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RESEARCH ON THE DYNAMIC RELATIONSHIP BETWEEN IMPORT AND EXPORT TRADE ON URBAN-RURAL INCOME GAP, CHINA

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ABSTRACT

Since the reform and opening up, China has adopted the policy of "multilateral trade", which has led to rapid economic development and increasingly close international cooperation, but also created the problem of unbalanced development between urban and rural areas. This paper analyzes the dynamic relationship between import and export trade and urban-rural income gap by constructing indicators related to import and export trade and urban-rural income gap and using VAR model, the results show that: there is a long-term equilibrium relationship between import and export trade and urban-rural income gap, and this relationship is volatile, which shows that import and export trade can narrow the urban-rural income gap in lags 1, 3 and 4, and increase the urban-rural income gap in lags 2 and 5. The volatility of the relationship is increasing and then decreasing, and the effect is gradually decreasing.

KEYWORDS: import and export trade, urban-rural input gap, VAR model, dynamic impact

INTRODUCTION

Since the Third Plenary Session of the Eleventh Central Committee in 1978, China has been implementing a comprehensive policy of internal reform and opening up to the outside world. The continuous development of import and export trade not only brings fiscal revenue to China, but also promotes economic growth, and has a significant impact on the development of cities and per capita income. At the same time, the rapid development of the economy has led to rapid urban construction and relatively backward rural development, coupled with the rise of industrial enterprises, a large number of young people flocked to the cities and towns to develop, prompting the loss of rural labor force and relatively backward economic development, and thus the gap between urban and rural income has been increasing, and in 2002, the urban per capita income has reached as much as three

times the rural per capita income. In such a context, it is particularly important to study the impact of the inflow and outflow of import and export trade on the urban-rural income gap.

At present, many scholars at home and abroad have conducted studies on the relationship between import and export trade and urban-rural income gap. Most scholars believe that import and export trade has a promoting effect on the urban-rural income gap (Miao Yohan, 2022; Deng W.B., Zhuang B.N., 2021) , and some other scholars believe that the impact of import and export trade on the urban-rural income gap is more complicated, and they believe that it has a promoting effect on developed countries, while the promoting effect on developing countries is not obvious(FETAHI-VEHAPI M, SADIKU L, PETKOVSKI M,2015; GUAN J L, HONG Y,2012). However, there are few studies on the dynamic impact of import and export trade on urban-rural income gap. Based on the previous studies, this paper analyzes the dynamic relationship between import and export trade on urban-rural income gap based on the national data from 2002-2021 using VAR model, and provides methods and ideas that can be referred to in order to accelerate the development of import and export and narrow the urban-rural income gap.

1. Variable selection and data description

This paper explores the dynamic relationship between import and export trade on the urban-rural income gap, using the national data from China 2002-2021 as an example, the ratio of urban per capita disposable income to rural per capita disposable income is selected as a measure of the urban-rural income gap, denoted by y . Using the national total import and export trade our country measures the import and export trade, denoted by x . and the data are from the 《China Statistical Yearbook 2002-2021. According to the data results, make a line graph of import and export trade and urban-rural income gap.

