

The Impact of Changes in the RMB Exchange Rate on the Export Competitiveness of China's Textiles and Clothing Industry

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Abstract: In recent years, the export volume of China's textiles and clothing industry and its international market share have increased year by year. Under such circumstances, studying the export status of China's textiles and clothing is conducive to further promoting the development of its textiles and clothing industry. This paper establishes a model based on the annual Revealed Comparative Advantage Index of China's textiles and clothing industry from 2000 to 2021, the nominal exchange rate of RMB against the US dollar, and the annual data of GDP. This paper then tests its stability, and continues to carry out the co-integration test and Granger-Causality under the condition that the data is stable in the same order to judge the relationship between the change of RMB exchange rate and the Revealed Comparative Advantage Index of China's textiles and clothing. Research shows that for every 1% appreciation of the nominal exchange rate of the RMB against the US dollar, the Revealed Comparative Advantage Index of China's textiles and clothing industry will increase by 0.0009647%. The rise of the RMB exchange rate has a certain effect on the RCA of China's textiles and clothing industry, and the results of Granger-Causality also show that the RMB exchange rate is the reason for RCA in China's textiles and clothing industry.

Keywords: RMB exchange rate, RCA, Textiles and clothing industry.

1. Introduction

Since the cancellation of global textile quotas in 2005, China's textiles and clothing industry has maintained rapid growth. As of 2021, China's textiles and clothing exports accounted for about 35% of the world's share. However, this does not mean that the international market share of textiles and clothing can be unimpeded by China. First, in recent years, China's world market share of textiles and clothing has continued to rise, but the speed has slowed down significantly, and with the gradual rise of labour costs in China, the textiles and clothing industry has gradually shifted to Asian countries such as Vietnam and India. Second, although the world market share of Chinese textiles continues to rise as a whole, its Revealed Comparative Advantage Index (RCA) has gradually declined. The RCA index is the most convincing indicator to measure the competitiveness of a product or industry in a country in the international market. Its decline shows the gradual decline in the international market competitiveness of China's textiles and clothing. In the above context, this article aims to achieve the following purposes through research:(A) Through a

comparative study of China's textiles and clothing exports and international market share between China and its main competitor India and its main competitor from 2010 to 2021, we will explore the development status of the world's major textiles and clothing exporters; (B) Use RCA to compare and study the export competitiveness of China and its main competitors in the textiles and clothing industry, and explore the overall changing trend of the international market competitiveness of textiles and clothing in these three countries; (C) Through the empirical analysis of China's textiles and clothing industry RCA through the changes in the exchange rate of RMB against the US dollar, discuss whether the changes in the RMB exchange rate are the main factors affecting China's textiles and clothing RCA. This paper can provide certain reference value for practitioners in the relevant industry in China.

2. Analysis of Export Competition in China's Textiles and Clothing Industry

2.1. The Export Status of China's Textiles and Clothing Industry

The textiles and clothing industry is one of the earliest industries in human history. As one of the earliest countries in the world to introduce textiles, China has a long history and a long textile culture. The textiles and clothing industry has also made great contributions to the exchange and dissemination of Chinese and Western cultures. Since modern times, China's textiles and clothing industry has gradually shifted from handmade textiles to mechanical textiles. At present, China's textiles and clothing exports rank first in the world. According to the data released by the World Bank, the export value of China's textiles and clothing industry in 2021 is about \$304.9 billion, mainly exported to Vietnam, Japan and the United States, totalling about \$88.7 billion, accounting for about 30% of total exports. Among them, exports to Vietnam are about \$17.7 billion, exports to Japan are about \$19.3 billion, accounting for about 6% of exports, and exports to the United States are about \$51.7 billion, accounting for about 17% of exports. In terms of export volume, the United States is China's largest exporter of textiles and clothing.

In order to adapt to the evolution of the times, China must clearly understand its shortcomings and compare it with the main competitors in the textiles and clothing market.

Since World Trade Organization (WTO) fully relaxed the textile export quota system in 2005, China's textile export market has opened up rapidly. Taking advantage of the labour force and the market, China has gradually become a global textile production centre. However, in recent years, the textiles and clothing industry has gradually shifted to Vietnam, India and other Asian countries with lower labour costs. And the major textiles and clothing exporters of China, India and Vietnam are highly overlapping. That is why India, Vietnam and China are selected for comparative study by this study. The selection of these two countries as research objects is also based on the following considerations.

