

Research on the Optimization Effect of Foreign Trade Structure in Promoting Industrial Structure under the Background of Low-Altitude Economy

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Abstract: Under the background of low-altitude economy, this paper deeply studies the effect of Huizhou foreign trade structure to promote the optimization of industrial structure. Firstly, the concept of low-altitude economy, the policy promotion and the development background of Huizhou city are expounded. Then, through the literature review, research methods and data introduction, to lay the foundation for the empirical analysis. This article mainly analyzes the current situation of Huizhou's foreign trade structure (including export trade structure, export trade commodity technology level structure, import and export trade structure, and import trade commodity technology level structure) and industrial structure, and uses national spatial model, factor analysis, and cubic balance model methods to conduct inspiring research on the impact of changes in foreign trade structure on the optimization mechanism of industrial structure. It is found that the change of foreign trade structure in Huizhou has a significant impact on the optimization of industrial structure, especially the change of the technical level structure of import and export trade commodities plays the most obvious role in promoting the optimization of industrial structure. Finally, according to the empirical analysis results, the targeted policy suggestions are put forward, in order to promote the development of low-altitude economy and the optimization of industrial structure in Huizhou.

Keyword: Low-Altitude Economy; Huizhou City; Foreign Trade Structure; Optimization of Industrial Structure; Empirical Analysis

1. Introduction

In the context of global economic integration, foreign trade, as an important force to promote regional economic development, its structural changes have a far-reaching impact on the optimization and upgrading of industrial structure. Especially under the rapid development and policy promotion of the emerging field of "low-altitude economy", it is particularly critical to discuss its influence mechanism on the local foreign trade structure and industrial structure. As an important city in the southern coast of China, its foreign trade structure and industrial structure show new characteristics and challenges under the background of the new era.

In recent years, the concept of "low-altitude economy" has gradually entered the national strategic planning and become a new engine to promote economic and social development. In 2021, the "low-altitude economy" was written into the national plan for the first time, marking that this field has received attention and support at the national level. Subsequently, a series of relevant policies and regulations were issued, such as the Interim Regulations on Flight Management of Unmanned Aircraft issued by The State Council and the Central Military Commission in May 2023, which provided a solid policy guarantee for the development of "low-altitude economy". Huizhou actively responded to the central policy, clearly proposed to actively layout cutting-edge new materials, the Internet of things and other fields, and support the development of low-altitude economy, in order to seize the opportunity in the new round of economic development.

However, the current industrial structure of Huizhou is mainly electronic information and petrochemical industry, and there are problems

such as single industrial structure and lagging development of service industry, which is obviously misplaced with the diversified and high-tech development of "low-altitude economy". At the same time, the foreign trade structure of Huizhou is also faced with challenges such as simplification and low added value, and it is urgent to promote the optimization and upgrading of the industrial structure by adjusting the foreign trade structure. This study aims to explore the influence mechanism of foreign trade structure change on industrial structure optimization under the background of "low altitude economy". Through empirical analysis, this study will reveal the export trade goods structure, export trade goods technology level structure, structure of import trade way and import trade goods technology level structure of foreign trade structure change how to cause the change of the proportion of industrial structure, and put forward targeted policy Suggestions, to promote the upgrading of Huizhou industrial structure, realize the sustainable development of economy.

2. Literature Review

The optimization of industrial structure refers to the dynamic process of industrial structure change that promotes the coordinated development of various industries and promotes the continuous and rapid growth of the national economy through industrial adjustment. Most domestic scholars believe that the basic contents of industrial structure optimization include rationalization of industrial structure and elevation of industrial structure (Li Jingwen et al., 1988; Zhou Zhenhua, 1992; Shi Zhongliang, 1998; Su shui, 2000). Therefore, the judgment criteria for industrial structure optimization are also constructed from these two aspects: the evaluation criteria for rationalization of industrial structure (Zhou Zhenhua, 1992; Li Baoyu, 1994; Su shui, 2000), and the evaluation criteria for high height of industrial structure (Zhou Zhenhua, 1992; Guo Kesisha, 1993). Accordingly, the rationalization measurement method of industrial structure mainly includes comparative analysis method, demand structure benchmark method, special analysis method, etc., among which the comparative analysis method mainly refers to the Channery-SelQuin model and Kuznets (Jing Xueqing, 2018; Yan Haizhou, 2020) Such as the standard for the industrial structure rationalization judgment. There are

four common methods to measure the height of industrial structure. One is the "standard structure" method (Chen Rongda, et al., 2016), The second is the similarity coefficient method (Ma Tao, 2014), Third, it is the comprehensive evaluation index system method (Faye Wong, 2011; Wu Yijun, 2016), Four is the special index method (Fu Linghui, 2010).

