

Empirical Analysis of the Impact of Monetary Policy on the Return Rate of Chinese Stock Market

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Abstract: Monetary policy as a typical means of macro-control, its impact on the stock market is the key issue of this research, has a very important research value. This paper uses literature analysis to sort out relevant literature from the aspects of whether monetary policy affects the stock market, the channels of influence, the characteristics of influence, etc., and summarizes the relevant theories of monetary policy affecting the stock market. Then, the influence mechanism of the two intermediary channels, credit effect and asset portfolio effect, was analyzed, corresponding hypotheses were proposed, and the corresponding intermediary effect model was established. The monthly data of the stock market return rate of the whole Shanghai Stock market from January 2015 to November 2024 were selected as the research object, and the individual fixed effect model was used to control the industry effect. Three kinds of intermediary effects are used to explore the mechanism of monetary policy affecting stock market returns. Finally, the conclusion is drawn: first, the broad money quantity, the statutory deposit reserve and the medium-term lending facility will affect the return rate of the stock market; Second, the loosening of monetary policy will promote the rise of stock market through credit effect; Third, the easing of monetary policy will promote the rise of the stock market through the portfolio effect.

Keywords: Monetary policy, stock market return, mediating effect

1. Introduction

1.1. Research background

Along with the rapid development of economy, the scale of China's stock market expands rapidly, the number of listed enterprises increases gradually, and the number of investors, capital and rationality degree also get a certain development. As of December 2024, there are 5,383 A-share listed companies in Shanghai and Shenzhen, with A total market value of 93.97 trillion yuan, while the annual turnover of the A-share market totaled 1.06 trillion yuan, A historical annual peak. As of December 31, the Shanghai Composite Index closed at 3,351.76 points, an annual increase of 12.67%, the largest increase in nearly four years; The CSI 300 index, the chinext Index and the Science and Innovation 50 index rose 14.68%, 13.23% and 16.07%, respectively, the largest gains in nearly four years. The rapid expansion of the stock market will affect all aspects of the national economy, and the fluctuation of its yield is related to financial stability and economic development.

At the same time, the central government also clearly pointed out that efforts should be made to build an effective market mechanism, active micro-entities and a moderate macro-control system. At the same time, we should strengthen the financing function of our multi-level capital market, establish a modern central bank system, improve our money supply management system, and establish a sound modern financial system. Therefore, in the future development, we should take the initiative to use the control tools, build a market-oriented modern financial system, and promote the high-quality development of the capital market is an important topic in this field. Under the strategic goal of China actively promoting the construction of modern financial system and building a "financial power", it is of great significance to discuss how China's monetary policy affects the stock market, both in theory and in reality.

1.2. Research significance

In terms of practical value and practical significance, as the largest developing country, China is currently actively building a modern financial system, and a market-oriented financial system will be the focus of future development, with an open, transparent and growth-oriented capital market as the center. Securities market is an important part of China's economic development, and its response to monetary policy is directly related to the success or failure of China's financial development and financial stability. Under this background, through the analysis of interest rate level and interest rate level of China's securities market, it can provide theoretical basis for the establishment of monetary policy in our country. At the same time, the performance of the stock market will also affect the market value of a stock, the financing situation, and even the operation of the company. Therefore, in order to maintain the steady development of China's financial industry, it is necessary to study the impact of China's monetary policy on the stock market returns and take appropriate measures to avoid unnecessary economic changes.

2. Literature Review

2.1. A view study on the effect of monetary policy on stock market returns

Monetary policy is a macroeconomic policy with money supply as the object of regulation, so the research on the impact of monetary policy on stock market returns starts from the impact of money supply on stock prices. Rigobon and Sack[1], after considering the endogenous problem of using stock price and interest rate modeling, believed that stock market would respond to monetary policy changes accordingly. Bjornland and Leitemo[2] studied the synchronicity of monetary policy and stock price changes and found that monetary policy had a significant impact on stock price.

Subsequently, scholars further explored whether the two would influence each other. Gospodinov and Jamali[3] studied the reaction of the stock market after the change of monetary policy under dynamic circumstances, and concluded that the change of monetary policy had a significant impact on the volatility and returns of the stock market. Zhang Hongwei and Ran Fang[4] conducted an empirical analysis using the monthly data of China's market from 2001 to 2015 and found that the impact of money supply fluctuations had a significant impact on asset prices represented by stocks and real estate. Wang LAN, Chen Langnan et al.[5] used the VAR model with time-varying disturbance terms and coefficients, and found that the money supply and interest rate indicators of monetary policy would have a significant impact on the volatility of the stock market in the short term.

