ISSN: 2688-9323

Research on the Transmission Relationship of Volatility in Chinese and American Stock Markets from Bootstrap Perspective

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Abstract

With the deepening of global financial integration, it is also gradually opening up, and the fluctuation transmission between stock markets in various countries becomes more and more obvious. Under this background, this paper studies the fluctuation transmission of stock markets in China and the United States, and analyzes the mutual influence of stock markets in China and the United States. On the basis of economic expectation, uncertainty theory and behavioral finance overreaction theory, this paper makes an empirical test on the causal relationship of volatility transmission between Chinese and American stock markets by using Bootstrap causality test method, and finds that there is an obvious one-way causal relationship between American stock market and Chinese stock market volatility, while the impact of Chinese stock market volatility on American stock market volatility is not significant. The empirical results are analyzed, and some policy suggestions are put forward to develop China's stock market.

Keywords

Stock Market; Wave Conduction Effect; Bootstrap Model.

1. Introduction

Since the subprime mortgage crisis broke out in the United States in 2007, the international financial situation has come one after another. A series of events, such as the European debt crisis in 2010, Brexit in 2016 and Trump New Deal in 2017, have added many uncertain factors to the current international financial situation. With the rapid development of China's economy, the financial sector is also accelerating reform. The Central Bank (2018) announced that as of the end of April 2018, China's foreign exchange reserves reached 3,124.9 billion US dollars, ranking first in the world. China and the United States have conducted in-depth cooperation in trade, finance and investment, and made many important achievements. In this process, China's stock market is also undergoing continuous reform, and gradually connecting with the international stock market. As the two countries with the largest GDP in the world, the two countries have cooperated in many fields, and the cooperation in the financial field has been gradually strengthened. The stock markets of the two countries are closely related, so it is of great significance to study the fluctuation relationship between the stock markets. With the deepening of global financial integration, the financial markets of different countries are gradually opening up, and the fluctuation transmission between stock markets of different countries becomes more and more obvious. Stock market has become an important part of China's financial system, which is of great significance to improve the efficiency of capital operation and reduce the financing cost of enterprises. Under the background of the "new normal" of economy and the upgrading of industrial structure, the Chinese government is stepping up the reform of stock market, giving full play to the role of capital allocation in stock market, and striving to achieve the goal of connecting China's stock market with international financial markets. On the one hand, this open reform of China's stock market is of great

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significance to attract international liquidity, standardize the trading system of the stock market and optimize the capital allocation of China's stock market; On the other hand, the impact of international liquidity and international stock market volatility on China's economy will also increase, and the risk of China's stock market will further expand. China's economy is in a critical period of "new normal" and industrial structure upgrading, and the stock market is of great significance to improve the efficiency of capital operation and reduce the financing cost of enterprises. The Chinese government is stepping up the opening of the stock market, which not only attracts international capital, but also further expands the risk of the stock market. Because of the strong transmission effect of volatility in transnational stock markets, the volatility of one stock market in China and the United States may have an important impact on the other stock market. Therefore, it is necessary to make an empirical study on the causal relationship of volatility transmission in Chinese and American stock markets to maintain the stability of China's stock market.