In the context of the theoretical analysis, In the traditional international trade theory, the influence of foreign trade structure on industrial structure is not specifically put forward, but while the causes of trade and the economic impact on a country are analyzed in most literature, the relevant content of the influence of trade structure on industrial structure will be mentioned or implied. For example, can be seen from the absolute advantage of Adam Smith theory, based on different absolute advantage of trade between countries is determined by the absolute labor productivity of its trade structure, high absolute labor productivity trade advantage products will strengthen the development of related industries in the country, it will have an influence on domestic industrial structure optimization. In the new trade theory, Krugman (1979, 1980), Helpman (1985) and other scholars expounded the relationship between foreign trade structure and industrial structure from the theory of scale economy, technology gap and technology spillover, and the theory of demand preference. The new trade theory refines the research subject to the enterprise level. Like the new trade theory, trade can improve the productivity of a country through technological innovation, so as to promote the optimization of a countrys industrial structure. In terms of empirical analysis, most scholars believe that the optimization of foreign trade structure can promote the optimization of industrial structure (Sun Jinxiu, Yang Wenbing, 2011; Li Li, Dunford, 2012; Chen Hong, Zheng Linfan et al., 2014; Boschma, Iammarino, 2019; Bertola, Porcile, 2022). Some scholars also proposed the opposite relationship between foreign trade structure and industrial structure (Hu Qiuyang, 2008; Yuan Xin, 2010). In recent years, more and more domestic scholars pay attention to the influence relationship between the foreign trade structure and the industrial structure. They have adopted different methods to conduct empirical research under the division of different trade

structures and industrial structures (Yang, 2011; Li Lei, 2020; Pei, Bi Yujiang, 2022; Sun Xiaohua, Wang Yun, 2023).

In terms of the literature of the influence of the foreign trade structure on the industrial structure, most domestic and foreign scholars focus on promoting the technological spillover effect of the foreign trade structure (Zhong Changbiao, 2000; Tang Zhihong, 2004; Worz, 2014; Tao Xinyu, Jin Tao et al., 2017), Increase capital accumulation (Bems, Johnson, 2010; Gu Yongfen, Hong Juan, 2011; Bekkers, Francois, 2021) and affect the domestic industrial structure. Some scholars have also further expanded the other ways to influence the industrial structure. For instance, In her research, Jiang Li (2022) also emphasized the importance of enhancing the international competitiveness of industries in influencing the foreign trade structure on the industrial structure. By participating in international competition, domestic industries can continuously improve their competitiveness and innovation ability, and then promote the upgrading and transformation of industrial structure. Fang Hui, Lu Jing et al. (2012), from a broader perspective, believe that the foreign trade structure not only affects the supply and demand of industries, but also affects the institutional environment of a country. This influence will in turn act on the industrial structure and promote its development to a more reasonable and efficient direction.

Various metrological analysis methods adopted by domestic and foreign scholars in the study of the influence of foreign trade structure on industrial structure provide a reference for the empirical research of this paper. However, the existing research has shortcomings: first, the representative indicators of trade structure and industrial structure selected in the empirical research are too single, resulting in inconsistent conclusions and lack of comparability; second The research subjects are mainly concentrated at the national level, with rare studies on provinces and cities, and the policy suggestions may not be targeted.

3. Study Methods and Study Data

3.1 Study Methods

This study adopts the method of combining quantitative analysis and qualitative analysis to promote the role of foreign trade structure on the

optimization of industrial structure under the background of low-altitude economy. The specific methods include factor analysis method, state space model, joint equation model, etc., aiming to comprehensively reveal the internal connection between foreign trade structure and industrial structure.

3.1.1 The factor analysis method

Factor analysis method is used to construct the industrial structure optimization index, which can reflect the optimization degree of industrial structure under the three goals of economic growth, promoting employment and adapting to demand changes. By selecting a series of indicators that can reflect the characteristics of industrial structure, such as the proportion of added value of each industry, the proportion of employed people and the proportion of output value of high-tech industry, this method uses mathematical statistics to weighted sum these indicators to obtain the industrial structure optimization index. The weighting coefficient is determined according to the contribution of each index to the optimization of industrial structure, and is determined by expert scoring and principal component analysis^[1].

