

Yield and Volatility of BYD in Uncertain Market: Evidence from Fed's Monetary Policy

Wenzhuo Feng^{1, †}, Yuxin Gao^{2, †} and Jiaqi Wu^{3, *, †}

¹ Departure of applied mathematics, Northeastern University, Boston, Massachusetts, 02115, United States of America

² School of Management, Fudan University, Shanghai, 200433, China

³ Brunel College London, North China University of Technology, Beijing, 100144, China

† These authors contributed equally.

*Corresponding author: 20190010214@mail.ncut.edu.cn

Abstract. On March 16, 2022, the U.S. Federal Reserve Board announced that It would be the first rate increase since December 2018 and the target range for the rate of federal funds should be increased by 25 basis points, to 0.25 and 0.5%. The Federal Reserve Board of the United States announced a rise in interest rates on June 15, 2022, increasing the fed funds rate firing range to 1.5% and 1.75%, which was the Fed's biggest single rate increase since 1994. Chinese multinationals would be affected by the Federal Reserve's rate increase through the mechanisms of interest rates and currency rates, which will significantly affect the economy of China in many areas, including the automobile industry. This paper selects the well-known Chinese automobile international company BYD and intercepts its stock data as well as the Federal Reserve interest rate and uses both VAR model and ARMA-GARCH model to analyze the data, to study how the yield of Chinese companies has been affected by the Federal Reserve interest rate hike, and to provide feasible suggestions for the investors, lawmakers, and other international enterprises.

Keywords: US Federal rate, automobile industry, ARMA-GARCH model, VAR model.

1. Introduction

The global currency is pegged to the US dollar because the superpower of the globe is the United States. and the issuer of the international dominant currency. Therefore, fluctuations in the US dollar's size and value brought on by the Federal Reserve's financial authorities will more or less affect the economy of the entire world. The free flow of cross-border capital makes the interests of holders of dollars are directly impacted by the Fed Bank's fiscal policy. In the past, changes in the Federal Reserve's monetary policy have even led to substantial swings in the value of commodity, currencies, equities, and bonds on a worldwide scale. This change has also had an impact on the macroeconomics and cross-border capital flows as well as foreign trade of other nations.

The Federal Reserve began to gradually end its quantitative easing program in 2014, and on December 15, 2016, it increased interest rates for the first time, and raised interest rates three times in 2017, while gradually reducing the scale of its balance sheet. The Federal Reserve increased interest rates four times in 2018, and the process of normalizing its monetary policy was moving along quickly. On March 16, 2022, the U.S. Federal Reserve Board announced that It would be the first rate increase since December 2018 and enlarge the target range for the federal funds rate by 25 basis points, to 0.25 and 0.5%. The US Federal Reserve Board stated on June 15, 2022, that interest rates will rise by 75 basis points, increasing the fed funds rate target range to between 1.5% and 1.75%. [1]. It was the Fed's biggest single rate increase since 1994, signaling the urgency of controlling inflation. The US Federal Reserve's cycle of raising interest rates has had a significant knock-on effect on how the world market is structured, especially on emerging economies with relatively fragile economies and finance. Emerging economies have generally encountered financial turmoil, such as capital outflow, increased exchange rate volatility, and stock market decline.

Since China acceded to the WTO, it has shared the achievements of international economic and trade development and has been on the train of rapid globalization. Its economic strength has been greatly enhanced. As a result, China's influence on the world economy continues to grow, and it is increasingly connected with the world economy, especially the superpower of the United States. Since the economic catastrophe in 2008, in order to cope with the domestic credit and debt American national emergency and to promote employment and economic development, the monetary policy of the Federal Reserve has been changed several times. Such a new economic normal arouses our urgent attention to the dissemination of American monetary policies to Chinese economy.