India is one of the four ancient civilisations in the world, and the textiles and clothing industry is one of the oldest industries in India. In 2021, India's textile exports accounted for 10.5% of India's total exports, which is one of India's pillar industries. In recent years, based on population welfare and relatively cheap social welfare, India has gradually become a textile purchaser second only to China. In 2021, the exports of India's textiles and clothing industry increased by about \$30.2 billion compared with 2000, with an average annual growth rate of about 12.9%. Therefore, India was selected as one of the main competitors for China's textile exports.

In recent decades, Vietnam's textiles and clothing industry has developed rapidly, and its textile industry also occupies an important position in the country's economy. In 2021, textiles and clothing exports were about \$41.2 billion, the world's second largest exporter of textiles and clothing. And although its share in the world market is only about 20% of China, its share in the

U.S. market is about 50% of China's U.S. market. The biggest competitor of Chinese textiles in the United States.

Table 1: Exports and market share of the textiles and clothing industries in China, India and Vietnam[1]

Year	China/Billion\$	MS of China	India	MS of India	Vietnam	MS of Vietnam
2010	199.53431	0.294679657	27.127	0.40062158	13.303	0.19646363
2011	240.539595	0.30148505	33.347	0.041796121	16.76	0.021006477
2012	246.094186	0.31505178	32.682	0.041839762	18.15	0.023235778
2013	274.010292	0.32719546	40.191	0.04799204	21.535	0.025714926
2014	287.645387	0.34040387	38.597	0.045676269	25.241	0.029870578
2015	273.46473	0.33856986	37.161	0.046008107	27.27	0.033762307
2016	253.292356	0.33504137	35.429	0.046863557	28.705	0.037969415
2017	257.399072	0.32385654	37.22	0.046829775	31.811	0.040024233
2018	266.228192	0.31819796	37.01	0.044234634	36.664	0.043821092
2019	260.341791	0.31432455	35.485	0.042842937	39.428	0.047603532
2020	280.643238	0.35288365	29.605	0.037225627	37.1	0.046649916
2021	304.896146	0.3322196	41.4	0.045110086	41.29	0.044990228

Since 2010, textile exports from China, India and Vietnam have continued to grow rapidly. Specifically, in 2011, China's textile exports reached \$240Billion, accounting for 30.14% of the world market share (see Table 1), India was \$33Billion, accounting for 4% of the world market share, and Vietnam was \$16.76Billion, accounting for 2% of the world market.

As shown in Table 1, India's textile exports fell sharply from \$35.485 billion to \$29.605 billion in 2020 due to COVID-19. Vietnam's textile exports fell for the first time in a decade, from \$39.4 billion to \$37.1 billion. The growth of China's textile exports has changed from negative to positive. In 2021, with the gradual recovery of the global economy and the increase in global demand for textiles such as masks, the import demand for textiles in countries around the world has also rebounded significantly. India and Vietnam's textiles and clothing exports also increased from negative to positive, especially India's textile exports from \$29.6 billion to \$41.4 billion. In 2021, the exports of these three countries reached the highest level in a decade: \$304 billion in China, \$41 billion in India, and \$412.9 billion in Vietnam.

From Table 1, China's textile exports have increased by about \$6.5 billion in 10 years. From China's global market share, it can be seen that China has always been an important country in the world's textile exports. India's textile industry has also gradually developed, with an increase of about 700 million US dollars. Vietnam's textiles and clothing industry has achieved great development in 10 years. Textile exports have increased by about 2.5 billion US dollars, and the world market share has increased from 2.1% to 4.4%, gradually becoming a textile power.

2.2. Comparative Analysis of RCA Index of Textiles and Clothing in China, India and Vietnam

RCA index is the dominant comparative advantage theory. The so-called dominant advantage theory is the ratio between the share of the total export value of a country's total export value of a certain type of commodity exported by a country and the share of the total export value of such goods exported worldwide in the world market. The expression of the index is:

$$RCA = \frac{\frac{X_{ij}}{X_{tj}}}{\frac{X_{iw}}{X_{tw}}} \quad (1)$$

X_{ij} Indicates the export value of commodity i in the country j , X_{tj} indicates the export value of all goods in the country, X_{iw} Indicates the export value of commodity i in the world, X_{tw} represents the total export value of all commodities in the world. This index aims to judge whether a commodity in a country is internationally competitive. If $0.8 \leq RCA \leq 1.25$, it means moderate international competitiveness; if $1.25 \leq RCA \leq 2.5$, it indicates strong international competitiveness; if $RCA \leq 0.8$ indicates weak international competitiveness[2-3].

