

Influence of scissors difference of money growth rate on stock market return in different financial cycles

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Abstract. We use TVP-VAR model to study the relationship between the scissors difference of money growth and stock returns in different financial cycles from February 2001 to October 2022. The results show that the scissors difference of money growth rate has a positive effect on the stock return rate that lags behind for one month, but a negative effect on the stock return rate that lags behind for three months. The impact on the half-year lag is almost negligible. In addition, during the financial cycle contraction, the scissors difference of money growth rate has a greater impact on stock returns; In the period of financial cycle expansion, its impact is small. During the financial shock, its impact is between the first two.

Keywords: Financial cycle; Money growth scissors difference; Stock market yield.

1. Introduction

The stock market is an important investment market, and the issue that investors are most concerned about is the stock market return rate. There are many factors that affect the stock market return rate, and many scholars hope to find the factors that affect the stock market return rate trend, so as to predict the stock return rate to obtain excess returns. The research on the stock market return rate is very hot, so more and more variables affecting the stock market return rate have been found. The money market is closely related to the stock market and the financial cycle. The stock market is one of the important indicators reflecting the economic operation, and the rise and fall of stock prices will also be affected by the economic and financial cycle. During the recovery period, the company's profit growth and the improvement of corporate confidence usually push the stock price up; In a slowdown or recession, the opposite is true. In addition, the loosening or tightening of monetary policy will also affect the performance of the stock market. And in a certain period of time, the amount of money in the market is limited, so the liquidity of money will have a certain impact on the stock market price, and the relationship between the money supply and the stock market caused by this has become a widely studied topic in academic circles. Then, does the scissors difference of money growth, an important indicator representing the change of money supply, have different effects on the stock market return rate in different financial cycles?

2. Literature review

2.1. Scissors difference of money growth rate and stock market

Wen Bohui (2012) used probit model to study the month-end closing price and M1M2 growth rate of Shenzhen Composite Index before and after the subprime mortgage crisis from February 2002 to March 2012. Finally, it is concluded that the oblique relationship between M2 and China stock price fluctuation is gradually strengthened before and after the subprime mortgage crisis, and the difference between the year-on-year growth rates of M2 and M1 can predict the stock price fluctuation in the next five months, and the prediction effect is continuously enhanced from before to after the crisis. Zhang lei (2012) found a long-term equilibrium relationship between the scissors difference of money supply and the Shanghai Composite Index through the cointegration-error correction model. A 1% change in scissors difference caused a 9.85% change in the Shanghai Composite Index, but the short-term effects of the two were not obvious. It was also found that the scissors difference index was

ahead of the Shanghai Composite Index by the impulse response function. Liu Chao (2015) conducted structural mutation test and Granger test on scissors difference and stock price from 2004 to 2012. The results show that the currency scissors difference is a stationary sequence without structural mutation, while the Shanghai Composite Index has structural mutation in 2006.9 and 2007.7. Granger test shows that the change of Shanghai Stock Exchange index is the Granger cause of scissors difference, but scissors difference is not the Granger cause of Shanghai Stock Exchange index change. Ren Yufei (2017) used MSUAR model to study the data from 1996 to 2016. The results show that the first-order and second-order lag variables of regional stock price can promote the expansion of scissors difference, and the scissors difference is positively correlated with stock price. Sun Liangwen (2020) added the scissors difference factor to the five-factor model to study the influence of scissors difference on the return of China's A-share market. The results show that scissors difference has a significant positive impact on the stock return model.

To sum up, we can find that there are few scholars who study the relationship between scissors difference and stock market return, and the research results are also different. For example, Wen Bohui (2012) concluded that scissors difference can predict the stock market five months later, while Zhang lei (2012) concluded that scissors difference can predict the stock market three months later. Liu Chao (2015) and Ren Yufei (2017) concluded that the stock will have an impact on the scissors gap, which is not the Granger cause that affects the stock market, while other scholars believe that the scissors gap has an impact on the stock. The research methods are also different. Wen Bohui (2012) before and after the subprime mortgage crisis and Ren Yufei (2017) have been studied in different regions, but at present, no scholars have studied the forecasting effect of scissors difference on stock market returns in different financial cycles in more detail. And at present, no scholars consider the time-varying characteristics of the influence of money growth scissors on stock returns, which will make the results inaccurate. Therefore, we use TVP-VAR model considering time-varying characteristics to study the influence of money growth scissors on stock returns.

