Academic Journal of Management and Social Sciences
ISSN: 2958-4396 | Vol. 9, No. 2, 2024

An Empirical Study on the Factors Influencing the International Competitiveness of Shanghai's Service Trade

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Abstract: In order to analyze the factors affecting the international competitiveness of Shanghai's trade in services, this paper uses VAR model to explore the factors affecting the international competitiveness of Shanghai's trade in services, and finds that the development of trade in goods and investment in scientific research have a greater positive impact on the international competitiveness of Shanghai's trade in services. Finally, the paper puts forward some suggestions for Shanghai to improve the international competitiveness of trade in services, such as increasing investment in scientific research to promote scientific and technological innovation, maintaining investment in infrastructure and continuing to promote economic growth.

Keywords: Trade in Services; International Competitiveness; VAR Model.

1. Introduction

Global economic integration has promoted trade and capital flows between countries, as well as the rapid growth of the world economy. With the deepening of economic globalization, the industrial structure has changed, the proportion of the tertiary industry in the national economy has gradually increased, and the contribution of trade in services to economic growth has also increased. The international competitiveness of trade in services, which is the standard to measure the international competitiveness of a country or region, has gradually become the focus of academic research and policy formulation. with the continuous development of the global economy, the demand and scale of service trade are also expanding. As China's financial center, the international competitiveness of Shanghai's service trade affects the level of China's international competitiveness of service trade. The exploration of the influencing factors of Shanghai's international competitiveness of service trade can provide some reference for the study of regional international competitiveness of service trade.

2. The Current Situation of Service Trade Development in Shanghai

According to the Statistical Yearbook, the development status of Shanghai's trade in services is shown in Figure 1. During the period from 2008 to 2022, the growth rate of Shanghai's trade in services was relatively stable, with an average annual growth rate of 5.71%. In 2022, Shanghai's service trade showed a sustained, stable and rapid development trend. In 2022, the total import and export volume of services in Shanghai reached 245.454 billion US dollars, which was 3.37 times, accounting for 28% of the total service trade in China. In 2022, the export volume and export volume of Shanghai's service trade reached a record high, of which the export volume was 112.18 billion US dollars, 3.5 times that of 2008, an increase of 55.4% over the previous year, accounting for 26.5% of the national service trade export volume, and the import volume was 133.274 billion US dollars, an increase of 45.7% over the previous year. Accounting for 28.7% of the country's service trade imports. Although there is still a certain deficit in Shanghai's service trade, the deficit narrowed to 21.494 billion US dollars, which is 1.15 billion US dollars narrower than previous year. These figures show that the structure of Shanghai's service trade is gradually optimized and its competitiveness is constantly improving.

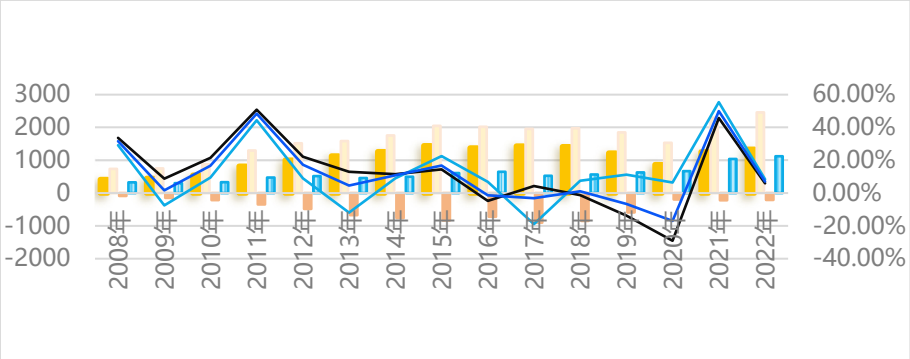


Figure 1. Statistics of Shanghai's service trade from 2008 to 2022

3. An Empirical Analysis of the Factors Influencing the International Competitiveness of Shanghai's Trade in Services

3.1. Variable Selection and Model Construction

3.1.1. Theoretical Basis

The traditional theory of comparative advantage emphasizes that the basis of international trade is the relative difference of production technology (rather than absolute difference) and the resulting difference of relative cost. According to the principle of "choosing the most beneficial and the least harmful", we should concentrate on producing and exporting products with "comparative advantages" and importing products with "comparative disadvantages". According to the theory of national competitive advantage, whether a country's specific industry has international competitiveness depends on six factors: factor conditions, demand conditions, supporting industries and related industries, enterprise strategic structure and competition, opportunities and government.

