The Effect of RMB Exchange Rate Appreciation and Aepreciation on Export

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Abstract. The influence of exchange rates on global trade has long been a topic of significant interest and importance in the field of international economics. Exchange rates play a crucial role in determining the competitiveness of nations in the global marketplace, affecting the costs of imports and exports and shaping the dynamics of international trade flows. China has maintained its position as the world's largest country in goods trade for five consecutive years. At present, research on the impact of changes in the RMB exchange rate on export trade still has the following shortcomings: for the horizontal changes in the RMB exchange rate, current research has not distinguished the heterogeneous effects of RMB exchange rate appreciation and depreciation on exports. Based on that, This article subdivides the changes in exchange rate levels into appreciation and depreciation, this paper constructed a panel model in order to explore the heterogeneous impact of RMB appreciation and depreciation on exports.The study reveals that exchange rate appreciation and depreciation exhibit heterogeneous effects on export scale. In fact, contrary to expectations, exchange rate appreciation, which corresponds to currency depreciation, does not have a stimulating effect on China's export scale. Conversely, exchange rate depreciation, corresponding to currency appreciation, significantly inhibits the export scale.

Keywords: exchange rate depreciation, exchange rate appreciation, export, heterogeneous effects

1   Introduction

The influence of exchange rates on global trade has long been a topic of significant interest and importance in the field of international economics. Exchange rates play a crucial role in determining the competitiveness of nations in the global marketplace, affecting the costs of imports and exports and shaping the dynamics of international trade flows. Understanding the relationship between exchange rates and global trade is essential for policymakers, businesses, and economists alike, as it can provide valuable insights into the drivers and implications of international trade patterns.

Exchange rates serve as the prices at which currencies are exchanged in the foreign exchange market. They reflect the relative values of different currencies and are determined by various factors such as interest rates, inflation rates, political stability, and market forces. Fluctuations in exchange rates can have profound effects on the cost and profitability of international trade transactions. When a country's currency appreciates, its exports become relatively more expensive for foreign buyers, potentially reducing demand and market share. Conversely, a depreciation of the currency can enhance a country's export competitiveness, making its goods and services more attractive to foreign consumers.

The impact of exchange rate movements on global trade is not limited to individual countries but extends to the overall patterns of international commerce. Changes in exchange rates can alter the relative prices of goods and services between countries, influencing the competitiveness of industries and the composition of trade. For instance, a country experiencing a currency depreciation may see a boost in its export-oriented industries, leading to a shift in the structure of its economy. Similarly, changes in exchange rates can influence import volumes by affecting the affordability of foreign goods, thereby influencing domestic production and consumer choices.

The relationship between exchange rates and global trade is complex and multifaceted. It is influenced not only by economic factors but also by political events, investor sentiment, and market expectations. Researchers have employed various methodologies to study this relationship, including empirical analysis, econometric modeling, and case studies. By examining historical data, economists can gain insights into the short-term and long-term effects of exchange rate fluctuations on trade volumes, patterns, and competitiveness.

China has maintained its position as the world's largest country in goods trade for five consecutive years. In the past decade, the continuous leap in the scale of China's

goods trade has fully demonstrated that China is not only a "world factory", but also a "world market". In the past decade, the business entities of foreign trade have increased 1.7 times. In 2022, the total amount of imported and exported goods in China was 630.96 billion US dollars, while the globe is 50.5 trillion US dollars, indicating that China accounts for 12.5% of the global trade.

Based on the mentioned above, this research aims to shed light on the influence of exchange rates on global trade by analyzing the empirical data of China.. By understanding the mechanisms through which exchange rates affect trade, policymakers can make informed decisions to foster economic growth, manage trade imbalances, and enhance international competitiveness. Furthermore, businesses can develop strategies to navigate the challenges and opportunities arising from exchange rate volatility, mitigating risks and capitalizing on favorable currency movements.

