Study on the correlation between Crude oil price and new energy stock price in China and America

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Abstract. In today's new world situation, the consumption structure of energy is constantly changing. All countries attach importance to the use of new energy, vigorously promoting the development of new energy-related industries.Traditional energy and new energy are interchangeable, so there is a complex relationship between crude oil futures market and new energy stock market. China, as an economy with strong energy demand and high dependence on oil, will be affected by changes in oil futures prices. America's new energy policy has two striking sides. On the one hand, due to the lack of consensus, the US has so far failed to come up with new energy development plans and targets at the national level. On the other hand, a series of supportive policies launched by the federal and local governments have enabled the U.S. wind and solar industries to maintain a high growth rate in recent years. In view of this, the research takes WTI crude oil price, Zhongzheng New energy Index and China crude oil price as the research object, analyzes the interaction among them by using VAR model and GARCH model, and predicts the volatility of crude oil price and new energy stock price.

Keywords: Crude oil price; new energy share price; VAR model; GARCH model.

1. The introduction

Crude oil plays an important role in human society. It is not only an important raw material for industrial production, but also an important strategic resource for a country. Compared with the new energy which is still in the process of development, crude oil is more mature as a traditional energy technology. However, as a non-renewable energy, its massive application has caused serious damage to the environment. Therefore, some countries begin to look for new energy which can replace crude oil. This environmentally friendly energy source can help the country achieve green development goals and change the energy consumption structure. In the early days of the United States, there was a lack of political consensus on the development of new energy sources, because some people believed that the United States needed to reduce its dependence on energy imports, and that the most direct way to do that was to increase domestic oil production rather than invest a lot of resources in the development of renewable energy sources which had many uncertainties. After 2009, new energy in the United States has maintained a rapid growth rate. As a big energy consumer, China has a huge demand for crude oil and new energy. China has invested a lot of money and energy in developing new energy sources, including non-renewable coal bed methane, combustible ice and renewable energy sources such as solar and wind power. On the one hand, as the most important strategic energy reserve, crude oil plays an irreplaceable role in China and the US for a long time. China also launched crude oil futures in 2018, and there is a complex interaction between the prices of crude oil between China and the US. On the other hand, there is both substitution relationship and positive spillover effect between new energy and crude oil. Therefore, the change of crude oil price will also affect the new energy industry, and then affect the stock price of new energy. Therefore, in-depth analysis of the relationship between crude oil prices and new energy stock prices in China and the United States, and on this basis, analysis of the risk characteristics of Crude oil prices and new energy stock prices in China is of great practical significance to the realization of China's "double carbon" goal to prevent related risks and improve China's international competitiveness.

2. Review of existing literature

Park and Ratti (2008) used the data of the US and 13 European countries from January 1986 to December 2005 to find that oil prices had an important impact on stock returns. Miller (2009) found that the relationship between oil prices and stock returns was time-varying, that is to say, he used the oil prices from 1971 to 2008 and the stock market data of six OECD countries, and the results showed that the correlation between the two changed with time. Faff and Brailsford (199) selected the data from 1983 to 1996 and used the three-factor model to study and found that the gasoline industry had a positive sensitivity to oil price fluctuations. Henriques and Sadorsky (2008) found that crude oil price was the Granger cause of the stock price of alternative energy companies. Kumar (2012) discussed the mutual influence of crude oil price and new energy stock price based on VAR model and found a positive correlation between them. Reboredo et al. (2017) established wavelet analysis model to study the relationship between oil price and stock price of clean energy companies and found that crude oil price is the Granger cause of stock price of clean energy companies. Sadorsky Beta using single variable model to investigate the clean energy companies facing the determinants of systemic risk, and found that rising oil prices would increase systemic risk, the company and the company to increase sales will reduce the risk, when moderate the influence of oil prices, rising oil prices are systemic risk may be offset with an increase in reducing the risk of sales. Dawar Ishaan; Dutta Anupam; Bouri Elie; Saeed Tareq (2020) test the association between crude oil and renewable energy stock prices under average conditions, indicating that clean energy stock returns react differently to new information on oil returns under different market conditions. Yahya Muhammad; Kanjilal Kakali; Dutta Anupam; Uddin Gazi Salah; Ghosh Sajal(2021)evaluate nonlinear price transmission mechanisms between clean energy stock and crude oil price in levels, mean, and error variances and The research indicates that the clean energy index emerges as the dominant influencer on the crude oil price over the post-crisis subsample. Tiwari, Aviral Kumar; Jena, Sangram Keshari; Kumar, Satish; Hille, Erik (2021) use a dependence-switching copula model for the first time to analyse the dependence structure between sectoral equity markets and crude oil prices for India, one of the largest oil importing countries and reveal that a bearish oil market does not add additional systemic risk to a bearish sectoral equity market. The carbon sector is found to be the safe haven investment when both the equity and the oil markets are in a downward phase. Fen Jiang; Yushuang Li(2021) use nonlinear ARDL model to predict how gasoline prices respond to the positive and negative impact exerted by crude oil prices through adopting the asymmetry-based dynamic multipliers of price. Kumar Suresh; Choudhary Sangita, Singh Gurcharan; Singhal Shelly investigate the nexus among natural gas price, crude oil price, gold price, exchange rate, and stock market index in Indian context using the Nonlinear Autoregressive Distributed Lag (NARDL) model on weekly data for the time period of January 1997 to June 2019.Mensi Walid et al. Oil, natural gas and BRICS stock markets: Evidence of systemic risks and co-movements in the time-frequency domain [J]. Resources Policy, 2021, 72 uses the wavelet method to investigate co-movements between the five emerging stock markets of Brazil, Russia, India, China, and South Africa (BRICS), and the oil and natural gas markets. Monge Manuel; Gil-Alana Luis Alberiko (2021) deal with the analysis of (spatial) crude oil production divergence in the United States, paying particular attention to the domestic crude oil production between PADD 2 and PADD 3, which are the areas in which the bottleneck occurs and has a direct implication on the price of West Texas Intermediate (WTI).

