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An Empirical Study on the Fluctuation of Vegetable Prices in Producing and Selling Places

-- Taking Shouguang - Beijing as an Example

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Abstract

This paper selects three typical vegetables in Shouguang - Beijing as the object to study the price transmission relationship in Shouguang - Beijing vegetable wholesale market. The results showed that there was a positive correlation between Shouguang and Beijing vegetable wholesale market prices, and the correlation was strong. Vegetable price fluctuation has the characteristics of consistency, periodicity and clustering. Three kinds of vegetables are mutually Granger causality; The result of impulse response shows that both places have a large response to their own random disturbance, and the influence time is short. And the conduction efficiency has asymmetry. The variance decomposition showed that the explanation degree of the vegetable price of Beijing Xintafadi to the vegetable price of Shouguang Logistics Park was twice that of the latter to the former, that is, the market price of Beijing sales place was the main guiding force. Therefore, the price transmission between the two places belongs to the "demand-oriented". At the same time, some suggestions were put forward to regulate vegetable production in a reasonable period, strengthen the effective regulation by the government and improve the transparency of information, and scientifically arrange the vegetable industrial structure in the producing area.

Keywords

Vegetables; Granger Causality Test; Price Fluctuation; Price Conduction.

1. Introduction

Vegetables are the daily necessities of Chinese residents. The fluctuation of vegetable price is closely related to the daily consumption expenditure, and affects the living quality and welfare of residents. Therefore, the stability of vegetable price is the focus of the government and all walks of life. On the one hand, vegetables are connected to the urban residents "vegetable basket", on the other hand, vegetables are affecting producers' income "purse", in the process of fluctuations in the price of vegetables, producers become the direct victims of vegetable prices fell, and consumers are often the undertaker of rising prices, to produce the "food base your injured people, cuisine is hurt farmers" dilemma. How to conduct the price fluctuation of vegetable industry chain in China? Who has the stronger dominant role in the vegetable wholesale market in the production and marketing area? In this, the author selects shouguang, Beijing research to the wholesale market of vegetable prices to fluctuations in the price of proven shouguang Beijing ChanXiaoDe conduction path, the speed and effect, and the factors that influence the vegetable ChanXiaoDe price fluctuations, conduction is reasonable for the government to guide vegetables planting and stable market prices, to set up the early warning system to provide powerful basis to avoid price risk.

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2. Empirical Study on Shouguang - Beijing Vegetable Price Fluctuation

2.1. Data Source and Description

The author chooses Shouguang Logistics Park vegetable wholesale market as the origin sample, and Beijing Xintafadi agricultural products wholesale market as the sales place sample. The data of Shouguang agricultural products logistics park and Beijing Xintafadi wholesale market come from China Agricultural Information Network and National Agricultural Products Wholesale Market Price Information System. Due to the highest frequency of diurnal data, it can best reflect the fluctuation and conduction characteristics of vegetable prices in the region, and the analysis effect is better for the region with a relatively close spatial distance. Since the vegetables picked by Shouguang in the morning were sold on the same day in Beijing Xincadii Wholesale Market, and the daily prices were basically available from the website, the daily price data were adopted. The data span is January 1, 2019 solstice, June 12, 2020 (on June 13, 2020, the Beijing Xinfangdao wholesale market was closed due to the epidemic, so the price could not be found). In addition, if there are data missing, the average value will be taken before and after this paper to fill in. Therefore, the three kinds of vegetables in the two markets formed 522 groups of daily price series respectively.

2.2. Frequency Analysis

In this paper, the data source is information system for the national wholesale market for agricultural products prices [[http://pfscnew.agri.gov.cn/scdt/shucai/.2020.7.15]]. In this paper, the basic statistics and descriptive analysis of 522 groups of daily data of three kinds of vegetables were carried out by EViews software, and the frequency distribution statistical chart was compiled based on this, and the value of Beijing price and Shouguang price of cucumber, tomato and sharp pepper were observed. Price on the horizontal axis, frequency on the vertical axis:

