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The Effect of Interest Rate Adjustment on the Stock Price Index in China

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Abstract: The interest rate is one of the main tools used to control monetary policy in China. Changes in interest rates will affect the return on capital and the financial situation of enterprises, which will in turn have an impact on the stock market. What effect will interest rate adjustments have on the stock market? Are fluctuations in the interest rates and the stock market correlated? At present, there is no consensus on the answers to these questions. This paper studies these problems. In order to study the effect of the interest rate adjustment on the stock price index, this paper first conducts literature review and analysis, and then uses unit root test, Johansen integration test, Granger causality test and error correction model. The factors studied are the one-year deposit rate and the closing price of the Shanghai Composite Index from 1991 to 2015. It can be seen that the long-term relationship between the interest rate and stock prices is a reverse relation - when interest rates change, the stock price is adjusted in reverse. Specifically, (1) there is a long term reverse relationship between the interest rate and the stock price index, (2) interest rates are the Granger cause of the stock price index, and the stock price index is not the Granger cause of interest rates, (3) the stock price index cannot adjust to the interest rate in a short time.

Keywords: Interest Rate, Stock Marke, Stock Price Index

1. Introduction

According to the World Federation of Exchanges, China's share trading volume is 1/3 of global equity trading, and China's stock market turnover reached $27 billion, 300 million - 55% of the global stock trading volume in 2015. China's government has a strong hand in the capital market, and investors are sensitive to changes in the central government's policies. The interest rate control policy is a common measure used by the Chinese government. From April, 21, 1991 to October 24, 2015, the one-year deposit interest rate has been adjusted 36 times. Studying the impact of China's interest rate adjustment on stocks, on the one hand, can reveal the relationship between interest rate adjustment and stocks, and promote policymakers to make better decisions. On the other hand, when interest rate adjustment occurs in the future, investors will make more favorable decisions.

The use of this interest rate mechanism will affect the capital market, in turn playing a role in the stock market. What effect does interest rate policy have on stock prices? This is correlation that many scholars have studied. At present, many scholars believe that there is a certain relationship between interest rates and stock prices, and through empirical studies, they have found that there is a reverse relationship between interest rates and stock prices [1, 2]. There are also some scholars who argue that there is no relationship between the interest rate and stock prices [3-6]. From the perspective of China, Yan and Jin [7] and Liu [8] use empirical methods to test that interest rate changes will not affect stocks. However, Duan and Zeng [9], and Wu [10] find that there is no obvious correlation between them. Through the literature review above, it also can be seen that most domestic research studies are

usually negatively impacted by the lack of data.

Due to the limitations of the data samples, most of research has been based on small samples that involved less interest rate adjustments, and most of them utilized qualitative research. The sample of this study contains 36 incidents of interest rate adjustments from 1991 to 2015, therefore it is an improvement on previous studies. Therefore, in order to make the research results more scientific, this paper will select the interest rate change data from 1991 to 2015 to conduct a deeper research on this issue. Research on the impact of interest rates on stock prices not only has theoretical significance, but also has practical significance. In theory, a fluctuation of the money market will lead to a fluctuation in the capital market; the change of interest rate will greatly impact stock prices, showing a negative correlation. In practice, this information can provide investors with predictive data, so they can invest rationally; alternatively, it can also provide a strategy for the policy makers.

2. Theoretical Hypothesis

Although the impact of the current interest rate adjustment on the stock index has not been determined, based on the existing theory, we believe that in China, the interest rate policy adjustment will significantly affect the stock market. There are mainly the following factors:

(1) The market transmission mechanism is not perfect, and the interest rate adjustment has changed the expectations of some investors. Numerous scholars have shown that China's capital market is in a transition stage from an inefficient market to a weak efficient market. The inefficiency of the capital market directly reduces the speed at which interest rate policy impacts the stock market and prolongs the time lag. Ma [11] argues that in China the money market and the capital market are split by separate operation policies and separate supervision policies, which directly influences the flow of information between the money market and the capital market. He also claims that in the process of formulating policies, the Chinese government often conveys opaque information, and some important policy information can be distorted in the process of transmission. This is also an important reason for restricting the effectiveness of China's capital market. When investors base their decisions on incorrect information, it not only increases the possibility for errors in judgment, but can also cause losses. The policy of interest rate adjustment will change the expectations of investors, thus bringing changes to the stock market.

