Research on China's Foreign Trade High-Quality Development Driven by Industry Optimization and Upgrading

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Keywords: Industry optimization and upgrading, Foreign trade development, Research.

Abstract. Based on VAR model and data from 1996-2017, the thesis states investigations of the principle, dynamic evolution and path of industry optimization and upgrading 's influence on Chinese foreign trade. Researches show that: industry optimization and upgrading 's influence on Chinese foreign trade is merely 10.17%, which illustrates defects in Chinese industry structures and low industry level; Chinese foreign trade development level has limited industry optimization and upgrading , and is detrimental for industry globally developing towards medium and high end, on which the influence is only 12.11%. The methods to promote Chinese foreign trade high quality development are perseveringly embedding global research network, accelerating constructing open, confluent innovative policy system, actively leading all types of trade subjects' function elevation and model innovation, consecutively improve upgrading level of industry optimization.

1. Introduction

Since the 40 years of reform and opening-up, Chinese economy has gained substantial achievements; as one of the "three carriages" pulling economy increase, Chinese foreign trade has been developing quickly as well. In 2013, China has become the largest trading country in the world. But the paradox is the profit does not increase along with total volume of rapidly expanding foreign trade. There is still large gaps between Chinese foreign trade quality profit, competition advantages and western developed countries: low commodity add value and technology content, weak self-innovation competence, low adaptability in new product development according to global consuming change trend, backward development of market diversification and sales channels integration, low position in global value chain. These have caused unfair, unjust treatment for China in global market and this situation is still aggravating and restricting the sustainable development of Chinese foreign trade. Hence, improving industry optimization and upgrading , enhancing country competition advantages and enterprise core competence are the only methods to survive new global technology competition and industry competition. These methods will be helpful to promote Chinese economy develop pattern conversion, push Chinese foreign trade transformation upgrading, lift the position in global industry chain system. Therefore, there are great reality meanings to thoroughly study the principle, dynamic evolution and path of Chinese foreign trade high quality development driven by industry optimization and upgrading .

2. The definition of industry optimization and upgrading

Industry optimization and upgrading includes not only the once, twice and tree times industry optimization and upgrading but also interior optimization and upgrading in one industry. During the process of economy development, every industry has its own unique technology situations. Different technology abilities and levels decide different development speed and scale of each industry. Some industries develop rapidly because of technology breakthrough and high-new technology application, other industries shrink due to slow technology innovation speed, and some industries will be

eliminated due to laggard upgrading. Numbers of industries are constantly changing because of industries wane and wax.

Technology and knowledge are the most positive, active and important elements in economic activities by bringing up product added value. They promote structure change and innovation among once, twice and three times industries, and inside the industries. Then promote industry continuous leaps in global value chain, and comprehensively promote industry core competence.

3. The principle and path of Chinese foreign trade high quality development driven by industry optimization and upgrading

3.1 Industry optimization and upgrading promotes international trade structure changing

Industry structure is the foundation of international trade, which decides the level of international trade structure. While international structure is the feedback of industry structure, which leads the changes of a country's industry structure. In a way, higher industry structure means higher international trade structure level. Therefore, industry optimization and upgrading will change international trade structure, promote international trade structure walking towards knowledge, high-tech content, high added value and other senior conversions. These are all key points of Chinese foreign trade development. Therefore, industry optimization and upgrading promotes Chinese foreign trade high quality development by changing international trade structure.

3.2 Industry optimization and upgrading promotes international competition advantages

The key of Chinese foreign trade high quality development is to depend on international competence of technology, brand, quality and service. Industry optimization and upgrading increases the industries with more knowledge, high technology, high capital, enlarges the production of intermediate product with higher knowledge and technology, leads to decrease in labor input, knowledge, increase in technology and other intangible element, lowers production unit energy consumption, promotes product added value, stretches global value chain from both ends, enhances a country's initiative and controlling power in global value chain, elevates a country's influence, competence in global market and accelerates high quality development of a country's foreign trade.