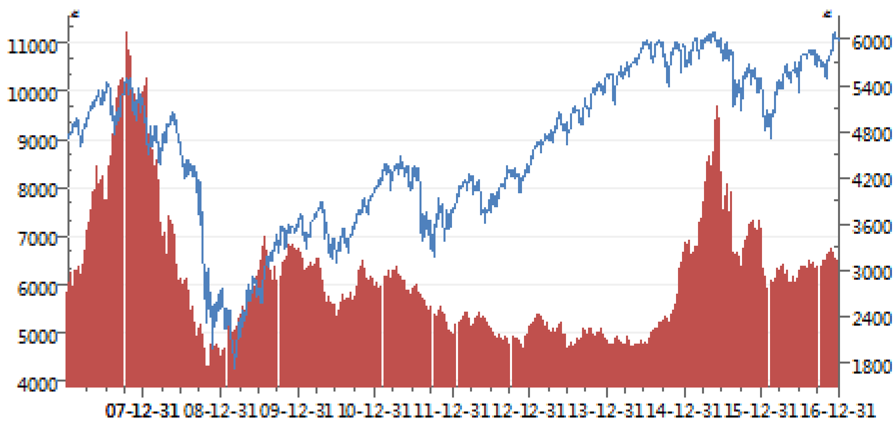

Figure 1. Shanghai Stock Exchange Index and NYSE Index Chart

New York Stock Exchange has accumulated many Chinese listed companies such as Alibaba, China Life Insurance, China Mobile, etc. Most of the main businesses of these companies are concentrated in China. From the above 2007-2016 New York Stock Exchange Composite Index and Shanghai Composite Index, it can be seen that although the fluctuation ranges are different, the index trends are generally similar. Based on this background, this paper makes an empirical study on the impact of stock market volatility in China and the United States, and analyzes the relationship between the stock markets in China and the United States [3] [4].

Firstly, this paper combs the research status and development trends of domestic and foreign scholars on the impact of stock market volatility, and based on economic expectation, uncertainty theory and behavioral finance overreaction theory, summarizes the real economy volatility transmission mechanism and virtual economy volatility transmission mechanism that cause stock volatility transmission. Secondly, it compares the current situation of the stock market development between China and the United States in detail, and discusses the connection and difference between the stock markets of China and the United States. Thirdly, this paper makes an empirical test on the causal relationship of volatility transmission between Chinese and American stock markets by using Bootstrap causality test, and finds that there is an obvious unidirectional causal relationship between American stock market and Chinese stock market volatility, while the impact of Chinese stock market volatility on American stock market volatility is not significant. Finally, this paper selects the New York Stock Exchange Composite Index, NASDAQ Composite Index and NASDAQ China Index in American OTC market and Shanghai Composite Index in Chinese stock market to build a vector autoregressive model (VAR) to test the volatility transmission in Chinese and American stock markets.

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The empirical results show that there is a long-term equilibrium relationship between the volatility transmission of Chinese and American stock markets, and the volatility transmission of American stock markets has a positive impact on Chinese stock volatility on the first day, then the impact becomes negative on the second day, and then the impact weakens rapidly until it disappears. Among them, the impact of Nasdaq China Index on Shanghai Composite Index is greater than that of New York Stock Exchange Composite Index and Nasdaq Composite Index. According to the current situation of China's stock market and the conclusion of this empirical analysis, this paper puts forward some relevant policy suggestions on developing China's stock market. It includes five aspects: strengthening the stock market infrastructure, constructing the early warning mechanism of stock market fluctuation between China and the United States, constructing the international working capital supervision system, deepening the financial market cooperation between China and the United States, and perfecting China's financial system.

2. Model Building

Bootstrap method has some translation methods in Chinese literature, such as "self-help method", "bootstrap method" and "self-help method regression". At present, it has no academic common name. This method was put forward by American econometrician Efron in the late 1970s. This method is different from the original sample distribution hypothesis that needs to be tested in the past. By repeating iteration and observing and analyzing the given original data, the nonparametric statistics of the overall sample can be realized, but it was not paid attention by the academic circles at that time. In 1990s, with the increasing complexity and variety of statistical data, the superiority of this method was manifested. Bootstrap method was quickly applied to many fields, and a complete set of statistical test methods has been formed up to now [5].

Since 1990s, a large number of foreign scholars have studied Bootstrap method and found that Bootstrap method is obviously superior to the statistical method of large sample approach theory. Since then, this method has been widely used in various fields, including finance, medicine, foreign trade, biology and many other emerging disciplines. Foreign scholars mainly use Bootstrap method to solve practical problems in these fields, so this method is widely used and has done a lot of empirical research. Domestic scholars started late to study Bootstrap method, but applied this new method to many research fields in time and made some achievements. Now domestic scholars have applied Bootstrap method to finance, medicine, biology and other fields. Bootstrap method can perform inference test on samples without determining which distribution the population obeys. Nowadays, the stock market fluctuates frequently, and the causes of stock market fluctuations are becoming increasingly complex. Especially the fluctuation of stock indexes in China and the United States in recent ten years, it is difficult to guess which specific distribution the stock market obeys. In the stock market, the error of regression analysis among various stock index indexes is uncertain, and the long-term index fluctuates frequently in the stock market. Bootstrap method is a feasible method under the condition of uncertain overall distribution and error terms. In view of the practicability of this statistical method, it is especially suitable for the stock market which needs to accurately describe the causal relationship of variables.