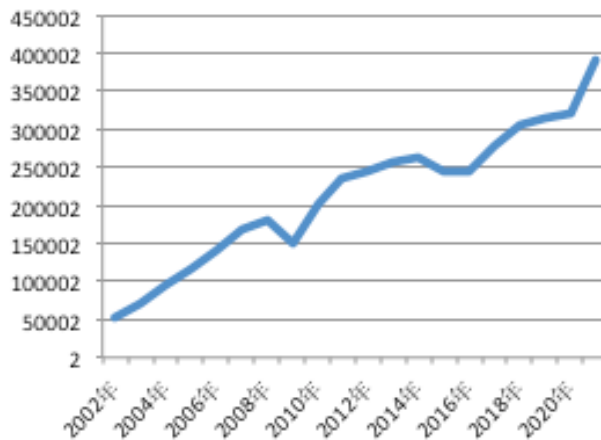


Figure 1. import and export trade folding line chart

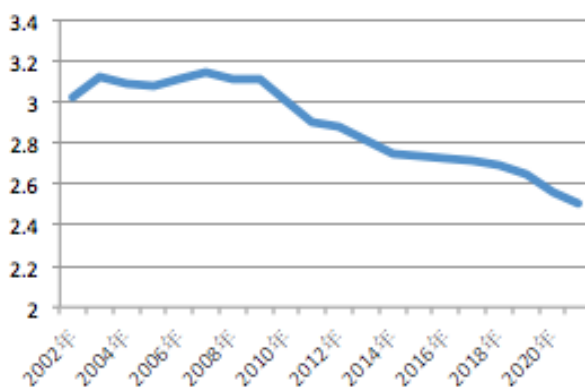


Figure 2. Urban-rural income gap line graph

Figure 1 shows the line graph of national total import and export trade from 2002-2021, from the image results, it is known that China's total import and export trade has been in an upward trend, reaching 3,9100.9 billion RMB in 2021, but there are two obvious downward trends, in 2009 and 2016, respectively. 2009 because of the external influence factors of the financial crisis, the declining trend in 2015 is inseparable from the national policy as well as the international market situation, and China's import and export trade in 2020 appeared in the obvious trend of slowing down the growth rate, which is related to the impact of the international and domestic new crown pneumonia epidemic in 2020 and 2021.

Figure 2 shows the line graph of urban-rural income gap from 2002 to 2021, from the results of the line graph, it can be seen that China's urban-rural income gap was in a stable stage in 2002 to 2009, and the urban income was about 3 times of the rural income, and since 2010, the income gap gradually decreased,

and by 2021, the income gap narrowed to 2.5 times, which is related to the country carrying out new urbanization, strengthening rural This is inextricably linked to the country's new urbanization, strengthening rural construction, rural revitalization, and poverty eradication projects.

Before building the model, to eliminate the heteroskedasticity of the data, the logarithm of INT and CJ is taken, and the finished logarithm is expressed as $LNINT$ and $LNCJ$.

2. ANALYSIS OF RESULTS

2.1. ADF test

Before establishing the VAR model, to test the smoothness of the series, this paper uses the ADF unit root test for the smoothness of the series, because there is an obvious upward and downward trend in the total import and export trade and income gap, so when conducting the unit root test, the intercept term and trend term should be included, the test results are shown in Table 1, from the results in Table 1, it can be seen that, at 1% significance level, $LNINT$ and $LNCJ$ are non-stationary series, after the first order difference, they are still non-stationary series, but after the second order difference, $LNINT$ and $LNCJ$ series are stationary, at this time, $LNINT$ and $LNCJ$ are second order single integer series, and there is a long-term stable relationship between them.

Table 1. ADF test results of import/export trade and urban-rural income gap

Variables	ADF Statistic	t-statistic	P-value	Test Results
$LNINT$	-3.471	-3.674	0.072	Non-Stable
$LNINT(-1)$	-3.365	-4.572	0.088	Non-Stable
$LNINT(-2)$	-5.024	-4.668	0.005	Smooth
$LNCJ$	-3.65	-4.668	0.058	Non-Stable
$LNCJ(-1)$	-3.948	-4.572	0.032	Non-Stable
$LNCJ(-2)$	-6.04	-4.616	0.001	Smooth

2.2. Determine the lag order of the model

The choice of lag order of VAR model is a crucial aspect in establishing VAR model. The choice of lag order should, on the one hand, consider reflecting the dynamic characteristics of the model, and should try to choose a relatively large lag order, on the other hand, consider AIC, SC criterion, likelihood ratio test, PPE, HQ criterion, VAR model focuses on the values of AIC and SC variables, so it should try to choose the lag order that makes AIC, SC small lag order. From Table 2, we can see that the model has the smallest AIC at lag 5 and the smallest SC at lag 1. The lag order of the model is chosen to be 5th order by integrating other criteria.

