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论 文 题 目 ：Market Reaction to Corporate Philanthropy in Response to the COVID-19: An Empirical Study in the Chinese Stock Market

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Market Reaction to Corporate Philanthropy in Response to the COVID-19: An Empirical Study in the Chinese Stock Market

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Abstract

The COVID-19 outbreak has an enormous impact on both the global economy and the companies' prospects. We focus on the corporate philanthropy during this pandemic and examine whether corporate giving would benefit the charitable firms. Analysing a sample of 388 public-listed companies in China, we find a significantly positive market reaction to corporate charitable donations, measured by the event study methodology. Our cross-sectional analyses and our multivariable regression analyses show that a higher value of the cumulative abnormal return (CAR) is correlated with a less amount of charitable contribution. However, when comparing the in-kind donations with cash donations, as well as the different timing of donation announcements, we find that investors' reaction is inconsistent. This study provides insights into rationales and influence of corporate philanthropic behaviour during disasters, which have important implications for firms in a similar situation in the future.

Keywords: COVID-19, Corporate Social Responsibility, Corporate Philanthropy, Event Study, Market Reaction, Cumulative Abnormal Return

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1. Introduction

Corporate social responsibility (CSR) refers that corporations need to hold responsibility for consumers, communities, and the environment when earning profit and holding legal responsibility for their shareholders and employees. In recent years, the thought of CSR rapidly develops in the Chinese economy. In particular, corporate giving the most traditional approach of CSR, attracts more and more attention from the public and investors (Bartkus, Morris, & Seifert, 2002).

The recent outbreak of COVID-19 has caused a more extensive discussion about CSR among the public. On 12th January 2020, the WHO named the virus "COVID-19" after the first death had been reported on 11th January 2020. On 24th January 2020, the epicenter of COVID-19, Wubei province was locked up, closing all entertainment venues and tourist attraction. As of 10th April, a total of 819652 cases COVID-19 were confirmed in China. At the early stage of the epidemic, the lack of capital and resources became a severe problem in many regions, especially in Hubei province that was the epicenter of the outbreak. Under this circumstance, many corporations in China chose to hold the responsibility of helping society and make a donation. According to the corporate announcements released on the official websites of the Shanghai Stock Exchange and Shenzhen Stock Exchange, at least 338 Chinese listed firms voluntarily made charitable donations for COVID-19 fight. Total corporate contributions amount to about 217 billion CNY, donated from January 20th 2020 when the World Health Organization (WHO) confirmed that the virus is the human-to-human transmissible, to April 8th 2020 when the lockdown of Wuhan was ended.

In addition to its influence on social security, the COVID-19 has also made a great negative impact on the global economy, including stock, bond, core oil, and gold market. Immediately following the open quotation on 9th March, the S&P index fell 7%, triggering the circuit breaker (Balentine, Ponczek, &Hajric, 2020); and on 12th March, the European stock market descended by 11%, the most serious one-day decline in history (Smith &Ellyatt, 2020). Such a severe impact on the global financial market caused an extremely high cost for the companies. Since the large-scale outbreak like COVID-19 pandemic has never happened before, the induced economic costs are unknown yet, causing investors' engagement in reevaluating their investments (Muller &Kräussl,

2011). Therefore, it raises questions among researchers: why companies respond so generously to the epidemic when they suffer great losses during the times of crisis? How does corporate philanthropy affect a firm's subsequent performance? We are motivated to examine the association between corporate giving and the firm valuation, namely the stock market reaction to corporate donation announcement.

We apply the event study methodology to determine investors' reaction to corporate philanthropy and construct cross-sectional analyses as well as multivariate regression models to investigate investors' preference over different types of corporate giving. R programming is used in order to manipulate data and construct models. Through the discussion about our findings, we intend to broaden current knowledge of the relationship between firm value and corporate philanthropy.

The remainder of this study is organized as follows. Section 2 describes the overview of related literature and develops our hypothesis. Section 3 presents our data and empirical model. Section 4 reports our analytical results, and Section 5 draws conclusions from this study.

2. Literature Review and Hypothesis

2.1.Hypothesis 1

Considerable amounts of research have been devoted to understanding whether and how corporate social responsibility and corporate philanthropy impact a firm's valuation, and most existing explanations fall into one of the two categories: agency cost theory and value enhancement theory.

1. Agency Cost Theory

As the agent of shareholders, corporate management is supposed to make decisions that align with shareholder's best interests. However, given the conflicts of interests between managers and principles, agency costs always exist in companies, including monitoring costs, bonding costs and residual losses that arise from a divergence between managers' decisions and decisions that maximize the benefits of principles (Jensen &Meckling, 1979). One specific management decision that is associated with the agency problem is an investment in CSR activities. Friedman (2007)points

out that corporate executives have a direct responsibility to benefit their employers rather than act in satisfying the general social interests at the expense of shareholders' wealth.

Several studies find evidence that the implementation of CSR policies may have a negative impact on firm value with regards to financial performance and stock market reactions. (Krüger, 2015) shows that the stock market reacts unfavorably to not only negative CSR news but also positive CSR news, because of the adverse impact of agency problems. Fich, Garcia, Robinson, and Yore (2009) propose that corporate philanthropy, one important form of CSR activities, is costly to shareholders, by underperforming firms' market-to-book ratios, return on assets and return on sales. One possible reason why CSR expenditures lead to the decrease in firm value is that insiders (managers and large blockholders) may over-invest in CSR to enhance their personal reputation and status (Barnea& Rubin, 2010). Masulis and Reza (2015) suggest that managers, under weak corporate governance, may engage in corporate giving. The authors indicate that managers with charity preferences have incentives to misuse corporate philanthropy that should be distributed to shareholders, causing a reduction in firm value. Although one potential benefit of CSR is advertising firms' products, Masulis and Reza (2015) state that there may not be a causal and effective relationship between advertising intensity and CSR. In general, corporate charitable donations may negatively influence firm performance and charitable firms may receive a negative stock market reaction, according to the agency theory.