2.2. Financial cycle

Financial cycle will affect money growth. Research on the forecast result of scissors difference on stock market return. Chen Yulu's (2016) research shows that it is helpful to economic growth when the financial cycle is stable, and the economic growth is low when the financial cycle fluctuates. Shi Zhenyu (2018) studies that the scissors difference of superficial money growth rate may offset or amplify the monetary policy's efforts to regulate financial cycle and inflation through market liquidity, and it has pro-cyclical characteristics. Liu Juzhao (2020) put the financial cycle into the framework of monetary policy. Through empirical comparison, it is found that the monetary policy rules that incorporate the financial cycle factor perform better. Liu Yuxuan (2022) found that the introduction of financial cycle indicators into the multi-factor stock selection model will increase the rate of return, which shows that financial cycle is an important factor affecting stock volatility. Zhong Chunxiao (2022) studied the influence of monetary policy transmission on the investment efficiency of enterprises in different financial cycle stages, and the results showed that when the financial cycle rose, the investment efficiency of enterprises would rise. From the above literature, we can draw that the financial cycle will have an impact on money supply, monetary policy, stock market, etc. Therefore, the financial cycle may indirectly affect the ability to predict the stock market yield by influencing these factors.

In the selection of synthetic financial cycle index. Ma Yong (2017) uses eight representative financial variables, such as house price, stock price, bank spread, financial leverage ratio and long-term risk premium, to synthesize the financial cycle index by simple arithmetic average method after dimensionless treatment. Zhu Taihui (2018) selected generalized credit, generalized credit /GDP and real estate price to synthesize financial cycle indicators. Wang Chao (2020) considered that there was a high degree of overlap between credit and money supply, and finally selected five variables, including money supply, house price, stock price, interest rate and exchange rate, to form a variable set, and described China's financial cycle by synthesizing FCI. Deng Chuang (2022) selected 8 core

financial indicators such as Shanghai Composite Closing Index, National Housing Prosperity Index and Money Supply (M2) and 10 uncertain financial indicators such as fund turnover and national foreign exchange reserves to synthesize the financial cycle index. Drawing on the previous research results, this paper finally selects the representative index of the stock market: stock price; Representative indicators of money market: market interest rate and credit; Representative indicators of the real estate market: housing price growth rate; Representative index of foreign exchange market: exchange rate, which is used as the basic variable to synthesize the comprehensive index of financial cycle.

3. The scissors difference of money growth rate can predict the stock return: theoretical analysis and empirical facts

3.1. Theoretical analysis

M1= cash+demand deposit

M1 growth rate mainly reflects the growth of corporate demand deposits.

M2=M1+ resident savings deposit+unit time deposit+other unit deposits+customer deposit of securities company.

M2 mainly reflects the changes of time deposits and resident deposits, and its liquidity is weak.

M1-M2 scissors difference refers to the difference between the year-on-year growth rates of M1 and M2. Make the scissors difference of money growth rate F.

$$F = \frac{\Delta M_1}{M_1} - \frac{\Delta M_2}{M_2} \quad (1)$$

$$\text{Make } N = M_2 - M_1, F = \frac{\Delta M_1 * N - \Delta N * M_1}{(M_1 + N) * M_1} \quad (2)$$

$$\text{If } F > 0, \Delta M_1 * N - \Delta N * M_1 > 0, \frac{\Delta M_1}{M_1} > \frac{\Delta N}{N} \quad (3)$$

Because the growth rate is caused by demand deposits and the growth rate of N is caused by time deposits, then the scissors difference of money growth rate is greater than zero, which means that the growth rate of demand deposits is greater than that of time deposits, which means that the growth rate of demand deposits of enterprises is greater than that of time deposits, enterprises and residents are active in transactions, micro-subjects have strong profitability, and economic prosperity is rising. If the growth rate of M1 is less than that of M2, it indicates that enterprises and residents choose to deposit their funds in banks on a regular basis, and the profitability of micro-individuals declines, and the investment opportunities available in the future are limited, and the redundant funds begin to precipitate from the real economy, and the economic operation falls back. Since M2 includes time deposits and savings deposits other than M1, if the growth rate of M1 is faster than that of M2, it indicates that time deposits are in demand, and a large amount of funds turn to M1, which is active in trading, which may have a more positive impact on the supply of funds in the stock market.

The financial cycle essentially depicts the dynamic relationship between financial expansion and financial risks (Zhu Taihui 2018). During the expansion of the financial cycle, the overall liquidity is loose, and financial supervision is also loose, so asset prices are more inclined to rise. However, if financial assets rise too fast, financial risks will continue to gather (Zhang Ming 2021).

At this time, the higher money growth scissors will further aggravate the rise of asset prices. However, when asset prices are overvalued, investors may start to worry about market risks, thus reducing their investment in the stock market, leading to the weakening of the positive impact of the scissors difference in money growth on the stock market return. At this time, the central bank may raise interest rates and tighten credit conditions to curb inflationary pressures and overheating of asset prices. This overweight of monetary policy may slow down the growth of money supply, narrow the scissors gap of money growth and weaken its positive impact on stock market returns.