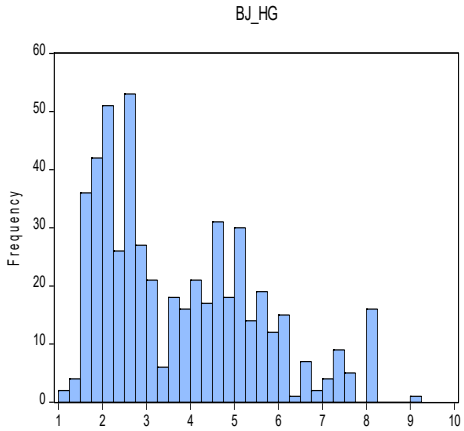

Figure 1. Cucumber price histogram in Beijing

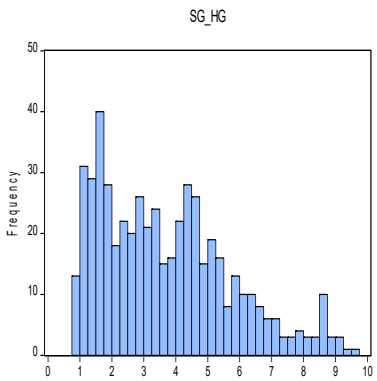

Figure 2. Cucumber price histogram in Shouguang

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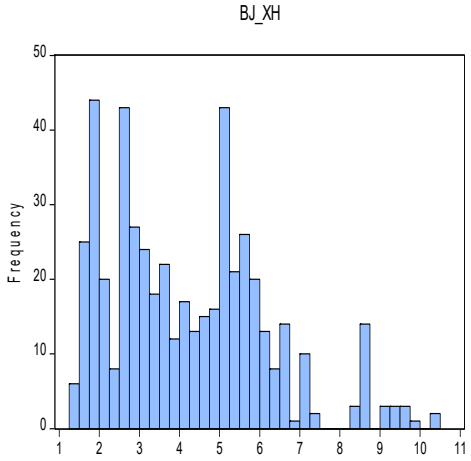