When analyzing the cause and effect of variables A and B, firstly, the models of variables A and B are constructed. In this model, if the statistical data of variable A can improve the prediction accuracy of variable B, variable A can be called Granger cause of variable B; On the contrary, variable b is called Granger cause of variable a [6] [7]. In determining the causal relationship of volatility transmission in Chinese and American stock markets, it is more appropriate to use Bootstrap method to determine the causal relationship of volatility in different stock indexes in

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China and America, because the overall data samples of the two countries are uncertain and it is not easy to judge the distribution of data errors [8].

Assuming that the distribution f of the tested population is unknown, independent and identically distributed samples are extracted from the population f and recorded as. Let x, as an unknown statistic to be processed, represent an unknown characteristic of population f, which is a function of sample s and population f. First, let the empirical distribution function of F(s) be that samples S1*, S2*, ... , Sn* are obeying random samples. Therefore, Xn* can be estimated from sample S*, and x can be estimated from the mean value of Xn*, which is the basic principle of Bootstrap. Operation method is as follows:$S_1, S_2, \cdots, S_n F_n(s) F_n(s)$

(1) through the empirical distribution function Fn(s) of the sample, it can be known that $S_1, S_2, \cdots, S_n$

$$F_n(s) = \frac{1}{n} \sum_{i=1}^{n} I(S_i \leq s) \tag{1}$$

(2) Take out the sub-sample Si*, i=1, 2,...,n, and calculate R(I,F), which is called a sample.$F_n(s) S_1, S_2, \cdots, S_n$

(3) Repeat step (2) many times, and manually set it for m times to calculate the value of X(S,F) form times.

(4) Estimate X (S, F) by the mean value of Bootstrap sample X*(S, F).

3. Empirical Analysis

3.1. Data Sources

The American stock market has two main components: one is the on-market trading market, such as the New York Stock Exchange market; The other is over-the-counter market, such as Nasdaq Stock Market. Chinese stock market includes Shanghai Stock Exchange and Shenzhen Stock Exchange. Empirical test needs to measure the index trading data of Chinese stock market and American stock market. This paper selects the representative stock market data of the two countries, Shanghai Composite Index for Chinese stock market, Nasdaq Composite Index, New York Stock Exchange Composite Index and Nasdaq China Index for American stock market to test the causal relationship of volatility transmission between the two countries' stock markets. The data comes from China WIND Database.

3.2. Empirical Model Construction

According to the characteristics of Chinese and American stock markets, the volatility of Shanghai Composite Index, NYSE Composite Index, NASDAQ Composite Index and NASDAQ China Index are selected to construct three causal test models. According to the existing research, assuming that the error term obeys the same distribution and is independent of the regression element, then:

$$y_i = \beta X_i + \mu_i, \ i = 1, \ldots, I \tag{2}$$

$$E((\mu_i | X_i) = 0, \mu_i \sim IID(0, \sigma^2) \tag{3}$$

Yi represents the New York Stock Exchange Composite Index, and xi represents China Shanghai Composite Index.

The specific operation method is as follows:

(1) using OLS method to estimate, the sum value can be obtained by estimation.$\beta \mu_i$

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(2) Scale change is carried out for, and the specific change formula is:μ_i

$$\mu_i = (n/n-k)^{1/2}\widehat{\mu_i} \tag{4}$$

(3) The formula (4) is resampled with return to obtain m samples, which are called Bootstrap residual samples, and then the parameters are estimated with the formula (3-2). $\mu_i^*(i = 1, \dots, I)\beta_i^*$

(4) Repeat (3) form times to obtain m groups of Bootstrap residual samples, that is, m groups of parameter estimators.$\beta_i^*(i = 1, \dots, I)$

(5) M+1 parameter estimators can be obtained by the above formula, and their empirical distribution functions can be obtained, and interval estimation and hypothesis testing can be carried out.

