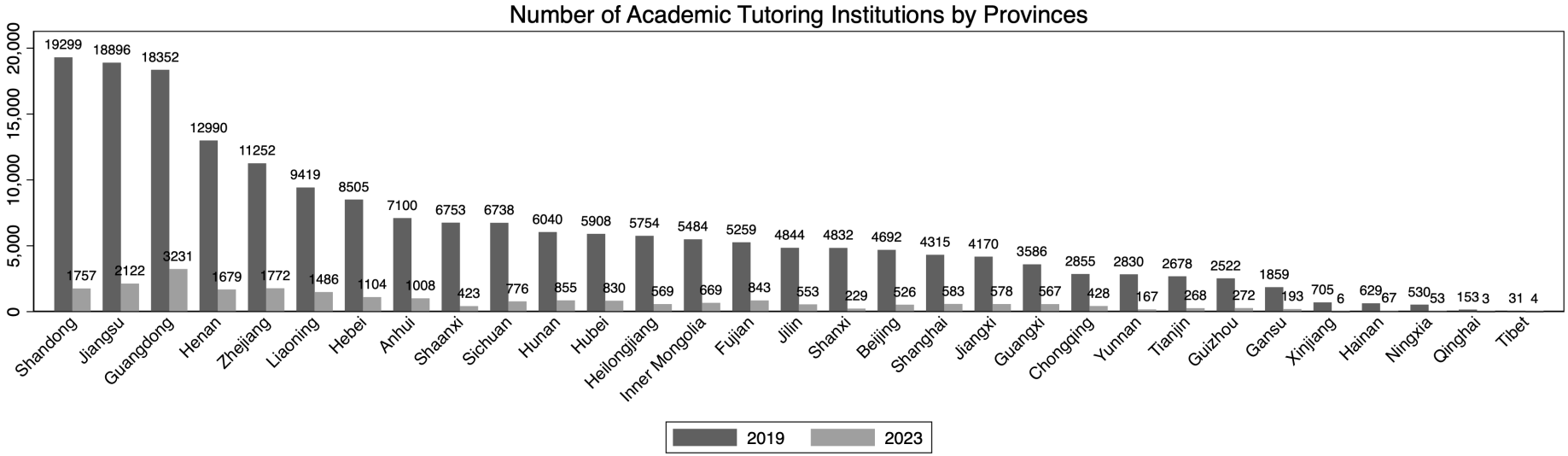


Figure 2: Number of Private Academic Tutoring Institutions by Provinces in 2019 and 2023

Results. In Figure 2, we present the number of private academic tutoring facilities by province 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, 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.[9] Thus, our data collected from the review and navigation platforms aligns well with the statistics disclosed by the government.

4 Data and Empirical Strategy

4.1 Data

A central challenge for empirical research on private tutoring regulation 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. To rigorously evaluate the effects of the tutoring ban, a large and detailed dataset is essential. A key contribution of this paper is the introduction of a novel, comprehensive survey panel that captures household investments in both public and private education.

We design and implement a novel, 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. 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. CIEFR-HS is the first national survey to provide detailed household-level data on expenditures related to private tutoring.

The dataset includes rich information on household spending on 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 organizer (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,

[9] Available at: https://news.youth.cn/gn/202209/t20220909_13988908.htm

including student age and gender, parental education, and household income.

Student academic performance is reported by parents on a five-point scale, ranging from 1 (top) to 5 (other), corresponding to top, above average, average, below average, and others, respectively. In China, students in grades 1 through 12 typically 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, given our empirical framework, this will not impose serious threats on our 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 reduced 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 education expenditures for several reasons. First, the legal penalties associated with private tutoring are directed at tutors rather than parents, so there is no direct incentive for households to conceal their tutoring activities. Second, although the survey collects detailed household and individual characteristics, it is conducted anonymously and contains no personally identifiable information. Third, while respondents are asked to describe the nature of tutoring services (e.g., subject, class size, and organizer), they are not required to disclose the identity of the tutor. These design features reduce the likelihood that parents would underreport expenditures out of concern for protecting tutors from potential penalties.

Table 1: Summary Statistics

	Compulsory Education (CE)		High School (HS)	
	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
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.

4.2 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. Aside from mother's education, we

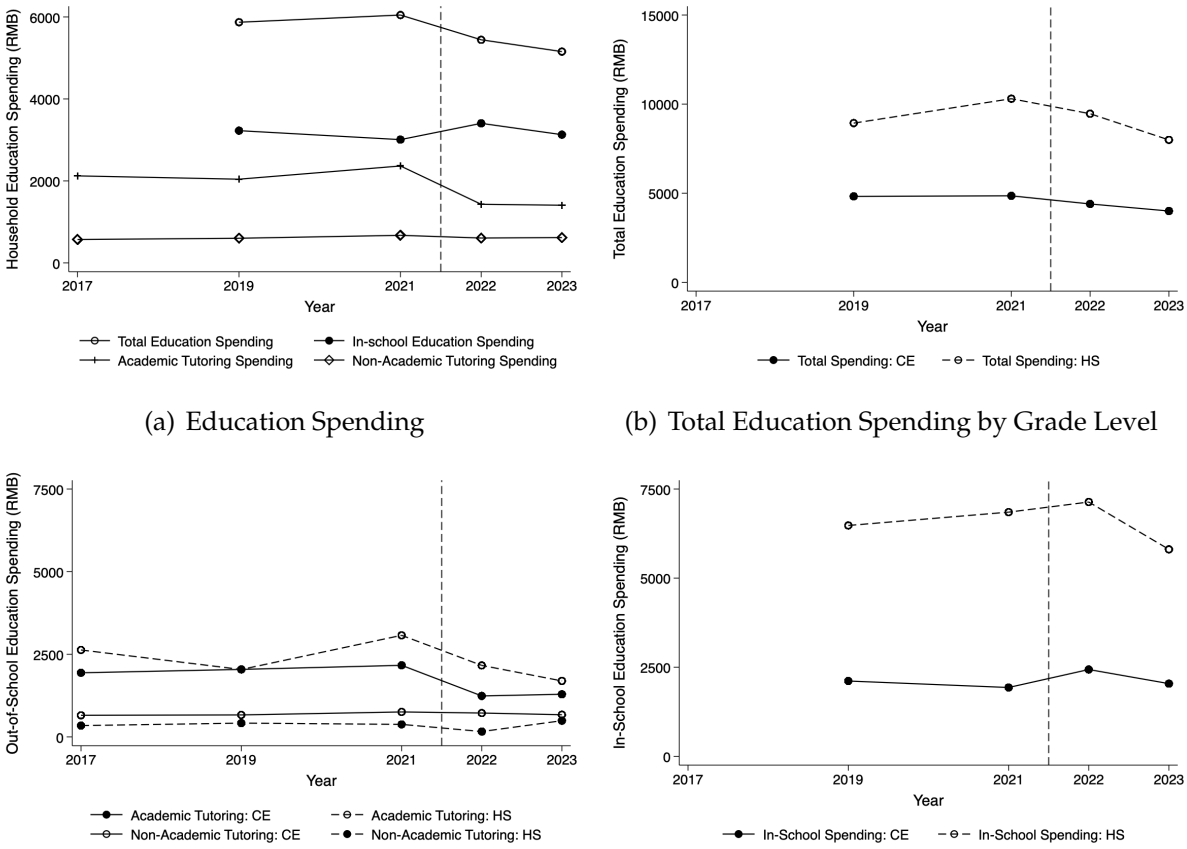
observe no substantial changes in household demographics post 2021. We control for these characteristics in all regressions.