There are two ways that Chinese multinationals will be affected by an increase in interest rates set by the Federal Reserve:

First, the mechanism governing interest rates. After the Federal Reserve's adoption of a contractionary monetary policy through raising interest rates, the investors' interest in the yield of US assets will be positively affected by the high-interest rate policy, pursuing a high yield of U.S assets and the relatively undervalued US dollar. At this time, investors will choose to buy dollar assets and sell RMB assets, and invest the obtained funds from the Chinese market into the American market in order to obtain high returns brought by the American economic growth. Capital flight has an influence on The financial sector in China. Therefore, The financial sector in China will face decline, which will in turn adversely affect the stock prices of multinational enterprises.

Second, the exchange rate mechanism. As the United States and China's commercial relations grow become increasingly close, this mechanism becomes very important. When the Federal Reserve implements a tightening monetary policy by increasing interest rates, It will result in pressure for RMB depreciation and an increase in the rate of exchange for the United States dollar. This will stimulate United States imports from China, which will increase China produced, which is undoubtedly a major positive for Chinese multinational enterprises and will have favorable effect on such multinational companies' stock values.

The impact of the above two mechanisms based on the company's stock of global corporations is hedging. Depending on investigation of the existing literature and relevant data, this paper will predict the impact of the above two mechanisms on the stock prices of Chinese multinational companies under the background of interest rate hike by the Federal Reserve, and then determine which mechanism is dominant, so as to provide decision-making suggestions for enterprise managers to cope with the Federal Reserve's history of changing interest rates. Since automobile enterprises are typical representatives of Chinese multinational companies, this paper will take the stock price of BYD as an example to explore the effect of the Fed's rate increase on Chinese multinational corporations' stock values.

This essay's remainder is organized as follows: Part two is the literary review, which includes study as it relates to Fed rate adjustments at the stock exchange that is relevant and how the Fed rate changes affect the economy of China, concluding with a summary of the literature review. Then it is followed by Part 3, which introduces certain data and the formula used to calculate how variations in the rate of federal funding would affect the yield and volatility of BYD in a volatile market. After that, the fourth section will then conduct a VAR model and an ARMA-GARCH model analysis using the relevant data obtained. The empirical study' findings are utilized to show how the Fed's interest rate rise has affected the yield and volatility of BYD, and finally to draw conclusions and make predictions and give feasible and innovative suggestions for investors and other international enterprises.

2. Literature Review

2.1 Studies related to Fed rate changes' impact on stock market

The ultimate aims of monetary policy, which are conveyed through macroeconomic variables like output, employment, and inflation, are to promote economic development and stability by influencing the cost and availability of credit and money. Historically, contractionary policies entail raising

interest rates to battle inflation, and expansionary policies involve reducing interest rates to combat unemployment in recessions. At most, economic strategy instruments have a little direct influence on these variables. However, quantitative easing adjustments, such as those to the fed funds rate, have the most immediate and direct effect on money system. By influencing property valuations and earnings, authorities seek to alter socioeconomic behavior in numerous ways. that support their overall objectives. Policymakers know that an essential channel for macroeconomic stimulus is the stock market that may be utilized to impact actual economic activity, and the reaction of the stock market to long-standing area of interest is the Governmental Treasury's quantitative easing. Bernanke and Kuttner discover that a 25 basis point surprising drop in the federal funding rate target will often result in an increase of around 1% in the stock index [2]. Basistha and Kurov check out the cyclicity in the influence of Treasury Department policies mostly on share market and illustrate that the stock market' response to macroeconomic factors is much more than twice as robust during times of recession and liquidity crunches as it is during expansionary times. [3]. The results suggest that financial system responds strongly to equity economic turmoil. By using three month euro-dollar (ED) rate as a gauge of fiscal policy, Rigobon and Sack analyze how asset prices and interest rates respond to changes in monetary policy. The chance of a tightening of 25 basis points would be about halved with a 5% increase (down) in the S&P 500 index (easing) [4]. When the government basic interest rate goes up by 1%, the price index of the main stock markets throughout the world falls typically by 0.5 percentage points, according to Seyhun's study on how changes in the rate of federal funding affect [5]. Yang examines consequences of anticipated and inexplicable shifts mostly in rate of federal funds on the insurance and banking equities markets in order to explain how money supply and stock prices are related, particularly propagation of the policy mechanisms associated with the insurance and financial industries [6].