2. Value Enhancement Theory

The other view with respect to corporate philanthropy is that charitable contributions can help enhance firm value. Given that the support from stakeholders (shareholders, debtholders, employees, customers, suppliers, and the society) is necessary for firms' long-term development, a successful business strategy is to consider interests of all stakeholders rather than maximum the wealth of one specific group (Freeman &McVea, 2001). Navarro (1988) discussed that managers' motivation behind philanthropy policies is to generate profitable benefits such as a favorable tax rate because an excellent social reputation allows firms to gain political supports. H. Wang and Qian (2011) find consistent findings that contributions the firms made for society bring positive impacts on their financial performances, by helping firms gain positive feedback from stakeholders and political access. According to W. O. Brown, Helland, and Smith (2006), charitable contributions are

significantly higher in firms that advertise intensively and firms with a higher portion of intangible assets since corporate giving helps firms to create goodwill with customers and public society.

The research made by K. T. Wang and Li (2016) convinces the value-enhancement view, showing that firms that participant in CSR, especially those with high-qualified CSR reports, enjoy better financial performance than nonparticipants. Lev, Petrovits, and Radhakrishnan (2010) show that future revenues are closely related to charitable contributions, especially for the firms that mostly rely on customers, indicating that the customers are more likely to get satisfied with higher amounts of corporate contributions. Additionally, Patten (2008) examines the stock market reaction to donation events related to the Tsunami in 2004. He suggests a foundation of corporate giving to increase firms' valuation because investors appear to react positively to donation announcements to reward corporate kindnesses. Therefore, the market reaction to a charitable announcement is likely to be positive, if investors interpret the corporate giving as a value-enhancing activity.

Overall, as the majority of existing studies regarding corporate philanthropy demonstrate a positive relationship with corporate wealth, we state our first hypothesis under the value enhancement theory:

H1: investors react positively to the donation announcements

2.2.Hypothesis 2

Since the ultimate goal of all the investors is to earn profits, they pay close attention to whether donations are beneficial for companies' future development. Accordingly, the stock market may react differently to different types of corporate donations that lead to various influences for companies(Li, 2009). This results in our second hypothesis:

H2: Investors often reacts differently according to the timing of donation and the forms of corporate giving.

First, the size of corporate philanthropy possibly has an influence on the market reaction. Patten (2008) states that a larger-sized donation helps enhance firm value to a greater extent since only a generous contribution can bring positive reputational influence. However, given the severe impacts

of coronavirus pandemic on the economy, an excessive amount of donation can become a financial burden for a company that generates little income during the outbreak. Li (2009) suggests that the more charitable contributions made, the worse consequences potentially happen to business operations in the future. As a result, investors are likely to prefer smaller-sized corporate giving, with concerns about corporate operations in difficulty, as formulated in a hypothesis:

H2-a. Holding other factors constant, the investors react more favorably to charitable firms with a less amount of donation.

Second, there is a likelihood that the in-kind donation is preferred over the cash donation during the pandemic. Through the in-kind contributions, charitable firms are able to not only clear their inventory but also release the pressure from donations on their financing positions. In addition, in-kind donations can bring more advertising capital to firms and help them establish brand awareness and loyalty in the disaster area, leading to increases in sales of products. In contrast, W. O. Brown et al. (2006) and Masulis and Reza (2015) highlight that cash donations are associated with high agency costs, which negatively affect shareholders' wealth. This helps us to formulate the following hypothesis:

H2-b. Holding other factors constant, the investors react more favorably to charitable firms with in-kind donations.

Third, differences in the timing of the charitable announcements appear to impact market reactions. The advertising effect is one of the most crucial results of corporate philanthropy. Pattern (2008) points out that late announcements of corporate giving have limited advertising effect, as early companies have already attracted media attention. In spite of the insignificant result from this study, we formulate our hypothesis as follows:

H2-c. Holding other factors constant, the investors react more favorably to firms that make their donation announcements earlier.

3. Data and Empirical Model

3.1 Data

Our initial sample consists of 388 firms listed on the Shanghai and Shenzhen Stock exchange, which made philanthropic responses to the COVID-19 outbreak from January 20 to April 8 in 2020. Our data of corporate donation details are manually collected from announcements notified on the websites of the Shanghai Stock Exchange and Shenzhen Stock Exchange. Several firms issue more than one time press releases that indicate additional charitable contributions, and thus we focus only on the first-time announcements. The data of daily stock prices and accounting variables is obtained from the Chinese Stock Market and Accounting Research (CSMAR) database, developed by Shenzhen GTA Information Technology Company. Our appropriate econometric software is R programming to process the data, create the regression model, and get the estimated results.

3.2 Model Specification

3.2.1 Event Study

1. Measurement of Abnormal Stock Market Reaction

An event study analyzes the influence of an event on a corporation by focusing on the changes in the company's stock price and we employ this method to investigate the stock market responses to the corporate giving announcement. In our study, we use the market model (see S. J. Brown & Warner, 1985) to calculate the cumulative abnormal return (***CAR***) surrounding the event date t_0, which is defined as the first-time donation announcement made by each company. Details of our measurements are shown as follows:

1. Defining *R* as the stock return for firm *i* on the trading date *t*, measured as follows:

$$R_{i,t} = \frac{P_{i,t}}{P_{(i,t)-1}} - 1$$

Where $R_{i,t}$ stands for the observed stock return for firm ***i*** on day ***t***, and $P_{i,t}$stands for the corresponding stock price of firm ***i*** on day ***t***.

2. Choose an appropriate estimation window and obtain the estimated value of parametersβ_i and α_i through the following approach:

$$R_{i,t} = \alpha_i + \beta_i \times R_{m,t} + \varepsilon_{i,t}$$

where $\beta_i$stands for the systematic risk of stock i; $R_{m,t}$stands for the return rate of market indices on day t; $\varepsilon_{i,t}$ is the random error term. To ensure that our measurements of expected returns are not affected by a firm's giving announcement, we select the period preceding the event date as the estimation window over the trading dates (-180, -30).

3. Calculate the expected return for firm I by using the estimated value of parameters:

$$\hat{R}_{i,t} = \hat{\alpha}_i + \hat{\beta}_i \times R_{m,t}$$

4. For each firm i, the abnormal return on event day t and the cumulative abnormal return over event window (m, n) are calculated as follows:

$$AR_{i,t} = R_{i,t} - \hat{R}_{i,t}$$

$$CAR_i(m,n) = \sum_{t=m}^{n} AR_{i,t}$$

Where $A_{i,t}$ is the abnormal return for firm i on day t and $CAR_i(m, n)$ means cumulative abnormal returns for firm i during the event window(m, n). For sensitivity check, several event windows are used in our tests, including three-day event window (-1,1), six-day event window (0,5), eleven-day event window (0,10), sixteen-day event window(-5,10), thirty-one-day event window (0,30), and thirty-six-day event window (-5,30).

