The Impacts of the China–US Trade War on China's Agricultural Commodity Futures Prices

—Research based on the event study method

Si Chen[*]

College of Economics, Sichuan Agricultural University, Sichuan, China

*Corresponding author e-mail: rosy_chen@stu.sicau.edu.cn

Keywords: event study method; the China-US trade war; agricultural commodity futures market

Abstract: Based on the composite price index and the prices of 7 agricultural commodity futures from March 2018 to October 2020, the event study method was adopted in this paper to study the impacts of China-US trade war on the agricultural commodity futures prices in China. Taking 5 negative events and 4 positive events of the China-US trade war as the examples, it was analyzed that how China's agricultural commodity futures prices were influenced according to various event natures and differences. The results of empirical analysis revealed the significant impacts of the China-US trade war on the futures prices of China's agricultural commodities. It was also found that the impacts of positive events were contrary to those of the negative eons. Besides, different agricultural commodities were influenced to varying degrees. That is, the composite price of agricultural commodity futures reacted passively to the negative events and actively to the positive ones. For the 7 futures, the impacts of positive events on the prices of No.1 soybean and soybean oil were weak, and to the impacts of negative events were even weaker. Although both soymeal and corn price were not significantly affected, the prices of strong gluten wheat, cotton and sugar were strongly influenced, which was consistent with the hypothesis and statistically significant. In this paper, theoretical study was conducted to draw relevant conclusions for people to understand the impacts of the China-US trade war on China's agricultural commodity futures prices, which contributes to deal with the adverse effects of the China-US trade war and maintain the order of agricultural market.

1. Introduction

Up to now, the United States, following the European Union, has become China's second largest trading power. However, as the trade volume between China and the United States increases, trade disputes are also escalating. The China-US trade war was first triggered by the US on March 23, 2018, when the US government intended to impose tariffs on Chinese imports worth of 50 billion dollars. This incident has caused serious damage to not only the economy of China but also that of the US (Liu and Woo, 2018). What's more, the rivalry between the mis fiercer than ever since the establishment of diplomatic ties. In general, the impacts of trade friction events are often related to the correlation of the trade between two countries (Hook et al., 2011). The United States ranks first in exporting agricultural commodities among the world. Its trade restrictions on China will have a certain impact on the prices of China's agricultural commodities. Since the break out of the trade war, the US agricultural exports to China from the second half of 2018 to the first quarter of 2019 were 6.25 billion US dollars, decreased by nearly 70 percent. The United States restricted China's imports and exports, meanwhile, imposed tariffs. As a result, the trade volume was declined but the costs were increased. China has further responded to the US trade restrictions by imposing tariffs on a wide range of US agricultural imports. In addition, given the correlation between the commodity values of the two countries, China's agricultural prices will surely be affected by the trade events. For agricultural commodities, the futures prices were selected as the study objectives for their quick response to the events above. At the same time, the market will adjust the portfolio position due to the change in the expected value of the currency, thus further affecting China's agricultural futures

market.

During the 14th five-year plan period, China further proposed "let the futures market play a more active role in the economy and the market". However, due to the large demand of China's agricultural commodities and the complex price formation mechanism, the futures market is vulnerable to external factors. Agricultural futures have attracted many investments with the advantages of smaller contract value and lower marginal rate. Therefore, this impact will be weakened by the future price as investors are sensitive to it. In addition, it will also affect the spot price since there is a gap between supply and demand of agricultural commodities, thus affecting the futures prices. A huge percent of China's agricultural commodities has been imports from the US market. From 2004 to 2010, China has imported more than 25% of its agricultural commodities from the US. In 2017, China imported agricultural commodities of 24.116 billion dollars from the US, increased by 12.8% compared to the same period last year. The US has raised export tariffs, which will add to the pressure on the prices of China's agricultural commodities. Prices of the commodities with large trade volume between China and the United States may be greatly affected. For example, soybeans exported from the United States to China accounted for 41% of China's trade volume (FAOSTAT, 2019). Another example is cotton. The price of domestic cotton will be raised in the long run, which may affect the export volume of domestic textile and garment industry. Therefore, the trade war events may have distinct impacts on the prices of different agricultural commodities. Generally speaking, futures prices, as a "bellwether" of agricultural commodity prices, will be subject to frequent fluctuations due to the trade war. On this account, questions were put forward in this paper: what impact would the China-US trade war have on China's agricultural futures prices? Were various agricultural futures affected to varying degrees? How should China's agricultural futures market respond to the imminent China-US trade events? It is meaningful to conduct study on the questions above. It will to a large extent enrich researches related to agricultural commodity futures prices and provide theoretical guidance for China to mitigate adverse impacts.