Similarly, the Nasdaq Composite Index, Nasdaq China Index and Shanghai Composite Index are also subject to the above steps. In the causal test of Chinese stock market and American stock market, Y stands for American stock market index and X stands for Chinese stock market index. I stand for lag order.

Bootstrap method is a non-parametric method of Monte Carlo simulation, which depends on the repeated sampling test of samples, so there is no need for unit root test and cointegration test of data. This method is based on the quasi-uncorrelated regression estimation of equations, which can make full use of the extra information of time series data to get more effective estimation.

It can be expressed as follows:

$$\begin{aligned}
y_{1,t} &= a_{1,1} + \sum_{l=1}^{ly_1} \beta_{1,1,l} y_{1,t-l} + \sum_{l=1}^{lx_1} \delta_{1,1,l} x_{1,t-l} + \varepsilon_{1,1,t} \\
y_{2,t} &= a_{1,2} + \sum_{l=1}^{ly_1} \beta_{1,2,l} y_{2,t-l} + \sum_{l=1}^{lx_1} \delta_{1,2,l} x_{2,t-l} + \varepsilon_{1,2,t} \\
&\vdots \\
y_{N,t} &= a_{1,N} + \sum_{l=1}^{ly_1} \beta_{1,N,l} y_{N,t-l} + \sum_{l=1}^{lx_1} \delta_{1,N,l} x_{N,t-l} + \varepsilon_{1,N,t}
\end{aligned} \tag{5}$$

$$\begin{aligned}
x_{1,t} &= a_{2,1} + \sum_{l=1}^{ly_2} \beta_{2,1,l} y_{1,t-l} + \sum_{l=1}^{lx_2} \delta_{2,1,l} x_{1,t-l} + \varepsilon_{2,1,t} \\
x_{2,t} &= a_{2,2} + \sum_{l=1}^{ly_2} \beta_{2,2,l} y_{2,t-l} + \sum_{l=1}^{lx_2} \delta_{2,2,l} x_{2,t-l} + \varepsilon_{2,2,t} \\
&\vdots \\
x_{N,t} &= a_{2,N} + \sum_{l=1}^{ly_2} \beta_{2,N,l} y_{N,t-l} + \sum_{l=1}^{lx_2} \delta_{2,N,l} x_{N,t-l} + \varepsilon_{2,N,t}
\end{aligned} \tag{6}$$

In 2007, the subprime mortgage crisis occurred in the United States, and China's stock market also suffered different impacts. This paper mainly selects the daily volatility data of the stock markets of the two countries from January 1, 2007 to December 16, 2016. Since the section of Nasdaq China Index data in China WIND Database is from May 7, 2007 to August 12, 2012, this paper chooses the comparative fluctuation between Nasdaq China Index and China Shanghai Composite Index during this period to determine the fluctuation relationship between them.

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3.3. Selection of Optimal Lag Order

Because Bootstrap causality test method is sensitive to lag order, it is necessary to determine the optimal lag order in order to ensure the robustness of the results before conducting causality test on the selected indicators. In each set of equations, the lag order of Chinese stock market index and American stock market index can be different, but the lag order of each equation is the same. By constructing different data index equations of Chinese and American stock markets, the data of each group are compared and analyzed. The optimal lag order is tested by stata13, and the test results are as follows:

The first group is to test the fluctuation causality between Nasdaq Composite Index and Shanghai Composite Index. Choose Nasdaq composite index as y and Shanghai composite index as x;

Table 1. Optimal lag order of Nasdaq Composite Index and Shanghai Composite Index1

Selection-order criteria

lag	LR	Df	p	AIC
0				-5.26346
one	4.3838*	one	0.036	-5.26996
2	3.3936	one	0.065	-5.27376
three	2.7168	one	0.099	-5.27571*
four	.02823	one	0.867	-5.27034

Endogenous: y

Exogenous: _cons

Selection-order criteria

lag	LR	df	p	AIC
0				-4.72823
one	13.834	one	0.000	-4.76047
2	2.7628	one	0.096	-4.76255
three	3.5404	one	0.060	-4.76675
four	18.09*	one	0.000	-4.81059*

Endogenous: x

Exogenous: _cons

The test results are shown in the above table. According to AIC criterion, the optimal lag order of Nasdaq Composite Index is 3, and the optimal lag order of Shanghai Composite Index is 4.