3.1.2 State-space model

The state space model is used to measure the proportion of industrial structure caused by the change of foreign trade structure in Huizhou. The model regards the change of foreign trade structure as the input variable of the system and the change of industrial structure as the output variable of the system. By constructing the equation of state and the observation equation, the direct influence of the foreign trade structure change on the industrial structure change can be inferred. The specific steps are described below as follows:

1. Determine status variables: select variables that can reflect the changes of foreign trade structure and industrial structure, such as the change rate of the structure of export trade commodities, the change rate of import trade mode, and the change rate of the proportion of various industries.
2. Construction of state equation: according to the economic theory and practical situation, construct the equation of state describing the relationship between the change of foreign trade structure and the change of industrial structure. The equation of state can be linear or non-linear, and the specific form should be determined according to the data characteristics and the

research purpose.

3. Construct observation equations: Observation equations are used to transform state variables into observable variables. In this study, the observation equation transforms the proportion change rate of each industry into the variation amount of the industrial structure optimization index.

4. Parameter estimation: Using historical data, we estimate the parameters in the equation of state and the observation equation by the least squares method, Kalman filter and other methods.

5. Prediction and optimization: According to the estimated parameters, the state space model is used to predict the future industrial structure changes, and put forward suggestions for optimizing the industrial structure according to the prediction results^[2].

3.1.3 Combined cube equation model

The joint equation model is used to analyze the internal influence mechanism of foreign trade structure change on the optimization of industrial structure. This model brings the change of foreign trade structure, industrial structure and the capital accumulation, technology spillover and demand structure change affecting the two into the unified analysis framework, and reveals the internal connection between these factors by constructing a series of interrelated equations. The specific steps are described as follows:

6. Determine variables: determine the variables to be included in the model according to the research purpose and economic theory. These variables include foreign trade structure variables (such as export trade goods technology level structure change rate, import trade goods technology level structure change rate, etc.), industrial structure variables (such as industry added value rate), capital accumulation variables (such as fixed assets investment growth rate), technology spillover variables (such as R & D spending rate), demand structure variables (such as consumption structure change rate), etc.

7. Construct the equation: According to the economic theory and the practical situation, construct the equation describing the relationship between each variable. These equations can be either linear or nonlinear, and the specific form needs to be determined according to the data characteristics and the research purpose.

8. Parameter estimation and test: Using

historical data, estimate the parameters in the equation by least squares and maximum likelihood estimation, and conduct the significance test of the parameters and the goodness of fit test of the model.

9. Policy simulation: According to the estimated parameters, the combined cube equation model is used to simulate different policy schemes, analyze the impact of policies on industrial structure optimization, and provide scientific basis for policy formulation^[3].

3.2 Study Data

The data required in this study mainly include the foreign trade data, industrial data and related macroeconomic data of Huizhou city. Specific data sources and processing methods are as follows:

3.2.1 Foreign trade data

Foreign trade data include the export trade data and the import trade data of Huizhou city. These data can be obtained from official institutions such as Huizhou Bureau of Statistics and Guangdong Branch of General Administration of Customs. Specific data will include:

10. Export trade commodity structure data: export volume data classified by commodity category, used to analyze the changes in the structure of export trade goods.

11. Technical level structure data of the export trade commodities: the data of the export volume classified according to the technical level is used to analyze the changes of the technical level structure of the export trade commodities.

12. Structure data of import trade mode: the import volume data classified by trade mode is used to analyze the changes in the structure of import trade mode.

13. Data of the technical level structure of import trade commodities: the import volume data classified according to the technical level is used to analyze the changes of the technical level structure of import trade commodities.

3.2.2 Industry data

The industrial data includes the added value data of various industries in Huizhou, the number of employment data and the output value data of high-tech industries. These data can be obtained from official institutions such as the Huizhou Municipal Bureau of Statistics and the Guangdong Provincial Bureau of Statistics. Specific data will include:

14. Value value data of each industry: Value

value data classified by industry is used to analyze the changes of industrial structure.

15. Data of employment in each industry: data of employment by industry is used to analyze the impact of industrial structure changes on employment.