To sum up, the current agricultural futures market, which is in a critical period of development, is getting more and more open. The China-US trade friction events have already affected the agricultural commodities futures market in China. As the financialization trend of agricultural commodities become increasingly obvious, the complex price formation mechanism of futures will make it more difficult for investors to predict the futures prices. Beyond that, the Chinese government will face more challenges to formulate policies for its agricultural commodities futures market. Therefore, it is of great significance to determine the impacts of the China-US trade war on China's agricultural commodity futures prices to reduce its adverse influence as well as stabilize the futures market. Moreover, previous studies on the impacts of external events on the agricultural commodity futures prices mainly focus on the overall futures price, but this paper will be more targeted to compare the overall price with the prices of various specific agricultural commodities. By using the event study method, 4 positive events and 5 negative events of the trade war were selected in this study to quantitatively analyze the impacts on composite price of agricultural commodity futures and the prices of 7 agricultural commodity futures. The purpose of the study is to supplement the researches on the price fluctuation of agricultural commodity futures to a certain extent.

2. Literature review and hypothesis establishment

In history, there were many trade disputes between China and the United States, and trade imbalance is often the main reason of China-US friction (Autor, Dorn and Hanson, 2013). The trade war deliberately launched by the United States has aroused a great impact on China's economy. Li et al. (2020) found that trade disputes have brought great negative effects on Chinese enterprises. Xia et al. (2019) found that under the influence of the China-US trade war, the economic growth speed and energy demand of china are declining. All in all, many scholars have found that the China-US trade war has brought adverse effects on China's economy.

The increasing trend of financial speculation and financialization of agricultural commodities

result in futures price fluctuations of the agricultural commodities, and the research on the futures prices of agricultural commodities gradually increases (Le Pen and Sévi, 2017). Monique Carvalho et al. (2019) believe that the price of soybean and dairy products will increase, which will cause heavier burden on producers and consumers. Ji et al. (2020) found that the time of China-US trade war had a significant impact on Chinese soybean trade and spread to futures markets. Generally speaking, in the short term, due to the fluctuation of investment sentiment and the gap between supply and demand in the agricultural futures market, the cost of agricultural commodities will be greatly increased, which will weaken the competitiveness of China's agricultural commodities. In the long run, after China announced the imposition of tariff measures, Russia, India and other countries immediately expressed their willingness to provide agricultural commodities for China. From this point, it will further expand the international market of China's agricultural commodities and improve market management.

Study about the impact of external events on market prices is the most common research direction in the field of traditional finance. Therefore, this paper applied the event study method to analysis the China-US trade war. Event study method is a common statistical measurement used to explore the influence of unusual events on economic indicators. Irwin et al. (2001) divided the release of all monthly USDA WASDE reports for corn and soybeans into two categories and found these reports have a significant impact on corn and soybean markets. Pandey and Kumari(2021), Duso et al.(2010), Kim and Mei(2001) also applied the event study method to study the impact of different events on the market. From the beginning of 2018. when the United States launched the first trade war, to October 2020, there were many major negative and positive events between China and the United States, providing plentiful samples for this research.

The main contributions of this study could be outlined as follows: first, there are few empirical studies on the impact of China-US trade war on China's agricultural futures prices, and most of them are qualitative analysis. On the one hand, the futures market of agricultural commodities is one of Chinese earliest futures markets, and its trading is active (Ahumada and Cornejo, 2016) but vulnerable to external factors. On the other hand, under the background of the outbreak of COVID-19 and the presidential election of the US, China-US relation has become increasingly tense, leading the China-US trade war becomes a hot topic again. In this respect, this study will be of great significance. Second, most of the current researches on the agricultural commodity futures prices are based on the overall price of agricultural commodities, only a few literatures compared the differences between futures prices impact on each variety of agricultural commodities. Third, the research on the futures prices of agricultural commodities can help investors to formulate reasonable investment strategies, so as to minimize the losses caused by the trade war (Luo et al., 2019). Therefore, this study uses the event study method to analysis the effects of the most influential China-US trade war events between March 2018 to October 2020 on China's agricultural commodity futures prices. Studying the positive and negative effects on China's agricultural commodities to discuss China-US trade war will have great significance. Then we put forward the following hypothesis:

Hypothesis 1. (H1): The China-US trade war will have an impact on China's agricultural commodity futures prices, in which the impact of positive events is positive, and that of negative events is negative.

