

Empirical Analysis of Factors Influencing China's Imports and Exports

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Abstract. Given the dynamic nature of the international trade landscape and China's pivotal role in global trade, there is a compelling need to comprehensively investigate the myriad macro-factors influencing China's imports and exports. This study adopts econometric methods, based on a multiple linear model with fitness test and heteroskedasticity test for a comprehensive examination of diverse macro-factors affecting China's trade. Anticipated outcomes include a nuanced quantitative analysis of macro-factors impacting China's imports and exports, aiding understanding China's position in the global supply chain, offering decision-making insights for relevant industries, governments, and investors. The findings are expected to offer comprehensive and in-depth information for academia and practitioners alike, assisting financial decision-makers, business leaders, and investors in navigating global trade uncertainties and economic fluctuations. By delving into the quantitative impact of diverse macro-factors on China's imports and exports, this study aims to fill existing research gaps, providing substantial insights into the Chinese economy and international trade.

Keywords: import and export trade; exchange rate change; PPI; CPI; GDP.

1. Introduction

In the contemporary economic landscape, China has emerged as a cornerstone in the intricate network of the global supply chain. Its imports and exports have transcended traditional boundaries, assuming a central role in steering the course of international trade. The unprecedented dynamism exhibited by China's economy, coupled with its considerable footprint in the global trade arena, has garnered heightened interest from financial researchers. These scholars are motivated by a collective curiosity to unravel the multifaceted interplay of macro factors that exert influence over the patterns and trends observed in China's imports and exports. This burgeoning significance is underscored by the nation's pivotal role in shaping the dynamics of the interconnected global economy, positioning it as a focal point for in-depth exploration and analysis. In order to seek to enrich this academic discourse, this study embark on an investigation into "Empirical Analysis of Factors Influencing China's Imports and Exports". This research represents a crucial exploration essential for cultivating a nuanced comprehension of China's position within the dynamic and evolving international trade milieu.

China's exports, often considered the powerhouse propelling its economic growth, undergo fluctuations shaped by a myriad of factors. These encompass, but are not restricted to, currency exchange rates, the prevailing global economic conditions, trade policies, and geopolitical dynamics. In contrast, the trajectory of the nation's imports is intricately linked to its domestic demand, production capabilities, and the prevailing conditions within the international market. Historically, inquiries into a nation's imports and exports predominantly centered around the examination of tariff barriers and the identification of the country's comparative advantages. Nevertheless, when delving into the determinants of import and export volumes, there has been a tendency to overlook the dynamic temporal shifts in macroeconomic factors. While tariff barriers and comparative advantages remain focal points, understanding the nuanced impact of changing macroeconomic conditions over time is crucial for a comprehensive analysis of a country's trade dynamics [1]. The ever-evolving macroeconomic landscape within the domestic sphere unquestionably wields a substantial impact on the import and export trade dynamics of China. The intricate shifts and fluctuations in broader

economic factors at the national level play a pivotal role in shaping the trajectory of China's international trade activities [2]. This research employs econometric techniques, utilizing a multiple linear model with fitness and heteroskedasticity tests to quantitatively assess the impact of different macro-factors on China's imports and exports and conduct a thorough analysis of various factors impacting China's trade.

The subsequent sections of this research paper are organized as follows: Section 2 conducts a comprehensive review of pertinent literature, pinpointing existing gaps in knowledge. Section 3 constructs the theoretical framework, elucidating the variables, data sources, and analytical techniques utilized. Moving forward, section 4 unveils the empirical study's results, while the concluding section 5 delves into its implications, encapsulates key findings, offering a synthesis and proposing potential directions for future research.

2. Literature Review

At both domestic and international levels, numerous scholars have studied issues related to the factors affecting imports and exports, but the studies have reached different conclusions.

