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The Impact of the "Double Reduction" Policy on the Stock Performance of Education Industry

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Abstract

This paper studied the impact of the "Double Reduction" policy on educational technology companies by analyzing the company's stock performance. This paper selected the market model to calculate the cumulative abnormal rate of return (CAR) through an event study approach and found that the introduction of the "Double Reduction" policy has a negative impact on the stock performance of Chinese education technology corporations. Then the study divided the education technology companies into four different size categories and calculated their CAR respectively to do the robustness check. Furthermore, the study used an alternative model to calculate the CAR, the constant mean model. The results hold the same. This empirical research fills in the existing gap on the effect of implementing the "Double Reduction" policy on the Chinese education technology company's stock price.

JEL Classification: G14, G18, G38

Keywords: "Double Reduction" policy, education stock, event study

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1. Introduction

Recently, The Central Committee of the Communist Party of China and the General Office of the State Council issued opinions on further reducing students' homework burden, and afterschool training burden in the stage of compulsory education referred to as the "Double Reduction" policy. This policy intends to reduce the students' excessive homework burden and afterschool training burden, family education expenditure, and parents' corresponding energy burden within one year effectively, achieve remarkable results within three years and improve people's education satisfaction significantly. This policy also reflects the Chinese government's determination to alleviate educational anxiety and promote students' overall and healthy growth.

Huang and Zheng (2021), members of the Guangdong survey team of the National Bureau of Statistics, did a particular survey of 1,332 parents and students in the stage of compulsory education. They found that 74.7% of the parents believed there was heavy family economic pressure due to high afterschool training costs before introducing the "Double Reduction" policy. It is not difficult to see from the survey data that this policy has alleviated the educational difficulties of some parents and students to a certain extent. However, the situation of the competitive education and training industry is not optimistic, and there has been an inevitable shock in the education capital market. According to Liu (2021), a doctor from the school of government and Peking University, Chinese education stocks fell sharply in the global capital market due to the robust implementation of this policy. New Oriental, a leader listed on Nasdaq, fell 54.22%, New Oriental online fell 28%, Tomorrow Advancing Life (TAL) fell 70.76%, the GOTU group fell 63.4%, and DAO fell 42.8%. TAL, GOTU, and New Oriental have evaporated 800 billion yuan of market value from the highest point. The impact of the "Double Reduction"

policy on the economy is not a cyclical fluctuation in the traditional economic development process. The short-term recession generated by the publication of the policy also surpasses any endogenous and extreme events in the past. Assessing and understanding the economic impact of the "Double Reduction" policy has become an important issue. The purpose of this article is to evaluate the impact of the "Double Reduction" policy on the stock performance of the education industry.

According to the traditional economic and financial theory, market and firm characteristic-based factors play a vital role in affecting stock prices. The theory of behavioral finance holds that psychological influences and biases affect the financial behaviors of investors and financial practitioners. More importantly, it is undeniable that investor optimism will reduce the volatility of the stock price, while investor pessimism will increase the stock price volatility. The "Double Reduction" policy has an unprecedented high regulatory intensity. For instance, the qualification approval, business operation, financing marketing, and other aspects have the strict and detailed provisions. Therefore, kindergarten through twelfth grade (K12) education and training stocks are expected to be impacted dramatically in the short term. Some comparative research has been undertaken to explain the challenging circumstance of the educational corporation now. Nevertheless, little work has been undertaken to analyze the impact of the "Double Reduction" policy on the stock price of Chinese education technology corporations. I will analyze the company's performance from its stock price. Only further research on the capital market changes can help education companies adapt to national policy and product transformation.

The study first uses the market model of event study method to test our hypotheses, then uses the constant mean model to do the robustness check. The empirical results show that the "Double Reduction" policy negatively impacts China's education technology companies, such as New Oriental, GOTU, and DAO. No matter the company's size, all Chinese education technology

companies have been negatively affected. The outcome reflects that companies in the same industry face the same regulatory, policy environment, and macroeconomic conditions. However, after the stock slump, education stocks generally tend to be stable. There is no sustained decline. The expansion of non-disciplinary training has become the primary choice for many organizations. Most companies have decided to make a complete transformation of their primary businesses.

This paper makes significant contributions to the literature. First, the paper provides supportive evidence to the strand of literature showing the impact of education policy on the economy. Although many studies have proved that education policy will impact the economy, there is little literature to discuss the impact of the education policy on the company's stock price. Second, this paper contributes to the literature discussing the effect of the "Double Reduction" policy. Since the "Double Reduction" policy has been issued for less than half a year, the study on this policy is not very comprehensive. This article is a powerful supplement to this field.

The article proceeds as follows. Section 2 presents the literature review. Section 3 outlines the data collection and methodology. Section 4 provides the empirical results and robustness check, while Section 5 summarizes the article.

2. Literature Review and Hypotheses Development

2.1. The Economic Impact of Education Policy

Education promotes social and political stability and development by cultivating qualified citizens and political talents needed by society. Education trains the people needed by the political and economic system. The primary way for education to act on the political and economic system is to realize its influence on the political and economic system by training talents. Educational

policy plays a guiding role in people's educational behavior and the development direction of educational activities. Over the years, many researchers have studied the changes in education policy and its impact.