Hypothesis 2. (H2): The impact of China-US trade war is different on each variety of China's agricultural commodity futures prices.

3. Research methods and data description

3.1 Incident description and data source

This study takes the positive and negative events of China-US trade war as the research background. "Positive Events" is defined as an event that can promote economic growth, stimulate financial markets, and expand the volume of net export trade, such as lifting tariffs, easing trade restrictions and other measures. "Negative Events" refers to the events that will have adverse

impacts on the national economy and restrict imports and exports trade, such as raising trade tariffs, increasing controls on Chinese companies, and restricting air traffic. In this study, all China-US trade war events were sorted out, and the events that had the most significant influences on Chinese economy were selected, and the events with close dates are integrated or excluded. According to the above principles, 4 positive events and 5 negative events were finally selected (see Table 1). Considering the time difference between China and US, as well as the influence of weekends and holidays and other factors, some date was adjusted.

It is necessary to define the event window and the estimation window to assess the impacts on the price and return rate of an event. Regarding the event window, the accurate occurrence date of the event was described as t=0, and 5 days before and after the occurrence of the event was selected, that is described as [-5, 5], summing to 11 days. As for the estimation window, Andoh-Baidoofk (2002) suggested that 120 working days to 255 working days are the most appropriate. Therefore, 160 days before the occurrence of the event was selected as the event estimation window.

China's Agricultural Commodity Composite Future Index and the closing prices of seven varieties of agricultural commodity futures prices (including No.1 soybean, soybean oil, soymeal, corn, strong gluten wheat, cotton and white sugar) that constitute the price index were selected as research objects. This paper takes the daily data of agricultural commodity futures prices from March 23, 2018 to October 23, 2020 as research sample. With a total window period of 160 days, the daily futures price data from September 21, 2017 to October 23, 2020 will be used as the sample. All data were from the Wind database, and the missing parts of the data were filled in by the linear regression method.

Table 1. List of major events in the China-US trade war

Impact	Declaration date (US Time)	Declaration date (Adjusted time)	Content of the announcement
Positive events	2018.12.1	2018.12.3	The leaders of China and the United States have agreed at a meeting in Buenos Aires at the G20 summit in Argentina to stop imposing new tariffs on each other
	2019.6.29	2019.6.30	The leaders of China and the United States met in Osaka and said they agreed to resume trade talks and that the United States would not impose new tariffs on Chinese exports
	2020.1.15	2020.1.15	China and the United States signed the first-stage economic and trade agreement, and the formal signing of the first-stage economic and trade agreement between China and the United States came to a temporary conclusion
	2020.7.27	2020.7.27	USTR released the seventh list of products with extended exclusion period (including commodities of 16 billion yuan on the tariff exclusion list)
Negative events	2018.3.23	2018.3.23	US President Donald Trump signed a memorandum of understanding on trade with China at the White House and announced tariffs of 25 percent on $60 billion worth of goods, including 128 US products worth $3 billion
	2018.6.15	2018.6.15	The US government has released a list of goods that will be subject to additional tariffs of 25 percent on about $50 billion of imports from China
	2018.7.6	2018.7.6	Donald Trump has announced a 25 percent tax on 34-billion-dollar imports from China
	2019.8.5	2019.8.5	US names China 'currency manipulator' for first time in 25 years
	2020.8.28	2020.8.28	The Office of the United States Trade Representative (USTR) has reimposed 7.5 percent tariffs on 128 products in US-China trade

3.2 Research Methods

The event study method was applied to analyze the impact of the China-US trade war on China's agricultural commodity futures prices, which mainly includes the following steps: first, determine the research sample and the event window. Second, select an appropriate yield model to predict the normal rate of return (ER) without the event, so as to calculate the abnormal rate of return (AAR) and cumulative abnormal rate of return (CAAR) according to the event window period. Finally, through the hypothesis test of the CAAR values, the significance of the statistics is obtained, and then the effects of the event on the rate of return can be discussed.

