Analysis of the Total Influencing Factors of Imports and Exports in China

-- Based on a Multi Linear Regression Model

Xiaorong Yang , Anan Yan, Yijia Rong

School of Anhui University of Finance and Economics, Bengbu, 233000, China

Abstract

Today, with the deepening development of globalization, trade between countries is continuously strengthened. As far as the national economy is concerned, foreign trade also reflects the level of my country's national economy. Because of economic development, it will give birth to people's demand for some foreign products. More and more trade will reduce the cost of people's living costs, realizing the optimized allocation of resources.In this context, China's total import and export have also increased significantly. This article analyzes the changes in total import and export in the decade of 2012 to 2021. Establish a related model through the use of Eviews software, and then check and correct the model through the relevant inspection method. Finally, the optimal model is obtained to analyze the correlation of the total import and export value of the influencing factors, thereby making suggestions on improving the development of foreign trade.

Keywords

Total Imports and Exports; GDP; Regression Models; Inspection.

1. Introduction

With the end of the 21st century, the total foreign trade has continued to expand, the company's enterprises have continued to go out, and foreign-funded enterprises have continued to come in.My country's international competitiveness has become increasingly competitive. Although the total trade volume is relatively large, my country is currently facing a problem that cannot be ignored, that is, the national consumption of the national consumption has a low contribution to GDP growth, and there is still a trend of decline year by year. The degree of dependence is very serious. In addition, the actual use of foreign investment is relatively small, and the growth rate of total import and export is also declining. Therefore, in order to maintain the stable growth of my country's GDP, improve international competitiveness, and increase foreign trade, it is necessary.

In terms of various reasons, the factors that affect my country's imports and exports development are mainly GDP, fixed investment, and actual use of foreign capital. The per capita disposable income of residents across the country, exchange rates, etc. This article studies and analyzes the impact of the total import and export from these 5 factors to demonstrate their relationship.

2. Literature Review

Yuan Ming et al. (2016) Analysis of the influencing factors of the total import and export in the "Analysis of the Influential Factors of the total import and export of my country's import and export based on the line -based regression model", and established the economics model of parallel data to measure the economics model of parallel data.Finally put forward relevant

suggestions for its influencing factors.[1] Hu Deng (2018) in the "Research on the Factor Factors Influential Factors in Shaanxi in Shaanxi — Based on the Multiple Linear Return Model", by using the multi -linear regression model, the total product value and government fiscal revenue have an important effect on the total influence of import and export.[2]Yu Lining (2022) pointed out in the "Research on the Influence of Macroeconomic Factors on the total import and export trade -based on empirical analysis of Jiangsu Province" that the effects of five macroeconomic factors such as the total investment in fixed assets have on:Fully develop the economy, promote economic growth and foreign trade interactions and stabilize prices, and slow down the two major policy suggestions for economic fluctuations.[3]Sha Jing et al. (2020) In the article "Research on the Factors Affecting Factors of Jiangsu Province's Factors of Exports of Jiangsu Province" from fixed asset investment, total retail sales of social consumer goods, fiscal expenditure, regional productive value, per capita disposable income of urban residents, and RMB per capita residents of residents in cities and towns The six indicators of the US dollar exchange rate studies its influence on the total imports of Jiangsu Province, and the relevant conclusions are obtained through multiple regression analysis in the use of R language.[4]

3. Analysis of Influencing Factors

3.1. GDP

GDP is an important indicator for measuring the level of economic development in a country. With the continuous improvement of my country's total GDP, foreign trade cannot be ignored, so it is an important measure of the total import and export trade.

3.2. Fixed Investment

Investment in fixed assets will promote the adjustment of the domestic industrial structure, improve the level of service, optimize the foreign investment environment, and enhance the international competitiveness of the country.

3.3. The Actual Use of Foreign Capital

More than 60% of the total import and export are brought by foreign investment. If the proportion of foreign investment continues to increase, my country's imports and exports will also steadily expand. Therefore, it is important to actually use the factors of foreign capital.

3.4. Available Income

The per capita disposable income reflects the people's spending power, and to a certain extent, it also represents the overall purchase capacity of the domestic market, which will affect the total import and export trade.

3.5. Exchange Rate

My country has long implemented RMB and US dollar -controlled floating exchange rates, and foreign exchange transactions cannot be performed at will. Although my country's foreign exchange fluctuations are not great, its development is relatively stable, and it can also be analyzed as a influential factor.