5. The mean abnormal return and the mean cumulative abnormal return are calculated as:

$$\bar{AAR}_t = \frac{1}{N} \times \sum_{i=1}^{N} AR_{i,t}$$

$$\bar{CAAR}(m,n) = \frac{1}{N} \times \sum_{i=1}^{N} CAR_i(m,n)$$

2. Significance test

To evaluate the significance of the market reaction, we apply the Student's t-test to investigate whether the average CARs over different event windows are significantly different from zero.

H0: $\mu = 0$

H1: $\mu \neq 0$

The statistical value of t: $t = \frac{\mu}{s/\sqrt{n}}$

where μ is the average value of the sample, s stands for the standard deviation of the sample, n is the size of the sample, and the degree of freedom of t distribution is $n-1$.

3.2.2 Cross-Sectional Analysis

In order to find the factors that influence stock market reactions to the donation announcements, we test cross-sectional differences between sub-samples of firms that are grouped by the size of donations, the form of donations (in-cash and in-kind), and the timing of donation announcements, respectively. We examine whether the mean CARs of sub-samples are significantly different, using Student's t-test, F-test, and Wilcoxon test. Considering that the mean CARs surrounding corporate donation announcements may not be normally distributed, we employ the F-test and the Wilcoxon test as alternative approaches to the t-test. The F test, also called the variance test, examines whether the variances of two samples are equal. In contrast, the Wilcoxon test aims to test whether the medians of the two samples are identical.

3.2.3 Multivariate Regression Analysis

Our research focuses on the differentiation by the ways of corporate giving; however, there is a likelihood that other potential factors cause changes in stock returns. Therefore, apart from cross-sectional analyses, we further apply the multivariate regression models to control for potential factors that impact market valuations. Our regression model is constructed as:

$$\mathbf{CAR_i = \beta_1 + \beta_2 * Relatdonate_i + \beta_3 * EPS_i + \beta_4 * LEV_i + \beta_5 * SIZE_i + \beta_6 * BM_i + \beta_7 * ROA_i + \beta_8 * Salesgrowth_i + \beta_9 * Capex_i + \beta_{10} * Priorreturn_i + \sum Indcd + error_i} \quad \textbf{(1)}$$

$$CAR_i = \beta_1 + \beta_2 * Relatdonate_i + \beta_3 * Inkind_i + \beta_4 * EPS_i + \beta_5 * LEV_i + \beta_6 * SIZE_i + \beta_7 * BM_i + \beta_8 * ROA_i + \beta_9 * Salesgrowth_i + \beta_{10} * Capex_i + \beta_{11} * Priorreturn_i + \sum Indcd + error_i \quad (2)$$

$$CAR_i = \beta_1 + \beta_2 * Relatdonate_i + \beta_3 * Inkind_i + \beta_4 * Late_i + \beta_5 * EPS_i + \beta_6 * LEV_i + \beta_7 * SIZE_i + \beta_8 * BM_i + \beta_9 * ROA_i + \beta_{10} * Salesgrowth_i + \beta_{11} * Capex_i + \beta_{12} * Priorreturn_i + \sum Indcd + error_i \quad (3)$$

Where CAR_i is the CAR for firm *i* over the event window (t1, t2); $Relatdonate_i$ is the relative value of the donation for firm *i*, calculated as the sum value of both cash and in-kind contributions donated by firm*i* scaled by its net profit in 2019;$Inkind_i$is a dummy variable that equals to 1 if firm *i* makes in-kind donations and 0 otherwise; $Late_i$ returns 1 if firm *i* is one of the latest 50 firms that release their donation announcements and 0 otherwise. Definitions of control variables are presented in Appendix. These three models correspond to Hypothesis 2-a, 2-b, 2-c, respectively.

4. Empirical Results

4.1 Summary Statistics

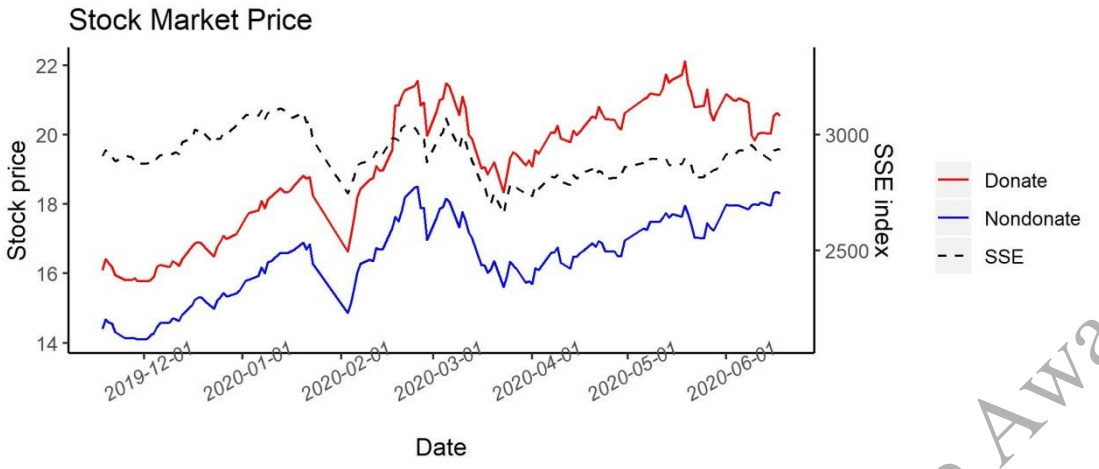
Table 1

Industry	Donate		Non-donate	Total	Valuation(CNY)		
	N	%	N	N	Cash	In-kind	Sum
Agriculture	5	11.36	39	44	22700	2825600	2825600
Mining	7	8.86	72	79	474700	12800	487600
Manufacturing	225	9.01	2272	2497	296600	169500	463500
Electric power	8	6.9	108	116	244200	24300	270600
Construction supply	7	7.22	90	97	671600	366700	1022900
Wholesale and retail	15	8.43	163	178	522900	63400	578100
Railway	4	3.6	107	111	144100	0	144100