In the stage of financial tightening, liquidity is generally tight, and financial supervision is generally stricter, so asset prices are more inclined to decline (Zhang Ming 2021). At this time, the central bank may take measures such as lowering interest rates and relaxing credit conditions to stimulate economic growth and investment activities, resulting in an increase in the scissors gap of money growth. The higher scissors gap of money growth may reflect the central bank's willingness to provide more liquidity support, which further strengthens the optimism of the market and investors' confidence in the stock market, thus strengthening the positive impact of scissors gap of money growth on the stock market yield.

3.2. Empirical fact

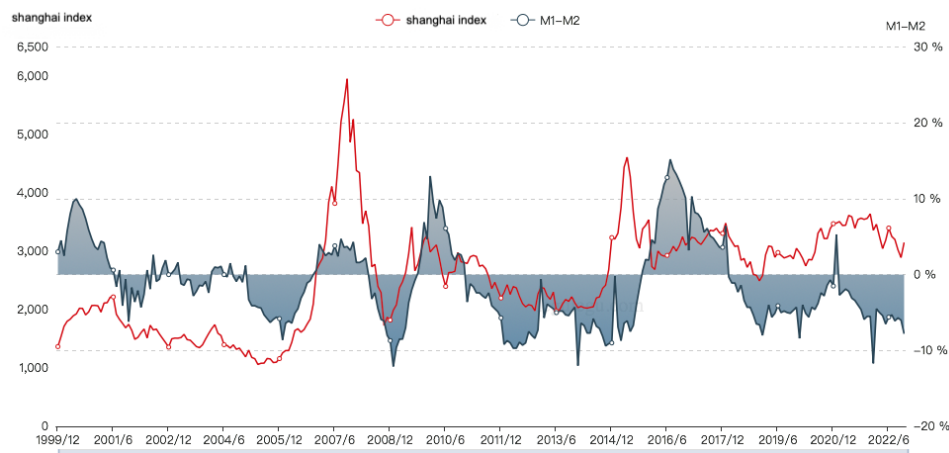


Fig 1. Trend of Shanghai Composite Index and Scissors Difference.

It is not difficult to see from the trend of M1-M2 scissors difference and the trend chart of Shanghai Stock Exchange Index that, on the whole, the trend of M1-M2 is significantly positively correlated with the trend of the stock market, and the irrational trend appeared in 2007 and 2015. Because of the bull market (the stock market rose sharply). By comparing the M1-M2 scissors difference with the trend of the Shanghai Stock Exchange Index in the same period, we can find that the M1-M2 scissors difference will rise upward, and the stock market will also rise upward in the same period. Once the scissors difference falls downward, the stock market will also adjust in the same period. Statistics from 1999 to now show that the scissors difference between M1 and M2 fluctuates between -15 and +15 except for a few extreme cases. When the scissors difference fluctuates downward and reaches -8, it indicates that the stock market is not far from the bottom, while when it fluctuates upward and exceeds +8, it indicates that the stock market is not far from the top. It can be seen that the scissors difference of money growth rate is closely related to the stock market.

4. Model construction

4.1. Constructing comprehensive index of financial cycle

Indicators closely related to the financial cycle mainly come from money market, bond market, stock market, real estate market and foreign exchange market. Referring to Qian Zongxin's (2021) construction of financial cycle index, this paper finally chooses the representative index of stock market: stock price; Representative indicators of money market: market interest rate and credit; Representative indicators of the real estate market: housing price growth rate; Representative index of foreign exchange market: exchange rate, which is used as the basic variable to synthesize the comprehensive index of financial cycle. Among them, the monthly year-on-year growth rate of A-share market index is used as the proxy variable of stock price, the weighted average interest rate of 7-day interbank lending is used as the proxy variable of market interest rate, the credit of non-financial sector is used as the proxy variable, the growth rate of national housing prosperity index is used as the proxy variable, and the real effective exchange rate is the proxy variable of exchange rate. The

above data are all from the national Taian database. For some missing data, exponential smoothing method is used to supplement the missing data. Because the data used above are different in types and units of measurement, we need to "dimensionless" the data first, and standardize it with the Min-Max dimensionless method according to Ma Yong (2017).

$$V'_{it} = 100 * \frac{V_{it} - \text{Min}(V_i)}{\text{Max}(V_i) - \text{Min}(V_i)} \quad (4)$$

Among them, V_{it} is the original value of variable I in the t period, $\text{Max}(V_i), \text{Min}(V_i)$ is the maximum and minimum value of variable I in the sample interval. Finally, V'_{it} is the standardized value of variable I after processing in the t period, and its value range is [0,100]. If its value increases, the financial cycle prosperity will increase, while if it decreases, the financial cycle prosperity will decrease. Finally, the comprehensive index of each variable is synthesized by simple arithmetic average as shown in the figure below.

