

RESEARCH ON THE DYNAMIC RELATIONSHIPS BETWEEN RMB REAL EFFECTIVE

EXCHANGE RATE AND SHANGHAI COMPOSITE INDEX

JIN YING 5917195718

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RESEARCH ON THE DYNAMIC RELATIONSHIPS BETWEEN RMB REAL EFFECTIVE

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Thematic Certificate

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JIN YING

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Advisor

(Dr. Zhang Li)

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FP J

(Associate Professor Dr. Jomphong Mongkhonvanit) Acting Dean, Graduate School of Business Administration Siam University, Bangkok, Thailand

Abstract

 Title:
 Research on the Dynamic Relationships Between RMB Real Effective Exchange Rate and Shanghai Composite Index

 By:
 Mrs. JIN, YING

 Degree:
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 Major:
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Advisor:

(Dr. Zhang Li)

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With deepening economic globalization and increasing uncertainties in the growth of the world economy, there are more substantial linkage effects and far-reaching interactions among the world's economies. The threat of global trade frictions has increased, and financial companies' links between markets are closer than ever. More development opportunities arise, making the linkage between financial sub-markets easier to transfer risks across markets and countries. Therefore, preventing systemic financial risks has become an eternal theme for countries to maintain stable economic development.

China' s financial market is relatively new, and the foreign exchange market and the stock market are essential components. The RMB exchange rate and the stock price index are taken as the prices of these two financial markets, respectively. With the increasing marketization and openness of China' s financial market, the relationship between the two is getting closer and closer, and the forms of risk and the transmission mechanism faced in economic development are increasingly complicated. Therefore, an accurate grasp of the dynamic relationship between the two under the entire macroeconomic system is significant for preventing systemic financial risks and promoting the stable operation of China' s macroeconomics.

Combined with literature and theoretical analysis, this paper selected two core indicators of the RMB real effective exchange rate and the Shanghai Composite Index. It introduced short-term international capital flows and broad money supply as intermediary transmission variables. From June 2001 to June 2019, The monthly data of the above four economic variables were used as research samples. The SVAR model analyzed the internal economic relationship between the variables and characterized the path and proportion affected by the random disturbance interference term. Then, the variables were combined under the SVAR model. The quantile regression method analyzed the heterogeneous effects of exchange rate prices and stock prices at different quantile points.

The empirical research results showed that: (1) There exists a long-term equilibrium relationship between the two core indicators. The two are positively related, and with there is a profound impact of foreign exchange markets on the stock market.

However, this relationship is relatively weak; (2) After the "8.11 New Exchange Reform" in 2015, the short-term effects between these two became more complicated, with asymmetric effects being significant. The impact of the foreign exchange market on the stock market became progressively more flexible; (3) The transmission mechanism between the two core indexes is not smooth enough. The intermediary transmission of international short-term capital flows has become more critical, but the transmission path using the money supply as an intermediary variable is not smooth; (4) The relationship between the two core indicators in China was unstable. The dynamic relationship between the two markets changed in the degree and direction at the high quantile level.

Finally, combined with the research conclusions, this paper put forward some suggestions at the end of the article. The study recommends deepening the reform of the RMB exchange rate mechanism, improving the stock market systems construction, closely monitoring short-term international capital flows, coordinating and coordinating macro-control policies, and guiding

Keywords: RMB Real Effective Exchange Rate, Shanghai Composite Index, Structural Vector Auto Regressions Methodology, Quantile Regression



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Chapter 1 Introduction

1.1 Research Background

The exchange rate is the transaction price of two currencies in the foreign exchange market, which represents the exchange price of the currency with other currencies in the global economic market, and the buying and selling transactions between different currencies are carried out in the foreign exchange market. Exchange rate fluctuations reflect changes in the international purchasing power of relevant currencies, and international purchasing power is affected by the economic fundamentals of the country (region), so exchange rate changes also reflect the trend of a country (region) economic fundamentals. Against the background of the increasingly close political, economic and cultural ties among countries, the vigorous development of the overall world economy, the frequent cross-border transactions and international capital flows, and the increasingly diversified consumer demand for products have all led to a high demand for currency exchange. In order to meet the demand for currency transactions in the foreign exchange market and adapt to the growing international economic transaction volume, the currency exchange policies of various countries (regions) have been adjusted and relaxed accordingly. ground conduction.

The stock market is an important channel for investors to raise funds. Generally speaking, the prosperity of the stock market reflects the good economic status of the country (region). The stock price index in the stock market is regarded as a "barometer" of the national economy, reflecting the overall price level of the stock market. This indicator is sensitive to various changes and important information in the real economy.

The further opening of the capital market also makes the stock market price fluctuations not only affected by internal factors, but also the financial market fluctuations in developed countries (regions) will also affect the stock market through the foreign exchange market. In the context of deepening economic globalization, the world economies have stronger linkage effects and far-reaching interactive influences, which increases the uncertainty of world economic growth and strengthens the threat of global trade frictions. The linkages between the various financial submarkets are closer than ever, showing increasingly obvious linkage effects. As an important part of the financial market, the foreign exchange market and the stock market have gradually attracted people's attention.

Judging from the actual situation in China, after the split share reform and the reform of the exchange rate system, the foreign exchange market and the stock market show a close relationship when special events or changes in the economic situation occur, and the linkage between the prices of the two markets becomes more and more It has become stronger and stronger, and it has shown a trend of synchronous changes many times. After the split share structure and the reform of the exchange rate system in 2005, the RMB exchange rate and stock price determination mechanism became more market-oriented. After that, the RMB exchange rate against the US dollar continued to rise, and the Shanghai Composite Index also rose nearly 6 times in just two years., reached an all-time high of 6092.06 on October 6, 2007. Later, due to the impact of the global financial crisis caused by the subprime mortgage crisis in the United States, the appreciation trend of the RMB stopped, and the Shanghai Composite Index fell sharply to below 3,000 points. In June 2010, affected by the improvement of domestic and foreign economic conditions, the central bank further enhanced the flexibility of the RMB exchange rate, and the RMB appreciated steadily in the following year. During the same period, the Shanghai Composite Index rose slightly. August 11, 2015 (referred to as "8.11 New Exchange Reform") is a landmark reform of the RMB exchange rate system. The RMB exchange rate is no longer closely pegged to the US dollar, and gradually turns to refer to a basket of currencies. The intermediate quotation mechanism can better reflect the current period. The real supply and demand relationship in the foreign exchange market. Within a few days after the implementation of the "8.11 New Exchange Rate Reform", the RMB exchange rate and the Shanghai Composite Index showed a clear downward trend at the same time. After the shock period brought about by the reform of the exchange rate system, although the RMB is still in the depreciation channel, the stock index has shown a slight upward trend. Until May 2017, after the introduction of the counter-cyclical factor into the USD/RMB quotation mechanism, the divergence between the exchange rate and the stock index did not end. From February 2019, the RMB appreciated by nearly 8%, and the Shanghai Composite Index also showed that an upward trend. From the above historical practice of foreign exchange market and stock market, it can be preliminarily recognized that there should be some inherent

dynamic relationship between the two markets in China. It is based on this background, this paper uses the real effective exchange rate of RMB and the Shanghai Composite Index as the price representatives of China's foreign exchange market and stock market respectively, trying to explore the internal logic of changes between the two to clarify the dynamic relationship between the two cities in China. Conduction mechanism.

1.2 Research objective

After the split of shareholding and the reform of the exchange rate system in 2005, China's exchange rate system and stock market system have been maturing, and the mechanism for determining the RMB exchange rate and stock price has gradually returned to marketization. The real supply and demand relationship in the market can be better reflected; the implementation of the registration system in the Securities Law revised in 2019 will also promote the further marketization of China's financial market. With the continuous improvement of the marketization and openness of China's financial market, the risk forms and transmission mechanisms faced by China's economic development are also more complicated. The research on the dynamic relationship between the RMB exchange rate and the stock index should always be the focus of attention.

