

The Impact of RMB Exchange Rate Changes on the Import and Export Trade of China's Textile and Clothing Industry: An Empirical Analysis Based on the Data from 2000 to 2019

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ABSTRACT

With the low-cost advantage of the textile and clothing industry gradually weakened, the impact of RMB exchange rate changes on the import and export of China's textile and clothing industry has become increasingly significant. In this paper, we use cointegration method to analyze the impact of RMB exchange rate changes on the import and export of China's textile and clothing industry. The results show that there is a significant positive correlation between the real effective exchange rate and import and export, and the real effective exchange rate has a greater impact on the export. In addition, there is also a mutually reinforcing relationship between imports and exports.

Keywords: Textile and clothing products, Import and export trade, Exchange rate.

1. INTRODUCTION

For a long time, China is a big country in textile production and sales, and the textile and clothing industry has played an important role in China's foreign trade and economic development. The long-term stable development of textile and clothing trade is very important to maintain China's reserve assets, promote the internationalization of RMB, improve the balance of payments and ease the pressure on employment. However, with the continuous advancement of China's opening to the outside world, the impact of exchange rate changes on the import and export trade of textile and clothing industry is becoming increasingly significant.

According to the statistics of GENERAL ADMINISTRATION OF CUSTOMS. P. R. CHINA, in 2019, the import and export volume and foreign trade volume of China's textile and clothing products showed a downward trend. The total trade volume of China's textile and clothing products in 2019 was \$296.55 billion, and decreased by 2.2% from a year earlier. Over the past two decades, the RMB exchange rate has experienced a trend of "rising, declining, and finally two-way fluctuation". In 2019, the midpoint of RMB

against the US dollar has dropped by 1130 basis points (BPS), with a depreciation rate of RMB about 1.65%.

In this paper, basing on China's data from 2000-2019, we use cointegration method to analyze the impact of RMB exchange rate fluctuations on the import and export of China's textile and clothing industry. The paper is proceeding as follows. Section 2 reviews the theoretical basis and research status of the impact of RMB exchange rate on textile and clothing import and export trade. Section 3 is empirical research. Some conclusions are contained in Section 4.

2. RESEARCH STATUS

2.1. Theoretical Basis

Up to now, elasticity approach, J-curve effect and absorption approach still have strong explanatory power in studying the impact of exchange rate changes on import and export trade. The elasticity method holds that if the elastic condition, such as Marshall-Lerner Condition, or Bickerdike-Robinson-Metzler Condition, is met, the devaluation of local currency can improve the balance of payments ^[1]. The J-curve effect is generally used to explain the time lag effect between

currency depreciation and the improvement of trade balance [2]. The absorption approach believes that the existence of idle resources is necessary for currency devaluation to improve the balance of payments.

2.2. Research Status

Some scholars have shown that the fluctuation of RMB exchange rate has no significant impact on the import and export of textiles and clothing products (Silvana Tenreyro, 2004; Wang Junqin and Li Shao, 2017; Wei Xiao, 2019; Wang Wei, 2013; Li Qi, 2017) [3]-[7]. Sheng Baozhu (2009) analyzed the impact of RMB exchange rate change on China’s textile and clothing industry from positive and negative aspects [8]. Huo Xin (2015) found that the change of RMB exchange rate is negatively correlated with the export of textile and clothing industry [9]. Moreover, some scholars studied the impact of RMB exchange rate changes on China's import and export and textile and clothing import and export from the long-term and short-term perspectives (He Jiankui and Ma Hong, 2012; He Yihong, 2013; Jing Ju and Li Na, 2015) [10]-[12].