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.

Prior to the implementation of the private tutoring ban, approximately one-third of households 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. Moreover, the declines in spending and participation are observed for both households with children in compulsory education and those with high school students. Nevertheless, in-school education spending increased, especially for households with primary and middle school students. This likely reflects a shift in demand from private to 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.

Figure 3 presents trends in average household education spending over time. Panel (a) shows that, following the implementation of the policy in 2021, spending on private academic tutoring declined sharply, while spending on non-academic tutoring remained relatively stable. In contrast, in-school education spending slightly increased over the same period. Importantly, because the private tutoring ban did not directly apply to high school students, we expect differential trends in education spending between households with children in compulsory education and those with high school students. This distinction allows us to examine heterogeneous policy effects across educational stages.

Panel (b) shows that total education spending has declined for both households with primary and middle school students and those with high school students after 2021. Similar trends are observed for out-of-school education spending. However, while house-



(a) Education Spending

(b) Total Education Spending by Grade Level

(c) Out-Of-School Spending by Grade Level

(d) In-School Spending by Grade Level

Figure 3: Household Average Education Spending

Note: All education expenditures are denominated in RMB and deflated to real 2016 values. HS represents high school and CE stands for compulsory education. Out-of-school education spending is the total of expenditures on private academic tutoring and private non-academic tutoring. Rural households are excluded to account for the potential differences in education spending between urban and rural families.

holds with high school students reduced their in-school education spending, households with primary and middle school students did not. Since the decline in total education spending may be partially influenced by the COVID-19 pandemic, we use households with high school students as a comparison group and identify the effects of banning private tutoring by comparing changes in education spending between households with compulsory education children and households with high school students. We assume that the pandemic did not create differential impacts on education spending between these two groups.

Figure 4 presents average household education spending by income percentile. Total education spending increases with income nonlinearly, as does spending on academic

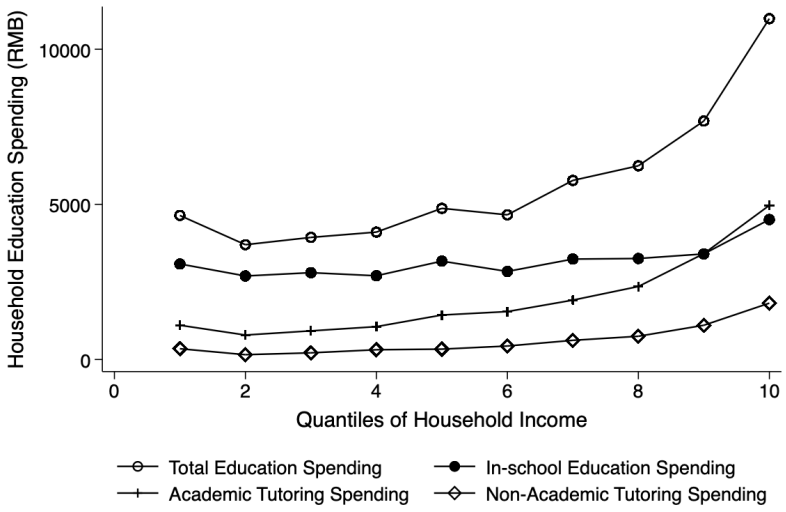


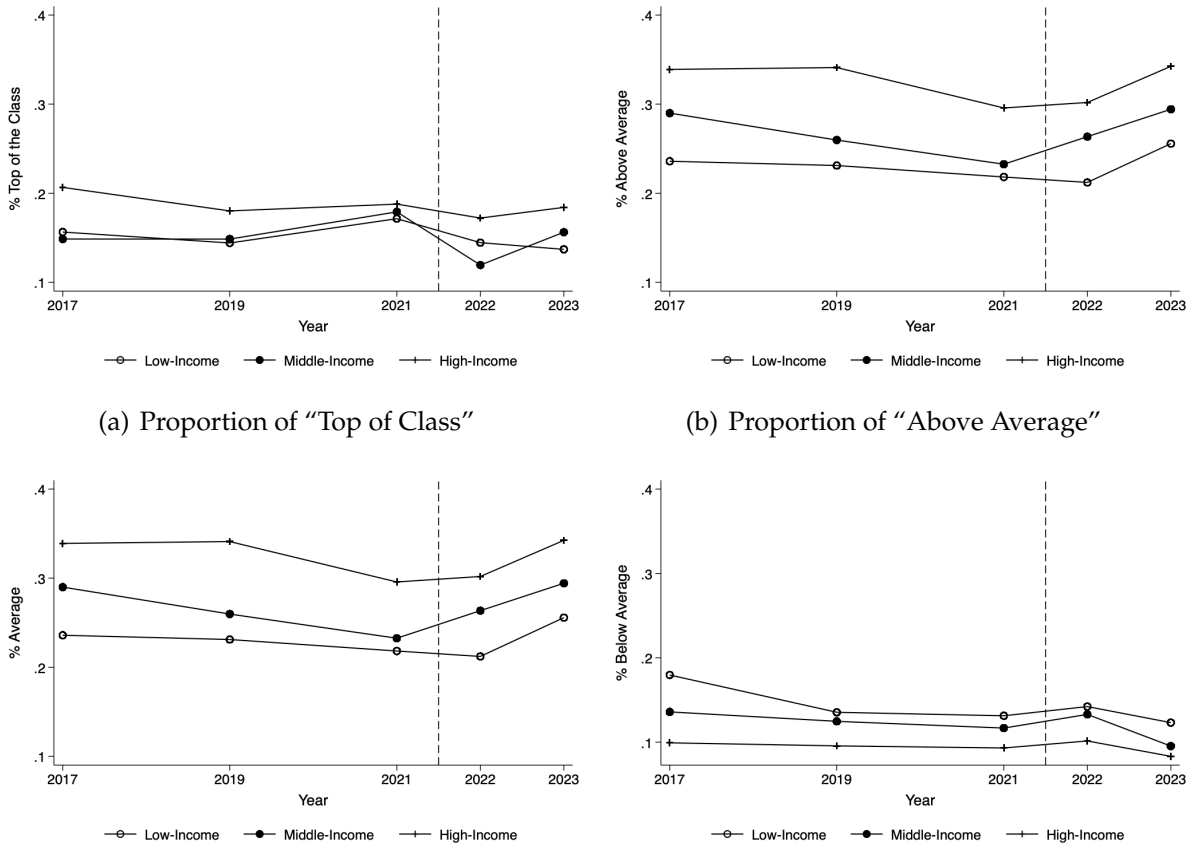
Figure 4: Household Average Education Spending by Income