With the increasingly fierce global competition, improving global competitiveness has become the common goal of all countries. To better rank, national competitiveness needs to understand the different variables of economic competitiveness (Farinha et al., 2018). Most countries rank comprehensively according to the driving factors of competitiveness and the performance of economic, social, and sustainable development (Aiginger and Vogel, 2015). In the information age, the definition of global competitiveness has gradually diversified, and the proportion of innovative technology and intellectual property rights has gradually expanded. According to Farinha et al. (2015), it is found in their investigation and research that in addition to the system, infrastructure, and market supervision, higher education and training also make a significant contribution to explaining the competitive advantage of the economy. Quality and creative human resources will widen the power gap between countries (Iatagan et al., 2020). Therefore, as a critical factor in increasing human capital, education has also gained a new meaning (Dyba, 2012). The labor force is no longer the key to winning the game, but knowledge has become critical in economic production.

Nevertheless, the practice of taking educational reform as the core of national strategic development is not accepted by every politician. The key to the dispute is that the improvement of educational level cannot fully ensure the enhancement of economic performance. However, much research has proved that education quality can promote economic development, as Hanushek and Woessmann (2016) proposed that the cognitive skills of national citizens are closely related to economic growth. More and more politicians also realize that education policy plays a vital role

in improving social problems and promoting social development (Dumciuviene, 2015). Taking European countries as an example, due to the differences in human resources among the Member States, the education policies of European countries have also changed from supporting integration to supporting market orientation (Walkenhorst, 2018). More importantly, the introduction of the education policy should consider the needs of the existing market and the acceptability and tolerance of the national education system after introducing the policy (Lingard, 2013).

2.2. The Impact of Education Policy on Educational Technology Corporations

Take Corona Virus Disease 19 (Covid-19) as an example of an event study on the education technology industry. Many countries have implemented a lot of new educational policies during the epidemic. Covid-19 has swept the world since January 2020, with more than 1 million people infected in the world. Because the virus has the characteristics of human-to-human transmission, to avoid the further spread of the epidemic and reduce the transmission risk caused by offline aggregation, all the schools stopped offline teaching, which profoundly impacted students and teachers. The public education systems of various countries have neither been established nor prepared related policies in advance to deal with this emergency (Garcia and Weiss, 2020). In this context, the Chinese government put forward the emergency policy of "Suspending Classes without Stopping Learning" (Zhang et al., 2020). The Turkish government carried out the education policy of establishing a distance education system (Ozer, 2020). The Israeli government implemented the alternative initial teacher education policy (Ramot and Schmidt, 2021). Publishing these new education policies is undoubtedly a massive challenge for education technology companies and the education industry.

In China, in addition to in-school education, the out-of-school participation rate of students at all stages cannot be underestimated. This phenomenon is because of the Chinese national condition, which is exam-oriented education. According to a family survey in the China Education Finance of 2017, the overall participation rate of primary and secondary school students in out-of-school education is 48.3%, and the average student expenditure is about 5616 yuan. Nationwide, the participation rate of primary school students in out-of-school discipline tutoring is 33.4%, that of junior middle school students is 60.8%, and that of senior high school students is 48.2%. With the proposal of "Suspending Classes without Stopping Learning," online education is no longer unique to educational technology corporations. The influence of online teaching has risen to the whole population. Before the epidemic's impact, the proportion of offline and online education was 9:1, which means that the afterschool training industry, supporting the trillion market, is facing a big test.

Moreover, 90% of educational institutions must make changes. In the face of pressure, the business model of educational institutions has been adjusted to promote the popularization of online mode vigorously. For most offline organizations, it is unrealistic to give up the original ground advantage, so it is easier to accept the Online-Merge-Offline (OMO) style. OMO means integrating online education and offline education. Although most students and teachers hold a positive attitude towards OMO, the implementation requires a comprehensive set of core and functional abilities, including online platforms, communication skills, class management, and effective use of resources. In addition, the findings suggest that more efforts should be put into classroom design, such as infrastructure, to effectively support OMO learning (Huang et al., 2021). From the data of 2019, the investment and financing situation of the primary market of the whole education industry is in a downward trend, which will have a continuous impact on the investable

amount of the corporation in the next two or three years. At the same time, the "Head Effect" is apparent. "Head Effect" means that in a field, the first place often gets more attention and has more resources. Famous enterprises in the education technology industry raise funds many times within a year, improving the reinvestment rate. It can be shown that it is more difficult for new education enterprises to obtain good funds. According to incomplete statistics, since the beginning of the epidemic, many well-known institutions have declared bankruptcy. Some education companies also reported salary cuts and layoffs. According to the survey report on the epidemic situation of K12 education and training institutions, 87% of the institutions said they had been extensively or even seriously affected and had problems in operation.[1]

Based on keeping track of the core corporations in the education industry, researchers can timely pay attention to the situation of education technology enterprises under Covid-19 through many aspects. For example, the history of industrial development, market size, industry chain, business model, competition analysis, policy environment, development trend and path, the development status, and development trend of the education industry. It can provide a reference for the benign development of the education industry.

Based on the above observation, I propose two hypotheses:

Hypothesis 1: The introduction of the "Double Reduction" education policy will have a negative impact on educational technology companies, mainly those with K12 education as their primary business.

[1] Sohu News: The impact of COVID-19 on education: the pandemic will help reshape the entire education industry.

Hypothesis 2: The top education technology corporations are relatively unaffected because of their breadth of the business. Most of the new education technology corporations will go out of business to a large extent.

3. Data and Methodology

3.1. Data

The study employs three data sources, all free of survivorship bias: (1) finance.yahoo.com, (2) the China Stock Market & Accounting Research (CSMAR) Database, (3) Bloomberg, and (4) Wind Database.