2.2. Research on the transmission path of the impact of monetary policy on stock market returns

After some research on the basic issues of monetary policy's impact on the stock market, scholars have also explored the channels through which monetary policy affects the stock market. Ioannidis and Kontonikas[6] expound the impact of monetary policy on stock price through discounted cash flow model, and find that monetary policy on the one hand affects the discount rate R expected by investors, thus affecting stock price; on the other hand, it affects investors' expectation level of future cash flow (that is, dividends). This has also had an impact on share prices. Hussain[7] believes that monetary policy can affect stock market prices not only through discount rate and expected cash flow, but also through three channels: signaling of future economic development, influencing asset allocation and asset mix, and influencing investor sentiment and psychology. Challe and Giannitsarou[8] believe that changes in interest rate indicators of monetary policy are negatively correlated with stock prices, and the changes in federal funds rate affect stock prices through three channels: real interest rate, dividend and excess return.

While exploring the channels or intermediaries through which monetary policy affects stock market returns, what policy tools or intermediary targets of monetary policy have a more obvious impact on stock market returns is also an important branch direction for scholars to study. Some scholars have also studied what kind of intermediary target is more effective in influencing the stock market. Chen Jiyong [9] believes that the credit growth rate, money supply and interest rate have different impacts on the stock market, and there are obvious differences. Jiang Sangeng and Li Xiaoyan [10] believe that the change of interest rate has a limited impact on the stock market, while the change of money supply has a greater impact on the stock market.

2.3. Research on the characteristics of the influence of monetary policy on stock market

With the deepening of the research, the characteristics of the impact of monetary policy on the stock market have become the direction of further exploration by many scholars. Ren Aihua, Li Pengyan and Wang Shu[11] adopted the time-varying parameter model to explore the impact of monetary policy changes on the liquidity of the stock market. The results show that the impact of monetary policy changes on the liquidity of the stock market is reflected in the nonlinearity of policy models and periods. Qi Yue and Liu Tongyang[12] used the time-varying parameter vector autoregression (TVP-VAR) model and nonlinear Granger test to study the impact of monetary policy on stock assets and real estate. The results show that in different periods, the degree and duration of the impact of monetary policy on stock asset prices are different, and the impact of interest rate on stock prices has a lag. Ding Jisha [13] the standing lending facility failed to play a good role in reducing the volatility of stock market returns, while the medium-term lending facility significantly suppressed the volatility of stock market returns, and there were obvious differences in the impact of medium-term lending facilities with different maturities on the volatility of stock market returns.

3. Literature Review

3.1. Research assumption

3.1.1. Whether monetary policy can affect stock market returns

With the rapid development of China's financial market, the transmission channels of monetary policy in China's securities market are increasing day by day. It is difficult to make a rational explanation of various practical problems simply from the perspective of capital supply and demand. Based on the perspective of capital supply and demand, some scholars have deeply discussed the action path of

monetary policy on stock price, and given relevant views from the discounted cash flow model. Based on the existing research results, this topic discusses the regulating effect of monetary policy on the stock market from the three aspects of credit, asset portfolio and interest rate, which is in essence an in-depth study of the "first step" of China's monetary policy to the financial market.

Before exploring the intermediary effect, it is necessary to answer the question "whether monetary policy can affect the return rate of the stock market", which is the prerequisite for further exploring the intermediary effect. This paper is based on the study of the mediating effect of the influence, therefore, hypothesis H1 is proposed:

H1 The expansion of monetary policy can affect the stock market.

3.1.2. Credit effect

The credit effect takes the social credit situation as the transmission intermediary variable between monetary policy and stock market. The change of money supply will affect the quantity and price of credit obtained by enterprises. It is shown that when the money supply increases, the scale of social financing will also increase, that is, enterprises will get more financial support. This phenomenon indicates that enterprises will increase investment and expand production capacity, thus improving the company's profits; And equity investors will get more dividends, from the investor's point of view, the value of the company has been increased.

From these two points of view, under the credit effect, the increase in money supply will make rational investors more bullish on stock market performance.

Therefore, hypothesis H2 is proposed:

H2 Monetary policy will promote the rise of the stock market through the credit effect and improve the stock market closing profit rate.