3. EMPIRICAL ANALYSIS

3.1. Model

We establish the export demand function and import demand function of China's textile and garment industry in the form of classical C-D function. The function is represented as follows:

$$E_t = A(R_t)^{\alpha_1} (GDP_t^*)^{\alpha_2} \tag{1}$$

$$I_t = A(R_t)^{\beta_1} (GDP_t)^{\beta_2} \tag{2}$$

In the equations, *t* represents the period. *E_t* represents export volume of China's textile and clothing products in period *t*, *R_t* is RMB real effective exchange rate (REER), *GDP_t^{*}* is GDP of trading partner countries, *α₁* is exchange rate elasticity of textile and clothing exports, *α₂* is income elasticity of textile and clothing exports, *I_t* represents import volume of China's textile and clothing products, *GDP_t* is China's GDP, *β₁* is exchange rate elasticity of textile and clothing imports, *β₂* is income elasticity of textile and clothing imports. Considering the interaction between export and import and other factors affecting import and export, and taking logarithm of the above equations, we can get the empirical analysis model.

$$\ln(E_t) = \ln(A) + \alpha_1 \ln(R_t) + \alpha_2 \ln(GDP_t^*) + \alpha_3 \ln(I_t) + \mu \tag{3}$$

$$\ln(I_t) = \ln(B) + \beta_1 \ln(R_t) + \beta_2 \ln(GDP_t) + \beta_3 \ln(E_t) + \mu \tag{4}$$

In the formula, *μ* is the random perturbation term, *α₃* is the elasticity of the impact of textile and clothing

imports on textile and clothing exports, and *β₃* is the elasticity of the impact of exports on imports.

3.2. Variables

In order to deeply analyze the impact of the change of RMB exchange rate on China's textile and clothing import and export trade since 2000, we will take the export volume of textile and clothing industry (E) and the import volume of textile and clothing industry (I) as the explained variables. In this paper, RMB REER and GDP are selected as the explanatory variable.

3.3. Data

This paper selects the relevant data from 2000 to 2019. The import and export data of China's textile and clothing industry comes from the National Bureau of statistics. The data of RMB real effective exchange rate comes from BIS. Since only monthly data are found, it is averaged to obtain annual data. GDP data are from the World Bank. As the EU is the main destination of China's textile and clothing exports, this paper selects the EU as our trading partner.

3.4. Quantitative Analysis

3.4.1. Correlation Analysis of Variables

In this paper, Pearson correlation coefficient is used to analyze the correlation between variables. The specific results are shown in Table 1 and Table 2.

Table 1. Correlation analysis of export model variables

Probability	LNE	LNR	LNGDP _t [*]	LNI
LNE	1			
LNR	0.72681***	1		
LNGDP _t [*]	0.93462***	0.47228**	1	
LNI	0.95195***	0.80876***	0.81432***	1

Table 2. Correlation analysis of import model variables

Probability	LNI	LNR	LNGDP _t	LNE
LNI	1			
LNR	0.80876***	1		
LNGDP _t	-0.95452***	0.86096***	1	
LNE	0.95195***	0.72681***	0.96586***	1

Note: *** Indicates that there is a strong correlation between the two variables, ** indicates that there is a medium correlation between the two variables.

According to the correlation coefficients of the variables in the export model, there is a significant positive relationship between RMB REER, EU GDP, China's textile and clothing imports and China's textile and clothing exports. Similarly, there is a significant

positive relationship between China's textile and clothing import and RMB REER and China's textile and clothing export, but there is a negative correlation with China's GDP.

3.4.2. Stationary Test

In order to avoid pseudo regression, it is necessary to test the stationarity of time series. In this paper, we use Augmented Dickey-Fuller (ADF) test method to test the unit root and judge whether the time series are stationary. The null hypothesis is that the original data is non-stationary, and the results are shown in table 3.

Table 3. Stationary test of variables

Variables	ADF test t-statistic	Critical value at 5% significance level	P value	Stationary or not
dLNE	-4.36602	-3.71048	0.0157	Yes
dLNR	-2.76163	-1.96141	0.0087	Yes
dLNGDP _t	-3.06005	-3.04039	0.0482	Yes
dLNI	-3.51362	-3.04039	0.0200	Yes
dLNGDP _t	-4.67961	-3.06559	0.0024	Yes

Through the test, we found that the ADF test t-statistic of LNE, LNR, LNGDP_t, LNI and LNGDP_t are greater than the critical value of the significance level of 5%, indicating the null hypothesis can be accepted and the time series are non-stationary. When we do first-order difference on these time series, we find at significance level of 5%, the null hypothesis can be rejected, that is, all the series are stationary and integrated of the same order (as shown in Table 3).