From finance.yahoo.com, I can download the details of each stock. The sample period is from April 9, 2021, to October 9, 2021, because on July 24, 2021, the general office of the CPC Central Committee and the general office of the State Council officially issued the opinions on further reducing the homework burden and afterschool training burden of students in the stage of compulsory education. July is the middle point between April and October. I obtain the daily historical price of each stock, including open price, high price, low price, close price, and adjusted close price. During my sample period, I can also gain stock price data of other noneducational technology companies listed in the United States. By comparing the stock price data of other listed companies, I can further judge whether the rise and fall of stock prices of education and technology companies are directly related to the "Double Reduction" policy.

From the CSMAR, I can get the stock market data of the whole Chinese education industry. The Covid-19 gave birth to fierce competition in the education and training industry and led to false propaganda by educational institutions. More importantly, small educational institutions'

frequent breaking of contracts led to the promulgation of the strictest policy in history. Therefore, the “Double Reduction” policy will profoundly impact the whole education industry. This impact is not only for large companies in the education industry, so the data of large companies listed in the United States cannot fully explain the critical influence of this policy.

Bloomberg terminal provides real-time market data, covering financial markets and securities. It includes various asset categories such as fixed income, stocks, foreign exchange, commodities, and derivatives. All information is seamlessly integrated and transmitted to customers in real-time through personal computers or mobile devices. From Bloomberg, I can download more comprehensive data, which consists of the data from finance.yahoo.com. Combining these two methods of data collection can make the data more authentic and reliable and reduce the possibility of data loss to some extent. Bloomberg's company information description page includes the company's stock trading chart, high and low prices of last fifty-two weeks, market value, P/E ratio, dividends, and the number of personnel (because the unemployment rate is also a factor I want to consider), which allows me to have a very macro-overview of the company. I can also download the financial statements of the company I want to study. All the company's financial data will be shown on Bloomberg, including historical data and future forecast data.

WIND is a financial data and analysis tool service provider, which is a financial data, information, and software service company in the Chinese mainland. I downloaded the daily return data of about 30 Chinese and American educational technology companies.

3.2. Methodology

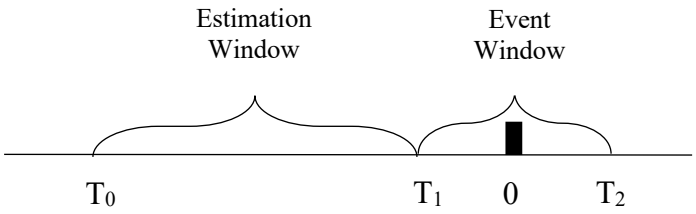
The principal methodology is event study. An event study conducted on a specific company examines any changes in its stock price and its relation to a given event. It can be used as a

macroeconomic tool, analyzing the influence of an event on an industry, sector, or the overall market by looking at the impact of the change in supply and demand. This study aims to compare a trend before and after the "Double Reduction" policy to explain how and to what degree the event changed companies. According to the efficient market theory, the market can quickly and effectively reflect the information about the company's value. In an efficient market, the stock price reflects the internal operation and financial situation of the company. On this premise, I can test the impact of the "Double Reduction" policy by examining the response of stock prices to the implementation of the "Double Reduction" policy. An event study is a method used to evaluate whether an event will have a significant impact on the research object. Usually, the normal rate of return in the event window is calculated with the help of the samples of the estimation window. The abnormal rate of return is obtained by subtracting the normal rate of return from the actual rate of return in the event period. Finally, the significance test of the abnormal rate of return is carried out. Event study methods usually include defining events, calculating relevant returns, and significance test.

3.2.1. Definition of the event

This step mainly includes determining the event day, estimation window, and event window. Event day refers to the occurrence point of time, which is usually short, so it is necessary to determine the estimation and event windows for research. Typically, the estimation window is selected a period before the event occurs. The length shall be selected appropriately to avoid deviation of results caused by too short or too long. Most studies choose a small-time window before and after the event to investigate the stock market's response to control the confusion effect. The commonly used event window is 21 days, ten days before, and ten days after the event date. This paper selects the "Double Reduction" policy as the research event. Considering that the

"Double Reduction" policy is officially released on July 23, 2021, July 23, 2021, is defined as the event day (t = 0), and ten trading days before and after July 23 are selected as the event window period. The estimated window for event analysis is 165 days before the event window. Therefore, the event window is (–10, 10), and the estimated window is (–176, –11).



3.2.2. Relevant calculation of each rate of return

The normal rate of return. There are many estimation methods of the normal rate of return, including market, mean adjustment, factor, CAPM, APT models, and so on.

I first use the constant mean return model. The idea of the model is to choose one security as the benchmark. Then take the average return of the underlying security in the estimation period (i.e., the estimation window) as the expected rate of return of the securities in the event period (i.e., the event window). Let $AVERAGE\left(R_{Benchmark} \right)$ be the average rate of return of the benchmark during the estimation window, then the constant average income model is:

$$E\left[R_{it(\ event)}\right]=AVERAGE\left(R_{Benchmark} \right)+\varepsilon_{it} \tag{1}$$

Where $E\left[R_{it(\ event)}\right]$ is the expected rate of return of security i within time t, and ε_{it} is the perturbation term, with a mean of 0 and a variance of $\sigma_{\varepsilon_i}{}^2$. Although the constant mean return model is the simplest model, Brown, and Warner (1980, 1985) found that the results produced by

this model are similar to those produced by more complex models. In addition, the research results of Chen (2002) found that the mean adjustment model has some advantages in the Chinese market.