Based on the findings and deficiencies in the research process of this paper, future related research can use nonlinear models to examine the dynamic relationship between exchange rates and stock indexes under the condition that the research samples are further enriched. The transmission effect of intermediary variables on exchange rate and stock price. At the same time, since the "8.11 new exchange rate reform" in 2015 had a significant impact on the dynamic relationship between the two cities, the rationality of the time window proposed by the exchange rate reform system is also an aspect worthy of in-depth study. In addition, there is almost no existing theory at home and abroad that can fully explain the complex relationship between China's stock market and foreign exchange market, including the research in this paper, which is only based on the support of classical theories.

At present, most of the domestic literature is based on the existing theoretical basis of foreign countries, and the research on the linkage relationship between

domestic markets is carried out by drawing on foreign research results on the relationship between the two cities. In the future, Chinese scholars can summarize and sort out the theoretical particularity of the relationship between the two cities in China through in-depth empirical and theoretical research, and make up for the gap in China's theoretical contribution to the relationship between the foreign exchange market and the stock market. This is a very worthwhile direction. At the same time, it is also possible to study the interaction between the foreign exchange market and stock market in China and the United States, and make a scientific evaluation of the development of the financial markets of the two countries from the perspective of data facts.

1.3 Research problem

Taking RMB real effective exchange rate as the price representative of China's foreign exchange market and Shanghai Composite Index as the price representative of the stock market, this paper introduces relevant intermediary variables to study the dynamic relationship between China's foreign exchange market and the stock market. This to promote the coordinated development of the health of our economy as a whole have important significance, on the macro to guarantee efficient capital circulation, improve the financial market reform, and promote financial stability and prevent systemic financial risks, on the microscopic help investors correctly understand the relationship between market, form a scientific investment idea, put forward the following question.

1. How to promote the deepening of financial reform, capital market development and RMB internationalization under the complex financial environment?

2. How to accurately grasp the dynamic relationship between foreign exchange market and stock market?

3. How to prevent systemic risks and promote sound ecological interaction of financial sub-markets?

1.4 Research significance

Against the background of the further opening of China's economic market and the increasingly diversified role of the RMB, the internationalization of the RMB has also attracted more and more attention from countries around the world. In 2016, the RMB was included in the Special Drawing Rights (SDR) currency basket and became the only emerging economy currency among the SDR currencies. This was a milestone in the internationalization of the RMB, and the status of the RMB in the international monetary system was further enhanced. According to the data released by the Society for Worldwide Interbank Financial Telecommunication (SWIFT) in 2018, the RMB has become the world's fifth most important international payment currency and the "currency anchor" of many other currencies1. Fluctuations in the RMB exchange rate often cause price fluctuations in other currencies. (Fratzscher & Mehl, 2014). For a long time, the issue of the RMB exchange rate has been criticized internationally. Some countries believe that the RMB is highly manipulated by the Chinese government and claim that it has seriously harmed their interests. However, a statement by the International Monetary Fund in August 2019 directly refuted this view, emphasizing that the RMB exchange rate was a good reflection of China's economic fundamentals, consistent with China's economic fundamentals as a whole, effectively refuting " exchange rate manipulation".

The continuous improvement of the international status of the renminbi makes the renminbi play an increasingly important role in international trade. Combined with the current situation of China's export-oriented economic development and the fact that the renminbi is under pressure of depreciation expectations, the fluctuation of the renminbi exchange rate is closely related to the The importance of the relationship between financial markets cannot be overemphasized. Inevitably, in the process of promoting RMB internationalization and further opening up the economy, it will bring greater exchange rate risks and affect China's stock market through transmission mechanisms; similarly, strong fluctuations in the stock market will also have an impact on the foreign exchange market. , a stock market with stable prices and clear transactions is a stabilizer to maintain the healthy operation of the financial market. At present, China is gradually promoting the opening of the financial market. International capital flows in and out frequently, and the linkage between the two markets is strengthened. The role of exchange rate and stock price in China's economic transformation is very critical.

With the deepening of China's financial reform and opening up and the continuous improvement of the international status of the RMB, the financial market is also facing more complicated risk situations. If the pessimism in the market spreads or is exploited, and the acceleration of international capital, it may affect the entire country in China. The economic market has had a more serious impact. If the linkage between the RMB exchange rate and the stock price index produces large-scale unreasonable and abnormal fluctuations, which are transmitted to other financial sub-markets, China's financial market will be exposed to huge risks, and even cause systemic financial risks and lead to financial crises. Therefore, the coordinated and orderly development between the foreign exchange market and the stock market plays a very important role in the development environment of China's economic and financial markets. As early as the Fifth National Financial Work Conference, the deepening of the reform of the RMB formation mechanism and the prevention of systemic financial risks are the key to Emphasized emphasis.

In the face of the complex financial environment crisscrossing the international and domestic markets, how to accurately grasp the dynamics between the foreign exchange market and the stock market, two very crucial financial sub-markets, in the process of deepening financial reform, capital market opening and RMB internationalization Contact is a key issue for preventing systemic risks and promoting the formation of benign ecological interactions among financial sub-markets.

Therefore, this paper takes the real effective exchange rate of RMB as the price representative of China's foreign exchange market, and the Shanghai Composite Index as the price representative of the stock market, introduces relevant intermediary variables, and conducts research on the dynamic relationship between China's foreign exchange market and the stock market. This is of great significance to promoting the healthy and coordinated development of China's overall economy. On the macro level, it is conducive to ensuring the effective circulation of capital, improving financial market reform, promoting financial stability and preventing systemic financial risks. On the micro level, it is helpful for investors to correctly Understand the connection between markets and form a scientific investment concept.

Chapter 2 literature Review

2.1 Stock orientation model

The capital market in developed countries developed earlier, and the market mechanism is relatively mature. Foreign scholars have carried out research on the dynamic relationship between the foreign exchange market and the stock market earlier, and have formed a series of mature theoretical results. Two dominant theories of dynamic correlation with stock prices. The flow-oriented model proposed by Dornbusch and Fisher (1980) focuses on microeconomic analysis, emphasizing the role of the current account or trade balance. The model considers a negative relationship between exchange rates and stock prices, with the former being the Granger factor of the latter. Exchange rate changes will affect the international competitiveness of a country's products, and then affect the country's import and export trade and domestic macroeconomics, and ultimately change stock prices. The process of causing changes is reflected in capital flows rather than capital accounts. For example, when the domestic currency depreciates, the relevant enterprises gain a more favorable comparative advantage in the international market, and their products are more attractive, which will lead to a corresponding increase in the country's exports, which will have a positive impact on the future cash flow of the enterprise, and ultimately cause stock prices to rise.

Frankel and Branson (1983) proposed the stock-oriented model (also known as the stock-oriented model), emphasizing the importance of capital and financial accounts, and analyzing the relationship between the two from the macro level. The model believes that changes in the supply and demand of currencies in the market will cause changes in the relevant exchange rates. Stocks, on the other hand, are a form of wealth that is affected by the demand for money and the exchange rate, which is determined by market mechanisms, is similar to the price of assets such as commodities and bonds. Rising stock prices will cause foreign capital inflows, which will increase the demand for the currency, that is, rising stock prices will lead to currency appreciation through direct and indirect channels. Branson and Henderson (1985) enriched this theory by proposing a portfolio balance model, which holds that exchange rates have a significant impact on balancing complex financial markets, with stocks as an asset, if exchange rates fluctuate significantly, investors will adjust them The asset portfolio allocation will further affect the price of the stock, that is, under the direct quotation method, the exchange rate will have a negative impact on the stock price. Morales and Sosvilla (2018) used two theoretical methods to analyze the relationship between exchange rates and stock prices. The results showed that under the flow-oriented model, the two were positively correlated, while under the stock-oriented model, the a negative relationship.

