

A Study on Strategy-making of Five Big Chinese Logistics Companies under the Impacts of COVID-19

Muhan Ma^{1,a,*}, Meihan Chen², Shizhuo Weng³

¹ High School Affiliated To Nanjing Normal University, Nanjing, 210003, China

² Pope John XXIII Regional High School Sparta, 07871, United States

³ St Francis Methodist School, Singapore, 478095, Singapore

a. 3036767699@qq.com

*corresponding author

Abstract: In this paper, we examine the impact of Covid-19 on the Chinese logistics industry, using both qualitative and quantitative analysis to examine the performance of the top five logistics companies in the months following the initial outbreak in early 2020. The top five companies are Shunfeng, Yuantong, Zhongtong, Shentong, and Yunda. Using a linear regression model and a questionnaire of 251 individuals, we analyze the strengths and weaknesses of the top five companies. We then conclude with our financial recommendations for the five companies, based on our analysis.

Keywords: logistic, COVID-19, business strategy, econometrics, oligopoly.

1. Introduction

One of the hottest topics these days would be New Crown Pneumonia. Discovered in December 2019, New Crown did not attract much attention when it was found, and it was thought that it might just be a prevalent infectious disease. However, the symptoms found the world considered one after another and the fact that it is strongly transmissible to be a high-risk contagious disease. In early 2020 the Chinese government took swift action to quarantine the population and control various industries, which significantly impacted our daily lives. The most affected of all industries would belong to the logistics industry. Because people were quarantined at home due to the epidemic, they had more opportunities to shop online. Still, under the influence of the epidemic, the government imposed strict controls on the logistics industry. So, it is difficult to judge directly whether the epidemic has had a beneficial or harmful effect on the logistics industry. Therefore, the logistics industry has been chosen as our topic of study. We will use different methods to analyze the impact of the new crown on the logistics industry. The span of the epidemic is very much from December 2019 to almost three years now.

To make a more accurate study and prediction, we surveyed at the beginning of 2020, when the outbreak occurred. During the investigation, several statistics were compiled, calculated, and presented in graphs to make them easier to understand.

In the first part of the paper, we will use four methods to conduct a quantitative analysis. Of these, we have chosen five of the more representative companies in the industry to study. The most representative companies are also chosen to be studied. In the first method, we analyzed whether the stock returns of the five companies received an impact before and after the outbreak. The second

method we did was a hypothesis test, and we used Shunfeng as a case study for the hypothesis test. The third method was an event analysis, where we borrowed market data to determine the epidemic's impact on SF. The final process is regression analysis, again using SF as a case study, where we analyze the relationship between the number of new diagnoses and SF's stock returns.

In the second part of the analysis, we conducted qualitative research, and we used the results of a questionnaire to make some recommendations to the company.

This paper is inspired by the event study method in the literature on the market performance of K12 listed educational companies according to the "double reduction" policy [1] and uses the event study method to test the impact of the epidemic on the logistics industry. According to the microeconomics knowledge in the book of Principles of Economics [2], demand curve and PED curve were simulated to analyze the results of the questionnaire to clarify the choices of consumers.

2. Impacts of COVID-19 on Chinese Logistics Industry

2.1. Time Division

I collected the epidemic data in China and used Excel to draw the graphs of newly confirmed cases, total confirmed cases and daily new deaths per million in China over time.

Figure 1 plots the change of the total number of confirmed cases over time. According to Figure 1, there were two significant increases in total cases in January 2020 and March 2022, and the second one was more significant. The increase in total cases between the two periods has been very slow.

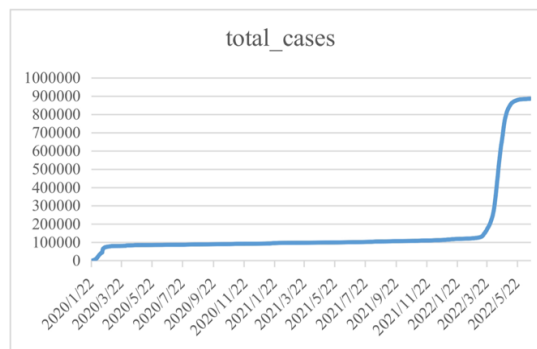


Figure 1: Total cases.

Figure 2 shows the curve of daily newly confirmed cases over time. There were also two peaks in the number of newly confirmed cases in Figure 2, which were in January 2020 and March 2022 respectively, consistent with the peak in Figure 1. For the second time, the number of daily additions was also higher.

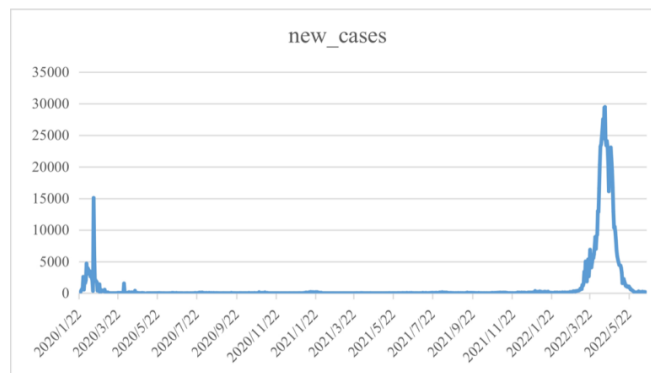


Figure 2: New cases.

Figure 3 shows the curve of daily new deaths over time. While the second outbreak appears to be more severe, the number of deaths in March 2022 is far lower than the number in January 2020.