2.2 Studies related to Fed rate changes' impact on Chinese economics

After the Federal Reserve implemented quantitative easing monetary policy in 2008, the global liquidity flood caused the shock to the world economic system, and a large number of studies on this hot issue emerged. According to Ebastian Edwards' study, various countries are affected differently by changes in US monetary policy, with Asian nations being the most severely impacted and experiencing the longest adjustment periods [7]. Morgan researches how quantitative easing as part of US monetary policy has affected Asia's rising economies, which argues that the majority of Asia's emerging countries do not respond significantly about the U.S. quantitative easing monetary policy in terms of production level, inflation, or other macroeconomic factors. [8]. Fu constructs a DSGE model of the two countries economies and analyzes interest rate increases through the Federal Reserve and their effects on the RMB monetary value and related prices. Fu believes that China's prices and stock prices will decrease due to the Federal Reserve's rise in interest rates and the decline in the value of the currency, but this depreciation of the exchange rate may not necessarily lead to an increase in exports [9]. Using data from January 2010 to July 2016 and a VAR model, Xiao (2017) examines how the Fed's interest rate rise has affected China's cross-border capital movement. Xiao thought that the revision of China's mechanism for determining the RMB exchange rate has a mitigating effect on how the interest rate set by the Federal Reserve affects rise on international capital flows. [10]. Liu measures that Chinese economy affected by interest rate increase by Federal Reserve through DY spillover index and argues that Chinese economy is more influenced by the anticipated rate of interest increase., but after the implementation of interest rate hike, this impact is weakened [11]. By using an SVAR model, Zhang and Liu investigate how Monetary guidance from the Federal Reserve affects both the route between domestic rate of interest and Sino-US currency values. The empirical findings reveal that nominal interest rates and realistic and hypothetical currency values for China, are not significantly impacted by the United States' monetary policy shocks related to quantity (M2) and price (FFR). In other words, the channel for rates of interest and transmission implications of exchange rate channel are not immediately apparent[12].

2.3 Review of the literature

In general, in the existing literature, there are relatively complete studies on how the stock market will be affected by Interest rates set by the Federal Reserve increase, but there are still relatively few studies on how Interest rates set by the Federal Reserve increase will affect Chinese multinational corporations, especially on Chinese multinational automobile enterprises. It is difficult to predict the impact of the stock prices of Chinese multinational automobile enterprises under the Federal Reserve's interest rate hike. Therefore, this paper hopes to further fill the research gap in this field and use empirical data to prove how Interest rates set by the Federal Reserve increase affected the present and long-term development of Chinese multinational automobile enterprises.

3. Research Design

3.1 Data Sources

In this paper, we obtained some relevant data on the US dollar's value relative to RMB from September 2021 to now through the investing website and BYD's stock price from the Choice financial terminal [13]. Since the Federal Reserve starts to raise interest rates this year, we will use these data to study and analyze the changes in the yield and volatility of the Chinese enterprise BYD in the case of Federal Reserve interest rates increase.

3.2 ADF test

Before testing the data and estimating the model, we need to perform a unit root test to check whether the sequence has a unit root and is stable. Because only when the sequence is stable can the subsequent modeling, like the ARMA model, can be carried out. The original hypothesis is assumed to be unstable. After putting the data into Stata, we get the ADF test. From table 1, we can know that the p-value return 0, which is less than 0.1. Therefore, we can reject the original hypothesis and conclude that the sequence is stable.