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

private tutoring. That is, households in higher income brackets allocate significantly more resources to academic tutoring, resulting in substantially higher overall education expenditures. In contrast, in-school education spending exhibits relatively little variation across income groups. As noted earlier, approximately 90 percent of students in our sample attend public schools, where tuition fees are relatively stable over time and largely uniform across institutions.

One key outcome variable is student academic performance. In Figure 5, we plot student's average academic performance by household income groups for students in compulsory education. Parent-reported academic performance ranking ranges from 1 to 5, representing top, above average, average, below average, and others in their class, respectively. These classifications are mutually exclusive. Household income levels are equally divided into three groups, for each year and each province, to account for income differences across geography and over time.

Panel (a) shows that after 2021, and especially in 2022, students from middle-income households reported lower average academic rankings compared to those from both low- and high-income households. Panels (b) through (d) further present the share of students ranked at above average, average, or below average in their class by income group. Following the implementation of the policy in 2021, the proportion of middle-income students ranked at the top declined, while the proportion ranked above average (but not top) and average increased. These patterns suggest that the policy may have disproportionately affected the highest-performing students from middle-income households.



(a) Proportion of "Top of Class"

(b) Proportion of "Above Average"

(c) Proportion of "Average"

(d) Proportion of "Below Average"

Figure 5: Compulsory Education Student Academic Performance by Household Income

Note: Reported academic performance ranking ranges from 1 to 5, corresponding respectively to top, above average (excluding top), average, below average (excluding bottom), and others. Households are divided into three equally sized groups based on income, separately by year and province, to account for income differences across locations and over time.

In summary, the descriptive evidence shows that household spending on private academic tutoring declined, while in-school education expenditures increased after the policy was implemented. The magnitude of these changes differed between households with children in compulsory education and those with high school students. These trends also varied across household demographics. Moreover, we observe heterogeneous changes in students' reported academic performance across the household income distribution. We formally investigate each of these patterns in Section 5.

4.3 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 parallel trends assumption: 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 offers both advantages and limitations. As discussed in Section 2, the *Double Reduction* policy applies only to students in compulsory education; private tutoring for high school students is 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 generated spillover effects on high school students, as many private tutoring companies that were forced to exit the market had previously offered services to both compulsory education and high school students. That said, high school students remain a valuable comparison group, as they help account for the broader impact of the COVID-19 pandemic on education expenditures. In our analysis, we assume that the pandemic did not generate differential effects on education spending between students in compulsory education and those in high school.

Because the policy was implemented during the COVID-19 pandemic, we also directly control for pandemic-related variation by constructing a COVID index based on the number of confirmed cases at the province-year level. In addition, 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 kids, 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 index and high school competitiveness index.[10] Standard errors are clustered at the grade level (Abadie et al., 2023). The coefficient of interest is β, representing the difference-in-differences estimates of the policy's effects on students in compulsory education.

5 Results

5.1 Education Spending

Pre- and Post-Policy Comparison. Table 2 presents changes in education spending before and after the implementation of the private tutoring ban. Among households with children in compulsory education, we observe significant declines in spending on academic tutoring, non-academic tutoring, and total education expenditures. For households with high school students, academic tutoring expenditures, in-school education spending, and total education spending also declined significantly over the same period. Overall, we observe substantially lower education expenditures across all grade levels post-2021. One notable distinction between students in compulsory education and those in high school is the pattern in in-school education spending. While high school students reduced their in-school education expenditures by approximately 900 RMB on average, there was no significant decline in in-school spending among students in compulsory education. Nevertheless, the consistent decline in education expenditures observed after 2021 might be attributable to the effects of the COVID-19 pandemic.

Academic and non-academic tutoring spending. Table 3 shows the differential responses to the policy between compulsory education students and high school students, in terms of academic and non-academic tutoring. The outcome variables are: a dummy for participation in private academic tutoring (Column 1), household spending on private academic tutoring (Column 2), hours that a student spends on private academic tutoring (Column 3), a dummy for participation in private non-academic tutoring (Column 4), household spending on private non-academic tutoring (Column 5), hours that the student spends on private non-academic tutoring (Column 6). Compared to high school students, those in compulsory education were significantly less likely to attend private academic tutoring after the policy, and both their expenditures and hours spent on academic tutoring declined. This pattern is likely driven by the sharp contraction in the post-policy supply of private academic tutoring services. In addition, as shown in Columns 5 and 6,

[10] Individual and family characteristics include gender, age, rural/urban area, parental education, family income, and public school attendance.