Figure 3. Tomato price histogram in Beijing

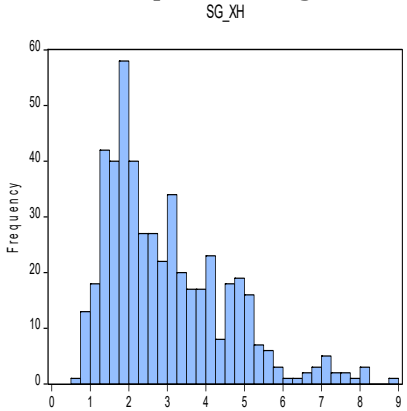

Figure 4. Tomato price histogram in Shouguang

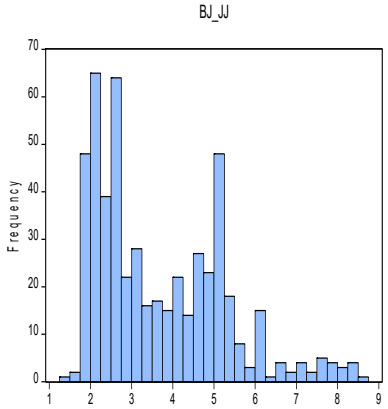

Figure 5. Hot peppers price histogram in Beijing

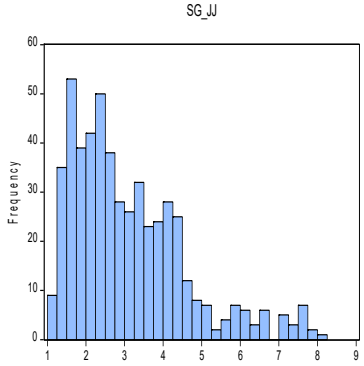

Figure 6. Hot peppers price histogram in Shouguang

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2.3. Correlation Analysis

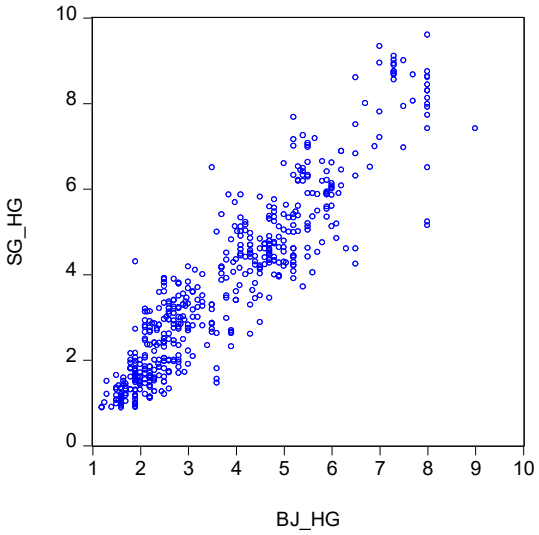

Figure 7. Scatter map of cucumber production and marketing areas

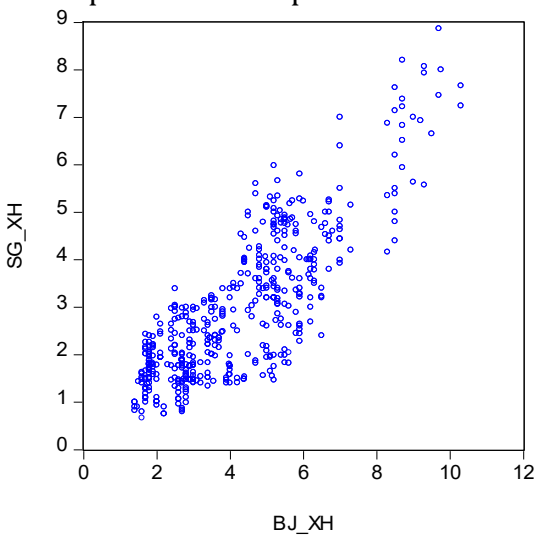

Figure 8. Scatter map of tomato production and marketing areas

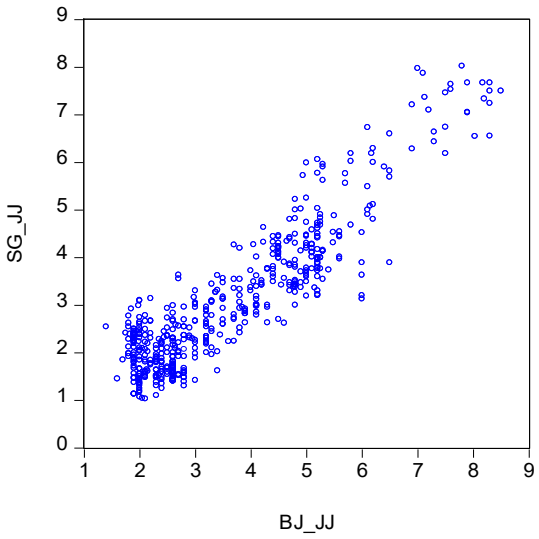

Figure 9. Scatter map of production and marketing of sharp pepper

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2.4. Time Series Analysis

It can be roughly seen from Figure 10, Figure 11 and Figure 12 that the variation trend of market prices of Beijing and Shouguang vegetables is relatively consistent. In terms of fluctuation trend, they show the same direction of fluctuation, indicating that the transmission path of vegetable prices is generally smooth. The prices of cucumber, tomato and prickly pepper in producing and selling areas fluctuate similarly, and the ranges of rise and fall are also very similar. Moreover, the price of the same shouguang vegetable producing area and Beijing XiaoDe basic synchronization, the rise and fall of price changes is the same the price of vegetables in most cases the basic falling or rising at the same time, quite some time and Beijing XiaoDe changes in wholesale prices should come before shouguang origin changes in wholesale prices, further proves the correlation between the two markets the same vegetable prices. In addition, according to the phenomenon reflected in the three price charts, it was found that the wholesale price fluctuations of the three vegetable markets were characterized by periodicity and clustering.