Moreover, because the market model eliminates the part related to the fluctuation of market return and has the advantage of reducing the estimation error, this paper also selects the widely used market model to calculate the normal rate of return before the event. The basic settings of the market model are as follows:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \tag{2}$$

In model (2), R_{it} represents the rate of return of company i on the t trading day; R_{mt} represents the market return rate on the t trading day; ε_{it} is the error term of company i on the t trading day. α_i and β_i are parameters to be estimated. The model uses the data of the estimation period (–176, –11) to estimate the risk-free return a of each company α_i and the market risk of individual stocks β_i. Through regression analysis by Excel, it can be concluded that the expected rate of return in the event period is:

$$E\left[R_{it(\,event)}\right] = \alpha_i + \beta_i R_{mt(\,event)} \tag{3}$$

Calculate the abnormal return of the event window. The abnormal rate of return in the event window is the actual rate of return in the event period minus the expected rate of return:

$$AR_{it} = R_{it} - E\left[R_{it(\,event)}\right] \tag{4}$$

To reflect the whole process of the event affecting the stock price before and after the announcement date and measure the market reaction, the cumulative excess return (CAR) can be calculated:

$$CAR_{it} = \sum_{\tau=-10}^{t} AR_{i\tau} (\,t = -10,\ \ldots,\ 10) \tag{5}$$

$CAR_{(t_1, t_2)}$ represents the company's cumulative abnormal rate of return within (t_1, t_2).

$$CAR_{(t_1,t_2)} = \sum_{t_1}^{t_2} AR_{it} \tag{6}$$

$AAR_{(t_1,\ t_2)}$ represents the company's average abnormal rate of return within (t_1, t_2). N stands for number of days of the event window.

$$AAR_{(t_1,t_2)} = \frac{1}{N} \sum_{t_1}^{t_2} AR_{it} \tag{7}$$

3.2.3. Test the significance of the abnormal stock rate of return

According to the data obtained in the previous steps, the variation trend and causes of AR and CAR are analyzed in detail, and the empirical results are tested. T test shows the difference between the cumulative abnormal return rate and zero. If the T test is significant, it indicates that "Double Reduction" policy has an impact on the stock price; otherwise, it indicates that the event has no impact on the stock performance of educational technology companies.

4. Results and Discussions

4.1. Main Results

The "Double Reduction" policy was officially released on June 23, 2021. Before that, the market was not sensitive to the sporadic news about the "Double Reduction" policy. After June 23, 2021, the market began to have an obvious response. Using the data of Wind database and finance. Yahoo from November 6, 2021, to September 3, 2021, this paper estimates the impact of the introduction of the "Double Reduction" policy on the short-term fluctuation of stock returns in the education industry by using the event study method. The main conclusions are as follows:

According to the event study method, the expected rate of return is estimated by using the constant mean return model and the market model respectively. The cumulative abnormal rate of return in the stock price of Chinese education technology companies are negative. The cumulative abnormal rate of return in the early stage of the "Double Reduction" policy was not very obvious but increased significantly after the "Double Reduction" policy was released. During the whole event period, the cumulative abnormal rate of return of Chinese educational technology companies was significantly negative.

4.2. Additional Results

The stock cumulative abnormal rate of return of Chinese education technology companies does not differ significantly due to the size of the company. This is contrary to our previous hypothesis. If an industry has good or bad news or supports or suppresses the leading stocks of the industry, it will have an overall impact on the stock trend of the industry. Since the "Double Reduction" policy is aimed at the whole education and training industry, the stock performance of the Chinese education technology corporations regulated by the same market also shows a unified negative trend. In addition, the industrial transformation of educational technology companies also leads to the noncontinuous decline of the company's shares. Before the "Double Reduction" policy, K12 education was favored by many capitals. However, after the implementation of the "Double Reduction" policy, more and more capital will flow to vocational education and quality education.

4.3. Robustness Checks

This paper selects the "Double Reduction" policy as the study event, takes July 23, 2021, as the event day, defines the ten days before and after the event day as the event

window, and uses the event study method to analyze it. Through the analysis, the abnormal rate of return and cumulative abnormal rate of return of the twelve Chinese education technology companies in the event window period have negative performance and have passed the significance test, which is in line with my previous hypothesis analysis, that is, the release of the "Double Reduction" policy has a significant negative impact on the stock performance of Chinese education technology companies.

5. Conclusions

The empirical results of this paper show that in the short term, the "Double Reduction" policy has a significant negative impact on the stock performance of the education industry of China. I first use the market model to calculate the abnormal rate of return. After obtaining the results of each time window, I used a t-test to verify the correlation between the cumulative abnormal rate of return and the introduction of the "Double Reduction" policy. The results show that except for the two windows (0, 25) and (0, 30), they are related at the level of 5%, the others are related at the level of 1%. The data indicates that the correlation is extremely high. Then I use the constant mean model to test the robustness. Although the constant mean model and the market model have different methods for calculating the expected rate of return, there is little difference in the final cumulative average rate of return, which means that the results we just obtained with the market model have passed the robustness test. This outcome is consistent with the first hypothesis.

In addition, when calculating each company's cumulative abnormal rate of return, I classify the companies by different sizes (based on the market value). After obtaining the cumulative abnormal rate of return data of different event windows, I calculated the average cumulative abnormal rate of return of each company in the event window. Through comparison, it is found

that the results are not as expected. I assumed that the larger companies are relatively less affected because of their broad business scope. In fact, leading companies in the education industry, such as New Oriental, are one of the most affected.

There may be two reasons for the negative impact of the “Double Reduction” policy on educational technology companies. On the one hand, the original product structure of Chinese education technology companies has been destroyed due to the impact of the overall environment influenced by the introduction of the “Double Reduction” policy. On the other hand, investors’ expectations for the education industry have been greatly reduced, weakening their investment confidence. Investors tend to be more rational and have a deeper consideration of their investment behavior.