Table 2: 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	-1078.030***	-164.997***	-90.953	-1503.939***
	(125.709)	(58.410)	(98.882)	(189.116)
Observations	26,776	26,776	18,359	18,359
Panel B: High School				
Post	-1121.644***	198.457	-899.960***	-1523.415***
	(268.480)	(134.219)	(264.934)	(402.658)
Observations	9,342	9,342	6,310	6,310

Notes: 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. Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 3: 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	-0.023**	-245.497*	-11.670	0.014	-124.779**	-9.245***
	(0.002)	(68.786)	(6.630)	(0.008)	(28.460)	(0.557)
Observations	36,118	36,118	24,669	36,118	36,118	36,118

Notes: Academic tutoring time in 2017 is excluded from the analysis because, during the first survey year, households mistakenly reported the combined hours of out-of-school (private) and in-school academic tutoring as out-of-school academic tutoring time. After 2017, we revised the survey questions and instructions to prevent this error. Standard errors are clustered at the grade level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

we observe spillover effects on non-academic tutoring, despite the fact that the policy did not explicitly target such activities. Taken together, the results suggest that the *Double Reduction* policy may have generated broader reductions in household demand for private tutoring across both academic and non-academic domains.

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 educational investment. Table 4 reports the effects of the policy

Table 4: 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	-370.276**	894.132***	408.538**
	(57.978)	(3.290)	(51.330)
Observations	36,118	24,669	24,669

Notes: 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. Standard errors are clustered at the grade level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

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. For students in compulsory education, average annual out-of-school education spending decreased by 370 RMB ($52 USD), while average annual in-school education spending increased by 894 RMB ($125 USD), relative to high school students. These results suggest that households substituted spending on private tutoring with spending on in-school educational services after the policy was introduced. This resulted in a 409 RMB ($57 USD) increase in total education spending for households with compulsory education students.

Given that tuition fees are relatively stable over time, most of the variation in in-school education spending reflects differences in after-school tutoring offered within schools. Therefore, although students in compulsory education spent fewer hours in private academic tutoring, the total time devoted to academic tutoring may not have declined significantly, as some of that demand may have been absorbed by in-school tutoring services.

Event-study estimates. We supplement the results above with an event-study design. The regression model is given by:

$$Y_{igt} = \alpha_t + \mu_g + \sum_{\tau=-3}^{\tau=1} \beta_\tau D_{\tau gt} + \Gamma X_{it} + \epsilon_{igt} \tag{2}$$

where $D_{\tau gt}$ is set to 1 for compulsory education students if the private tutoring ban was implemented in year $t - \tau$, and 0 otherwise. We omit 2021, the year before policy came into place. Figure A.1 presents the results from Equation 2. Consistent with our estimates in Tables 3 and 4, we observe a decrease in private academic tutoring participation, and an increase in in-school spending due to the private tutoring ban.

5.2 Heterogeneous Effects

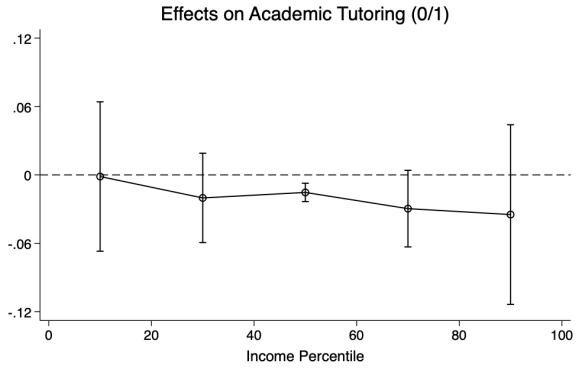
Household income. As noted in the preliminary analysis, spending on private academic tutoring varies across households with different income levels. These income groups may also exhibit heterogeneous responses to the private tutoring ban. To examine these differential effects, we implement the following 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. Thus, 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.

The findings are presented in Figure 6. Panels (a) and (b) show that, for households in the 20th to 60th percentiles of the income distribution, children in compulsory education were less likely to attend private academic tutoring, and household spending on such tutoring declined relative to households with high school students. In contrast, the coefficient for households in the top 20 percent of the income distribution is non-significant in Panel (a) and significantly positive in Panel (b), indicating that the policy did not reduce private tutoring participation but led to higher expenditures for high-income households. In contrast, there is limited heterogeneity in non-academic tutoring across income groups. Panel (e) reveals that households increased their in-school education spending following the policy, with stronger responses among those in the top and bottom income quintiles.

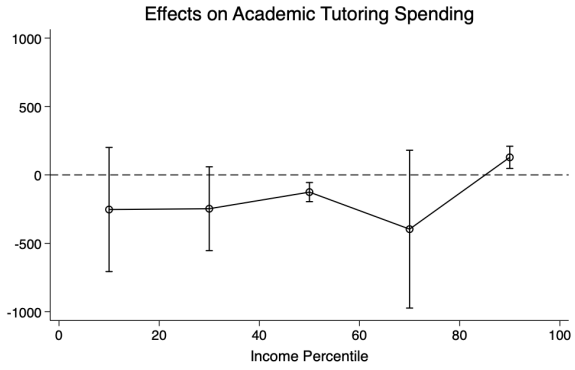
Taken together, these results confirm that the *Double Reduction* policy led to a decline in private academic tutoring expenditures but a corresponding increase in in-school spending for students in compulsory education, relative to high school students. The heterogeneity analysis indicates that middle-income households likely reduced private academic tutoring spending more than other income groups, while households at the top and bottom of the income distribution exhibited larger increases in in-school education spending.

Mother's education. Since more educated parents may be better equipped to provide academic support at home, changes in education spending following the tutoring ban may differ by parental education. To examine this heterogeneity, we 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).