For the study of factors affecting import and export trade, the primary consideration is the country's exchange rate. According to conventional theory, an appreciation of the local currency will be detrimental to the country's export trade and favourable to the country's import trade, but not vice versa. Shi, on the other hand, selects the monthly import and export volume of China to the United States and the monthly converted exchange rate of the RMB to the US dollar from January 1995 to September 2014 and constructs the VECM model to analyse, and studies the relationship between the balance of payments of China and the United States and the exchange rate, and obtains that the relationship between the volume of exports and the exchange rate is negatively correlated with the exchange rate and persists in the long run, while the relationship between the volume of imports and the exchange rate is positively correlated with the exchange rate, and there is lagged effect, and at the same time the impact is long-lived[4]. Lu used the VAR model to study the impact of bilateral real exchange rate on the export trade structure of China and the United States, and concluded that RMB appreciation is not conducive to the improvement of the technological structure of China and the United States export trade, and the bilateral real exchange rate of China and the United States has a greater impact on the technological structure of China and the United States export trade[5]. Ni systematically analysed the basic situation of RMB exchange rate changes and the development of import and export trade between China and the United States over the past 20 years, establishing that the RMB exchange rate does not have as great an impact on trade between China and the United States as does the economic development of the importing country[6].

In addition to national exchange rates, economists consider other factors such as economic aggregates and terms of trade when studying import and export trade. Geng conducted an empirical study on the long-run equilibrium and short-run dynamics of imports and exports by using China's annual import and export data and price indexes for the period 1951-2004 to conduct cointegration tests and establish an error correction model[7]. Some other studies used multiple linear regression analysis to study the factors affecting China's total import and export trade over different 20-year periods, analysing the impact of several variables on the total amount of imports and exports, establishing econometric models, seeking the quantitative relationship between variables and the total amount of imports and exports, and finally obtaining the similar theories: GDP plays a critical role in the total amount of imports and exports, and tariffs play an indirect pulling role in the total amount of imports and exports[8][9][10].

In another way, many scholars consider political factors such as trade barriers, national differences and relations between the two countries. Chen examined the impact of the establishment of the FTZ on imports, exports and total trade with the help of the classical gravity model, and finds that the less similar the economies of the two countries are, the more the imports of the home country will increase, which means a positive trade effect is achieved[11]. Yuan used comprehensive FGLS analysis to

study the heterogeneous impact of RMB exchange rate imbalance and trade barriers on China's export industry, and found that tariff barriers have a significant negative impact on China's export industry as a whole, and non-tariff barriers have a significant positive impact on China's export industry as a whole[12]. Li summarises the impact of relevant factors on China's import and export trade under the influence of the epidemic, and the results of the empirical analysis show that the country's marketisation process, policies and trade facilitation, Internet penetration, and the development of cross-border e-commerce platforms are important factors affecting China's import and export trade[13].

In summary, although many scholars have previously studied the impact of different factors on China's imports and exports, there are few that take into account the two macro factors of PPI and CPI. In this paper, we will explore the impact of these four variables on China's imports and exports by combining these two factors as well as the US-China exchange rate and GDP.

3. Empirical Analysis

3.1. Selection of Variables

3.1.1. The Explained Variable: the Total Imports and Exports

The total import and export amount is the total amount of all actual imports and exports of goods of a country or region in a certain period of time expressed in currency, i.e. the sum of the total imports of goods and the total exports of goods in the same period of time. Total imports of goods is the total amount of goods imported from abroad during a certain period of time; total exports of goods is the total amount of goods exported abroad during a certain period of time. The total amount of import and export reflects the overall scale and development level of a country or region's foreign trade, and it is an important basis for studying foreign trade exchanges and balance of payments, carrying out economic analyses and decision-making, and carrying out macroeconomic regulation and control, as well as for studying the development of foreign economy and trade and the important information of international economic and trade relations. This refers specifically to China's total imports and exports in a year, in billions of RMB.

3.1.2. The Explanatory Variables

USD/CNY: The choice of the US-China exchange rate as a measure of the RMB exchange rate is based on multiple considerations. As one of the most important exchange rates in the world, the US-China exchange rate not only reflects the relationship between the two economies of China and the United States, but also affects global trade and financial markets. Therefore, it is of great practical and theoretical significance to use the US-China exchange rate to measure the RMB exchange rate. Zhang used the real exchange rate between China and the US as an explanatory variable in his study[13]. Here the average annual exchange rate between the US and China is used, calculated as in the following formula, where $\bar{R}$ is the annual average exchange rate, USD stands for United States dollar, n is the trading day, and r_i is the i th trading day for that currency. In such a calculation, a large value of this variable implies a relative appreciation of the RMB.

$$\bar{R}_{\text{USD}} = \frac{1}{n} (\sum_{i=1}^n r_i) \quad (1)$$

Industrial producer price index (PPI): it is a relative number of changes in the ex-factory and purchased prices of industrially produced goods over a period of time, reflecting the trend and magnitude of changes in the ex-factory and purchased prices of all industrial producers. PPI can reflect the degree of activity of industrial production in China. Industrial production is an important portion of China's economy and has a significant impact on China's export trade. Therefore, the industrial production index can be used as an indicator to reflect the vitality of China's economy, and there is a certain correlation with the total amount of imports and exports.