3.1.2. Selection of Influencing Factors

According to the difference of the scope, mechanism and policy implementation of the influencing factors, the influencing factors of service trade competitiveness are divided into macro and micro levels. Macro factors are variables selected from the whole economic system or national level, which indirectly affect service trade by affecting the overall economic environment; Micro-factors determine the competitiveness of trade in services through variables within the service industry or at the enterprise level, by directly affecting the quality and efficiency of service industry.

According to this division, Yin Feng and Chen Xian (2009) pointed out through time series analysis at the macro level that factors such as GDP, per capita income level, the scale of trade in goods and the openness of trade in services have a positive impact on the competitiveness of trade in services, but compared with developed countries, the development of trade in services in China is relatively backward and the competitiveness of trade in services is poor. Only by supporting the development of modern service industry can we effectively improve the competitiveness of service trade [6]. The research of Sun Shaoyan et al. (2020) shows that the perfection of transport infrastructure directly affects the competitiveness of transport service trade [7]. Liu Dongqiang (2019) and others believe that the openness of financial policy and the support of tourism policy will have an impact on the competitiveness of financial service trade and tourism service trade [8], which indicates that government support and policy orientation will have a direct impact on the competitiveness of service trade. At the internal or enterprise level of the service industry, Xu Zhiyu, Zhang Meng and Ma Yeqing (2018) analyzed the current situation and influencing factors of the international competitiveness of China's service trade from the perspective of the global value chain, and pointed out that the degree of openness of the service industry, the level of agglomeration of the service industry and the level of human capital are the key factors affecting the competitiveness of the service trade [9]. Wang Jiayi (2022) It is believed that increasing investment in scientific research and optimizing the trade system will help to improve the competitiveness of trade in services [10]. This reflects the important role of scientific and technological innovation in enhancing the competitiveness of trade in services. Through qualitative analysis, Wu Bingqing and Xu Shan (2023) pointed out that the cultivation of high-quality talents and the adjustment of trade structure are also key factors to enhance the competitiveness of service trade [11]. These micro-level factors directly affect the quality and efficiency of service industry, and then determine the competitiveness of service trade.

Based on the national competitive advantage model, combined with Wang Xingli (2023) [12] and Zhou Rui (2020)The variable selection method of [13], on the premise of available data, chooses the export volume of service trade instead of the competitiveness of service trade, because the selection of competitiveness index instead of the competitiveness of service trade is single and the calculation method and data sources have certain limitations, while the export volume of service trade can clearly show a country's performance in the service trade market. Relevant data are also easy to obtain and quantify. in addition, the increase in the export volume of service trade means that the quality and competitiveness of a country's service industry is enhanced, so this paper selects the export volume of service trade as the dependent variable to represent the competitiveness level of service trade. According to the national competition model and data availability, trade in goods (GE), per capita gross domestic product (PGDP), investment in science and technology (R & D) and urbanization level (UL) are selected as independent variables.

3.1.3. Model Construction

In order to eliminate the influence of heteroscedasticity, the vector autoregressive expression constructed in this paper is:

$$LnEXt = \beta 0 + \beta 1LnGEt+\beta 2LnPGDP+\beta 3LnR\&Dt+\beta 4LnULt+\varepsilon t$$

β0 is a constant vector, β1 to β4 are the influence coefficients of, LnPGDP, LnRD, and LnUL, εt is the residual term, and t is the number of samples.LnGE

3.2. Empirical Analysis

3.2.1. Unit Root Test

Table 1. Shanghai ADF Test Results

Sequence	P value	Conclusion		Sequence	P value	Conclusion
LnEX	0.0896	It's not smooth		DLnEX	0.0035	Smooth
LnGE	0.1644	It's not smooth		DLnGE	0.0067	Smooth
LnPGDP	0.1738	It's not smooth		DLnPGDP	0.0210	Smooth
LnRD	0.4089	It's not smooth		DLnRD	0.0015	Smooth
LnUL	0.0934	It's not smooth		DLnUL	0.0139	Smooth

Through the stationarity test of time series data on the Eviews13 software platform, it aims to determine whether the

time series contains a unit root, that is, whether it is non-stationary. The test results of the explained variables selected in this paper and the other four explanatory variables are as Table 1.