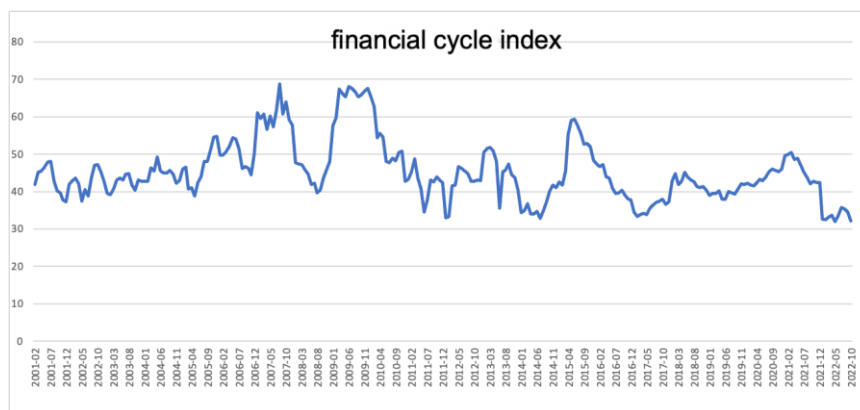


Fig 2. Financial cycle trend.

It can be seen from the figure that from 2000 to 2006, China's financial cycle index remained at a high level of 40-60 during this period, because China's economy was in a stage of rapid development at this stage. From 2006 to 2018, China's financial cycle has three obvious small cycles. The first small cycle is from 2006.7 to 2009. During this period, China's financial cycle index changed greatly, first rising to the highest point and then falling to the lowest point. Before the financial crisis in 2008, the financial cycle index was on the rise, and after the financial crisis, it began to decline rapidly. The second small cycle is from 2009 to 2012. First, the financial cycle index rose to the highest point from 2009 to 2010, because the easing policy implemented by the state came into effect. In 2011, China began to implement prudent monetary and fiscal policies, so the financial cycle index began to decline. The third small cycle is from July 2014 to June 2017. First, the financial cycle index rose from July 2014 to May 2015, because during this period, the economy recovered, oil prices fell, and the stock market soared. In September 2014, the central bank set up a medium-term loan facility, which reduced the cost of social financing. The decline of the financial cycle index from May 2015 to July 2017 is due to a series of macro-control policies issued by the China government during this period to curb the real estate market bubble and financial risks. These policies include restricting real estate investment, tightening credit and controlling money supply, which may reduce the activity of financial markets. Affected by the epidemic in 2020, China's financial index is also depressed. Generally speaking, the trend of financial cycle index is in line with China's economic situation.

4.2. TVP-VAR model

VAR model is a commonly used multivariate time series analysis method, which assumes that the relationship between variables is linear and does not change with time. However, in practical application, the relationship between variables often changes, such as financial crisis and other events will cause structural changes in the relationship between economic variables. In order to better capture this change, researchers put forward TVP-VAR model (Time-Varying Parameter VAR), also known as dynamic VAR model. The basic form of VAR model is:

$$AY_t = F_1 Y_{t-1} + \dots + F_p Y_{t-p} + \varepsilon_t \quad t = p+1, \dots, n \quad (5)$$

Where, Y_t is a vector of $k \times 1$, representing k variables in T period; $A, F_1, \dots, F_p$ is a coefficient matrix of $k \times k$ and ε_t is a random error vector of $k \times 1$, assuming u_t normal distribution $\varepsilon_t \sim N(0, \Sigma)$ and Σ satisfying

$$\Sigma = \begin{pmatrix} \sigma_1 & 0 & \dots & 0 \\ \vdots & \ddots & \ddots & \vdots \\ 0 & \dots & 0 & \sigma_k \end{pmatrix} \quad (6)$$

Matrix A is a lower triangular matrix.

$$A = \begin{pmatrix} 1 & 0 & \dots & 0 \\ a_{21} & \ddots & \ddots & \vdots \\ \vdots & \dots & a_{k,k-1} & 0 \\ a_{k1} & \dots & \dots & 1 \end{pmatrix} \quad (7)$$

Therefore, the above formula can be simplified as:

$Y_t = B_1 Y_{t-1} + \dots + B_p Y_{t-p} + A^{-1} u_t$, $B_i = A^{-1} F_i$, $i = 1, \dots, p$; $u_t \sim N(0, I_k)$ Is a random disturbance term, the model can be further simplified as:

$$Y_t = X_t \beta + A^{-1} \Sigma u_t, \quad X_t = I_k \otimes (y_{t-1} \dots y_{t-p}) \quad (8)$$

The coefficients in the model are fixed and do not change with time. The TVP-VAR model allows the coefficients in the VAR model to change with time, that is, the fixed parameters in the VAR model are transformed into dynamic parameters, which can more accurately reflect the changes of the relationship between variables in time.