3.3 Industry optimization and upgrading promotes reasonable distribution of resources and other elements

The essence of Chinese foreign trade high quality development originates from competition advantages relying on international competence in technology, brand, quality and service instead of cost, resource and labor, that is: Technology, brand, service input superseding resource and labor reliance. In order to complete the conversion, we have to lower the dependence on resource and labor as well as reducing cost and low-price advantage. Industry optimization and upgrading facilitates resource and other similar factors shifting from low efficiency industry department to high efficiency industry department, moving freely among industries and inside each industry. By doing this it realizes resource factor reasonable distribution, leads to foreign trade department's resource factor economizing, foreign trade product unit energy consumption decrease, and finally accelerates foreign trade high quality development.

3.4 Industry optimization and upgrading decreases international trade friction

The optimization and upgrading of the industry can significantly increase the quantity of products with higher knowledge, technology and differentiated of one country, and improve the quality and grade of products, and enhance the status of the country in global industrial chain division, thus reducing competition and international trade friction, as well as improving international trade relations. At the same time, with the enhancement of China's core competitiveness brought by industrial optimization and upgrading, the quality of foreign direct investment has improved significantly, and the capability of global resource integration has been strengthening continuously,

and embedding to middle and high end of international cooperation, which effectively reduces trade frictions, and help China's foreign trade development become more stable and healthier, as well as boost higher quality foreign business.

3.5 Industrial optimization and upgrading promotes the transformation of demand structure

Although industrial structure of a country is subject to the demand structure, industrial structure will also accelerate qualitative changes in demand structure to a certain extent. A country's demand structure, size and internationalization affect its international competitiveness. Industrial optimization and upgrading accelerate the transfer of production and investment to higher-level social demand sector, leading to a higher-end structure of social demand. If a country's demand structure is global, critical and growing, then the country's export products will also shift to higher-end as the structure of social demand changes, thus significantly increasing the competitive advantage of the country's products in international market, which, in turn, promotes the high-quality development of foreign trade.

4. Empirical test of industrial optimization and upgrading promoting high-quality development of China's foreign trade

The regression analysis of this paper takes China's foreign trade development level as dependent variable, industrial optimization and upgrading as model independent variable, and introduces other variables like the innovation ability, to improve the fitness of this model.

4.1 Model construction, variable meaning

The basic model equation is

$$CFTM_t = \beta_0 + \beta_1 IS_t + \beta_2 INNO_t + \varepsilon_t$$

In which, t=1, 2, 3…22 refers to different years between 1996--2017; CFTM refers to the development level of China's foreign trade; IS refers to industrial optimization and upgrade; INNO refers to creative capability; ε_t is stochastic disturbance.

4.2 Data source and processing

The data selected in this paper is from 1996 to 2017, as follows:
4.2.1 China's foreign trade development level
The indicator is measured by comprehensive evaluation value of the transformation of China's foreign trade development mode. The specific evaluation system and calculation refer to the research results of Xiaodong Bo and Hongwen Zheng (2015).
4.2.2 Industry optimization and upgrading
This indicator is measured by the proportion of the tertiary industry's output value in China's GDP. The data come from China Statistical Yearbook.
4.2.3 Creativity
This indicator is measured by the number of high-tech enterprises in China. The specific data come from China Science and Technology Statistical Yearbook.

At the same time, in order to eliminate the multi-colinearity and heteroscedasticity of the above non-stationary time series, and to reflect the correlation coefficient between variables more intuitively, and to avoid large-scale changes and pseudo-regression of data, natural logarithm is taken for the explanatory variables such as industrial optimization and upgrading, and innovation ability, etc. This paper uses Eviews6.0 software for regression analysis.