Table 1 ADF test

Variables	t-statistic	p-value
Price		
BYD	-2.572	0.2928
Exchange rate	-0.878	0.9585
Yield		
BYD	-12.226	0.0000***
Exchange rate	-12.129	0.0000***

3.3 VAR Model Specification

Since we are concerned about the prediction and dynamic dependence of multiple variables at the same time, we introduce VAR(p) model. The formula of VAR (p) is as followed:

$$\mathbf{y}_t = \begin{pmatrix} \beta_{10} \\ \beta_{20} \end{pmatrix} + \begin{pmatrix} \beta_{11} & \gamma_{11} \\ \beta_{21} & \gamma_{21} \end{pmatrix} \mathbf{y}_{t-1} + \cdots + \begin{pmatrix} \beta_{1p} & \gamma_{1p} \\ \beta_{2p} & \gamma_{2p} \end{pmatrix} \mathbf{y}_{t-p} + \boldsymbol{\varepsilon}_t \quad (1)$$

We define the corresponding coefficient matrix as $\mathcal{T}_0, \mathcal{T}_1, \dots, \mathcal{T}_p$. Then we can get a simplified version:

$$\mathbf{y}_t = \mathcal{T}_0 + \mathcal{T}_1 \mathbf{y}_{t-1} + \cdots + \mathcal{T}_p \mathbf{y}_{t-p} + \boldsymbol{\varepsilon}_t \quad (2)$$

Where $\boldsymbol{\varepsilon}_t$ is a generalization of a bunch of white noise processes, called vector white noise processes.

This model is very similar to the AR(p) model. However, the difference is that each variable in the VAR(p) model is a vector or matrix.

3.4 ARMA-GARCH model

The formula of ARMA (p, q) is as followed:

$$x_t = \varphi_0 + \sum_{i=1}^p \varphi_i x_{t-i} + a_t - \sum_{i=1}^q \theta_i a_{t-i} \quad (3)$$

p, q both are integers of non-negative; a_t is white noise

The AR model and MA model are combined to form the ARMA model. Where $\sum_{i=1}^p \varphi_i x_{t-i}$ is AR model and $a_t - \sum_{i=1}^q \theta_i a_{t-i}$ is MA model. The purpose of this model is to predict future values by using past and past disturbance values.

Next, in this article, we introduce ARMA- GARCH model in order to predict the yield and volatility of BYD. The mean equation of GARCH model can be set as ARMA process.

The GARCH model is set up based on the ARCH model to reduce the number of parameters because in the ARCH(p) model, If P is too big, there will be too many factors to take into account, which will reduce the sample size. The formula of GARCH (p, q) is as followed:

$$\sigma_t^2 = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \cdots + \alpha_q \varepsilon_{t-q}^2 + \gamma_1 \sigma_{t-1}^2 + \cdots + \gamma_p \sigma_{t-p}^2 \quad (4)$$

In equation (4), the term $\alpha_1 \varepsilon_{t-1}^2 + \cdots + \alpha_q \varepsilon_{t-q}^2$ is the ARCH model, σ_t^2 is the disturbance term's ε_t conditional variance in t's period. And the term $\gamma_1 \sigma_{t-1}^2 + \cdots + \gamma_p \sigma_{t-p}^2$ is the GARCH model.

And by using the iterative method, we can know that The infinite order of the ARCH model corresponds to GARCH (1,1). As a result, it is possible to convert the custom Orthotic (p) model into a Generalized autoregressive conditional (1,1) model.

$$\sigma_t^2 = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \gamma_1 \sigma_{t-1}^2 + \beta \text{exchange rate}_t \quad (5)$$

In equation (5), we introduced external explanatory variables *exchange rate* in period t with the coefficient β based on GARCH (1,1).

4. Empirical Results and Analysis

4.1 VAR model order selection

In this section, The VAR model's ordering must be chosen first. After using Stata, we get the VAR model identification. We need to use the information criterion in Table 2 to determine the maximum lagged order. From table 2 we can see that there are many information criteria. We use the LR criterion, that is, the likelihood ratio test for the joint significance of the last order coefficient. When the LR value is less than the critical value, the lagged order of the VAR model is considered to be moderate. Therefore, we can determine the maximum lagged order of VAR as order 4.