Although the “Double Reduction” policy has brought a significant blow to the education industry, opportunities also appear. Educational technology companies should carry out product transformation, which can be transformed from previous K12 education to vocational education and family education. Moreover, educational science technology, and informatization are also gradually being realized. The aim is to improve the company’s operation and management efficiency, communication efficiency between home and school, and enrollment efficiency by means of digitization, informatization, and the Internet through high-quality and cost-effective products and services.

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Figure 1: Plot the CAR of twelve Chinese education technology corporations from event day -20 to event day 10 under the market model

Plot of cumulative rate of return for twelve Chinese educational technology corporations from event day -20 to event day 10. The event day is July 23, 2021. The abnormal return is calculated using the market model as the normal return measure. Different color stands for different companies. The company name is abbreviated by the stock symbol on the chart. CAR values represent percentages. The vertical line indicates the specific event day.

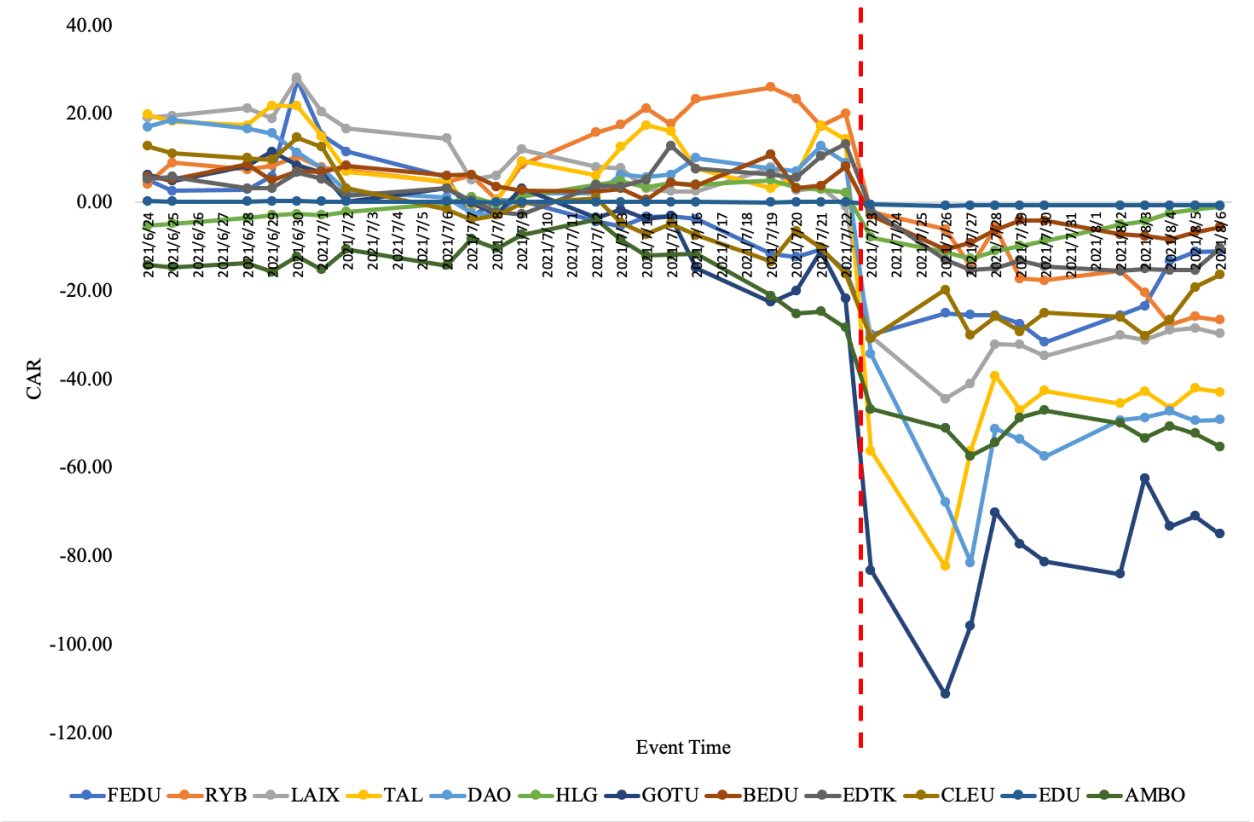

Figure 2: Plot the CAR of twelve Chinese education technology corporations from event day -20 to event day 10 under the constant mean return model

Plot of cumulative rate of return for twelve Chinese educational technology corporations from event day -20 to event day 10. The event day is July 23, 2021. The abnormal return is calculated using the market model as the normal return measure. Different color stands for different companies. The company name is abbreviated by the stock symbol on the chart. CAR values represent percentages. The vertical line indicates the specific event day.