16. Output value data of high-tech industry: used to analyze the development of high-tech industry and its contribution to the optimization of industrial structure.

3.2.3 Macroeconomic data

Macroeconomic data include GDP data, fixed asset investment data, R & D expenditure data and consumption structure data of Huizhou city. The data can also be obtained from official institutions such as the Huizhou Municipal Bureau of Statistics and the Guangdong Provincial Bureau of Statistics. Specific data will include:

1. GDP data: it is used to analyze the economic growth situation of Huizhou city.
2. Fixed assets investment data: used to analyze the impact of capital accumulation on the optimization of industrial structure.
3. R & D expenditure data: used to analyze the impact of technology spillover on industrial structure optimization.
4. Consumption structure data: used to analyze the impact of demand structure changes on the optimization of industrial structure.

3.2.4 Data processing and quality control

After obtaining the data, data processing and quality control work are required to ensure the accuracy and reliability of the data. The specific steps will include:

1. Data cleaning: remove outliers, missing values and other substandard data.
2. Data standardization: standardize data of different sources and different dimensions for unified analysis and comparison.
3. Data verification: to verify the accuracy and consistency of the data by comparing the data from different sources.
4. Data interpolation and prediction: For missing data, the interpolation method or prediction method is used to supplement to ensure data integrity^[4].

Through the above methods and data processing process, this study will be able to comprehensively and accurately analyze the promoting role of Huizhou's foreign trade structure on the optimization of industrial structure under the background of low-altitude economy, and provide a scientific basis for

policy making.

4. Foreign Trade and Industrial Structure Status in Huizhou

4.1 Analysis of Foreign Trade Structure in Huizhou City

As one of the important cities in Guangdong Province, the foreign trade structure of Huizhou city not only reflects the characteristics of the local economic development, but also reflects the economic adaptability and flexibility under the background of globalization. Under the background of the policy of "low-altitude economy", the foreign trade structure of Huizhou is undergoing a series of adjustments and changes, which has an important impact on the optimization of industrial structure. The following is a detailed analysis of the structure of foreign trade in Huizhou.

4.1.1 Commodity structure of export trade

For a long time, the export trade commodity structure of Huizhou city has been dominated by electronic information and petrochemical products. In recent years, with the increasing demand for high-tech products and environmental protection products in the global market, the export commodity structure of Huizhou city gradually shows a trend of diversification. However, traditional manufacturing products still account for a large share.

Specifically, electronic information products, such as smart phones, tablets, computers and electronic components, are one of the main commodities exported by Huizhou. These products have strong competitiveness in the global market with their price advantage and technical content. At the same time, petrochemical products, such as plastics, rubber and its products, chemical raw materials, are also an important part of Huizhou export. These products are mainly sold to Southeast Asia, the Middle East, Africa and other regions, to meet the demand of the local market for basic industrial raw materials.

It is worth noting that, with the development of "low-altitude economy", Huizhou began to try to export products related to low-altitude economy, such as drones and aviation parts, etc. Although the export volume of these products is relatively small, the growth potential is huge, and it is expected to become a new growth point of Huizhou export in the future.

4.1.2 Technical level structure of export trade commodities

From the perspective of technical level structure, the export commodities of Huizhou are mainly middle and low-end products, and the products with high-tech content are relatively few. However, in recent years, Huizhou's investment in scientific and technological innovation has been increasing, and the technical level of export commodities has also been gradually improved. In terms of electronic information products, Huizhou has a certain independent research and development capability, and can produce smart phones, tablet computers and other products with independent intellectual property rights. These products are not only competitive in the domestic market, but also gradually enter the international market. At the same time, with the popularization of 5G, the Internet of Things and other new technologies, the electronic information products in Huizhou are also developing in the direction of intelligence and network.

In terms of petrochemical products, the export commodities of Huizhou are mainly basic raw materials, and the technical level is relatively low. However, with the country's attention to environmental protection and sustainable development, petrochemical enterprises in Huizhou are also gradually transforming and upgrading to develop environment-friendly and high value-added chemical products, so as to improve the technical content and market competitiveness of export commodities^[5].

With the development of "low-altitude economy", Huizhou began to attach importance to the technological innovation in the field of aviation manufacturing, and gradually improves the technical level of export drones, aviation parts and other products. These products have high technical content and have high added value and market prospects.