It can be found that the existing literature research international crude oil price and more new energy interaction between the stock price, only a small amount of research has analyzed the China's crude oil futures and the relationship between China's new energy stock prices, and ignore the international price of crude oil by China's crude oil futures prices of China's new energy stock price conduction effect, and few studies based on price volatility risk the risk of further analysis of new energy shares evolution characteristics. Based on the existing literature, this paper will further analyze the interaction between international oil price, Chinese oil price and Chinese new energy stock price, and further study the risk evolution characteristics of Chinese oil price and Chinese new energy stock price.

3. Data

3.1 Data Sources

The data used in this paper are the daily closing prices of monthly consecutive contracts of China New Energy Corporation Shares (NEW), International Crude Oil Price (WTI) and China Crude Oil Price (CN).Select new energy index as a representative of the new energy industry, the stock selection involves new energy application, renewable energy production, new energy storage and new energy interactive equipment business of listed companies as shares, the index has a total of 80 components, to reflect the overall performance of new energy industry related listed companies. The sample interval for all data from 27 March 2018 to 30 June 2021 yielded 859 sets. The CSI New Energy Company Stock Price (NEW) index comes from netease Finance, and the International Crude Oil Price (WTI) comes from the Investing, China Crude Oil Price (CN) comes from the Wande database.

3.2 Descriptive Statistics

In Figure 1, CN, WTI and NEW respectively represent Chinese crude oil price, international crude oil price and stock price of Chinese NEW energy companies, showing the relationship trend among the three. You can see the biggest fluctuation in the first half of 2020.During this period, the new outbreak, which has caused the world economy since the 1930 s, the worst recession since the great depression, the energy market, particularly oil market suffered serious impact, since the beginning of march to April 20 (WTI) happened in the history of international oil prices slump in the fourth round, China's oil prices also implicated, presenting the state fell sharply. In the second half of 2020, the epidemic was brought under control, the global economy recovered slowly, oil demand recovered to normal range, and the trend of international oil price was relatively stable. However, under the leadership of socialism, China gradually resumed work and production, and the trend of oil price returned to the right track. At the same time, affected by the epidemic, social demand for electricity declined sharply, and new energy companies faced problems such as reduced utilization hours and significantly reduced generation income. Moreover, new energy companies were generally small in scale and poor in risk resistance, resulting in a huge impact and impact on the stock prices of new energy companies. In September 2019, October and November 2018, the three trends also had a large fluctuation

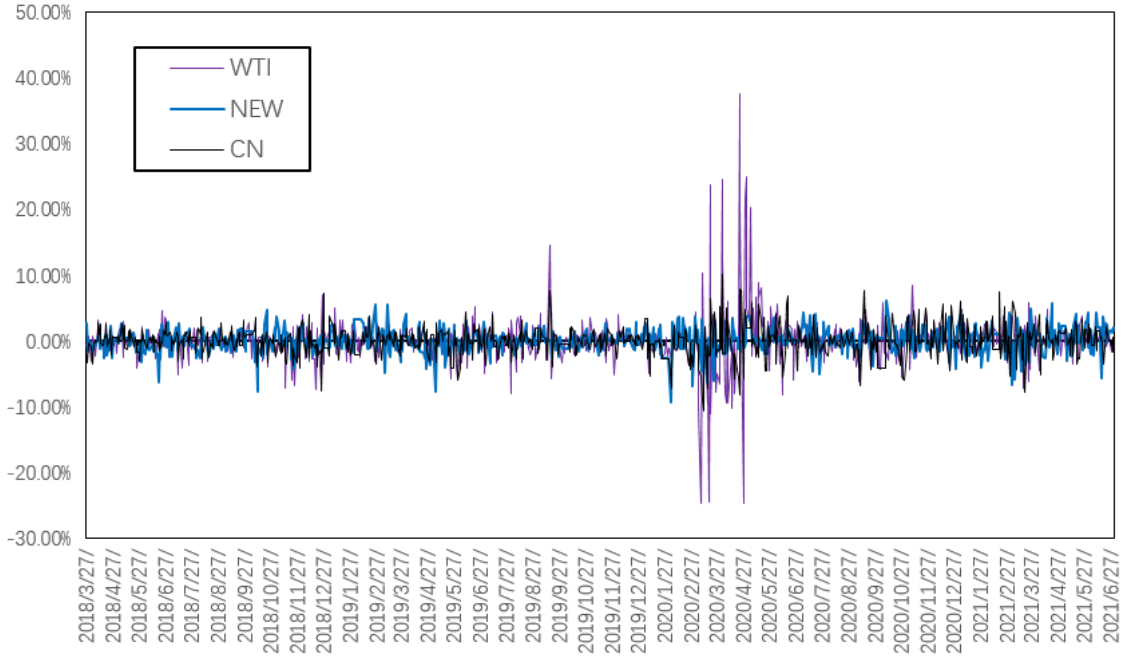


Figure 1. China crude oil price International crude oil price China New Energy company stock price relationship chart.

Table 1 reports descriptive statistical results of Share prices of Chinese new energy companies, international crude oil prices and Chinese crude oil prices. By comparing the variance and standard deviation of the three, it can be found that the trend of NEW is relatively stable. By observing the average, it can be found that WTI and CN show a trend of slow negative growth from 18 to 21, while NEW shows a trend of small growth.

Table 1. Descriptive statistics of data.