In terms of empirical research, foreign scholars have discussed a lot about the relationship between the foreign exchange market and the stock market. Although the empirical models used are different, the conclusions of the empirical research on the transmission mechanism and direction of influence between the two markets are not the same, but most scholars believe that the relationship between the two markets is not the same. There is indeed a mutual influence relationship. Dumas and Solnik (1995) found a significant correlation between the U.S. dollar value and U.S. stock market returns. Gradeazabal et al. (1997) found strong evidence to support the conclusion that there is a cointegration relationship between the sample exchange rate and its own economic fundamentals by studying some currencies, such as the British pound and the Deutsche mark. Ong and Izan (1999) used the least squares method to test the relationship between exchange rate and stock price, and the results showed that there is a weak correlation between the two. If a country's currency depreciates, the stock return in the country's stock market will increase. Yang and Doong (2004) concluded from data analysis of G-7 countries that changes in stock prices have an impact on future exchange rates, but exchange rate changes have relatively little impact on future stock price changes. Ming-Shium et al. (2007) used the data of seven countries (or regions) before and after the Asian financial crisis in 1997 to conduct an empirical study on the relationship between the two cities, and found that the seven research objects had the linkage relationship between the two cities before and after the crisis. There are large differences, for example, the exchange rates of Hong Kong, Japan, Malaysia and Thailand were correlated with the stock market before the crisis, and the correlation disappeared after the financial crisis. Tian and Hamori (2016) used a time-varying structure vector autoregressive model with stochastic volatility, and by studying the transmission mechanism of financial shocks in the US foreign exchange, stock, bond and commodity markets, they concluded that the dynamic changes of

volatility spillovers change significantly over time. in conclusion. Sheng-ping (2017) used monetary policy as an intermediary variable to analyze the impact of the dynamic relationship between exchange rates and stock prices on the market in small open economies. The results of the study of monthly data from 1999 to 2016 showed that the relationship between these three indicators The mechanism is very complex. Stock price and exchange rate are related to the other two variables, but the degree of correlation varies greatly with different time and regions.

Contrary to the positive attitude of most scholars on the linkage between the foreign exchange market and the stock market, some foreign scholars believe that there is no long-term equilibrium relationship between the two. Jorion (1990), by studying dollar value and stock returns, concluded that there is no significant relationship between these two variables. Chow (1997) also analyzed the US dollar real exchange rate return and stock return, and obtained a similar conclusion that there is no connection between the two by studying monthly data from 1985 to 1995. Tabak (2006), in his research on the relationship between the Brazilian foreign exchange market and the stock market, came to the conclusion that there is no long-term equilibrium relationship between the two markets.

Foreign scholars' research on the relationship between China's foreign exchange market and the stock market has also yielded mixed results. Ho and Huang (2015) explored the causal relationship between China's exchange rate and stock price index, arguing that the relationship between the two may change with the change of the exchange rate system, because the change of the exchange rate system will affect the international trade volume and the The investment climate has an impact on factors such as money demand and capital flows. Liu and Wang (2012) believed that there is no long-term equilibrium relationship between exchange rates and stock prices by studying the linkage between the Shanghai stock market and the RMB foreign exchange rate reform has both advantages and disadvantages, namely that the efficiency of the RMB foreign exchange market has increased but the link between the onshore and offshore markets has weakened.

2.2 Reform of non-tradable shares in China

Combined with the development history of China's capital and financial markets, it is not difficult to find that before the reform of the exchange rate system in 2005, China implemented a fixed exchange rate system pegged to the US dollar. Under the control, it is easy to hide some economic laws. Scholars pay less attention to the dynamic relationship between the two markets or have not obtained valuable research results, and there are few related research results. After 2005, the relationship between the two cities began to receive attention. After China's share-trading reform in 2007, the dynamic relationship between the two cities was gradually valued by scholars, and related research began to emerge. In 2015, the "8.11 New Exchange Reform" The People's Bank of China initiated the reform of the new RMB exchange rate quotation mechanism. China began to implement the central parity rate of RMB against the US dollar. The new round of reform of the RMB exchange rate system is based on market supply and demand and refers to a basket of currencies. Managed floating exchange rate regime. From the perspective of the improvement of the exchange rate system, the floating range of the RMB exchange rate has gradually expanded. This policy adjustment has brought the RMB exchange rate formation mechanism closer to the market interest rate level and better reflects the real supply and demand situation in the foreign exchange market at that time. Since then, a large number of scholars have conducted empirical research on the dynamic relationship between the two markets using different methods, and they have come to different conclusions.

In terms of theoretical research, domestic scholars have mainly explored the channels of interaction between China's foreign exchange market and the stock market by learning from more mature foreign theories. Yao Zheng (1994) believed that changes in the RMB exchange rate would affect the fundamental economic aspects of a country, and affect stock prices by affecting the liquidity of the stock market and the profitability of listed companies. Liu Ganzhou (2006) found that interest rates, import and export trade, money supply, psychological expectations and other factors played an important role by discussing the process of the relationship between the two cities. Zhang Jingsi (2013), based on micro-theories, constructed a three-variable theoretical model by using the risk-reward factors of short-term international capital flows, and carried out research from both theoretical and empirical aspects.

In terms of empirical research, domestic scholars have different sample intervals,

empirical methods and variable selections when discussing the dynamic relationship between the two cities, resulting in different research results. Similarly, most scholars believe that there is a certain influence relationship between the foreign exchange market and the stock market. Zhu Xinrong and Zhu Zhenyuan (2008) analyzed the relationship between the RMB exchange rate against the US dollar and China's stock market price, and found that there is a negative correlation between the two, which is consistent with the conclusion of Ajaya and Mougoue (1996). In addition, Chen Yanyun and He Weida (2006) ARCH model tested the daily data from 2001 to 2005, and obtained GARCH and EGARCH models, the results showed that there is a significant positive correlation between these two markets. Zhao Jinwen and Zhang Jingsi (2013) studied the data after the reform of the exchange rate system in 2005 and found that the impact of the RMB exchange rate on stock prices during the global financial crisis was significantly greater than that during the non-financial crisis period. The research of Qiao Ningning (2017) shows that after the reform in 2015, the stock market and the foreign exchange market are more closely linked. Leng Song and Tian Gang (2017) analyzed the impact of RMB exchange rate and interest rate on China's stock market by using monthly data after the "8.11 new exchange rate reform", and found that there is a non-uniform relationship between variables. Wang Xueying (2018), through the research on the RMB exchange rate index and the liquidity of the Shanghai and Shenzhen stock exchanges, found that there is a cross-link between the RMB exchange rate index and stock market liquidity, showing strong positive sustainability.

The empirical research conclusions of a small number of domestic scholars and some foreign scholars also support that there is no long-term stable equilibrium relationship between the two. Ba Shusong and Yan Min (2009) support the conclusion that there is no long-term stable equilibrium relationship between China's stock market and foreign exchange market by studying the dynamic relationship between the two cities in China. Li Xiangyu and Wang Lingya (2013)) also came to the same conclusion.

In the study of foreign exchange and stock market, the relationship between the two and other financial submarkets has not been ignored. Guo Yanan and Sun Kai (2018) analyzed the nominal exchange rate of RMB against the U.S. dollar, stock prices and China's short-term international capital flows, and found that stock prices will affect short-term international capital flows and have no significant correlation with the RMB exchange rate, short-term international capital flows and other

macroeconomic There is a positive correlation between the indicators. Yu Naishu and Yu Pengtu (2018) came to the conclusion that there is a long-term equilibrium cointegration relationship between exchange rate and stock price by studying the relationship between RMB exchange rate changes and the stock market and industry composite index, and stock price changes are always a single factor of exchange rate changes. For Granger reasons, the relationship between exchange rates and industry indices varies across industries.