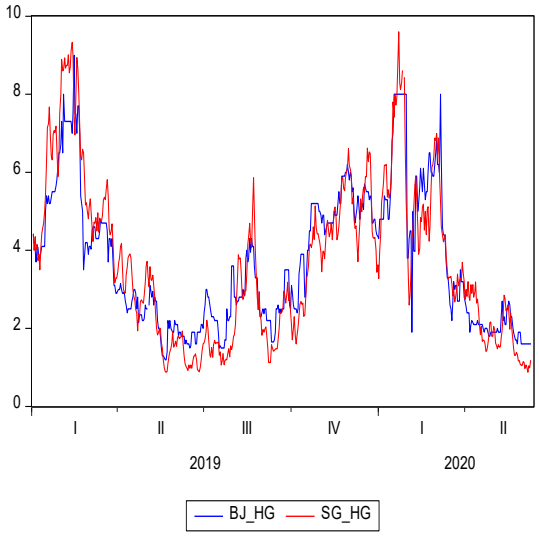

Figure 10. Cucumber production and marketing time series map

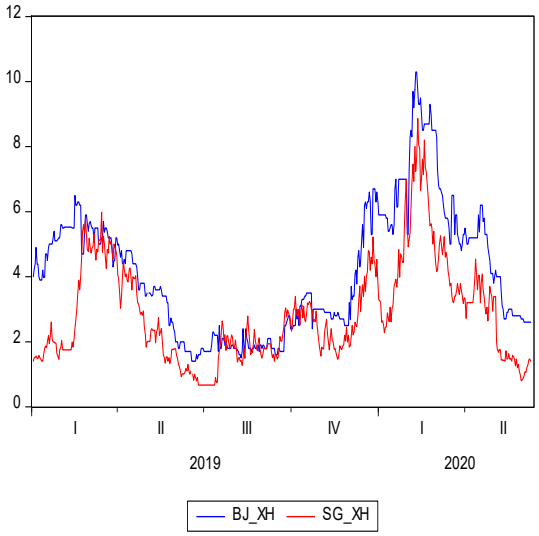

Figure 11. Tomato production and marketing time series map

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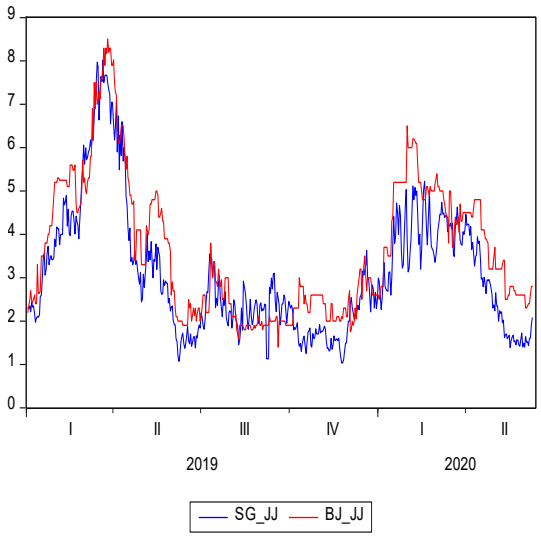

Figure 12. Hot peppers production and marketing time series map

2.5. Summary

Through the analysis of frequency, central tendency and degree of dispersion, it is found that the time series data presents a relatively ideal statistical property of random samples, so we can conduct econometric statistical analysis. Correlation analysis showed that there was a correlation between the vegetable prices in Shouguang Logistics Park wholesale market and those in Beijing Xindadii wholesale market, and the correlation coefficient was high, and they were all positively correlated. In addition, EViews is used to make the time price sequence diagram of the market prices of three kinds of vegetables. The image shows that the market price of vegetables in the producing and selling places fluctuates greatly, and the change trend is highly consistent: in terms of the time trend, it shows the same direction of fluctuation, indicating that the price conduction path of the three kinds of vegetables is generally smooth. In addition, through the time series diagram, we found that the price fluctuations of the production and marketing places of the three vegetables have the characteristics of consistency, clustering and periodicity. And it is speculated that there is a certain conduction relationship between the prices of the production and marketing places of the three vegetables.

3. An Empirical Study on Vegetable Price Transmission between Shouguang and Beijing

3.1. Stationary Test

The determination of the optimal lag order is an important step in the VAR model, because the Granger causality test is particularly sensitive to the lag period. When selecting the optimal lag order P, we try to choose the lag order large enough so that the dynamic characteristics of the construction model can be presented more completely. On the other hand, if the lag order is quite large, it means that we need to estimate more parameters, so the model has fewer degrees of freedom, which defeats our purpose again. Therefore, we need to make a choice after comprehensive measurement, that is, there should be enough lag items and enough number of degrees of freedom.

According to the criteria of LR, ALC, FPE, SC and HQ, the optimal lag order of cucumber, tomato and pepper was 2, 2 and 3, respectively.

3.2. Granger Causality Test

Based on the study of vegetable price fluctuations, this paper continues to study the transmission path of the wholesale prices of three kinds of vegetables in the production and

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marketing market, and conducts Granger causality test on the vegetable prices in Shouguang Agricultural Products Logistics Park and Beijing Xafadi Agricultural Products Wholesale Market. The test results are shown in the Table 1 Stationary test.

