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Logistics Industry Growth, Factor Investment and Import and Export of Agricultural Products Trade Dynamics—Based on Xinjiang 2000-2019 Time Series Data

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Abstract:

Taking Xinjiang data from 2000-2019 as a sample, vector autoregressive (VAR) model is used to verify the relationship between logistics development level and agricultural products import and export trade. The results show that the level of logistics development is highly correlated with the import and export trade of agricultural products, there is a long-term equilibrium relationship between various variables, and the volume of import and export of agricultural products is the one-way Granger reason of the total import and export trade of agricultural products, the other Granger causality. Generally speaking, Xinjiang logistics development and agricultural products import and export trade showed a good synergy between 2000-2019, but the significant level is relatively low, indicating that the level of logistics development and agricultural products import and export trade conditions and relations still need to be further improved. Therefore, some suggestions are put forward from three aspects: making full use of the new era to promote the development of the western region to form a new pattern, improving the service capacity of the logistics supply chain, and strengthening the construction of the green channel for the rapid customs clearance of agricultural products in Xinjiang.

Keywords*: Logistics industry, Import and export trade of agricultural products, VAR model, Xinjiang.*

I. INTRODUCTION

Xinjiang is a big agricultural province in the western region of China. The import and export trade of agricultural products is an important part of Xinjiang's economic development. With the growth of import and export trade of agricultural products, the supply chain service with logistics as the carrier is particularly important in today's era. Logistics is an international trade mode that needs to be perfected and considered in the process of modern international trade. Different from domestic commodities, logistics needs customs inspection, and needs to do a good job of commodity price and related matching in advance. Since President Xi Jinping put forward the "Belt and Road" strategy in September 2013, Xinjiang agricultural product logistics supply chain has taken this opportunity to develop rapidly and promote the

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development of international agricultural products trade in Xinjiang. The import and export demand of agricultural products is also increasing, logistics supply chain naturally becomes the ideal way to meet these needs. At present, Xinjiang logistics industry presents a good development trend, According to the data the value added of Xinjiang logistics industry rose from 12.96 billion yuan in 2000 to 83.526 billion yuan in 2019, The average annual growth rate is 13.28%, Meanwhile, The import and export trade volume of agricultural products in Xinjiang is increasing year by year, The total import and export trade of agricultural products in Xinjiang increased from 2.856 billion yuan in 2000 to 9.875 billion yuan in 2019, The average annual growth rate reached 12.34%. In the past, Xinjiang agricultural products import and export trade practice, Transportation, long distribution cycle, high logistics costs and other drawbacks seriously restrict its "buy and sell" development goals. In this context , Vigorously develop Xinjiang cross-border agricultural products logistics supply chain system, which is conducive to build Xinjiang into a cross-border logistics hub in the core area of the Silk Road economic belt, It brings more opportunities and challenges to the domestic logistics industry, The import and export trade of agricultural products in Xinjiang has become one of the important driving forces for the transformation and upgrading of logistics industry in Xinjiang, For the "Belt and Road" construction to make more contributions.

II. LITERATURE REVIEW

Logistics developed countries have reached a certain level of research on the relationship between logistics and trade. It mainly studies the influence of the relationship between the growth of logistics industry, the input of logistics elements (logistics infrastructure) and international trade on the economy, and the research on the relationship between the import and export of agricultural products and the level of logistics development is especially rare. Lee, Rodrigue, Frankel (2006) Point out the logistics factor input (Infrastructure) Can promote the growth of international trade, indicating the role of the improvement of logistics infrastructure in promoting international trade[1]. Berndt and Hansson (1992) studied the relationship between Swedish logistics industry and foreign trade, and points out that the increase of investment in logistics industry infrastructure, the development and application of related logistics technology, the ability of goods to assemble and the degree of internationalization of logistics are very great to reduce the cost of Swedish foreign trade and promote the development of Swedish foreign trade[2]. Devlin J ,Yee P (2002) believes that the growth of logistics factor inputs(Transport and warehousing infrastructure, logistics-related Information technology)It can minimize the cost of foreign trade and stimulate the growth of foreign trade[3]. Nordas H K(2006) pointed out that, the volume of logistics transportation promotes the increase of foreign trade volume and should be developed as a priority transport system to promote the progress of foreign trade[4]. Warren H. Hausman et al. (2013) took the United States as an example, In-depth study of the impact of various indicators of logistics industry on global bilateral trade, based on global logistics from the perspective of supply chain, the quantitative relationship between the index of logistics industry and the volume of global bilateral trade is measured and divided into ,The results show that there is a strong cooperative development relationship between the two, and the promotion and optimization of each index of logistics industry can significantly promote the increase of bilateral trade volume[5]. Bensassi et al. (2015) using the gravity model of international trade, using2003-2007 Annual data to conduct an empirical analysis of the relationship between the logistics