(2) Investors may behave irrationally. Compared to developed countries, the Chinese stock market is relatively young and undeveloped and most investors are speculative in their trading. According to Ma [11], most investors' overall understanding of financial knowledge is generally low, and the system of educating investors about securities trading is not perfect. This situation often leads to mismatches when selling financial products, such as the allocation of high-risk assets to risk-averse investors. In the long term, this will allow investors to have an erroneous understanding, resulting in blindly following certain trends regarding investment habits. When this type of investor is predominant in the market, it is likely to cause instability and possible investment panic in the stock market. It will also affect the transmission of the interest rate policy to the stock market.

(3) The formulation and functioning of interest rate policy will take some time, and the impact on the stock market may a certain lag. Interest rate policy is a kind of monetary policy which is often used in China. Ma [11] stated that the government's policy measures to control the economy have certain time delays, including an internal delay and an external delay. The internal delay is divided into cognitive delay, decision delay and action delay. Cognitive delay refers to a change in the economy to discover the process of change, decision delay is the process of finding change to decide what to do and action delay refers to the process of deciding to take measures to promote action. External lag refers to the process of policy actions having a real impact on the economy. The research in this paper was done based on interest rate policy that has been published, so we will only consider the external delay. Compared to fiscal policy, the external delay of monetary policy is relatively long. After the announcement of a new interest rate policy, the central bank influences investment patterns through the transmission mechanism of monetary policy. The change of interest rate can affect the operation of enterprises and the supply of investors' money, and will affect the performance of the stock market for a period of time.

Based on the above factors, we can find that the interest rate policy adjustment will significantly affect the stock market in China. And put forward the theoretical hypothesis: In China, the interest rate policy adjustment will significantly affect the stock market.

3. Empirical Research

3.1. Selection of Variables and Selection of Samples

Two variables are introduced in this paper, the independent variable is the interest rate level in China, recorded as I; the dependent variable is the stock price index, recorded as INDEX. The interest rate is the one-year deposit benchmark interest rate, because financial institutions usually calculate deposit rates at three and six months, based on the one-year deposit benchmark interest rate. Therefore, the one-year benchmark interest rate represents the change in interest rates in China. The Shanghai composite index is chosen as the stock price index because there is a strong correlation between the Shanghai composite and Shenzhen composite index and the Shanghai composite index has broader coverage and a stronger representation [8].

Since 1949, the one-year deposit rate has been adjusted 55 times. China's stock market was established in 1991, and at the beginning of the establishment of the market it was very unstable, so in this paper the data is chosen from 2002 when the interest rate adjustment and movement of stock prices was relatively stable. From 2002 to 2015, the one-year deposit rate was adjusted 26 times, reducing interest rates 13 times and raising interest rates 13 times, with each adjustment measuring around 0.25%. The stock price is the average value of all the daily settlements of the Shanghai composite index compiled during the time between one interest rate to the next adjustment of the interest rate, because the stock price levels have been affected by the interest rate during this time. Moreover, the average index represents the long-term impact of changes in interest rates, avoiding short-term fluctuations caused by short-term investor behaviour. As the stock index and interest rates vary in magnitude, the Shanghai composite index is handled in 100 units, using the natural logarithm of the interest rate and the average of the stock index.

3.2. Empirical Analysis and Results

3.2.1. Stationarity Test

Table 1. *The unit root test of LNI.*

Null Hypothesis: LNI has a unit root			
Exogenous: Constant			
Lag Length: 1 (Automatic - based on SIC, maxlag=9)			
		t-Statistic	**Prob.***
Augmented Dickey-Fuller test statistic		-2.535338	0.1164
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	
*MacKinnon (1996) one-sided p-values.			