Table 2. Hysteresis order judgment results

Lag	LogL	LR	FPE	AIC	SC	HQ
0	37.881	NA	0.000	-4.784	-4.690	-4.785
1	64.444	42.501*	0.000	-7.793	-7.509*	-7.796
2	69.574	6.839	1.28e-06*	-7.943	-7.471	-7.948
3	73.052	3.711	0.000	-7.874	-7.213	-7.881
4	78.164	4.089	0.000	-8.022	-7.172	-8.031
5	82.966	2.561	0.000	-8.128*	-7.090	-8.139*

*Denotes the lag order chosen according to the corresponding criterion

2.3. Parameter estimation of VAR model

The VAR model is a model in which all endogenous variables in the model are lagged as explanatory variables and the current period endogenous variables are the explanatory variables. Since only the endogenous variables are on the right side of the equation in the model, the parameters of the VAR model can be estimated using simple least squares estimation (Yu Zimin, Tian Zhiwei, Pan Huanxue, Deng Jing,2014). The model estimation results were obtained using Eviews10 as follows, and from the model results, it can be seen that the import and export trade with lags 1, 3, and 4 has a positive impact on the current period, while the import and export trade with lags 2 and 5 has an inverse impact on the current period, with lag 1 having the largest impact on the import and export trade. For the urban-rural income gap, the urban-rural income gap with lags 1, 3 and 4 has a reverse impact on the current period, while the urban-rural income gap with lags 2 and 5 has a positive impact on the current period, with lag 2 having the largest impact. For the impact of import and export trade on urban-rural income gap, import and export trade in lags 1, 3 and 4 narrow the widening of urban-rural income gap, and import and export trade in lags 2 and 5 increase the urban-rural income gap.

$$\begin{aligned}
 \begin{pmatrix} LNINT_t \\ LNCJ_t \end{pmatrix} &= \begin{pmatrix} 1.287 & 5.854 \\ -0.206 & -0.708 \end{pmatrix} \times \begin{pmatrix} LNINT_{t-1} \\ LNCJ_{t-1} \end{pmatrix} + \begin{pmatrix} -0.468 & -9.028 \\ 0.046 & 1.520 \end{pmatrix} \times \begin{pmatrix} LNINT_{t-2} \\ LNCJ_{t-2} \end{pmatrix} \\
 &+ \begin{pmatrix} 0.349 & 3.536 \\ -0.123 & -0.858 \end{pmatrix} \times \begin{pmatrix} LNINT_{t-3} \\ LNCJ_{t-3} \end{pmatrix} + \begin{pmatrix} 0.873 & 6.658 \\ -0.121 & -0.855 \end{pmatrix} \times \begin{pmatrix} LNINT_{t-4} \\ LNCJ_{t-4} \end{pmatrix} \\
 &+ \begin{pmatrix} -0.580 & -5.952 \\ 0.108 & 0.973 \end{pmatrix} \times \begin{pmatrix} LNINT_{t-5} \\ LNCJ_{t-5} \end{pmatrix} + \begin{pmatrix} -6.668 \\ 4.605 \end{pmatrix}
 \end{aligned}$$

After the VAR model is established, the AR unit root test of the model is performed to further verify the smoothness of the model, and the results are shown in Figure 3. From the results of Figure 3, it can be seen that most of the unit roots are within the unit circle, so the VAR model is stable.