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industry and bilateral trade between Spain's 19 regions and 64 international trade destinations. The results show that the development level of the logistics industry, especially the investment in logistics infrastructure, scale and service capabilities are crucial factors affecting the development of Spain's international trade, and the interdependence is particularly strong[6]. China has also studiedthe relationship between logistics and international trade in recent years.GE Feixiu (2015) conducted a quantitative analysis on the relationship between logistics development and import and export trade based on relevant statistical data, and found that logistics development has a positive relationship with import and export trade, and the development of the logistics industry has a positive impact on the development of import and export trade[7]. Liang Wen et al. (2017) selected variables such as import and export trade, freight volume, and logistics network mileage based on the sample data of Anhui Province, and used research methods such as cointegration test and Granger causality test to explore the relationship between modern logistics and foreign trade in Anhui Province[8]. The research results show that there is a long-term equilibrium relationship among the three selected variables, and the influence of logistics network mileage on import and export trade is greater than that of total transportation. Tang Xinzhi (2014) took Sichuan Province as an example and used regression analysis to select four variables: total import and export, transportation and warehousing and postal industry added value, cargo volume, and GDP to establish a time series model. The research on the relationship between export trade shows that the development of logistics industry in Sichuan Province and the increase of import and export trade have a significant mutual promotion effect[9]. Jin fang fang (2012) used correlation and elasticity analysis method to calculate the change ratio between "logistics development level and foreign trade elasticity" to measure the degree of influence of modern logistics development level on Zhejiang's foreign trade growth. The research results show that, the development level of the logistics industry has a positive impact on foreign trade[10]. For every one percentage point increase in the logistics industry in Zhejiang Province, the total foreign trade volume responds to an increase of 2.9%. Zhang baoyou (2009) used data from 1995 to 2004 and used elastic analysis to study the relationship between the development of the logistics industry and foreign trade[11]. The research results show that the development of the logistics industry has a great role in promoting the development of foreign trade, Development will reduce logistics costs and have a multiplier effect on import and export trade. Li Hui (2010) pointed out that the development of the logistics industry has an impact on Tianjin's international trade[12]. By drawing the growth trend of the logistics industry's added value and the total import and export trade of Tianjin, it is concluded that the development of the logistics industry has an impact on Tianjin's import and export trade, The total impact is significant, and it points out the logistics bottleneck faced by the development of import and export trade in Tianjin.

Also some scholars have proposed different research results, Hong-OanhNguyen and JoseTongzon (2010) analyzed the relationship between the development of the logistics industry and international trade by using vector autoregressive model (VAR), cointegration test, and Granger test[13]. The research results show that the growth of Australia's foreign trade has promoted the development of the logistics industry, but the promotion of the development of the logistics industry in foreign trade is not obvious. Wang Ling (2010) used Shanghai's relevant data from 1978 to 2008, using co-integration test and Granger causality test to run an empirical study on the relationship between Shanghai's foreign trade and the development of the logistics industry[14]. The growth of total trade has promoted the growth of foreign trade cargo

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transportation in the long-term, but the growth of transportation has not played a role in promoting the growth of foreign trade, It is a time lag effect.

Judging from the research results, although the results are not completely consistent, but the follow-up related research has a great enlightening effect on the follow-up related research. This article uses the total amount of agricultural import and export trade in Xinjiang from 2000 to 2019, and the relevant data of the logistics industry as a sample, and uses a series of econometric methods to verify the dynamic relationship between the variables of the VAR model. This article intends to make contributions from the following aspects: First, on the basis of drawing on domestic and foreign literature, using a combination of quantitative analysis and qualitative analysis, relevant data are used to empirically test the relationship of various variables. Secondly, although many studies have been conducted on the development of the transportation and logistics industry and the impact of international trade, However the literature on the dynamic relationship analysis between the growth of Xinjiang's logistics industry, factor input, import and export trade of agricultural products is very scarce. Therefore, studying the development of Xinjiang's logistics industry and agricultural product import and export trade is of great significance to the construction of Xinjiang's agricultural product logistics supply chain. Its conclusions are expected to provide theoretical references for the rational and effective promotion of the development of Xinjiang's logistics industry and the healthy development of import and export trade of agricultural products in the future.