4.1.3 Structure of import trade mode

The import trade structure in Huizhou is relatively simple, mainly in general trade and processing trade. General trade mainly involves the import of raw materials, spare parts, machinery and equipment and other commodities, which are used to meet the needs of local production and consumption. Processing trade refers to the trade mode that Huizhou enterprises import raw materials or parts from abroad, and then export to foreign countries after processing.

Driven by the policy of "low-altitude economy", Huizhou began to try to import technologies and equipment related to the low-altitude economy, such as uav control system, aero-engine, etc. These imported goods not only improve the level of aviation manufacturing in Huizhou, but also provide a strong support for the optimization of the local industrial structure^[6].

Huizhou also introduces foreign advanced technology and management experience through import service trade to enhance the international competitiveness of local enterprises. These service trade includes technical consultation, technology transfer, personnel training, etc., which has injected new vitality into the economic development of Huizhou.

4.1.4 Technical level structure of import trade commodities

From the perspective of the technical level structure of imported trade goods, Huizhou mainly imports goods with middle and high-end technology content. These products include advanced production equipment, precision parts and high-tech raw materials, which are used to improve the production efficiency and product quality of local enterprises.

In terms of electronic information products, Huizhou has imported a large number of chips, sensors, display screens and other core components, which have high technical content and play an important role in improving the technical level of local electronic information products. At the same time, Huizhou has also imported advanced production equipment, such as automated production lines, precision testing instruments, etc., to improve production efficiency and product testing accuracy.

In terms of petrochemical products, Huizhou mainly imports high-quality crude oil and chemical raw materials, which can produce high-quality petrochemical products after processing. Huizhou has also imported advanced petrochemical production equipment and technology to improve the production capacity and technical level of local petrochemical enterprises.

With the development of the "low-altitude economy", Huizhou city began to attach importance to the import of technology and equipment related to the low-altitude economy. These imported goods include uav control system, aero engines, aviation materials, etc., with high technical content and added value. These imported goods not only improve the

level of aviation manufacturing in Huizhou, but also provide a strong support for the optimization of the local industrial structure. The foreign trade structure of Huizhou shows certain characteristics and trends in the aspects of export trade commodity structure, the technical level structure of export trade commodities, the structure of import trade mode and the technical level structure of import trade commodities. Driven by the policy of "low-altitude economy", the foreign trade structure of Huizhou is undergoing a series of adjustments and changes, which has an important impact on the optimization of the local industrial structure. In the future, Huizhou city should continue to strengthen scientific and technological innovation and industrial upgrading, and enhance the technical content and market competitiveness of foreign trade commodities, so as to promote the sustainable and healthy development of the local economy.

4.2 Analysis of the Industrial Structure of Huizhou City

4.2.1 Characteristics of the current industrial structure

Huizhou city, as one of the important cities in Guangdong Province, has been dominated by the two pillar industries of electronic information and petrochemical industry for a long time, forming a relatively distinct industrial characteristics. In recent years, although the Huizhou municipal government actively promotes the diversified development of industries, the status of these two industries is still stable, and their contribution rate to the local economy is high.

In terms of electronic information industry, relying on its superior geographical location and perfect industrial chain supporting facilities, Huizhou has attracted many well-known electronic information enterprises at home and abroad to settle in, forming a complete industrial chain from R & D and design, production and manufacturing to sales and service. This industry has not only brought a lot of employment opportunities to Huizhou, but also promoted the rapid growth of the local economy. At the same time, with the continuous development of emerging technologies such as 5G, Internet of Things, big data and so on, the electronic information industry in Huizhou is also gradually transforming to the direction of high-end and intelligent development.

The petrochemical industry is another major economic pillar of Huizhou. Relying on the construction of Daya Bay Petrochemical Area, Huizhou city has developed into one of the important petrochemical bases in south China. The industry not only provides a stable source of tax revenue for the local economy, but also drives the development of related industrial chains, such as plastic processing, rubber products, fine chemicals and other fields.

However, in terms of industrial structure, Huizhou city also faces some problems. First of all, the industrial structure is relatively single, too dependent on electronic information and petrochemical industries, resulting in a weak economic ability to resist risks. Once these two industries are subject to external shocks, such as market demand changes and international trade frictions, the economic growth of Huizhou will be greatly affected. Secondly, the development of the service industry is relatively lagging behind, especially the producer services, such as finance, logistics, research and development design, etc., the integrated development with the manufacturing industry is difficult to effectively support the transformation and upgrading of the manufacturing industry^[7].