	The variance	The average	The standard deviation
WTI	0.014114332	0.003545402	0.118803754
CN	0.000518396	0.000330002	0.022768311
NEW	0.0003405	0.015272364	0.018452642

4. Model design

4.1 The VAR model

VAR model is mainly used in the prediction of time series system and analysis of random disturbance on the variable system the dynamic impact of each endogenous variable in the system as all the lag value of the endogenous variable in the system function structure model (a. jaeger, 2009), which adopts the form of the equations of many, will each endogenous variables as explanatory variables of its own and other variables in the lag make OLS regression. Its basic form is:

$$Y_t = \sum_{i=1}^{p} \theta_i Y_{t-i} + \varepsilon_t \tag{1}$$

Where Y t is the n-dimensional column vector of endogenous variables, P is the lag order, θ I is the n× N-dimensional regression coefficient matrix to be estimated, εt is the random disturbance term and n-dimensional column vector. VAR model constructed in this paper includes the CN, NEW, WIT their as is to explain the three simultaneous equations, and USES granger causality test, determine to what extent each variable can explain lag item by other variables, and through the impulse response function to capture NEW interest about variable (Innovations) impact on NEW energy company's share price variables such as the effect of current and future period.

4.2 GARCH model

In order to study the risk evolution characteristics of crude oil prices and new energy stock prices in China and the United States, this paper uses GARCH model to simulate the volatility of time series variables.

GARCH model expression:$\sigma_t^2 = c + \sum_{i=1}^{m} \alpha_i a_{t-i} + \sum_{j=1}^{s} \beta_j \sigma^2{}_{t-j}$

Where, is the volatility of phase T, is ARCH term, and is GARCH term.

$$\boldsymbol{\sigma_t^2 \sum_{i=1}^{m} \alpha_i a_{t-i} \sum_{j=1}^{s} \beta_j \sigma^2{}_{t-j}} \tag{2}$$

5. Empirical analysis

5.1 Impact analysis based on VAR model

5.1.1 Model setting

In terms of the overall data, the first step is to conduct unit root test for all three variables. ADF test results show that the sequences of CN, NEW and WTI are all stable. Next, combined with LR test and AIC and SC minimum criterion, the lag period was determined to be 3.

Secondly, according to the data from March 27, 2018 to December 31, 2019, after unit root test of the three variables, ADF test shows that the sequence of CN, NEW and WIT are all stable. In addition, LR test and the results of AIC and SC minimum criterion D indicate that the lag period is 2.

Finally, during the period from the beginning of 2020 to the end of June 2021, through the unit root test, it is found that the ADF test of the CN, NEW and WTI variable series at this stage presents stable results. Next, using LR test and the above criteria, the lag period is determined to be 1.

5.1.2 Granger causality test

Table 2. Granger causality test.

Null content:	Obs	F-Statistic	Prob.
NEW does not Granger Cause CN	856	0.49132	0.6884
CN does not Granger Cause NEW		2.16328	0.0909
WTI does not Granger Cause CN	856	22.524	5.00 e-14
CN does not Granger Cause WTI		2.89262	0.0345
WTI does not Granger Cause NEW	856	1.47259	0.2206
NEW does not Granger Cause WTI		0.37785	0.769

Table 2 shows the Granger causality test results using the VAR model, and its original hypothesis is that the tested variable is not the Granger cause of the explained variable. The equation of each explained variable and x of other explained variables are listed in the table[2]Statistical value.

(1) regarding data in March 2018 to June 2021 as a whole, through the granger causality analysis, in the NEW variable equation, CN at 0.0909 significant level rejecting the null hypothesis suggests that the CN is the granger cause of the NEW; overall from 18 to 21 years China's crude oil price fluctuations on the current NEW energy company stock prices have a significant impact, indicating that from late March 18 years in our country crude oil futures listed on the first time and also the emerging industry of NEW energy company's share price depends on the domestic oil price fluctuations.CN in the significance level of 5.00 E-14 rejecting the null hypothesis states that WTI is the granger cause of CN, from the listing of Chinese crude oil futures in 2018 to the end of 19, fluctuations in U. S. crude oil prices had a significant impact on Chinese crude oil; this may be because by 2019, as the U. S. pipeline is elected, U. S. crude will flood the market, so it is bound to affect crude oil prices in China. Meanwhile, in the WTI equation, CN rejects the null hypothesis at the significance level of 0.0345, which proves that CN also exists as the Granger cause of WTI. In other words, under the background of tight and slow Sino-US trade relations, China's crude oil price has an impact on US crude oil price to some extent. The test results also show that WTI is not the Granger cause of NEW. The original hypothesis is established, and the impact of American oil price on the stock price of domestic NEW energy companies is not obvious for the time being, which may be because the two are temporarily in a relatively separate state. In the crude oil price equation of NEW energy on the United States and China, the hypothesis that the variable of NEW is not the cause of CN and WTI Granger cannot be rejected, respectively, indicating that NEW energy will not be affected by the crude oil price in the United States and China for the time being.

(2) In CN variable equation, WTI in 3.00 E-54 significance level rejects the null hypothesis, suggesting that the WTI is the granger cause of CN. From 2018 to 2019 in U.S., crude oil price fluctuations on China's crude oil have a significant impact, because the United States on China's economy will bring imported inflation, also rising coupled with monetary phenomenon when the phenomenon becomes more severe, causing domestic demand for commodities rising. In the remaining equations, the Granger causality test shows that the null hypothesis is accepted. Different from (1) above, China's crude oil price will not affect new energy and new energy will not affect us crude oil price. In addition, the results of the remaining three equations are consistent with the above situation.