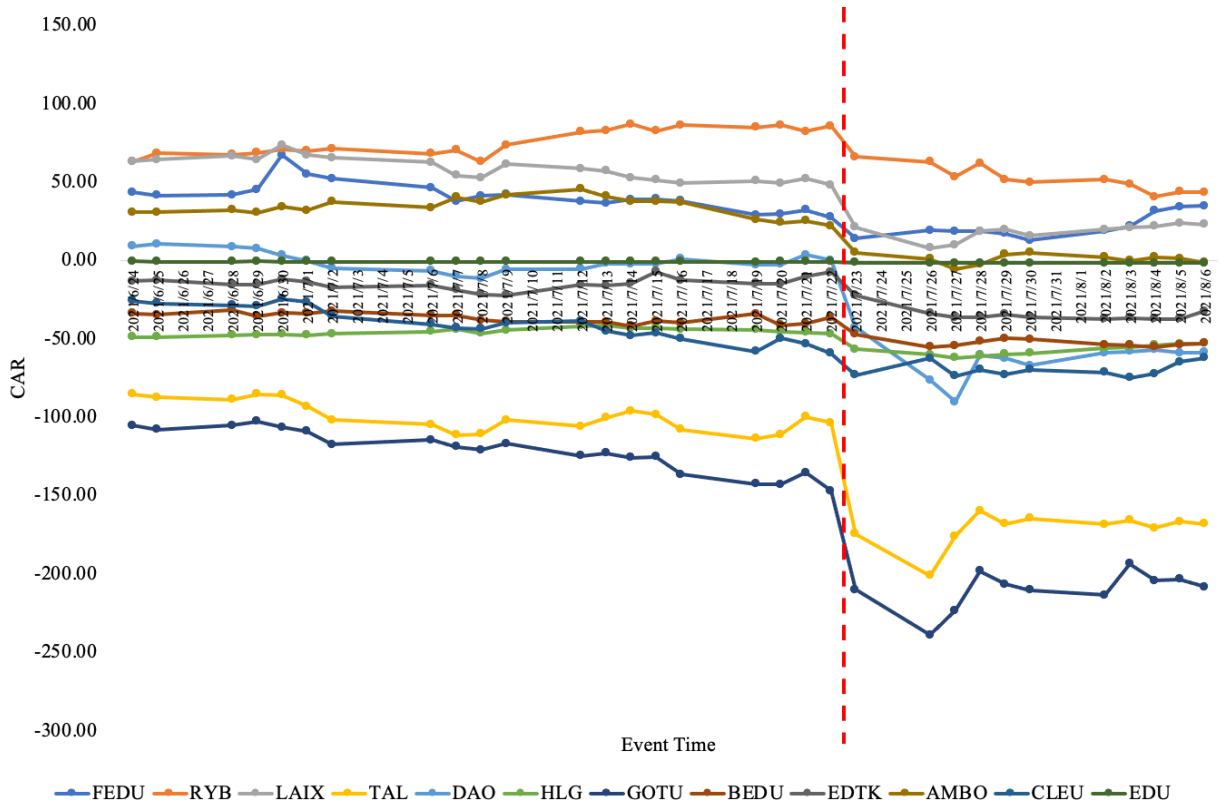

Table 1: Descriptive statistics

The table reports descriptive statistics for the stock price of S&P 500 and twelve Chinese education technology corporations. The descriptive statistics include number of days, mean, minimum, maximum, and standard deviation. This paper selects the "Double Reduction" policy as the research event. Considering that the "Double Reduction" policy is officially released on July 24, 2021, July 24, 2021, is defined as the event day (t = 0), and 10 trading days before and after July 24 are selected as the event window period. The estimated window for event analysis is 165 days before the event window. Therefore, the event window is (- 10, 10) and the estimated window is (- 176, - 11).

	All	Estimation Window	Event Window
S&P 500 return			
Number of days	186	165	21
Mean	0.0013	0.0013	0.0013
Minimum	-0.0257	-0.0257	-0.0159
Maximum	0.0238	0.0238	0.0152
Standard Deviation	0.0080	0.0081	0.0072
Chinese EdTech Corp.			
Number of days	186	165	21
Mean	-0.2391	-0.0999	-1.3389
Minimum	-70.7602	-41.5581	-70.7602
Maximum	59.7656	59.7656	30.0275
Standard Deviation	6.1998	5.6201	9.5694

Table 2: The CAR of twelve Chinese education technology corporations in the event window under the market model

The table shows the cumulative abnormal return (CAR) of twelve Chinese education technology corporations in the event window. Considering that the "Double Reduction" policy is officially released on July 23, 2021, July 24, 2021, is defined as the event day (t = 0), and 10 trading days before and after July 24, 2021, are selected as the event window period. Therefore, the event window is (- 10, 10). The company name is abbreviated by the stock symbol and be classified by the size of them. There are four categories in total, with three companies in each part. Company size is measured by total market capitalization in US dollars. The four categories are: the total market value is less than 50 million, the total market value is between 50 million and 100 million, the total market value is greater than 100 million and less than 1 billion, and the total market value is greater than 1 billion. Finally, the average abnormal cumulative return of each company in the event window is obtained.

Panel A	Size<50 m (USD)			50m<Size<100 m (USD)		
t	AMBO%	CLEU%	EDTK%	LAIX%	RYB%	FEDU%
-10	11.45	11.58	4.53	11.85	8.33	0.26
-9	11.45	12.79	11.27	7.95	15.75	-4.43
-8	11.87	7.28	11.07	7.63	17.44	-5.52
-7	9.42	4.81	12.67	2.89	21.23	-3.35
-6	13.17	7.28	20.29	2.43	17.65	-3.17
-5	12.44	4.93	15.14	2.36	23.26	-3.82
-4	18.93	-0.82	13.84	7.85	25.88	-11.72
-3	11.77	6.17	13.20	2.65	23.37	-12.44
-2	12.68	2.33	17.98	3.37	17.22	-10.70
-1	17.04	-3.55	20.86	-1.15	19.99	-15.54
0	6.38	-18.18	6.14	-30.46	-2.21	-29.95
1	-1.29	-7.18	-5.18	-44.48	-6.12	-25.11
2	0.05	-17.41	-7.52	-41.04	-14.55	-25.49
3	3.04	-13.08	-7.03	-32.22	-5.67	-25.62
4	5.29	-16.27	-5.13	-32.24	-17.32	-27.55
5	5.05	-11.93	-6.58	-34.78	-17.75	-31.71
6	1.91	-12.85	-7.55	-30.13	-15.53	-25.56
7	1.75	-17.07	-6.95	-31.19	-20.61	-23.43
8	0.98	-13.30	-7.25	-28.98	-27.66	-13.37
9	2.71	-5.91	-7.20	-28.53	-25.94	-11.30
10	3.91	-3.11	-2.17	-29.86	-26.73	-11.05
Average	7.62	-3.98	4.02	-15.05	0.48	-15.27