It can be seen from the ADF test results in Table 1 that LnEX, LnGE, LnPGDP, LnRD and LnUL are all non-stationary series, while they are stationary series after the first difference, which indicates that there may be a cointegration relationship between variables. In order to avoid the endogenous relationship between variables, the cointegration test is carried out.

3.2.2. Cointegration Test

Johansen cointegration test is a method used to test the cointegration relationship between multiple time series. It tests the cointegration relationship between time series by building a vector autoregressive (VAR) model. Firstly, the lag order is determined, and the results are as follows:

Table 2. Determination Results of Shanghai VAR Lag Order

Lag	LogL	LR	FPE	AIC	SC	HQ
0	67.95485	NA	8.56e-11	-8.993550	-8.765315	-9.014677
1	139.2387	85.82922	9.79e-13	-13.65484	-12.20623	-13.58066
2	203.1728	39.95883*	2.95e-14*	-18.52160*	-15.86583*	-18.38561

It can be seen from Table 2 that the optimal lag order of VAR in Shanghai is 2 by using Eviews13 software and LR, FPE, AIC, SC and HQ. The results of cointegration test are as follows:

Table 3. Shanghai VAR Johansen Cointegration Test Results (Characteristic Root Trace Test)

Number of assumed cointegration equation	Eigenvalue	Trace statistics	0.05 critical value	P value
None *	0.096544	149.2495	69.81899	0.0000
Up to one *	0.947338	95.40682	47.85613	0.0000
Up to two *	0.847728	48.30512	29.79707	0.0001
Up to three *	0.635509	18.19172	15.49471	0.0191
At most four	0.119907	2.043646	3.841465	0.1528
Note: * indicates that the null hypothesis is rejected at the 0.05 level				

Table 4. Results of Shanghai VAR Johansen Cointegration Test (Maximum Eigenvalue Test)

Number of assumed cointegration equation	Eigenvalue	Maximum characteristic statistic	0.05 critical value	P value
None *	0.096544	53.84266	33.87687	0.0001
Up to one *	0.947338	47.10170	27.58434	0.0001
Up to two *	0.847728	30.11341	21.13162	0.0021
Up to three *	0.635509	16.14807	14.26460	0.0249
At most four	0.119907	2.043646	3.841465	0.1528
Note: * indicates that the null hypothesis is rejected at the 0.05 level				

It can be seen from the results of Shanghai VAR cointegration test in Table 3 and Table 4 that for the cointegration equation hypothesis "none", "at most one", "at most two" and "at most three", both the trace statistic and the maximum characteristic statistic are greater than 5% critical value, indicating that the hypothesis is rejected. Under the assumption of "at most four", the trace statistics and the maximum eigenvalue statistics are less than critical value of 5%, which cannot be rejected, indicating that there are three cointegration equations in the Shanghai VAR model.

When carrying out Johansen cointegration test, the lag order should be the lag order k-1 of the VAR model. At the same time, with the help of Eviews13, the parameters of the Shanghai VAR model are estimated, and the cointegration equation is obtained after model correction:

$$\begin{gathered}\mathrm{LnEX} = 2.510935\mathrm{LnGE}(-1) - 2.495293\mathrm{LnPGDP}(-1) \\ + 3.289789\mathrm{LnRD}(-1) \\ (0.09179) \qquad (0.28641) \qquad (0.43718) \\ +1.038003\mathrm{LnUL}(-1) + 20.39803 \\ (0.08856)\end{gathered}$$

The results show that when the trade volume of goods in Shanghai increases by 1%, the export volume of service trade will increase by 2. 51%, indicating that the growth of trade in goods has a positive effect on the increase of export volume of service trade. When GDP increases by 1%, the export volume of service trade will decrease by 2.50%, indicating that with the increase of GDP, consumers may change their consumption habits and prefer to buy local services or imported services rather than export services. When the proportion of R & D expenditure in GDP increases by 1%, the export volume of service trade will increase by 3. 29%, which indicates that the increase of R & D expenditure can improve the technical content and added value of service industry, make service trade more attractive in the international market, and thus increase the export volume of service trade. When the government's investment in infrastructure increases by 1%, the export volume of service trade increases by 1. this shows that good infrastructure is conducive to reducing the operating costs of trade in services, improving service efficiency, and attracting more international investment and consumers, thereby increasing the export volume of trade in services.