2   Literature Review

The impact of fluctuations in exchange rates on exports remains inconclusive, with research subject selection, model settings, and differing measurement standards for exchange rate fluctuations all influencing empirical outcomes. In the case of developed countries, Bredin et al. [1] discovered that exchange rate fluctuations can boost export trade, while Grier and Smallwood [2] concluded that such fluctuations can hinder exports from developed nations. For developing countries, research outcomes exhibit more consistency, as Coric and Pugh [3] suggest that exchange rate fluctuations can suppress exports in these regions.

Goya [4] delves into the intricate dynamics of international trade by examining the relationships between export variety, exchange rate factors, and technological intensity. The study reveals that a weaker exchange rate and lower exchange rate volatility tend to promote export variety, particularly for technologically intensive goods. This review underscores the broader context of these findings within existing trade literature, emphasizing the importance of methodology and the consideration of potential biases for policymakers and practitioners seeking accurate and actionable insights.

Regarding the impact of fluctuations in the RMB exchange rate on exports, research conclusions are relatively consistent. Caglayan et al. [5], Tang [6], and Smallwood [7] all argue that RMB exchange rate fluctuations have suppressed

China's exports. Héricourt and Poncet [8] found that these fluctuations can reduce the export scale of enterprises based on microenterprise data.

Traditional trade theory posits that a depreciation of the domestic currency should lead to lower prices of domestic goods in foreign currencies, enhancing international competitiveness and increasing exports. However, Boyd et al. [9] highlight that while a currency devaluation can boost commodity exports, it may not necessarily increase export values due to declining international commodity prices. Additionally, there may be a time lag in foreign consumer consumption adjustments, resulting in initial export decreases followed by increases after currency depreciation, known as the J-curve effect. Empirically, Ahmed [10] noted that when the real exchange rate of the RMB appreciates relative to Asian developing countries, the regression coefficient of processed goods exports is positive but not significant, suppressing alternative goods exports. Conversely, when the real exchange rate of the RMB appreciates relative to developed countries, both processed goods and alternative exports are significantly negatively affected.

Furthermore, Chen [11] assessed the net trade effect of RMB exchange rate changes, emphasizing two primary effects: the exchange rate level change and exchange rate risk. Empirical analysis focusing on China's agricultural exports to Japan revealed distinctive patterns. Specifically, RMB depreciation against the Japanese yen promoted export growth, while RMB appreciation hindered export performance. Additionally, exchange rate volatility had a positive impact on agricultural exports to Japan, but its influence was considerably smaller compared to exchange rate level changes, resulting in an overall negative net effect on export performance.

However, current research on the impact of RMB exchange rate changes on export trade still has notable limitations. Specifically, existing studies have not sufficiently differentiated the heterogeneous effects of RMB exchange rate appreciation and depreciation on exports. To address this gap, this article divides exchange rate level changes into appreciation and depreciation, constructing a panel model to explore the distinct impact of RMB appreciation and depreciation on exports.

3   The Model and Data

Considering the impact of exchange rate fluctuations, real GDP, FDI, and other factors on exports, the baseline regression model is set as follows:

$$exp_{it} = \alpha + exc_{it} + x_{it} + \varepsilon_{it} \qquad (1)$$

In the model, "i" represents the country and "t" represents time. "exp" represents exports.Since this paper focus on China's exports, exp_{it} is actually the the value of exports to country i.To more accurately capture the impact of variables at that time, this article logarithmically transforms the export amount, represented as "lnexp," in order to quantify its effects. "X" consists of a series of control variables, including real per capita GDP (Similar logarithmic transformation is applied., represented by "lngdp"), FDI (Similar, logarithmic transformation is applied., represented by "lnfdi"), and inflation level (represented by "inf"). "E" represents exchange rate fluctuations and serves as the residual term.

At present, most studies assume that the impact of changes in exchange rate levels on exports is symmetrical, and do not take into account the heterogeneous impact of exchange rate appreciation and depreciation on exports.This study examines the influence of bilateral exchange rate fluctuations on bilateral export trade. To capture this impact accurately, the study distinguishes between exchange rate appreciation and depreciation to obtain precise econometric regression results. To achieve this, the study constructs two variables based on exchange rate data: "adex" for exchange rate appreciation and "dex" for exchange rate depreciation. The construction method for these variables is provided in the given text.

$$adex_{it} = \begin{cases} drer_{it}, drer_{it} > 0 \\ drer_{it}, drer_{it} < 0 \end{cases} \qquad (2)$$

$$dex_{it} = \begin{cases} drer_{it}, drer_{it} < 0 \\ drer_{it}, drer_{it} > 0 \end{cases} \qquad (3)$$

drer represents logarithmic differential of the RMB bilateral exchange rate.