Panel B	100m<Size<1b (USD)			Size>1b (USD)		
t	BEDU%	GOTU%	HLG%	EDU%	DAO%	TAL%
-10	11.45	68.29	2.02	-2.26	43.94	9.29
-9	11.45	61.97	4.76	-3.77	44.39	5.95
-8	11.87	64.13	5.47	2.84	48.59	12.38
-7	9.42	62.39	4.15	4.21	48.34	17.33
-6	13.17	63.36	5.02	4.08	48.93	15.98
-5	12.44	52.00	4.59	-0.23	52.72	7.53
-4	18.93	44.50	5.38	-7.87	50.13	3.20
-3	11.77	47.42	3.98	-2.75	50.13	5.79
-2	12.68	57.03	3.40	2.65	56.26	17.35
-1	17.04	46.69	2.82	1.24	52.89	14.19
0	6.38	-14.24	-7.18	-53.25	10.00	-56.31
1	-1.29	-41.97	-10.41	-86.64	-23.16	-82.36
2	0.05	-26.09	-12.05	-72.75	-36.69	-56.19
3	3.04	0.06	-10.39	-64.37	-6.30	-39.30
4	5.29	-6.72	-9.13	-70.49	-8.34	-47.05
5	5.05	-10.46	-8.09	-71.24	-12.21	-42.66
6	1.91	-12.93	-4.45	-70.48	-3.84	-45.64
7	1.75	9.19	-3.54	-68.28	-2.78	-42.72
8	0.98	-1.31	-1.74	-72.68	-1.29	-46.62
9	2.71	1.35	-0.87	-70.69	-3.05	-42.14
10	3.91	-2.28	-0.40	-72.11	-2.55	-43.00
Average	7.62	22.02	-1.27	-36.90	19.34	-20.71

Table 3: The CAR of twelve Chinese education technology corporations in the event window under the constant mean return model

The table shows the cumulative abnormal return (CAR) of twelve Chinese education technology corporations in the event window. Considering that the "Double Reduction" policy is officially released on July 23, 2021, July 24, 2021, is defined as the event day (t = 0), and 10 trading days before and after July 24, 2021, are selected as the event window period. Therefore, the event window is (- 10, 10). The company name is abbreviated by the stock symbol and be classified by the size of them. There are four categories in total, with three companies in each part. Company size is measured by total market capitalization in US dollars. The four categories are: the total market value is less than 50 million, the total market value is between 50 million and 100 million, the total market value is greater than 100 million and less than 1 billion, and the total market value is greater than 1 billion. Finally, the average abnormal cumulative return of each company in the event window is obtained.

Panel A	Size<50 m (USD)			50m<Size<100 m (USD)		
t	AMBO%	CLEU%	EDTK%	LAIX%	RYB%	FEDU%
-10	41.56	-40.13	-22.32	61.30	73.45	41.82
-9	45.44	-38.99	-15.69	58.23	81.80	37.54
-8	40.59	-45.36	-16.17	56.97	82.63	36.32
-7	37.45	-48.16	-14.73	52.48	86.76	38.73
-6	37.45	-46.52	-7.38	51.13	82.40	38.82
-5	37.04	-50.16	-12.90	49.09	86.13	37.75
-4	26.06	-58.15	-14.77	50.48	84.73	28.81
-3	23.78	-49.93	-15.25	49.11	86.15	29.38
-2	25.18	-53.31	-10.47	51.89	82.15	31.88
-1	21.95	-59.42	-7.73	47.83	85.48	27.33
0	4.81	-73.38	-22.40	21.07	65.92	13.83
1	0.78	-62.57	-33.86	7.61	62.66	19.00
2	-5.81	-73.79	-36.51	9.79	53.07	18.42
3	-2.68	-69.94	-36.21	18.52	61.95	18.42
4	3.61	-73.12	-34.40	19.52	51.43	16.95
5	4.78	-69.84	-36.18	15.56	49.66	12.54
6	1.89	-71.43	-37.38	19.68	51.46	18.69
7	-0.49	-75.19	-36.77	20.67	48.51	21.59
8	1.94	-72.40	-37.38	21.65	40.33	31.45
9	1.01	-64.79	-37.38	23.59	43.63	34.11
10	-1.66	-62.27	-32.51	22.64	43.31	34.64
Average	16.41	-59.95	-24.69	34.71	66.84	28.00