The second group is to test the fluctuation causality between Nasdaq China Index and Shanghai Composite Index. Choose Nasdaq China Index as Y and Shanghai Composite Index as X.

Table 2. Optimal lag order of Nasdaq China Index and Shanghai Composite Index2

Selection-order criteria

Lag	LR	df	p	AIC
0				-4.00029
1	8.1511*	1	0.004	-4.0312*
2	.26376	1	0.608	-4.02248
3	.27228	1	0.602	-4.0138
4	1.8449	1	0.174	-4.01302

Endogenous: y

Exogenous: _cons

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Selection-order criteria

Lag	LR	df	p	AIC
0				-4.56045
one	8.5689	1	0.003	-4.59346
2	.25484	1	0. 614	-4.58469
three	3.271	1	0.071	-4.59108
four	7.7669*	1	0.005	-4.62006*

Endogenous: x

Exogenous: _cons

The test results are shown in the above table. According to AIC criterion, the optimal lag order of NASDAQ China Index is 1, and the optimal lag order of Shanghai Composite Index is 4.

The third group is to test the fluctuation causality between NYSE Composite Index and Shanghai Composite Index. Choose the New York Stock Exchange Composite Index as Y and the Shanghai Composite Index as X.

Table 3. Optimal lag order of New York Stock Exchange Composite Index and Shanghai Composite Index

Selection-order criteria

lag	LR	df	p	AIC
0				-5.20941
one	2.2893	1	0.130	5.21019
2	6.1726	1	0.013	-5.22156
three	4.8522*	1	0.028	-5.22933
four	2.8052	1	0.094	-5.23153*

Endogenous: y

Exogenous: _cons

Selection-order criteria

lag	LR	df	p	AIC
0				-4.72823
one	13.834	1	0.000	-4.76047
2	2.7628	1	0.096	-4.76255
three	3.5404	1	0.060	-4.76675
four	18.09*	1	0.000	-4.81059*

Endogenous: x

Exogenous: _cons

The test results are shown in the above table. According to AIC criterion, the optimal lag order of New York Stock Exchange Composite Index is 1st order, and that of Shanghai Composite Index is 4th order.

3.4. Fluctuation Causality Test

After determining the optimal lag order of each set of equation data in Chinese and American stock markets, continue to carry out causal test. Under the optimal lag order, Bootstrap test is carried out on the above indicators, and the specific steps are as follows:

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Step 1, estimating the model (3-5) under the original assumption that there is no causal relationship between x and y, so as to obtain the estimated value of residual error;

Step 2: Since the residual error needs to meet the independent and identical distribution, the residual error estimation value is subjected to standardized transformation to obtain standardized residual error estimation values (I = 1, 2, ..., n, the same below);e_{it}^{*}

Step 3: Bootstrap repeated sampling is carried out on the standardized residual estimation value obtained above, and under the original assumption that X is not Granger cause of Y, bootstrap samples are obtained by using the following equation:y_{it}^{*}

$$y_{it}^{*} = \hat{\alpha}_{1i} + \sum_{l=1}^{ly_1} \hat{\beta}_{1,i,l} y_{i,t-l} + e_{it}^{*} \quad (7)$$

Step 4: replace yit with yit*, re-estimate the model (5) under unconstrained conditions, and calculate f statistics according to the estimation results;

Step 5: Repeat the above steps for 999 times to obtain the empirical distribution of F statistics. Under significance level α, take the 1-α quantile in the empirical distribution of F as the critical value of F test statistics under significance level α;

Step 6, judging the measurement result, and if the value of F test statistics is less than the critical value under the specified significance level, not rejecting the original hypothesis, that is, the Granger reason that X is not Y; Otherwise, the alternative hypothesis is not rejected, that is, X is the Granger cause of Y.

3.5. Empirical Test Results

Use stata13 for causal test, and the test results are as follows.

