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Factors affecting Stock Returns, Stock Return Volatility and Stock liquidity under the COVID-19 situation: A Case study of the banking sector in Shanghai Stock Market

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Abstract

Purpose: This research aims to test whether the Covid-19 cases and deaths as well as other stock indicators have significant relationships with the stock market return, liquidity, and volatility under the banking sector in the Chinese stock market. **Research design, data and methodology:** The researcher applies a quantitative method for the data measurement. This research collected the available data from several reliable resources such as tradingview.com, Sina news, WHO website and so on. Fixed effect panel regression model was used in this research to test the hypothesis. **Result:** The regression results indicate that the daily growth in the total number of confirmed cases and the total number of confirmed deaths caused by COVID-19 has no significant effects on the stock market returns and price volatility. The daily growth in the total number of confirmed cases caused by COVID-19 has some significant negative effects on the stock liquidity. Moreover, the trading volume of stocks, Price-Book ratio has significant positive effects on the stock market return, volatility, and negative effects on stock liquidity, while market capitalization has significant positive effects on the stock liquidity, negative effects on stock return volatility. **Conclusion:** The study indicates that stock market investors should focus more on other factors such as financial ratio (P/E ratio); GDP, interest rate, those relevant indicators might also affect the stock return volatility and stock trading liquidity, as well as affect the return on the stock. Researchers as well as investors are recommended to understand that Covid-19 pandemic cannot always affect the stock return, stock liquidity, and stock price volatility. Moreover, investors can get some ideas about finding good investment opportunities under the covid-19 after reading this research.

Keywords: Covid-19 pandemic, stock liquidity, stock return, PB ratio, trading volume, Chinese stock market

1. Introduction

1.1 General Background:

At the beginning of year 2020, Covid-19 pandemic has created huge and further impacts on the global markets until the current period (Sohrabi, C., Alsafi, Z., O'Neill, N., Khan, M., Kerwan, A., Al-Jabir, A. and Agha, 2020). The global economy faced a huge challenge, which brought huge potential and uncontrollable business risks toward many small and medium enterprises. According to the report from WHO (2020), the number of Covid-19 cases as well as number of Covid-19 deaths keep increasing around the world. This pandemic crisis will continue to create further unpredictable impacts on the global economy and society in the near future.

Investors coming from affected enterprises as well as personal investors would like to invest in some kinds of stocks in order to generate some income. However, they need to consider the potential Covid-19 influence on the stock price return as well as stock trading liquidity.

Study of Alaoui Mdaghri, A., Raghibi, A., Thanh, C.N. and Oubdi (2021) showed that the Chinese stock market was able to remain stable under this serious crisis, especially with the high-quality control by its government. However, even though China can control and reduce the Covid-19 effects, the overall Chinese stock market with many firms' stocks still face some negative effectiveness based on the performance of the daily stock market, this consequence requires further research to test whether stock market faces some influence mainly caused by confirmed Covid-19 cases and number of Covid-19 deaths.

Financial sectors in the stock market play an important role in China, especially the banking industry (Zhang, D., Hu, M. and Ji, 2020). This research selected banking industry in the Financial Sector under the Shanghai Stock Exchange market as this research's target, in order to correspond to and compare with previous studies.

Compared to our previous studies, this research not only tested the impact on stock returns and stock liquidity created by Covid-19 pandemic, it also tested the further impact on stock market volatility created by this crisis.

1.2 Objective:

The main objective of this research is to test whether Covid-19 pandemic, market capitalization, trading volume as well as price to book ratio have influence on the stock market return, liquidity and volatility.

1.3 Contribution:

This research gives more ideas to investors and researchers, in order to know how Covid-19 crisis and other stock indicators affect stock return and stock liquidity in the Chinese stock exchange, especially Shanghai Stock Exchange market. It also helps to support researchers to do further research on Covid-19 effects and the stock market. Moreover, this research helps to remind investors to be aware of the firms' financial indicators and Covid-19 crisis, which can affect the stocks' performance in the near term.

1.4 Limitation:

There are several limitations on this study. Firstly, some reliable resources do not provide a specific number of Covid-19 cases and Covid-19 deaths at the end of 2019, this study can only apply the available data from the beginning of 2020. Secondly, this study only use available stocks data on weekdays since stock market closes on weekends. Thirdly, this study can only consider data until October 2021 since it is impossible to use unlimited information into this research. Fourthly, only 12 banking firms can contribute into the research since some firms in this sector do not provide adequate stock price information. The last limitation is that: some other financial variables such as P/E ratio cannot be used since the available data sources do not provide adequate data to support.