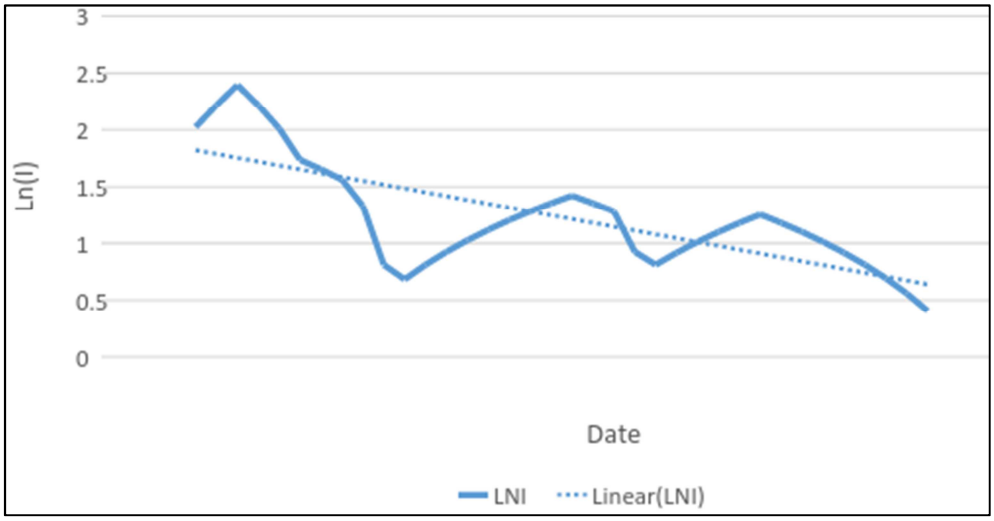

Figure 1. *Logarithmic trend of interest rates.*

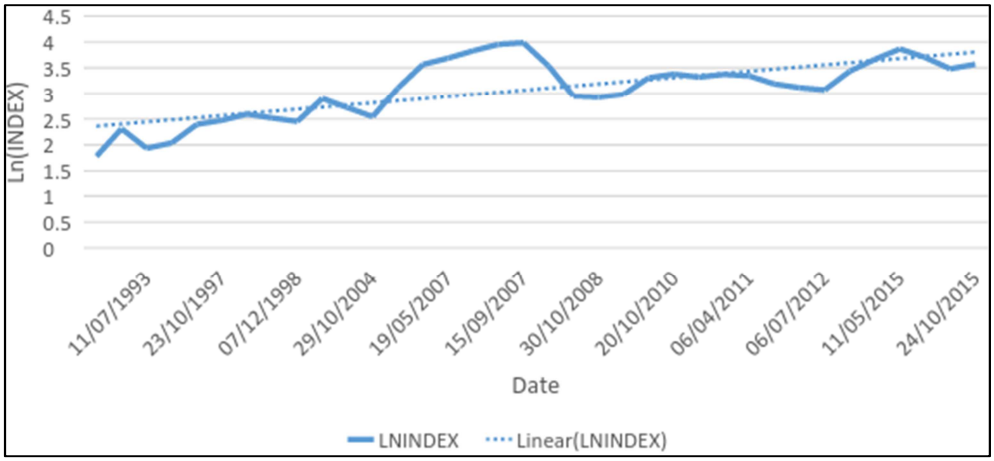

Figure 2. *Logarithmic trend of stock price index.*

Financial time series are usually unstable. The study of nonstationary sequences will lead to a pseudo regression problem, thereby making the conclusion invalid, so we must test the stationarity of time series, and then do a regression analysis. Through figure 1 and figure 2, it can easily be seen that the logarithm of the interest rate LNI and the logarithm of the average stock index LNINDEX are unstable, but we still need to use Eviews to test their stationarity. In this paper, the

ADF test is used for the unit root test. The following is the ADF test result of the interest rate series and the stock prices index series.

Table 2. *The unit root test of LNINDEX.*

Null Hypothesis: LNINDEX has a unit root			
Exogenous: Constant			
Lag Length: 1 (Automatic - based on SIC, maxlag=9)			
		t-Statistic	**Prob.***
Augmented Dickey-Fuller test statistic		-1.724756	0.4102
	1% level	-3.639407	
Test critical values:	5% level	-2.951125	
	10% level	-2.614300	
*MacKinnon (1996) one-sided p-values			

Through table 2, the ADF statistic value of the original sequence of LNI is -2.535338 and the critical value at 10% significant level is -2.6143. The statistic value is larger than the critical value, so it accepts the original hypothesis, which means the LNI has a unit root, and therefore, the original sequence of LNI is unstable. Through table 3, the ADF statistic value of the original sequence of LNINDEX is -1.724756, the critical value at 10% significant level is -2.6143, and the statistic value is larger than the critical value. Thus, the original sequence of LNINDEX is unstable.