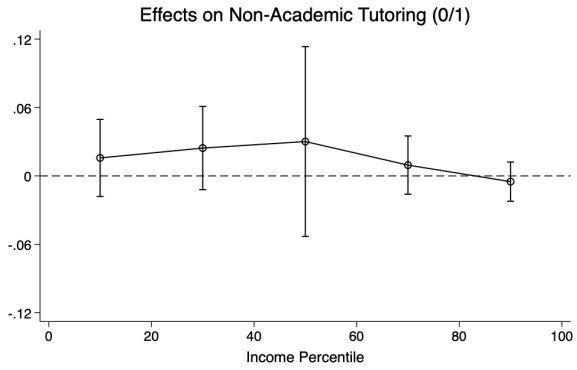
Figure 7 presents the results. Students with more highly educated mothers exhibited significantly lower participation in private academic tutoring following the policy, but the



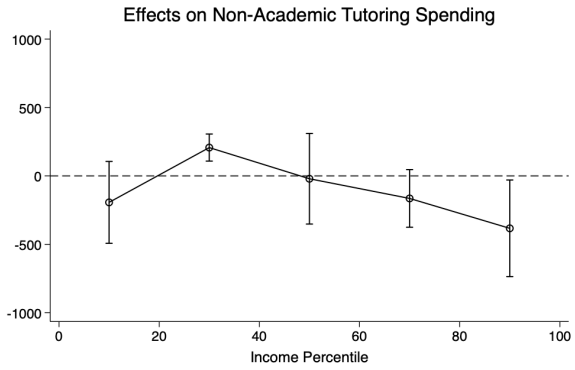
(a) Private Academic Tutoring (0/1)



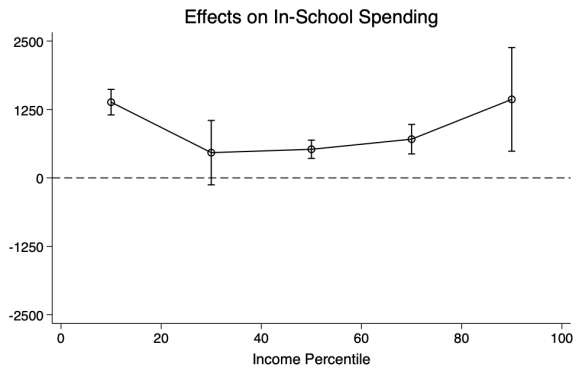
(b) Private Academic Tutoring Spending



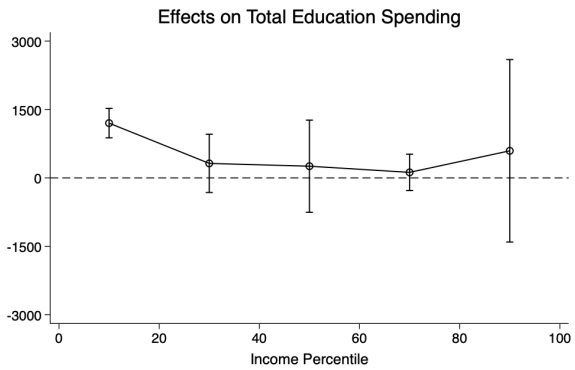
(c) Private Non-Academic Tutoring (0/1)



(d) Private Non-Academic Tutoring Spending



(e) In-School Education Spending

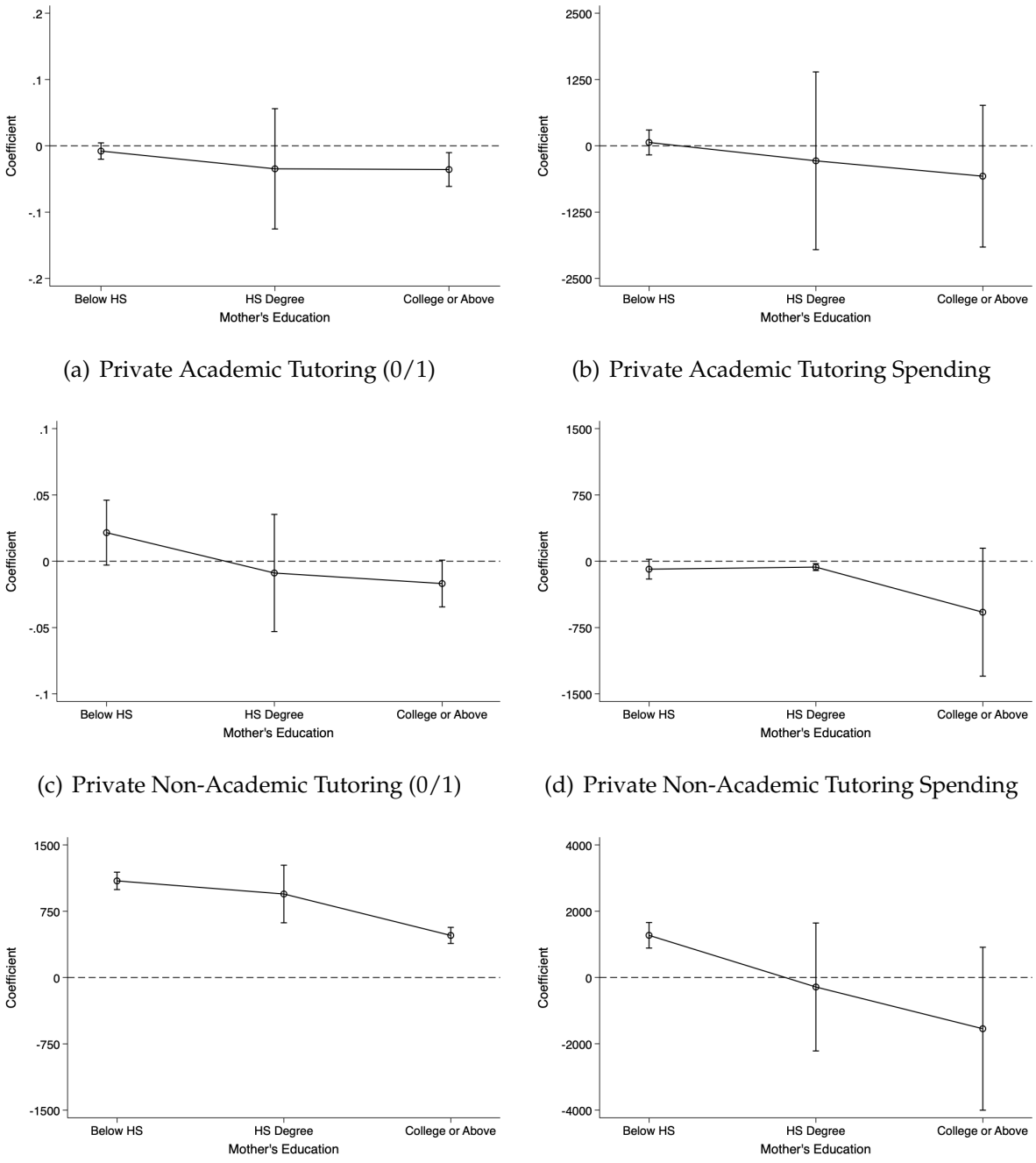


(f) Total Education Spending

Figure 6: Heterogeneous Effects on Spending by Household Income Percentile

Note: Standard errors clustered at the grade level. All education expenditures are denominated in RMB and deflated to real 2016 values.