III. MATERIAL AND METHODS

3.1 Model and Indicator Selection

The vector autoregressive model (VAR) mainly studies the relationship between the endogenous variables of the macroeconomic system, and commonly used cointegration test, Granger causality test, VAR model and other test methods for analysis. This article also uses cointegration test, Granger causality, least square regression analysis method, stability of the VAR model, etc. analyzing the transportation volume of import and export goods of Xinjiang agricultural products, the growth of the logistics industry, the input of logistics elements and the total import and export trade of agricultural products, and use Stata15 software to assist related analysis, its expression is as follows:

$$Y_t = A1y_t - 1 + A2y_t - 2 + ...Apy_t - p + Bx_t + \varepsilon_t \quad (t=1, 2, ..., n) \qquad (1)$$

In formula (1), Endogenous variable vector (Y_t), Exogenous variable vector (X_t), model lag order (p), model sample size (t), model random disturbance term (ε_t), variable influence coefficient (A, B).

In the selection of indicators, in order to enhance the pertinence and authenticity of the research results, this study selects the direct import and export trade volume of agricultural products, transportation and storage and postal industry added value, transportation and storage and postal fixed asset investment, and agricultural products import and export trade,and Combined with the availability of index data, and with

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reference to relevant research literature and relevant expert consultation, the dynamic relationship between the development of the logistics supply chain and the import and export trade of agricultural products is finally determined.

The logistics supply chain is a complex economic phenomenon, which mainly includes multiple subsystems such as cargo circulation, transportation, cargo storage, cargo handling, cargo packaging and cargo distribution, among which cargo transportation as a key pillar subsystem accounts for the majority costs. Bensassi (2015)[6] selected logistics infrastructure investment (transportation, transportation and warehousing) and logistics scale to represent the development level of the logistics industry. Wang Ling (2010)[14], Zhou Qiliang et al.(2011)[15] selected port throughput and cargo transportation volume to represent the logistics development level indicators. This article draws on previous research methods, combined with the particularity of the logistics supply chain and the availability of data, , this study selects the total import and export trade of Xinjiang agricultural products (JC), Xinjiang transportation storage and postal industry added value to represent the logistics industry added value (YZ), Xinjiang transportation storage and postal fixed Asset investment represents logistics element input (JT) and Xinjiang agricultural product import and export cargo transportation volume (YS) as a measure, and run vector autoregressive model (VAR) to analyze the statistical sense between them.

The data used in this article is the time series data of Xinjiang logistics supply chain and import and export trade related indicators. According to the availability of data, macroeconomic data from 2000 to 2019 are selected. From the perspective of dynamic analysis, construct a vector autoregressive model (VAR), in which Xinjiang agricultural product import and export cargo transportation volume, factor input, logistics industry added value represents the development level of Xinjiang logistics industry, and Xinjiang agricultural product import and export trade total represents the development of Xinjiang agricultural foreign trade. The total amount of import and export of agricultural products is converted into RMB at the annual average exchange rate in U S dollars. Taking into account the characteristics of time series data, in order to reduce the volatility of the data, the logarithm of the variables is used in the empirical analysis. In this study, the logarithm of the four variables of YS, JC, JT, YZ are taken as LNYS, LNJC, LNJT, LNYZ. The data used in the model comes from the "China Statistical Yearbook", "Xinjiang Statistical Yearbook", and Urumqi Customs database. The specific data is shown in Table 1.

Table 1. Sample data converted to logarithmic form

	LNYS	LNJC	LNJT	LNYZ
2000	3.923951576	12.55872716	14.00824851	14.07479316
2001	3.985273467	12.60741366	14.07005355	14.21180037
2002	4.032469159	12.6259449	13.97793208	14.21011692
2003	4.063885355	12.69654871	14.07690281	14.33775079
2004	4.178072778	12.76445993	13.97779606	14.28194533
2005	4.171305603	12.92934889	13.88957017	14.43984342
2006	4.242764567	13.05667926	14.56514487	14.21837228
2007	4.25561271	13.23039122	14.41745322	14.31991561
2008	4.33073334	13.35791739	14.33386973	14.38807078
2009	4.355425953	13.29092217	14.72055468	14.46700206

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2010	4.355425953	13.54009645	15.30057343	14.55315298
2011	4.388753955	13.63754666	15.48710322	14.61513263
2012	4.423648309	13.50933548	15.18692476	14.75832637
2013	4.368181228	13.48869951	15.30199047	15.09059399
2014	4.817697585	13.6372352	15.55864912	15.16868754
2015	4.384523515	13.56426584	15.929204	15.38504272
2016	4.407938016	13.52526119	16.17764562	15.49458647
2017	4.888090941	13.59048023	15.93913548	15.5516516
2018	4.989071116	13.67698845	15.42874545	15.71485307
2019	5.217649463	13.80293178	15.4287287	15.93808343