Table 3. *The first order difference test of LNI.*

Null Hypothesis: D(LNI) has a unit root			
Exogenous: Constant			
Lag Length: 1 (Automatic - based on SIC, maxlag=9)			
		t-Statistic	**Prob.***
Augmented Dickey-Fuller test statistic		-3.861441	0.0058
	1% level	-3.646342	
Test critical values:	5% level	-2.954021	
	10% level	-2.615817	
*MacKinnon (1996) one-sided p-values.			

Table 4. *The first order difference test of LNINDEX.*

Null Hypothesis: D(LNINDEX) has a unit root			
Exogenous: Constant			
Lag Length: 1 (Automatic - based on SIC, maxlag=9)			
		t-Statistic	**Prob.***
Augmented Dickey-Fuller test statistic		-4.499165	0.0011
	1% level	-3.646342	
Test critical values:	5% level	-2.954021	
	10% level	-2.615817	
*MacKinnon (1996) one-sided p-values.			

Through table 4, the ADF statistic value of the first order difference sequence of LNI is -3.861441 and the critical value at 1% significant level is -3.646342. The statistic value is smaller than the critical value, so it rejects the original hypothesis, which means that D (LNI) does not have a unit root and therefore the first order difference sequence of LNI is stable. Through table 5, the ADF statistic value of the first order difference sequence of LNINDEX is -4.499165, the critical value at 1% significant level is -3.646342, and the statistic value is smaller than the critical value. Thus, the first order difference sequence of LNINDEX is stable. Similarly, we can also judge by the p value. Both of their p values are smaller than 1%, so they reject the original hypothesis.

Thus, if both the interest rate series and the stock price index series are the first order and single integral sequence, and they meet the requirements of the cointegration test, then then cointegration tests will be performed on them.

3.2.2. Cointegration Test

(1) Johansen Cointegration Test

Through the unit root test, it is clear that the original sequence of LNI and LNINDEX are not stable, but they can get stable sequences D(LNI) and D(LNINDEX) after differential processing, so the original series can continue to do the Johansen cointegration test. Through this process, we can test whether there is a long-term and stable equilibrium relationship between the two data LNI and LNINDEX. Through the Johansen cointegration test, the problem of long term data loss in differential processing can be avoided, and the cointegration can be estimated at the same time. The conclusion that can be drawn is that there is a long-term relationship between the two data.

Table 5. *Johansen Cointegration Test of LNI and LNINDEX.*

Sample (adjusted): 7/11/1993 10/24/2015				
Included observations: 34 after adjustments				
Trend assumption: Linear deterministic trend				
Series: LNI LNINDEX				
Lags interval (in first differences): 1 to 1				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		**Trace**	**0.05**	
No. of CE (s)	**Eigenvalue**	**Statistic**	**Critical Value**	**Prob.****
None *	0.318579	17.94095	15.49471	0.0210
At most 1 *	0.134199	4.899416	3.841466	0.0269
Trace test indicates 2 cointegrating eqn (s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				

In table 6, the 'None' is the original hypothesis, which means there is no long-term cointegration between LNI and LNINDEX. Through chart 4.7, the trace statistic value is 17.94095, the critical value at 5% significant level is 15.49471, and the trace statistic value is larger than the critical value, which means it rejects the original hypothesis at 5% significant level. Therefore, this supports the alternative hypothesis about a long-term cointegration between LNI and LNINDEX. The next step is to find the cointegration equation.

(2) Linear Regression Model

A review of the literature shows that most studies suggest the adjustment of interest rates having a negative impact on the stock index, which is the basis of this model. However, the stock price index is not only affected by the interest rate, but also affected by some other variables and factors. In this paper, these factors are not specifically analyzed, but these factors are included in the model of random variable μ, specifically to indicate that other factors aside from the interest rate affect stock prices. The linear regression model between the stock price index LNINDEX and interest rate LNI is $ln\ (INDEX)\ = \beta_0 + \beta_1 ln\ (I)\ + \mu$.