Table 1. Granger causality test table for prices of three vegetables

The null hypothesis	Lag order	P values	conclusion
Beijing cucumber price is not the Granger reason Shouguang cucumber price	2	0.0000***	Refused to
Shouguang cucumber price is not the Granger reason for Beijing cucumber price	2	0.0001***	Refused to
Tomato prices in Beijing are not the Granger cause of Shouguang tomato prices	2	0.0007***	Refused to
Shouguang tomato prices are not Granger reasons for the price of tomatoes in Beijing	2	0.0504*	Refused to
Beijing sharp pepper price is not Shouguang sharp pepper price Granger reason	3	0.0039***	Refused to
Shouguang pointed pepper price is not the Granger reason for the price of Beijing pointed pepper	3	0.0383**	Refused to

Note: * represents significant at 10% confidence level; ** represents significant at a confidence level of 5%; *** represents significant at a 1% confidence level.

It can be seen from the table that the prices of three kinds of vegetables in Shouguang and Beijing are mutually Granger causality.

3.3. Impulse Response

(1) Cucumber impulse response results

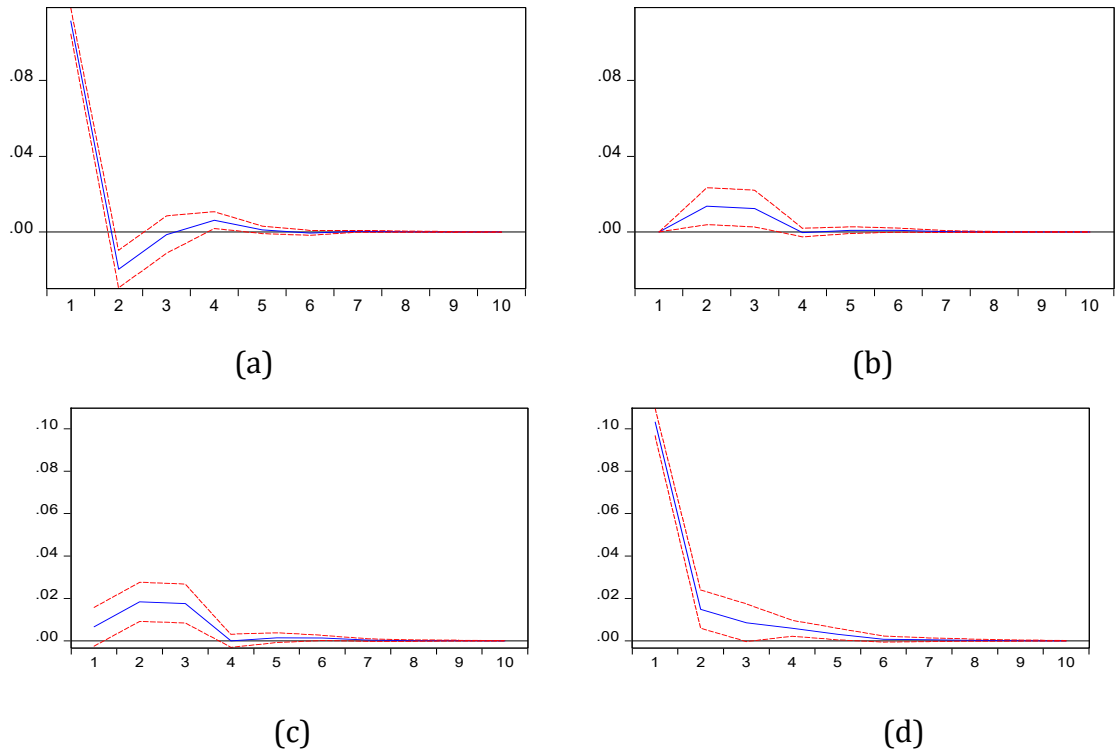

Figure 13. Cucumber impulse response diagram

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(2) Results of tomato pulse response