magnitudes of the decrease are similar across maternal education levels. However, for in-school education, students whose mothers did not attend college (whether they had less



(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 Spending by Mother's Education

Note: Standard errors clustered at the grade level. All education expenditures are denominated in RMB and deflated to real 2016 values.

than a high school education or a high school degree) experienced significantly larger increases in in-school education spending after the policy, compared to students with more

educated mothers. These patterns suggest the potential for substitution toward home-based tutoring among more educated households. Under the constraints imposed by the private tutoring ban, parents with higher levels of education may be better positioned to offset the reduction in external academic support by providing direct instruction at home.

5.3 Reported Student Academic Performance

Now, we examine how the *Double Reduction* policy impacted students' academic performance. We have shown above that middle-income households experienced relatively larger declines in private academic tutoring expenditures following the policy. This raises the question of whether their children's academic performance may have been disproportionately affected. To address this, we investigate heterogeneity in the policy's effects on academic performance across the household income distribution.

To do that, we use a triple-differences estimator. We interact $Post_t$ (an indicator for whether the policy has been implemented or not in year t), $CompulsoryEduc$ (an indicator for compulsory education students), with $MiddleIncHH$ (an indicator for household being in the middle tier of the income distribution). β_1, the coefficient of the interaction term $Post_t \times CompulsoryEduc_g \times MiddleIncHH_c$ indicates the differential impacts of the policy on academic performance of children in middle-income households, relative to others. Note that we use a fully saturated model:

$$\begin{aligned} Y_{igct} =& \alpha_t + \mu_g + \lambda_c + \beta_1 Post_t \times CompulsoryEduc_g \times MiddleIncHH_c + \Gamma X_{it} \\ &+ \beta_2 Post_t \times CompulsoryEduc_g + \beta_3 Post_t \times MiddleIncHH_c \\ &+ \beta_4 CompulsoryEduc_g \times MiddleIncHH_c + \epsilon_{igct} \end{aligned} \tag{3}$$

Table 5 shows the estimates. In Columns 1 through 4, the dependent variables are indicators representing whether students are ranked as the "top of class", "above average", "average", or "below average", based on their academic performance within class.[11] In other words, the dummy variable is equal to one if the child's academic performance ranking falls within the range specified by the dummy. In Panels A and B, we first report the difference-in-difference estimates for middle-income households and high- & low-income households separately. In Panel C, we report the tripe-differences results. The coefficients suggest that the ban is associated with worse academic performance of the top-ranking students from middle-income families. The probability of students from middle-income families attaining top rankings in class declined. At the same time,

[11] These academic performance categories are mutually exclusive.

Table 5: Effects on Reported Student Academic Performance

	(1) "Top of Class"	(2) "Above Average"	(3) "Average"	(4) "Below Average"
Panel A: Middle-Income HH				
Post × CE	-0.010***	0.028*	0.003*	-0.025*
	(0.001)	(0.008)	(0.001)	(0.008)
Observations	11,886	11,886	11,886	11,886
Panel B: Other HH				
Post × CE	0.003	0.008	-0.001	-0.019***
	(0.006)	(0.008)	(0.010)	(0.001)
Observations	23,009	23,009	23,009	23,009
Panel C: Triple Diff-in-Diffs				
Post × CE × Mid-inc	-0.014*	0.020***	0.006	-0.007
	(0.003)	(0.001)	(0.008)	(0.008)
Observations	34,895	34,895	34,895	34,895

Notes: We rank households based on their income levels within each year and each province, then we categorize households into three groups according to their rankings in the joint income distribution. Standard errors are clustered at the grade level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

students from middle-income families were more likely to rank in the "above average" range. These results are also consistent with the trends in Figure 5.

Combining the evidence from Figure 6 and Table 5, we find that middle-income households reduced their spending on private academic tutoring services following the policy, and their children exhibited relatively weaker academic performance as a result. These patterns suggest that middle-income households were disproportionately affected by the *Double Reduction* policy, compared to both low- and high-income households. One possible explanation is that, although the policy induced a substantial supply shock to the private tutoring market, high-income households retained the financial resources to continue accessing such services, potentially through informal or one-on-one arrangements, while middle-income households could not. On the other extreme, low-income households had limited access to private tutoring even prior to the policy, so the marginal effect of the ban on their educational investments and outcomes was likely smaller.

5.4 Competition Across Tutoring Organizers and Sizes

Given varying levels of enforcement across different types of private tutoring, we may expect heterogeneous policy effects depending on the nature of the tutoring arrangement. Since non-compliant providers are primarily identified and penalized through a government reporting channel, larger tutoring classes and those organized by institutions face a higher risk of detection and intervention. In contrast, smaller classes, particularly one-on-one sessions, and those organized by individual tutors are less visible and therefore less likely to be subject to enforcement. To examine this dimension of heterogeneity, we analyze the competitive landscape across both tutoring organizers and class sizes. Specifically, we compare outcomes between institution-organized and individually organized tutoring, as well as between one-on-one tutoring and larger group classes. We report the results in Table 6. Different from previous results, the education expenditures in these analysis are conditional on positive private tutoring participation.

Table 6, Columns 1 and 3, report policy effects on the extensive margin of private academic tutoring participation. We estimate the difference-in-differences regression model using alternative binary outcome variables. In Column 1, the dependent variable is an indicator equal to 1 if the tutoring session was organized by a firm and 0 if it was provided by an individual tutor. We exclude online tutoring from this analysis, as it comprises only 4 percent of the sample. The coefficient on the interaction term captures the effect of the policy on the likelihood of attending a firm-organized private academic tutoring session. In Column 3, the dependent variable is an indicator equal to 1 if the tutoring session was one-on-one and 0 if it involved multiple students. The interaction term coefficient in this specification reflects the impact of the policy on the probability of participating in one-on-one tutoring, relative to larger class formats.