4.3 Empirical test and result analysis

4.3.1 Stationarity and cointegration test
In this paper, the unit root (ie ADF) test is used to test the stability of the three sequences, and Johansen test and the residual unit root test are used to co-integrate the variables involved in the model equation. The results are as follows:

Table 1. ADF unit root test results for each variable

Variable	T value	1% critical value	5% critical value	10% critical value	P value	stability
CFTM	-4.424381	-4.616209	-3.710482	-3.297799	0.0141	stable
D(CFTM，1)	-4.02768	-3.959148	-3.081002	-2.68133	0.0088	stable
LNIS	-1.509703	-4.616209	-3.710482	-3.297799	0.7849	unstable
D(LNIS，1)	-2.861223	-3.92035	-3.065585	-2.673459	0.0721	stable
LNINNO	-1.41077	-4.616209	-3.710428	-3.297799	0.8192	unstable
D(LNINNO，1)	-2.787773	-3.92035	-3.065585	-2.673459	0.0821	stable

It can be seen from the results of the stationarity test in Table 1 that the raw data, after logarithm of each variable, only China Foreign Trade Development Level (CFTM) meet the stability requirement, but all other variables do not meet the stationarity requirements. After that, all variables accept the null hypothesis, which is consistent with the first-order single-integration process. Therefore, China's foreign trade development level, industrial optimization and upgrading, and innovation capability are first-order and single-order, and there may be a stable linear relationship between them.

Table 2. Cointegration test results of sample data

Johansen test					Residual ADF unit root test		
Equations Number	CH.V	Stastic	C.V (5%)	P.V	ADF stastic (%)	T stastic	P .V
No **	0.9915	115.7037	60.0614	0.0000		-3.9604	0.0006
Max 1	0.5356	11.6740	12.3209	0.0640	S. lever	-3.6257*** -2.7916** -1.9792*	
Max 2	0.0113	0.1703	4.1299	0.7327			

Note: ** refers to reject the null hypothesis at 5% significant hypothesis.

It can be seen from Table 2 that according to the Johansen test result, there is a cointegration relationship between the interpreted variable CFTM and the other two explanatory variables in the model equation; the residual ADF unit root test results show that the residual sequence, at 1% significant hypothesis, rejects the null hypothesis, that is, there is a cointegration relationship between China's foreign trade development level and related explanatory variables. Therefore, there is a stable cointegration relationship between China's foreign trade development level and industrial optimization and upgrading and innovation capabilities.

4.3.2 VAR model (impulse response analysis, variance decomposition analysis)

In this paper, the AIC criterion and the SC criterion are used to judge and determine the lag period in combination with the order of co-integration test. After comprehensive judgment, the optimal lag period is 1, and the VAR model is obtained after regression, with better model goodness and fitting effect.

Impulse response analysis. In order to deeply grasp the internal relationship between the three, this paper selects 10 stages for estimation in the impulse response period. The impulse response function of industrial optimization and upgrading, innovation capability and China's foreign trade development level is shown in Figure1.
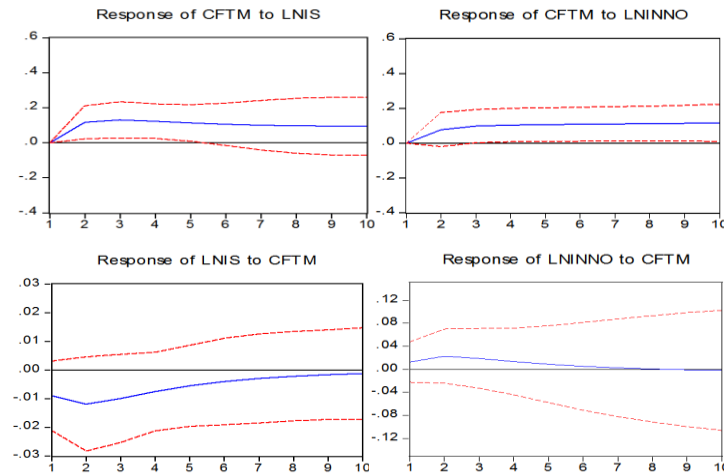
Fig. 1. Impulse response function of industrial optimization and upgrading and Chinese foreign trade development.