2. Literature Review

Several previous research aims to prove that Covid-19 crisis plays an important role in the stock market performance. Based on the study of Nguyen, Hai, and Nguyen (2021), daily growth in the number of confirmed cases affected by Covid-19 crisis as well as the daily growth in the number of confirmed deaths cause by Covid-19 pandemic have inverse relationship with the stock market returns and stock liquidity under the financial services sectors in Vietnam. A higher number of Covid-19 cases and deaths will lead to lower stock market return and lower stock liquidity. Since the serious Covid-19 pandemic might create a huge impact on those enterprises under the selected market, and might cause less investors to invest in those sectors.

Alaoui Mdaghri, Raghibi, Thanh, and Oubdi (2021) also did the deep research to examine the impacts on stock liquidity created by Covid-19 pandemic; the serious problem of covid-19 crisis will reduce more stock trading activities in MENA countries where

are strongly affected. The global financial markets have been strongly affected by Covid-19 crisis, which influences its stability, resulting in fluctuating stock returns on most countries' stocks. Kaouther, and Mohammed Abdullah (2021) also proved that the increasing number of Covid-19 new cases with increasing number of Covid-19 new deaths would make further negative influence on the stock trading performance. Furtherly lead to lower stock price returns as well as stock liquidity of S&P 500 firms, the result of this previous study might be caused by the poor performance of those selected firms, since more Covid-19 deaths had made those firms more difficult to generate enough profits. Empirical research of Marozva and Magwedere (2021) discovered that under the Covid-19 crisis, volatility of stock price in developed markets can negatively affect the stock market liquidity. This study will conduct further research to test the influence of stock volatility under the number of Covid-19 cases and deaths

Moreover, Al-awadhi, Alsaifi, Alawadhi, and Alhammadi (2020) applied panel regression analysis to examine that the firms under the Chinese stock market, especially the firms listed in the Shanghai Stock Exchange Composite Index were significantly inversely affected by the Covid-19 crisis at the beginning of the Covid-19 pandemic. The number of Covid-19 increasing cases brings in more influence on the stock market return and liquidity more than the number of Covid-19 deaths during that time.

Based on these aforementioned studies, this study will conduct further research by applying appropriate methods to test the relationship among Covid-19 crisis, stock market liquidity, stock returns, and volatility; this study will also apply several financial indicators corresponding to previous studies to test the further results.

3. Research Methodology

3.1 Research Models:

According to Nguyen, Hai, and Nguyen (2021), this study applies several models to conduct and examine the potential influence of the Covid-19 pandemic with other stock indicators on the stocks return, volatility and liquidity of those selected banking companies under the Shanghai Stock Exchange market.

To extend the previous studies and create a new research direction, this study will conduct three research models. Model 1 is going to test how the impacts created by Covid-19 pandemic and other stock indicators can affect the stock return of those selected companies (Nguyen, Hai, and Nguyen, 2021). Model 2 is going to test how the impacts created by Covid-19 pandemic and other stock indicators can affect the stock liquidity of those listed banking companies (Alaoui Mdaghri, Raghibi, Thanh, and Oubdi, 2021). Model 3 is going to test how the impacts created by Covid-19 pandemic and other stock indicators can affect the stock volatility of those listed banking companies (Floros, 2009).

(1) $\mathbf{R\_PRC_{i,t} = \theta_o + \theta_1 MARCAP_{i,t} + \theta_2 Volume_{i,t} + \theta_3 PB_{i,t} + \theta_4 CHGCASENO_{i,t} + \theta_5 CHGCASEDEAD_{i,t} + \sum_{i=1}^{n-1} \theta_i Dummy_i + \mu_{i,t}}$

(2) $\mathbf{AMIHUD_{i,t} = \alpha_o + \alpha_1 MARCAP_{i,t} + \alpha_2 Volume_{i,t} + \alpha_3 PB_{i,t} + \alpha_4 CHGCASENO_{i,t} + \alpha_5 CHGCASEDEAD_{i,t} + \sum_{i=1}^{n-1} \alpha_i Dummy_i + \mu_{i,t}}$

(3) $\mathbf{VOLATILITY_{i,t} = \beta_o + \beta_1 MARCAP_{i,t} + \beta_2 Volume_{i,t} + \beta_3 PB_{i,t} + \beta_4 CHGCASENO_{i,t} + \beta_5 CHGCASEDEAD_{i,t} + \sum_{i=1}^{n-1} \beta_i Dummy_i + \mu_{i,t}}$

where:

- β, θ, α = Regression coefficient
- R_PRC_{it} = Daily return on the stock based on closing price of bank i during day t
- $AMIHUD_{it}$ = Amihud illiquidity ratio of bank i during day t = $\frac{Daily\ stock\ return_{i,t}}{Ln(Volume_{i,t})}$
- $VOLATILITY_{it}$ = Stock return volatility of bank i during day t
- $MARCAP_{it}$ = Market capitalization of bank i during day t
- $Volume_{it}$ = Daily Stock trading volume of bank i during day t
- PB_{it} = Market to Book ratio of bank i during day t
- $CHGCASENO_{it}$ = Change in number of Covid-19 case of bank i during day t
- $CHGCASEDEAD_{it}$ = Change in number of Covid-19 death of bank i during day t
- $Dummy_i$ = Cross section fixed-effect dummy variable
- n = Number of Banks
- μ = Error term

3.2 Measurement of Variables:

Dependent variable:

$R\_PRC_{i,t}$ represents the return of banking company's stocks i on day t, it will be applied to test the daily stock return of those listed banking companies (Nguyen, Hai. and Nguyen, 2021). The formula of calculating this key variable is:

$$R\_PRC_{i,t} = Ln(\frac{Closing\ Price_{i,t}}{Closing\ Price_{i,t-1}})$$

$AMIHUD_{i,t}$ is a common measurement that researchers normally apply it to measure the stock illiquidity. This key variable indicates the stock illiquidity of banking company i on day t. Higher Amihud ratio will indicate lower liquidity of the stock, those listed companies' stocks with higher amihud ratio would not be traded successfully (Alaoui Mdaghri, Raghibi, Thanh, and Oubdi, 2021). The formula of calculating this key variable is:

$$AMIHUD_{i,t} = \frac{|Daily\ stock\ return_{i,t}|}{Ln(Volume_{i,t})}$$

$VOLATILITY_{i,t}$ represents the stock volatility of banking company i on day t. For the stock price volatility, it means how the stock price fluctuated in that trading day. Under the volatility measure, the high prices as well as the low prices will contributes to conduct the simple measure of stock volatility (Floros, 2009), higher volatility indicates higher fluctuation of the company's stock during the trading periods. The formula of calculating this key variable is:

$$VOLATILITY_{i,t} = Ln(H_{i,t}) - Ln(L_{i,t})$$

Independent variable:

$MARCAP_{i,t}$ represents the market capitalization of banking company i during trading day t. Market capitalization is defined as the total value of the shares of a company, which applies the total number of stock shares multiplied with the stock market price. This key variable normally refers to firm size of a company as well (Nguyen, Hai, and Nguyen, 2021). The formula of calculating this key variable is:

$MARCAP_{i,t}$ = Ln (Market capitalization of bank i during day t)

VOLUME $_{i,t}$ represents the daily trading volume of banking company i's stocks during day t. It refers to how many stocks of the company traded in the current day. Based on the previous studies (Marozva and Magwedere, 2021), this key variable normally can measure and indicate stock liquidity and stock return. The formula of calculating this key variable is:

$VOLUME_{i,t}$ = Ln (Trading volume of bank I during day t)

$PB_{i,t}$ represents Market to Book ratio or we call Price to Book value of bank i during day t. PB value is a reliable indicator for investors since investors will clearly know whether this stock is overvalued or undervalued. Moreover, this indicator uses the market value of the company stock divided by its book value, which equals to the difference between its assets and liabilities. (Nguyen, Hai, and Nguyen, 2021). The formula of calculating this key variable is:

$$PB = \frac{Market\ Value\ of\ company\ i\ during\ day\ t}{Book\ value\ of\ company\ i\ during\ day\ t}$$

CHGCASENO $_{i,t}$ represents the change in number of Covid-19 cases announced on day t (Alaoui Mdaghri, Raghibi, Thanh, and Oubdi, 2021). The formula of calculating this key variable is:

$$CHGCASENO_{i,t} = \frac{CASE_{i,t} - CASE_{i,t-1}}{CASE_{i,t-1}}$$

$CHGCASEDEAD_{i,t}$ represents the change in number of Covid-19 deaths announced on day t (Kaouther and Mohammed Abdullah, 2021). The formula of calculating this key variable is:

$$CHGCASEDEAD_{i,t} = \frac{DEATH_{i,t} - DEATH_{i,t-1}}{DEATH_{i,t-1}}$$

3.3 Research Hypothesis:

In order to examine the relationship between the Covid-19 pandemic and stock return, liquidity and volatility of the listed companies under the financial sector, the study runs several hypotheses to test the further result.