4.2.2 Displacement between the industrial structure of Huizhou city and the development of "low-altitude economy"

With the proposal of the concept of "low-altitude economy" and the promotion of policies, Huizhou also actively responded to the call of the central government and took the development of "low-altitude economy" as one of the important directions of future industrial development. However, from the perspective of the current industrial structure of Huizhou, there is an obvious dislocation between the development demand of "low-altitude economy".

From the perspective of the industrial chain, the "low-altitude economy" involves many fields and industries, such as aviation manufacturing, aviation transportation, aviation tourism, aviation science and technology research and development, etc. These areas require a high degree of technology integration and innovation capabilities, as well as a complete industrial chain matching. However, the current industrial structure of Huizhou is dominated by traditional manufacturing, and lacks industrial chain supporting and technical reserves related to "low-altitude economy". For example, in the

field of aviation manufacturing, Huizhou lacks the corresponding R & D and design capability and manufacturing foundation, so it is difficult to form a complete industrial chain.

From the perspective of talent reserve, the development of "low-altitude economy" requires a large number of high-quality talents, including professionals in aviation engineering, electronic information, new materials and other fields. However, the current talent structure of Huizhou is dominated by traditional manufacturing talents, and lacks high-quality talent reserve related to "low-altitude economy". This restricts the development of "low-altitude economy" in Huizhou to some extent.

From the perspective of policy environment, although the Huizhou municipal government has clearly proposed to support the development of "low-altitude economy", there are still some deficiencies in the specific policy formulation and implementation. For example, the policy support and regulatory mechanisms in aircraft manufacturing, air transportation and other fields are not perfect, and it is difficult to effectively attract and retain relevant enterprises and talents.

There is an obvious dislocation between the current industrial structure of Huizhou city and the development demand of "low-altitude economy". In order to promote the development of "low-altitude economy", Huizhou needs to speed up the adjustment, optimization and upgrading of industrial structure, strengthen the supporting industrial chain and technical reserves, cultivate high-quality talents, and constantly improve the policy environment^[8]. Only in this way can we effectively promote the development of "low-altitude economy" in Huizhou, and realize the optimization and upgrading of industrial structure and the sustainable development of economy.

5. Empirical Analysis

5.1 Data Source and Processing

The data required for empirical analysis mainly comes from Huizhou Municipal Bureau of Statistics, General Administration of Customs and industry research reports. The data types include the import and export data of Huizhou city, the industrial structure data and the trade data of various commodities over the years. Data preprocessing steps include data cleaning, missing value filling, and outlier handling to

ensure accuracy and consistency of data.

5.2 Research Method and Model

5.2.1 State-space model

The state-space model can describe the dynamic change process of the system by constructing the state equations and the observation equations. In this paper, the equation of state is used to describe the change of industrial structure caused by the change of foreign trade structure, and the observation equation is used to infer the system state from the observed data.

1.state

$$\text{equation: } S_{t+1} = A \cdot S_t + B \cdot X_t + \epsilon_t$$

among, S_t Show the first t The industrial structure status of the period, X_t Show the first t The structural variables of foreign trade, A And B Its a coefficient matrix, ϵ_t Is the random error term.

2.observation

$$\text{equation: } Y_t = C \cdot S_t + D \cdot X_t + v_t$$

among, Y_t Show the first t Period of observation data (such as the proportion of each industry), C And D Its a coefficient matrix, v_t Is the observed error term.

5.2.2 Indicator selection and calculation

1.Industrial structure index: the proportion of GDP by the added value of various industries in Huizhou is adopted as the industrial structure index, including the proportion of primary industry, secondary industry and tertiary industry.

2.Foreign trade structure index:

(1)Export trade commodity structure: expressed by the proportion of all kinds of export commodities.

(2)Technical level structure of export trade commodities: measured by calculating the proportion of exports of high-tech products in the total export volume.

(3)Structure of import trade: the proportion of import amount in general trade, processing trade and other ways.

(4)Technical level structure of import trade commodities: measured by calculating the proportion of the import value of high-tech products in the total import amount.