In consideration of data availability, the study selects China's top seven trading partners: the United States, European Union, Japan, South Korea, Australia, the United Kingdom, and Canada. These seven trading partners account for more than 95% of China's total exports. Therefore, analyzing data related to these countries can explain the impact of bilateral exchange rate fluctuations on China's export trade. The study uses quarterly data from 2016 to 2022 for these selected countries.

The export trade data is sourced from China Customs Statistics, which is considered authoritative for China's export trade. The GDP and FDI data for each

country are obtained from the official statistical departments of the respective economies.The descriptive statistics of the variables are shown in Table 1.

Table 1. Descriptive Statistics

Variable	Number of Observation	Mean	Standard Deviation	Min	Max
lnexp	196	15.017	0.878	13.672	16.618
adex	196	0.050	0.095	0.000	0.465
dex	196	-0.058	0.093	-0.620	0.000
lngdp	195	12.501	1.449	9.763	14.844
inf	196	2.277	2.469	-0.933	10.767
lnfdi	148	10.297	2.607	6.667	14.666

4   Empirical Results

Table 2 presents the baseline regression results regarding the impact of exchange rates on exports.In the second column, the univariate test results show that the coefficient for exchange rate appreciation is significantly positive at the 10% significance level, while exchange rate depreciation is negative, aligning with expectations.

Moving to the third column, the addition of one control variable—GDP—does not alter the situation significantly. The coefficient for exchange rate appreciation remains 0.26, still significantly positive at the 10% significance level. The coefficient for exchange rate depreciation becomes -0.28 and is significantly positive at the 5% significance level.

Further incorporating an additional control variable—CPI—into the fourth column results in the coefficient for exchange rate appreciation being 0.17, which is not statistically significant. However, the coefficient for exchange rate depreciation maintains its significance at the 10% level, with a value of -0.28.

The fifth column introduces another control variable—FDI. While the coefficient for exchange rate appreciation is 0.12 and not significant, the coefficient for exchange rate depreciation remains significant at the 5% level with a value of -0.33. These findings indicate that exchange rate appreciation and depreciation exhibit heterogeneity and asymmetric effects on the scale of exports.

Table 2. Regression Results

	Model 1	**Model 2**	**Model 3**	**Model 4**
adex	0.313*	0.259*	0.173	0.115
	(0.182)	(0.153)	(0.141)	(0.152)
dex	-0.382**	-0.282*	-0.278*	-0.334**
	(0.192)	(0.162)	(0.148)	(0.157)
lngdp		2.415***	1.185***	1.165***
		(0.268)	(0.317)	(0.354)
inf			0.040***	0.044***
			(0.007)	(0.008)
lnfdi				-0.054**
				(0.024)
_cons	14.979***	-15.201***	0.087	1.035
	(0.023)	(3.352)	(3.948)	(4.452)
N	196	195	195	148
R-sq	0.025	0.323	0.438	0.411

Standard errors in parentheses, * $p<0.10$, ** $p<0.05$, *** $p<0.01$

5   Conclusion

This paper utilizes bilateral export data from China and exchange rate fluctuation data to construct a fixed-effects model, exploring the influence of the latter on the former. The study reveals that exchange rate appreciation and depreciation exhibit heterogeneous effects on export scale. In fact, contrary to expectations, exchange rate appreciation, which corresponds to currency depreciation, does not have a stimulating effect on China's export scale. Conversely, exchange rate depreciation, corresponding to currency appreciation, significantly inhibits the export scale.

In order to minimize the negative impact of RMB exchange rate fluctuations on exports, it is necessary to accelerate the development of the RMB forward and option markets, stabilize expectations of the RMB exchange rate through the use of financial derivatives, and reduce trade risks caused by exchange rate fluctuations.

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