(3) From the beginning of 2020 to the end of June 2021, the results of Granger causality analysis show that the significance level of 3.00E-06 in the equation of CN variable indicates that the null hypothesis that WTI is not the Granger cause of CN is rejected, so WTI is the granger cause of CN Influential. In the equations between the other three variables, the null hypothesis are accepted. One reason is that domestic new energy sources are not actually mature enough to influence the price of crude oil, which plays a more important role domestically and internationally. Compared with the overall situation, the difference in results is that domestic oil prices do not have an impact on new energy stocks and US oil prices in 20-21 years.

5.1.3 Impulse response function analysis

On the basis of VAR model, the impulse response function is further analyzed.

(1) The results of the overall interval are shown in Figure 2, which shows the response of CN to the impact of one standard deviation from NEW. CN stays in a stable state from the first phase to the middle of the second phase, then rises slightly to the middle of the third phase, and finally drops to 0 in the fourth and fifth phases. Figure 3 shows the response of CN to WTI impact. There is an obvious rise from the first stage to the second stage, reaching the highest point, and then there is a relatively rapid decline to the fourth stage, negative impact from the fourth stage to the sixth stage, gradually disappearing in the seventh stage.

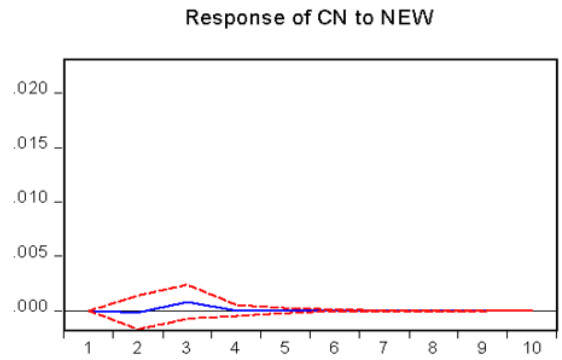


Figure 2. Impulse response of CN to NEW.

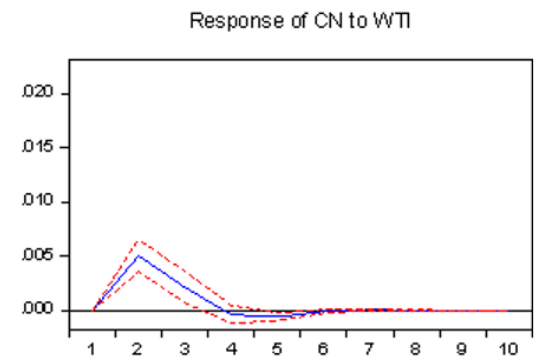


Figure 3. Impulse response of CN to WTI.

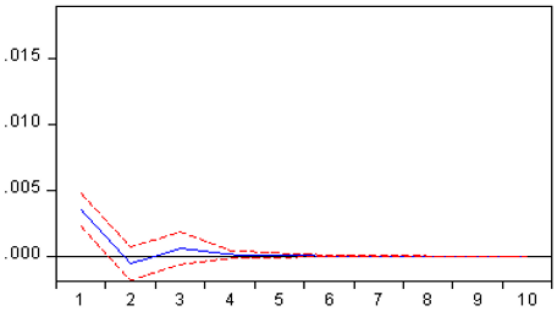


Figure 4. Impulse response of NEW to CN.

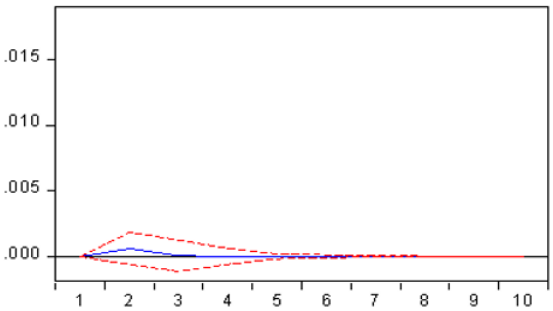


Figure 5. Impulse response of NEW to WTI.

Figure 4 shows the response of NEW after it is impacted by one standard deviation of CN. Specifically, it drops sharply from the first phase to the middle of the second phase and reaches the lowest point below 0. Then, it rises slightly and then tends to a moderate decreasing trend in the middle of the third phase and returns to 0.Figure 5 the overall fluctuation range is small, there is a slow fluctuation in the second phase, disappear in the third strike, in a stable state.

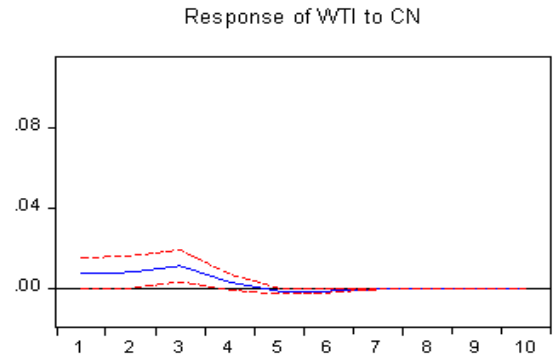


Figure 6. Impulse response of WTI to CN.

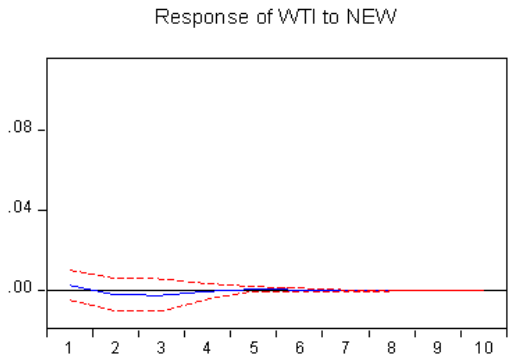


Figure 7. Impulse response of WTI to NEW.

Figure 6 shows the response of CN to WTI after WTI impact. From the first stage to the middle of the third stage, CN is in a relatively stable state. The middle of the third stage is the turning point, and it declines slowly until reaching the 0 line after the middle of the fifth stage. Figure 7 shows the response of WTI after it is impacted by NEW. The WTI is impacted positively in the first phase and negatively from the second phase to the fifth phase, and then it is stable.