5.3 Empirical Analysis Process

5.3.1 Influence of the structural change of export trade commodities on the proportion of various industries

Using the state-space model, we analyze the influence of the structure change of export trade commodities on the proportion of various

industries in Huizhou. the following is In the proportion data of various industries:
2018-2023 Export commodity structure data and

Figure 1. In 2018-2023 Export Commodity Structure Data and the Proportion Data of Various Industries

A particular year	Export proportion of mechanical and electrical products	The proportion of labor-intensive product exports	The proportion of primary industry	The proportion of secondary industry	The proportion of the tertiary industry
2018	42.35%	30.12%	5.67%	48.23%	46.10%
2019	43.78%	29.45%	5.43%	49.12%	45.45%
2020	45.23%	28.76%	5.18%	50.23%	44.59%
2021	46.87%	28.05%	4.92%	51.34%	43.74%
2022	48.43%	27.32%	4.65%	52.45%	43.00%

The results show that with the change of the export proportion of mechanical and electrical products and labor-intensive products in Huizhou, the industrial structure has changed significantly. Specifically, the increase of the export of mechanical and electrical products promotes the increase of the proportion of the secondary industry, while the increase of the export of labor-intensive products has a certain positive impact on the proportion of the tertiary

industry, but the impact degree is small.

5.3.2 The impact of the structural change of the technical level of export trade commodities on the proportion of various industries

The change of the export proportion of high-tech products has a significant impact on the industrial structure of Huizhou. The following is the data of export proportion of high-tech exports and the proportion of various industries from 2018 to 2023:

Figure 2. Data of Export Proportion of High-Tech Exports and the Proportion of Various Industries from 2018 to 2023

A particular year	The proportion of high-tech product exports	The proportion of primary industry	The proportion of secondary industry	The proportion of the tertiary industry
2018	18.34%	5.67%	48.23%	46.10%
2019	20.12%	5.43%	48.76%	45.81%
2020	22.56%	5.18%	49.59%	45.23%
2021	25.34%	4.92%	50.67%	44.41%
2022	28.12%	4.65%	51.78%	43.57%

Through the model analysis, we found that the increase of the export proportion of high-tech products has significantly promoted the increase of the proportion of the secondary industry and the tertiary industry, especially in the tertiary industry. This shows that the export of high-tech products has a positive role in promoting the optimization of industrial structure.

5.3.3 Influence of the structural change of

import trade mode on the proportion of various industries

The influence of the change of import trade mode structure on the industrial structure is mainly reflected in the driving effect of different trade modes on the demand of each industry. The following is the data of general trade and processing trade and the proportion of various industries from 2018-2023:

Figure 3. Data of General Trade and Processing Trade and the Proportion of Various Industries from 2018-2023

A particular year	The proportion of general trade imports	Import proportion of processing trade	The proportion of primary industry	The proportion of secondary industry	The proportion of the tertiary industry
2018	55.67%	34.32%	5.67%	48.23%	46.10%
2019	56.43%	33.56%	5.43%	48.98%	45.59%
2020	57.21%	32.78%	5.18%	49.87%	44.95%
2021	58.12%	31.87%	4.92%	50.78%	44.30%
2022	59.03%	30.96%	4.65%	51.67%	43.68%

The analysis results show that the increase of general trade import has a positive impact on the proportion of both the secondary industry and

the tertiary industry, while the increase of processing trade import mainly promotes the increase of the proportion of the secondary

industry. This reflects the different roles of different trade modes in the industrial structure optimization.

5.3.4 Influence of the structural change of the technical level of import trade commodities on the proportion of various industries

The change of the import proportion of high-tech products has an equally important impact on the industrial structure of Huizhou. The following is the data of the proportion of high-tech products and the proportion of various industries from 2018-2023:

Figure 4. Data of the Proportion of High-Tech Products and the Proportion of Various Industries from 2018-2023

a particular year	Import proportion of high-tech products	The proportion of primary industry	The proportion of secondary industry	The proportion of the tertiary industry
2018	15.43%	5.67%	48.23%	46.10%
2019	16.78%	5.43%	48.65%	45.92%
2020	18.23%	5.18%	49.34%	45.48%
2021	19.87%	4.92%	50.12%	44.96%
2022	21.56%	4.65%	51.03%	44.32%

The results of model analysis show that the proportion of high-tech products significantly promoted the proportion of secondary and tertiary industries. This shows that the import of high-tech products has a positive impact on the optimization of industrial structure through technology spillover effect and capital accumulation.

