

A Study on Determinants of China's Service Trade Performance Within the Belt and Road Context

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Abstract: The Belt and Road Initiative has a multifaceted impact on China's services industry in trade performance. This study examines the growth trends of China's services industry in trade performance, identifies key influencing factors, and develops a corresponding analytical model. First, a correlation analysis is conducted between the export volume and urbanization rate, income, labor force, and foreign direct investment to assess the degree of their correlation. Then, econometric analysis is performed using Eviews software. Additionally, the Belt and Road policy is introduced as a dummy variable to further analyze its impact on China's services industry in trade performance. The paper also provides an outlook on the future development of China's services industry in trade.

Keywords: Belt and Road Initiative, Service Trade Export, Influencing Factors

1. Introduction

On September 10, 2023, the State Council Information Office held a routine press briefing to introduce the “Opinions on Promoting High-Quality Development of Service Trade through High-Level Opening.” During the meeting, it was mentioned that global service trade and service industry cooperation have deepened, with the processes of digitalization, intelligence, and greening accelerating. Service trade has become an important driving force of economic globalization.[1] According to statistics from the World Trade Organization, from 2013 to 2023, global service exports increased at an average yearly rate of 4.9%, nearly double the growth pace of goods exports. The share of service trade in total trade (goods and services) has increased to one-quarter.

Since the launch of the Belt and Road Initiative, China has focused on service trade as a key approach to expanding high-level opening-up and cultivating new momentum for foreign trade development. Efforts to accelerate the growth of service trade have continued, with China's total service trade import and export reaching \$933.12 billion in 2023, a year-on-year increase of 10%, setting a new historical high. However, the development of China's services industry in trade still faces numerous deficiencies and challenges, with a series of pressing issues that need to be addressed. This research aims to analyze in depth the current development trends and existing problems in China's services industry in trade, and conducts an empirical study by establishing a model to examine the key factors hindering its growth.

2. Current situation analysis

2.1. Rapid development of service trade

According to the official data on China's services industry in trade performance from 1993 to 2022 disclosed by the National Bureau of Statistics, the following time-series graph is presented.

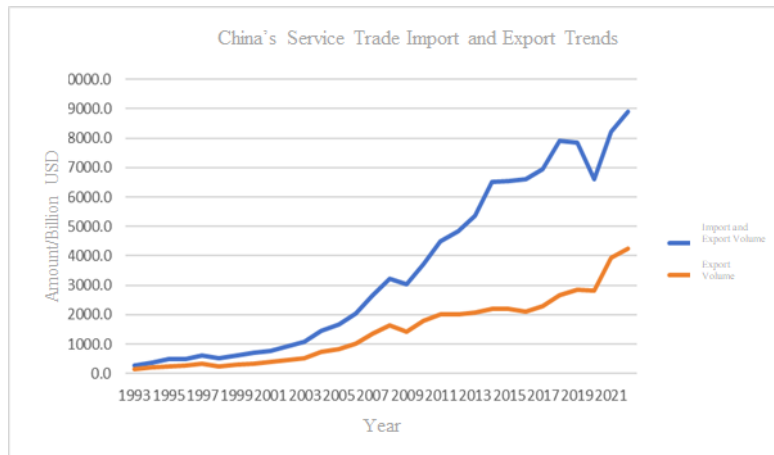


Figure 1: China's Service Trade Import and Export Trends

The graph illustrates a steady upward trajectory in the total trade volume of China's services industry over the last 30 years, marked by notable growth. Since the implementation of the Belt and Road Initiative (BRI) in 2013, China has maintained its position as the world's second-largest service trade exporter, with a continuous and unstoppable growth trend. By 2018, China's annual service export growth rate to countries along the Belt and Road had reached 14.63%, reflecting the effectiveness of the country's foreign trade policies and the impressive results achieved. This rapid development indicates that China's services industry in trade has been thriving, with an increasingly prominent international role.

2.2. Imbalance in the structure of service trade

The imbalance in the structure of China's services industry in trade mainly manifests in two aspects: industrial structure and regional distribution.

In terms of industrial structure, China's services industry in trade is currently overly reliant on resource-intensive and labor-intensive industries. Over the past three years, the top three industries in terms of service trade share have consistently been transportation, other business services, and tourism services. Together, the import and export volumes of these three industries constitute over 60% of the total service trade. Regarding regional structure, there is an imbalance in the development of service trade across different regions in China.[2] Provinces with significant service trade activity are mainly located in the eastern region, whereas the central and western areas show comparatively lower volumes. According to the Global Service Trade Development Index Report 2023, provinces and cities ranked highly in four dimensions—service trade volume, service trade status, industrial foundation, and overall environment—are all located in the eastern part of China, with most of the top 10 being coastal cities. [3]This regional difference is closely related to the regional characteristics of China's current economic development.

