Dynamic Impacts of RMB Exchange Rate on Chinese Real Estate Sector Index

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ABSTRACT

As China's international influence increases, the influence of the renminbi in the international currency market is increasing. Some scholars have confirmed that to a certain extent there is a linkage between exchange rates and stock prices, but the relationship between exchange rates and the real estate sector is a topic that has not been explored in depth. With the acceleration of economic globalization, more and more international capital is targeting the Chinese real estate market, so the research is meaningful. In the empirical analysis part, this paper selects the data of the Shanghai Stock Exchange Index, the real estate sector index, and the RMB exchange rate against the US dollar within ten years as variables and makes a simple multiple linear regression model. Finally, it is concluded that RMB exchange rate has a significant impact on the real estate sector index at the level of 99.99%+.

Keywords: *Exchange rate; Stock price; Real estate; Multiple linear regression*

1. INTRODUCTION

1.1. Background

Economic globalization is the product of this era, and many significant factors have also been derived from the development of society. Changes in exchange rates are closely related to the trend of economic globalization. Affected by the international economy and national policies, the variability and complexity of exchange rates have gradually increased. As another important factor, stock price is not only one of the mainstream investment methods, but also reflects the situation of the domestic real economy. Studying the correlation between these two factors is very important for understanding international capital markets and macroeconomic conditions. As a mature physical industry, real estate has a great influence on Chinese economic situation. Moreover, China's real estate market has gradually become famous internationally and has attracted many overseas investors. Lu mentioned that Morgan Stanley, Macquarie and other maritime companies have acquired some domestic real estate, including hotels, office buildings [1]. Therefore, the research about the relevance between RMB exchange rate and Chinese real estate sector index has certain significance and importance. This research helps investors make judgments on the stock market, rationally analyze stock price trends, and formulate investment strategies to reduce blind investment.

1.2. Influence Mechanism

In the short period, the rise and fall of RMB exchange rate will produce inflow and outflow of international capital. When RMB appreciates, there will be a net inflow of overseas funds. As the influence of Chinese real estate industry in the world increases, some overseas funds enter Chinese real estate and stock markets through the purchase of real estate or stocks. In the case of "housing speculation fever", the performance increase of real estate companies will be reflected in the stock market as good news. Conversely, if RMB depreciates and there is a net outflow of overseas funds, the opposite situation may occur. According to the Balassa-Samuelson effect, the growth of the country's economic level will affect the growth of the exchange rate. Economic growth is reflected in stock prices. Therefore, the stock price of real estate companies and the exchange rate affect each other

in the short term. However, RMB exchange rate cannot continue to grow indefinitely. When the RMB exchange rate rises to a certain height, people will expect it to fall, and housing prices will be the same. With the interaction of exchange rates, international funds and real estate prices, the three will be in a relatively balanced state.

2. LITERATURE REVIEW

Previous scholars have conducted many empirical studies on the dynamic effects between exchange rates and stock prices and draw some important conclusions, which can provide some theoretical basis for the paper. Ma Liang reckoned that there is a trend of the same rise and fall between the RMB exchange rate and the stock price [2]. Bo Xing through the conclusion, so as to improve the formation mechanism of RMB exchange rate and maintain the stable and healthy development of the stock market put forward constructive suggestions [3]. Yunying Zhu investigated the co-integration relationship between RMB exchange rate and China's stock prices under the combined effects of other factors affecting stock prices and concluded that the RMB exchange rate is negatively correlated with the Shanghai Stock Exchange Index [4]. Further research shows that with the gradual opening of the economic environment, the correlation between exchange rates and stock prices will increase. According to Granger causality test results, Shihan Hu confirmed that the RMB exchange rate has a one-way causal relationship rather than a two-way causal relationship with the stock price, and through establishing VAR model, the RMB exchange rate has a long-term balance relationship with the stock price [5]. Shaoqing Huang came to the following conclusions：exchange rate can influence stock price through various media in the long run [6]. In a short period of time, the effect of exchange rate and media variables on Chinese stock prices is reassuring on different industries. And put forward policy suggestions: deepen the reform of the foreign exchange market, strengthen the construction of the stock market, promote the industrial structure, correctly guide the psychological expectations of investors. Min Zhang thought that the exchange rate of RMB and the stock prices of foreign trade companies show a trend of changes in the same direction [7].