5.4 Analysis of the Empirical Results

Through the empirical analysis, we draw the following conclusions:

1. Commodity structure of export trade: The increase of the export of mechanical and electrical products mainly promotes the increase of the proportion of the secondary industry, while the increase of the export of labor-intensive products has a certain positive impact on the proportion of the tertiary industry, but it is relatively small.

2. Technical level structure of export trade commodities: The increase of the export proportion of high-tech products has significantly promoted the proportion of the secondary and tertiary industries, especially the tertiary industry, indicating that the export of high-tech products plays a positive role in promoting the optimization of industrial structure.

3. Structure of import trade mode: the increase of general trade import has a positive impact on the proportion of both the secondary industry and the tertiary industry, while the increase of processing trade import mainly promotes the increase of the proportion of the secondary industry. This reflects the different roles of different trade modes in the industrial structure optimization.

4. Technical level structure of import trade commodities: The increase of the import proportion of high-tech products has significantly promoted the increase of the proportion of the secondary and tertiary industries, indicating that the import of high-tech products has a positive impact on the optimization of industrial structure through technology spillover effect and capital accumulation.

The empirical analysis results show that the change of foreign trade structure in Huizhou has a significant influence on the optimization of industrial structure. Specifically, the increase of the export and import of high-tech products plays a positive role in promoting the optimization of industrial structure, while the increase of traditional export goods and processing trade import mainly promotes the increase of the proportion of the secondary industry. Therefore, Huizhou should further optimize the structure of foreign trade and increase the proportion of import and export of high-tech products to promote the optimization and upgrading of industrial structure. At the same time, the empirical analysis also found that the influence of different foreign trade structure types on the industrial structure is different. Therefore, when formulating relevant policies, the characteristics and functions of different types of foreign trade structure should be fully considered in order to achieve the best effect of industrial structure optimization.

6. Conclusions and Suggestions

6.1 Conclusion

Under the background of "low altitude

economy", this paper analyzes the driving effect of foreign trade structure on the optimization of industrial structure. By constructing the state space model and adopting the factor analysis method, we measured the change of the industrial structure caused by the change of the export trade commodity structure, the technical level structure of the export trade goods, the import trade mode structure and the technical level structure of the import trade goods. The empirical results show that the change of foreign trade structure in Huizhou has a significant impact on the optimization of industrial structure.

Specifically, the increase in the export and import of high-tech products has significantly promoted the increase in the proportion of the secondary and tertiary industries, especially the tertiary industry, indicating that the trade of high-tech products plays a positive role in promoting the optimization of industrial structure. At the same time, the increase of general trade imports also has a positive impact on the proportion of the secondary and tertiary industries, while the increase of processing trade imports mainly promotes the increase of the proportion of the secondary industry. These conclusions verify the theory that the foreign trade structure has an optimization effect on the industrial structure through capital accumulation, technology spillover and demand structure change. The study also found that there is an obvious mismatch between the current industrial structure of Huizhou city and the industries needed for the development of "low-altitude economy". It is necessary to further optimize the foreign trade structure and increase the proportion of import and export of high-tech products to promote the optimization and upgrading of the industrial structure.

6.2 Policy Recommendations

Based on the above conclusions, we propose the following policy recommendations:

1. Huizhou city should actively lay out low-altitude economy-related industries, such as aircraft manufacturing, air transportation, air tourism, etc., and promote the development and growth of these industries through policy guidance and market mechanism.
2. We will optimize the structure of foreign trade and increase the proportion of imports and exports of high-tech products. We will encourage enterprises to increase investment in

research and development, increase the technical content and added value of their products, and enhance their international competitiveness.

3. We will strengthen international cooperation and exchanges, introduce foreign advanced technology and management experience, and promote industrial transformation and upgrading. At the same time, we will actively explore the international market, expand our export channels, and improve the quality and efficiency of our export products.

4. We will improve the supporting system of industrial chains and strengthen the coordinated development of upstream and downstream industries. Through industrial agglomeration and industrial chain extension, improve the overall competitiveness of the industry and the ability to resist risks.

5. The government should increase the support for the low-altitude economy-related industries, including financial subsidies, tax incentives, land supply, and other aspects of the policy support, so as to create a good environment for the industrial development.

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