3.2.3. Variance Decomposition

As the variables in the VAR model are interrelated, variance decomposition can reveal the impact of each shock on the dynamic change of variables. The results of variance decomposition of Shanghai VAR are shown in Table 5:

Table 5. Variance Decomposition of Shanghai VAR

Period	S.E.	LNEX	LNGE	LNPGDP	LNR&D	LNUL
1	0.103362	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.149965	57.75018	0.119697	37.08632	0.094039	4.949796
3	0.181744	52.63660	0.772866	40.94967	0.655628	4.985236
4	0.182164	52.48186	0.790935	41.06131	0.678785	4.987113
5	0.189485	51.39167	1.363510	41.25438	1.264928	4.725513
6	0.191823	50.33004	1.781336	41.99205	1.234276	4.662295
7	0.196472	48.38975	4.597128	41.33402	1.176820	4.502286
8	0.199296	49.67630	4.469385	40.18880	1.286662	4.378857
9	0.202628	49.95208	5.031051	39.24024	1.541737	4.234891
10	0.207661	49.47891	4.912478	39.10779	1.986863	4.513953
Note: The unit of analysis of variance is%.						

It can be seen from Table 5 that the export volume of Shanghai's service trade is not only most affected by its own impact, but also by the impact of per capita GDP, which reached 41.99% in the sixth period, indicating that the forecast variance of Shanghai's export volume of service trade is 41.99% can be predicted by GDP per capita, while the impact of trade in goods, the proportion of scientific research funds to GDP and infrastructure investment is relatively small, but the contribution rate of trade in goods and the proportion of scientific research funds to GDP to the forecast variance of Shanghai's service trade exports is generally increasing, while the contribution rate of infrastructure investment is relatively stable.

4. Conclusion and Recommendations

4.1. Conclusion

With the development of global economic integration, the status of service trade in international trade is rising. This paper analyzes the factors affecting the competitiveness of Shanghai's service trade through vector autoregression model. The results show that: (1) the increase of per capita GDP will have a negative effect on the competitiveness of service trade, which further indicates that the higher the level of economic development, the higher the labor cost. At the same time, the demand for service quality is higher; (2)The development of goods trade, the investment of scientific research funds and the government's investment in infrastructure have a direct positive impact on the competitiveness of Shanghai's trade in services, among which the investment in science and technology has the greatest impact on the competitiveness of trade in services, while the government's investment in infrastructure has the smallest impact, indicating that the investment in scientific research funds can promote technological research and development and innovation. The improvement of urbanization level will bring about the gathering of talents and resources. It will bring greater development potential for trade in services.

4.2. Suggestions on Improving the Competitiveness of Shanghai's Service Trade

(1) Increase investment in scientific research to promote scientific and technological innovation. According to the analysis of the factors affecting competitiveness, the research investment has a positive impact on the annual growth of Shanghai's service trade exports at a rate of 3.29. Therefore, Shanghai needs to continue to increase scientific research expenditure to support scientific and technological innovation, and attract more talents by setting up scholarships to strengthen the training of scientific and technologically innovative talents and providing internship opportunities. Shanghai should also further establish and improve the mechanism and policy system for the transformation of scientific and technological achievements, and strengthen the docking and integration of scientific and technological achievements with the market, so as to transform the achievements of technological innovation into actual productive forces and then produce actual benefits.

(2) Maintain investment in infrastructure. According to the modified equation, we can see that the level of urbanization, that is, the government's investment in infrastructure, affects the annual growth of Shanghai's service trade exports by a ratio of 1. 04, which indicates that infrastructure has a positive impact on the competitiveness of service trade, and the improvement of urbanization level has a positive effect on the development of service trade. Therefore, Shanghai should further expand transportation facilities such as airports, ports, railways and highways, so as to improve transportation efficiency, reduce logistics costs, and provide more convenient logistics channels for trade in services; at the same time, it should also pay attention to improving the service quality in the process of urbanization, so as to provide better environment and conditions for the development of trade in services.

(3) Continue to promote economic growth. According to the empirical results, 41.99% of Shanghai's service trade exports can be predicted by GDP per capita, which shows that there is a positive correlation between Shanghai's service trade exports and GDP per capita. Shanghai can improve the quality and efficiency of economic development by optimizing industrial structure, accelerating industrial innovation and deepening industrial reform, and constantly promote economic development. To provide an economic basis for the development of trade in services.

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