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Research on the Impact of Science and Technology Innovation on the Export of High-end Equipment of Yunnan Province Facing the Livelihoods of South Asia and Southeast Asia

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Abstract: Based on the panel data of Yunnan Province's export trade volume of high-end equipment for people's livelihood to 12 South Asian and Southeast Asian countries from 2010 to 2022, we empirically analyze the impact of science and technology innovation in Yunnan Province through the fixed effect model. The empirical results show that science and technology innovation has a significant positive impact on Yunnan Province's export of high-end equipment for people's livelihood to South and Southeast Asia; the impact of Southeast Asian countries is positive and significant, but the impact of South Asian countries is negative; the impact of different high-end equipment for people's livelihood is slightly different, and the promotion effect is reflected in the order from high to low in the medical high-end equipment, agricultural and food high-end equipment, and textile high-end equipment. Finally, based on the empirical results, it puts forward the countermeasure suggestions related to science and technology innovation to promote the export of high-end equipment for people's livelihood in Yunnan Province towards South Asia and Southeast Asia.

Keywords: Science and Technology Innovation; Yunnan Province; South and Southeast Asia; Livelihood and High-end Equipment; Exports.

1. Introduction

With the formal implementation of the Regional Comprehensive Economic Partnership Agreement (RCEP), South Asia Southeast Asian countries provide new market opportunities for Yunnan Province's livelihood high-end equipment manufacturing industry. The signing of this agreement not only changes the positioning of Yunnan in the domestic industrial chain, but also provides a historic opportunity for the development of this field, helping it to achieve a higher level of high-end.

Under the new development pattern, the domestic macrocycle has become the main body, and the domestic and international double cycle promotes each other, which brings new development opportunities for Yunnan's manufacturing industry. Yunnan should make full use of its border and neighboring advantages with South Asia and Southeast Asia countries, and closely combine the domestic and international market demand in order to develop high-end equipment manufacturing industry. This is not only conducive to meeting the vast market demand in Yunnan Province, but also makes it a strategic link between the strong domestic market and the international market in South and Southeast Asia. Therefore, it is an important task to study and promote Yunnan's high-end equipment manufacturing exports to South and Southeast Asia, which is of practical significance for Yunnan to embed itself in the new development pattern of "big cycle and double cycle", to build a radiation center facing South and Southeast Asia, and to enhance the status of domestic and international value chain.

In recent years, China had established the world's largest manufacturing system. To further accelerate Yunnan's industrial development and its goal of becoming a strong manufacturing province, the provincial government has developed the 3815 strategy to strengthen manufacturing and innovation. At the same time, manufacturing in South and Southeast Asia is growing, with countries such as Vietnam and Thailand gradually dominating the low-end and mid-range markets. As a neighboring province, Yunnan's manufacturing sector must move upmarket to create a new competitive advantage.

At present, China has entered the ranks of innovative countries, and its capacity for scientific and technological innovation continues to grow. However, this has also triggered the suppression and technological blockade of China by advanced technology countries such as Europe and the United States. The marginal gains brought by pure technology imitation and technology following are gradually diminishing, and China must realize the transformation from technology introduction to technology innovation. High-end equipment manufacturing industry as a high technology content, high value-added and industry chain core of the high-end field, the key to the competitiveness of its export trade in scientific and technological innovation ability to enhance. And scientific and technological innovation is crucial to the development of high-end equipment manufacturing industry, and its breakthroughs and talent cultivation determine the competitiveness of the field to a large extent. However, according to the research of Han Bin (2018), Yunnan Province has an obvious lag in terms of scientific and technological innovation capacity, and the scientific and technological development indicators during the period of 2011-2016 are generally at a low level.

2. Research Design

2.1. Selection of Variables

Based on data availability and completeness, this paper selects panel data from 2010-2022. The data sources include National Research Network, Yunnan Provincial Statistical Yearbook, China Statistical Yearbook, and the World Bank database. At present, there are fewer empirical studies on livelihood high-end equipment, this paper refers to the classification of livelihood high-end equipment by Hainan Wang et al. (2020), and collectively refers to agricultural high-end equipment, food high-end equipment, textile high-end equipment, and medical high-end equipment as livelihood high-end equipment, and by proofreading and analyzing the contents of the customs HS code, agricultural and food high-end equipment are included in chapter 84, textile high-end equipment is included in chapter 85, and medical high-end equipment is included in chapter 85, and medical high-end equipment is included in chapter 85. Chapter 84, textile high-end equipment is included in Chapter 85, medical high-end equipment is included in Chapter 90, this paper finally will be the 84th, 85th, 90th chapter products as the research object. After excluding the countries with serious missing data, this paper finally selects 3 South Asian countries, Bangladesh, India and Pakistan, and 9 Southeast Asian countries, Myanmar, Cambodia, Indonesia, Laos, Malaysia, Philippines, Singapore, Thailand and Vietnam. Very few missing values were supplemented by interpolation.