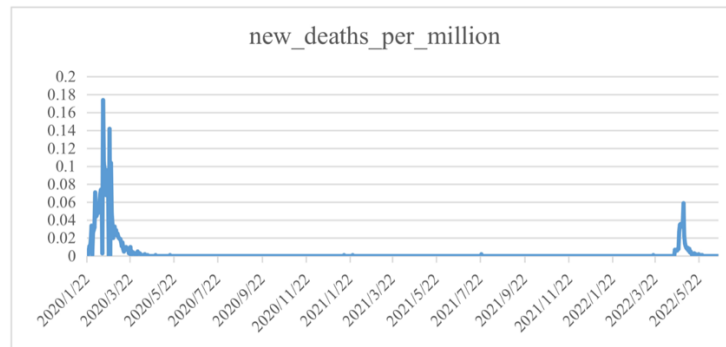


Figure 3: New deaths.

This means that in 2022, a more effective treatment for COVID-19 has been developed and, presumably, other measures have been developed as well. The first outbreak was caught off guard and had a bigger impact. In addition, March 2022 is relatively short, and many companies don't have complete data. Therefore, I chose the outbreak period in early 2020 as the research period.

2.2. Stock Returns of the Five Logistics Companies

We choose the stock data of SF Express, YTO Express, STO Express, Yunda Express and ZTO Express for research. Because in the logistics market, the market share of these five enterprises is the top five in the whole market, and the total market share of the five companies accounts for more than 70% of the whole market. So, it is an oligopoly market. Data of each company's opening quotation and closing quotation are collected to calculate stock returns. The formula of stock return is:

$$R = \frac{P_t - P_{t-1}}{P_t}$$

The line charts of stock returns over time are drawn below.

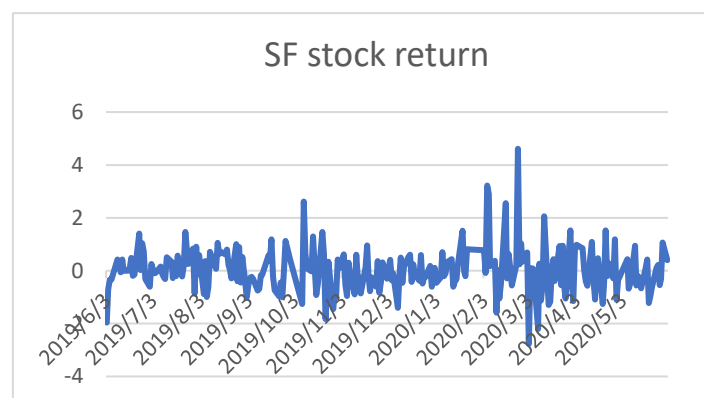


Figure 4: SF stock return.

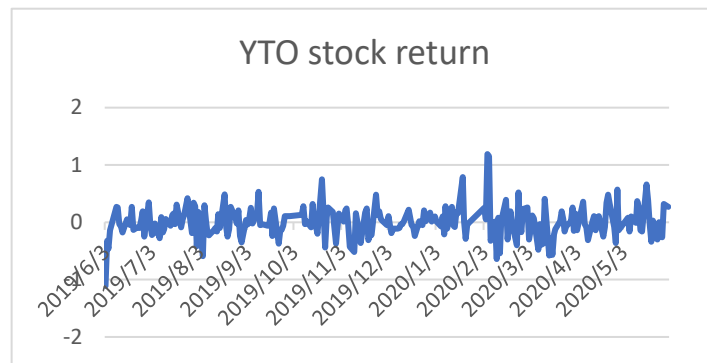


Figure 5: YTO stock return.

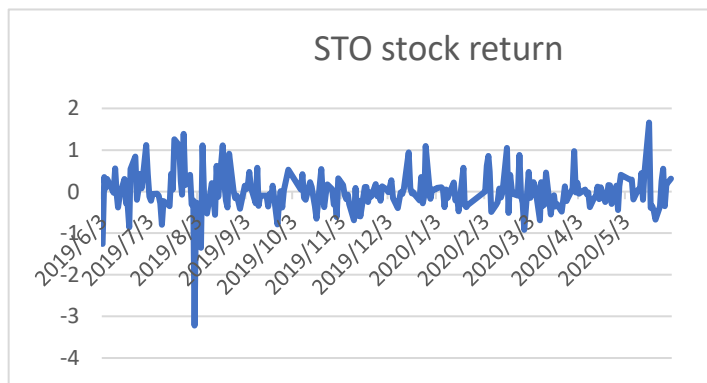


Figure 6: STO stock return.

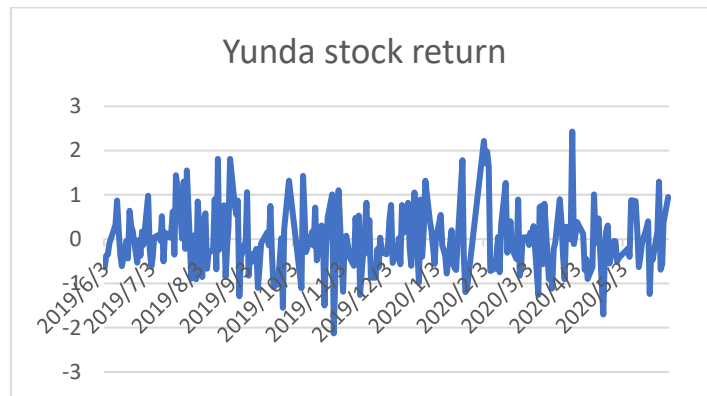


Figure 7: Yunda stock return.

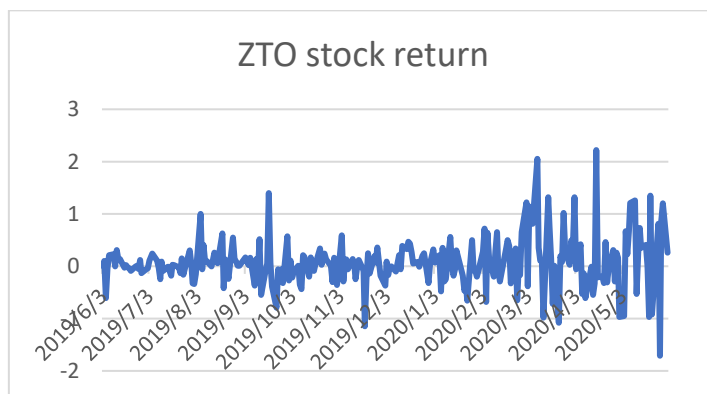


Figure 8: ZTO stock return.