TVP-VAR model transforms coefficient matrix A into dynamic parameters β_t , namely:

$$Y_t = X_t \beta_t + A^{-1} \Sigma u_t, t = p+1, \dots, n \quad (9)$$

Referring to the definition of primiceri(2005), $a_t = (a_{21}, a_{31}, a_{41}, \dots, a_{k,k-1})$ defined as a matrix composed of elements in; $h_{jt} = \log \sigma_{jt}^2$, $j = 1, \dots, k$, $h_t = (h_{1t}, \dots, h_{kt})$ represents random volatility.

Assuming that the time-varying parameters in the model obey the first-order random walk: $\beta_{t+1} = \beta_t + \mu_{\beta t}$, $a_{t+1} = a_t + \mu_{at}$, $h_{t+1} = h_t + \mu_{ht}$. In the TVP-VAR model, each coefficient is modeled as a dynamic variable, and the changes of these coefficients are estimated by fitting historical data. This setting will increase the flexibility of the model, but it will also increase the difficulty of parameter estimation. If the maximum square method or the maximum likelihood method is used, the over-identification of parameters will be caused, and this change MCMC usually be handled by Bayesian statistical methods, that is, Bayesian methods are used to estimate and predict the time-varying coefficients, so we refer to NaKajima (2011).

Generally speaking, TVP-VAR model is a model that introduces time variables on the basis of VAR model, which can better describe the changes of the relationship between variables and help to predict and analyze the data in financial and macroeconomic fields more accurately.

Finally, regarding the order of setting variables, the order of variables will have a certain impact on the model results. The variables ranked behind have no current impact on the previous variables, but only lag impact, so the order of our variables should be reasonable. Because finance has a great impact on other economic variables, we put it last. According to the previous literature review, the scissors difference of money growth rate can predict the lagging stock market return rate, so we put the scissors difference of money growth rate behind the stock market return rate. So in the end, the order of our variables is: stock market yield, money growth scissors difference, financial cycle.

5. Empirical analysis

5.1. Data selection

China's modern stock market includes two trading markets in Shanghai and Shenzhen, which started trading in 1990. 1990-1996 was the initial stage, the number of listed companies was relatively

small, the market transaction volume was relatively small, and the rate of return fluctuated greatly. Therefore, this paper excludes this initial period in data selection, and we choose all the normal listed A-share information data of Shanghai and Shenzhen stock markets from February 2001 to September 2022 as the research sample. The data of stock returns in China A-share market are taken from Reith database. The data in this paper is monthly frequency, and the data of M1-M2 scissors difference comes from official website, a Legou music company, from February 2001 to September 2022. The financial cycle index is a monthly index constructed by the previous section. Let's use X to indicate the scissors difference of money growth rate, Y to indicate the stock market return rate, and Z to indicate the financial cycle.

5.2. Variable test

5.2.1 Stationary test

Table 1. Stationarity test result.

variable	Inspection type	ADF	1%	5%	10%	P	result
x	intercept	-2.6978	-3.4553	-2.8724	-2.5726	0.0757	Nonstationary
	Trend and intercept	-2.7367	-3.9937	-3.4272	-3.1368	0.022	Nonstationary
	none	-2.1745	-2.5738	-1.942	-1.6158	0.0215	Nonstationary
D(x)	intercept	-13.5466	-3.4543	-2.8720	-2.5724	0.0000	stable
	Trend and intercept	-13.5212	-3.9922	-3.426	-3.1364	0.0000	stable
	none	-13.5646	-2.5735	-1.9419	-1.6159	0.0000	stable
y	intercept	-10.033	-3.4542	-2.8719	-2.5723	0.0000	stable
	Trend and intercept	-14.3105	-3.992	-3.4263	-3.1364	0.0000	stable
	none	-14.2569	-2.5734	-1.9419	-1.6159	0.0000	stable
z	intercept	-3.0288	-3.4553	-2.8724	-2.5726	0.0206	Nonstationary
	Trend and intercept	-4.6097	-3.993	-3.4217	-3.1368	0.0012	stable
	none	-1.081	-2.5739	-1.9420	-1.9420	-1.61	Nonstationary
D (z)	intercept	-14.027	-3.5548	-2.8724	-2.5726	0.0000	stable
	Trend and intercept	-14.0101	-3.9938	-3.4272	-3.1369	0.0000	stable
	none	-14.0264	-2.5739	-1.9420	-1.6158	0.0000	stable

From the above table, we can see that the scissors difference of money growth and the financial cycle index are not stationary series, but their first-order difference series is stationary. Because the VAR model requires the series to be stationary, the X data and the financial cycle index after the first-order difference are adopted in the subsequent model demonstration.