2.3 SVAR model

Whether using theoretical, empirical or a combination of the two methods, many domestic and foreign studies have conducted in-depth analysis of the dynamic relationship between the foreign exchange market and the stock market. Judging from the research conclusions of domestic and foreign scholars on the dynamic relationship between the foreign exchange market and the stock market, most scholars agree that there is a certain mutual influence between the two. The degree of linkage influence between the two cities is different due to the degree of economic development, the degree of market openness and other reasons. Different conclusions may also be generated when affected by some key events. The research methods and sample intervals selected in the empirical research will also be different. produce different research results.

The capital market development of foreign developed countries is relatively mature. Foreign scholars have studied the relationship between the two cities earlier and have formed a series of rich theoretical results. The main reason is that developed countries implemented a floating exchange rate system earlier, and the operating mechanism of the capital market has also It is relatively complete, and the connection and influence mechanism between exchange rate and stock price is relatively clear. After the Asian financial crisis, foreign scholars began to pay attention to the relationship between the two cities in emerging countries, but they still focused on the analysis of countries with more mature financial markets. There were few studies on emerging countries, and most of them focused on theoretical models, ignoring exchange rate and The particularity of stock prices, such as the impact of the reform of the exchange rate system and the difference in the scale of foreign trade. In terms of theory, domestic research mostly draws on the existing classic theories abroad, and conducts empirical research on the channels and linkages of the interaction between China's foreign exchange market and the stock market. Regulated by the government, the relationship between the exchange rate and the stock index is not as obvious as in the developed Western countries. The exchange rate reform and share-trading reform in 2005 made the capital market further open. The exchange rate system is relatively flexible. After the "8.11 New Exchange Reform" in 2015, the linkage between the foreign exchange market and the stock market has increased. After that, research on the relationship between the two cities in China has gradually increased. Relevant research has gradually emerged.

Through the research of domestic and foreign literatures, we can see that fruitful results have been achieved on the relationship between the foreign exchange market and the stock market. It is preliminarily believed that there is a certain correlation between the changes of the two markets. However, the research on the relationship between the two cities in China is not comprehensive enough. According to the characteristics of different eras and research purposes, researchers will have huge differences in the selection of sample intervals. Most of the research only focuses on the two indicators of exchange rate and stock price in a certain period, or from one of the short-term international capital flows. From the perspective of argumentation, there are few studies on how the exchange rate and stock index changes are transmitted in the entire macroeconomic system, and there is no unified conclusion on the relationship between the two.

Combining the research results and shortcomings of scholars at home and abroad, this paper introduces two intermediary transmission variables of short-term international capital flow and broad money supply based on the theory of transmission mechanism between exchange rate and stock index, and uses SVAR model and quantile regression model to analyze exchange rate. Carry out dynamic research on the internal economic relationship between stock indexes in the whole macroeconomic system. In the sample interval, the interval length of 18 years from June 2001 to June 2019 is selected. During this period, China has experienced the reform of the exchange rate system in 2005 and 2015, as well as China's accession to the WTO, the financial crisis, the Fed's interest rate hike, and the Belt and Road Initiative. This article aims to explore the dynamic relationship between China's RMB exchange rate and the stock index as comprehensively as possible.

Chapter 3 Research Methodology

3.1 Literature review method

By reading and studying a large number of existing literature and materials on the relationship between exchange rates and stock indexes, summarizing and sorting out the existing research results, in-depth understanding of the research status and development of this issue at home and abroad, and extracting theories suitable for clarifying the research content of this paper It lays a theoretical foundation for the construction of models in empirical research. It further summarizes and compares relevant theoretical achievements, and selects economic indicators and empirical models based on the characteristics of China's financial market, and selects appropriate economic indicators and empirical models to ensure the rigor of the article's analysis.

3.2 Empirical analysis

In the following two theories of research, this paper selects four economic indicators of RMB real effective exchange rate, Shanghai Composite Index, short-term international capital flow and broad money supply, and adopts the model method of structural vector autoregression (SVAR) to analyze these four economic indicators And then apply the quantile regression method to study the relationship between the exchange rate and the Shanghai Composite Index under different quantiles, in order to comprehensively analyze the dynamic relationship between China's foreign exchange market and the stock market, and enhance the credibility of the conclusions of this paper.

Exchange rate determination theory

The theory of purchasing power parity proposed by Gustav Cassel(1922) is one of the most influential classical theories for determining exchange rates. Based on the law of one price, the theory has the core idea that the exchange rate of each country's currencies is determined by the actual purchasing power of its currencies, emphasizing the decisive role of trade factors such as goods and services on exchange rates. Specifically divided into absolute purchasing power parity theory and relative purchasing power parity theory. The former is a static analysis, which holds that the exchange rate of two currencies is determined by their respective price levels. The different prices of a certain tradable currency represented by two different currencies are the exchange rate of the relevant currency, that is, the exchange rate is the ratio of the purchasing power of currencies, which focuses on the decision of exchange rate at a certain point. The latter considers the inflation factor and thinks that the exchange rate fluctuation between the two countries is related to the inflation change, and emphasizes that the exchange rate decision has the characteristics of dynamic fluctuation in a period of time. In essence, both see the price level as determining the exchange rate.

After the floating exchange rate system was implemented in the 1970s, international capital flows increased, and asset market theory gradually became the mainstream of exchange rate determination theory. According to this theory, exchange rate is the price of an asset, which is affected by supply and demand in the financial capital market of two countries. It emphasizes the role of capital flow and asset money stock. Unlike purchasing power parity theory, which is the key consideration for price level, asset market theory believes that net capital flow caused by investment is the key. The imbalance between supply and demand of financial capital in the two countries will lead to international capital flow, which will directly affect the demand for a country's currency and then cause exchange rate fluctuations.

Stock index determination theory

As a good index reflecting the whole stock market price, the stock index is essentially determined by the stock price. There are many factors affecting stock price. The stock price is not only affected by the listed company's own operating conditions, dividend distribution policies and investors' psychological preferences at the micro level, but also affected by the international economic environment, macroeconomic policies and political environment at the macro level. Micro pricing focuses on the analysis of the intrinsic investment value of the stock, using mathematical tools to determine the stock price through quantitative analysis. The traditional stock pricing theory think a stock price always fluctuates around its intrinsic value, the influence of any other factors are not decisive, then from the Angle of the issued shares of the company's business shares, refer to the various financial indicators data to estimate price, such as dividend discounted value calculation, free cash flow, such as p/e ratio and economic value added indicators.

Under the framework of efficient market theory, modern investment theory determines stock price from the perspective of investors the average variance is used to quantify the return and risk of stock, and the best combination of stock return and risk is studied distribution, focusing on the market equilibrium under the condition of investor preference and its portfolio of a variety of stocks, along the set profit pricing and capital asset pricing have further developed many classic stock price evaluation models.

Behavioral finance theory assumes that investors are different from efficient market theory, which believes that most investors are not always rational and do not always avoid risks. It emphasizes that investors' decision-making behaviors in the market are easily affected by their own psychological factors and other investors' behaviors. Therefore, the stock price is also related to the behavior of investors. Investors' psychological expectations will intensify the volatility of stock prices in some cases through "herd effect". This theory has provided a good explanation for some abnormal phenomena of stock prices.

Chapter 4 Data Analysis

4.1 SVAR model principle

This paper first uses the Structural Vector Autoregression Model (SVAR) to estimate the possible dynamic relationship among RMB real effective exchange rate, Shanghai Composite Index and its intermediary transmission variables. The model proposed by Sims(1980) is based on certain economic theories and combines the characteristics of time series variables. Its main function is to explore the dynamic response of different economic variables to independent shocks, and it is often used to study the immediate structural relationship between various economic variables. It has become a very common method to measure the dynamic relationship between economic variables and disturbance terms in the study of economic problems.

