



The Impact of Two Kinds of Responses to COVID-19 on the Stock Prices of Multinational and Local Enterprises

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Abstract: Ever since COVID-19 became popular around the world, there are two kinds of measures taken by governments to respond to the impact on stock markets, including controlling the number of new cases and promulgating economic policies to stimulus economy. This paper studies how the two measures, controlling the spread of COVID-19 and formulating economic policies, impact stock returns in United States and what are the differences. Additionally, this paper analyses if these two measures have the same impact on multinational companies and local companies. By using CAPM and descriptive statistical analysis, the researchers find that economic stimulus is effective in short term but controlling the spread of pandemic plays the key part in long-term economic growth, international trades make a difference in reducing risk during COVID-19. Finally, to understand is the impact of investor sentiment on stock prices the reason for these two responses to changes in stock returns, Fama-French three factor with sentiment factor added is used to explore the relationship between investor sentiment and stock returns. The conclusion is that changes in investor sentiment are positively correlated with the excess return of the portfolio.

Keywords: COVID-19; Two Kinds of Responses; Stock Prices

1. Introduction

Major public events often have an impact on the stock market. There are numerous studies on impact of major public events such as natural disasters and social security events on the stock market. As a major public event, the outbreak of COVID-19, came as a shock to market participants. Spreading extremely fast, the World Health Organization characterized COVID-19 as a pandemic on March 11, 2020. To avoid violent fluctuations in stock market caused by COVID-19, governments take two kinds of actions, controlling the spread of the pandemic and formulating economic policies to stimulate stock market.

Even though there are existing articles analysing factors affecting stock returns during COVID-19, there is no research on comparison of these two most vital actions, the control of the disease and governments' efforts to stimulate economy and create welfare. Controlling the spread of the pandemic could be seen as an indirect method of boosting economy, and formulating economic policies as a direct method. How long will the two methods take effect after being implemented, how effective are they, and how long will they last? Studying on effects of these two measures help governments make decisions and help the public better understand reasons behind and then make investment decisions.

So this paper will study how these two kinds of measures influence stock returns of some companies and the whole stock market in United States, including the speed and intensity of influence. In addition, this paper analyzes the transmission mechanism of the two measures to the stock price from the perspective of investor sentiment. Additionally, by comparing local enterprises and multinational enterprises in the same industry, this paper analyzes the role of international trade in coping with major shocks. This study helps for investment and policies making in major public events such as COVID-19.

The research questions raised in this paper are as follows:

- (1) How do the two measures, controlling the spread of COVID-19 and formulating economic policies, impact stock returns in United States and what are the differences?
- (2) Do these two measures have the same impact on multinational companies and local companies?
- (3) Is the impact of investor sentiment on stock prices the reason for these two responses to changes in stock returns?

2. Literature review

A large amount of work has been devoted to studying factors affecting stock volatility returns. Some researchers focus on the impact of corporate fundamental indicators or macroeconomic factors on stock returns, for example, Cai (2003) found that whether in the short-term or long-term, liquidity has an important impact on stock returns. Li et al. (2006) found that the asset-liability ratio, the rate of change in equity per share, the price-to-book ratio and the β value are significant influencing factors of stock returns. Dai (2012) stated that earnings per share and return on net assets can best reflect the profitability of the sample listed companies that year, thereby affecting the stock price return rate. Kishor & Marfatia (2013)^[1], Lutz (2015)^[2] and Caraiani & Călin (2018)^[3] all suggested that unexpected increase in the Federal funds rate is negatively related to stock prices and returns, and also the fact that the effect is state-dependent. Flannery (2015) estimated a GARCH model of daily equity returns, found six candidates for priced factors and finally concluded that macroeconomic factors do influence aggregate stock returns.