5.2.2. Nonlinear Granger causality test

Table 2. Non-parametric Granger test of scissors difference and stock market return index.

Lag order	$x \nrightarrow y$				$y \nrightarrow x$			
	origin		unif		origin		unif	
	HJ	T	HJ	T	HJ	T	HJ	T
1	0.1454	1.0563	0.2956	0.5368	0.7641	-0.7198	0.4451	0.1378
2	0.0855	1.3689	0.0438	1.7080	0.5338	-0.0850	0.1784	0.9211
3	0.0764	1.4291	0.1097	1.2277	0.6685	-0.4357	0.3628	0.3509
4	0.1308	1.1225	0.3319	0.4344	0.5902	-0.2282	0.2285	0.7436
5	0.4596	0.1014	0.3510	0.3824	0.7163	-0.5720	0.1392	1.0835
6	0.4943	0.0141	0.2926	0.5456	0.7003	-0.5252	0.1406	1.0771
7	0.6016	-0.2576	0.2918	0.5478	0.9040	-1.304	0.2629	0.6343
8	0.6324	-0.3383	0.2016	0.8356	0.8890	-1.2213	0.6423	-0.3646

The results show that there is no significant difference between the P values of "HJ test" and "T test" based on the original series (origin) and the transformed series (unif). Next, we analyze the results based on the "HJ test" of the transformation sequence. From the results of the table, it can be

seen that when the p value of the "HJ test" created by Diks and Panchenko(2006) is 0.0438 less than 0.1, the original hypothesis is rejected at the significance level of 1%. This shows that the scissors difference is the Granger reason for the stock market return after two months' lag. However, no matter how long the lag is, the P value of the "HJ test" of the stock market return rate and the scissors difference cannot reject the original hypothesis, which shows that the stock market return rate is not the Granger cause of the scissors difference.

5.2.3. Stability test of VAR model

Next, the stability of the VAR model is tested. After testing, the VAR model has two characteristic roots. And the reciprocal module of each characteristic root is in the unit circle, and there is no root outside the unit circle. Therefore, the VAR model passes the stability test, and the model is considered to be stable. The test result is as follows.

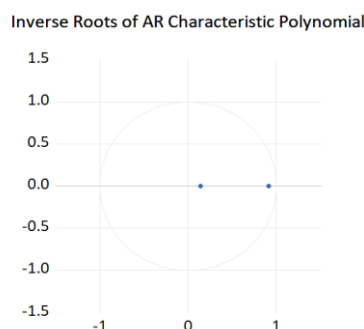


Fig 3. Stability test results of VAR model.

5.3. Empirical results of TVP-VAR model

We use the first-order differential data of stock market return, money growth scissors difference and financial cycle index growth as variables to construct TVP-VAR model. Monte Carlo simulation method (MCMC) is used to estimate the relevant parameters in the model for 10,000 times. The first 1,000 times are discarded as the results of pre-firing, and the results of the last 9,000 times are used to estimate the parameters.

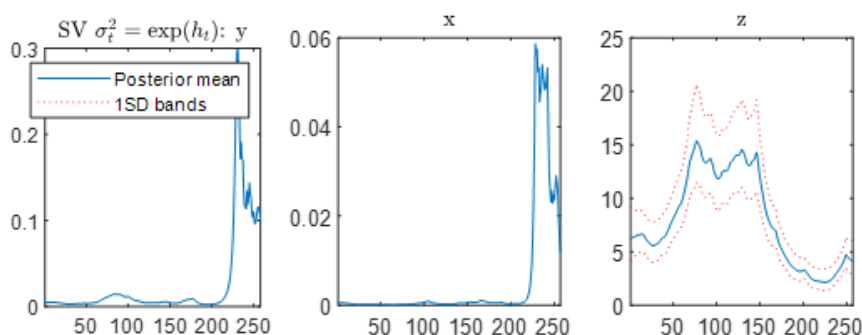


Fig 4. Time-varying characteristics of random volatility among variables.