Table 2 VAR identification

Lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	1894.9				4.2e-09	-13.618	-13.6075*	-13.5919*
1	1897.8	5.8029	4	0.214	4.2e-09	-13.6101	-13.5787	-13.5318
2	1899.28	2.9586	4	0.565	4.3e-09	-13.5919	-13.5396	-13.4614
3	1902.86	7.1686	4	0.127	4.3e-09	-13.5889	-13.5157	-13.4063
4	1912.76	19.792*	4	0.001	4.1e-09	-13.6314*	-13.5371	-13.3965

5	1913.79	2.0518	4	0.726	4.2e-09	-13.61	-13.4948	-13.3229
6	1916.98	6.3857	4	0.172	4.2e-09	-13.6042	-13.468	-13.2649
7	1920.71	7.455	4	0.114	4.2e-09	-13.6022	-13.4451	-13.2107
8	1921.13	0.8387	4	0.933	4.4e-09	-13.5764	-13.3984	-13.1328
9	1923.04	3.8347	4	0.429	4.4e-09	-13.5615	-13.3625	-13.0656
10	1924.35	2.6098	4	0.625	4.5e-09	-13.5421	-13.3222	-12.994
11	1925.51	2.33	4	0.675	4.6e-09	-13.5217	-13.2809	-12.9214
12	1927.07	3.1248	4	0.537	4.7e-09	-13.5041	-13.2424	-12.8517

Next, we need to carry out the Unit circle test after VAR construction. To check whether the VAR system is a stable process. So, we use Stata and get Figure 1. From Figure 1, we can see that all the roots of the companion matrix are inside the unit circle. Thus, we can conclude that it is a stable process.

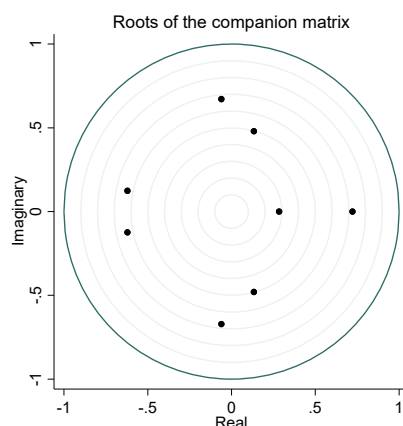


Figure 1 Unit circle test

4.2 Impulse and response

The increase in interest rate by the Federal Reserve will cause the upvaluation of the US dollar and promote the mobility of the international capital market. The international capital market and international hot money (short-term capital with strong international liquidity) will increase their holdings of the US dollar due to the influence of interest. The most intuitive example is that more people will deposit their money in the Bank of America in order to obtain benefits. And as the exchange rate rises, people will further hold more US dollars and less RMB.

Based on theoretical analysis, there are two possible economic consequences of US dollar upvaluation. First, after the increase of international capital's holdings of US dollars, people are often not satisfied with the bank interest rate itself, they will invest money in the stock market, which may lead to a large number of US dollars flowing into the US stock market or bond market, which means that there is a net capital inflow of domestic capital in the United States and a net capital outflow of Chinese capital. The possible economic consequence of this situation is to raise (lower) the share price or earning rate of the US (China) stock market.

Second, in 2022, BYD has become the third largest market value auto company in the world. Its overseas business is also moving forward steadily. Up to now, BYD bus products have been operated in more than 20 countries and more than 100 cities in Europe, covering more than 70 countries and regions and more than 400 cities around the world. Among them, in the United States, BYD electric buses have a monopoly position and have been spread over more than 30 states. In Europe, BYD's market share has also reached 26%, and in Britain, it has reached 50%. This year, the market also expanded to Japan, Germany, Sweden, and other automobile industry countries. According to the data released by BYD, in 2021, the overseas sales volume of BYD was 15363, compared with the same period last year, it increased by 107.75%. The upvaluation of the US dollar means that the purchasing power of the US dollar will increase. Therefore, it will certainly promote the import of the United States and the export of Chinese enterprises.