IV. RESULT ANALYSIS

4.1 An Empirical Analysis of Logistics Industry Growth, Factor Input and Agricultural Products Import and Export Trade

4.1.1 Correlation analysis of various variables

This study analyzes the correlation and degree of correlation among various indicators such as the transportation volume of import and export of Xinjiang agricultural products, the added value of the logistics industry, the input of logistics elements, and the total import and export trade of agricultural products by calculating the correlation coefficients between various variables. The analysis results show that the correlation coefficients among the four variables, such as LNJC, LNYS, LNJT, and LNYZ, are all greater than 0.7, and the trend of change is almost the same, showing that there is a correlation between the four variables; The correlation coefficients of the three variables of logistics industry added value (LNJT) and logistics element input (LNYZ) in the total agricultural product import and export trade (LNJC) are all greater than 0.85 and are positive, and there is a high degree of positive correlation between these four variables .

4.1.2 Stationarity test of time series data

Stationarity test, or unit root test, is to avoid the phenomenon of pseudo-regression, which is highly correlated due to the same trend. ADF unit root test was selected to investigate the stability of the model data, and the significance level was controlled at 5%. The software Stata15 is used to conduct time series test and analysis of the variables, and the test results are shown in Table 2.

Table 2. ADF unit root

Variable	ADF Statistics	Inspection type (C,T,L)	Critical value 1%	Critical value 5%	result
LNYS	-2.583	(C,T,1)	-4.38	-3.6	Non-statio nary
D(LNYS)	-4.496	(C,T,1)	-4.38	-3.6	Stable*
LNJC	-1.426	(C,T,1)	-4.38	-3.6	Non-statio nary
D(LNJC)	-3.856	(C,T,1)	-4.38	-3.6	Stable*
LNJT	-3.132	(C,T,1)	-4.38	-3.6	Non-statio nary

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D(LNJT)	-3.958	(C,T,1)	-4.38	-3.6	Stable*
LNYZ	-0.817	(C,T,1)	-4.38	-3.6	Non-statio nary
D(LNYZ)	-6.009	(C,T,1)	-4.38	-3.6	Stable*

Note: The parameters (C, T, L) in the test type respectively indicate that the unit root test equation includes a constant term, a time trend and a lag order; D represents the first-order difference form of the logarithm of the original sequence, and the significance level is 5% as Judgment criteria.

From the ADF unit root test results, the ADF test of the original data variables is at a significant level of 1% and 5%, the total import and export trade of agricultural products (LNJC), the transportation volume of agricultural import and export goods (LNYS), and the added value of the logistics industry (LNJT) and logistics element input (LNYZ) are not stable time series, but at a significant level of 5%, such as the ADF inspection value of agricultural import and export cargo (LNYS) -3.6<-2.583, it is not stable. According to the discriminant rule, the original data of the model variables are considered to be non-stationary time series at the 1% and 5% significance levels. However, after the first-order difference, the four variables are stable at the 5% significance level, that is, LNYS, LNJC, LNJT, and LNYZ are first-order single integer sequences, indicating that the model data has passed the ADF unit root test at the 5% significance level. The conditions of cointegration test and Granger causality test can be run.

4.1.3 Co-integration test

Cointegration test is used to analyze the long-term relationship between non-stationary variables and find whether there is a long-term equilibrium relationship between the variables. Although the original data variables of the model LNYS, LNJC, LNJT, LNYZ and other four variables are non-stationary time series, they all satisfy the first-order single integer series.

Table 3. Johansen cointegration test results

rank	LL	Trace statistics	Critical value (5%)	Maximum	Critical value (5%)	result
0	30.79092	100.8486	54.64	49.9359	30.33	Refusal
1	55.758874	50.9127	34.55	31.4336	23.78	Refusal

The four variables of agricultural product import and export trade volume (LNJC), agricultural product import and export cargo transport volume (LNYS), logistics industry added value (LNJT), and logistics element input (LNYZ) are all first-order single integers. this study will judge the long-term equilibrium relationship between variables by Johansen cointegration test. From Table 3, it can be seen that under the assumption that there is no cointegration relationship between the two sequences, the trace statistics and the maximum eigenvalues are both greater than the critical value of 5%. The test results show that the test rejects the original hypothesis, That the original hypothesis does not hold, and there is a long-term stable equilibrium relationship among various indicator variables such as LNYS, LNJC, LNJT, and LNYZ. It is worth noting that the coefficients of all indicators are positive, that is, the transportation volume of agricultural products import and export goods has a positive effect on the total import and export of agricultural products and the added value of the logistics industry. In general, the long-term relationship between the four variables is mainly manifested as mutual positive phase promotion.