Accommodation	0	0	11	11	0	0	0
Information technology	19	6.05	295	314	215600	202900	419200
Financial industry	16	14.16	97	113	1402700	0	1402700
Real estate	9	6.72	125	134	451100	0	454500
Leasing and commercial service	5	8.33	55	60	436800	9300	446100
Scientific research	6	9.84	55	61	147500	17000	164500
Water Conservancy	9	15.25	50	59	308500	176000	486500
Education	1	12.5	7	8	250000	0	0
Health and social work	2	16.67	10	12	1333300	0	1363600
Culture, sports and entertainment	0	0	59	59	0	0	0
Diversified	0	0	21	21	0	0	0
Total	338	8.51	3636	3974	337000	169100	503200

Table 1 reports a summary distribution by industry between January 20th 2020 and April 8th 2020, including the frequency of corporate giving and the average amounts of donation in cash and kind. In general, 8.51% of observations participate in aiding COVID-19 fights, whose mean total charitable contribution amounts to CNY 503200. Given the lockdown of Chinese provinces during the outbreak, firms in the agriculture industry donate the largest amounts of goods and the largest total amounts that value CNY 2825600. Companies in industries with fewer tangible assets make more significant contributions in cash, such as the Financial Industry, and Health and social work. By contrast, none firms in industries, such as Accommodation, Culture, sports and entertainment, and Diversified, is engaged in supporting this epidemic fight.

Figure 1



We provide one plot to understand the general trend of the stock market changing during the epidemic period and the difference between philanthropic firms and non-philanthropic firms. In Figure 1, we illustrate the fluctuation of stock prices of listed firms in the Chinese stock market from December 2019 to June 2020, along with Shanghai SE (SSE) Composite Index, which is a representative market index in China. We show the average stock price of firms that make charitable donations for COVID-19 fights in the red line and the average stock price of other companies in the blue line, respectively. The black dashed line presents the fluctuation of the SSE index. Overall, we observe a similar trend in these two groups, as well as the market index. The outbreak of coronavirus in January stopped the uptrend of share price, causing a dramatic decrease in the whole stock market that continued until early February. While both stock prices along with the SSE index bounced back during the February, Chinese companies experienced a second collapse in March when the global spread of the virus caused investors' panic and multinational stock indexes triggered their circuit breakers. The Chinese stock market has recovered since April. Compared with the overall market performance, the stock price of philanthropic firms increased more significantly until a decline in May. By comparison, philanthropic firms outperform non-philanthropic firms, with a higher value of share price.

4.2 Results for Cross-Sectional Analyses

4.2.1 Results for Hypothesis 1

Table 2

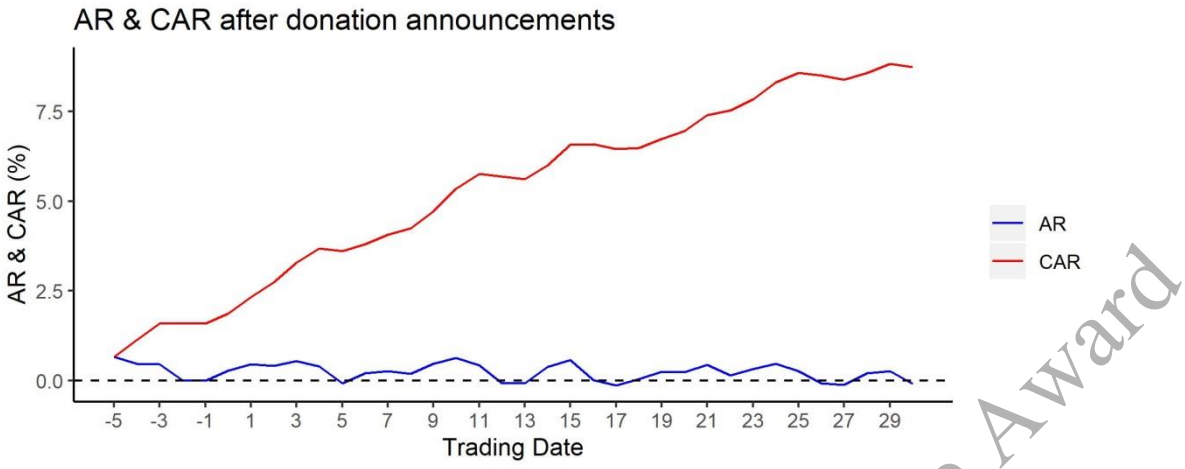
Trading Date	CAR(-5, 30)		CAR (-1,30)		CAR (0,30)	
	mean	T-test	mean	T-test	mean	T-test
-5	0.01	3.40***				

-4	0.01	3.75***				
-3	0.02	4.27***				
-2	0.02	3.79***				
-1	0.02	3.22***	0.00	-0.03		
0	0.02	2.86***	0.00	0.54	0.00	0.78
1	0.02	3.42***	0.01	1.37**	0.01	1.82*
2	0.03	3.94***	0.01	2.08***	0.01	2.65***
3	0.03	4.63***	0.02	2.92***	0.02	3.54***
4	0.04	5.15***	0.02	3.51***	0.02	4.12***
5	0.04	5.34***	0.02	3.54***	0.02	4.14***
6	0.04	5.54***	0.02	3.79***	0.02	4.35***
7	0.04	5.88***	0.02	4.16***	0.02	4.61***
8	0.04	6.00***	0.03	4.25***	0.03	4.64***
9	0.05	6.41***	0.03	4.75***	0.03	5.08***
10	0.05	7.08***	0.04	5.61***	0.04	5.9***
11	0.06	7.54***	0.04	6.11***	0.04	6.39***
12	0.06	7.32***	0.04	5.81***	0.04	6.04***
13	0.06	7.43***	0.04	5.91***	0.04	6.08***
14	0.06	7.94***	0.04	6.5***	0.04	6.7***
15	0.07	8.54***	0.05	7.2***	0.05	7.47***
16	0.07	8.28***	0.05	6.97***	0.05	7.19***
17	0.06	7.92***	0.05	6.49***	0.05	6.73***
18	0.06	7.97***	0.05	6.48***	0.05	6.84***
19	0.07	7.59***	0.05	6.06***	0.05	6.43***
20	0.07	8.10***	0.05	6.57***	0.05	6.83***
21	0.07	8.68***	0.06	7.14***	0.06	7.36***
22	0.08	8.67***	0.06	7.13***	0.06	7.31***
23	0.08	8.78***	0.06	7.31***	0.06	7.46***
24	0.08	8.82***	0.07	7.4***	0.07	7.65***
25	0.09	8.48***	0.07	7.08***	0.07	7.38***
26	0.09	8.53***	0.07	7.22***	0.07	7.5***
27	0.08	8.2***	0.07	6.94***	0.07	7.24***
28	0.09	8.18***	0.07	6.96***	0.07	7.28***
29	0.09	7.93***	0.07	6.72***	0.07	7.07***
30	0.09	7.32***	0.07	6.15***	0.07	6.51***

Note: $^{*}p<0.1$ $^{**}p<0.05$ $^{***}p<0.01$

Our analytical results for Hypothesis 1 are reported in Table 2: the daily value of CARs after donation announcements over and the t-test results for significance. The CARs are measured over three different event window, including (-5, 30), (-1, 30), and (0, 30). CARs on each day are consistently positive and significant, proposing investors' positive reaction to corporate giving.