Table 6, Columns 2 and 4, examine the policy's effects on the intensive margin, measured by household expenditures on private academic tutoring. We use the triple-differences specification with household spending as the dependent variable. The coefficient on the three-way interaction term in Column 2 captures the differential impact of the policy on spending between firm-organized and individually organized tutoring sessions. Similarly, the coefficient in Column 4 reflects the policy's differential effect on spending between one-on-one tutoring and larger group classes.

Based on Table 6, Columns 1 and 2, the private tutoring ban is associated with declines in both participation in and spending on firm-organized private academic tutoring, relative to tutoring organized by individual providers. In Column 2, the coefficient on the two-way interaction term indicates that the policy led to an average decrease of 164 RMB (approximately $23 USD) in household spending on individually organized aca-

Table 6: Competitive Effects among Class Organizers and Class Sizes

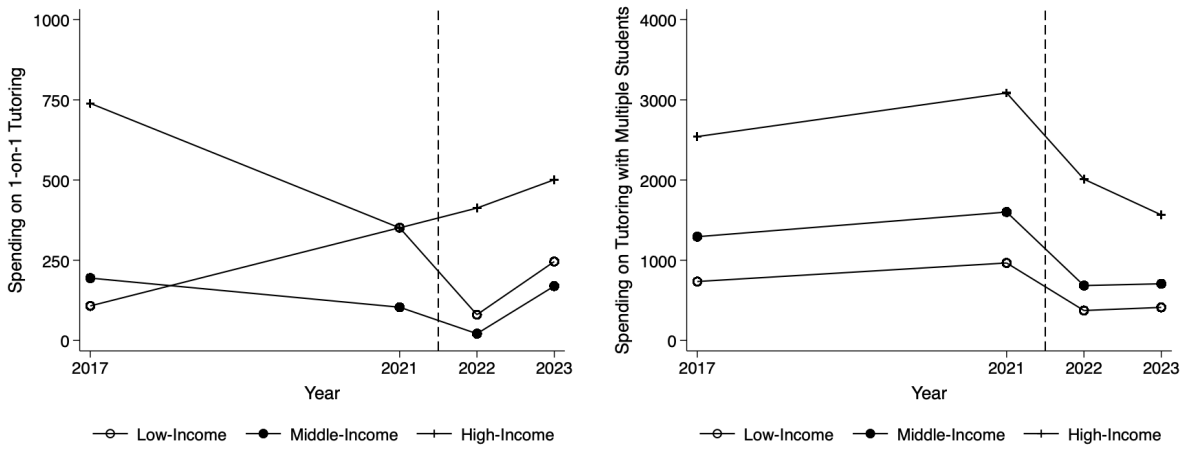
	Class Organizers		Class Sizes	
	(1) Firm Dummy	(2) Spending	(3) 1-on-1 Dummy	(4) Spending
Post × CE	-0.011**	-163.683	-0.059	-2953.732*
	(0.002)	(828.686)	(0.030)	(930.506)
Firm × Post × CE		-1018.640		
		(451.577)		
1-on-1 × Post × CE				7362.480*
				(1919.850)
Triple Diffs.		X		X
Observations	7,971	7,971	5,826	5,826

Notes: Standard errors in parentheses, clustered at the grade level. The dependent variable in Column 1 is a dummy equal to one if the class is organized by a firm, and equal to zero if the class is organized by an individual teacher. Since only 4% of household in our dataset attend an online class, we do not consider this type of organizer for this exercise. The dependent variable in Column 3 is a dummy equal to one if the class is 1-on-1, and equal to zero if the class has more than one student. In Column 2 and 4, we use household spending on academic private tutoring as the dependent variable. Significance: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

demic tutoring. The three-way interaction term shows an average post-policy decrease of 1,018 RMB (approximately $142 USD) in spending on firm-organized tutoring. Nevertheless, these coefficients are not statistically different from zero. These results suggest that, compared with individual tutors, tutoring institutions experienced a larger contraction in both participation and spending due to the private tutoring ban.

As shown in Table 6, Columns 3 and 4, the participation rate in one-on-one private academic tutoring did not increase following the implementation of the policy. However, household spending on one-on-one tutoring rose sharply. In other words, while the overall likelihood of attending one-on-one tutoring remained unchanged, those households that continued to use such services spent significantly more on them relative to larger class formats. This pattern suggests a shift in the composition of tutoring demand toward more costly, individualized arrangements in the aftermath of the policy.

It may be surprising to some that the private tutoring ban did not lead to increased participation in one-on-one tutoring relative to larger group classes. Intuitively, under heightened regulatory scrutiny, parents might prefer one-on-one tutoring to reduce the risk of exposure and the potential loss of access to tutors. However, one-on-one tutoring is typically less accessible to average households. First, the cost is substantially higher. In 2022, the average price for a one-hour one-on-one private academic tutoring session was



(a) 1-on-1 Classes

(b) Larger Classes

Figure 8: Average Spending for Compulsory Education Students

Note: All spending is adjusted using 2016 RMB. The dash vertical line denotes the previous year of the implementation of private tutoring ban. Since the 2019 survey does not ask questions on the size of private tutoring sessions, year 2019 is not included in these graphs.

176 RMB ($24 USD), nearly 95 percent higher than the average hourly price for group tutoring sessions. Second, as tutoring providers moved underground to evade enforcement, search costs for locating one-on-one tutors likely increased. Consequently, when access to lower-cost group tutoring became restricted, many households may have faced both financial and logistical barriers to substituting toward one-on-one instruction. In contrast, wealthier households, with greater willingness and ability to pay, may have been better positioned to shift toward individualized tutoring and, in some cases, even increase their private tutoring expenditures in response to the ban.

Figure 8 provides additional support for this interpretation. Focusing on students in compulsory education, we examine changes in household spending on different types of tutoring. Compared to 2021 levels, high-income households increased their expenditures on one-on-one private tutoring, while lower-income households experienced a sharp decline in spending on the same type of service. In contrast, both high- and low-income households reduced their spending on private tutoring classes involving more than one student. These patterns suggest that, although the policy broadly restricted access to larger, more affordable tutoring formats, only high-income households were able to compensate by shifting toward more expensive one-on-one tutoring. This substitution behavior highlights the unequal capacity of households to adjust to the regulation, potentially reinforcing disparities in access to educational resources.