While other researchers start from behavioral economics and oppose the assumption that people are rational, and analyze stock returns from the perspective of investors. Lee (1991)^[4] pointed out that investors are not completely rational, and their investment decisions may be influenced by emotions. Saunders (1993) found that negative sentiment caused by the influence of weather and seasons will affect the rate of return of risky assets. Hirshleifer (2001)^[5] found that investors would have systematic pricing bias for physiological and cognitive reasons. Psychological research shows that when investors have stronger anxiety and fear, they are more reluctant to take risks (Etzioni (1998)^[6], Hanock (2002)^[7], Mehra & Sah (2002)^[8]. Kaplanski & Levy (2010) studied the impact of the air crash on the U.S. stock market and found that investors' anxiety caused by the impact of the air crash has led to the negative return of the stock market that far exceeds the real economic loss caused by the air crash itself. Moreover, after the earthquake in Wenchuan, China, Shan (2011) found that investors closer to the epicenter had greater mood swings, and the stocks of companies they mainly invested in were more affected. Yu and Zhang (2012) empirically tested the correlation between the Baidu index and the performance of the ChiNext stock market, and on this basis, he verified that the limited attention of investors can affect the market trading activities of stocks. Xu (2013) found that the herd behavior of institutional investors will aggravate the risk of stock price collapse, rather than play a role in stabilizing the capital market, indicating that the investment psychology of investors has a huge impact on stock returns. On the other hand, policy uncertainty increases investors' risk perception and ambiguity aversion, which has a negative impact on their emotions, and then affect stock volatility (Jin, 2016). These studies have all proved that investor sentiment can be used as a reason to analyze stock fluctuations.

With the outbreak of COVID-19, many researchers began to study the factors affecting stock market in the pandemic, including economic policy stimulus and the change of severity of pandemic. He (2019) studied the relationship between economic policy uncertainty and stock price collapse risk. On the other hand, Cao (2020) indicated that a stock market index tends to move with Covid-19's local and non-local spreads, so international efforts of containment are expected to pare stock market losses. Bullard (2020)^[9] found that a financial crisis during the initial shock was avoided by compensating those who are most disrupted. Through empirical analysis, Chen and Qu (2020) found that the growth rate of confirmed cases has an inverted U-shaped relationship with stock returns, and the growth rate of death cases has a U-shaped relationship with stock returns. Further research found that the smaller the company and the higher the level of financial leverage, the more severe the negative impact of the epidemic on stock returns; at the same time, the stock prices of listed companies located in severely affected provinces are more affected by the epidemic. Cepni (2021)^[10] found that the negative reaction of stock returns to contractionary monetary policy shocks is stronger in the state associated with relatively higher investor sentiment.

The above results show that the pandemic has a negative impact on the company's stock price, and investors should rationally distinguish the impact on different companies.

However, few studies have compared the impact of economic policy stimulus and the change of pandemic severity on stocks, even these internal logics for fighting the pandemic are applicable in the face of other public emergencies. Making comparison of these two kinds of measures helps governments to formulate policies in the face of shocks such as COVID-19.

3. Research method

This paper will use both secondary and primary data to conduct quantitative and qualitative analysis. In general, the resources, research methods and other information rated is shown in table 1.

Table 1 Resources and research methods

	Research question 1	Research question 2	Research question 3
Data	1) Newly confirmed cases from January 3 rd , 2020 to September 3 rd , 2021 in United States. 2) The time point when US government promulgated economic policy 3) S&P 500 Index	1) Daily stock price 2) Number of outstanding shares 3) S&P 500 Index	Data of forty-eight companies with the most active trading volume on the NYSE from June 2020 to June 2021, 52 weeks, including outstanding price, net book asset and others.
Resources	Secondary: World Health Organization, Bloomberg Primary: questionnaire	Secondary: World Health Organization, Bloomberg, Wind, Sina Finance Website	Secondary: Wind
Research methods	Quantitative: descriptive statistical analysis Qualitative: CAPM	Quantitative: descriptive statistical analysis Comparative analysis Qualitative: CAPM	Qualitative: Fama- French three factor model
Analysis tools	Excel, Eviews8, python	Excel, Eviews8	Excel, Stata
Result presentation	Chart to analyze people's option; Figure to analyze the trend	Figure to compare the difference of impact on multinational and local companies	Tables to display test results and regression results.