The trends shown in the line charts are normal stock return movements, without particularly obvious or significant changes.

2.3. Hypothesis Test: T-Test

Since SF Express is the most popular logistics firm and enjoys a good reputation among consumers, SF Express is chosen as a case study. The t-test is used to see if there were significant differences or changes in stock returns before and after the epidemic. Therefore, the difference of mean values of sample is used for hypothesis test. After calculating the mean values separately, the following formulas are used to calculate the value of the relevant samples. Finally, we compare value with p value according to the p value table and draw a conclusion.

$$\begin{aligned}\bar{X}_1 &= \bar{X}_{before} = \frac{1}{n} \sum_{i=1}^{n=83} R_i \approx 0.09 \\ \bar{X}_2 &= \bar{X}_{after} = \frac{1}{n} \sum_{i=1}^{n=86} R_i \approx -0.012790698 \\ \sigma_{X_1} &= \sigma_{X_{before}} = \sqrt{\frac{1}{n} \sum_{i=1}^{n=83} (R_i - \bar{R})} \approx 1.30004444 \\ \sigma_{X_2} &= \sigma_{X_{after}} = \sqrt{\frac{1}{n} \sum_{i=1}^{n=86} (R_i - \bar{R})} \approx 0.50211918 \\ \gamma &= \frac{Cov(X_1, X_2)}{\sqrt{Var(X_1)Var(X_2)}} = \frac{\sum_{i=1}^{n=83} (X_1 - \bar{X})(X_2 - \bar{X})}{\sqrt{\sum_{i=1}^{n=86} (X_1 - \bar{X})^2} \sqrt{\sum_{i=1}^{n=83} (X_2 - \bar{X})^2}} \\ t_{SF} &= \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{\sigma_{X_1}^2 + \sigma_{X_2}^2 - 2\gamma\sigma_{X_1}\sigma_{X_2}}{n-1}}} \approx 1.97783\end{aligned}$$

Table 1: T-test.

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	0.09	-0.012790698
Variance	1.300044444	0.502119179
Observations	82	86
Hypothesized Mean Difference	0	
df	134	
t Stat	0.697904585	
P(T<=t) one-tail	0.243223066	
t Critical one-tail	1.656304542	
P(T<=t) two-tail	0.486446131	
t Critical two-tail	1.977825758	

Then,

H_0 : there is no significant difference of stock return between the two period

H_1 : there is significant difference of stock return between the two period

When sample size is between 100 and 200, and significant interval is 0.05, the two-tail p-value is 1.972.

$\therefore 1.977 > 1.972$

\therefore do not reject H_0

Therefore, there is no significant difference of stock return between before the breakout of COVID-19 and after the breakout of COVID-19 for SF.

2.4. Event Analysis

The sample is still SF Express. Since the study was on the impact of the epidemic at the beginning of 2020 on SF Express's stock returns, January 23, 2020, was selected as the event date, which was the day when Wuhan was shut down, indicating that the epidemic officially entered a very severe period.

$$\text{Expected Return 1} = R_{it1} = \frac{1}{243} \sum_{i=1}^{n=243} \frac{p_{closed_{i1}} - p_{open_{i1}}}{p_{open_{i1}}} \approx 0.004742742$$

$$\text{Expected Return 2} = R_{it2} = \frac{1}{41} \sum_{i=1}^{n=41} \frac{p_{closed_{i2}} - p_{open_{i2}}}{p_{open_{i2}}} \approx 0.028117873$$

$$\text{Market Return 1} = R_{mt1} = \frac{1}{243} \sum_{i=1}^{n=243} \frac{p_{closed_{m1}} - p_{open_{m1}}}{p_{open_{m1}}} \approx 0.00557431$$

$$\text{Market Return 2} = R_{mt2} = \frac{1}{41} \sum_{i=1}^{n=41} \frac{p_{closed_{m2}} - p_{open_{m2}}}{p_{open_{m2}}} \approx 0.02400066$$

$$\therefore \text{Normal Return} = R_{it} = \alpha_{it} + \beta_{it}R_{mt} + \zeta_{it}$$

$$\therefore \text{AR 1} = AR_{it1} = R_{it1} - (\alpha_{it1} + \beta_{it1}R_{mt1} + \zeta_{it1}) \\ = -0.959803643157403$$

$$\text{AR 2} = AR_{it2} = R_{it2} - (\alpha_{it2} + \beta_{it2}R_{mt2} + \zeta_{it2}) \\ = -0.904396296296296$$

So,

H_0 : there is no significant difference of stock return between the two period

H_1 : there is significant difference of stock return between the two period

$$CAR_i(t1, t2) = \sum_{t=t1}^{t2} AR_{it} = -1.859193952$$

$$var(CAR_i) = \sigma^2_1(t1, t2) = E((X - E(X))^2) = 0.00093222$$

So,

$$\theta_i = \frac{CAR_i(t1, t2)}{var(CAR_i)} = \frac{-1.859193952}{0.00093222} \approx -1994.3703$$

\therefore Reject H_0

\therefore There is significant difference of stock return between before the event and after the event for SF.

As a result, the epidemic has had a big impact on SF's stock returns.

2.5. Regression Analysis

SF Express is still selected as the research object. Linear regression analysis is used to study the relationship between daily new COVID-19 cases and stock returns. The scatter chart (Figure 8) below shows the number of new cases on the horizontal axis and stock returns on the vertical axis. The scatter points are very dense in the domain 12 to 214 and in the range -3.36 to 2.43. The red line is the best fit line, and it seems to have a slow upward trend.