Figure 4 shows the stochastic volatility characteristics of each variable. It can be seen that the volatility of stock market returns is relatively small before 2020, because China has strengthened the supervision of financial markets before that, and these measures have enhanced the transparency and predictability of the market, thus improving investors' confidence and market stability and reducing the volatility of stock market returns. At the end of 2019, the outbreak of epidemic in COVID-19 led to a series of prevention and control measures, such as traffic control, enterprise shutdown, tourism damage, etc., which had a great impact on the economy. These uncertain factors lead to investors' emotional fluctuations, which in turn increases the volatility of stock market returns.

The volatility of scissors difference in money growth was close to zero before 2019, and it began to rise to a peak at the end of 2019, and then began to decline. Before 2019, China began to implement a macroeconomic policy based on a "prudent" monetary policy, maintaining a relatively stable growth

rate of M2, while strengthening control over the growth rate of M1 to avoid inflation risks. In this way, the difference between the growth rates of M1 and M2 is reduced, thus reducing the volatility of the growth rate of scissors difference between M1 and M2. At the end of 2019, with the outbreak of the epidemic, China's economy has undergone complex changes, which led to a significant increase in the fluctuation of M1-M2 money growth scissors. Then, with the improvement of the epidemic, the fluctuation of money growth scissors began to decrease, but it was still much larger than before the epidemic.

The volatility of the financial cycle peaked in 2008 due to the financial crisis, and then began to decline. Then, with the arrival of the stock market crash in 2015, its volatility began to rise again, and then it began to decrease with the stable financial development.

Generally speaking, the random volatility of each variable is basically consistent with the trend of China's economic form.

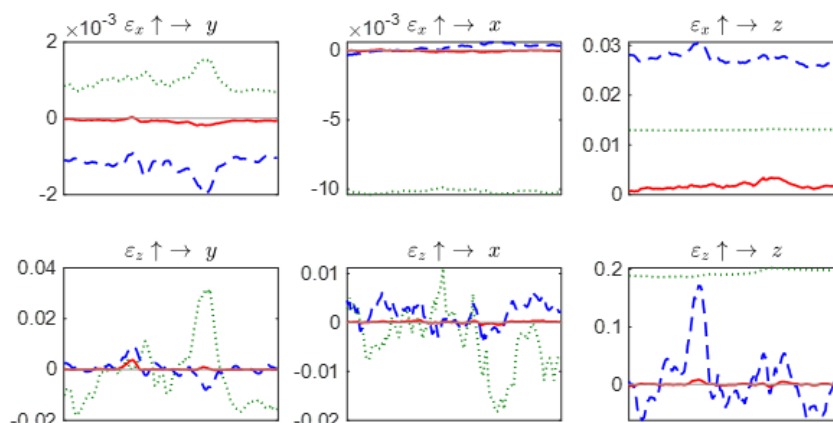


Fig 5. Equispaced impulse response diagram.

Fig. 5 is an equally spaced impulse response function with a lag of one phase, two phases and three phases, respectively. On the graph, the horizontal axis represents time, and the vertical axis is the corresponding impulse response value. Specifically, we only study the impact of scissors difference of money growth on stock market returns under the influence of financial cycle. It can be seen from the figure that the scissors difference of money growth rate has a positive effect on the stock market return rate that lags behind for one month, a negative effect on the stock market return rate that lags behind for three months and almost zero effect on the stock market return rate that lags behind for half a year. The impact of stock market return rate on the scissors difference of money growth rate that lags behind one month is positive, the impact on the scissors difference of money growth rate that lags behind three months is negative, and the impact on the scissors difference of money growth rate that lags behind half a year is almost zero. And with the change of time, the impact of money growth scissors on stock market returns is also different. In order to see its impact trend more clearly, we have made a three-dimensional impulse response diagram.

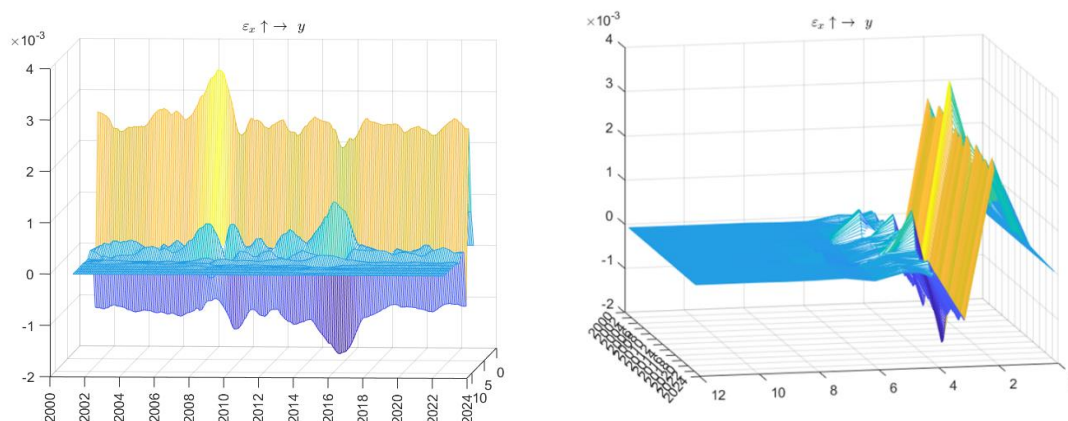


Fig 6. Three-dimensional impulse response diagram of x to y.