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4.1.4 VAR inspection

Establish a VAR model for the natural logarithms of the four variables LNJC, LNYS, LNJT and LNYZ, and the lag period of the model is determined by Stata15 software. Here we consider the AIC 、FPE 、LR 、HQIC 、SBIC information criteria and statistics according to the significant level of 5%. The results of the optimal lag order test are shown in Table 4.

Table 4. VAR model optimal lag period test result

Lag	LL	LR	FPE	AIC	HQIC	SBIC
0	32.0496		4.3e-07	-3.29995	-3.28046	-3.1039*
1	44.3226	24.546	7.2e-07	-2.86148	-2.76404	-1.88123
2	74.8062	60.967*	2.0e-07*	-4.56543*	-4.39004*	-2.80098

Note: "*" represents the optimal lag in the selection of evaluation indicators

According to the test results in Table 4, under the information criteria of AIC, HQIC, and SBIC, the optimal lag order of the model is 2, and the most criterion is chosen as the final lag order, that is, the best lag order of the VAR model is 2. The AR root test is used to verify the robustness of the VAR model. When the characteristic roots of the model are all located in the unit circle, the model construction is considered to be scientific and robust, and the prerequisites are met. Figure 1 is the result of the robustness test of the VAR (1) model. It can be seen from the results that the modulus reciprocal of all roots of the VAR model are all less than 1, and all unit roots are within the unit circle, indicating the VAR model of this study It is robust, has a good explanatory ability and a good degree of fit for actual economic problems, reflecting the dynamic effects of the development of Xinjiang's agricultural product logistics supply chain and agricultural product import and export trade.

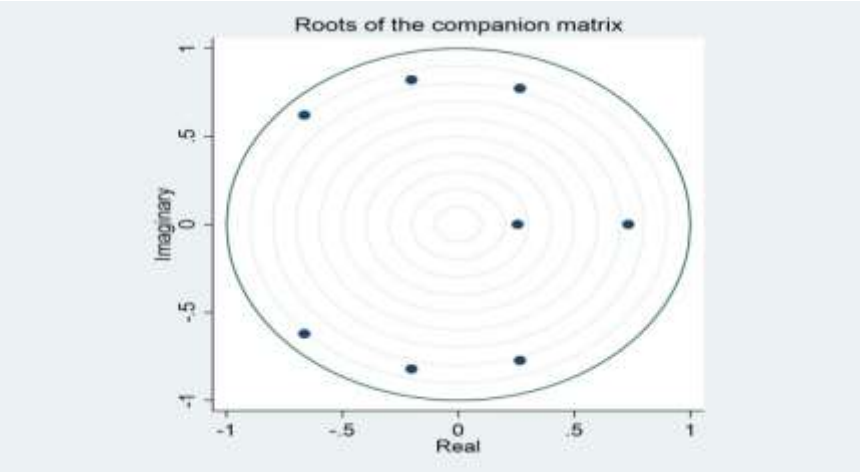

Figure 1: VAR model AR root test

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4.1.5 Granger causality tests

Through co-integration analysis, it can be seen that there is a long-term equilibrium relationship between each variables, but it is also necessary to determine whether the changes between the variables are causal, so it also needs to be verified by the Granger causality test. The Granger causality test is carried out on the transportation volume of Xinjiang agricultural products import and export goods, the total value of Xinjiang agricultural products import and export trade, factor input, and the added value of the logistics industry. The results of the Granger test are shown in Table 5.

Granger causality test results show that at the level of 10%, to accept the assumption that LNJC's not LNYS Granger cause, that is LNJC is not LNYS Granger reason. Therefore, LNJC changes do not cause LNYS changes, LNYS changes cause LNJC changes, this is a one-way Granger causality. At 10% level, to accept the assumption that LNJT's not LNYS Granger cause, Rejection LNYS not LNJT Granger reason, that LNJT is not LNYS Granger cause, LNYS is LNJT Granger reason. Therefore, LNJT changes do not cause LNYS changes, LNYS changes cause LNJT changes, this is a one-way Granger causality. At 10% level, to accept the assumption that LNJC's not LNJT Granger cause, Reject LNJT original hypothesis that is not LNJC Granger cause, That LNJC is not LNJT Granger cause, LNJT's LNJC Granger, this is also a one-way Granger causality. The others are all true at a 10% significance level, it's a two - way Granger causality, Mutual influence can cause mutual change. The results show that the added value of logistics industry has a two-way Granger causality to the total import and export trade of agricultural products, the quantity of goods transported and the input of elements.