4. Variables and Data

4.1. Explanation Variables and Interpretable Variables

X1 -GDP total amount

X2 -Fixed investment/100 million yuan

X3 - actual use of foreign capital/100 million yuan

X4 -per capita disposable income/yuan

X5 -exchange rate/%

Y -The total import and export of goods/100 million yuan

4.2. Related Data of Total Import and Export in China from 2012 to 2021

Table 1. Selected variable data from 2003 to 2022

Year	The total import and export Y/100 million yuan	GDP total amount X1/100 million yuan	Fixed investment X2/100 million yuan	Actual foreign investment X3/100 million yuan	Per capita disposable income X4/yuan	Exchange rate X5/%
2012	244160.2	538580	281,683.80	1,117.16	16510	6.3125
2013	258168.9	592963.2	329,318.30	1,175.86	18311	6.1932
2014	264241.8	643563.1	373,636.90	1,195.62	20167	6.1428
2015	245502.9	688858.2	405,927.70	1,262.67	21966	6.2284
2016	243386.5	746395.1	434,363.50	1,260.01	23821	6.6423
2017	278099.2	832035.9	461,283.70	1,310.35	25974	6.7518
2018	305010.1	919281.1	488,499.40	1,349.66	28228	6.6174
2019	315627.3	986515.2	513,608.30	1,381.35	30733	6.8985
2020	322215.2	1013567	527,270.30	1,443.69	32189	6.8976
2021	391008.5	1143669.7	552,884.20	1,734.83	35128	6.4515

Data Source: National Bureau of Statistics

5. The Establishment and Inspection of the Model

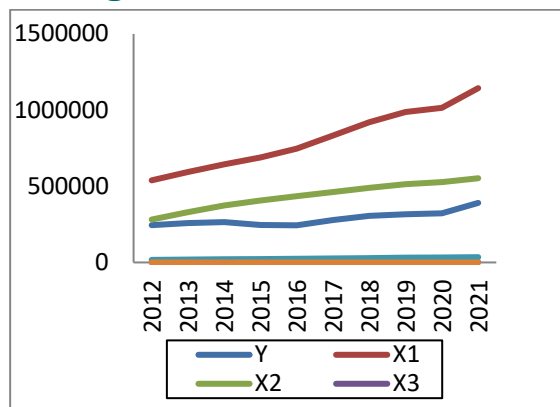## 5.1. Analysis of Related Diagrams and Trend Charts

Figure 1. Trend Chart

From the trend chart, we can see that each interpretation variable is roughly the same as the direction of the interpretation variable change, and the greater the gap, the larger.

The above is the correlation diagram of each interpretation variable and the interpretation variable. As a result, there is a high linear correlation between the first 4 explanation variables and the interpreted variables. Obviously, therefore establish the following linear regression model:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + u$$
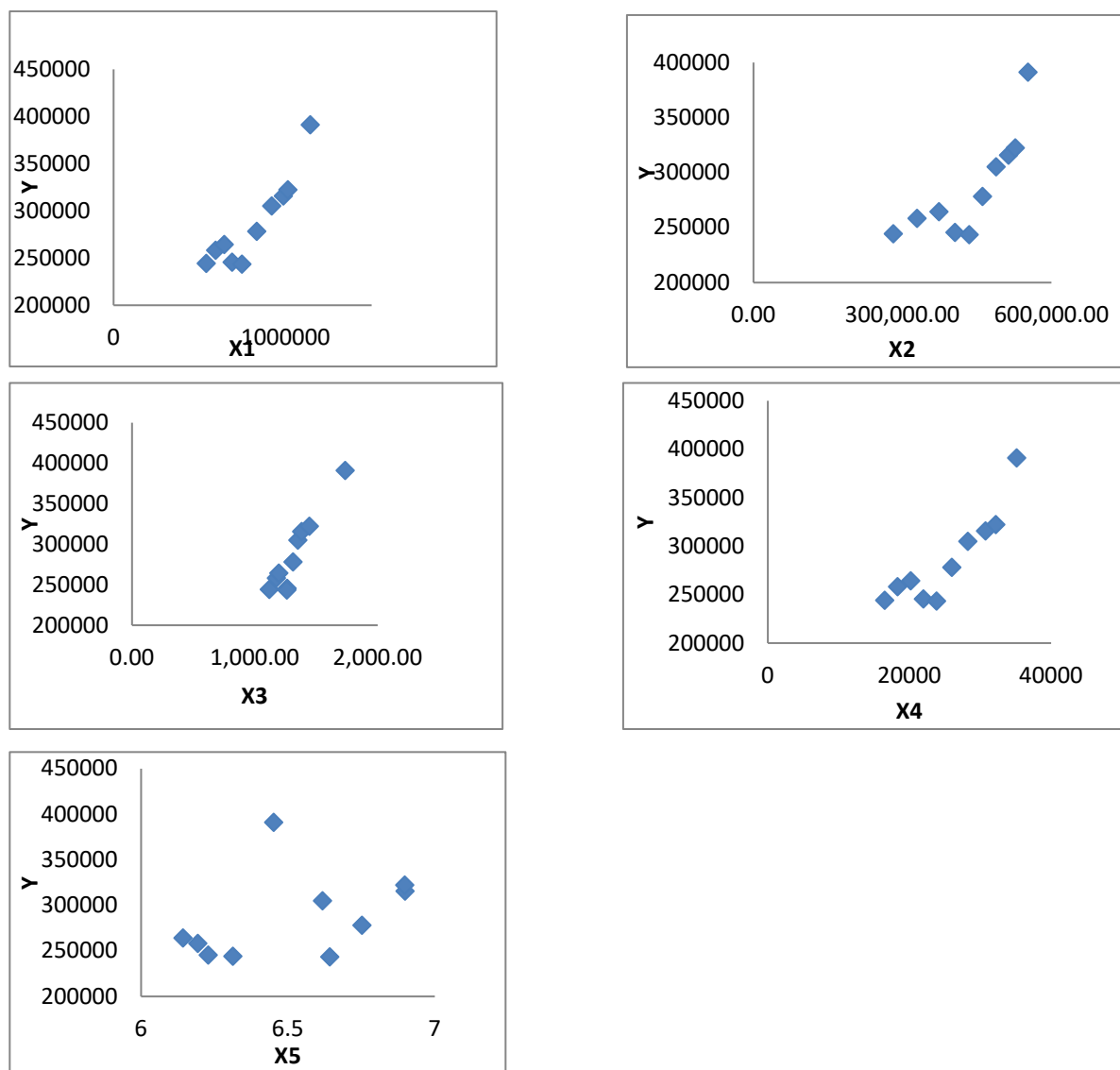
Figure 2. The correlation diagram between the explanation variable and the interpretation variable