2.3. Relative weakness in international competitiveness of service trade

China's services industry in trade still has considerable room for improvement in terms of its share in the global market. According to data from the United Nations Conference on Trade and Development (UNCTAD), in 2022, the import and export volumes of the United States in service trade accounted for 11% and 13% of global trade, respectively. In comparison, China's services industry in trade import and export volumes only accounted for 7% and 6%, showing a significant gap.[4]

The TC index refers to the ratio of the trade balance of a country's imports and exports to the total trade volume. The closer the index is to 1, the greater the competitiveness. [5]The TC index for China from 1993 to 2022 is shown below.

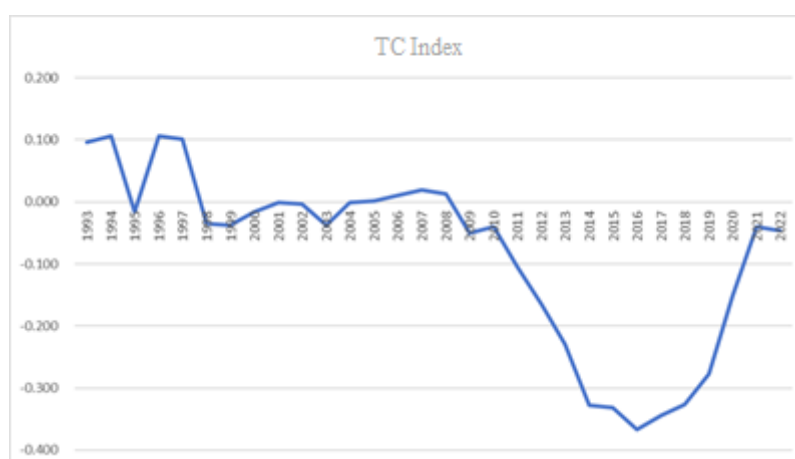


Figure 2: TC Index

From the graph, it can be seen that China's services industry in trade TC index has remained negative over the past decade. Although it reached its highest point in 2021, it has since shown a declining trend. This indicates that China's services industry in trade competitiveness is relatively weak and poses a risk of further decline.

3. Empirical analysis

To enhance the current state of China's trade in services, both imports and exports, this paper constructs a multiple linear regression model to empirically analyze the factors influencing China's services industry in trade performance. Based on the empirical analysis results, the paper proposes recommendations for improving China's services industry in trade import and export.

3.1. Model setup

Considering the various factors that affect China's services industry in trade performance and taking China's actual situation into account, this paper selects relevant data from 1993 to 2022, covering nearly 30 years of China's services industry in trade. The explanatory variables selected include Gross Domestic Product (GDP), urbanization rate, foreign direct investment (FDI), per capita disposable income, and labor force, which are denoted as X1, X2, X3, X4, and X5, respectively. China's services industry in trade export volume is used as the dependent variable, denoted as Y.

In addition to the above-mentioned influencing factors, other factors (such as exchange rates) also affect China's services industry in trade performance, represented by u_i .

Due to the large values of the variables and the issue of inconsistent dimensions, the data was log-transformed to minimize these effects. Using Eviews 13.0 software, the multiple linear regression model is established as follows:

$$\ln Y = \beta_0 + \beta_1 \ln X_{1i} + \beta_2 \ln X_{2i} + \beta_3 \ln X_{3i} + \beta_4 \ln X_{4i} + \beta_5 \ln X_{5i} + u_i \quad (1)$$

In Equation (1), i represents time, β_0 is the constant term, and β_1 - β_6 are the parameters to be estimated.

Descriptive statistical analysis of the data reveals that both the explanatory variables and the dependent variable have large standard deviations, and the difference between the minimum and maximum values is significant. This indicates that there were considerable changes in China's economic development between 1993 and 2022.[6]

3.2. Parameter estimation

3.2.1. Regression parameter estimation

Using Eviews 13.0 software, Ordinary Least Squares (OLS) regression is performed on the established multiple linear regression model, and the regression results are shown in Figure 3-1.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-9.896064	11.47151	-0.862664	0.3969
LOG(X1)	1.152864	0.866143	1.331032	0.1957
LOG(X2)	1.359842	0.800108	1.699573	0.1021
LOG(X3)	1.255390	0.327868	3.828954	0.0008
LOG(X4)	-1.504035	0.874171	-1.720527	0.0982
LOG(X5)	0.281508	1.112122	0.253127	0.8023
R-squared	0.990853	Mean dependent var	6.877304	
Adjusted R-squared	0.988948	S.D. dependent var	1.007040	
S.E. of regression	0.105870	Akaike info criterion	-1.476345	
Sum squared resid	0.269005	Schwarz criterion	-1.196105	
Log likelihood	28.14517	Hannan-Quinn criter.	-1.386694	
F-statistic	519.9733	Durbin-Watson stat	1.515476	
Prob(F-statistic)	0.000000			

Figure 3: Regression Parameter Estimation Results

3.3. Model testing

3.3.1. Statistical testing

From Figure 3-1, it can be seen that the R^2 and adjusted R^2 are 0.9909 and 0.9889, respectively, indicating a good fit.

With a significance level of $\alpha = 0.05$, the regression result shows an F-value of 519.9733 and a p-value of 0, which is much smaller than 0.05, indicating that the F-test passes.