3.2.1 Research Model

There are numerous models to measure ER, including market model, constant mean model, market adjustment model, etc. Among them, the market model is a statistical model that compares the price of a certain security with the market price, which has been extensively used to study the impact of events on the market (Sharpe, 1963). Therefore, this study selects the market model, and first establishes the empirical model as follows:

$$R_{it} = \beta_0 + \beta_1 R_{mt} + \mu_{it}$$

R_{it} represents the rate of return of the ith agricultural commodity futures on the t trading day. R_{mt} represents Chinese agricultural commodity futures composite price index. β_0 and β_1 are the parameters of the market model. μ_{it} is the error disturbance term of the rate of return of futures i at time t.

Second, determine the abnormal rate of return (AR) and CAAR values. The AR value refers to the difference between the actual rate of return of the event window and the normal return rate of the estimated window, which can be expressed as:

$$AR_i = R_{it} - ER_{it}$$

Besides, we need to calculate the AAR in the same cross section and get AAR and CAAR values of 7 kinds of agricultural commodity futures prices in nine time points. The CAAR value refers to the average result of the abnormal rate of return of 7 varieties affected by various events, that is:

$$AAR_i = \frac{1}{NK} \sum_1^N \sum_1^K AR_{it}$$

$$CAAR(t_1, t_2) = \sum_{t_1}^{t_2} AAR_t$$

$$AAR_t \sim (0, \frac{1}{N^2} \sum_1^N [\frac{1}{T-1} \sum_{t=1}^T (R_{it} - \mu_i)^2])$$

$$CAAR(t_1, t_2) \sim (0, \frac{T_2 - T_1 + 1}{T-1} \sum_{t=1}^T (R_{it} - \mu_i)^2)$$

3.2.2 Statistical test

The original hypothesis (H0) refers to that the China-US trade war has no significant impact on prices, and the AAR value is 0. The alternative hypothesis (H1) is that the China-US trade war has a significant impact on prices, so the AAR value will be significantly different from 0. At present, most of the literature carries out statistical tests by means of t test or Z test, and the precondition for the tests is that the samples obey the overall normal distribution. Since the sample capacity of this paper is large enough, according to the central limit theorem, the samples approximately obey the normal distribution. According to the t test method of Lakshmi (2016), the formula is given below:

σ 2(t1，t2) is the variance of the abnormal return rate of each futures commodities in [T1, T2].

$$J_1 = \frac{CAAR(t_1, t_2)}{[\sigma^2(t_1, t_2)]^{\frac{1}{2}} / \sqrt{n}}$$

$$t = \frac{AAR_t}{[\sigma^2_{AAR_t}(t_1, t_2)]^{\frac{1}{2}} / \sqrt{n}}$$

4. Empirical results

4.1 The impact on the agricultural futures composite price

We judge the significance level by constructing J-statistics. If the result is significant, it will be considered that the event has an impact on China's agricultural commodity futures prices, otherwise it is insignificant. In general, the impact of positive events and negative events on agricultural prices shows a positive correlation. Table 2 lists the AAR and CAAR values of agricultural commodity futures composite price.

Table 2. AAR values, CAAR value and their significance test results

Event day	Negative events			Positive events		
	AAR	T	CAAR	AAR	T	CAAR
-5	0.00171	0.01862*	0.00171	-0.0047	-0.04874***	-0.00470
-4	0.00407	0.04436***	0.00577	-0.00163	-0.01688*	-0.00632
-3	0.00036	0.00398	0.00614	-0.00005	-0.00056	-0.00638
-2	0.00177	0.01934*	0.00791	0.00196	0.02039*	-0.00441
-1	0.00024	0.00263	0.00815	-0.00260	-0.02700**	-0.00701
0	0.00060	0.00658	0.00876	0.00046	0.00480	-0.00655
1	-0.00220	-0.02400**	0.00655	0.00062	0.00641	-0.00593
2	-0.00112	-0.01227	0.00543	0.00099	0.01030	-0.00494
3	0.00146	0.01588	0.00689	0.00160	0.01659	-0.00334
4	-0.00131	-0.01428	0.00558	0.00013	0.00136	-0.00321
5	0.00302	0.03291**	0.00859	0.00260	0.02695**	-0.00062

AAR represents the average abnormal rate of return of all agricultural commodity futures prices affected by all negative and positive events in the whole event window.