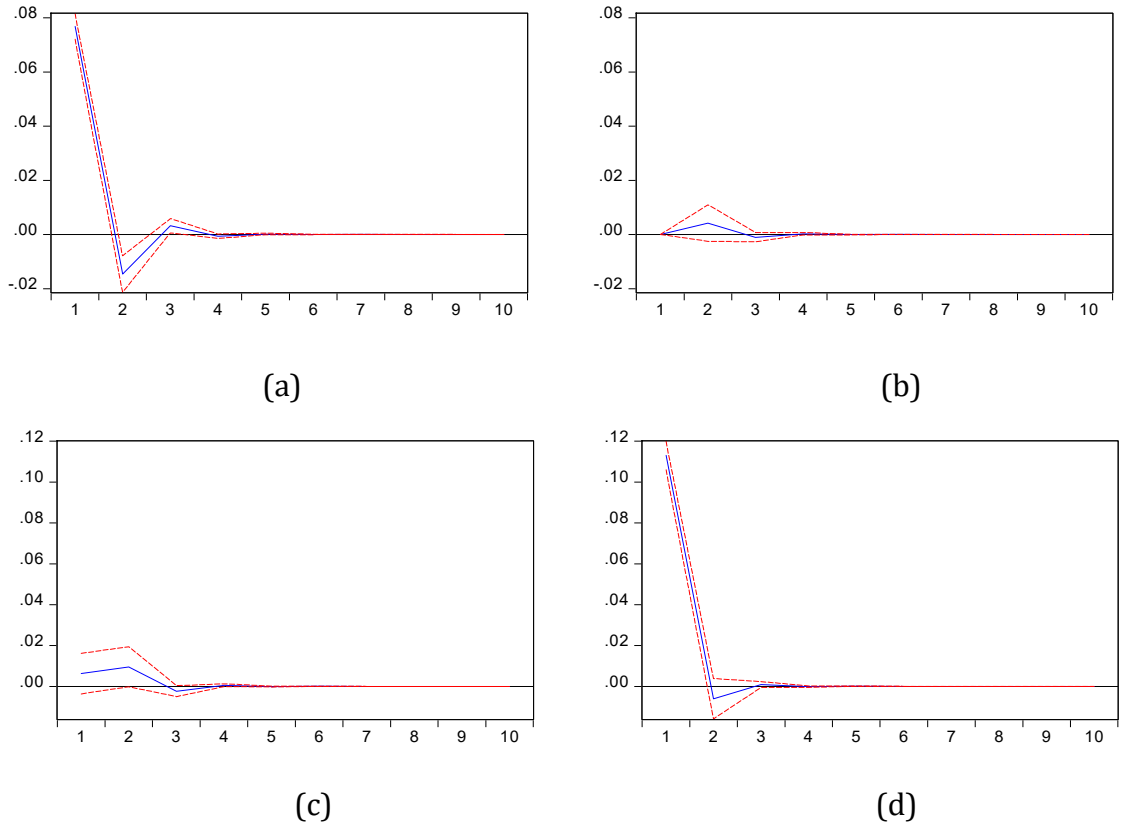

Figure 14. Tomato impulse response diagram

(3) Pulse response results of prickly pepper

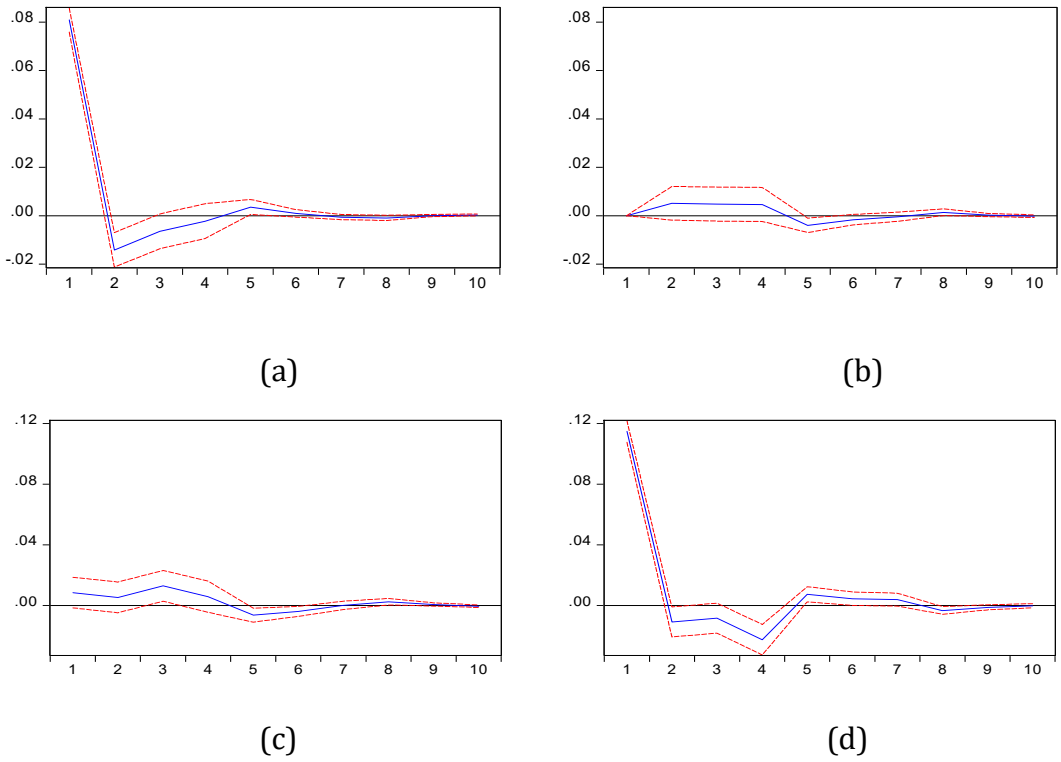

Figure 15. Hot peppers impulse response diagram

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Through the impulse response, it is found that the wholesale prices of cucumber, tomato and pepper all have a great influence on their own random disturbance, that is, the prices are mainly influenced by themselves. In the first two stages, the wholesale price of cucumber producing and selling place had the strongest response to its random disturbance, but the response gradually returned to 0 around the fifth stage. The wholesale price of tomato production and marketing area has the strongest response to the random disturbance in the first period, and then decreases to a negative number in the second period, and then increases after reaching the lowest point. In the third and fourth periods, the response returns to 0, and the response time is short. The wholesale price of sharp pepper producing and selling areas has the strongest response to its own random disturbance in the first period, the response from the second to the fifth period is negative, and then the response gradually increases, and the response is basically 0 in the sixth and seventh periods, and the response disappears with a slightly longer duration.

4. Conclusions and Suggestions

4.1. Conclusion

The price fluctuation of vegetables in Shouguang - Beijing wholesale market has the following similarities: First, the time of the peak and trough of the price fluctuation of vegetables in Shouguang and Beijing wholesale market is basically the same; Secondly, the fluctuation frequency and trend of vegetable prices in the two places are consistent. In addition, through the time series diagram, we can see that the price fluctuations of the production and marketing places of the three vegetables are characterized by consistency, clustering and periodicity, and the price cycle of vegetables is about six months. Difference: The fluctuation range of wholesale price of vegetables in Beijing is obviously larger than that in Shouguang producing area, indicating that when subjected to external shocks, the market price of vegetables in the selling area is more sensitive and more susceptible to influence than that in producing area, and the sensitive reason is the circulation link. References.