Hypothesis 1 to hypothesis 5 will examine that whether these key variables: (market capitalization, stock trading volume price to book value, change in number of Covid-19 cases and change in number of Covid-19deaths) affect the stock price return.

H1o: There is no significant relationship between market capitalization and stock return.
H2o: There is no significant relationship between trading volume and stock return.
H3o: There is no significant relationship between Price-Book value and stock return.
H4o: There is no significant relationship between Change in number of Covid-19 Case and stock return.
H5o: There is no significant relationship between Change in number of Covid-19 Death and stock return.

Hypothesis 6 to hypothesis 10 will examine the whether these key variables: : (market capitalization, stock trading volume price to book value, change in number of Covid-19 cases and change in number of Covid-19deaths) affect the stock liquidity.

H6o: There is no significant relationship between market capitalization and stock liquidity.
H7o: There is no significant relationship between trading volume and stock liquidity.
H8o: There is no significant relationship between Price-Book value and stock liquidity.
H9o: There is no significant relationship between Change in number of Covid-19 Case and stock liquidity.

H10o: There is no significant relationship between Change in number of Covid-19 Death and stock liquidity.

Hypothesis 11 to hypothesis 15 will examine the whether these key variables: : (market capitalization, stock trading volume price to book value, change in number of Covid-19 cases and change in number of Covid-19deaths) affect the stock volatility.

H11$_o$: There is no significant relationship between *market capitalization* and stock return volatility.
H12$_o$: There is no significant relationship between *trading volume* and stock return volatility.
H13$_o$: There is no significant relationship between *Price-Book value* and stock return volatility.
H14$_o$: There is no significant relationship between *Change in number of Covid-19 Case* and stock return volatility.
H15$_o$: There is no significant relationship between *Change in number of Covid-19 Death* and stock return volatility.

4. Data Sources

This research mainly focuses on testing the relationship between the stock market in China and Covid-19 pandemic situation. Sample size of this research is 16. The study applies 16 listed banks under the Shanghai Stock Exchange but only 12 qualified banks were available to use, since some banks cannot provide adequate financial data to support this study, such as (BANK OF BEIJING CO., LTD; INDUSTRIAL AND COMMERCIAL BANK OF CHINA LIMITED…)

All financial data such as stock price information as well as other indicators used in this study were collected during year Jan.2020 to Oct.2021; the Covid-19 confirmed cases and deaths data were collected during year Jan.2020 to Oct.2021. The daily data were collected from tradingview.com for those listed banks in Shanghai Stock Exchange market; the daily Covid-19 data were collected from Sina News website as well as WHO.

After we collected an adequate amount of data, researcher of this study applied "Fixed Effect Panel Data Regression" to test the hypothesis and further regression results.

5. Research Results

According to Table1, except market capitalization and Covid-19, the trading volumes as well as Price to Book ratio of the companies' stocks create significant impact on the stock return. The coefficient of VOLUME and PB ratio are positive, which can indicate that these variables have a positive relationship with the return of stocks. A higher trading volume of a company's stocks, also the higher price to book value of a company's stocks can lead to the greater expected return on those stocks.

Therefore, the study can reject hypothesis 2 and hypothesis 3, which means there is a significant relationship between stock trading volume and stock return, there is also a significant relationship between Price-Book ratio and stock return.

Table1: Regression Result of Model 1 (Dependent Variable: PRC)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	-0.00997	0.002572	-3.879235	0.0001
MARCAP	2.28E-15	5.92E-15	0.384372	0.7007
VOLUME	3.32E-09	3.51E-10	9.467021	0.0000
PB	0.007977	0.003229	2.470206	0.0135
CHGCASENO	-2.91E-07	2.48E-07	-1.172665	0.2410
CHGCASEDEAD	1.65E-06	3.29E-06	0.499333	0.6176

Table 2 illustrates that the change in Covid-19 cases including other stock indicators can create impacts on the stock liquidity. However, the change in number of deaths due to Covid-19 pandemic does not have any influence on the stock liquidity. The coefficient of MARCAP is negative which means the higher market capitalization of a company's stocks will lead to the lower Amihud ratio. Since Amihud represents the illiquidity of the stocks, higher market capitalization can lead to higher stock liquidity. The coefficient of other variables such as VOLUME, PB and change in number of Covid-19 cases are positive. Therefore, an increasing value of these variables will lead to lower stock liquidity.