CAAR represents the average cumulative abnormal rate of return of all agricultural commodity futures prices affected by all negative and positive events in the whole event window.

According to the AAR values, in the 11-days event window, the ARR values of positive events are negative on 3 days and positive on the remaining 8 days. On the first day, the second day and the fourth day after the event, the response was negative, and on the third and fifth day, the response was positive. This indicates that there is a delay in the response of futures prices to positive events. For negative events, there are four days of negative response with strong significance, and all occurred before the day of the event. because the reason is that the market will be informed in advance before trade measures are taken, so that investors have time to prepare and buffer for the event. However, the AAR values were positive at 5 days after the event, among them there are four days of negative response without significance. From this point, it verifies hypothesis 1(H_1).

From the perspective of CAAR, on the whole, it can be preliminarily estimated that China's agricultural commodity futures prices are sensitive to the China-US trade war and the positive and negative events will have opposite effects on them. The CAAR value of negative event is -0.00062, and that of positive event is 0.00859. Thus, hypothesis 1 is verified. As for the influence of two kinds of events, the CAAR values of agricultural commodity futures prices of positive events are all positive, which increases before the event day and decreases after the event day. It indicates that the

agricultural commodity futures prices will react in advance before the occurrence of positive events, while the impact gradually decreases with the time of the event. On the contrary, the CAAR values of negative events are all minus, which illustrates that the agricultural commodity futures prices are negatively affected as a whole. Among them, the absolute value of CAAR is the largest on the day of the event and the day before the event, indicating that it was affected greatly. In addition, from the CAAR values of 11-day event windows, we can see that the CAAR value of negative events is -0.00062, and that of positive events is 0.00859.

As shown in Table 3, CAAR values of window periods with different time lengths can be used to compare the short-term and long-term impacts of events, and then discuss the hysteresis or the advance of the impact. CAAR values of positive events are also positive, and the values of the negative events are the opposite. The larger the time window period, the larger the absolute values of CAAR. So the effect will be more obvious. From the significance point of view, the results were all with statistical significance except when on the event day. Therefore, hypothesis 1 is also verified.

Table 3. CAAR values and their significance of different window length

Event window period	Positive events		Negative events	
	CAAR	T-value	CAAR	T-value
（0,0）event widow	0.00876	0.99742	-0.00655	-0.99089
（-1,+1）event widow	0.02346	2.67287**	-0.01950	-2.94911**
（-2,+2）event widow	0.03680	4.19269***	-0.02885	-4.3638***
（-3,+3）event widow	0.04983	5.67644***	-0.03857	-5.83387***
（-4,+4）event widow	0.06118	6.96949***	-0.04811	-7.27605***
（-5+5）event widow	0.07148	8.14301***	-0.05342	-8.07949***

4.2 Impact on futures prices of 7 kinds of agricultural commodities

There may be differences in various influences on agricultural commodity futures prices due to the diversity in trading volume, openness, agricultural policies and other reasons. Therefore, this paper discusses these impacts on the futures prices of 7 representative agricultural commodities (see Table 4). The event window is divided into three periods: the "preparation period", the "occurrence period" and the "post period". Since there is always a certain advanced announcement of trade events, the period of 5 days before the event day is defined as the "preparation period". It is used to discuss the effect brought by market expectation before the event. The event day and the first day after the event when the market has just received the signal, which can be used to estimate the market's timely response and refers to the "occurrence period". The period from day 2 to day 5 after the event day is defined as the "post period", which is a measure of the delayed market reaction. In this paper, CAAR values of 7 agricultural commodity futures prices will be calculated respectively to analyze the impact on the futures prices in the preparatory period, occurrence period and post period.