5.2. Return Model Analysis

Table 2. Diversity linear regression results

Variable	Coefficient	Std.Error	t-Statistic	Prob
C	507710.9	209678	2.421383	0.0727
X1	0.633019	0.261593	2.419859	0.0728
X2	-0.62621	0.218826	-2.861676	0.0459
X3	-46.49502	87.6753	-0.530309	0.624
X4	-1.866373	11.21518	-0.166415	0.8759
X5	-54003.42	26271.32	-2.055604	0.109

Preliminary estimation of the total import and export model:

$\hat{Y}_i$ =-507710.9000 + 0.6330x1 - 0.6262x2 - 46.4950 x3 - 1.8664x4 -54003.4200x5

R^2 = 0.9867 $\overline{R}^2$ = 0.9701 DW=2.5217 F=59.4858

Based on the model estimation of the fitting advantages of 0.9867 is close to 1, it shows that the fitting superiority of the model is high, and the explanation variable is well explained to the

explanatory variable. When the significant level α=0.05, F=59.4858> 4.05, indicating that the linear relationship of the model is significant, the GDP, fixed investment, actual use of foreign investment amount, the per capita disposable income of residents and the total exchange rate of the RMB against the US dollar exchange rate The influence is significant. When α = 0.05, the statistics of the T statistics of the X3 and X4 are less than 2.015, and the T test failed.

In summary, the model may have problems such as multiple common linearity, heterogeneity, and independence, which require further amendments.

5.3. Merit Economic Inspection

5.3.1. Multiple Common Linear Inspection and Amendments

(1) Related coefficient test

Use EViews9 software, enter the COR X1 X2 X3 X4 X5, and get the result as shown in the figure

Table 3. Related coefficient matrix

	Y	X1	X2	X3	X4	X5
Y	1.000000	0.914740	0.811714	0.947055	0.893937	0.411399
X1	0.914740	1.000000	0.972855	0.931530	0.997934	0.680342
X2	0.811714	0.972855	1.000000	0.869221	0.981489	0.718845
X3	0.947055	0.931530	0.869221	1.000000	0.922594	0.413919
X4	0.893937	0.997934	0.981489	0.922594	1.000000	0.698828
X5	0.411399	0.680342	0.718845	0.413919	0.698828	1.000000

It can be seen from the figure that except for the explanation variable X5, the remaining interpretation variables and the interpretation variables are highly related to the explained variables, of which the minimum value is 0.811714> 0.8, indicating that the model has serious multiple common linearia.