From the possible economic consequences above, we cannot directly judge which one plays a dominant role. If the first consequence plays a dominant role, BYD's share price or earning rate will decrease with the rise in currency rate. If second consequence plays dominant role, BYD will benefit from the rate hike.

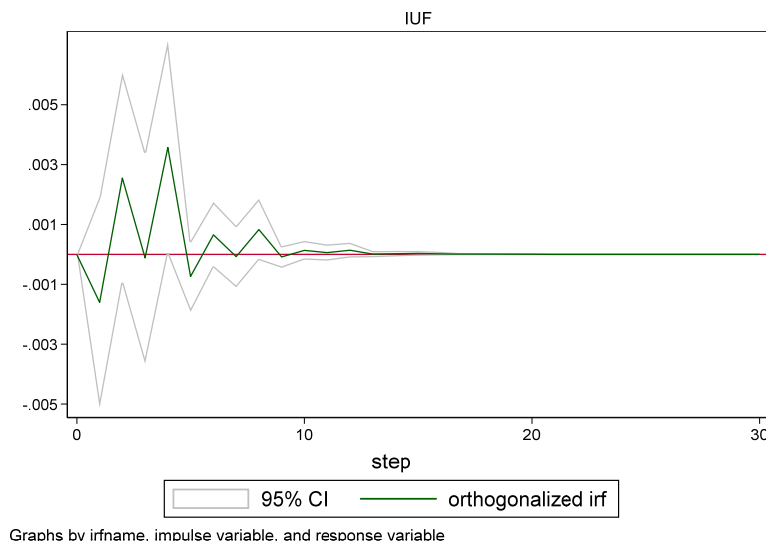


Figure 2 Impulse and response

We use Stata to get the impulse and response diagram. According to the estimation results in Figure 2, we can know that one unit exchange rate shock has the biggest impact on BYD's stock returns in the period of $T=0$. The positive effect appeared in the period of $T=4$, which is slightly greater than 0.3%. And the second highest value appeared in the period of $T=2$, which is slightly less than 0.3%. Overall, the net effect is positive.

In conclusion, BYD benefited from the rate of interest policy of the Federal Reserve in 2022.

4.3 ARMA model order selection

In this section, we use Stata to plot figure 3. From the result of the two images in figure 3, We can find that in the left graph, the first point beyond the boundary occurs when the lag order is equal to 24. Therefore, the first value is 24. In the graph on the right, there is no point beyond the boundary. Thus, there is no MA term.

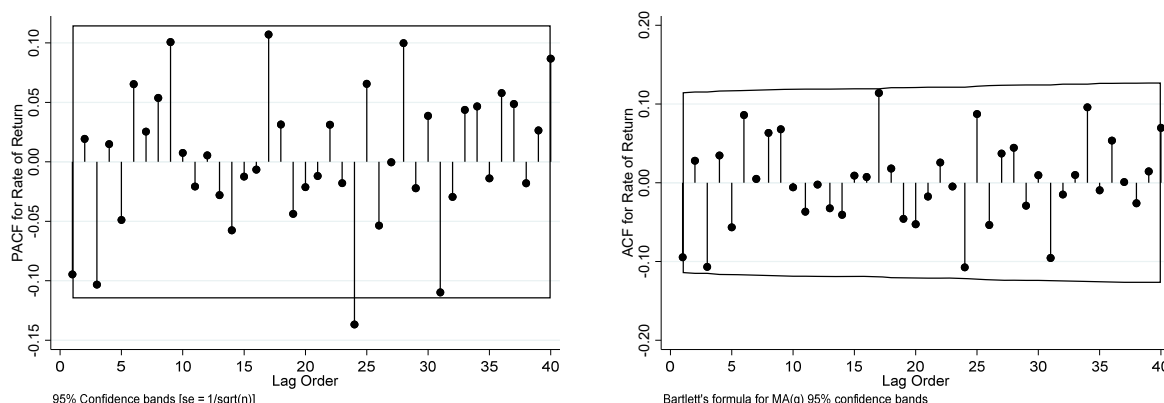


Figure 3 PACF and ACF

Then, by looking at the time chart of yield (Figure 4), we can find that the volatility of the time series is aggregation. But whether it is statistically significant or not, we need to have further empirical tests.