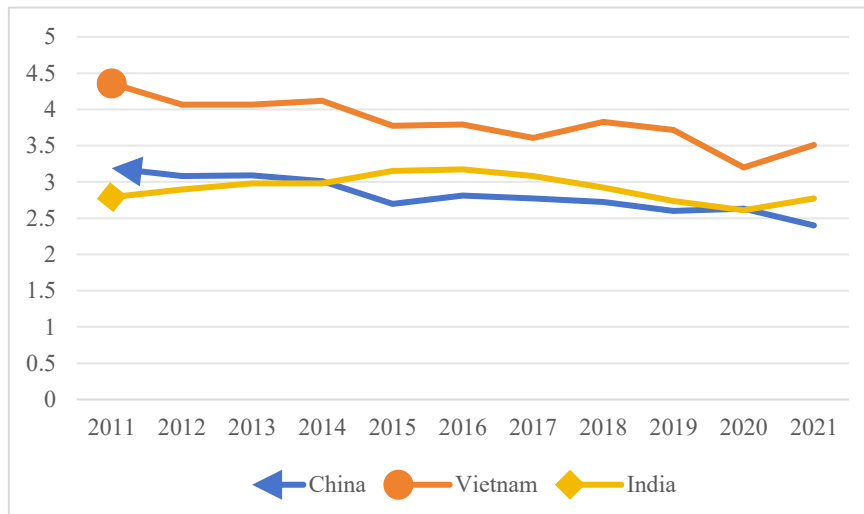


Figure 1: Changes in the RCA index of China, Vietnam and India in 2011-2021

From Figure 1, the RCA index of China, Vietnam and India is greater than 2.5, which has strong international competitiveness. The RCA index of China's and Vietnam's textiles and clothing exports maintained an overall downward trend from 2011 to 2021. China fell from about 3.3 to about 2.5; Vietnam fell from about 4.4 to about 3.5. The RCA index of Indian textiles was about 2.8 in 2011 and fell to about 2.8 after reaching a high of about 3.2 in 2015. International competitiveness changed from Vietnam > China > India to Vietnam > India > China in 2011. This shows that China is gradually losing its competitiveness.

3. Empirical Analysis of the Impact of RMB Exchange Rate Changes on RCA in Chinese Textiles and Clothing Industry

3.1. Selection of Variables and the Source of Data

The above concludes that the RCA index of Chinese textiles has declined. Regarding the export of textiles and clothing, its competitiveness may be affected by changes in the RMB exchange rate, because changes in the exchange rate can directly reflect the price of textiles exported from China in the world market. In addition, the global GDP per capita will also affect the international competitiveness of China's textiles. Therefore, the description of each variable selected to analyse the influencing factors of export competitiveness is as follows: (a) explicit comparative advantage (RCA). Data from World Integrated Trade Solutions (WITS); (b) RMB exchange rate change (EX). Data from China National Bureau of Statistics; (c) world gross domestic product (Y_{wt}). Data from the United Nations website.

3.2. Empirical Analysis

3.2.1. Stability Test

Stability test is a statistical detection method used to detect the stability of the time series of a certain trend [4]. In order to prevent pseudo-regression of data, it is necessary to conduct a stability test of each variable before the data is a co-integration test to ensure that each variable is stable at the same level.

Table 2: Second-order differential unit root test of RCA, EX, Y_{wt}

Variable	t-Statistic	5% level	Stability
RCA	-7.182	-3.600	✓
EX	-4.562	-3.600	✓
Y_{wt}	-4.309	-3.600	✓

Table 2 shows that the test statistic=-7.182 of the second-order difference ADF unit root test of the variable RCA is less than the critical value of -3.600 at the level of 5%, so the second-order difference of the variable RCA is stable at the significant level of 5%. Similarly, the Test statistic of the second-order differential ADF unit root test of the variable GDP and the variable exchange rate is -4.562 and -4.309 respectively, both of which are less than their critical values at the 5% level. Therefore, the assumption that it has a unit root can be rejected, and the second-order difference between the variable GDP and the exchange rate is stabilised at a significant level of 5%.