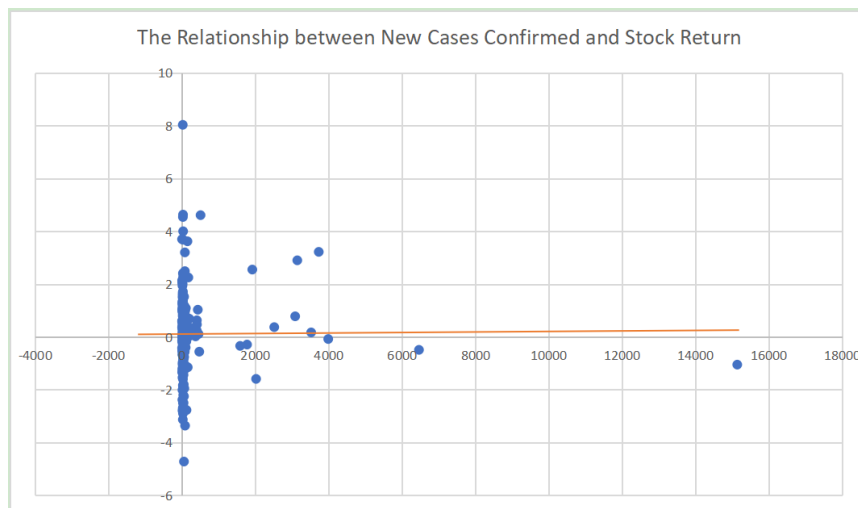


Figure 9: The Relationship between New Cases Confirmed and Stock Return.

The slope parameter β_1 of the best fit line is calculated by the following formula:

$$\begin{aligned}\beta_1 &= \frac{Cov(X, Y)}{Var(X)} = \frac{Cov(X, Y)}{\sqrt{Var(X)Var(Y)}} \times \sqrt{\frac{Var(Y)}{Var(X)}} \\ &= 1 \times 10^{-5}\end{aligned}$$

The value is so small and is smaller than 1 which means there is not a strong positive correlation between daily new COVID-19 cases and stock returns.

3. How the Five Big Logistics Companies Make Strategies Can Help Them Capture Initiative under the Background of COVID-19

3.1. Data Collection, Collation and Simple Process

Some information is needed to make qualitative analysis about the statuses of the five companies in consumers' minds. A questionnaire is designed to collect the data online by Wen Juanxing and offline.

The main purpose of designing the questionnaire is to know consumers' opinions towards these companies, so we asked some questions like 'Which one (or several) logistics company (ies) do you use most frequently? (You can choose more than one option)' 'Which company do you think is the most successful (best services, best reputation and goodwill, most suitable prices and some other comprehensive judge criteria) one?'. Also, there are some questions like 'The reason(s) for you to choose this (or these) companies is(are)? (You can choose more than one option)' 'Which company would you like to offer suggestion(s)? The suggestion(s) is(are)?' in order to know some improving points that are required to be considered by these companies. In addition, some questions which were originally designed to calculate Price Elasticity of Demand are also provided but there is something wrong with the questions and I will mention it later.

The questionnaire is firstly issued online and collected about two hundred copies of data online, several offline questionnaires are collected in one of the most crowded regions in Nanjing with a large volume of people which is Deji Plaza. At last, some extreme data which are obviously impossible are deleted. The two main criteria to determine the useless data are whether it is extreme value or whether it is logically wrong. The extreme value means the value is impossible to happen in reality like much larger or smaller than the common situation as some points on the top of the figure 9 and 10 shown below. Logically mistake means the logic in answering the questionnaire does not follow what the questionnaire supposes may because of answering questions casually or carelessly. For instance, the former question asks ‘If the delivery fees of your chosen logistics companies increase (ceteris paribus), will you continue to choose this (these) companies? If yes, to what extent of the increase of prices you can accept approximately?’ and this copy answers ‘yes’ for the former question but does not answer the next one, it is logically wrong and it should be neglected.

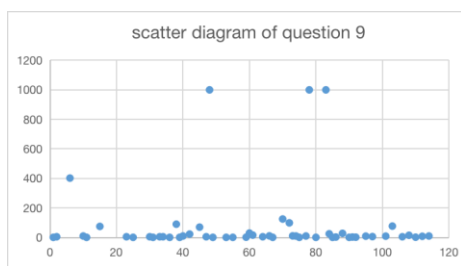


Figure 10: scatter diagram of Q9.

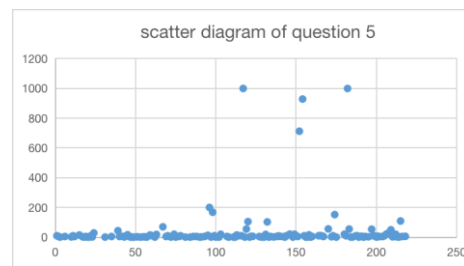


Figure 11: scatter diagram of Q5.

After this process, all the useful data are sorted out into an excel form and some calculations and statistical tools are made to obtain the basic data. The simply processed data is shown below (some direct data and charts are provided by Wen Juanxing):

Q1 Which one(or several) logistics company(ies) do you use most frequently? (you can choose more than one option)

option	number	%
Zhongtong	85	34%
Yunda	66	26.4%
Yuantong	66	26.4%
Shentong	61	24.4%
Shunfeng	214	85.6%
valid number	250	

Figure 12: Q1.

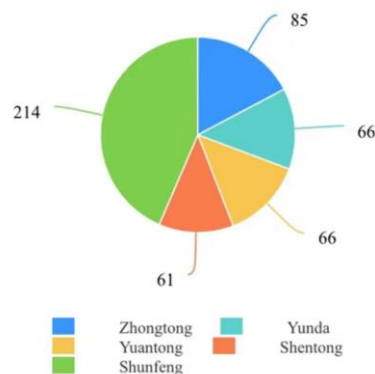


Figure 13: Q1.