In general, the China-US trade war has a certain impact on the China's agricultural commodities futures prices, and the impacts on the prices of 7 different agricultural commodities are different. Therefore, the Hypothesis 2 is confirmed. For the price of No.1 soybean, the effect is significantly positive in both the occurrence period and the post period, indicating that No.1 soybean price has a weak response to the positive event. The impacts of negative events in the three periods are positive, indicating that No.1 soybean prices are little affected by negative events. Similar to the results of No.1 soybean price, soybean oil price is positively affected by the occurrence period and the post period with significance, which indicates that it has little response to positive events and no response to negative events. Perhaps the reason is that China has implemented relevant policies to maintain the stability of the supply and demand of No.1 soybean and soybean oil, making them less sensitive to external factors. As for the price of soymeal, the impact of positive events turns negative in the post period, and the impact of negative events turns positive in the post period,

which demonstrates that soymeal price overreacts to the trade war. The impact of corn price is consistent with hypothesis 1, but it is prominent only in the preparation period, and not prominent in the other periods. For the prices of strong gluten wheat, cotton and white sugar, the results are obviously and consistent with hypothesis 1. They respond positively to positive events and negatively to negative events, which greatly illustrates that the strong gluten wheat, cotton and white sugar are significantly affected by the China-US trade war.

In terms of time, in the preparation period, except soybean, the other 6 varieties all reacted passively to negative events and actively to positive events. The market would have an early perception of these events and presented positive or pessimistic market expectations. Maybe the reason is that the public would be informed in advance or the pre-proposal would be made before the formal implementation of the trade policy, which gives the market sufficient time to respond. During the occurrence period, the trade events just happened, but the reaction of No.1 soybean price and soybean oil price reacted positively during and after the negative events, but without significance. Maybe the reason is that there is linkage between these two prices, and the soybean oil price will have an impact on the soybean price, which also explains the reason for their similar results. In the post event period, except for the price of No.1 soybean, soymeal and soybean oil, the negative impact of the negative event on the other 4 varieties was still negative, which indicates that the negative impact of the trade war on these three varieties has a strong sustainability. CAAR represents the average cumulative abnormal return of each variety affected by all negative and positive events in the whole event window.

Table 4. CAAR of 7 varieties in the window period

Commodity futures	CAR(-5,-1)		CAR(0,1)		CAR(2,5)	
	Positive events	Negative events	Positive events	Negative events	Positive events	Negative events
No.1 soybean	-0.00248 (-0.50037***)	0.01826 (3.68866***)	0.00187 (0.9441)	0.00046 (0.23296)	0.00044 (0.1123**)	0.00912 (2.30372**)
Soybean oil	0.05831 (4.25319)	-0.01913 (-1.39542)	0.01011 (1.84358***)	0.02091 (3.81334***)	0.04248 (3.87286***)	0.05345 (4.87327***)
Soymeal	0.05748 (4.39484***)	-0.07576 (-5.68617***)	0.01215 (-1.41974)	-0.00687 (-1.28938)	-0.03204 (-2.14188)	0.00379 (0.35586)
Corn	0.03180 (6.03517***)	-0.02172 (-4.12121***)	0.01807 (8.57422)	-0.00148 (-0.70308)	0.02446 (5.80233)	-0.00505 (-1.19682)
Strong gluten wheat	0.01127 (1.32676***)	-0.03429 (-4.03879***)	0.04248 (12.5068***)	-0.03567 (-10.50245***)	0.09158 (13.48216***)	-0.03579 (-5.26797***)
Cotton	0.03061 (2.7805***)	-0.03604 (-3.27334***)	0.01472 (3.34249***)	-0.04568 (-10.37225***)	0.02643 (3.00118***)	-0.06061 (-6.88103***)
White sugar	0.02076 (3.65336***)	-0.03308 (-5.81985***)	0.00777 (3.41816***)	-0.01907 (-8.38774***)	0.03205 (7.04829***)	-0.04972 (-10.93541***)

5. Conclusions and implications

By using the event study method, this study attempts to discuss the impacts of the positive and negative events of China-US trade war on the composite price index and the prices of 7 agricultural commodity futures. The results indicate that the China-US trade war has a certain impact on China's agricultural commodity futures prices, the impact of positive and negative events is opposite, while the levels of impact different agricultural commodities confronted with are different.

Overall, China-US trade war has a certain impact on China's agricultural commodity futures prices. The negative events have a negative impact on the prices, and the positive events have a positive impact on the prices. From the perspective of the values, the results of the CAAR values are consistent with hypothesis 1at all points in time and periods, while those of the AAR values are partly consistent with hypothesis 1.