The first group of empirical tests on fluctuation causality between Nasdaq Composite Index and Shanghai Composite Index:

Table 4. Causality Table of Nasdaq Composite Index to Shanghai Composite Index Fluctuation

Variable	sample size	195 percentile	quantile; fractile	95% confidence interval	
F	1000	90	3.108347	2.891901	3.376539
		95	3.888173	3.653116	4.183281
		99	5.525995	5.017062	6.046848

F (3, 2311) = 27.93, Prob > F = 0.0000

It can be seen from the table that the F value of this group is 27.93, of which 95% points are 5.525999. Because 27.93 > 5.525995, we reject the original hypothesis that the fluctuation of Nasdaq Composite Index is the Granger cause of the fluctuation of Shanghai Composite Index.

Table 5. Causal Relationship between Shanghai Composite Index and Nasdaq Composite Index Fluctuation

Variable	sample size	195 percentile	quantile; fractile	95% confidence interval	
F	1000	90	2.015422	1.877150	2.139730
		95	2.479207	2.315288	2.657818
		99	3.278454	3.081358	3.882760

F (4, 2311) = 0.33, Prob > F = 0.8597

It can be seen from the table that the F value of this group is 0.33, of which 90% points are 2.015422. Because 0.33 < 2.015422, we accept the original hypothesis that the fluctuation of Shanghai Composite Index is not the Granger cause of Nasdaq Composite Index.

The second group empirical test of fluctuation causality between Nasdaq China Index and Shanghai Composite Index;

Table 6. Causality Table of Nasdaq China Index to Shanghai Composite Index Fluctuation

Variable	sample size	195 percentile	quantile; fractile	95% confidence interval	
F	1000	90	4.462841	3.824509	4.892551
		95	5.897136	5.435665	6.797067
		99	9.546095	8.752896	10.45126

F (1, 1234) = 63.25, Prob > F = 0.0000

It can be seen from the table that the F value of this group is 0.33, of which 99% points are 9.546095. Because 63.25 > 9.546095, we reject the original hypothesis that the fluctuation of Nasdaq China Index is the Granger cause of the fluctuation of Shanghai Composite Index.

Table 7. Causal Table of Shanghai Composite Index to Nasdaq China Index Fluctuation

Variable	sample size	195 percentile	quantile; fractile	95% confidence interval	
F	1000	90	1.921299	1.847736	2.097687
		95	2.465871	2.308471	2.701595
		99	3.486595	3.133460	4.357535

F (4, 1234) = 1.52, Prob > F = 0.1948

It can be seen from the table that the F value of this group is 0.33, of which 90% points are 1.921299. Because 1.52 < 1.921299, we accept the original hypothesis that the fluctuation of Shanghai Composite Index is not the Granger cause of the fluctuation of Nasdaq China Index.

The third group: empirical test of fluctuation causality between NYSE composite index and Shanghai composite index;

Table 8. Causality Test Table of New York Stock Exchange Composite Index to Shanghai Composite Index Fluctuation

Variable	sample size	195 percentile	quantile; fractile	95% confidence interval	
F	1000	90	2.612844	2.444588	2.803898
		95	3.292374	3.118447	3.520506
		99	4.896293	4.396955	5.155065

F(4, 2309) = 19.88, Prob > F = 0.0000

It can be seen from the table that the F value of this group is 0.33, of which 99% points are 4.896293. Because 19.88 > 4.896293, we reject the original hypothesis that the fluctuation of the New York Stock Exchange Composite Index is the Granger cause of the fluctuation of the Shanghai Composite Index.

It can be seen from the table that the F value of this group is 0.33, of which 90% points are 2.037892. Because 0.38 < 2.037892, we accept the original hypothesis that the fluctuation of NYSE composite index is not the Granger cause of Nasdaq China index fluctuation.