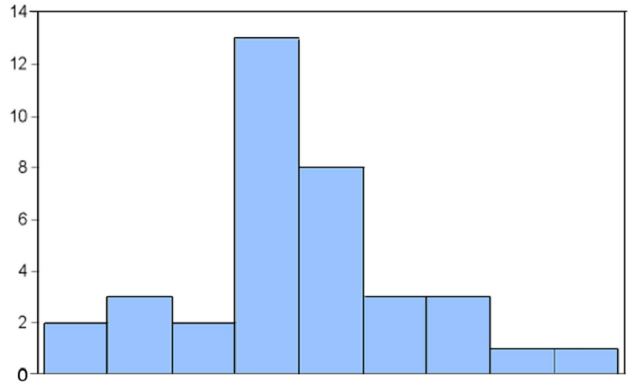

Figure 3. *Standard normal distribution of residuals.*

Table 6. *Linear Regression Test of LNINDEX and LNI.*

Dependent Variable: LNINDEX				
Method: Least Squares				
Sample: 4/21/1991 10/24/2015				
Included observations: 36				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	4.105665	0.201893	20.33583	0.0000
LNI	-0.830386	0.153076	-5.424662	0.0000

Table 7. *The first order difference test of Residual.*

Null Hypothesis: D (E) has a unit root			
Exogenous: Constant, Linear Trend			
Lag Length: 0 (Automatic - based on SIC, maxlag=9)			
		t-Statistic	**Prob.***
Augmented Dickey-Fuller test statistic		-4.535404	0.0050
Test critical values:	1% level	-4.252879	
	5% level	-3.548490	
	10% level	-3.207094	
*MacKinnon (1996) one-sided p-values.			

In table 7, at a significant level of 5%, the p value is 0, which is smaller than 5% apparently, so the regression coefficient is significant. Therefore, it can be concluded that there is a reverse linear relationship between the stock price index and the interest rate. In figure 3, by testing the residual normal sequence, we can see that the residual sequence obeys the normal distribution. Therefore, the regression equation is significant and effective. The next step is to do the ADF test on the residual sequence of the regression equation.

In table 8, the ADF statistic value of the first order difference sequence of E is -4.535404, the critical value at 1% significant level is -4.252879, the statistic value is smaller than the critical value, so it rejects the original hypothesis which means D(E) does not have a unit root. Therefore, the first order difference sequence of E is stable. As a result, it can be concluded that there is a long term cointegration relationship between the interest rate and the stock index. The regression equation is

$$ln\ (INDEX)\ = 4.11 - 0.83ln(I)$$

From the model results, interest rate changes will have an impact on stock prices in the long run, and they will have a negative impact. This conclusion is consistent with the previous theoretical analysis. In this equation, the coefficient of LNI is -0.83, which means the interest rate is raised by 1 unit, and the stock price index is reversed by 0.83 unit.

3.2.3. Granger Causality Test

Granger causality tests were performed on two sequences to see whether the variables of a sequence were affected by the lag period of another sequence variable. Before performing a Granger test, a VAR test should be used to determine the lag order.

Table 8. *The VAR test of LNI and LNINDEX.*

VAR Lag Order Selection Criteria						
Endogenous variables: LNI LNINDEX						
Exogenous variables: C						
Sample: 4/21/1991 10/24/2015						
Included observations: 32						
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-28.87508	NA	0.023612	1.929693	2.021301	1.960058
1	22.98356	93.99380	0.001187	-1.061473	-0.786647	-0.970376
2	34.73213	19.82570*	0.000734	-1.545758	-1.087716*	-1.393930*
3	39.31635	7.162853	0.000715*	-1.582272*	-0.941013	-1.369713
4	39.90708	0.849171	0.000899	-1.369193	-0.544716	-1.095902
* indicates lag order selected by the criterion						

Table 9. *The Granger Causality Test of LNI and LNINDEX.*

Pairwise Granger Causality Tests			
Sample: 4/21/1991 10/24/2015			
Lags: 3			
Null Hypothesis:	**Obs**	**F-Statistic**	**Prob.**
LNINDEX does not Granger Cause LNI	33	1.29192	0.2981
LNI does not Granger Cause LNINDEX		3.50451	0.0294

In table 9, according to the AIC guidelines mentioned above, the smallest value will be selected, so the lag 3 is the most appropriate lag order. Then the lag 3 will be selected to do the Granger test. In table 10, at a significant level of 5%, the first line accepts the null hypothesis that LNINDEX does not Granger cause LNI, but the second line rejects the null

hypothesis that LNI does not Granger cause LNINDEX, which means that LNI does Granger cause LNINDEX. Therefore, interest rate adjustments have an impact on the stock price index, but stock price movements do not affect interest rates.