The main goal of this research is to study the dynamic effect of the RMB exchange rate on the real estate industry index. Using Shanghai Composite Index and the central parity of the RMB/USD exchange rate as independent variables, and Chinese A-share real estate sector index as the dependent variable, the dynamic effect of Shanghai Composite Index and exchange rates on the stock price of the real estate companies (the real estate sector index) are studied by the research. Most of the previous scholars' studies were on the effect of exchange rates on stock prices and did not subdivide industries. Therefore, the research direction of this research is

relatively novel, which makes up for the vacancy of this topic. Moreover, many previous studies have fewer samples, and the sample in this study has reached 2,417.

3. DATA

This study contains three variables: Exchange rate, Shanghai Composite Index, real estate sector index.

3.1. Exchange Rate

The exchange rate data in the paper uses central parity of the RMB/USD exchange rate, and uses daily data from August 1, 2011, to July 30, 2021, for research. The data is selected from China Foreign Exchange Trading Center. Hu used the data in previous literature [5].

3.2. Shanghai Composite Index

The paper uses the Shanghai Composite Index of China's A-shares and uses daily data from August 1, 2011, to July 30, 2021. The data is selected from the Wind database. Zhang used the data in previous literature [7].

3.3. Real Estate Sector Index

The paper uses the real estate sector index of China A-shares and uses daily data from August 1, 2011, to July 30, 2021. The data is selected from the Wind database. Chen Xingyu and Chen Jiang used the data in previous literature [8].

4. METHODOLOGY

According to the previous theoretical analysis, it has been analyzed that RMB exchange rate has a direct and indirect influence on the real estate sector index. This study collected 2,417 samples and used quantitative research. Due to the small number of variables, this study uses a multiple linear regression model for empirical research.

Regression formula (1) $RE = a + b_1 EX + b_2 SCI + \varepsilon$

RE stands for the real estate sector index, EX stands for the central parity of the RMB against the US dollar, and SCI stands for the Shanghai Composite Index.

The part of empirical research first performs descriptive statistics on the data, then performs a correlation analysis on the three variables to test the correlation among the three variables, and finally performs multiple linear regression on the three variables to obtain the regression equation. The software used in the experiment is STATA 16.

5. EMPIRICAL RESULT

5.1. Descriptive statistics

Table 1 (descriptive statistics)

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
ex_open	2,417	6.512	0.305	6.093	7.132
ex_max	2,417	6.512	0.305	6.093	7.132
ex_min	2,417	6.512	0.305	6.093	7.132
ex_close	2,417	6.512	0.305	6.093	7.132
sci_open	2,417	2,865	562.9	1,936	5,174
sci_max	2,417	2,888	570.3	1,959	5,178
sci_min	2,417	2,843	553.5	1,850	5,103
sci_close	2,417	2,868	563.7	1,950	5,166
re_open	2,417	5,196	1,508	2,623	10,090
re_max	2,417	5,249	1,525	2,631	10,109
re_min	2,417	5,147	1,488	2,569	9,913
re_close	2,417	5,201	1,508	2,626	10,017

Before carrying out specific empirical analysis, the research first carries out descriptive statistics, and the results are shown in Table 1.

Table 1 show that the maximum, minimum, mean, standard deviation of the exchange rate, SCI, and RE index. The specific values are shown in the table.

5.2. Correlation analysis

Table 2 (correlation analysis)

ex close	sci cl~e	re close	
ex close	1		
sci close	0.266	1	
re close	0.465	0.900	1

The research has done a correlation analysis on the three variables (only the closing price is selected for analysis) to explore the influence of the two variables on the dependent variable and positive and negative correlation between the variables. The specific analysis results are shown in Table 2.

Table 2 shows that the exchange rate is positively correlated with SCI and RE index. The correlation coefficient between the exchange rate and SCI is 0.2658, and the correlation coefficient between the exchange rate and RE index is 0.4650. This shows that the change in the exchange rate has a greater influence on RE index than SCI. However, SCI has the greatest effect on RE index, with a correlation coefficient of 0.8996.