Figure 2



In Figure 2, we illustrate the changing of AR and CAR from the 5 days before the donation announcements to 30 days after donation announcement. We show the value of AR in the blue line and the value of CAR in the red line, respectively, as well as the zero baseline in the black dashed line. Overall, the value of AR fluctuates above the zero baseline during this period, demonstrating the profitability of charitable stocks, and the value of CAR appears an increasing trend. Our results are consistent with our hypothesis that investors approve corporate philanthropy during the COVID-9 outbreak and award these firms with a higher valuation.

4.2.2 Results for Hypothesis 2

1. Results for Hypothesis 2-a

Table 3

（0）： 50 firms that make the largest amounts of relative donation; (1): 50 firms that make the smallest amounts of relative donation

	Estimation Window	CAR(0)	CAR(1)	(1)-(0)	T-test	F-test	Wilcoxon-test
Stage A	(-1,1)	-0.01	0.01	0.02	-3.39**	0.47	0.00*
	(0,5)	0.00	0.01	0.01	-3.46***	2.58	1.00***
Stage B	(0,10)	0.00	0.01	0.01	-4.13***	2.59	10.00***
	(0,30)	0.02	0.03	0.02	-4.66***	0.39***	224.00***
Stage C	(-5,10)	0.02	0.02	0.00	2.11**	0.71	173
	(-5,30)	0.03	0.04	0.00	-1.06	0.31***	582

Note: *p<0.1 **p<0.05 ***p<0.01

We examine the differences in market reactions to different types of corporate giving, which are estimated by using 6 event windows. We use the three-day window and six-window to capture the short-term reaction as Stage A and use longer windows to capture long-term reactions as Stage B. Considering the possible leakage of information, we

additionally measure CAR from 5 days before the announcement dates. To investigate the significance of the difference in market reactions, we report the statistical results of the t-test, F-test and Wilcoxon tests, respectively.

Results of firms which make the largest and smallest amounts of relative donation are shown in table 3. In Stage A and Stage B, differences between the smallest amounts and largest amounts of relative donation are consistently positive and significant, apart from the insignificance of F-tests. Although there is no distinct difference in Stage C, we decide to accept our hypothesis that investors react more favorably to charitable firms with relatively less amount of donation, as they interpret the excess contributions as a waste of corporate resources.

Figure 3

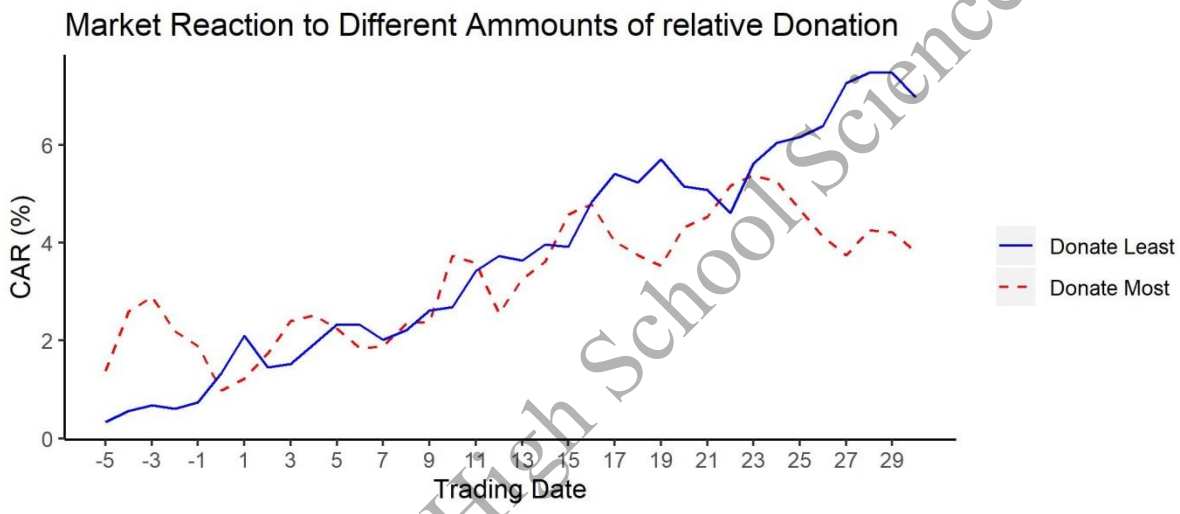


Figure 3 presents the abnormal performance of these two groups of firms during 36 days. In general, both firms with the least contribution (in the blue line) and firms with the most contribution (in the red dashed line) are increasing over (-5, 30), with a larger ascending slope for the former group. To be more specific, the group with the most generous giving outperforms the other group before the event date 0, while the firms that contribute least become comparatively more profitable after day 11. These results correspond to the results shown in Table 3.