According to the classical theory of Enders(1995), the SVAR model constructed by K variables and P lag variables can be expressed in the following structural form.

$$C_0 y_t = \Gamma_1 y_{t-1} + \Gamma_2 y_{t-2} + \dots + \Gamma_p y_{t-p} + u_t, t = 1, 2, \dots, T$$

$$\Gamma_{i} = \begin{bmatrix} 1 & -c_{12} & \cdots & -c_{1k} \\ -c_{21} & 1 & \cdots & -c_{2k} \\ \vdots & \vdots & \ddots & \vdots \\ -c_{k1} & -c_{k2} & \cdots & 1 \end{bmatrix},$$

$$\Gamma_{i} = \begin{bmatrix} \gamma_{11}^{(i)} & \gamma_{12}^{(i)} & \cdots & \gamma_{1k}^{(i)} \\ \gamma_{21}^{(i)} & \gamma_{22}^{(i)} & \cdots & \gamma_{2k}^{(i)} \\ \vdots & \vdots & \ddots & \vdots \\ \gamma_{k1}^{(i)} & \gamma_{k2}^{(i)} & \cdots & \gamma_{kk}^{(i)} \end{bmatrix}, i = 1, 2, \cdots, p, \qquad u_{i} = \begin{bmatrix} u_{1i} \\ u_{2i} \\ \vdots \\ u_{ki} \end{bmatrix}$$

4.2 Empirical Results of the SVAR Model

Considering that unprocessed raw time series data often cannot be directly used for quantitative analysis, it makes economic sense to perform general time series data adjustment on the four data series before model testing. To this end, this paper uses the CensusX-11 method to seasonally adjust the sequences of REER, M2 and SP and perform logarithmic processing to eliminate the dimensional influence to further ensure the validity of the model. The model checking process is mainly completed by Eviews9.0 software.

4.2.1 Stability test

Since the four economic variables studied in this paper are all time series data, there may be problems of stationarity. Non-stationary time series data often bring about "pseudo-regression" problems, and it is difficult to infer them from the information already contained in the series. Therefore, directly using the method of analyzing stationary time series to study non-stationary time series will greatly affect the validity of the analysis results. Before analyzing the economic data, this paper uses the most commonly used test methods AugmentedDickey-Fuller (ADF) and PP test to test for stationarity, that is, to test whether each original series has the stationarity of the unit root. The original data test results show that all four variables have a unit root within the unit level, which means that these variables are non-stationary. After the first-order difference of the data, the variables all show the characteristics of stationarity, and the specific results are shown in Table 4.1.

Table 4.1 ADF and PP test results after first difference

Variables I(1)	ADF t-statistic	PP t-statistic
REER	-10. 2439	-10.2706
SP	-8.0805	-13.4311
ISCF	-16. 5011	-56.8066
M2	-5.7711	-18.0778

Note: The critical value for ADF and PP tests at the 1% significance level is -3.46.

It can be seen from Table 4.1 that the ADF and PP tests are passed after the

first-order difference of the variables. All variables reject the null hypothesis (HT: there is at least one unit root), and it can be considered that at the 1% significant level, the four variables are The first-order difference sequence is a stationary time series, which is expressed as a first-order single-integration, that is, the same-order integration of the four sequences has stationarity.

4.2.2 Cointegration test

In addition to the overall stability of the SVAR model, in order to make the impulse response function more accurately reflect the time path of the information shock, it also requires a cointegration relationship between variables, that is, a long-term stable equilibrium relationship. Combined with the first-order difference stationary results in the stationarity test, this section will further carry out the cointegration test, which can determine whether there is a long-term equilibrium relationship between a set of non-stationary linear combinations of the same order time series to accurately reflect the new The time path of the information (random disturbance) shock. Based on the ADF test results, all variables in the model are I(1) sequences, and there may be multiple cointegration relationships among the four economic variables in this paper. The Johansen test 4 method is suitable for the cointegration test of the same order non-stationary series, and it is not necessary to set the dependent and independent variables when testing a group of variables. Therefore, the Johansen test is used to complete the cointegration test, and the specific results are shown in Table 4.2.

Table 4.2. Johansen Test Results

No. of CE(s)	Eigenvalue	Trace Statistic	0,05 Critical Value
None *	0.1160	56.9082**	47.8561
At most 1 *	0.0526	30.7807**	29.7971
At most 2 *	0.0471	19.3292**	15.4947
At most 3 *	0.0420	9.1063***	3.8415

Note: *** and ** indicate significance at the 1% and 5% significance levels, respectively.

It can be seen from Table 4.2 that at the 5% significance level, the trace statistic value of 56.9 is greater than the critical value of 47.9, so the null hypothesis is rejected (T: the number of eigenvectors is 0, that is, there is no cointegration relationship), and there is no cointegration relationship between the variables. There is a cointegration

relationship. Similarly, reject the null hypothesis that there are at most 3 cointegration relationships. Therefore, it is considered that there are multiple long-term stable cointegration relationships between these four time series, and it is reasonable to use the SVAR model to analyze.

4.2.3 Granger causality tests

Considering that previous research scholars have drawn different conclusions on the relationship between exchange rates and stock prices, the conclusions about how the two-way relationship exists between the two is not clear, and there are still a few people who believe that there is no relationship between the two. special association. Therefore, this paper attempts to use the Granger causality test to explore the direction of influence between the two, and initially find the causal relationship between China's stock market and foreign exchange market. The principle of this test is that if the estimated present value of variable A will be affected by the lag value of variable B, there is a Granger causality between the two, and B is the Granger cause of A. The specific test results are shown in Table 4.3.

Table 4.3 Pairwise Granger causality test results

Independent		Induc	ed Variable	
Variable	REER	SP	ISCF	M2
REER		Y	Y	Y
SP	Y		Y	Z
ISCF	Z	Y	· · · /	Z
M2	Y	Z	Y	A

Note: Y represents the existence of Granger causality, and Z represents the absence of it.

According to the results of Granger causality test in Table 4.3, it can be inferred that there are multiple Granger causality between the four variables. There is a two-way Granger causality between REER and SP, and the relationship between the two mediating transmission variables ISCF and M2 is more complex, and these relationships will be further discussed in the results of the SVAR model below.

Based on the test results of stationarity, cointegration and Granger causality test, further research to explore the connection between these variables is meaningful, especially the dynamic relationship between the RMB real effective exchange rate and the Shanghai Composite Index. Therefore, it is reasonable to conduct an in-depth discussion through the SVAR model.

4.2.4 Lag order determination

Before establishing the SVAR model, first establish the corresponding VAR model, and then impose constraints on the corresponding VAR model. According to the AIC, SC, FPE, HQ and LR criteria, the lag order is judged to select the appropriate lag length. The test results are shown in Table 4.4.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-2445.5300	NA	22.3111	23.6669	23.7313	23.6930
1	-806.4080	3199.0540	0.0345	7.9846	8.3067*	8.1148*
2	-783.3670	44.0787	0.0322	7.9166	8.4962	8.1510
3	-765.2450	33.9677	0.0316*	7.8961*	8.7333	8.2346
4	-757.1220	14.9116	0.0341	7.9722	9.0670	8.4149
5	-735.5550	38.7590*	0.0324	7.9184	9.2708	8.4653
6	-723.2120	21.7050	0.0336	7.9537	9.5637	8.6048
7	-713.2030	17.2126	0.0357	8.0116	9.8792	8.7669
8	-706.4100	11.4203	0.0392	8.1006	10.2258	8.9600
9	-695.0840	18.6041	0.0412	8.1457	10.5286	9.1093
10	-685.9200	14.6976	0.0442	8.2118	10.8522	9.2795

Table 4.4 Test results of optimal lag order

Note: * indicates the lag order determined according to this criterion

According to the results of the selection criterion of VAR lag order, the most suitable lag length is the first or third order lag. In this paper, p=3 is selected as the SVAR model, and p=1 is selected as the robustness test of the lag model.