Consumer price index (CPI):it is a relative measure of changes in the price levels of consumer goods and services over time, reflecting the trend and extent of changes in the price levels of goods and services purchased by residents. First, CPI is directly related to domestic consumption capacity and purchasing power. Changes in the exchange rate of the renminbi have a direct impact on the prices of imported goods, which in turn affects the level of domestic consumption. Therefore, the CPI can be used as an indicator to reflect the consumption situation of the domestic economy, and has a certain correlation with the total amount of imports and exports. Secondly, CPI indirectly affects the competitiveness of export products. Changes in the exchange rate of RMB will affect the domestic production cost and thus the price competitiveness of export commodities. A reasonable consumer price index as a dependent variable can assist in exploring the impact of RMB exchange rate changes on total exports.

Gross Domestic Product (GDP): it is the final result of productive activities of all resident units of a country (or region) over a certain period of time. Considering GDP as a factor, it reflects the overall economic condition of the country and also has a potential impact on trade. This study could reveal the potential link between the RMB exchange rate, economic aggregates and international trade, providing important clues for a deeper understanding of the drivers of foreign trade in the Chinese economy. Emanuel Kohlscheen Zhang et al and Zhao, have already explored similar issues in their studies, providing a reference for research in this area. In this study GDP is measured in billions of RMB[14][15].

3.2. Matching of Data

The explanatory variables of this paper, namely China's total exports and imports in a year, exports and imports, are denoted by $EXIM_t$, EX_t and IM_t , respectively. The explanatory variables, which are the exchange rate between China and the U.S., PPI, CPI, and GDP, are denoted by $rate_t$, PPI_t , CPI_t , and GDP_t , respectively. Considering that the above macro data can well reflect the current import and export and exchange rate situation in China, this paper selects the time series sample interval as the annual data from 2002 to 2022, and the specific data are as follows and all data are sourced from the National Bureau of Statistics of China.

Table 1 Between 2002-2022 China's total exports and imports and the U.S.-China exchange rate and some related factors

YEAR	$EXIM_t$	EX_t	IM_t	$rate_t$	PPI_t	CPI_t	GDP_t
2002	51,378.15	26,947.87	24,430.27	8.2770	121717.40	99.20	97.80
2003	70,483.45	36,287.89	34,195.56	8.2770	137422.00	101.20	102.30
2004	95,539.09	49,103.33	46,435.76	8.2768	161840.20	103.90	106.10
2005	116,921.77	62,648.09	54,273.68	8.1917	187318.90	101.80	104.90
2006	140,974.74	77,597.89	63,376.86	7.9718	219438.50	101.50	103.00
2007	166,924.07	93,627.14	73,296.93	7.6040	270092.30	104.80	103.10
2008	179,921.47	100,394.94	79,526.53	6.9451	319244.60	105.90	106.90
2009	150,648.06	82,029.69	68,618.37	6.8310	348517.70	99.30	94.60
2010	201,722.34	107,022.84	94,699.50	6.7695	412119.30	103.30	105.50
2011	236,401.95	123,240.56	113,161.39	6.4588	487940.20	105.40	106.00
2012	244,160.21	129,359.25	114,800.96	6.3125	538580.00	102.60	98.30
2013	258,168.89	137,131.43	121,037.46	6.1932	592963.20	102.60	98.10
2014	264,241.77	143,883.75	120,358.03	6.1428	643563.10	102.00	98.10
2015	245,502.93	141,166.83	104,336.10	6.2284	688858.20	101.40	94.80
2016	243,386.46	138,419.29	104,967.17	6.6423	746395.10	102.00	98.60
2017	278,099.20	153,309.40	124,789.80	6.7518	832035.90	101.60	106.30
2018	305,010.10	164,128.80	140,881.30	6.6174	919281.10	102.10	103.50
2019	315,627.30	172,373.60	143,253.70	6.8985	986515.20	102.90	99.70
2020	322,215.20	179,278.80	142,936.40	6.8976	1013567.00	102.50	98.20
2021	390,921.67	217,287.38	173,634.29	6.4515	1149237.00	100.90	108.10
2022	420,678.16	239,654.00	181,024.16	6.7261	1210207.20	102.00	104.10

3.3. Descriptive Statistics

Descriptive statistics were carried out after data collection, as shown in Table 2.