Table 7: 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	-273.176	-167.620**	-440.796*	840.818***	164.775*
	(141.502)	(32.628)	(112.894)	(70.508)	(39.592)
Observations	29,705	29,705	29,705	18,256	18,256

Notes: Control variables include gender, age, public school attendance, household income, mother education, and rural area. 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. Standard errors are clustered at the grade level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

5.5 Robustness Checks

One limitation of the analysis arises from the data collection process. Due to pandemic-related restrictions and travel difficulties, the third survey wave was 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 a 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 7 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.

6 Conclusion

This paper studies the effects of banning private tutoring on tutoring supply, household education investment, and its distributional implications. First, using data collected from the review and navigation platforms, we find that 87.5 percent of private academic tutoring facilities ceased operation after the ban. Then, using a novel national household

panel on education expenditure, we show that the ban is associated with a decline in compulsory education students' spending on out-of-school academic tutoring and also an increase in their in-school education spending, relative to high school students. As a result, total education spending relatively increased for students in compulsory education. Additionally, middle-income households responded to the ban with lower education spending relative to both low- and high-income households, and students from these families reported worse academic performance. We also show the heterogeneous effects across parent education, suggesting that more educated parents had lower in-school spending on their children's education compared to less educated parents. Analysis on competition implies that households spent less on tutoring institutions relative to individual tutors, and their spending on one-on-one academic tutoring became higher compared to larger tutoring classes, in response to the ban.

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 substituted toward other forms of educational investment in response to the regulation, rather than uniformly reducing their overall education-related expenditures.

Additionally, households in the middle of the income distribution experienced relatively larger declines in private tutoring expenditures, and students from these households reported worse academic performance compared to their peers from both lower- and higher-income families. Intuitively, low-income households were likely unaffected by the ban in practice, as financial constraints limited their access to private tutoring even prior to the policy. High-income households, by contrast, were able to substitute toward more expensive one-on-one tutoring arrangements, which are less visible and therefore less vulnerable to regulatory enforcement. As a result, 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.

This regulation also carries important distributional implications along the dimension of parental education. 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 support this hypothesis: households with a college-educated mother exhibited relatively lower participation rates and reduced spending on private academic tutoring in response to the policy. This suggests that more educated parents may have substituted toward home-based instruction. The potential for such home tutoring amplifies the unequal effects of the regulation and may, in turn, exacerbate existing disparities in educational outcomes across households.

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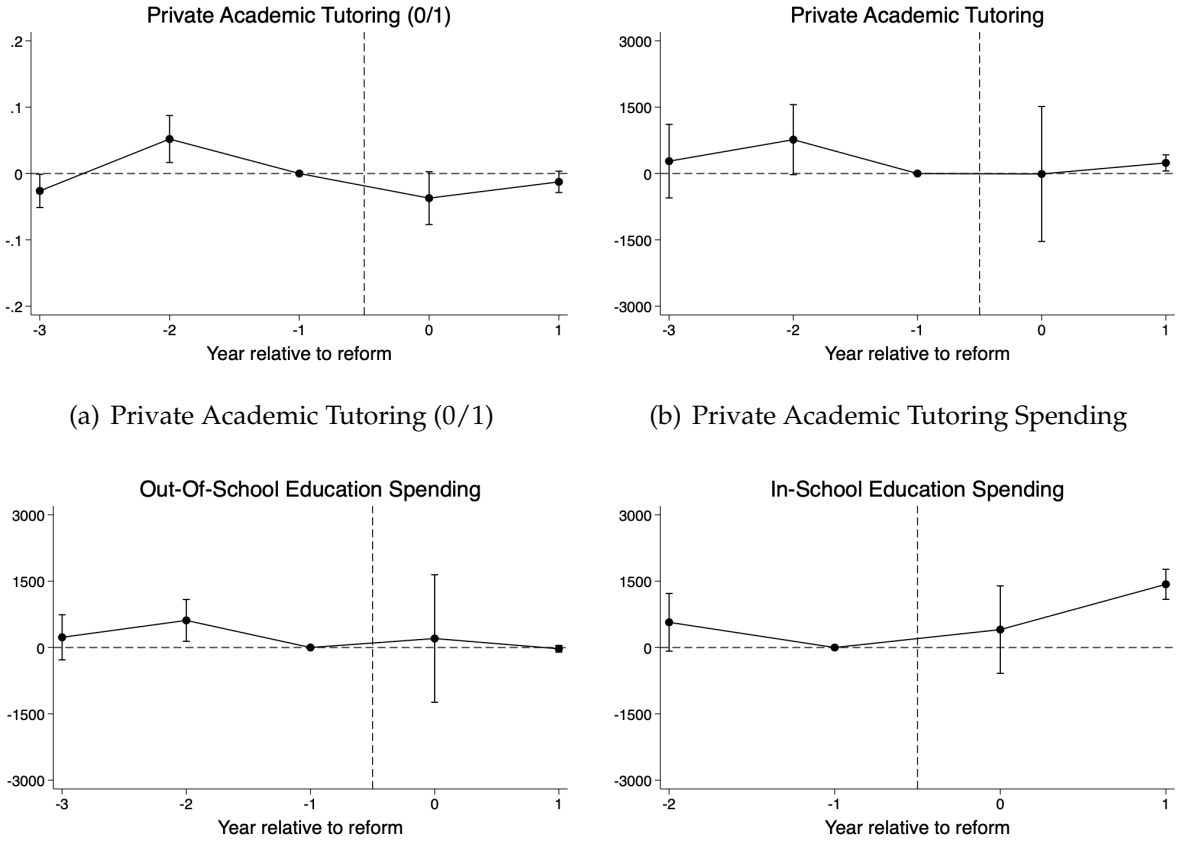
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A Appendix: Supplementary Materials



(a) Private Academic Tutoring (0/1)

(b) Private Academic Tutoring Spending

(c) Out-of-school Spending

(d) In-school Spending

Figure A.1: Event-Study Estimates of the Effects of Double Reduction Policy

Note: This figures shows the event study estimates of the effects on private tutoring participation, private tutoring spending, out-of-school spending, and in-school spending. All education expenditures are denominated in RMB and deflated to real 2016 values.