As can be seen from Figure 1, the response of Chinese foreign trade development level (CFTM) to the impact from a standard deviation of industrial optimization and upgrading (IS) is zero at the beginning, and then the responding force rises rapidly, reaching a peak of 0.117 in the second phase, then slowly declines, and tends to balance. This shows that industrial optimization and upgrading has a long-term positive impact on Chinese foreign trade development. The response of CFTM to the impact from a standard deviation of innovation capability (INNO) starts at zero, then rises slowly and tends to be stable. The effect of CFTM is increasing continuously and lasts for a long time, which indicates that innovation capability has a positive correlation with the level of Chinese foreign trade development.

The response of IS to the impact from CFTM is negative, and with the passage of time, the negative effect becomes more and more serious, reaching the lowest point of -0.012 in the second phase, then the effect weakens slowly, and has been negative all through. This shows that Chinese foreign trade development mode, which mainly focuses on the export of labor-intensive products, restricts the optimization and upgrading of industries, and is not conducive to the development of industries along the global value chain towards the medium and premium level. The impact of technological innovation capability on industrial optimization and upgrading is 0.013 in the current period, then slowly rises, reaching the highest point of 0.023 in the second period, then slowly declines, and the effect is slowly weakening.

Analysis of variance decomposition. In order to grasp the intrinsic relationship among the three, 10 periods are chosen in order to estimate the variance decomposition period.

Table 3. Decomposition table of variance for all variables in phase 10

	S.E.	CFTM	LNIS	LNINNO
CFTM	0.7418	67.54	10.17	22.29
LNIS	0.1034	12.11	25.21	62.68
LNINNO	0.2027	2.68	14.17	83.15

The variance decomposition of Chinese foreign trade development level shows, that the variance of the prediction error in Chinese foreign trade development level is mainly affected by itself, accounting for 67.54%, the impact of industrial optimization and upgrading accounted for 10.17%, and the impact of innovation capacity accounted for 22.29%. Generally speaking, due to the low level of industries and the lack of optimization of industrial structure in China, it is difficult to occupy a higher share in the variance decomposition.

The perspective of variance decomposition of industrial optimization and upgrading indicates, that the variance decomposition of industrial optimization and upgrading is mainly affected by innovation ability and self-influence, accounting for 62.68% and 25.21% respectively, and the influence of Chinese foreign trade development level accounts for 12.11%. The improvement of innovation

ability is helpful to promote the continuous optimization and upgrading of the industry, which is consistent with the analysis above.

5. Conclusion and Suggestions on policy

Based on the existing research, this article constructs a VAR model, using the data from 1996 to 2017, examined the mechanism, dynamic evolution and path of industrial optimization and upgrading on Chinese foreign trade development. The results show that: 1. Industrial optimization and upgrading, innovation ability have a positive correlation with Chinese foreign trade development, and this effect is long-term; the level of Chinese foreign trade development restricts industrial optimization and upgrading, and is not conducive to the development of industry along the global value chain to medium and premium level. 2. The influence of industrial optimization and upgrading on Chinese foreign trade development accounts for only 10.17%. This shows that Chinese current industrial structure is not optimized enough and the level of industry is relatively low. The influence of innovation ability in industrial optimization and upgrading reaches 62.68%, which indicates that the impact of innovation ability on industrial optimization and upgrading is significant.

The results show that only by accelerating the structural reform of the supply side, continuously improving the innovation ability and its level, and striving to improve the level of industrial optimization and upgrading, would Chinese high-quality foreign trade development be promoted. To this end, the following suggestions are made:

Further amend and improve various laws and regulations, accelerate the construction of an open and integrated innovation policy system, give full play to the dominant position of enterprises in the market, and realize a virtuous circle of technology introduction, digestion, absorption and innovation. Actively guide and promote the functional upgrading and mode innovation of various trade entities, accelerate the cultivation of transnational corporations with global competitiveness, achieve functional upgrading and rebuild core competitiveness, and further narrow the gap with international first-class enterprises.

Efforts should be made to embed global R&D network, continuously enhance the ability to integrate global scientific research resources, give priority to access to and use of global innovative resources, and seize the commanding heights of global high-tech.

Acknowledgment

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