Table 2 Descriptive statistics

Variable	EXIM _t	EX _t	IM _t	rate _t	PPI _t	CPI _t	GDP _t
Max	420678.16	239654	181024.16	8.2768	1210207.2	105.9	108.1
Min	51378.15	26947.87	24430.27	8.1917	121717.4	99.2	94.6
Mean	223758.4276	122613.9414	101144.4867	8.23425	570802.5762	102.3285714	101.8095238
Median	243386.46	129359.25	104967.17	8.23425	538580	102	103
Variance	9878229567	3158577886	1886992166	0.003621005	1.20799E+11	2.861142857	17.05090476

Through descriptive analyses, we can see that in the past 21 years, China's imports and exports have grown substantially and with significant fluctuations.

3.4. Benchmark Regression

The US-China exchange rate, PPI, CPI and GDP are all important factors affecting exports and imports. The relationship between them can be explored through benchmark regression analysis. Benchmark regression analyses can help to understand the relationship between these factors and the extent of their impact on exports and imports. Through rational management of exchange rate policy, monetary policy and trade policy, the government can promote the balanced development of exports and imports, thereby achieving stable economic growth.

The OLS method is used here to test the impact of RMB exchange rate fluctuations on China's total import and export volume. In an attempt to reduce the absolute differences between the data and pass the stability test, and assuming the classical line, all data were logarithmized[16].

From Table 3 Correlation coefficient matrix, it can be seen that all the correlation coefficients between the explanatory variables are less than 0.8. The explanatory variables are not highly correlated, and hence there is no multicollinearity.

Table 3 Correlation coefficient matrix

Variables	ln rate _t	ln PPI _t	ln CPI _t	ln GDP _t
ln rate _t	1.000000	-0.820973	-0.118436	0.246930
ln PPI _t	-0.820973	1.000000	0.049164	-0.066646
ln CPI _t	-0.118436	0.049164	1.000000	0.485262
ln GDP _t	0.246930	-0.066646	0.485262	1.000000

Hence, set the linear model:

$$\ln \text{EXIM}_t = \beta_0 + \beta_1 \ln \text{rate}_t + \beta_2 \ln \text{PPI}_t + \beta_3 \ln \text{CPI}_t + \beta_4 \ln \text{GDP}_t + \mu \quad (2)$$

Meanwhile look at the respective impacts of imports and exports separately and construct the following model:

$$\ln \text{EX}_t = \beta_0 + \beta_1 \ln \text{rate}_t + \beta_2 \ln \text{PPI}_t + \beta_3 \ln \text{CPI}_t + \beta_4 \ln \text{GDP}_t + \mu \quad (3)$$

$$\ln \text{IM}_t = \beta_0 + \beta_1 \ln \text{rate}_t + \beta_2 \ln \text{PPI}_t + \beta_3 \ln \text{CPI}_t + \beta_4 \ln \text{GDP}_t + \mu \quad (4)$$

With the same methodology, White test was also conducted for models 2 and 3, and it was found that none of them had heteroscedasticity.

4. Regression Analysis

4.1. Model 1

Firstly regression analysis is conducted for model 1.

$$\ln \text{EXIM}_t = \beta_0 + \beta_1 \ln \text{rate}_t + \beta_2 \ln \text{PPI}_t + \beta_3 \ln \text{CPI}_t + \beta_4 \ln \text{GDP}_t + \mu \quad (5)$$

Table 4 Results of import regression

Variables	Coefficient	Std. Error	T-Statistic	Prob.
Intercept	-19.56802	7.840086	-2.495894	0.0239
$\ln \text{rate}_t$	-0.575653	0.493253	-1.167055	0.2603
$\ln \text{PPI}_t$	0.660187	0.065497	10.07961	0.0000
$\ln \text{CPI}_t$	4.255774	1.906180	2.232620	0.0402
$\ln \text{GDP}_t$	0.991464	0.812192	1.220726	0.2399