3.2.2. Co-integration Inspection

The co-integration test adopts a linear combination method to stabilise the non-stationary sequences [5]. Because this article only studies the co-integration relationship between two variables, the Engel-Granger Two-step co-integration test method can be used to carry out the co-integration test. And the second-order difference between the variable RCA, Y_{wt} and EX is stable at a significant level of 5%. Therefore, it can be co-integregated. The test results are as follows:

Table 3: Co-integregistic regression results

D2.y	Coefficient	Std. err.	t	P>t
D2.x	0.0009647	0.0017791	0.54	0.595
D2.z	5.24E-15	8.38E-15	0.63	5.40E-01
cons	-0.0014996	0.0396421	-0.04	0.97

Table 4: ADF test results of residuals

	t-Statistic	Prob.*
Augmented Dickey–Fuller test statistic	-4.512	0.0002
test critical value:		
1% level	-3.750	
5% level	-3.000	
10% level	-2.630	

As shown in Table 3, the coefficient of the variable EX is 0.0009647, the coefficient of the variable is 5.24E-15, and the constant term is -0.0014996. Therefore, its co-integration is multiplied by:

$$RCA = -0.0014996 + 5.24 \times 10^{-15}Y_{wt} + 0.0009647EX \quad (2)$$

And do ADF tests on its residual sequence. According to Table 4, its t statistical value is -4.512, which is less than the critical value of -3.570 at the level of 1%, indicating that the residual sequence is significant at the level of 1%, so it is stable.

Through the co-integration equation, it can be concluded that the textile RCA index will rise by 0.0009647% for every 1% increase of the RMB against the US dollar. Therefore, the appreciation of the RMB will be conducive to the RCA index of Chinese textiles, but the impact is significant.

3.2.3. Granger Cause and Effect Test

Granger proposed a statistical test method to test the statistical causal relationship between two time series, so it is called Granger-Causality [6]. Before Granger-Causality, it is necessary to determine the optimal lag order test result of the VAR vector autoregressive model. As shown in Table 5, choose the fourth lag as the optimal lag order.

Table 5: Post-test results

Lag	LL	LR	DF	p	FPE	AIC	HQIC	SBIC
0	-561.84				9.30E+26	70.605	70.6125	70.7499
1	-552.445	18.79	9	0.027	9.10E+26	70.5556	70.5853	71.1351
2	-538.578	27.735	9	0.001	5.80E+26	69.9472	69.9992	70.9613
3	-527.159	22.838	9	0.007	6.80E+26	69.6449	69.719	71.0935
4	-468.085	185.15*	9	0.000	4.7E+26*	63.3856*	63.4821*	65.2688*

After determining the lag order, you can establish a VAR model according to its optimal lag. After establishing the VAR model, its main variable can be Granger-Causality. The results are shown in Table 6:

Table 6: results of Granger-Causality

Original hypothesis	chi2	df	prob>chi2	Result
EX is not RCA's Granger reason	22.77	4	0	×
Y_{wt} is not RCA's Granger reason	31.671	4	0	×

According to Table 6, the RMB exchange rate, Y_{wt} , and the RCA index of Chinese textiles are respective Granger reasons.

4. Conclusion

This paper mainly discusses the current situation of China's textiles and clothing industry and the comparison between India and Vietnam, and focuses on the impact of RMB exchange rate changes on China's textile RCA. After analysis and testing, the conclusion of this article is as follows: First, Chinese textiles have an overwhelming advantage over India and Vietnam in terms of world market share, but China is lower than India and Vietnam in terms of the RCA index. And the RCA index of Chinese textiles showed an overall downward trend between 2010 and 2021. Second, the exchange

rate elasticity of RCA for Chinese textiles and clothing is 0.0009647, that is, for every 1% increase in the exchange rate of RMB against the US dollar, the RCA of Chinese textiles will rise by 0.0009647%. According to Granger-Causality, the change in the RMB exchange rate, there is a statistically causal relationship between the GDP and the RCA index of China's textiles and clothing. Empirical analysis shows that the rise in the RMB exchange rate has a stimulating effect on the RCA of Chinese textiles, but the effect is not significant. There are some shortcomings in this paper. For example, only two variables are selected in this article. In future research, the number of workers and factories in China's textiles and clothing industry can be taken as new variables. It is included in the measurement square multiplication to further verify the impact of these influencing factors on the export competitiveness of the textiles and clothing industry.

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