According to the results of 7 varieties, for the price of No. 1 soybean and soybean oil, both just had little response to the China-US trade war. The price of soymeal overreacted to the trade war, contrarily, the corn price had little reaction to the event. However, there were no significant impacts

on both prices in the occurrence period and the post period. The impact on the prices of strong gluten wheat, cotton and white sugar are significantly consistent with the hypothesis. They responded in advance in the preparation period, and the impacts lasted a long time in the post period.

The relationship between China and the US becomes more and more intense at present, trade friction events emerging frequently. The China-US trade war had an impact on China's agricultural commodity futures prices, which is also related to the country's food security and the sustainable development of agriculture. How to stabilize the agricultural commodity futures prices and build a stable agricultural commodity futures market are still urgent problems to be solved. Therefore, in order to resist market risk, China should strengthen the supervision of agricultural futures market and improve the risk control system of agricultural futures market. In addition, introducing price stabilization policy in response to characteristics of each varieties is another fine approach to stabilize the prices of agricultural commodities and reduce the adverse impact of China-US trade war on China's agricultural futures market.

References

[1] Ahumada, H., & Cornejo, M. (2016). Forecasting food prices: the case of corn, soybeans and wheat. International Journal of Forecasting, 32(3), 838–848.

[2] Andoh-Baidoo, Osei-Bryson, & Amoako-Gyampah. (2013). A hybrid decision tree based methodology for event studies and its application to e-commerce initiative announcements. ACM SIGMIS Database, 44(1), 78-101.

[3] Autor, D. H., Dorn, D., & Hanson, G. H. (2013). The China syndrome: Local labor market effects of import competition in the United States. American Economic Review, 103(6), 2121–2168

[4] Carvalho M., Fendel R. Emerging Countries and the Effects of the Trade War between US and China [J]. Economies, 2019, 7.

[5] D. Tomaso, Peter G. K., Burcin Y. B. Is the Event Study Methodology Useful for Merger Analysis? A Comparison of Stock Market and Accounting Data[J]. Social Science Electronic Publishing, 2007.

[6] Food and Agriculture Organization of the United Nations (FAOSTAT), 2019 (accessed Feb. 2019.).

[7] Hook, G.D., Gilson, J., Hughes, C.W., Dobson, H., 2011. Japan's International Relations: Politics, Economics and Security. Routledge.

[8] Irwin S. H., Good D. L., Gomez J. K. The Value of Usda Outlook Information: An Investigation Using Event Study Analysis[C]// 2001 Conference, April 23-24, 2001, St. Louis, Missouri. NCR-134 Conference on Applied Commodity Price Analysis, Forecasting, and Market Risk Management, 2001.

[9] Ji Q., Zhang X., Zhu Y. Multifractal analysis of the impact of US–China trade friction on US and China soy futures markets[J]. Physica A: Statistical Mechanics and its Applications, 2020, 542.

[10] Lakshmi V, Joshi M. Market Reaction to Listing of Stocks on F&O Segment of NSE: Application of Event Study Methodology[J]. IUP Journal of Applied Economics, 2016, 15.

[11] Le Pen, Y., Sévi, B., 2017. Futures trading and the excess co-movement of commodity prices. Rev. Finan. 22 (1), 381–418.

[12] Li D., Shi F., Wang K. China-US trade dispute investigations and corporate earnings management strategy[J]. China Journal of Accounting Research, 2020, 13(4).

[13] Liu, T., Woo, W. T., 2018. Understanding the U.S.-China trade war. China Econ. J. 11(3), 319–340.

[14] Luo, J., Klein, T., Ji, Q., & Hou, C. (2019). Forecasting realized volatility of agricultural futures with infinite Hidden Markov HAR models. International Journal of Forecasting, (in press).

[15] Pandey D. K., Kumari V. Event study on the reaction of the developed and emerging stock markets to the 2019-nCoV outbreak - ScienceDirect[J]. International Review of Economics & Finance, 2021, 71:467-483.

[16] Sharpe, W. F. (1963). A simplified model for portfolio analysis. Management Science, 9(2), 277-293.

[17] Xia Y., Kong Y., Ji Q., et al. Impacts of China-US trade conflicts on the energy sector[J]. China Economic Review.