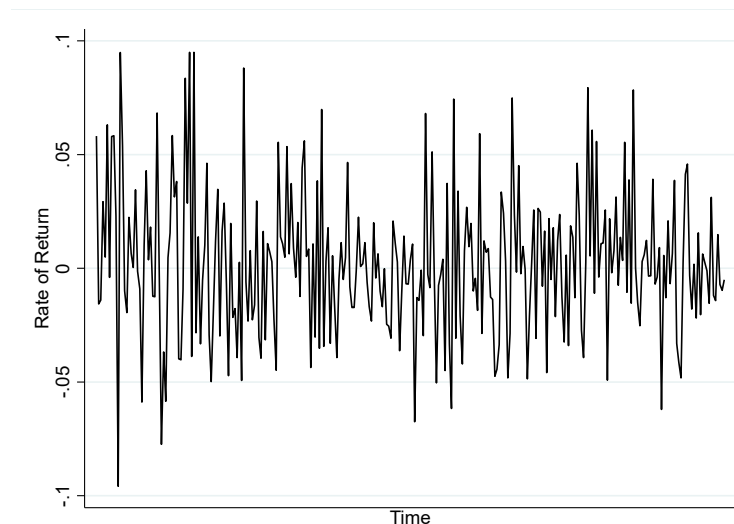


Figure 4 Yield

4.4 ARMA-GARCH estimation results

In order to use the GARCH model, we perform model estimation, Table three displays the estimation's findings. According to the ARMA-GARCHX model's estimate outcomes, the both term in the variance equation is still significant after controlling the autocorrelation of returns in the mean equation. This indicates that there is obvious conditional heteroscedasticity in BYD's return rate, and GARCH Modeling can be conducted.

From the estimation results of external explanatory variables, exchange rate change has substantial positive impact on the earnings volatility of BYD, this impact is lagging.

Table 3 ARMA-GARCHX estimation results

Variables	a		b		c	
	Coef	P> z	Coef	P> z	Coef	P> z
Exchange rate						
L0	160.1094	0.246	-114.2484	0.723	-96.7632	0.869
L1			197.0064	0.095*	239.5065	0.063*
L2					-131.7411	0.778
GARCH (1, 1)						
ARCH, L1	0.0516	0.056*	0.0631	0.048**	0.0635	0.043**
GARCH, L1	0.9055	0.000***	0.8772	0.000***	0.8782	0.000***
Constant	-10.2130	0.000***	-9.9187	0.000***	-10.0152	0.000***

5. Discussion

The result from the passage is a little different from the document. The most important part of the result is exchange rate fluctuations significantly reduce BYD's profit volatility, this impact is lagging. The document shows the change of exchange rate has some bad impact on the earnings volatility of BYD. The biggest reason why these two results are different probably is the time. The dataset which is used has some time points which are not affected by the COVID-19 virus. The COVID-19 virus changes a lot of things and conditions which people think usually includes the exchange rate. The effect that which virus causes forces government to post policy to constrain people from doing something. And these policies will give serious damage to the economy. Exchange rate changes are one of the parts of the economy, so they are also affected. Once, volatility of BYD's earnings can benefit from exchange rate change in normal conditions but unpredictable viruses disrupt all plans. The volatility of BYD's earnings can't fit the new situation at the time so useful tools become a lethal weapons. And it leads to one enlightenment, economics can't be truly forecasted like politics. Because one thing which has no relevance to economic but enough impactive can change the whole condition.