3.4.3. Cointegration Test

Since the model in this paper contains five variables, Johansen test, a regression coefficient test method based on Vector Autoregressive model (VAR), is used for cointegration test of each variable. We conducted Johansen test on the variables in the export model and the import model respectively.

According to the cointegration test of the variables in the export model, the trace statistics of the original hypotheses that there is no cointegration relationship, at most one cointegration relationship, at most two cointegration relationships and at most three cointegration relationships in the variables are greater than the critical values at 5% significance level, and their corresponding probabilities are lower than 0.05, indicating that there is a long-term cointegration relationship between the variables. In the same way, according to Johansen test, we find there is a long-term cointegration relationship between the variables in the import model.

3.4.4. Regression Analysis

Use Eviews 7.2 to carry out regression analysis on import model and export model respectively, and the results are shown in Table 4.

Table 4. Results of regression analysis

Variables	Export model LNE	Import model LNI
LNR	0.780561*** (3.665204)	0.568244** (2.739907)
LNGDP _t	-	-0.084745 (1.586974)
LNGDP _t *	1.40033*** (11.22235)	-
LNE	-	0.381156** (2.499464)
LNI	0.874646*** (4.327904)	-
Constants	-3.521296* (-1.859148)	5.675377 (1.566775)
R-squared	0.990033	0.936539
Adjusted R-squared	0.988164	0.924641
F-statistic (Prob.)	529.7621 0.00000	78.70845 0.00000

Note: In the table, the data in brackets are the t-test values of the estimated values of the corresponding parameters. *** means significant at the significance level of 1%, ** means significant at the significance level of 5%, and * means significant at the significance level of 10%.

According to the regression results, the R-squared of the two models are significantly greater than 0.5, indicating that the fitting degree of the model is good. At the same time, it can be seen that the probability values of F-statistic of the models are significantly 0, that is, the models are significant. The specific regression equation is as follows:

$$\ln(E_t) = -3.52 + 0.78\ln(R_t) + 1.4(GDP_t^*) + 0.87\ln(I_t) \quad (5)$$

$$\ln(I_t) = 5.68 + 0.57\ln(R_t) - 0.08(GDP_t) + 0.38\ln(E_t) \quad (6)$$

According to the results of regression analysis, it can be seen that REER has a significant positive relationship with the import and export of textile and clothing, and REER has a greater impact on the export than the import. Specifically, the RMB REER increases by 1%, the import and export of textile and clothing will increase by 0.57% and 0.78% respectively. In addition, there is a significant positive promotion between the import and the export, that is, with the increase of import, the export will also increase and vice versa. As for the impact of GDP on import and export, EU GDP has a significant positive impact on China's textile and garment exports, while China's GDP has a negative

impact on the import of textile and garment products, but this impact is not significant.

4. CONCLUSIONS

In this paper, we conduct an empirical research on the impact of RMB exchange rate on the import and export trade of China's textile and clothing industry, based on the data of 2000-2019. The main conclusions include:

- RMB exchange rate has a significant positive relationship with the import and export of China's textile and clothing, and RMB REER has a greater impact on the export than the import. Specifically, the RMB REER increases by 1%, the export and the import of China's textile and clothing will increase by 0.78% and 0.57% respectively.
- GDP will also affect the import and export of textile and clothing industry. EU GDP has a significant positive impact on China's textile and garment exports, while China's GDP has a negative impact on China's textile and garment imports, but this impact is not significant.
- For China's the textile and clothing industry, there is a significant positive promotion between the import and the export, that is, with the increase of the import, the export will also increase. At the same time, with the increase of the export, the import will also increase significantly.

From the above conclusions, the stable development of China's textile and clothing export trade depends on the stability of RMB exchange rate, the growth of domestic and foreign economy, and the stable import scale of China's textile and clothing products.

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