Panel B	100m<Size<1b (USD)			Size>1b (USD)		
t	BEDU%	GOTU%	HLG%	EDU%	DAO%	TAL%
-10	-39.17	-117.10	-44.62	-1.05	-5.94	-102.10
-9	-39.42	-124.83	-42.07	-1.07	-5.70	-106.01
-8	-39.43	-123.10	-41.86	-1.01	-2.00	-100.47
-7	-42.18	-125.93	-43.47	-1.00	-2.55	-96.20
-6	-38.84	-125.43	-43.10	-1.01	-2.46	-98.42
-5	-40.08	-136.66	-44.22	-1.07	0.66	-107.95
-4	-34.29	-142.90	-44.51	-1.17	-2.95	-113.75
-3	-41.43	-143.00	-45.54	-1.11	-2.68	-111.18
-2	-40.67	-135.45	-46.08	-1.06	3.45	-99.97
-1	-36.60	-146.99	-46.91	-1.08	-0.20	-103.77
0	-47.35	-210.25	-56.78	-1.62	-43.01	-174.53
1	-55.30	-239.23	-60.25	-1.96	-76.42	-201.20
2	-54.41	-223.63	-62.45	-1.83	-90.51	-175.98
3	-51.76	-198.37	-61.14	-1.76	-60.48	-158.82
4	-49.75	-206.66	-60.03	-1.82	-62.71	-168.11
5	-50.44	-210.58	-59.57	-1.84	-67.15	-164.70
6	-53.95	-213.72	-56.36	-1.84	-59.21	-168.49
7	-54.26	-193.65	-55.41	-1.82	-58.17	-165.92
8	-55.48	-204.44	-54.17	-1.88	-57.23	-170.77
9	-53.94	-203.53	-53.37	-1.86	-59.09	-166.73
10	-53.03	-208.32	-53.16	-1.88	-58.88	-168.25
Average	-46.27	-173.04	-51.19	-1.46	-33.96	-139.25

Table 4: Results of the impact of "Double Reduction" policy on the stock value of twelve Chinese education technology companies

$CAR_{(t_1,t_2)}$ stands for the New Oriental's cumulative abnormal rate of return within (t_1, t_2). The t test is undertaken to check whether the average abnormal return for each stock is statistically different from zero. The formula is $Test = \left[\left(\sum_{AR}/N\right)/\left(AR_{SD}/\sqrt{N}\right)\right]$, where AR is the abnormal return and AR_{SD} is the standard deviation of abnormal return. If the absolute value of test is greater than 1.96, then the average abnormal return for that stock is significantly different from zero at the 5% level. The value of 1.96 comes from the standard normal distribution with a mean of 0 and a standard deviation of 1.95% of the distribution is between ±1.96. The ordinate represents the event window. ***, **, and * are significant at 1%, 5%, and 10% confidence levels, respectively.

Company	$CAR_{(t_1,t_2)}$	*t value*
CLEU	-30.80	-1.0857
BEDU	-2.94	-.1527
FEDU	-29.95	-1.2927
TAL	-56.31	-.6540
AMBO	-46.75	-1.9340
EDU	-.53	-.7810
DAO	-34.42	-.5184
LAIX	-30.46	-.8340
HLG	-7.98	-.6217
EDTK	-1.72	-.0716
RYB	-2.21	-.0657
GOTU	-83.24	-1.0161

Table 5: AAR of Chinese education technology companies with different sizes in the event window

$AAR_{i(t_1,t_2)}$ represents the average abnormal rate of return within (t_1, t_2). Companies are divided into four groups according to their size (based on the market value).

Size(USD)	*Company*	$AAR_{i(t_1,t_2)}$
29,860,300	AMBO	-2.13%
29,353,300	CLEU	-0.57%
21,158,000	EDTK	-0.35%
334,000,000	BEDU	-0.39%
733,000,000	GOTU	-3.06%
763,000,000	HLG	-0.03%
43,965,100	LAIX	-1.71%
68,138,300	RYB	-1.30%
65,692,600	FEDU	-0.55%
3,767,000,000	EDU	-3.08%
1,571,000,000	DAO	-1.95%
2,508,000,000	TAL	-13.27%

Table 6: Results of CAR under the market model

$CAR_{(t_1,t_2)}$ stands for the cumulative abnormal return rate of the education technology industry represented by 12 education technology companies within (t_1, t_2). ***, **, and * are significant at 1%, 5%, and 10% confidence levels, respectively.

Event window	$CAR_{(t_1,t_2)}$	*t value*	*p value*
(-30, 0)	-36.2710***	-4.3020	.001028
(-25, 0)	-30.3613***	-3.9256	.002014
(-20, 0)	-30.6928***	-3.8488	.002315
(-15, 0)	-37.3190***	-4.2536	.001120
(-10, 0)	-26.3309***	-3.6713	.003199
(-5, 0)	-30.6259***	-4.3655	.000919
(0, 0)	-25.8804***	-4.1487	.001350
(0, 5)	-29.1328***	-4.5988	.000612
(0, 10)	-25.6825***	-3.7805	.002621
(0, 15)	-31.8443***	-4.4161	.000841
(0, 20)	-32.4319***	-3.4734	.004602
(0, 25)	-27.2298**	-2.8894	.013591
(0, 30)	-20.2029**	-2.2868	.041170

Table 7: Results of CAR under the constant mean model

$CAR_{(t_1,t_2)}$ stands for the cumulative abnormal return rate of the education technology industry represented by 12 education technology companies within (t_1, t_2). ***, **, and * are significant at 1%, 5%, and 10% confidence levels, respectively.

Event window	$CAR_{(t_1,t_2)}$	*t value*	*p value*
(-30, 0)	-38.8237***	-3.8333	.002381
(-25, 0)	-32.0223***	-3.4548	.004762
(-20, 0)	-31.7202***	-3.3847	.005421
(-15, 0)	-38.3752***	-3.9888	.001797
(-10, 0)	-26.8379***	-3.4019	.005250
(-5, 0)	-30.8601***	-4.1569	.001330
(0, 0)	-25.2992***	-3.9704	.001858
(0, 5)	-29.8047***	-4.5409	.000676
(0, 10)	-26.6048***	-3.7003	.003034
(0, 15)	-33.1921***	-4.2735	.001081
(0, 20)	-35.1878***	-3.6141	.003553
(0, 25)	-29.7901***	-2.9950	.011170
(0, 30)	-23.2883**	-2.5513	.025407