(2) The results from 2018 to 2019 are shown in Figure 8, which shows that WTI is affected by the impact of one standard deviation of NEW. From the first period to the second period, there is a slow decline, thus reaching the negative impact, followed by an obvious rise in the middle of the third period, and finally gets balanced and drops to 0.FIG. 9 shows the response of CN to WTI impact. From the first stage to the second stage, there is a sharp rise, thus reaching the highest point, forming a positive impact.

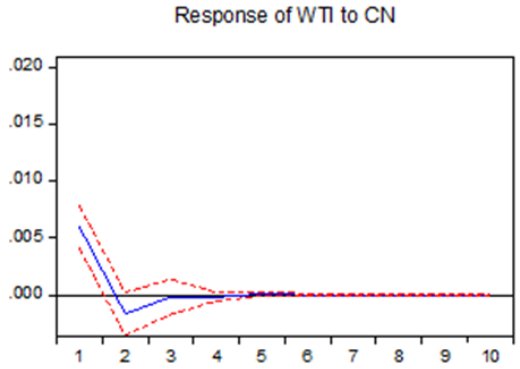


Figure 8. Impulse response of WTI to NEW.

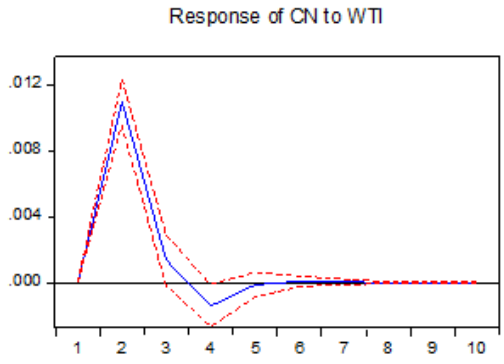


Figure 9. Impulse response of CN to WTI.

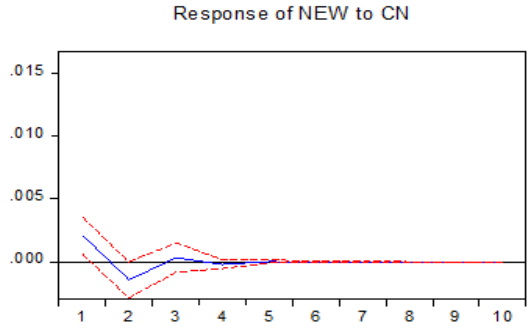


Figure 10. Impulse response of NEW to CN.

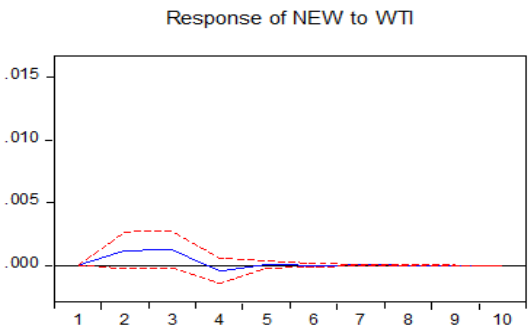


Figure 11. Impulse response of NEW to WTI.

Figure 10 shows the response of NEW to the impact of CN. From the first phase to the second phase, there is a slow decline, thus forming a negative impact. From the second phase to the third phase, NEW increase from a negative value to a gentle 0 point. Figure 11 shows the response of WTI to NEW shock. It rises slowly from the first period, continues to the third period, and then slowly declines to the middle of the fourth period, a turning point, and reaches 0.

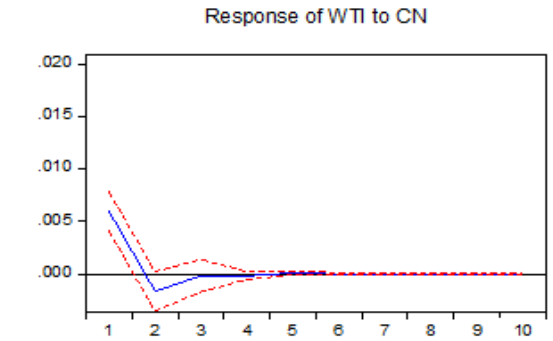


Figure 12. Impulse response of WTI to CN.

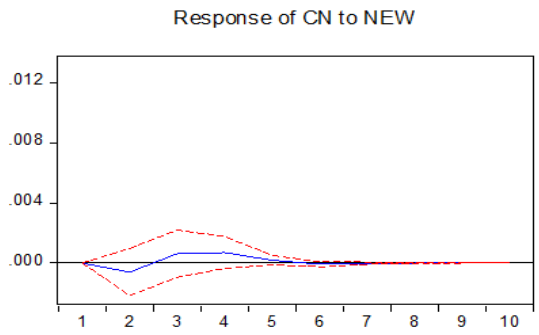


Figure 13. Impulse response of CN to NEW.

FIG. 12 shows the response of WTI to CN impact. It drops to 0 at the beginning of the first period, with negative impact on the site and then slowly rises to 0. Figure13 shows that CN is affected by one standard deviation impact of NEW. During the first period and the second period, it is a negative impact, then rises until it forms a positive impact, and then returns to 0.

(3) The results of the 2020-2012 stage are shown in Figure 14, which shows the response of NEW after being impacted by CN. It rises slowly from the first stage to the middle of the third stage, then declines slightly, and reaches the 0 line in the middle of the fourth stage and remains stable.