Cucumber, pepper and tomato were Granger causality at the confidence level of 1%, 5% and 10%, respectively. In other words, there was a two-way guidance relationship; The response of Shouguang - Beijing wholesale vegetable prices fluctuated the most in the first two or three periods, and then gradually eased and reached 0, indicating that mutual transmission was rapid without time delay. The external impact made the transmission efficiency of vegetable prices from the origin to the selling place 13.6%, 6.4% and 7.7%, respectively. External impact makes the transmission efficiency of vegetable prices from the selling place to the producing place 17.6%, 14.3% and 13.6% respectively. The transmission efficiency of vegetable prices from the selling place to the producing place is 1.3, 2.2 and 1.8 times of the transmission efficiency from the producing place to the selling place respectively. It can be seen that the transmission efficiency of vegetable prices in Beijing wholesale market to Shouguang wholesale market is high. The conduction path is smooth, which further verifies that the wholesale market in Beijing has the dominant position of price.

4.2. Suggestions

The transaction information service platform of Shouguang vegetable market should be further improved and refined, and the vegetable market information feedback platform should be established. According to China's own market conditions according to local conditions, the establishment of agricultural insurance and subsidy system matching China's national conditions; Reduce the circulation link, reform the circulation and trading mode of vegetables, vegetable production end and sales end are directly connected, minimize the circulation link and transaction times, reduce the circulation cost; It is suggested that the relevant government should give full play to its regulatory role and regulate vegetable prices in a reasonable period

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under the premise of following the law of vegetable economy market and giving full play to the regulatory function of market economy.

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