2. *Results for Hypothesis 2-b*

Table 4

	(0): firms with only cash donations, n=178; (1): firms with in-kind donations, n=151						
	Estimation Window	CAR(0)	CAR(1)	(1)-(0)	T-test	F-test	Wilcoxon-test
Stage A	(-1,1)	0.00	0.01	0.01	-1.84	0.04*	0.00*
Stage B	(0,5)	0.01	0.02	0.01	-1.15	1.78	12.00
	(0,10)	0.02	0.02	-0.01	1.00	6.87***	73.00
	(0,30)	0.05	0.04	-0.01	2.2**	1.66	644.00**
Stage C	(-5,10)	0.02	0.04	0.01	-2.75**	1.67	62.00**
	(-5,30)	0.05	0.06	0.01	-1.45	1.47	540.00

Note: *p<0.1 **p<0.05 ***p<0.01

Table 4 shows the statistical results of analyses in which the sample of philanthropic firms are divided into two groups: firms that make donations only in cash, and firms that make in-kind donations. In Stage A, the difference in CARs between two groups numbers to 0.01 and is slightly significantly at 10% level based on the results of F-test and Wilcoxon-test. This finding indicates that the positive reaction of investors immediately around the announcements is more significant to firms that donate in-kind contributions. Consistently, the difference in CARs calculated by using the 16-day event window is positive and significant at 5 % level. However, over the event window (0,30), we observe a negative and significant result, suggesting that firms with only cash donations receive stronger market reactions over a long-term period. Because of the contradicting results, we fail to find evidence to support our hypothesis that firms with in-kind donations receive stronger market reactions after their donation announcements.

Figure 4

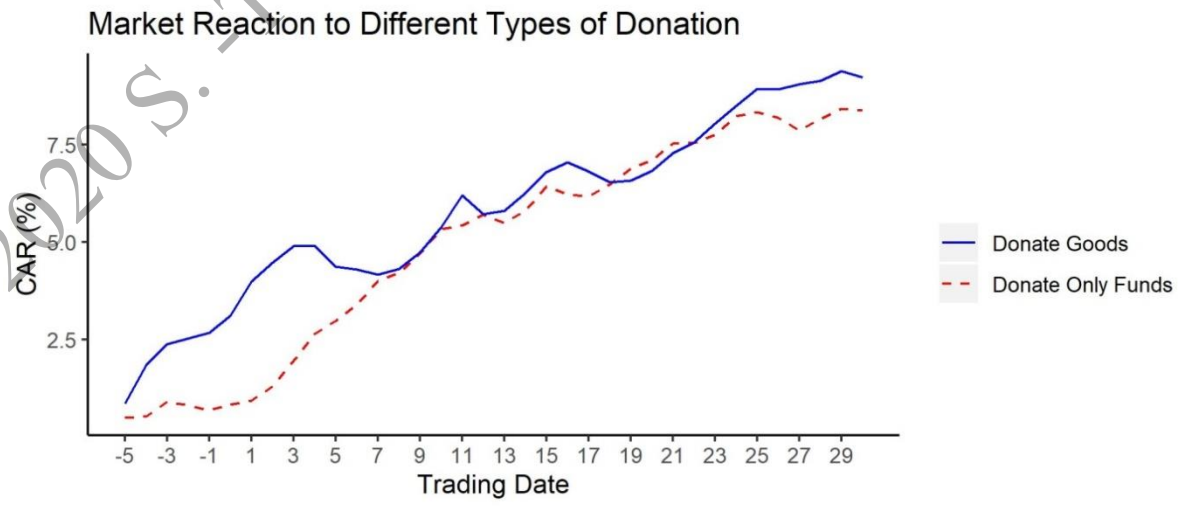


Figure 4 illustrates the market reaction to these two groups over the event window (-5, 30). Both CARs for

firms with in-kind donations in the blue line and CARs for firms without in-kind contributions show upward trends. The blue line rises more rapidly than the red dashed line in the first 13 days, and the two join together in the following days. In general, both groups receive a positive reaction after their donation announcements. Relative to firms that only contribute in cash, firms that give in-kind suppliers seem to generate higher CARs.

3. Results for Hypothesis 2-c

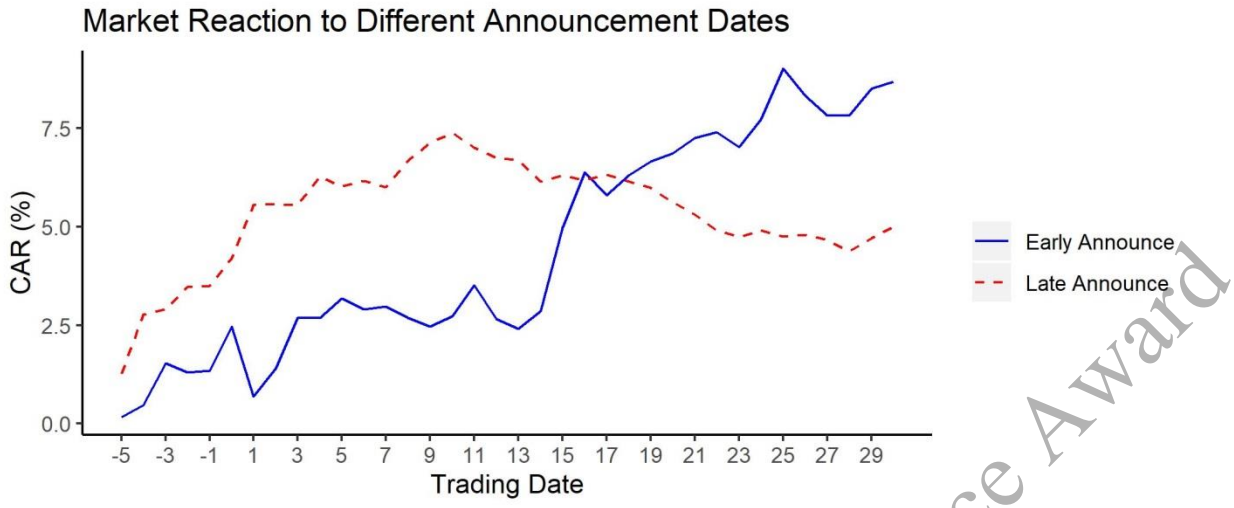
Table 5

	(0): 50 firms that make the earliest donation announcements; (1): 50 firms that make the latest donation announcements						
	Estimation Window	CAR(0)	CAR(1)	(1)-(0)	T-test	F-test	Wilcoxon-test
Stage A	(-1,1)	0.00	0.01	0.01	-0.94	0.74	3.00
	(0,5)	0.01	0.02	0.01	-2.48**	1.70	4.00**
Stage B	(0,10)	0.01	0.03	0.01	4.23***	0.72	9.00***
	(0,30)	0.04	0.02	-0.01	2.89***	8.84***	592.00
Stage C	(-5,10)	0.02	0.05	0.03	6.00***	0.3**	19.00***
	(-5,30)	0.04	0.05	0.01	-1.73*	4.26***	540.00

Note: $^{*}p<0.1$ $^{**}p<0.05$ $^{***}p<0.01$

Table 5 shows the results to examine how the timing of donation announcements affects the corresponding market reaction. Although the result is not significant under the three-day window at Stage A, the difference between CAR (0) and CAR (1) is 0.01 in a six-day window, significant at 5% level based on the results of T-test and Wilcoxon-test. Consistently, differences between CAR(1) and CAR(0) in Stage C are 0.03 and 0.01. These findings indicate that investors react more positively towards firms that make the latest donation announcements. One possible explanation is that investors may not pay too much attention to charitable events before the spread of COVID-19 so that investors react more strongly to the firms that make late donation announcements. However, the results in stage B are contradicted, which are positive and negative respectively. Given such a contradiction in our results, we cannot accept our Hypothesis 2-c.