The results of the model are obtained by running Eviews9.0 software. In order to analyze the linkage effect between exchange rate and stock price, this paper analyzes the impulse response function and variance decomposition to determine the impact of structural shock on each variable.

4.2.5 SVAR model results

The empirical results show that before the "8.11 new exchange rate reform" in 2015, there was a similar response between the changes in the real effective exchange rate of RMB and the Shanghai Composite Index, the trends were basically the same, and the degree of correlation increased with the increase of the time interval. The

response of REER to SP is basically the same as Figure 4.2, but it has a greater impact after the exchange rate reform in 2005. The contribution of REER to SP fluctuation is about 10 percentage points, and its impact tends to be stable after 4 cycles (the fluctuation contribution rate is 10.3%). In turn, the SP response to REER was as similarly linked as the entire sample interval, approaching 0 around the 8th month, and the degree of explanation remained 8.28% at the 12th month. This shows that after the exchange rate reform in 2005, the real effective exchange rate of RMB has a deeper and more stable impact on the Shanghai Composite Index.

The response of SP to the shocks from REER and ISCF is more complicated. The positive shock of the real effective exchange rate of RMB on the stock market is positive in the short term, but after 3 periods, the positive impact turns into a more persistent negative impact. This may be related to the current economic situation of China's largest exporter and the status quo of export-driven economic growth. In the long run, short-term fluctuations in the appreciation of the RMB will still have a negative impact on the stock market.

In addition, short-term international capital flows have a positive impact on REER and SP, and the inflow of ISCF will promote the internationalization of the RMB, increase the liquidity of the domestic market, and help stimulate the development of the stock market. This positive impact is lasting. The influence of M2 in the entire variable structure is also small, and hardly has a significant impact on other variables, which also shows that the transmission mechanism with money supply as an intermediary is still not smooth after the exchange rate reform in 2015.

Period	S.E.	REER	SP	ISCF	M2
1	0,0495	4,2481	91,7519	3,2546	0,7454
2	0,0637	4,2300	89,2311	5,8001	0,7389
3	0,0663	4,0623	86,0433	9,2113	0,6831
4	0,0671	5,4382	84,7448	9.0347	0,7823
5	0,0677	5,4690	83,8128	9,8589	0,8593
6	0,0683	6,9823	82,4004	9.6940	0,9234
7	0,0728	18,1144	72,4223	8,5267	0,9366
8	0.0776	27,5708	63,7702	7,6330	1,0260
9	0,0810	33,3066	58,5167	7,0629	1,1138
10	0,0839	37,5983	54,5986	6,5935	1,2095
11	0,0863	40,8179	51,6134	6,2894	1,2792
12	0,0881	42,8719	49,6016	6,1957	1,3308

Table 4.5 SP variance decomposition table

From Table 4.5, it can be seen that the degree of REER's interpretation of changes in SP fluctuations increases with time (from less than 5% to more than 40%), mainly because of the existence of time lags, that is, the stock market's impact on real effective exchange rate fluctuations. It takes a certain amount of time to react. The variance decomposition results of REER show that SP has a small degree of explanation for REER fluctuations, and the interaction between the two is asymmetric. Significantly, this is consistent with the results described above.

Overall, the responses between REER changes and SP shocks stabilized to varying degrees over different time periods. But after the "8.11 New Exchange Reform", the response between the two will be more intense and far-reaching. The real effective exchange rate of RMB and the Shanghai Composite Index can indeed be transmitted through short-term international capital flows as an intermediary, and they will be affected by different factors to varying degrees at different time periods. The linkage relationship between the foreign exchange market and the stock market is not stable, and there are some deviations due to the impact of exchange rate policies in different time periods. There is a dynamic, stable and predictable relationship between the two.

In addition, the SVAR model of this paper shows that no matter in which time period, the M2 indicator has a weak influence on other variables, the influence from its own fluctuation always accounts for more than 85%, and the contribution rate to the fluctuation of other indicators is always low. That is to say, the money supply does not play the role of the transmission path between the two markets, which is consistent with the conclusion of some researchers.

4.3 Quantile model analysis

4.3.1 Quantile analysis results

In order to further explore the relationship between the RMB exchange rate and the stock index at different quantiles, this section aims to analyze the relationship between the two markets under the quantile regression framework, and examine whether the relationship between the two markets at different quantile levels is stable We carefully observe the correlation between RMB exchange rate and stock index in different distribution states. The conclusion in Section 4.1 of this paper shows that the M2 indicator has a weak influence on other variables, and the conduction pathway with M2 as the mediating variable is not smooth. Therefore, M2 is eliminated from the quantile regression estimates. Similarly, the procedures such as stationarity test and Granger causality test that have been shown in the previous section will not be repeated. From the perspective of exchange rate and stock index, this paper selects 9 equidistant quantiles to analyze the quantile regression results.

(1) Quantile regression results of RMB real effective exchange rate

Taking the exchange rate as the dependent variable, we specifically analyze the impact of stock prices and short-term international capital flows on exchange rates at the extreme quantile levels of 10% and 90%. The results are shown in Table 4.6 and Table 4.7.

Variable	Coefficient	Std. Error	t-Statistic	Prob
SP	0.0501***	0.0146	3.4331	0.0007
ISCPF	0.0002***	0.0002	-12.0657	0.0000
С	4.0894***	0.1065	38.4178	0.0000

Table 4.6 REER regression results under the 10% quantile

Note: *** means significant at the 1% significance level

As shown in Table 4.6, when the model is set to a lower 10% quantile level, the result output of the quantile regression model is REER=0.05012*SP+0.0002*ISCPF+4.08941, the two coefficients and the intercept

term are at 1 % significant at the significance level. At this time, a 1% increase in China's Shanghai Composite Index will cause the RMB real effective exchange rate to rise by 0.05%, and a 1% increase in short-term international capital flows will cause the RMB real effective exchange rate to rise by 0.0002%.

 Table 4.7 Regression results of REER at 90% quantile

Variable	Coefficient	Std. Error	t-Statistic	Prob
SP	0.2172***	0.0741	2.9311	0.0370
ISCPF	0.0004**	0.0002	-2.0512	0.0502
С	3.0701***	0.5822	5.2752	0.0000

Note: *** and ** indicate significance at the 1% and 5% significance levels, respectively.in Table

It can be seen from Table 4.7 that when the high quantile level of 90% is set, the coefficients and intercept terms estimated by the quantile regression model are still significant at the 5% significance level, and the sign of the coefficient does not change. It shows that the direction of the effect of the Shanghai Composite Index and the short-term international capital flow on the exchange rate is unchanged at the high and low quantile levels, but the degree of impact has changed significantly. That is, when the exchange rate is in the room for appreciation, the impact from the stock market on the exchange rate changes has increased by nearly 4 times. A 1% increase in the Shanghai Composite Index will cause the RMB real effective exchange rate to increase by 0.21%, and the sensitivity of the exchange rate market will be greatly increased. The influence of international speculative capital has been reduced.

The results of the quantile regression model with 9 equally spaced quantiles with exchange rate as the dependent variable are shown in Table 4.8.

Quantile	SP	ISCF	С
0,1	0,0501	0,0020	4,0894
0.2	0,0928	0,0021	3,7927
0,3	0,1591	0,0018	3,3254
0.4	0,2018	0,0017	3,0276
0,5	0,2603	0,0013	2,6158
0,6	0,2745	0,0013	2,5213
0.7	0,2873	0,0011	2,4460
0.8	0,3103	0,0006	2,3050
0,9	0,2172	0,0004	3,0709

Table 4.8 REER Quantile Regression Parameter Estimation Results

Table 4.8 shows the estimated parameters of the quantile regression model with exchange rate as the dependent variable under the 9 quantiles from 10% to 90%, except that the ISCF at the 90% quantile is significant at the 5% significance level In addition, the coefficients of the remaining variables are all significant at the 1% significance level. It is not difficult to find that as the quantile level continues to increase, the exchange rate is more affected by changes in the index, but is gradually less affected by short-term international capital flows.