Q2

The reason(s) for you to choose this(or these) companies is(are)? (you can choose more than one option)

option	number	%
favorable and affordable prices	89	35.6%
complete services (after-sales services, customer services, service attitude of deliveryman...)	144	57.6%
good delivery services (the speed of delivering, whether or not the package is damaged...)	191	76.4%
other reasons	25	10%
valid number	250	

Figure 14: Q2.

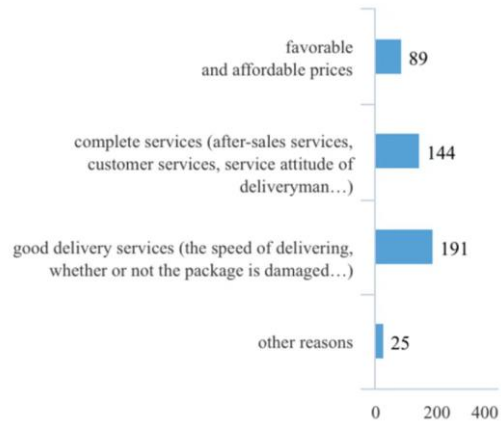


Figure 15: Q2.

The figure 12 and 13 are the data of question 1 which represents the using frequencies of different logistic companies to roughly evaluate their importance and market share between individuals and households. The figure 14 and 15 are the data of question 2 which can reflect some important elements for consumers to consider and judge whether he/she will choose this service. In addition, these two questions are the bases for our further analysis and suggestions.

Q2 If you want to deliver a stuff, how urgent the situation is will you be willing to choose use Shunfeng delivery in a higher price. (If Shunfeng is your frequent option, then please choose A)

option	number	%
Shunfeng has been my frequent option.	133	53.2%
Not very urgent but a little bit	31	12.4%
Relatively urgent	50	20%
Very urgent	36	14.4%
valid number	250	

Figure 16: Q8.

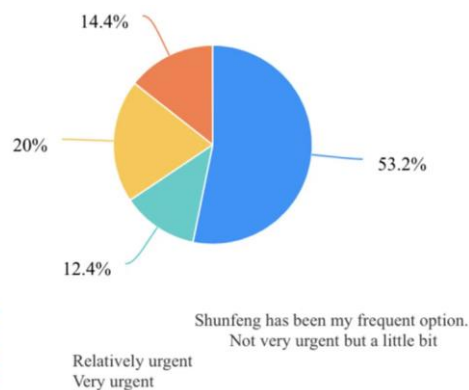


Figure 17: Q8.

Q9 Which company do you think is the most successful(best services, best reputation and goodwill, most suitable prices and some other comprehensive judge criteria) one?

option	number	%
Zhongtong	21	8.4%
Yunda	11	4.4%
Yuantong	6	2.4%
Shentong	5	2%
Shunfeng	207	82.8%
valid number	250	

Figure 18: Q9.



Figure 19: Q9.

Q11: Gender

option	number	%
Male	76	30.4%
Female	174	69.6%
valid number	250	

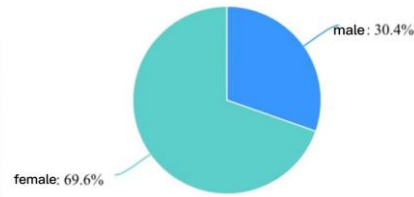


Figure 20: Q11.

Figure 21: Q11.

Q4 If the delivery fees of your chosen logistics companies increase (ceteris paribus), will you continue to choose this(these) companies? If yes, to what extent of the increase of prices you can accept approximately?

option	number	%
No (even if the increase of fees is just one cent)	78	31.2%
yes	172	68.8%
valid number	250	

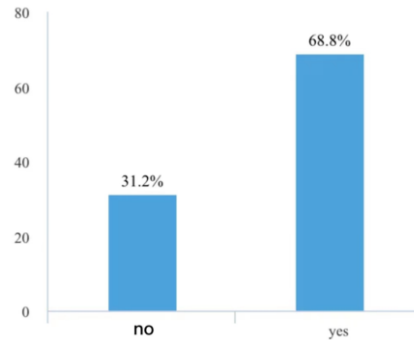


Figure 22: Q4.

Figure 23: Q4.

Q6 If there is no change in delivery fees of your chosen logistics companies but the prices of some competing companies decrease, will you be willing to switch to other companies? If yes, what is the minimum decrease of the other companies' prices you can accept approximately?

option	number	%
No	116	46.4%
Yes	134	53.6%
valid number	250	

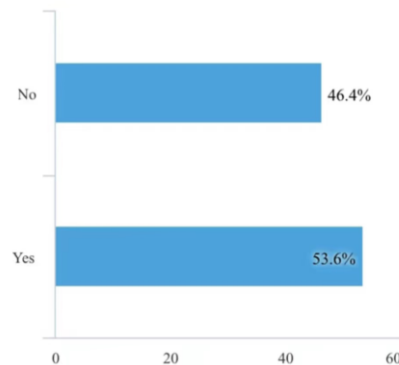


Figure 24: Q6.

Figure 25: Q6.

3.2. Suggestions of Decision-making to Improve Market Shares

Through figure 12 and 13, it is obviously that SF dominates the market among households as 214 people among 250 people choose SF (it is a multiple choice) which means most samples of the research use SF frequently, therefore, there is no need for SF to worry about its brand loyalty and market share.

By contrast, the other four companies seem to perform less competitive than SF does but the competition between these four companies are intense Because they almost take the same percentage of individuals and households' frequently used logistic services in Question 1 that is ranged from 24.4% of STO to 34% of ZTO. Thus, it may be difficult for them to catch up SF in this market, but there are still lots of ways for them to expand like internal revolution and external improvement because it turns out that a lot of customers repel services offered by these companies due to unsatisfied service quality that will be mentioned later.