Figure 5



In addition to the significance test, we show the illustration in Figure 5. For the group of firms with early announcements, CARs increase slightly in the first 13 days, rise rapidly on days from 13 to 17, and continues to increase in the following days. The blue curve suggests that the market reacts more positively after 13 days. The red dashed line shows the changes in CAR (%) over time for the group of late announcements. Precisely, the red curve increases in the interval (-5,10) and decreases after the 10th trading date. Despite the outperforming of the late group over the early group at the beginning, the later one exceeds the former one after day 17. This trend corresponds to the results in table 3, namely the negative result over (0, 30) event window at Stage B.

4.3 Results for Multivariate Regression Analyses

Table 6

Regression Results

	Dependent variable:			
	CAR (-5,10)			
	(1)	(2)	(3)	(4)
Relat_donate	-0.051	-0.053*	-0.052*	-0.054*
	(0.031)	(0.031)	(0.031)	(0.031)
Inkind		0.028***		0.027**
		(0.011)		(0.011)
Late			0.027*	0.025*
			(0.014)	(0.014)
EPS	-0.005	-0.002	-0.005	-0.002
	(0.008)	(0.008)	(0.008)	(0.008)
LEV	-0.025	-0.018	-0.021	-0.015
	(0.037)	(0.037)	(0.037)	(0.037)

Size	-0.004	-0.005	-0.004	-0.005
	(0.005)	(0.005)	(0.005)	(0.005)
BM	0.036	0.043*	0.031	0.038
	(0.025)	(0.025)	(0.025)	(0.025)
ROA	0.080	0.068	0.101	0.088
	(0.097)	(0.096)	(0.098)	(0.097)
Sales_growth	-0.00001	-0.00001	-0.00001	-0.00001
	(0.00003)	(0.00003)	(0.00003)	(0.00003)
Capex	0.211	0.232*	0.211	0.231*
	(0.130)	(0.129)	(0.129)	(0.128)
Prior_return	-5.140	-4.748	-5.478*	-5.073
	(3.311)	(3.280)	(3.300)	(3.274)
Constant	0.101	0.095	0.100	0.095
	(0.109)	(0.108)	(0.108)	(0.107)
Observations	289	289	289	289
R^2	0.050	0.073	0.062	0.083
Residual Std. Error	0.089 (df = 279)	0.088 (df = 278)	0.089 (df = 278)	0.088 (df = 277)
F Statistic	1.640 (df = 9; 279)	2.182** (df = 10; 278)	1.844* (df = 10; 278)	2.267** (df = 11; 277)

Note: *p<0.1**p<0.05***p<0.01

In Table 6, we present the multivariate analysis in which we use the CARs over (-5, 10) window as the dependent variable and use ***Relat_donate$_i$***, ***Inkind$_i$***, and ***Late$_i$*** as the key independent variables, which are added in order in each column, respectively. Shown in column (1), our first regression model works inefficiently, because of the insignificant F-statistic result. This result indicates that we cannot reject the null hypothesis that coefficients of all independent variables equal to zero. Nevertheless, the F-statistics are significant at 5% or 10% level in column (2) to (4), proving that our models with additional variables have statistically significant explanatory power. Overall, the coefficients of ***Relat_donate$_i$*** are negative and significant at 10% level, establishing a finding that a higher amount of relative donation has negatively effect on the abnormal market reaction. These results are consistent with the prior cross-sectional results over various event windows. Although we fail to find consistent results in the earlier cross-sectional analyses, we demonstrate, in the multivariate regression analyses, that investors react stronger to in-kind contributions and the later charitable announcements, observed as the positive and significant coefficients at 1% and 10% level, respectively.

Table 7

Regression Results with Industry Fixed Effect

	Dependent variable:			
	CAR (-5,10)			
	(1)	(2)	(3)	(4)
Relat_donate	-0.052*	-0.054*	-0.054*	-0.055*
	(0.031)	(0.031)	(0.031)	(0.031)
Inkind		0.026**		0.024**
		(0.012)		(0.012)
Late			0.027*	0.025*
			(0.015)	(0.015)
EPS	-0.005	-0.002	-0.005	-0.002
	(0.008)	(0.008)	(0.008)	(0.008)
LEV	-0.017	-0.016	-0.015	-0.014
	(0.039)	(0.039)	(0.039)	(0.038)
Size	-0.003	-0.005	-0.004	-0.005
	(0.006)	(0.006)	(0.006)	(0.006)
BM	0.056**	0.060**	0.051*	0.055**
	(0.027)	(0.026)	(0.027)	(0.027)
ROA	0.116	0.098	0.137	0.118
	(0.099)	(0.098)	(0.099)	(0.099)
Sales_growth	-0.00001	-0.00001	-0.00001	-0.00001
	(0.00003)	(0.00003)	(0.00003)	(0.00003)
Capex	0.298**	0.348**	0.299**	0.345**
	(0.142)	(0.143)	(0.142)	(0.142)
Prior_return	-6.035*	-5.612*	-6.373*	-5.946*
	(3.334)	(3.316)	(3.325)	(3.311)
Observations	289	289	289	289
R^2	0.101	0.117	0.112	0.126
Residual Std. Error	0.089 (df = 266)	0.088 (df = 265)	0.088 (df = 265)	0.088 (df = 264)
Note:				*p<0.1**p<0.05***p<0.01

In Table 7, to further improve the effectiveness of our models, we add the industry fixed effects that control for systematic differences in risk and performance across sectors types. The R-squared becomes relatively higher after controlling for the industry fixed effects, indicating an increasing accuracy of our model. All the coefficients of ***Relat_donate$_i$*** are negative and significant, showing that investors react more positively to the firms with less amount of donation, consistent with what H2-a hypothesis says. In the following two rows, the coefficients of ***Inkind$_i$*** and ***Late$_i$*** are both positive, with significance at 5% level and 1% level, respectively. As a result, we make a

conclusion that investors are more favorable to the charitable firms that make in-kind donations and that release later announcements. These findings are consistent with the earlier regression results without the industry fixed effect.