3.2.4. Error Correction Model

Since the time series of interest rate and stock price index have a long-term cointegration relationship, we can establish an error correction model to investigate the dynamic relationship between the interest rate and the stock index. The residual sequence E of the interest rate and the stock index is obtained by a cointegration test, then let the error correction term $ecm = e$.

$$\Delta ln\ (INDEX)\ = \beta_0 + \beta_1 \Delta ln\ (I)\ + \alpha ecm_{t-1} + \varepsilon_t$$

Table 10. *The Linear Regression Test of DLNINDEX, DLNI and DRESID.*

Dependent Variable: DLNINDEX				
Method: Least Squares				
Sample (adjusted): 5/15/1993 10/24/2015				
Included observations: 35 after adjustments				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	0.123812	0.062749	1.973119	0.0592
DLNI	0.693548	0.367170	1.888901	0.0701
DRESID	-0.561713	0.095957	-5.853801	0.0000

Through table 11, the equation will be

$$\Delta ln\ (INDEX)\ = 0.1238 + 0.694 \Delta ln\ (I)\ - 0.562 ecm_{t-1}$$

Table 11. *The Linear Regression Test of DLNINDEX, DLNI and DRESID.*

Dependent Variable: DLNINDEX				
Method: Least Squares				
Sample (adjusted): 5/15/1993 10/24/2015				
Included observations: 35 after adjustments				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	0.123812	0.062749	1.973119	0.0592
DLNI	0.693548	0.367170	1.888901	0.0701
DRESID	-0.561713	0.095957	-5.853801	0.0000

In the error correction model obtained by the model above, the effects of the short-term fluctuation can be represented by the difference sub item. At this point, the short-term changes in the stock index can be divided into two parts. The first is the effect of the short-term interest rate adjustment represented by the coefficient of Δln(I), followed by the deviation from the long-run equilibrium as expressed by the coefficient of ecm. When the short-term data deviates from the long-term equilibrium, the error correction term will be given a reverse correction, and the coefficient of ecm indicates the strength of the correction.

The coefficient of Δln(I) is 0.694, which shows that when the short-term interest rate fluctuates in one unit, the stock index will fluctuate by 0.694 units. The coefficient of ecm is -0.562, which indicates that when short-term fluctuations deviate from the long-term equilibrium, there will be an adjustment of size of -0.562, consistent with the reverse correction mechanism. The reverse adjustment can bring stock prices back to long-term equilibrium.

3.3. Analysis of Empirical Results

Through using the Granger Causality test, it can be concluded that at a significant level of 5%, the interest rate is the Granger cause of the Shanghai Composite Index, but the Shanghai composite index is not the Granger cause of the interest rate. In other words, the interest rate can lead to changes in the stock index, but the stock index cannot cause changes in interest rates. Thus, the formulation of interest rate policy in China is not affected by the stock price index. In fact, interest rates are more vulnerable to monetary policy [12]. Through using the Error Correction Model, the short term reaction of stock prices to changes in interest rates is different from the previous theoretical conclusion. However, the empirical research proves that the movement of the interest rate and the Shanghai Composite Index are reverse in the long run, which is in accordance with the previous theoretical conclusion. It shows that the change of stock price index lags behind the change of interest rate in China, and the stock prices cannot respond effectively in the short term. The change of interest rate will affect the company's debt, and then affect the company's share price [13]. Because of the existence of the reverse correction mechanism, once the short-term fluctuation deviates from the long-term equilibrium, the system will adjust the stock index from a non-equilibrium state to an equilibrium state with the adjustment of -0.526.

China's stock market is still considered a weak efficient market, and many theories about the factors affecting stock prices are not well represented in the market of our country. Through studying the data ranging from 1991 to 2015, we can find that there is a significant reverse relationship between China's deposit interest rate and the Shanghai Composite Index, and that the intensity of this influence is increasing day by day. This shows that the stock market in China is becoming increasingly mature in terms of the transmission mechanism of interest rates.

4. Conclusion

Theory suggests the link between value and interest rates is ambiguous and complicated [14]. Through an empirical analysis, it can be found that there is a long-term stable equilibrium between the one year fixed deposit interest rate and the closing price of the Shanghai Composite Index, and that changes in interest rates can cause stock price movements. This dissertation selects data from 1992 to 2015. Eviews8.0 was used to do unit root test, Johansen cointegration test, Granger causality test and error correction model. The following conclusions were drawn.

(1) There is a long-term reverse relationship between the interest rate and the stock price index.