(2) Gradual return law

Table 4. Gradually returning results

Model	X1	X2	X3	X4	X5	R2	$\overline{R}^2$
y=f(x3)			255.3664 (8.3430)			0.8969	0.8682
y=f(x3,x1)	0.0578 (0.7675)		193.584 (2.2401)			0.9049	0.8777
y=f(x3,x2)		-0.0249 (-0.1919)	266.3787 (4.0355)			0.8975	0.8682
y=f(x3,x4)			221.6176 (2.6482)	1.0302 (0.4371)		0.8997	0.871
y=f(x3,x5)			252.7542 (7.0471)		3842.128 (0.1760)	0.8974	0.868

It can be seen from the above-mentioned relationship number matrix that the actual use of foreign investment amount X3 and the explained variable import and export value Y correlation and the strongest correlation, so establish the most basic model of the regression model of actual use of foreign investment amount X3, the rest will be the rest of the rest. The variables introduce the model one by one, analyze it with the EVIEWS software, and get the results as in Table 4.

When the significant level α = 0.05, the equation cannot pass the T test after the X1, X2, X4, and X5 variables are introduced on the basis of the X3 equation. Therefore, the final equation after gradually returning analysis is:

Y = -51138.34 + 255.3664x3

T = (-1.2529) (8.3430)

R^2 =0.8969 $\overline{R}^2$ = 0.88840 DW=1.0512 F=69.6048

Explain that the statistics value of the variable X3 is absolutely greater than 2, indicating that the actual use of foreign capital X3 has a significant impact on the total import and export amount.

5.3.2. Related Inspection and Correction

The BG test is performed on the model. When the stagnation period is 1, nR^2=2.0560 <3.841, prob=0.1516 is greater than the given significant level = 0.05, indicating that the model does not have first -order autocorrelation.

When the stagnation period is 2, nR^2= 5.2210 <5.991, and its p value is 0.0735 greater than a given significant level, and at the significant level = 0.05, the regression coefficient of e_{t-1} and e_{t-2} of statistics are greater than 0.05, indicating that there is no second -order autocorrelation in the model.

5.3.3. Different Difference Test and Correction

When the White test method is adopted, when the significant level = 0.05, R = 1.2060, and the P value is 0.5398, which is greater than the significant level = 0.05, that is, there is no different difference in the regression model.

5.3.4. Economic Significance

In summary, the final model of the influencing factors of the total import and export in my country is:

Y = -51138.34 + 255.3664x3

T = (-1.2529) (8.3430)

R^2 =0.8969 $\overline{R}^2$ = 0.88840 DW=1.0512 F=69.6048

The economic significance of this model is that when the actual use of foreign capital X3 increases 100 million yuan, the total import and export Y will increase by an average of 255.3664 billion yuan.

6. Conclusion and Suggestions

6.1. Improve the Level and Quality of Actual Use of Foreign Capital

As my country enters the stage of high -quality development of foreign trade, while stabilizing foreign capital, we should also continuously improve the level and quality of using foreign capital. Not only should we give discounts in policies, but also to accelerate the implementation of an open system, ensure that foreign companies' preferential treatment in my country, and continuously improve their investment facilitation level. In other words, under the premise of ensuring the introduction of the total foreign capital, it will improve the level of foreign investment, and actively play its important role in optimizing the industrial structure, the transformation and upgrading of consumption, and the continuous high-quality development of foreign trade.

6.2. Improve the Disposable Income of Residents

The disposable income of residents is also one of the major influencing factors of the total import and export. Since the 21st century, my country's economy has developed rapidly, and

the wages of people have improved a certain degree of wages, but compared with developed countries, we still have a large gap. In today's circumstances, the people's life pressure is still high, especially for the younger generation, the pressure of housing car loans has continuously reduced its disposable income, so that there is no great desire for other consumption. Therefore, in order to promote the development of import and export trade, the state must gradually enhance the people's income, thereby driving the people's consumer desires and exerting its positive role in foreign trade.

6.3. Strengthen the Basic Construction of Foreign Trade

Some infrastructure construction of import and export ports has been strengthened, the quality of foreign trade services is improved, and foreign investors are given excellent impression and enjoyment. The government needs to invest a lot of funds to meet the needs of construction. In addition, investors not only attach importance to the product itself, but also value the overall service level of a region. If all aspects of services, after -sales, etc. in the trading area are improved and optimized. The region's trade volume, thereby promoting the prosperity and development of the import and export industry throughout the country.

References

[1] Yuan Ming, Dong Xiaowen, Zhou Lihui. Analysis of the influencing factors of China's total import and export based on the linear regression model [J]. Contemporary economy, 2016 (19): 122-123.

[2] The study of the total influencing factors of the total import and export of Shaanxi-based on the multi-linear regression model [J]. Contemporary economy, 2018 (14): 88-89.

[3] Yu Lining. Study on the total impact of macroeconomic factors on the total amount of import and export trade-Empirical analysis based on Jiangsu Province [J]. Modern Business, 2022 (09): 36-40.

[4] Sha Jing, Yang Yang, Zeng Gongli. The multiple regression analysis of the total factors of the export of Jiangsu Province [J]. Software, 2020,41 (10): 256-259.