For research question one, researchers first conducted a questionnaire survey on 1000 college students, asking what people think during the pandemic will affect the long-term fluctuation of stock prices and what will affect the short-term. Then, researchers analyzed data collected by making a graph of the stock price changes of local companies under economic stimulus and a graph of the changes of S&P 500 with the development of the pandemic. And CAPM is used to measure risk.

The changes of value of β can reflect the changes of stock risk under the two kinds of measures.

The original formula of CAPM is

$$R_i = R_f + \beta_i \times (R_m - R_f) \quad (1)$$

The above formula can be converted into:

$$R_i = R_f \times (1 - \beta_i) + \beta_i \times R_m \quad (2)$$

The corresponding regression equation of (2) is:

$$y_i = \alpha_i + \beta_i \times x + \varepsilon \quad (3)$$

Researchers regressed the expected market return of a single stock and the average market return using eviews8 and python.

For research question two, calculation and drawing methods are the same as question one. Analyze the figure we get and compare it with that of local companies.

For research question three, the mathematical expression of the model is expressed as follows:

$$R_{pt} - R_{ft} = a + b * (R_{mt} - R_{ft}) + s * SMB_t + h * HML_t + \varepsilon_t \quad (4)$$

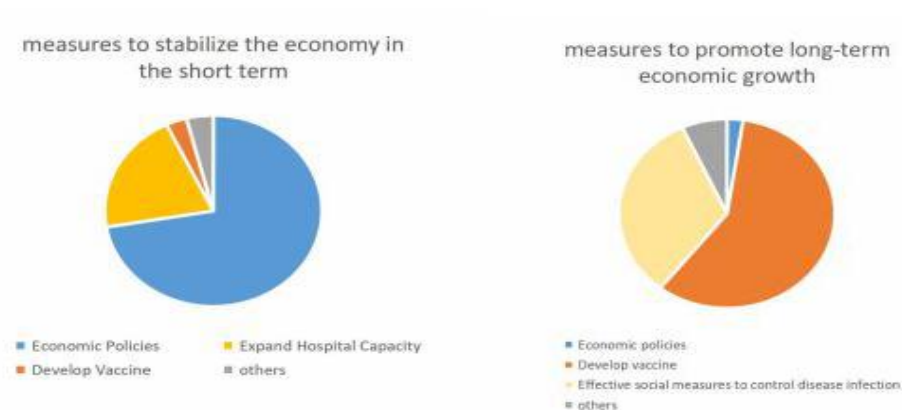
Based on this, this paper tried to add sentiment factors to the model. Firstly, the new sentiment factor was tested for stationarity. Then, performed correlation test and regression analysis on four explanatory variable factors, and did multicollinearity test. The four-factor model was obtained by constructing the emotion factor and introducing the FF three-factor model. Used stata14 software to perform regression analysis, and adopted a robust regression method to verify whether sentiment factors can affect portfolio excess returns. Finally, analyzed the results.

4. Result

Research question one:

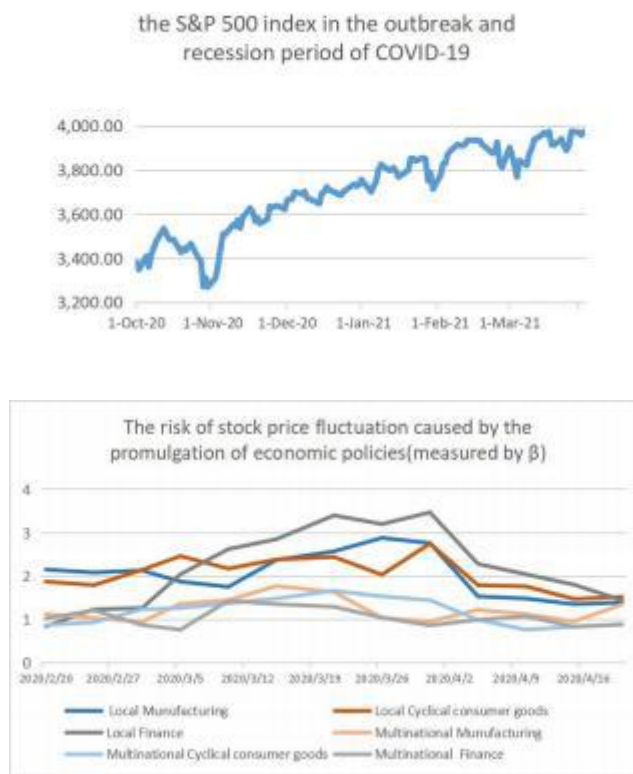
According to the questionnaire, more than 70% of people think that direct economic policy stimulus is more conducive to short-term economic recovery. But in long-term economic growth, the percentage of people supporting vaccine research and effective social measures to control disease infection exceeded 90%.

Figure 1 Questionnaire results



According to Figure 2, The S&P 500 index fluctuates in the short-term and rises in the long-term when newly confirmed cases reduce. While the index has a certain reaction time to the implementation of the policy, but in the long run, the index rises significantly due to the implementation of the policy.

Figure 2 Changes in the S&P 500 Index before and after two major events



Research question two:

Figure 3 The risk of stock price fluctuation caused by the promulgation of economic policies(measured by β)

5. Discussion

Research question one:

Same as the results shown in the questionnaire, when COVID-19 first appeared in the US in late February 2020, the economy declined rapidly. The decisive economic policies promulgated by the Federal Reserve quickly curbed the downward trend, so that the stock prices of various industries began to rise. However, in the long run, the rising speed of stock prices of various industries decreased after a short period of rapid recovery. Even half a year after the implementation of the economic policies, the stock prices had not returned to the level before the announcement of the economic policies. Compared with promulgation of economic policies, when entering 2021, after the government controlled the spread of the epidemic through social measures, the stock price can grow steadily for a long time.

Besides, the changes of value of β have shown the risk of stock under the two kinds of shock. When the number of new cases increased, the risk of stocks increased slightly in all three industries and returned to the original level after a short period of time. But after the promulgation of economic policies, the risk of stocks increased violently, especially in finance industry, and the high level of risk remained for more than half a month.

For different industries, the cyclical consumer goods industry responded most quickly to the situation in which COVID-19 became serious, but responded most slowly to both economic stimulus and the improvement of the pandemic, and the recovery degree is also the lowest. The financial industry responded slowly to the serious epidemic, but recovered quickly. The response speed and intensity of the manufacturing industry of both kinds of measures are the fastest and highest, and the recovery degree is also the highest.

In summary, when comparing the effect of the two kinds of measures towards COVID-19, economic policy stimulus can play a role quickly in the short term, while the control of the number of newly diagnosed cases is more effective for the long-term stability of stock prices.

Research question two:

Comparing multinational enterprises with local enterprises, under the impact of the first measure--controlling the number of newly confirmed cases, the overall change trend of stock price of financial industry and cyclical consumer goods industry was similar with that of local enterprises. But the biggest difference is in manufacturing industry. The stock price volatility of multinational manufacturing enterprises was significantly higher than that of local enterprises, which means that multinational enterprises have higher risk during COVID-19.

On the other hand, before and after the promulgation of economic policies, the fluctuation range of stock price of multinational enterprises in these three industries was smaller than that of local enterprises. The trends in these three industries are consistent.

Overall, compared with local enterprises, multinational enterprises have less response to government's economic policies, but when the number of newly confirmed cases increases sharply, the risk of stock price fluctuation is higher.

Research question three:

Correlation test and multicollinearity test after regression analysis were performed on the four explanatory variables. The VF test resultsshow that the VIF values of the four factors are all less than 10, the average VIF is 3.75, and there is no multicollinearity among the four factors.

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