At the significance level of $\alpha = 0.05$, as shown in Figure 3-1, except for foreign direct investment (X_3) and per capita disposable income (X_4), the p-values of the other variables are greater than 0.05, meaning they fail the t-test. This suggests the possibility of multicollinearity between the explanatory variables in the model.

3.3.2. Econometric testing

Multicollinearity Testing and Correction

The application of the variance inflation factor (VIF) method reveals that each explanatory variable has a VIF exceeding 10, signifying significant multicollinearity among them.

A stepwise regression method was used to adjust the model. By building five univariate linear regression models, it was found that the t-tests and F-tests between service trade exports and each explanatory variable passed, suggesting that each explanatory variable influences service trade exports. From the goodness of fit (R^2), the best fit was observed between service trade exports and foreign direct investment (X_3), so this paper takes foreign direct investment as the first independent

variable and introduces the explanatory variables in order of their goodness of fit (R^2), from high to low.

Based on the initial regression model, this study introduced $\ln X_1$, $\ln X_2$, $\ln X_4$, and $\ln X_5$, and found that the R^2 and adjusted R^2 improved only when $\ln X_1$ was introduced. The parameter signs were reasonable, and the variables also passed the 5% significance level t-test. When $\ln X_3$ and $\ln X_1$ were retained, other variables were introduced one by one, but the regression results with $\ln X_1$ and $\ln X_3$ as explanatory variables were the best. Therefore, the final model for the factors influencing service trade exports should be:

$$\ln Y = -4.85 + 1.42 \ln X_{1i} + 0.18 \ln X_{3i}$$

Heteroscedasticity Testing

For this sample data, since the explanatory variables may differ significantly across sample points, there might be heteroscedasticity. Therefore, the White test method was chosen to test for heteroscedasticity. The null hypothesis of this test is the homoscedasticity hypothesis, which assumes the absence of heteroscedasticity. [7] The test was conducted using Eviews 13.0 software, and the results are shown in the following figure.

Heteroskedasticity Test: White			
Null hypothesis: Homoskedasticity			
F-statistic	0.974069	Prob. F(5,24)	0.4535
Obs*R-squared	5.060915	Prob. Chi-Square(5)	0.4085
Scaled explained SS	8.609388	Prob. Chi-Square(5)	0.1257

Figure 4: White Test Results

From the figure, it can be seen that the p-value = 0.4085 > 0.05, so the null hypothesis holds, indicating that there is no heteroscedasticity in the random error terms.

Autocorrelation Testing

From the regression model, the Durbin-Watson (DW) value is 1.0815. Given a significance level of $\alpha = 0.05$, the sample size is $n = 30$ and the number of explanatory variables is $k = 2$. According to the table, the lower critical value $dL = 1.284$ is greater than the DW value, indicating positive autocorrelation. This could be due to the model overlooking some important variables, suggesting the need for further testing.

Introduction of Dummy Variables

In 2013, President Xi Jinping introduced collaborative initiatives to establish the "Silk Road Economic Belt" and the "21st Century Maritime Silk Road." By enhancing economic cooperation with countries along the Belt and Road, China promoted trade exchanges and people-to-people exchanges, which provided broader market space for China's services industry in trade. [8] The demand for infrastructure construction, resource development, and industrial upgrading in these countries has provided more opportunities for China's services industry in trade performance. This paper attempts to introduce a dummy variable with 2013 as the turning point. Based on the regression of the logarithm of service trade export volume ($\ln Y$) against the logarithms of GDP ($\ln X_1$), foreign direct investment ($\ln X_3$), and other variables, the following multiple regression model is constructed:

$$\ln Y = \beta_0 + \beta_1 \ln X_{1t} + \beta_2 \ln X_{3t} + \beta_3 D_t + u_t \quad (2)$$

Where

$$D_t = \begin{cases} 1, & \text{if } t > 2013 \\ 0, & \text{if } t \leq 2013 \end{cases}$$

After calculation, the DW value is $1.777 > dU$, indicating that after introducing the dummy variable for the "Belt and Road" policy, the model does not show autocorrelation. Additionally, all explanatory variables in the model are significant at the $\alpha = 0.05$ significance level, meaning the model setting is more reasonable, and the model results are consistent with actual operations.

The final model is:

$$\ln Y = -4.1357 + 0.0819 \ln X_{1t} + 1.4667 \ln X_{3t} + 0.2458 D_t$$
$$R^2 = 0.99, F = 1085, DW = 1.777$$

4. Conclusion

The model above indicates that Gross Domestic Product (GDP) and Foreign Direct Investment (FDI) positively influence the performance of China's trade in services. Meanwhile, the advancement of the 'Belt and Road' initiative is expected to drive continuous improvements in China's trade in services. Moving forward, the nation should gradually ease policies related to Qualified Foreign Institutional Investors (QFII) and Qualified Domestic Institutional Investors (QDII) while strengthening the global standing of the Chinese Yuan to attract increased foreign direct investment. Additionally, it is important to promote the "Belt and Road" trade strategy, fostering mutually beneficial and interconnected economic cooperation among multiple parties.

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