Therefore, the study can reject hypothesis 6 to hypothesis 9, which means there is a significant relationship between market capitalization and stock liquidity, there is a significant relationship between stock trading volume and stock liquidity, and there is a significant relationship between Price-Book ratio and stock liquidity. Moreover, there is a significant relationship between change in number of Covid-19 cases and stock liquidity.

Table2: Regression Result of Model 2 (Dependent Variable: AMH)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	-0.00029	0.000122	-2.387605	0.0170
MARCAP	-1.3E-15	2.81E-16	-4.752670	0.0000
VOLUME	4.6E-10	1.66E-11	28.12085	0.0000
PB	0.00199	0.000153	13.04951	0.0000
CHGCASENO	2.7E-08	1.18E-08	2.346183	0.0190
CHGCASEDEAD	-6.2E-08	1.56E-07	-0.402182	0.6876

Table 3 illustrates that the change in number of Covid-19 cases and change in number of Covid-19 deaths cannot create impacts on the stock return volatility. Other indicators have a related influence on the stock volatility. The coefficient of MARCAP is negative which means the higher trading volume of a company's stocks will lead to lower stock volatility. The coefficients of other variables such as VOLUME and PB are positive. Therefore, an increasing value of these variables will lead to higher stock volatility.

Therefore, the study can only reject hypothesis 10 to hypothesis 12, which means there is a significant relationship between market capitalization and stock volatility, there is a significant relationship between stock trading volume and stock volatility, and there is a significant relationship between Price-Book ratio and stock volatility.

Table3: Dependent Variable Volatility

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	-0.015266	0.001521	-10.03993	0.0000
MARCAP	-7.39E-15	3.49E-15	-2.114573	0.0345
VOLUME	9.31E-09	2.08E-10	44.81465	0.0000
PB	0.044084	0.001906	23.12676	0.0000
CHGCASENO	4.45E-08	1.47E-07	0.301903	0.7627
CHGCASEDEAD	-1.27E-06	1.95E-06	-0.652369	0.5142

6. Conclusion and Recommendation

The regression results in this research indicate that the daily growth in the total number of confirmed cases and the total number of confirmed deaths caused by COVID-19 has no significant effects on the stock market returns and stock volatility. Compared to the previous studies, their results illustrate that Covid-19 pandemic created some significant negative effects on the stock market return. There are some reasons why there are differences between this research and previous studies. Compared to other countries, the impact created by Covid-19 was small in China. Most investors under the Chinese stock market believed that even though Covid-19 pandemic occurred, enterprises would be able to generate profits soon due to the effective control under the Chinese government. Another reason is that many investors from both upper and middle class still enhance enough fund to invest in the stock market. In this research, Covid-19 does not affect stock market return, liquidity, and volatility. While in the previous studies, the areas such as Vietnam and other countries' stock market condition are different, and therefore got the different result. Secondly, the result of this research indicates the daily growth in the total number of confirmed cases caused by COVID-19 has some significant negative effects on the stock liquidity, which is the same as those previous studies' results. Moreover, trading volume of stocks, Price-Book ratio has significant positive effects on the stock return, volatility, negative effects on the stock liquidity, while market capitalization has significant positive effects on the stock liquidity, negative effects on volatility. Under the previous studies' results, there is no difference in stock liquidity among firms with varied market capitalization, while the price-to-book ratio has significantly negative correlation with the stock return due to the overvalued stocks in their selected industries, as investors might think the price of overvalued stock will drop down soon. Based on the relevant data of this research, most selected banks' PB ratio is lower than 1, which can indicate that those banks' stocks are undervalued. Also, they are more valuable and good to invest in the long term. Therefore, the PB ratio has a positive impact on the stock return since their lower PB value will lead to the raising stock price.

Based on this study, here are several recommendations provided to our further researchers and investors. Investors should consider the trading volume as well as price to book value that can also affect the stock return and liquidity when they invest and trade in the stock market. In addition, we recommend investors who would like to invest in the Chinese stock market under the current situation to apply the result from this research to know more about Chinese stock and get benefit from this research. Moreover, researchers who plan to test the relationship between Covid-19 and stock market can understand that Covid-19 pandemic does not always affect the stock market return in every country. Lastly, when doing research for the similar topic, apart from Covid-19 cases and Covid-19 deaths, researchers can apply other financial indicators such as beta, GDP, interest rates in this kind of research, in order to increase the accuracy of the further research.

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