Table 5 Regression statistics for model 1

Regression Statistics	
R-squared	0.965640
Adjusted R-squared	0.957050
S.E. of regression	0.113788
Sum squared resid	0.207164
Log likelihood	18.69932
F-statistic	112.4143
Prob(F-statistic)	0.000000

The regression equation has a goodness of fit R-squared of 0.965640, which is close to 1, indicating that the model 1 explains the independent variables well.

The p-values of $\ln \text{rate}_t$ and $\ln \text{GDP}_t$ are more than 0.05, which means that these two variables are not significant, on the contrary, $\ln \text{PPI}_t$ and $\ln \text{CPI}_t$ are significant.

On average, when $\ln \text{PPI}_t$, $\ln \text{CPI}_t$, $\ln \text{GDP}_t$ are constant, $\ln \text{EXIM}_t$ decreases by 0.58% for every 1% increase in $\ln \text{rate}_t$.

When $\ln \text{rate}_t$, $\ln \text{CPI}_t$, $\ln \text{GDP}_t$ are constant, $\ln \text{EXIM}_t$ increases by 0.66% for every 1% increase in $\ln \text{PPI}_t$.

When $\ln \text{rate}_t$, $\ln \text{PPI}_t$, $\ln \text{GDP}_t$ are constant, $\ln \text{EXIM}_t$ increases by 4.26% for every 1% increase in $\ln \text{CPI}_t$.

When $\ln \text{rate}_t$, $\ln \text{PPI}_t$, $\ln \text{CPI}_t$ are constant, $\ln \text{EXIM}_t$ increases by 0.99% for every 1% increase in $\ln \text{GDP}_t$.

4.1.1. Fitness Tests: F-test and T-test

The regression equation is next tested for robustness.

F-test.

Set null hypothesis as follow:

$$H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = 0 \quad (6)$$

Given the significance level $\alpha=0.05$, the critical value of the degrees of freedom of the query are $k-1=4$ and $n-k=16$ in the F-distribution table.

$F = 112.4143 > F_{0.05}(4,16) = 3.06$, reject the original hypothesis, that the regression equation is significant.

Variables $\ln \text{rate}_t$, $\ln \text{PPI}_t$, $\ln \text{CPI}_t$, $\ln \text{GDP}_t$ combined significant influence on $\ln \text{EXIM}_t$.

T-test.

Given $H_0: \beta_j = 0 (j=1,2,3,4)$, the level of significance, the critical value of degrees of freedom $n-k=16$ is obtained $t_{n-k=16}=1.75$ by checking the T-distribution table.

According to the regression results, the T-values are respectively: -2.50, -1.17, 10.08 and 1.22, the absolute values of $\ln \text{PPI}_t$, $\ln \text{CPI}_t$ are greater than $t_{n-k=16}$.

This indicates that at the significance level $\alpha=0.05$ of, that the regression equation is significant.

$\ln \text{PPI}_t$, $\ln \text{CPI}_t$ variable combined significant influence on Y.

4.1.2. Heterogeneity test

Considering the problem of heteroskedasticity, White test was used for model 1 and the data is shown in Table 6. It was found that Prob. Chi-Square(11)=0.0924>0.05 and there is no heteroskedasticity problem. Thus indicating that the present model fits well to the data.

Table 6 Heteroskedasticity: White test

F-statistic	4.172665	Prob. F(11,9)	0.0204
Obs*R-squared	17.55733	Prob. Chi-Square(11)	0.0924
Scaled explained SS	10.85455	Prob. Chi-Square(11)	0.4555

4.2. Model 2

Next, regression analysis is made for Model 2, that is, factors affecting exports.

$$\ln EX_t = \beta_0 + \beta_1 \ln rate_t + \beta_2 \ln PPI_t + \beta_3 \ln CPI_t + \beta_4 \ln GDP_t + \mu \quad (7)$$