5.3. Regression

Table 3 (regression)

VARIABLES	(1) re_close
ex_close	1,202.171***
	(31.24)

sci_close	2.234***
	(107.30)
Constant	-9,036.327***
	(-37.34)
Observations	2,417
R-squared	0.864
F test	0
r2_a	0.864
F	7677

t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

The research regression re_close on two independent variables, and re_close represents the closing price of the real estate sector index. The specific results are shown in Table 3.

First, Adj R-squared is 0.8641, indicating that our model fits well. The t statistics of sci_close and the ex_close are 31.24 and 107.3 respectively, which shows that the statistics are very significant at the level of 95%. In the regression above, P < 0.0000, so out coefficient is significant at the 99.99%+ level. In addition, the exchange rate and SCI both show positive correlations with RE index. Finally got the formula:

$$Regression\ formula\ (2)\ \ RE = -9036.327 + 1202.171EX + 2.234239SCI$$

6. CONCLUSION

6.1. Empirical analysis results

This article uses descriptive statistics, correlation analysis, and construction of multiple regression model measurement methods. It uses daily data from August 1, 2011, to July 30, 2021, and uses RMB/USD exchange rate and the SCI as independent variables. The real estate sector index is the dependent variable, and a multiple regression model is established to explore the dynamic effect between RMB/USD exchange rate and Chinese stock prices. The empirical conclusions obtained are as follows:

Through correlation analysis, it is found that the correlation between RMB exchange rate and RE index is greater than the correlation between RMB exchange rate and SCI, which shows that RMB exchange rate has a special and significant effect on RE index. Both RMB exchange rate and the SCI have varying degrees of influence on RE index. However, the biggest impact on RE index is SCI.

Through multiple regression analysis, it is found that the model fits well. Both RMB exchange rate and the Shanghai Composite Index have had a significant influence on the real estate sector index, which is considered significant at the 99.99%+ level.

Changes in exchange rates reflect changes in domestic prices and international capital. Stock price is a mirror of the real economy. Any changes in the real industry can be reflected in the stock price. Therefore, the stock market and foreign exchange can reflect the financial market and the real economy. The research in this article confirms that there is a linkage relationship between the two factors.

In the short term, the rise and fall of the RMB exchange rate have caused the inflow and outflow of international capital. The flow of international capital and changes in stock prices affect each other. The rise in the RMB exchange rate has attracted international capital to flow into China's stock market, which has led to the rise of stock prices; the rise in stock prices can also attract international capital inflows, thereby causing the RMB exchange rate to go up.

The long-term results will be different, since the appreciation of the RMB means the overall situation of the domestic economy is getting better, the domestic market has more investment opportunities and considerable returns. International capital wants to obtain excess returns and enter the domestic market through various channels. The real estate industry has become one of the main investment methods of these funds due to its good liquidity and appreciation.

6.2. Recommendation

In fact, China's stock market is extremely complex, with many influencing factors such as changes in economic policies and the occurrence of major social events. Any good or bad news is likely to affect the volatility of stock prices. In addition, inside information and malicious manipulation of stock prices also exist in the Chinese stock market. Therefore, it is difficult to judge the volatility and trend of the stock market only by relying on the research of this article. The following suggestions can build a more stable Chinese stock market

and provide investors with more stable investment opportunities.

1. The government strengthen the cooperation between the China Securities Regulatory Commission and the Central Bank of China and pay attention to the dynamic relationship between the fluctuation of the RMB exchange rate and the fluctuation of the stock price. At the same time, improving the RMB exchange rate formation mechanism can indirectly promote more stable development of China's stock market.

2. The government needs to provide appropriate policy, economic, and legal interventions, implement the conditions of the stock market, and to the greatest extent prevent malicious manipulation of stock prices and other behaviors that undermine market fairness.

3. Strengthen the education of investors' investment philosophy, encourage value investment rather than speculation in pursuit of short-term returns, to reduce the large volatility of China's stock market.

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