Table 5. Granger Causal test results

Null hypothesis	F value	P value	results
LNYS does not Granger Cause LNJC	6.939	0.031	refuse
LNJC does not Granger Cause LNYS	1.201	0.549	accept
LNJT does not Granger Cause LNJC	13.301	0.001	refuse
LNYZ does not Granger Cause LNJC	37.377	0.000	refuse
LNJT does not Granger Cause LNYS	3.186	0.202	accept
LNYZ does not Granger Cause LNYS	17.528	0.000	refuse
LNJC does not Granger Cause LNJT	2.899	0.235	accept
LNYS does not Granger Cause LNJT	6.421	0.040	refuse
LNYZ does not Granger Cause LNJT	5.223	0.073	refuse
LNJC does not Granger Cause LNYZ	7.018	0.030	refuse
LNYS does not Granger Cause LNYZ	7.305	0.026	refuse
LNJT does not Granger Cause LNYZ	9.355	0.009	refuse

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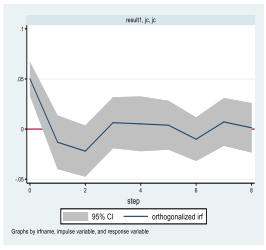
V. IMPULSE RESPONSE ANALYSIS AND VARIANCE DECOMPOSITION

5.1 Impulse Response Analysis

In order to study the degree and duration of the interaction between the various variables representing the development level of the agricultural product logistics supply chain and the total import and export trade of agricultural products, this paper conducts an impulse response analysis of the natural logarithm of the four variables, including LNJC, LNYS, LNJT, and LNYZ. The results of the cointegration test have shown that the relationship between the various indicators representing the agricultural product logistics supply chain and the total agricultural product import and export trade can promote the development of import and export trade in the long-term. Then in the short-term, what are the characteristics of the relationship between the variables? This article will use the impulse response analysis method to analyze the VAR model. The impulse response function analysis is to study the impact of a certain disturbance in a dynamic system, to what extent the system changes are affected by the impact. The results are shown in Figure 2.



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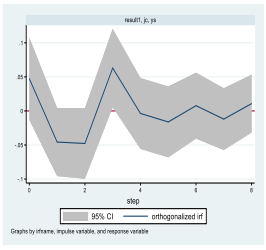

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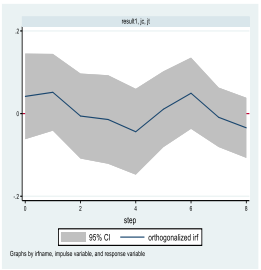

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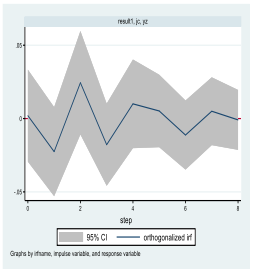

(d)

Figure 2: impulse response results

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July-August 2022 Page No. 1787-1801
Article History: Received: 02 April 2022, Revised: 15 April 2022, Accepted: 24 April 2022, Publication: 04 May 2022