Generally, the information collected shows that SF is leading the market and takes the dominant position in this market and the other four need to seek for alteration and improvement.

However, compared to the data searched online, the result we deduced is quite different from the

reality (the data is shown below).



Figure 26: changes in market share of 5 logistic companies in China.

The chart given in iiMedia Research’s website shows a quite different result from ours that is ZTO has been taken up the most market share throughout the past five years and the gap between it and the second company has become larger and larger no matter the second one is YTO before 2018 or Yunda after this time nodes. It turns out that the competition between the other four companies is disordered and changing but ZTO always comes out on top. In addition, SF’s dominant position in the collected set of information disappears in the other questionnaires. It only captured the fewest market share among the ‘Big Five’ for a time and rose by 0.92% from 2020 to January in 2021 and ascended into the top four.

This phenomenon may be caused by the difference of data sample. The questionnaire is released online and publicized among our classmates and their families that are all individuals and households. However, among the entire market, a large number of transactions are made between these companies and other businesses like online shops and delivery of products from factory or even international delivery also contributes to this market. To decrease the costs of production and increase the profit, businesses always choose to cut the cost in delivery like choosing a cheaper delivery service even if the quality of service may be low. That is why businesses always refuse to choose SF to deliver things although SF is much faster than other companies. The explanation of the differences between two sets of data is just a hypothesis since there is no sufficient data to support the opinions and assumption.

The general trends of data in Question 1 and Question 9 are extremely similar and it is reasonable and acceptable that if people think a company is successful, they will keep using products of this company on the premise that they are able to afford. Oppositely, if a company is not considered as successful or even unsuccessful, people will not choose its products with no doubt. Therefore, because households think SF’s some unique selling points of SF are attractive and worth consuming, they will frequently use SF delivery. However, the situation may be different among businesses because they may think that SF is expensive and they do not need a very fast delivery speed, so it is wasteful for them to choose SF, and therefore, other companies which are not very expensive but also not very slow are considered successful instead like ZTO. Therefore, data of Question 1 and Question 9 can only represent what individuals and households think but not the entire market.

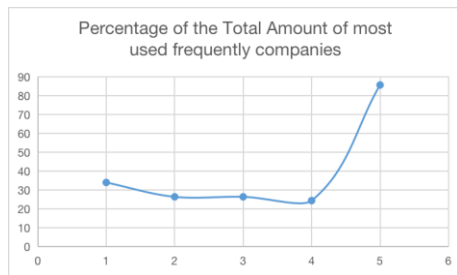


Figure 27: most used frequently.

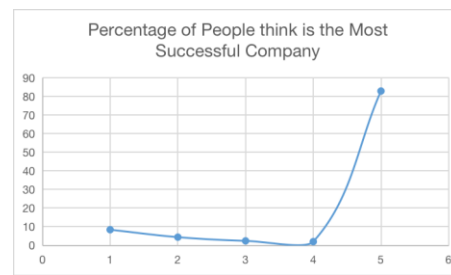


Figure 28: most successful.

These two charts show the result of Question 1 and Question 9. In chart 8, the y-axis represents the percentage of people who choose the company as frequent use, while the y-axis represents the percentage of people think the company is most successful. To axis, 1, 2, 3, 4, 5 and 6 represents ZTO, Yunda, YTO, STO and SF respectively.

There is also an interesting phenomenon which can be seen from the comparison of data between Question 1, 9 and Question 10. The Question 10 we set is ‘Which company would you like to offer suggestion(s)? The suggestion(s) is (are)?’ and the result shows that there are a lot of people want to offer suggestions to SF and it almost receives the largest quantity of advice. Because of the difficulty and lack of help in sorting out the data, we only collect 218 copies of qualitative questions and only 117 copies are eligible which give specified and detailed suggestions. Among the 117 copies, 42 copies is specially aimed at SF and some answers which are aimed at all the delivery companies are not included in the 42 copies. In addition to the 117 eligible copies, there are still 49 copies are ineligible but can be taken into account because the data only includes the company names that they want to suggest but there are not specified suggestions. Therefore, it can be deduced that these companies are the aim that they want to advise even if they did not specify their answers. Among the 42 copies of answers, 27 copies are about SF.

It seems conflicting that people use SF frequently and most people think it is the most successful one among the five, but SF also receives the most suggestions. It may be caused by the delicate services SF provides. The reason why individuals and households choose to use SF as a frequent choice is mainly because the delivery speed of SF is much faster than other companies, and, being different from businesses, the delivery speed is an important influencing factor when individuals are thinking about which service to choose. Among the suggestions, the most common answer is hoping SF to decrease the prices, therefore, we can find out that people are still unsatisfied by SF’s prices even if it provides very high-quality services. If SF can find ways to decrease its per unit costs and then decrease the prices, much more people will come to SF. It will be extremely easy for SF to dominate the whole market because all businesses are willing use a faster and higher quality services with a low price.

In order to make further analysis and future anticipation, we need to calculate the **Price Elasticity of Demand** of these five companies. Here is the formula of Price Elasticity of Demand, we can abbreviate it as the formula of PED:

$$PED = \frac{\% \Delta Q}{\% \Delta P}$$

Demand curves are needed to calculate the PED of these companies. Demand curve represents the quantity traded at different prices, therefore, our data collected is barely sufficient to obtain a rough demand curve because our Question 3 and Question 4 is ‘If the delivery fees of your chosen logistics companies increase (ceteris paribus), will you continue to choose this(these) companies? If yes, to what extent of the increase of prices you can accept approximately?’. Honestly, Question 4 to Question 7 is designed with a mistake that is ignorance of the quantity traded which means the

interviewees did not know how much kilograms the price refers to. So, some values which are much more than the supposed value range appears and some values are even three-digit numbers. Therefore, only the data ranged from zero to the price of the original delivery fee per kilogram can be selected, and the result from the data will be less accurate. The demand curve of these companies is obtained respectively and using SF as an example to explain how it is worked out.