Table 7 Results of import regression

Variables	Coefficient	Std. Error	T-Statistic	Prob.
Intercept	-20.94929	8.699165	-2.408195	0.0285
$\ln rate_t$	-0.441016	0.547301	-0.805805	0.4322
$\ln PPI_t$	0.700659	0.072674	9.641111	0.0000
$\ln CPI_t$	4.456882	2.115050	2.107223	0.0512
$\ln GDP_t$	0.786310	0.901188	0.872526	0.3958

Table 8 Regression statistics for model 2

Regression Statistics	
R-squared	0.960550
Adjusted R-squared	0.950678
S.E. of regression	0.126257
Sum squared resid	0.255052
Log likelihood	16.51580
F-statistic	97.39378
Prob(F-statistic)	0.000000

The regression equation has a goodness of fit R-squared of 0.960550, which is close to 1, indicating that the model 2 explains the independent variables well.

Then, using the same methodology as before, it was found that model 2 also passed the fitness test and heterogeneity test. Concluded that variables $\ln rate_t$, $\ln PPI_t$, $\ln CPI_t$, $\ln GDP_t$ combined significant influence on $\ln EX_t$ and the model 2 fits well to the data.

According to the t-statistics, variables $\ln PPI_t$ and $\ln CPI_t$ are significant.

According to the p-values, $\ln PPI_t$ and $\ln CPI_t$ are significant.

On average, when $\ln PPI_t$, $\ln CPI_t$, $\ln GDP_t$ are constant, $\ln EX_t$ decreases by 0.44% for every 1% increase in $\ln rate_t$.

When $\ln rate_t$, $\ln CPI_t$, $\ln GDP_t$ are constant, $\ln EX_t$ increases by 0.70% for every 1% increase in $\ln PPI_t$.

When $\ln rate_t$, $\ln PPI_t$, $\ln GDP_t$ are constant, $\ln EX_t$ increases by 4.46% for every 1% increase in $\ln CPI_t$.

When $\ln rate_t$, $\ln PPI_t$, $\ln CPI_t$ are constant, $\ln EX_t$ increases by 0.79% for every 1% increase in $\ln GDP_t$.

4.3. Model 3

Finally, regression analysis was done in the same way for model 3, which passed the fitness test and heterogeneity test, and concluded that the four independent variables jointly has significant effect on the dependent variable $\ln IM_t$.

$$\ln IM_t = \beta_0 + \beta_1 \ln rate_t + \beta_2 \ln PPI_t + \beta_3 \ln CPI_t + \beta_4 \ln GDP_t + \mu \quad (8)$$

Table 9 Results of import regression

Variables	Coefficient	Std. Error	T-Statistic	Prob.
Intercept	-19.37930	7.450661	-2.601018	0.0193
$\ln rate_t$	-0.738999	0.468752	-1.576523	0.1345
$\ln PPI_t$	0.612056	0.062244	9.833188	0.0000
$\ln CPI_t$	3.998621	1.811498	2.207356	0.0422
$\ln GDP_t$	1.242540	0.771849	-2.601018	0.0193

Table 10 Regression statistics for model 3

Regression Statistics	
R-squared	0.966435
Adjusted R-squared	0.958044
S.E. of regression	0.108136
Sum squared resid	0.187095
Log likelihood	19.76921
F-statistic	115.1727
Prob(F-statistic)	0.000000

The regression equation has a goodness of fit R-squared of 0.966435, which is close to 1, indicating that the model 3 explains the independent variables well.

According to the t-statistics, variables $\ln PPI_t$ and $\ln CPI_t$ are significant.

According to the p-values, $\ln PPI_t$, $\ln CPI_t$ and $\ln GDP_t$ are significant.

On average, when $\ln PPI_t$, $\ln CPI_t$, $\ln GDP_t$ are constant, $\ln IM_t$ decreases by 0.74% for every 1% increase in $\ln rate_t$.

When $\ln rate_t$, $\ln CPI_t$, $\ln GDP_t$ are constant, $\ln IM_t$ increases by 0.61% for every 1% increase in $\ln PPI_t$.

When $\ln rate_t$, $\ln PPI_t$, $\ln GDP_t$ are constant, $\ln IM_t$ increases by 4.00% for every 1% increase in $\ln CPI_t$.

When $\ln rate_t$, $\ln PPI_t$, $\ln CPI_t$ are constant, $\ln IM_t$ increases by 1.24% for every 1% increase in $\ln GDP_t$.