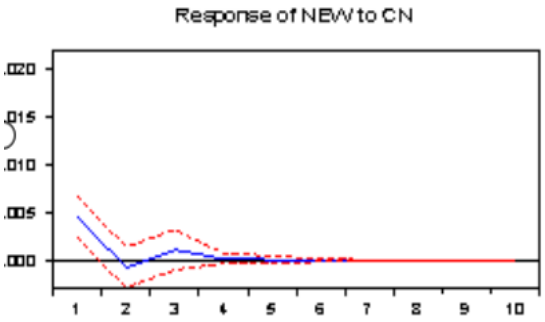


Figure 14. Impulse response of NEW to CN.

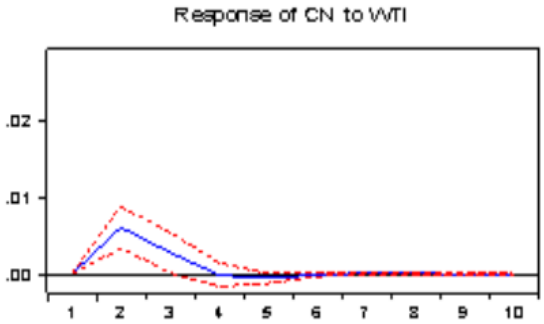


Figure 15. Impulse response of CN to WTI.

FIG. 15 shows the response of WTI to CN impact force. From the first stage to the middle of the fourth stage, there is a large fluctuation. With the middle of the second stage as a turning point, WTI first rises sharply and then declines at a medium speed, and remains stable until it reaches 0 point in the middle of the fourth stage.

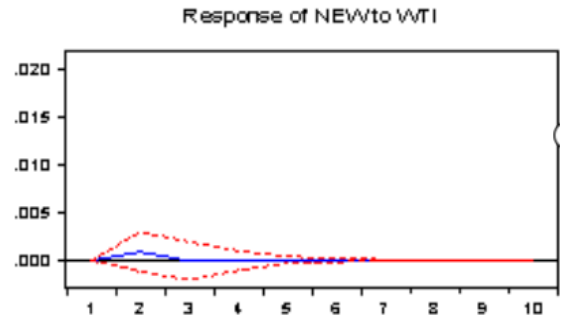


Figure 16. Pulse response diagram of NEW to WTI.

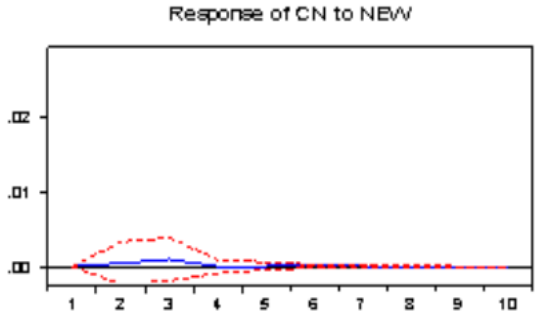


Figure 17. Pulse response of CN to NEW.

FIG. 16 shows the response of CN after receiving the NEW shock. In the first three periods, the trend is tortuous, falling from the first phase to the middle part of the second phase and reaching the negative impact, then slowly rising to the positive impact, taking the middle part of the third phase as the node, falling to the middle part of the fourth phase and then remaining stable.

Figure 17 reflects the response of WTI to NEW shock. From the first phase to the second phase, there is a small fluctuation in the positive range. At a turning point in the middle of the second phase, a small rise and then a decline, and then a steady regression to 0 line in the middle of the third phase.

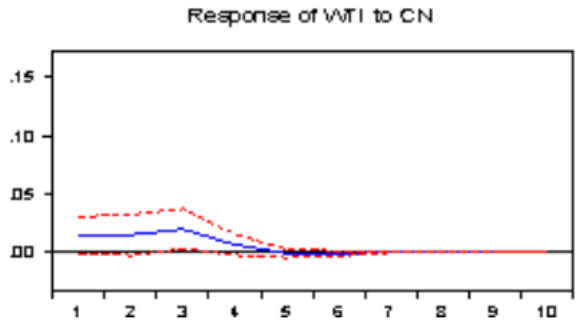


Figure 18. Pulse response of WTI to CN.