All the data about SF are selected from who choose SF in Question 1 which means these people use SF more frequently. Then every data with number in the range from 0 ~ 18 in Question 5 are picked out because these people will still choose to use SF even if SF increase its prices properly. Here, it is assumed that each consumer will purchase one unit of the service. Ultimately, the sorted data is shown below:

Table 2: raw data of demand for SF.

Range of price increased	Number of people in this range
0 - 6	86
7 - 12	22
13 - 18	6

This figure represents that if the price is increased even in 18 yuan, there are still 6 people are willing to buy it as well. Therefore, 4 pairs of data can be obtained which respectively represents how many people are willing and able to buy the service (deliver one kilogram of stuff) at a specific price. The final 4 pairs of data are shown in Table 3:

Table 3: final data of demand for SF.

quantity	price
214	18
114	24
28	30
6	36

The first pair of data means that when the price is in its original price which is 18 yuan per kilogram (the original price is obtained from the official website and the price of delivering in the region of southern and eastern China is selected), 214 people among 250 that can be counted by the data of Question 1 are willing and able to consume at this price. Similarly, there are 114 people are willing to buy when the price is 24 and so on. Then, the Linear Regression Model is used to establish the trend line of these four points and then it will be the demand curve of SF as chart 10 shows. Using the same approach, the demand curves of the other four companies can be obtained which are charts 11 to 14.

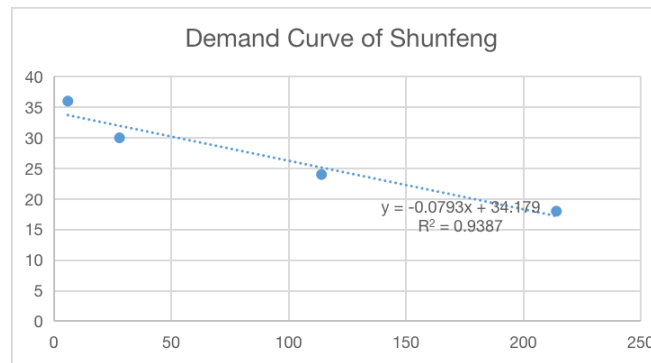


Figure 29: demand curve of SF.

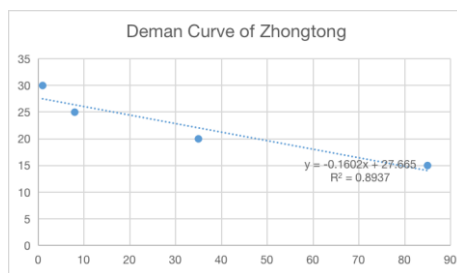


Figure 30: demand curve of ZTO.

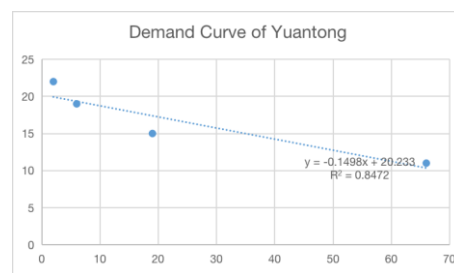


Figure 31: demand curve of YTO.

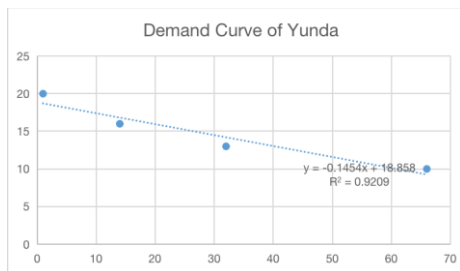


Figure 32: demand curve of Yunda.

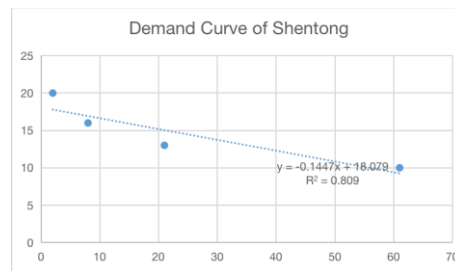


Figure 33: demand curve of STO.

Next, the PED of each firm is easy to be calculated. The method to calculate the PED of these companies is calculating the percentage difference of quantity divided by the percentage difference of price. The entire calculation process of PED of SF is:

$$\begin{aligned} \frac{\% \Delta Q}{\% \Delta P} &= \frac{\frac{Q_1 - Q_2}{Q_1}}{\frac{P_2 - P_1}{P_1}} = \frac{\frac{214 - 6}{214}}{\frac{36 - 18}{18}} \\ &= \frac{208}{214} \times \frac{18}{18} \approx 0.972 \end{aligned}$$

Therefore, all the PED of these five companies is calculated:

Table 4: PED of the five companies.

Company	PED
ZTO	0.988
Yunda	0.985
YTO	0.97
STO	0.967
SF	0.972

Nevertheless, PED is always changing in a demand curve, and it is nearly impossible for a company to double its prices, so the PED of the first one-third of the curve is also calculated to make more realistic suggestions.

Table 5: PED of the first one-third of the curve.

Company	PED
ZTO	1.765
Yunda	1.717
YTO	1.958
STO	2.186
SF	1.402

The PED calculated for the first one-third of the demand curve is clearer and more useful. STO has the largest PED in this segment, which means if STO decreases its prices for a few yuan, its revenue will increase totally, and it may be a successful strategy for it to increase its market share. By contrast, it is risky for SF to decrease its prices because its PED in this segment is 1.402 which is close to 1 and the decrease in prices will not have a very huge impact to its total revenue as STO has, and SF's delivery costs are also higher than the other companies for its advanced transport technology. In addition, our data collected makes some mistakes, so the PED calculated may be inaccurate.