5. Conclusions and Recommendations

Based on the annual time series data of the National Bureau of Statistics of China (NBS) from 2002 to 2022, this paper investigates the impact of different factors on China's imports and exports by multiple linear regression model, fitness test and heteroskedasticity test.

Based on the above survey research and the following Table 11, we can conclude: the impact of RMB exchange rate change on import and export is relatively small, while the impact of PPI and CPI is more significant, followed by GDP, which speculates that foreign supply and demand for industrial products will have a positive impact on China's import and export in a more significant way, and at the same time the total amount of import and export will increase further with the development of the economy and the rise of prices. In addition, the impact of PPI and CPI on imports and exports relies mainly on exports, while GDP relies mainly on imports.

Table 11 Proportional relationship between independent and dependent variables

Variables	$\ln EXIM_t$	$\ln EX_t$	$\ln IM_t$
$\ln rate_t$	-0.44%	-0.44%	-0.74%
$\ln PPI_t$	0.70%**	0.70%**	0.61%**
$\ln CPI_t$	4.46%**	4.46%*	4.00%**
$\ln GDP_t$	0.79%	0.79%*	1.24%*

Note: * intended to be significant, the more * the more significant, based on the t-statistics and p-values in the regression results.

The government should strengthen exchange rate control and maintain the basic stability of the RMB exchange rate at a reasonable equilibrium level. The government should also keep an eye on the movements of the PPI and CPI to ensure that they have a positive impact on the total volume of imports and exports. In addition, it should promote consumption to boost GDP growth and increase imports and exports.

For further research on this topic in the future, one should consider using more data to make the findings more plausible.

Acknowledgements

Thanks to myself who had to struggle with paper revisions during my daytime internship!

References

- [1] Slopek, U. D. EXPORT PRICING AND THE MACROECONOMIC EFFECTS OF US IMPORT TARIFFS. National Institute Economic Review, 2018, 244, R39-R45.
- [2] Jiashu Zhao. The Practical Use of Financial Modelling in Import and Export Trade. The 2022 International Conference on Financial Technology and Business Analysis, 2022.
- [3] Shi Beijia. On the Relationship between the Balance of Payments Situation and Exchange Rates of China and the United States. China Collective Economy, 2015.
- [4] Lu Yuliang. The Influence of RMB Real Exchange Rate on the Technical Structure of Sino-US Export Trade Products. American Journal of Industrial and Business Management, 2018, 8, 1261-1276.
- [5] Ni Yatong. An Empirical Study of the Impact of RMB Exchange Rate Fluctuations on Sino-US Trade. EDP Sciences, 2021.
- [6] Geng Nan. An Empirical Study of China's Import and Export Trade——Based on Cointegration Analysis and Error Correction Models. International Business - Journal of the University of International Business and Economics, 2006.04.003
- [7] Zhang Xiaojing. Empirical analysis of the influencing factors of China's total import and export. China Market, 2016.
- [8] Tian Ruixiu. An Empirical Analysis of Factors Affecting China's Import and Export Trade. Modern Business, 2019.
- [9] Xun Ziyang. Empirical analysis of the factors affecting the total amount of China's trade imports and exports. Journal of Jingdezhen University, 2019.
- [10] Chen Yuanyuan. Factors affecting the trade effects of imports and exports under free trade zones. World Economy Studies, 2010.
- [11] Yuan Luhang. Research on the Heterogeneity of the Impact of RMB Exchange Rate Misalignment and Trade Barriers on China's Export Industry. 2022.
- [12] Li Nan. Research on the factors of China's import and export trade under the background of COVID-19. University of International Business and Economics, 2022.
- [13] Zhang Zhanpeng. Research on the impact of exchange rate changes on China's import and export trade. Sichuan: Southwestern University of Finance and Economics, 2020.

- [14] Emanuel Kohlscheen, Benoît Mojon and Daniel Rees. The macroeconomic spillover effects of the pandemic on the global economy. *Economics*, 2020.
- [15] Jiashu Zhao. The Practical Use of Financial Modelling in Import and Export Trade. *Advances in Economics*, 2023.
- [16] Jin, Y. Y. An empirical analysis of factors influencing China's total import and export trade. *Investment and Entrepreneurship*, 33(08), 38-40, 2022.