Based on the VAR model constructed in this article, a positive impact on the total import and export trade of agricultural products (LNJC), factor input (LNJT), added value of the logistics industry (LNYZ), and transport volume of agricultural import and export goods (LNYS), respectively. Obtain the impulse response image of the import and export trade index of agricultural products to the development of logistics. as shown in picture 2. It can be seen from Figure 2(a) that the total import and export trade volume of agricultural products has a great positive response (0.05) to its own standard deviation shock, and then the impact begins to decrease, and the negative impact appears in the second period, followed by a negative impact, the positive impact began to decrease, and then there was a positive impact again, and then there was a slight fluctuation again. During the 8 lag period, it showed a positive response that tends to be gentle on itself. The magnitude of the impact is LNYS, LNYZ, LNJT, among which The transportation volume of agricultural products import and export goods has a longer period of influence on the total agricultural product import and export trade, which is consistent with the Granger causality test results. The results show that the development of the logistics industry has a positive role in promoting the growth of import and export trade of agricultural products. Figure 2(b) is the impulse response function diagram of the total change in the import and export trade of agricultural products caused by the impact on the import and export transportation volume of agricultural products. The total import and export of agricultural products has shown a negative growth from the first period, and the degree of negative growth is basically flat in the 1-2 period, and the negative growth gradually slows until it crosses the horizontal axis and becomes a positive response, and reaches the peak in the third period (0.065), reaching a steady state starting from the fourth period. This shows that the increase in the import and export trade volume of agricultural products will initially increase the intensity of the total import and export trade of agricultural products, and then show fluctuations, but the fluctuation range is relatively small and the fluctuation time is longer. Figure 2(c) The impulse response function diagram of the change in the total import and export trade of agricultural products caused by the impact on the factor input. From the test results, it can be seen that after a positive impact on the factor input in the current period, the total import and export trade of agricultural products is in the first The growth in the 1-3 period gradually slowed down until it reached the horizontal axis and turned into a negative growth. The negative growth gradually increased and reached the lowest point (-0.02) in the fourth period, and then the negative growth slowed down and increased again to become a positive growth, reaching the sixth period. The highest point (0.03), and then the positive growth slows down, and the growth is flat. The increase of factor input promotes the construction of transportation infrastructure, and the expansion of factor input will increase the volume of logistics and transportation, which will promote the growth of the total import and export trade of agricultural products, and short-term fluctuations will not affect the steady state of long-term positive growth. Figure 2(d) is the impulse response function diagram of the change in the total import and export trade of agricultural products caused by the impact on the added value of the logistics industry. The total trade volume was in a negative growth state in the first period, the lowest point (-0.025), and then the negative growth began to slow down, reached the highest point (0.03) in the second period, and then the positive growth slowed down, and reached the lowest point (-0.02) in the third period. After the third period, it showed a gradual increase and eventually tended to a relatively stable positive growth. The growth of the added value of the logistics industry has a positive effect on the total import and export trade of agricultural products.

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www.forestchemicalsreview.com
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July-August 2022 Page No. 1787-1801
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5.2 Variance Decomposition

Impulse response analysis is the effect of each endogenous variable in the vector autoregressive model (VAR) on itself or other variables, while variance decomposition analysis is to further evaluate the contribution of endogenous variables to the predicted variance, Table 6 for details, The variance decomposition diagram of the VAR model reflects the relative importance of the dynamic changes in the total import and export trade of agricultural products in Xinjiang, the transportation volume of agricultural import and export goods, fixed asset investment, and the added value of the logistics industry.

Table 6. LNJC's variance decomposition

period	Prediction standard error	LNJC (%)	LNYS (%)	LNJT (%)	LNYZ (%)
1	0.433012	100.0000	0.0000	0.0000	0.0000
2	0.201794	57.6781	10.6036	6.1994	25.5189
3	0.1947035	34.1741	6.0834	7.2116	52.5309
4	0.173485	30.2862	10.4797	8.1407	51.0934
5	0.1599191	33.2342	9.5444	10.0336	47.1877
6	0.1551274	33.8318	10.8318	9.3706	45.9658
7	0.1507381	33.6199	10.8151	10.2058	45.3592
8	0.1440281	32.9366	12.6022	9.8652	44.5961

From the model results, LNJC was only affected by its own fluctuations in the first period, and gradually weakened to 32.9% from the second period; the other three indicators LNYS, LNJT, and LNYZ, had a significant effect on LNJC since the second period. The fourth phase began to stabilize, among them, the contribution rate of LNYZ was the largest, and the contribution rate of LNYS and LNJT was relatively small. After the fifth phase, the contribution rate of LNYS and LNJT was relatively small. The degree of influence of LNYS and LNJT is basically stable at around 9%-12%, while the degree of influence of LNYS and LNJT is gradually increasing, but the degree of influence of LNJT does not exceed 10%. In summary, LNYS, LNJT, and LNYZ all have varying degrees of influence on LNCJ. The contribution of the fluctuation of the total import and export trade of agricultural products to the changes of other indicators is about 10%, 10%, and 45%, respectively, indicating that the fluctuation of the total import and export trade of agricultural products has a greater impact on other logistics industries. In the long run, the promotion effect is LNYZ>LNYS>LNJT.