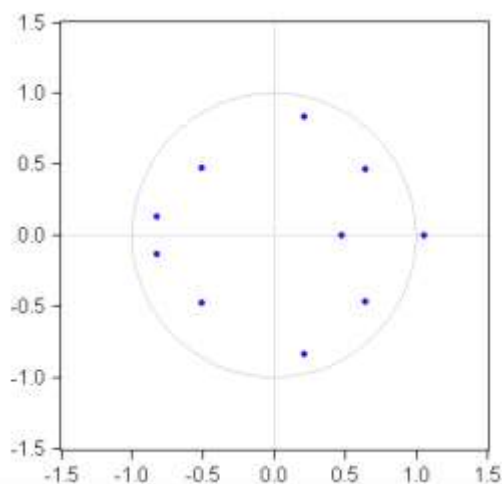
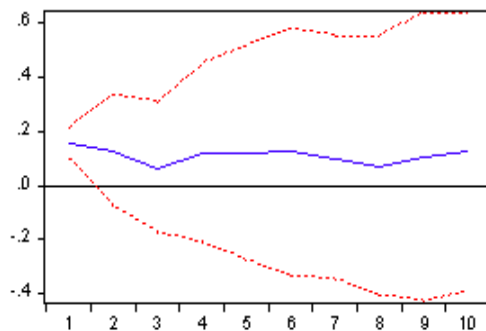


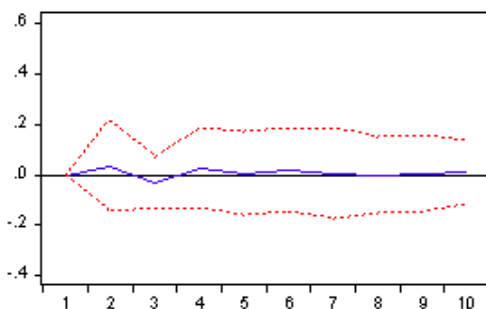
Figure 3. VAR smoothness test results

2.4. Impulse response

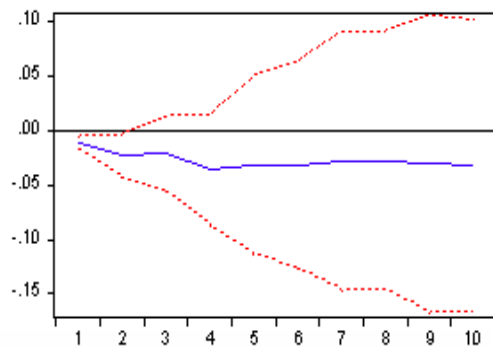
The impulse response is to test the model and observe the response of the endogenous variables in the model to a shock of one standard deviation as time continues to pass. The impulse response results are shown in Figure 4. From the results of Figure 4, it can be seen that when given a standard deviation shock to the import and export trade, the import and export trade has a continuous strong response, but there is a decreasing trend in period 2, reaching a minimum in period 3, and the impact gradually tends to be smooth thereafter. When giving a standard deviation shock to urban-rural income gap, the urban-rural income gap has been in constant fluctuation, but this fluctuation will gradually level off with the extension of time. For the impact of import and export trade on urban-rural income gap, when a standard deviation shock is given to import and export trade, the urban-rural income gap tends to increase in the first 2 periods and increases by 0.2, but falls back in the 3rd period, and the impact gradually increases in the 4th period and finally tends to be stable, and almost tends to 0 after the 7th period, it can be considered that the impact of import and export trade on urban-rural income gap has long-term volatility, and this volatility shows It can be concluded that the impact of import and export trade on urban-rural income gap has long-term volatility, and this volatility shows the trend of increasing and then decreasing, and the effect gradually decreases.



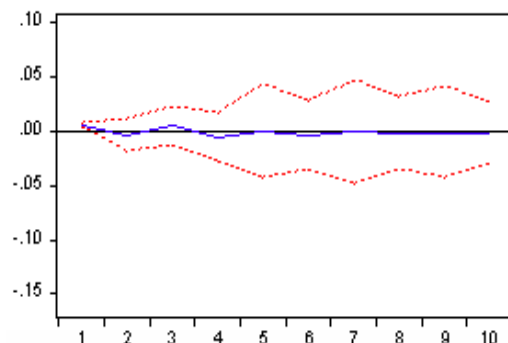
Import and export trade self-shock response function