Table 8

Regression Results with Industry Fixed Effect

	Dependent variable:			
	CAR (-1,1)			
	(1)	(2)	(3)	(4)
Relat_donate	-0.017	-0.018	-0.017	-0.018
	(0.020)	(0.020)	(0.020)	(0.020)
Inkind		0.012		0.012
		(0.008)		(0.008)
Late			0.002	0.001
			(0.010)	(0.010)
EPS	-0.007	-0.006	-0.007	-0.006
	(0.005)	(0.005)	(0.005)	(0.005)
LEV	0.026	0.026	0.026	0.026
	(0.025)	(0.025)	(0.025)	(0.025)
Size	-0.004	-0.005	-0.004	-0.005
	(0.004)	(0.004)	(0.004)	(0.004)
BM	0.007	0.009	0.006	0.008
	(0.017)	(0.017)	(0.017)	(0.017)
ROA	0.108*	0.100	0.109*	0.101
	(0.064)	(0.064)	(0.064)	(0.064)
Sales_growth	-0.00002	-0.00002	-0.00002	-0.00002
	(0.00002)	(0.00002)	(0.00002)	(0.00002)
Capex	0.064	0.087	0.064	0.087
	(0.092)	(0.093)	(0.092)	(0.093)
Prior_return	-0.989	-0.793	-1.012	-0.803
	(2.152)	(2.150)	(2.160)	(2.158)
Observations	289	289	289	289
R^2	0.077	0.086	0.077	0.086
Residual Std. Error	0.057 (df = 266)	0.057 (df = 265)	0.057 (df = 265)	0.057 (df = 264)

Note: *p<0.1 **p<0.05 ***p<0.01

In Table 8, we replace the dependent variable by the CAR (-1, 1) as a robustness test in which we investigate the market reaction over a shorter event window. Neither coefficients of $\boldsymbol{Relat\_donate_i}$, $\boldsymbol{Inkind_i}$ nor $\boldsymbol{Late_i}$ are insignificant. One potential explanation is that this event window is so short that investors do not have enough time to make plans and react toward corporate giving.

5. Conclusion

Our study focuses on the corporate philanthropy in China during the coronavirus pandemic and investigates the stock market reaction to firms' charitable announcements. We manually collect detailed information about corporate giving and use the R programming to analyse the data. The event study is our main methodology to evaluate market reactions. Overall, our significance test shows potent evidence that investors react positively to firms' charitable donations. In our cross-sectional tests, we find that investors are conscious of different types of corporate giving. Investors are more favourable to a small amount of donation than a large amount, while they do not have a consistent preference between in-kind contributions and cash contributions, or a clear preference to the different timing of donation announcements. These findings are further confirmed by our multivariate regressions analyses.

There are some drawbacks in this research: we analyse only the initial charitable announcements and the corresponding market reactions. In fact, some companies in our sample make donations for several times and the market may have further reactions to these strategies. As a result, part of our results in the cross-sectional analyses is inconsistent.

Despite these deficiencies, our study makes both academic and practical contributions. As far as we are aware, our study is the first empirical research that investigates the influence of the charity donation towards the firm value under the COVID-19 pandemic. Previous literature regarding the corporate social responsibility in China(e.g. Chen, Hung, & Wang, 2018; Cheng, Lin, & Wong, 2016; Wang & Qian, 2011) focuses mainly on the disclosure of the CSR information but provides little explanation on investors' reaction to corporate philanthropic disaster responses. Our study, therefore, extends the current understanding of the effect of CSR on firms' valuation. With the lack of data about corporate charity donations in China, our data collection can help improve the integrity of

related information. As our study analyzes the influence of the charity donation towards firm value under disaster like COVID-19 pandemic, it can provide suggestion to the companies' managers about how to improve their company value by properly considering the charity donation when they face a similar situation in the future.

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Appendix

Variable Definitions

Variables	Definitions
CAR (m,n)	the average cumulative abnormal return for firm i over the event window (-5,10),...
Relat_donate	the relative value of donation amount for firm i, calculated as the amount of both cash and in-kind donation divided by the net profit in 2019
Inkind	a dummy variable that amounts to 1 if firm i makes its first donation with in-kind suppliers, and 0 otherwise
Late	a dummy variable that equals to one if firm is one of the 50 firms that make their first donation announcement latest (later than 2020-02-20), and 0 otherwise
EPS	earnings per share for firm i in 2019
Lev	the leverage ratio for firm i in 2019, which equals to total liquidity scaled by total assets
Size	the firm size for firm i in 2019, measured as the natural logarithm of the market value of common equity for firm i in 2019
BM	the book-to-market ratio for firm i in 2019, which is measured as the book value of equity scaled by the total market value of equity at the year end captures the growth opportunity of companies
ROA	return on assets for firm in in 2019
Sales_growth	the sales growth for firm in in 2019
Capex	the capital expenditure intensity for firm i in 2019, which is the capital expenditures scaled by total assets captures the potential impact of corporate investment policy
Prior_return	the average stock return for firm i over [-180,-30] window prior to the donation announcement date.
Indcd	the industry type of firm i, based on the industry classification (2012) released by CRSC.

Acknowledgment

Under the impact of COVID-19, many companies in China provided financial aid and resource to the society. Many of these companies publicize their donation behavior in the media. These event inspired us to study economic influence behind such donation behaviors — whether they positively or negatively affects the value of companies.

During the process of our research, we chose the topic, looked for resources, and gathered data together. Based on the background and some basic information about the topic, we separated the research into three parts. Yu Weiran is responsible for literature review and hypothesis, Gong Siyuan is in charge of data and empirical model, and Pan Hongyi works on empirical results. When we finished our section, we discussed and revised some details and wording to guarantee the consistency of the paper.

Sun Yupu, the guider of our project, is an excellent graduate student majoring in Operational Research & Analysis at the London School of Economics and Political Science (LSE). Miss. Sun voluntarily guides the process of the research including the structure and format of the paper and introduces basic skills of data processing.

No other people assisted the completion of the research.