(2) Quantile regression results of the Shanghai Composite Index

The Shanghai Composite Index is used as the dependent variable to specifically analyze the impact of exchange rates and short-term international capital flows under different quantiles at 9 equally spaced quantile levels. The quantile regression results are shown in Table 4.9.

Quantile	REER	ISCF	C
0,1	1,8279***	-0,0009**	-1,0635*
0,2	1,8988***	-0,0005	-1,2966*
0,3	1,8732***	-0,0003	-1,1198
0,4	2.0708***	0.0004	-1.9760**
0,5	2,1290***	0,0006	-2,2130***
0,6	1,9173***	0.0010*	-1,1172
0.7	1,6026***	0.0013**	0.4587
0,8	0.6916*	0,0003	4.7897**
0.9	-0,0815	-0,0003	8,5132***

Table 4.9 SP Quantile Regression Parameter Estimation Results

Note: ***, ** and * indicate significance at the 1%, 5% and 10% significance levels, respectively.

Table 4.9 shows the estimated parameters of the quantile regression model with the Shanghai Composite Index as the dependent variable under 9 different quantiles ranging from 10% to 90%. Compared with the quantile regression results of the RMB exchange rate, it is more complicated. The impact of the RMB exchange rate on the stock price is relatively consistent at the quantile level of 70% and below, and the two have a significant positive correlation, but at the 90% quantile The sign has changed at the number level. In order to further explore the impact of the RMB real effective exchange rate on the Shanghai Composite Index at the high quantile, the 95% quantile is estimated. The impact of short-term international capital flows on the Shanghai Composite Index

is not significant, and is only significantly correlated at the 10%, 60%, and 70% quantiles. negative.

Variable	Coefficient	Std. Error	t-Statistic	Prob
REER	-1.5116***	0.4258	-3.5497	0.0005
ISCPF	-0.0004***	0.0002	-2.0512	0.001
C	15.3311***	0.5822	5.2752	0.0000

Table 4.10 SP regression results at 95% quantile

Note: ***Significant at the 1% significance level.

It can be seen from Table 4.10 that the coefficient obtained by the regression under the 95% quantile is -1.5116, indicating that when the stock market is in an extremely high quantile state, the impact of the exchange rate on the Shanghai Composite Index changes from a positive impact to a negative impact, and The impact is deepened. In short, when the stock market is in a more prosperous state, the impact of exchange rate changes on the stock market is more variable.

Based on the analysis results in this section, it can be seen that the mechanism of action between the real effective exchange rate of RMB and the Shanghai Composite Index in different distribution states is asymmetric, that is, unstable. First, as the quantile level increases, the exchange rate is more affected by changes in the stock index, but it is gradually weakened by the short-term international capital flow, and the direction of their influence does not change under different quantiles. Second, the stock index is relatively stable under the influence of exchange rate changes in the middle and low quantiles. At high quantiles, the direction of influence changes from positive to negative, and the degree of influence is unstable, and the impact of short-term international capital flows on the stock index. is unstable and insignificant.

4.3.2 Model checking

In order to examine the robustness of the quantile regression model, this paper uses two classical test methods to test the model, namely the QuantileSlopeEquality test and the SymmetricQuantiles test. The results are shown in Tables 4.11 and 4.12.

Table 4.11 REER Quantile Regression Test Results

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Quantile Slope Equality Wald Test	217,8578	18	0,000
Symmetric Quantiles Wald Test	41,7390	15	0,0002

It can be seen from Table 4.11 that when the exchange rate is used as the dependent variable to construct the quantile regression model, the slope equality test statistic value is 217.8578, the corresponding P value is 0, the slope symmetry test statistic value is 41.7390, and the corresponding P value is 0.0002. This shows that at the 1% significance level, the model rejects the null hypothesis that the coefficient estimates of the variables at different quantile levels are equal and the slopes are symmetric, that is, the regression coefficients are unequal and asymmetric at different quantile levels. , that is to say, the relationship between the exchange rate and the stock index is unstable, and the quantile regression model established in this paper is reasonable.

Table 4.12 SP Quantile Regression Test Results

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Quantile Slope Equality Wald Test	144,0582	18	0,0000
Symmetric Quantiles Wald Test	91,26601	15	0,0405

It can be seen from Table 4.12 that when the Shanghai Composite Index is used as the dependent variable to construct the quantile regression model, the slope equality test and the slope symmetry test are significant at the significance levels of 1% and 5%, respectively. This shows that the regression coefficients of the model are unequal and asymmetric at different quantile levels, that is to say, the relationship between the exchange rate and the stock index is unstable, and the quantile regression model established in this paper is reasonable.

4.4 Summary

This chapter is the process and result presentation part of the empirical analysis, and it is also the key research part of this paper, that is, to analyze the dynamic relationship between the real effective exchange rate of RMB and the Shanghai Composite Index, and to study its internal transmission mechanism and stability.

In the analysis of this chapter, the process of the structural vector autoregressive model is described in detail, and the impact of different shocks on different variables is analyzed according to the results of variance decomposition and impulse response function, and the relationship between the RMB exchange rate and the stock index under the macroeconomic system is obtained. dynamic relationship. Then, according to the unsmoothness of the intermediary transmission channel of the broad money volume in the research results of the SVAR model, the selected economic variables are adjusted and the quantile regression model is carried out to analyze the RMB exchange rate and the stock index in different quantiles. The results show that the relationship between the two has an asymmetric effect, and the relationship between the two is unstable at the extreme quantiles. In addition, both the SVAR model and the quantile regression model have proved to varying degrees the long-term positive relationship between the RMB real effective exchange rate and the Shanghai Composite Index.



Chapter 5 Conclusion and Recommendation

5.1 Research conclusion

This paper studies the dynamic relationship between the real effective exchange rate of RMB and the Shanghai Composite Index in China's financial market, using short-term international capital flows and broad money supply as intermediary transmission variables, and selects the period from June 2001 to June 2019 in mainland China. Monthly monthly data were used as research samples, and SVAR and quantile regression models were used. The main research conclusions are summarized as follows.

5.1.1 There is a long-term stable equilibrium relationship between the real effective exchange rate of RMB and the Shanghai Composite Index

In the long run, there is a positive correlation between the two, that is, an increase in the value of the RMB will promote the development of China's stock market. Similarly, China's stock prices will also drive the value of the RMB to rise, especially when the stock market is in a prosperous stage, the stock market's role in promoting the foreign exchange market is more obvious. This is consistent with the discussion on the direction of the relationship between the capital flow theory and the asset portfolio balance theory, which may be related to the economic situation of China's current largest exporter and the status quo of export-driven economic growth.

5.1.2 The impact of the foreign exchange market on the stock market is more flexible and changeable

On the one hand, the rise of the stock index has a continuous positive impact on the exchange rate, which is different from the conclusion that it turned negative in a short period of time before the exchange rate reform and then turned positive. On the other hand, unlike the boosting effect of the RMB exchange rate on the stock index before the exchange rate reform, the increase in the value of the RMB after the exchange rate reform will have a negative impact on the stock index for a long time, which is similar to the research conclusion of Zhao Jinwen and Zhang Jingsi (2012). Based on this, when judging stock prices and short-term international capital flows, relevant departments should pay special attention to the negative impact of the RMB's real effective exchange rate on stock indices.

5.1.3 The transmission mechanism between the real effective exchange rate of

RMB and the Shanghai Composite Index is not smooth enough

After the "8.11 new exchange rate reform" in 2015, the intermediary role of short-term international capital flows has become more and more important, and its inflow will promote the internationalization of the RMB and help stimulate the development of the stock market. When the stock market is at a higher quantile level, its mediating effect becomes very weak. The contribution of money supply to the fluctuation of other economic variables is always relatively small, and the transmission path of money supply as an intermediary variable is not smooth, which is related to the strong policy orientation of the Chinese government on important macroeconomic indicators.