According to the cointegration test of the interest rate and stock price index, we can see that there is a stable cointegration relationship between them. If the long-term interest rate is adjusted by 1 unit, the stock index reverse changes 0.83 units, in accordance with the theoretical analysis of the expected results.

(2) Interest rates are the Granger cause of the stock price index, and the stock price index is not the Granger cause of interest rates.

Through a Granger causality test of the interest rate and the stock price index, a 5% significant level can be seen, so the interest rates are the Granger cause of the stock price index but the stock price index is not the Granger cause of the interest rates. In other words, the stock price index could be explained by the past interest rates. Long-term investors often base their decision to invest in equities on the stated macroeconomic variables [15]. The current interest rate will have an effect on the next stock price index and has a certain prediction function to the stock price index.

(3) The stock price index cannot adjust to the interest rate in a short time.

Through the error correction equation of the interest rate and the stock price index, when short-term interest rates fluctuate by 1 unit, the stock index positively fluctuates by 0.694 units which is not consistent with the test described earlier. In the short run, the stock index will not react to changes in interest rates quickly. Because of the existence of the reverse correction mechanism, once the short-term fluctuation deviates from the long-term equilibrium, the system will adjust the stock index from the non-equilibrium state to the equilibrium state with the adjustment of -0.526.

Compared to developed countries, China's interest rate has a poor conduction speed and quality on stock prices. This paper combines empirical analysis and theoretical analysis, and puts forward some suggestions on the economic policy of China's capital market. Some solutions include, regulating the stock market, improving the transmission mechanism, strengthening the connection between the money market and the capital market and perfecting the supervision mechanism, optimizing the structure of interest rates and improving the policy making process, strengthening investor education and achieving a virtuous circle.

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References

[1] Fama, E. (1990). Stock Returns, Expected Returns, and Real Activity. The Journal of Finance, 45 (4), p. 1089.

[2] Bernanke, B. and Kuttner, K. (n.d.). What Explains the Stock Market's Reaction to Federal Reserve Policy? SSRN Electronic Journal.

[3] Hashemzadeh, N. and Taylor, P. (1988). Stock Prices, Money Supply, and Interest Rates: the Question of Causality. Applied Economics, 20 (12), pp. 1603-1611.

[4] Rahman, M. and Mustafa, M. (1997). Dynamic Linkages and Granger Causality between Short-term US Corporate Bond and Stock Markets. Applied Economics Letters, 4 (2), pp. 89-91.

[5] Durham, J. (n.d.). Does Monetary Policy Affect Stock Prices and Treasury Yields? An Error Correction and Simultaneous Equation Approach. SSRN Electronic Journal.

[6] Camilleri S J, Scicluna N, Bai Y. (2019) Do stock markets lead or lag macroeconomic variables? Evidence from select European countries. The North American Journal of Economics and Finance, (48), pp. 170-186.

[7] Yan, W., Jin, T. (2010). Price Overflow Effect and Volatility Overflow Effect between Interest Rate and Stock Prices. Finance and Trade Economics, (2), pp. 93-102.

[8] Liu, Y. (2014). Research on the Effect of Chinese Interest Rates on Stock Price. Published by Shandong University.

[9] Duan, J., Zeng, L. (2007). The Strategy of Monetary Policy Dealing with Stock Price Fluctuation. The Theory and Practice of Finance and Economics, (3), pp. 52-56.

[10] Wu, Q. (2002). An empirical study on the influence of interest rate change on stock index. Shanghai Tongji University, (5), pp. 11-23.

[11] Ma, J. (2016). A Study on the Effect of Interest Rate Adjustment on Stock Prices in China. Published by Capital University of Economics and Business.

[12] Van Binsbergen J H, Diamond W F, Grotteria M. (2022). Risk-free interest rates. Journal of Financial Economics, (1): 1-29.

[13] Gürkaynak R, Karasoy-Can H G, Lee S S. (2022). Stock market's assessment of monetary policy transmission: The cash flow effect. The Journal of Finance, (4), pp. 2375-2421.

[14] Maloney T, Moskowitz T J. (2021). Value and Interest Rates: Are Rates to Blame for Value's Torments?] The Journal of Portfolio Management, (6), pp. 65-87.

[15] Bhuiyan E M, Chowdhury M. (2020) Macroeconomic variables and stock market indices: Asymmetric dynamics in the US and Canada. The Quarterly Review of Economics and Finance, (77), pp. 62-74.