Response function of urban-rural income gap caused by import and export trade shocks



Urban-rural income gap shock induced import/export trade response function



Self-shock response function of urban-rural income gap
Figure 4 . Plot of impulse response function of VAR model

2.5. variance decomposition

Variance decomposition is the process of decomposing the fluctuations of endogenous variables in the model into associated components according to their causes, and using structural shocks to investigate the contribution of the endogenous variables to the model in the future changes of the variables, and thus distinguish the importance of each variable (Fan Huanhuan, Liu R, 2014). Table 3 shows the results of the variance decomposition of the VAR model, and from the results of Table 3, it can be seen that the largest influence on the urban-rural income gap is the chance factor in the current period, but with the passage of time, the influence of import and export trade on the urban-rural income gap gradually increases, and by the 4th period, it has reached 25.828%, and from the 4th period, the contribution gradually stabilizes, accounting for about a quarter of the urban-rural income gap, indicating that the import and export trade has the urban-rural income gap is obvious.

Table 3.VAR model variance decomposition results

Period	S.E.	INT	CJ
1	0.153	0.000	100.000
2	0.202	25.491	74.509
3	0.214	17.605	82.395
4	0.247	25.828	74.172
5	0.274	24.525	75.475
6	0.301	25.435	74.565
7	0.318	24.813	75.187
8	0.326	24.738	75.262

9	0.343	24.373	75.627
10	0.364	24.270	75.730

3. CONCLUSION

This paper explores the study of the dynamic relationship between import and export trade and urban-rural income gap, taking Chinese data as an example, constructs indicators related to import and export trade and urban-rural income gap, and analyzes the dynamic relationship between variables by combining VAR model, and obtains the following conclusions :

1. Since 2002 to date, China's import and export trade has been in a constant growth rate, but the growth rate has fluctuated due to the financial crisis, national policies and the impact of the new crown pneumonia; for the urban-rural income gap, the income gap between urban and rural areas is obvious, but since 2017, when China implemented the rural revitalization strategy, the income gap has continued to narrow, and in 2021, it has narrowed to about 2.5 times.
2. There is a long-term equilibrium relationship between import and export trade and urban-rural income gap. According to the results of the VAR model, it can be seen that import and export trade with lags 1, 3 and 4 has a positive impact on the current period, while the urban-rural income gap is negative, and import and export trade with lags 2 and 5 has a reverse impact on the current period, while the urban-rural income gap is positive. Import/export trade with lags 1, 3 and 4 can reduce the urban-rural income gap, and import/export trade with lags 2 and 5 increases the urban-rural income gap, and the impact shows obvious fluctuation situation over time.
3. The biggest influence on the urban-rural income gap is the chance factor in the current period, but with the passage of time, the influence of import and export trade on the urban-rural income gap gradually increases, and by the 4th period, it has reached 25.828%, and from the 4th period, the contribution gradually stabilizes, accounting for about a quarter of the urban-rural income gap, indicating that the influence of import and export trade on the urban-rural income gap is obvious. Among the structural shocks of import and export trade on urban-rural income gap, its impact on urban-rural income gap has long-term volatility, and this volatility shows the trend of increasing and then decreasing, cyclic and gradually decreasing effect.
4. From the model results, we can see that the impact of import and export trade on the urban-rural income gap is dynamic, showing a dynamic impact of promoting and then suppressing, promoting and then suppressing, and so on and so forth. In response to this influence, the development of import and export trade is both an opportunity and a challenge to the urban-rural income gap. The dynamic nature of the influence of import and export trade should be seized, and its suppression of the urban-rural gap should be brought into play under the premise of steady growth, and under the influence of multilateral trade, the revitalization of rural areas should be promoted, talent introduction programs should be implemented, rural employment should be promoted, and rural

special exhibition industries should be developed to continuously realize the unified development of urban and rural areas.

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