5.1.4 Lack of stability between China's exchange rate and stock index

Compared with the low and middle quantile levels, the foreign exchange market at the high quantile level responds more strongly to the influence from the stock market. Similarly, the relationship between the stock market and the foreign exchange market at the high quantile level is no longer stable, and the impact of the exchange rate on the Shanghai Composite Index has changed from a stable positive correlation at the low and middle quantiles to a deeper negative correlation.

From the above empirical conclusions, it can be found that the relationship between the real effective exchange rate of RMB and the Shanghai Composite Index is not static for a long time, but changes dynamically, and will also change when the market is extremely prosperous, so it is difficult to comprehensively define the relationship between these variables. China's intervention force from outside the market also causes the market to lack a certain degree of autonomy. Most economic variables will change relatively independently with changes in relevant policies, or be affected by some unpredictable factors, thus interrupting the long-term dynamic equilibrium.

With the continuous progress of exchange rate reform and capital market opening, the interaction between the real effective exchange rate of RMB and the Shanghai Composite Index has become more and more obvious. From historical experience, this kind of correlation also exists. The exchange rate not only reflects monetary policy and the real economy, but also reflects the management measures of the central bank and the ability of the government to intervene. Compared with the stock market, it is less speculative. To some extent, the pricing of the exchange rate is more marketable than the pricing of the stock market. After the "8.11 New Exchange Reform", the prices of China's foreign exchange market and stock market have become more closely linked. Short-term international capital flow has gradually become a more effective intermediary transmission channel between the two.

The improvement of the internationalization of the RMB, the deepening of financial reforms and the continuous opening of the capital market have made the linkage between foreign exchange market prices, stock market prices and international short-term capital flows more complex and closer. The linkage relationship has also changed. The exchange rate reform and financial deepening have made the pricing of asset prices in China more flexible and market independent. The ever-increasing linkage between the two countries will also make the risk forms in the financial market more complex. The impact of these on the foreign exchange market, the stock market and the relationship between the two is profound and lasting. China is in the process of maintaining a healthy and stable economic development. facing greater opportunities and challenges.

5.2 Recommendation

5.2.1 Further deepen the reform of the RMB exchange rate mechanism, increase

the flexibility and flexibility of exchange rate fluctuations

"After the 8.11 new exchange rate reform", the increased linkage between the real effective exchange rate of RMB and the Shanghai Composite Index means that

the onshore market and the offshore market are more closely linked. A sound RMB exchange rate price formation mechanism can more effectively restrain the impact of short-term international capital flows and other speculative international hot money on China's financial market order, and avoid the instability of China's stock market caused by frequent fluctuations in the RMB exchange rate. Therefore, in the process of promoting the opening of the capital market, corresponding measures should be taken to supervise and manage the financial market and promote the formation of a flexible RMB exchange rate mechanism. Combined with the reality of the devaluation pressure of the RMB, market pessimism is more likely to spread, and the overall economic risk is more complex. Although keeping the RMB exchange rate relatively stable is also a long-term and arduous task, the central bank needs to achieve the purpose of temporarily stabilizing the exchange rate when conducting foreign exchange interventions, but it is also particularly important to enhance the government's market credibility. Stabilizing market sentiment and restoring confidence are also necessary to maintain the capital market. The key is. Especially in recent years, the impact of exchange rate price fluctuations on the stock market has become more flexible and changeable, which requires the government to try to avoid too vague policy expressions and increase doubts in the market when further reforming the exchange rate, and pay attention to improving the transparency of foreign exchange reserves and exchange rate policies. , to increase information disclosure.

5.2.2 Strengthen the construction of the stock market system and improve the

stock price formation mechanism

At present, China's stock market still has defects of imperfect function and distorted price formation mechanism. Asset pricing lacks market nature. The entire securities market is highly volatile and speculative. The stock price formation mechanism needs to be further reformed and improved. In the current mature stock market, the successful experience of stock market system construction and price discovery is worth learning from. 's vitality. During the completion of this article, the process of comprehensively deepening the reform of China's capital market is constantly advancing, and the government has taken the initiative to reduce its intervention in the stock market. The revised Securities Law was passed at the end of

December 2019 and will be implemented in March 2020. The gradual implementation of the registration system for stock issuance in China provides institutional guarantees, and the allocation of stock market resources is expected to be more determined by the market price mechanism. It can be said that it is a very important reform of China's stock market. However, while the registration-based reform of China's stock listing brings prosperity and development opportunities to the stock market, the improvement of marketization will also strengthen the linkage between other financial sub-markets of the stock market, and the inevitable "pain period" in the reform will also brings many problems. Nonetheless, the government should regulate the stock market within an appropriate and reasonable range, minimize "market rescue" behaviors, avoid administrative interference with the normal flow of funds, improve market efficiency, and allow market demand to play a more effective role in promoting the stock price formation mechanism It can fundamentally and effectively improve the allocation of stock market resources. In the process of exchange rate reform, enhance the stability and autonomy of the stock market, and avoid aggravating the risk transmission between the two cities due to the exchange rate system reform.

5.2.3 Strengthen the supervision of short-term international capital flows and macro-prudential management of capital flows

In the context of economic globalization, a stable macroeconomic environment is of great significance to China's sustainable development. Otherwise, China's immature financial market will be more vulnerable. Short-term international speculative capital is all about profit, capital seeking profit is the law of the capital market, and the purpose of investment is arbitrage. A large amount of "hot money" usually brings uncertainty and negative impact to a country's economic market and impacts a country's financial security order. In recent years, the intermediary effect of short-term international capital flows between exchange rates and stock indexes has become more and more effective, which is a signal that deserves attention. China should strengthen the review, monitoring and management of short-term international capital flows, and monitor and control the channels of large inflows of hot money from the source, so as to buffer the impact of international speculative capital on China's financial stability. At the same time, it attaches great importance to the development of diversified institutional investors and innovative financial derivatives, to improve the ability of China's banking system to independently digest excess currency liquidity, to reduce the speculative flow of funds in the world, and to enhance the stability of foreign exchange and stock markets..

5.2.4 Coordinate various macro-management and control policies and improve

the financial control system

The results of the research model show that the linkage between China's foreign exchange market and the stock market has increased. If reasonable economic measures are not taken to control, the violent fluctuations between the two markets may lead to systemic financial risks, which may have incalculable impacts on China's economy. Serious impact. When extended to other markets, this also shows that the financial sub-markets are more closely linked and inextricably linked with each other. They all reflect the operation of a country's basic economy to a certain extent. Fluctuations and reforms in a market can easily lead to systemic financial risks due to the cross-market contagion of risks. The development of many financial crises in history also proves this. This puts forward higher requirements for policy makers to take into account the actual situation of each sub-market when formulating policies, establish and improve the communication mechanism between financial sub-markets, gradually improve the financial control system, and balance the short-term and long-term macro-control policies. Effect. Although the conclusion of this paper shows that monetary policy does not play an effective role in the intermediary transmission of asset prices, the monetary authorities cannot ignore the impact of changes in exchange rates and stock prices when adjusting monetary policy, and can consider setting the RMB exchange rate and stock prices as auxiliary monitoring index.

5.2.5 Guide investors to form reasonable psychological expectations

Individual investors account for a large proportion in China's stock market, and the individual's demand for foreign exchange is also increasing year by year. China's financial market is in a stage of perfect development, and there is a problem of information asymmetry. Changes in various economic indicators will cause changes in investors' psychological expectations to a certain extent, and investors' irrational expectations are more likely to deteriorate, resulting in "herd effect". Therefore, the government should strengthen the advocacy of the concept of value investment and guide investors to pay more attention to the value of the company itself. Especially when the market is at a high level, the government should guide investors to establish reasonable psychological expectations through some good policies, which plays an important role in maintaining the smooth operation of China's economy.



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