Lawmakers should make some laws to make companies especially small companies better and use new laws to make sure the economy can't be affected easily. Only a stable economic can smooth the effect and if a company like BYD can't survive in this special condition, most of the company which is smaller than BYD can't survive, too.

For investors, don't be glad because of predicting that exchange rate fluctuations significantly reduce BYD's profit volatility, and also don't be sad because change of exchange rate has bad impact on the earnings volatility of BYD. The benefit rate will change under different economic conditions. The only thing investor will pay attention to is to make sure before investing, investors have enough money for a living if investing fails.

6. Conclusion

According to research, this article found that the volatility of BYD's earnings is significantly positively impacted by exchange rate fluctuation, however this effect lags. One of the largest multinational corporations in world is BYD and its result has representativeness and reference in many aspects. It is reasonable that BYD can be on behalf of most international companies. Therefore, it can lead to exchange rate changes having a substantial positive impact on the earnings volatility of BYD of an international company, and this impact is lagging. This research assesses the objective impact of currency rate movements on global firm share prices. It is a benefit for investors and lawmakers. It will give them extra information to make investment decisions or make new laws. It is also beneficial for other international companies. BYD is a great example to show the effect of exchange rate changes. Other international companies can take BYD as a reference to make plans. This research doesn't think about the time range carefully. It has a short time range from 2019 to 2022. For one big international company, the effect of exchange rate changes will show for a long time. Short time can't show all effects and it may provide the wrong direction to research. For future research, data should be chosen which has a long period. It is a benefit for a deeper research of the issue.

References

- [1] Federal Reserve. Federal Reserve News & Events. <https://www.federalreserve.gov/newsevents.htm>
- [2] Ben S. Bernanke, Kenneth N. Kuttner. What Explains the Stock Market's Reaction to Federal Reserve Policy? *The Journal of Finance*, 2005, 60(3): 1221-1257.
- [3] Arabinda Basistha, Alexander Kurov. Macroeconomic cycles and the stock market's reaction to monetary policy. *Journal of Banking and Finance*, 2008, 32(12) : 2606-2616.
- [4] Roberto Rigobon and Brian Sack. Measuring the Reaction of Monetary Policy to the Stock Market. *The Quarterly Journal of Economics*, 2003, 118(2): 639-669.
- [5] Seyhun H.Nejat. Insiders' profits, costs of trading, and market efficiency. *Journal of Financial Economics*, 1986, 16(2): 189-212.
- [6] Charles C. Yang. The Impact of the Interest Rate on Insurance/Financials Industries: The Analysis of the Stock Market's Reactions to Federal Funds Rate Changes. *North American Actuarial Journal*, 2013, 17(1): 29-40.
- [7] Sebastian Edwards. The international transmission of interest rate shocks: The Federal Reserve and emerging markets in Latin America and Asia. *Journal of International Money and Finance*, 2010, 29(4): 685-703.
- [8] Morgan, Peter J. Impact of US Quantitative Easing Policy on Emerging Asia. ADBI Working Paper No. 321, 2011.
- [9] Fu Guangmin. Interest Rate Hike of the Federal Reserve, RMB exchange rate and price fluctuation. *International trade*, 2017(03) : 131-142.
- [10] Xiao Weiguo, Lan Xiaomei. Spillover Effects of a new round of Federal Reserve Interest rate hike on cross-border capital flows in China. *The Economist*, 2017(02),84-90.

- [11] Liu Shaohua, Zhang Hong. An empirical analysis of spillover effects of monetary policy differentiation in major developed economies on China's economy. *Financial Development Review*, 2017(04), 38-45.
- [12] Zhang Jingjing, Liu Ling. An empirical study on the transmission of US monetary policy to China's exchange rate and interest rate. *Shanghai financial*, 2014(01), 56 + 52-117.
- [13] Choice homepage. [2022-08-30]. <https://choice.eastmoney.com/>