Through the previous analysis, there are two companies that are very similar and encounter nearly the same situation in this market, which are Yunda and YTO. There may be an intense competition between these two companies because their data is so similar. In the past five years, these two companies have been the second and third ones in this market through the data provided by iiMedia Research and they all take up a percentage of the total frequently used companies of 26.4% that are the same. Therefore, their market shares or their sales revenue in this market are almost the same. Their delivery fees in a specific region are also closed which are 11 yuan and 10 yuan respectively in the region around Jiangsu Province. The high similar characteristics make them compete more intensely and strongly because people always think it is hard to make decisions when the options are similar.

Is there any possibility for them to apply game theory in their competition? It is difficult for 'prisoner's dilemma' to happen between these two companies since they cannot change the market just by their power even if they are two oligopolists in this market. Because several other companies also exist in this market, and as the number of oligopolists increases, the power of influencing the market for each company decreases. If Yunda and YTO decrease their prices simultaneously, their sales revenue may only increase a little or even decrease. Because the increase of quantity is distributed to both two companies, and the quantity increased for each one may be too few to counteract the impact of decreased prices. However, if they increase their prices simultaneously, customers will switch to other companies and both two companies will worse off. Therefore, the prisoner's dilemma is impossible to happen between these two companies because they are too weak

to influence the market. However, the pricing strategy game is still existing between them, and game theory is always being used, but it is too complicated to analyze in this article.

Thus, it is quite difficult for Yunda and YTO to compete in pricing. In order to increase their market shares, they should seek for another way that is improving their service qualities. In Question 10, there are 21 copies of answers are specially aimed at Yunda and 13 copies at YTO and most of the suggestions point out that both two companies are performing badly in providing services. Question 2 also shows the importance of quality services:

Q2 If you want to deliver a stuff, how urgent the situation is will you be willing to choose use Shunfeng delivery in a higher price. (If Shunfeng is your frequent option, then please choose A)

option	number	%
Shunfeng has been my frequent option.	133	53.2%
Not very urgent but a little bit	31	12.4%
Relatively urgent	50	20%
Very urgent	36	14.4%
valid number	250	

Figure 34: Q2.

Most people choose the second and the third option that are all about services. Therefore, quality services are quite important for these two companies to consider. If one of them can put money into Research and Development to seek ways to improve the quality of its services, it may win the other and gain more market shares in the long run.

4. Conclusion

In the part of quantitative analysis, data processing through hypothesis test and regression analysis shows that the epidemic has no impact on SF Express's stock returns. But it turns out that the epidemic had a big impact on SF Express's stock returns with the use of event analysis. This may be because the event method studies the effects of an event, i.e., a specific date. But the outbreak lasted for some time not a specific day.

In the part of qualitative analysis, SF is found to be the most prevalent logistics company among the five companies in the group of individuals and households. It is not only frequently used, but also commonly considered as a 'successful business' since it has created its image and brand profile that made such a characteristic business successful in this market. Also, it is better for companies to be market-oriented in this market because they should try to figure out what kind of services are customers most want. Through the Question 2, it is clear that quality services is a significant factor for people to choose businesses. Thus, it is crucial for Yunda and YTO to consider how to improve their service qualities like improving the attitudes of customer services and deliveryman, avoiding damages of packages through the way of transporting, providing home delivery services instead of just using receiving agencies and so on.

In conclusion, the situation in the market is much more complicated and special than we expect and imagine, so it is necessary for companies to make utter analysis before making decisions, and the most important is that companies should put the customers first if they want to increase their market shares, goodwill, and reputation in the long run.

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Appendix

Questionnaire

1. Which one (or several) logistics company(ies) do you use most frequently? (You can choose more than one option)
 - A. ZTO
 - B. Yunda
 - C. YTO
 - D. STO
 - E. SF
2. The reason(s) for you to choose this (or these) companies is(are)? (you can choose more than one option)
 - A. favorable and affordable prices
 - B. complete services (after-sales services, customer services, service attitude of deliveryman...)
 - C. good delivery services (the speed of delivering, whether the package is damaged...)
 - D. other reasons: _____
3. If the delivery fees of your chosen logistics companies increase (ceteris paribus), will you continue to choose this(these) companies? If yes, to what extent of the increase of prices you can accept approximately?
 - A. No (even if the increase of fees is just one cent)
 - B. Yes, the price increase I can accept is approximately ()yuan to ()yuan
4. If there is no change in delivery fees of your chosen logistics companies but the prices of some competing companies decrease, will you be willing to switch to other companies? If yes, what is the minimum decrease of the other companies' prices you can accept approximately?
 - A. No
 - B. No, the minimum decrease of the other companies' prices is approximately () yuan to ()yuan
5. If you want to deliver a stuff, how urgent the situation is will you be willing to choose to use SF delivery in a higher price. (If SF is your frequent option, then please choose A)
 - A. SF has been my frequent option.
 - B. Not very urgent but a little bit
 - C. Relatively urgent
 - D. Very urgent
6. Which company do you think is the most successful (best services, best reputation and goodwill,

most suitable prices and some other comprehensive judge criteria) one?

- A. ZTO
- B. Yunda
- C. YTO
- D. STO
- E. SF

7. Which company would you like to offer suggestion(s)? The suggestion(s) is(are)?

A. ZTO

(Suggestion(s) is(are)): _____

B. Yunda

(Suggestion(s) is(are)): _____

C. YTO

(Suggestion(s) is(are)): _____

D. STO

(Suggestion(s) is(are)): _____

E. SF

(Suggestion(s) is(are)): _____

Thank you for answering this questionnaire!