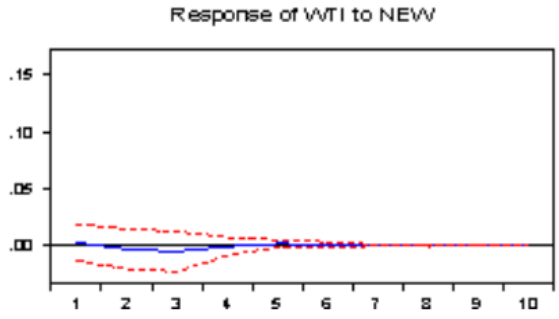
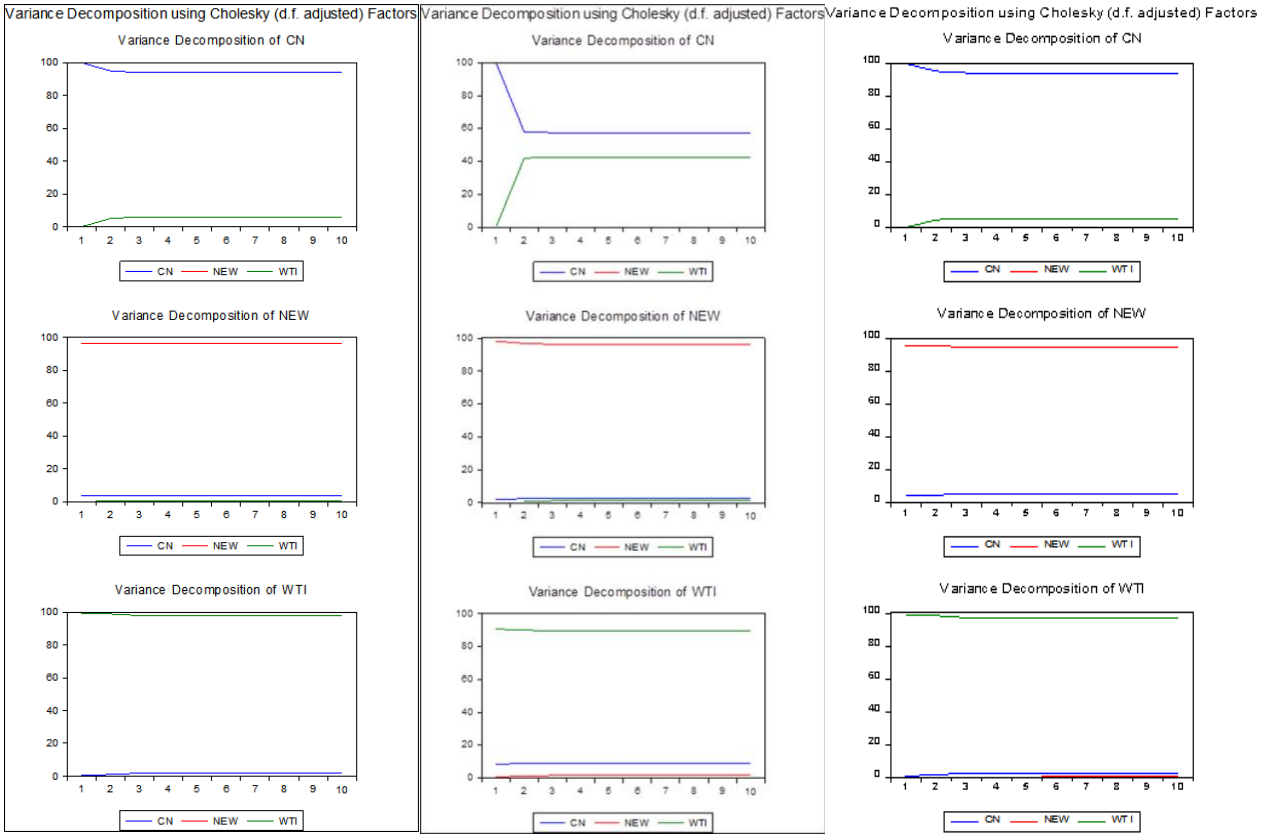


Figure. 19. Pulse response diagram of WTI to NEW.

FIG. 18 shows the response of WTIS after being impacted by CN, which rises slowly to the middle of stage 3 and then falls to line 0, and remains stable after the middle of stage 5.Figure 19 shows the response of WTI after NEW impact. It remains in negative impact until the middle of the fourth phase, and then gradually returns to 0 line and remained stable.

5.1.4 Result of variance decomposition



(a) (b) (c)

Figure 20. (a, b, c) Result graph of variance decomposition.

(1) FIG. 20(a) shows the relationship between (time) CN, NEW and WTI. The results shows that CN contributed nearly 95% to itself in the early stage, while WTI and New contributes almost nothing to CN. In the later period, the contribution of CN decreased to 90%, while WTI increases, but NEW still has no contribution. Similarly, the contribution of NEW to itself is about 95% and remains stable,

while the contribution of CN to NEW is about 5%.WTI contributes nearly 100% to itself, but CN and NEW also contribute to it. It can be seen that their own contribution to their own is the dominant factor.

(2) Figure 20 (b) shows the contribution relationship among CN, NEW and WTI. At the initial stage, the contribution of CN to CN is 100%, while the contribution of WTI and NEW to CN is 0. Later, the contribution of CN to CN begins to decline and tends to be stable at 60%, while the contribution of WTI begins to increase to 40%.As for NEW, NEW contributes nearly 100% to itself, while CN and WTI still contribute to a certain extent.

Similarly for WTI, WTI has a contribution of nearly 90% to itself, CN has a contribution of about 10% to WTI, and NEW also has a weak contribution to WTI.

(3) Figure 20 (c) shows the relationship of contribution degree among WTI, CN and NEW from January 1, 2020 to June 30, 2021.In the variance decomposition of CN, the contribution rate of CN to itself is 100% at the initial stage, while the contribution rate of NEW and WTI is 0.Subsequently, the contribution of CN decreased to about 95%, and that of WTI gradually increased to about 5%.

As for the variance decomposition of NEW, the contribution of NEW itself is always around 95%, fluctuates slightly in the second phase, while the contribution of WTI is always 5%, and has an insignificant increase in the fourth phase. Finally, for WTI, the contribution of WTI was 100% at the beginning, and then slowly decreased to around 97%. The contribution of CN and NEW is 0% at the beginning, and then CN slowly rise to a weak contribution of around 3%.

5.2 Risk evolution analysis based on GARCH model

First, GARCH model is established for Chinese crude oil futures price. Through constructing mean equation and ARCH test, it is found that Chinese crude oil futures price has significant ARCH effect. Then, AR (1)-GARCH (1, 1) model is constructed, and the volatility results in the sample period are shown in the figure.

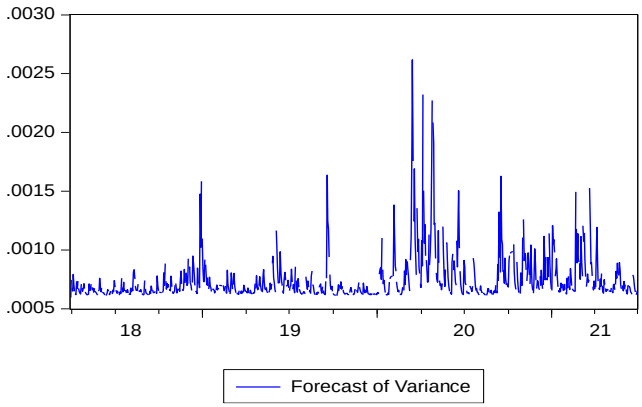


Figure 21. Variance analysis of Chinese crude oil futures prices.