Table 9. Causality Test Table of Shanghai Composite Index to New York Stock Exchange Composite Index Fluctuation

Variable	sample size	195 percentile	quantile; fractile	95% confidence interval	
F	1000	90	2.037892	1.955602	2.127782
		95	2.463863	2.288662	2.659721
		99	3.631797	3.313444	3.795581

F (4, 2309) = 0.38, Prob > F = 0.8263

4. Conclusion

The supervision and regulations of American capital market are relatively perfect, attracting a large number of global investors and gathering a global professional investment team on Wall Street. American stock market has become one of the largest stock markets in the world. It is against this background that the American stock market can attract the world's top listed companies for financing and many investment institutions for stock investment. The number and financing number of listed companies in American stock market far exceed the number and financing scale of listed companies in Chinese stock market. Most of China's listed companies in the United States are innovative enterprises and large-scale financial enterprises. Although these enterprises are Chinese companies, they are completely released and operated according to the rules of the American stock market, and global investors also invest in these enterprises according to the corresponding rules.

With the gradual deepening of trade and investment between China and the United States, the real economy of the two countries has become closer; With the deepening of China's financial reform, there is more and more cooperation between China and the United States in the field of virtual economy. Under the interaction between the real economy and the virtual economy in China and the United States, the stock markets of the two countries are increasingly connected. The fluctuation of Nasdaq China Index is an important judgment signal for investors in China's stock market. Therefore, the fluctuation of stock prices of Chinese companies listed in the US has a deep influence on China's stock market. However, Chinese companies listed in the United States face global investors, and the internationalization of such investors makes the impact of domestic stock fluctuations on them very limited. An empirical test of the fluctuation of Nasdaq Composite Index and Shanghai Composite Index shows that the fluctuation of Nasdaq Composite Index can be transmitted to Chinese stock market, but the fluctuation of Chinese stock market cannot be transmitted to Nasdaq stock market. This kind of fluctuation transmission also exists in Nasdaq China Index and New York Stock Exchange Composite Index. It can be seen that the investment source and scale of American stock market determine that it has great influence on Chinese and even global stock markets.

Acknowledgments

Subject Project:

1. Youth Fund Project of Yantai Institute of Technology, "Analysis Of Turnover, P / E Ratio And Total Market Value Of China's A-Share Stock Market - Empirical Research Based On Intermediary Effect" (Project No.: 2019QNJJA02).

2. Humanities and Social Sciences in Shandong Province “Research on the Impact and Risk of Blockchain Finance on the Real Economy of Shandong Province under the Background of New and Old Kinetic Energy Conversion” (Project No.: 19ZCJJ04).

3. Youth Fund Project of Yantai Institute of Technology, “Equity Concentration And Innovation Investment -- From The Perspective Of Equity Incentive Object Differentiation" (Project No.: 2021QNJJ02).

ISSN: 2688-9323

References

[1] Peng Yue, Sun Jiasheng. Analysis of the diffusion mechanism of stock investment behavior [J]. statistics and decision, 2018,34(09):168-171.

[2] Wang Wenzhao. Empirical analysis of the impact of stock market regulation on the effectiveness of capital allocation [J]. statistics and decision, 2017(07):154-156.

[3] Gong Jinguo, Shi Daimin. Linkage between financial liberalization, trade intensity and stock market --Evidence from Chinese and American markets [J]. International Finance Research, 2015(06):85-96.

[4] Zhang Xiaoming, Li Jinyun, Jia Junyang. Research on Sino-US Cross-listing and Cost of Equity Capital-Based on the Data of A-share Companies Listed on American Stock Exchange [J]. International Finance Research, 2013(06):78-87.

[5] Wang Jian. Sino-US Stock Market Linkage: A Study Based on Maximum Overlapping Discrete Wavelet Transform [J]. world economic papers, 2014(02):72-89.

[6] Yu Zhen, Xu Xiaomei. Is the financial market linkage between China and the United States stronger after the subprime mortgage crisis [J]. Economist, 2014(09):87-95.

[7] Chen Xuebin, Zeng Yufeng. Comparative Study on Linkage Effect between Chinese and American Stock Markets and Bond Markets --From the Perspective of Tail Risk Spillover [J]. Economic Management, 2016,38(07):1-13.

[8] Wang Peng, Song Yang, Lu Xinhua, Li Chen. Bootstrap test of asymmetric income distribution in China's stock market [J]. journal of industrial engineering and engineering management, 2014, (02): 79-86.