1. Explained variables

Yunnan Province's exports of high-end equipment for people's livelihoods to 12 South and Southeast Asian countries.

2. Core explanatory variables

The most innovative invention patents authorized are selected to measure the scientific and technological innovation in Yunnan Province.

3. Control variables

Refer to scholars such as Liu Lei (2013), Zheru and Wang Chuying (2020). GDP per capita, using constant price GDP per capita. Ratio of GDP per capita, using the ratio of South and Southeast Asian countries to China, reflecting the standard of living of South and Southeast Asian countries relative to China, and thus reflecting the scale of countries' import demand for China. Official exchange rate, using the period average of the local currency against the U.S. dollar. The ratio of freight turnover, using the ratio of Yunnan Province to China, reflects the freight turnover capacity of Yunnan Province as a radiation center relative to China.

2.2. Modeling

In order to analyze the impact of science and technology innovation on the export competitiveness of high-end equipment of Yunnan Province to South and Southeast Asia people's livelihood, this paper introduces the following fixed-effects regression model:

$$EX_{it} = \beta_0 + \beta_1 TI_{it} + \beta_2 GOOD_{it} + \beta_3 GDPP_{it} + \beta_4 GDPR_{it} + \beta_5 OER_{it} + \delta_t + \varepsilon_{it}$$

where, i is the region, t is the year, EX is the export value, TI is the technology and innovation, GOOD is the ratio of freight turnover, GDPP is the GDP per capita, GDPR is the ratio of GDP per capita, OER is the official exchange rate, and β is the coefficient of the variable, GDPP is GDP per capita δ are individual fixed effects, and ε is the random perturbation term.

3. Empirical Analysis

3.1. Descriptive Statistical Analysis

This paper uses Stata 17.0 software for empirical analysis. The results of descriptive statistics are shown in the table. It can be seen that "low level and big difference" is the common characteristic of people's livelihood high-end equipment export value and scientific and technological innovation.

Table 1. The results of descriptive statistics

Variable	N	Mean	SD	Min	Max
EX	156	1.1737	2.2056	0.0017	10.1124
TI	156	0.2063	0.0945	0.0652	0.4091
GOOD	156	0.0086	0.0010	0.0069	0.0099
GDPP	156	0.0827	0.1490	0.0003	0.5648
GDPR	156	156.7881	278.0910	0.6184	861.2721
OER	156	4039.2600	6720.0580	1.2497	23271.2129

3.2. Results of Empirical Tests

After standardization, the empirical results are shown in the table. Model (1) shows the results of the full sample analysis. Models (2) and (3) are the results of subgroup analysis for South and Southeast Asian countries. Models (4)-(6) are the results of the analysis of each of the three types of product exports in chapters 84, 85 and 90. It can be seen that, except for model (2), the impact of technological innovation on livelihood high-end equipment is positive and significant.

Table 2. After standardization, the empirical results

Model	(1)	(2)	(3)	(4)	(5)	(6)
Variable	EX					
TI	0.185***	-0.290	0.474***	0.270***	0.137*	0.321***
	(0.070)	(0.202)	(0.051)	(0.065)	(0.075)	(0.077)
GOOD	0.072	0.112	-0.123**	-0.000	0.094	0.023
	(0.063)	(0.152)	(0.049)	(0.059)	(0.068)	(0.070)
GDPP	1.598***	2.320***	-0.913	0.877*	1.758***	0.433
	(0.498)	(0.699)	(1.714)	(0.464)	(0.532)	(0.551)
GDPR	3.886***	1.629	1.954	2.749**	4.047**	1.392
	(1.485)	(3.574)	(1.916)	(1.383)	(1.588)	(1.644)
OER	0.742	-0.084	1.343	0.444	0.810	-0.092
	(0.885)	(1.316)	(1.036)	(0.824)	(0.946)	(0.979)
_cons	-0.000	-2.756	0.148	-0.000	-0.000	-0.000
	(0.058)	(3.737)	(0.303)	(0.054)	(0.062)	(0.064)
N	156.000	39.000	65.000	156.000	156.000	156.000
r2	0.195	0.356	0.612	0.183	0.173	0.155
r2_a	0.103	0.210	0.549	0.088	0.078	0.057

Standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

4. Conclusion and Insights

4.1. Conclusion

Based on the panel data of Yunnan Province for 12 countries in South and Southeast Asia from 2010 to 2022, the impact of science and technology innovation on the export of high-end equipment for people's livelihood in Yunnan Province is analyzed, and the following conclusions are drawn: (1) Science and technology innovation can significantly enhance the export trade of high-end equipment for people's livelihood in Yunnan Province for South and Southeast Asia. (2) Science and technology innovation, in particular, can significantly enhance the export trade of high-end equipment for Southeast Asian countries in Yunnan Province, but will inhibit the export trade for South Asian countries, indicating that Southeast Asian countries have a stronger import demand for high-end equipment for people's livelihood under the influence of science and technology innovation than South Asian countries. (3) Science and technology innovation in Yunnan Province for South Asia and Southeast Asia's livelihood of high-end equipment export trade significant role in medical, agriculture and food, textile, indicating that the medical high-end equipment really need science and technology innovation to enhance the technical content, and science and technology innovation under the influence of agriculture and food high-end equipment import demand gradually revealed in South Asia and Southeast Asia, but South Asia and Southeast Asia in the import of textile high-end equipment For scientific and technological innovation requirements are not high, mainly rely on low-tech textile machinery and equipment.

4.2. Revelations

First, strengthen government support and policy guidance. Yunnan government should be around the high-end equipment manufacturing industry system to develop a perfect development plan, clear industrial science and technology innovation development goals and tasks, co-ordinate the arrangement of industrial science and technology innovation resource allocation, provide the corresponding tax incentives, financial subsidies and other policies to support the major technological research and development, the results of the transformation of the application and industrialization development. At the same time, the training of industry-related scientific and technological innovation talents should be strengthened in terms of both quantity and quality. Through the establishment of talent introduction program and other measures to attract domestic and foreign talented people into the local high-end equipment manufacturing industry and foreign trade development.

Secondly, we should deepen economic and trade cooperation with South and South-East Asian countries. Strengthen exchanges and cooperation with South and Southeast Asian countries and promote trade facilitation. Simplify customs clearance procedures, improve the efficiency of cross-border logistics, reduce trade costs and raise the level of trade facilitation. Strengthen infrastructure construction and improve the level of connectivity with South Asian Southeast Asian countries. Formulate differentiated export strategies according to the market demands and characteristics of different countries. Focus on exploring the Southeast Asian market and tapping the export potential of medical high-end equipment, while paying attention to the market demand of South Asian countries. Establish an industrial cooperation mechanism with South and Southeast Asian countries to promote in-depth cooperation in the field of high-end equipment. Through the joint construction of industrial parks, joint R & D and other ways, jointly develop high-end equipment products suitable for local market demand.

Third, formulate differentiated development strategies for different products. As medical high-end equipment in the scientific and technological innovation to promote the export effect is remarkable, Yunnan Province should increase investment in R & D in the field of medical equipment, instruments and other areas, promote technological innovation, focus on improving the quality and competitiveness of medical equipment products to meet the growing medical needs of South Asia Southeast Asian countries. For South Asia Southeast Asian countries in the field of agriculture and food import demand, Yunnan Province should focus on the development of agricultural and food processing equipment adapted to the climate, soil and eating habits of these countries, through scientific and technological innovation to improve the technological content of the product and value-added, and enhance export competitiveness. Although the demand for scientific and technological innovation in textile high-end equipment is not high, there is still room for optimization. Yunnan Province should focus on upgrading the technical level of textile machinery, promote industrial upgrading, and increase the production of high-end textiles to meet the needs of consumption upgrading in South Asia Southeast Asian countries.

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References

[1] Han Bin. Research on countermeasures to enhance Yunnan's scientific and technological innovation capacity in the context of green development[J]. Ecological Economy, 2018,34 (07): 115-118.

[2] GU YISHANA, WU Haihua, ZHU Xiaoguang et al. Research on the optimization and upgrading path and countermeasures of high-end equipment for China's livelihood[J]. China Engineering Science,2020,22(02):22-28.

[3] WANG Hainan, WANG Liheng, ZHOU Zhicheng, WANG Kunsheng, CUI Jian. Research on the Development Strategy of Emerging Industries (2035) [J]. China Engineering Science, 2020, 22(2):1-8.

[4] Liu Lei. Research on the local market effect of China-Korea bilateral trade based on gravity model[J]. International Economic and Trade Exploration,2013,29(08):45-52. DOI:10. 13687/ j.cnki.gjjmts.2013.08.001.

[5] Zheru, Wang Chuying. Study on the trade potential of Chinese electromechanical products exported to ASEAN[J]. Price Monthly, 2020, (09): 36-43. DOI: 10. 14076/ j. issn. 1006-2025. 2020. 09.06.