According to the variance analysis of China's crude oil futures price in the figure, the fluctuation in 19 years ago may be due to the risk of oil supply reduction in Iran and other oil-producing countries caused by the Iranian nuclear agreement launched by the United States in May, 2018.From late 19th to 21st, China's crude oil futures prices had high volatility risk, which was on the one hand due to sino-US trade friction affecting crude oil imports, and on the other hand due to the impact of the epidemic on China's economy.

Similarly, the GARCH model of China's new energy stock price is constructed. It is verified that China's new energy stock price also has a significant GARCH effect. The AR (1)-GARCH (1, 1) model is constructed to obtain the volatility evolution within the sample, as shown in the variance analysis of China's new energy stock price. It can be found that from late 19th to 21st, there were continuous fluctuations consistent with the fluctuations of crude oil prices in China, but the fluctuations of new energy stock prices were more unstable before 19th.In 2018, the National

Development and Reform Commission, the Ministry of Finance and the National Energy Administration reduced the on-grid electricity price through the "Notice on photovoltaic Power Generation matters in 2018", resulting in a 19.7% year-on-year decline in China's newly installed photovoltaic power generation, and a number of new energy listed companies' share prices received varying degrees of impact, and even the net interest rate of some companies fell to 1%.

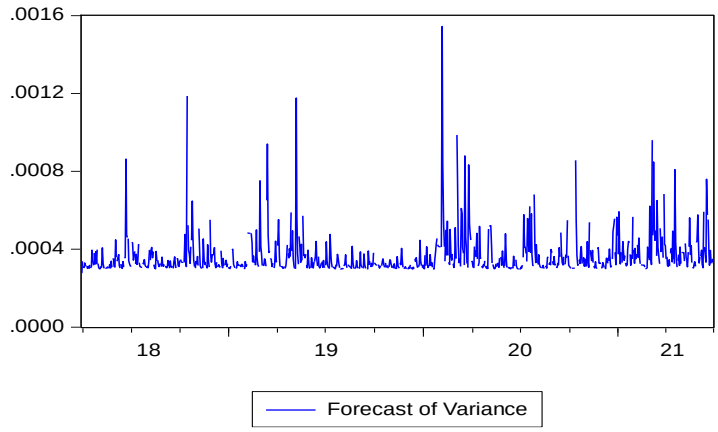


Figure 22. Variance analysis of China's new energy stock prices.

6. Conclusions and Suggestions

This paper uses crude oil prices and new energy stock prices in China and the US from 2018 to 2021 as data, and uses VAR model and GARCH model to conduct empirical research on the correlation and volatility of the three. The main conclusions are as followed: First of all, through the granger relationship response, only the first phase of WTI in 3.00 E-54 significance level rejects the null hypothesis, suggesting that the WTI is the granger cause of CN, from 18 to 19 years in U.S. crude oil price fluctuation has significant influence on China's crude oil, the second pulse graph, most notably the CN for WTI shows that it has had the obvious difference, and the overall rise and decline of the amplitude, are of great difference, the last is the variogram, which also have obvious differences, the fluctuation of the second phase of the figure is larger than that of overall graph that illustrate the impact of international crude oil price on China's crude oil prices is larger. On the whole, Granger causality test shows that there is a mutual influence between international oil prices and Chinese oil prices, and Chinese oil prices also affect the stock prices of new energy companies. At the same time, variance decomposition results show that the impact of international oil prices on Chinese oil prices is greater than that of Chinese oil prices on international oil prices. In addition, the analysis results of impulse response function show that the impact of Chinese oil price and international oil price on the stock price of new energy companies is not significant in fact, and the impact of domestic oil price is greater. In the second stage (From January 1, 2020 to June 30, 2021), granger causality indicates that only international crude oil always has an impact on China's crude oil price. Second, the result of variance decomposition is indistinguishable from the whole. Finally, the results of impulse response function analysis are in agreement with those of the whole data. Secondly, based on the ANALYSIS of GARCH model, it can be found that Chinese crude oil futures price and new energy stock price have significant ARCH effect, and their prices have certain volatility. WTI's price is relatively stable. The results show that national policies have a great impact on the volatility of crude oil futures and the stock price of new energy.

In the face of the deteriorating environment and the gradual reduction of natural resources, the state has issued relevant policies to promote the development of new energy and related industries. At the same time, in order to reduce the dependence on traditional energy, the state has continuously improved the relevant system of new energy. The study of crude oil price and new energy stock price in China and the United States in this paper can help stabilize the market and provide data reference

for the government and relevant personnel to promote the rational use of capital in the capital market of new energy industry. The following are the suggestions of the paper:

First of all, for the government, the government should have an understanding of the impact of the policies introduced. The policies mentioned in the paper have led to the sharp drop in the stock price of new energy. The state should have an expectation of such huge fluctuations and stabilize the stock price through relevant methods, so as to protect the new energy market to some extent. At the same time, the government should strengthen the management of negative news to prevent negative news from having too much impact on the market. In the face of the impact of WTI stock price fluctuations, the government needs to formulate a series of policies to stabilize the new energy market. For example, certain subsidies can be given to relevant new energy industries to encourage the development of new energy industries.

Secondly, for new energy companies, China's new energy industries are still in the preliminary stage of slow development. Faced with the fluctuation of crude oil price, new energy enterprises can adopt different measures and development strategies. When the price of crude oil rises, new energy companies can further improve the performance and quality of new energy on the original basis by using the capital market to invest in researching and equipment purchasing. At the same time, new energy enterprises can pay attention to the adjustment of the new energy industry and extend the industrial chain downward.

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