VI. DISCUSSION & CONCLUSION

This study conducted co-integration test and VAR test on four variables by mining the relevant data of the total import and export trade of agricultural products in Xinjiang from 2000 to 2019, the transport volume of import and export goods of agricultural products, transportation and warehousing and postal fixed asset investment, and the added value of the logistics industry, Granger causality test, impulse response and variance decomposition methods quantitative analysis of the relationship, the main conclusions are as follows: There is a highly positive relationship between the variables representing the

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logistics industry and the total import and export trade of agricultural products. The four variables have a long-term equilibrium relationship at a significant level of 10%. In the long run, the four variables mainly show positive mutual promotion. The continuous growth of Xinjiang's agricultural product import and export trade is not only affected by its own accumulation, but also by the combined impact of Xinjiang's agricultural product import and export transportation volume, factor input, and the added value of the logistics industry. The transportation volume of agricultural import and export goods and the added value of the logistics industry have a significant impact on the import and export trade of agricultural products. In contrast, the long-term relationship between the input of logistics elements and the development of the import and export trade of agricultural products is relatively weak. Generally speaking, the combined effects of various factors have a positive impact on the total import and export trade of agricultural products. Among the long-term contributions to the total import and export trade of agricultural products in Xinjiang, Xinjiang's logistics industry has contributed the most to the added value of Xinjiang's agricultural product imports and exports. Secondly, the factor input is the smallest. From the perspective of the long-term equilibrium relationship, the influence between the logistics development indicators and the import and export trade of agricultural products is not equivalent. This is related to the lack of service capabilities of Xinjiang's logistics industry and the lack of professionalism in the services of enterprises participating in cross-border agricultural product logistics. In the dynamic analysis of various indicators and the growth of Xinjiang's agricultural product import and export trade, there is a "V-shaped" relationship between factor input, logistics industry added value and agricultural product import and export trade growth. After reaching a certain peak, the effect gradually increases and is being compared. Maintaining stability at a slow level indicates that the input of logistics elements has a certain timeliness for the growth of import and export trade of agricultural products. If the logistics input is not updated in time, it may affect the steady growth of import and export trade of agricultural products. The transportation volume of import and export of agricultural products also has a positive impact on the growth of import and export trade of agricultural products in the short term, and in the long run, it has a significant contribution to the total import and export trade of agricultural products.

VII. POLICY IMPLICATIONS

Based on the above conclusion, indicators such as the total import and export trade of agricultural products in Xinjiang, the transportation volume of import and export goods of Xinjiang agricultural products, the input of factors and the added value of the logistics industry better reflect the interaction between agricultural product logistics and agricultural product import and export trade. and the following countermeasures and suggestions are proposed to promote the coordinated development of Xinjiang agricultural product logistics supply chain and agricultural product import and export trade:

Make full use of the preferential policies of the new era to promote the development of the western region and form a new pattern. Actively integrate into the "One Belt One Road" construction, make full use of Xinjiang's role in the core area of the Silk Road Economic Belt, Increase investment in logistics elements, vigorously promote transportation hubs and commercial logistics, and actively accelerate land-rail-air combined transportation, China-Europe trains and organic combined other transportation

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service models and large logistics channels, further improve the open infrastructure such as cross-border transportation and cross-border logistics information channels, accelerate the opening of cross-border logistics systems, and encourage agricultural product exporters to establish agricultural product warehouses overseas. Shortening the transportation cycle can also reduce the cost of the cross-border agricultural product logistics supply chain.

Good agricultural product logistics supply chain service capabilities are the basic element prerequisite and fundamental driving force guarantee for the stable and sustainable development of agricultural product import and export trade. From the perspective of the government, it is necessary to ensure the construction and supply of the infrastructure elements of the comprehensive service platform for related agricultural product logistics and agricultural product import and export trade, but also to focus on the development of human resources and the construction of the ecosystem of the cross-border agricultural product logistics supply chain industry. From an enterprise perspective, attention should be paid to industry standardization, intelligent operation, logistics and agricultural product import and export trade service innovation, strengthen the construction of integrated service platform facilities at the end of the intensive agricultural product supply chain, and substantially improve the end of the agricultural product supply chain system Service capabilities. At the same time, companies should focus on enhancing the attractiveness of cross-border compound talents for business innovation, and improve cross-border logistics and agricultural product import and export enterprises' application capabilities and specialization in high-tech information technologies such as the Internet of Things, blockchain, and automation, so as to promote agricultural product logistics. Interconnection with agricultural product import and export trade information, and ultimately promote the interaction of the cross-border agricultural product logistics supply chain and the agricultural product import and export trade industry.

Agriculture is a characteristic industry in Xinjiang. The green channel project for fast customs clearance for import and export of agricultural products can effectively promote the development of Xinjiang's characteristic industries, provide enterprises with customs clearance policy services for trading countries, and realize information exchange, mutual assistance in law enforcement, and supervision through international cooperation between customs. Mutual recognition provides enterprises with convenient customs clearance measures for the countries that are trading partners. At present, the ports of Xinjiang and neighboring countries have opened green channels for the import and export of agricultural products, striving to expand the scope of the green channels and open up the green channels for the rapid customs clearance of the import and export of agricultural products to neighboring countries.

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