From the trend of the financial cycle index synthesized above and the trend in Figure 3, we can find that during the financial crisis in 2008 (financial cycle contraction), the scissors difference of money growth had the greatest impact on the stock market return, and its impact began to decline as the crisis faded (financial cycle expansion). During the big bull market from July 2014 to early 2015 (financial cycle expansion), the scissors difference of money growth had the least impact on the stock market return, and its impact began to rise after June 2015 with the occurrence of stock market crash (financial cycle contraction). Other time periods showed a slight fluctuation. Therefore, we can get that when the financial cycle is tight, the scissors difference of money growth has a greater positive impact on the stock market return, and when the financial cycle is tight, its impact will be relatively small. The scissors difference of money growth rate has a positive effect on the financial cycle that lags behind one month, a negative effect on the financial cycle that lags behind three months, and a close to zero effect on the financial cycle that lags behind half a year.

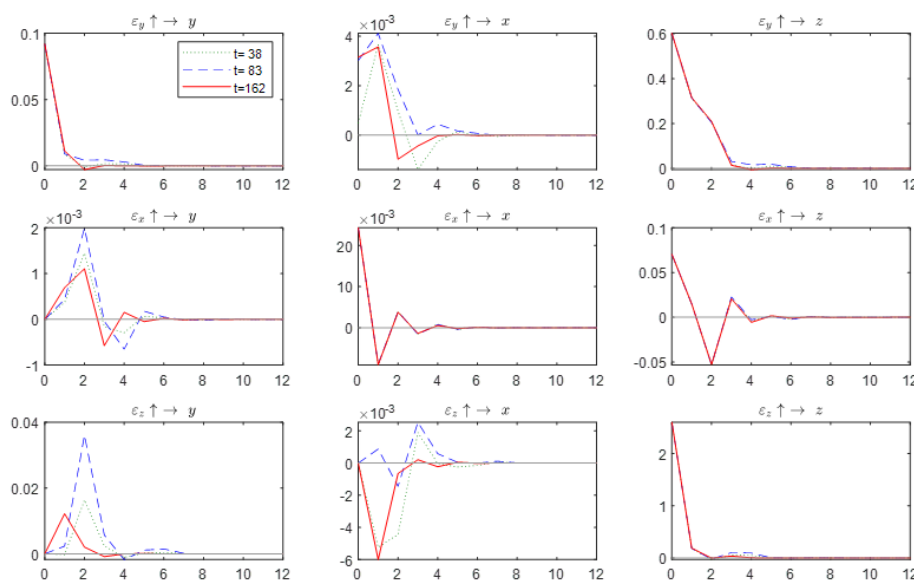


Fig 7. Impulse response diagram at different time points.

From Figures 2 and 3, it can be seen that the relationship between variables has obvious time-varying characteristics. In order to further analyze the influence of scissors difference of money growth on stock market returns in different financial cycles, we select the 38th month (January 2004), the 83rd month (January 2008) and the 162nd month (August 2014), which correspond to the shock, contraction and expansion of financial cycles respectively, as the three impulse response time points.

From Figure 4, we can see that the trends of these three periods are roughly the same. The impact of the scissors difference of money growth on the stock market returns showed that it first increased to the maximum, then began to decrease after the second period, turned negative in the third period, and gradually disappeared after the sixth period. The difference is that when the financial cycle is tight (the 83rd month), the scissors difference of money growth has the greatest impact on the stock market return, followed by the financial cycle shock (the 38th month), and the least impact is when the financial cycle expands (the 162nd month).

6. Conclusion

By using TVP-VAR model, we study the relationship between the scissors difference of money growth and the stock market return in different financial cycles from February 2001 to October 2022. The results show that the scissors difference of money growth rate has a positive effect on the stock market return rate that lags behind one month, a negative effect on the stock market return rate that lags behind three months and almost zero effect on the stock market return rate that lags behind half a year. Moreover, when the financial cycle is tight, the scissors difference of money growth has a greater impact on the stock market return, while when the financial cycle is expanding, its impact is

smaller, and its impact is between the first two. Therefore, when investors invest in stocks, they should first understand what stage the macro-environment financial cycle is in, and then use the scissors difference of money growth rate to predict the stock market yield, and then formulate investment strategies.

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