3.2. Index selection

3.2.1. Explained variable

The Shanghai Stock Exchange Index has the longest history in China's stock market. This study selects the return rate of the Shanghai Stock Exchange Index covering the whole industry in the A-share market to reflect the return rate of various industries, and uses IR as the return rate indicator. Stock return rate usually refers to the return rate of investment. In this paper, the stock market return rate of the whole industry of Shanghai Stock Exchange is selected, including the ten industries of energy, materials, industry, optional, consumption, medicine, finance, information, telecommunications and public utility, and the industry closing index is used as the basic data to calculate the industry return rate

3.2.2. Explaining variable

Based on previous studies of scholars, M2[14] and deposit reserve ratio[15] are selected as indicators to evaluate monetary policy. In view of the fact that MLF is the most commonly used monetary policy tool of the central bank, MLF[16] is included in the explanatory variable category. In addition, in order to maintain a match with the monthly measure of IR of the stock market industry yield, the monthly growth data of M2 and the monthly data of MLF are further selected to represent the tightness of monetary policy.

3.2.3. Mediating variable

In the setting of intermediary variables, the monthly month-on-month growth rate (Scale) of the scale of social financing is selected as the measurement index of credit effect. The scale of social financing

is an indicator reflecting the better financial support status of enterprises, which is conducive to in-depth analysis of how monetary strategies affect the stock market through credit channels.

3.2.4. Control variable

In the process of selecting control variables, a total of four control variables are included. In view of the fact that the industry dynamics of the stock market belong to a more detailed level compared with the macroeconomic situation of the country, this study selected two variables as control indicators from the micro and macro dimensions respectively. In the micro dimension, the average monthly trading volume and turnover rate of Shanghai A-shares are included as variables, which is A key index to measure the trading activity and market sentiment in the stock market, and is closely related to the change of stock market returns. In the macro dimension, the RMB exchange rate against the US dollar and the pledged repurchase rate are selected as variables, which can reflect key information of capital flow, investment and foreign trade, and have A significant correlation with the return rate of the A-share market. The pledged repo rate has a significant impact on the short-term market interest rate.

3.3. Data source

In this paper, the whole industry of SSE is selected as an individual, including energy, materials, industry, optional, consumption, medicine, finance, information, telecommunications and public utility of SSE. It is divided into 10 industries. Data from January 2015 to November 2024 are selected, and a total of 1190 sample observations are collected to form panel data. Among the selected variables, the relevant data were all from the Wind database, and the empirical process was completed by Stata17.

3.3.1. Descriptive statistics

The specific symbols, meanings and calculation methods of each variable selected according to the model are shown in Table 1.

Table 1: Definition and design of variables

	Variable symbol	Variable meaning	Calculation mode
Explained variable	IR	Stock industry return rate	monthly market return rate of the whole industry
	M2	Broad money supply	The monthly yield of M2
Explaining variable	Rrr	Deposit reserve ratio	Required reserve ratio
	MLF	Medium-term lending facility	monthly growth rate of the MLF
Mediating variable	Scale	Scale of social financing	The growth rate of the scale of social financing
	Volume	Trading volume	Monthly trading volume of the Shanghai Index
Control variable	Turnover	Turnover rate	Monthly turnover rate of the Shanghai Index
	Exchange	Exchange rate	Central parity of the exchange rate(USD and RMB)
	Rep_r	Pledged repo rate	The monthly value of the SSE 7-day pledge repo rate

Descriptive statistics of variables are as follows:

Table 2: Descriptive statistics of variables

Variable	Obs	Mean	Std. dev.	Min	Max
IR	1190	0.4536926	7.676442	-32.71392	41.92808
M2	1190	0.7898319	0.8037758	-1.18	2.77
Rrr	1190	13.88655	2.893859	9.5	20
MLF	1190	0.2730702	1.135829	-0.8243243	7.625
Scale	1190	0.1015043	3.187269	-32.34195	4.933158
Volume	1190	0.0571513	0.3596499	-0.486	1.612
Turnover	1190	0.787	0.3703057	0.342	2.36
Exchange	1190	6.732613	0.3033829	6.114	7.184
Rep_r	1190	3.039834	0.9138825	1.6494	5.7119

3.3.2. Data stationarity test

First, the panel unit root test of variable data was carried out, and the LLC test was adopted in this paper, as shown in Table 3. It can be seen that because the relevant data selected are mostly monthly growth or month-on-month growth rate data, the phenomenon of instability in some financial market related data has been avoided, and the data has been tested to be stable.

Table 3: Panel unit root test results for variable data

Variable	Unadjusted-t	Adjusted-t*	P	Stationarity
IR	-35.4739	-41.1673	0.0000	Stationary
M2	-34.5341	-36.7897	0.0000	Stationary
Rrr	-33.4703	-35.1361	0.0000	Stationary
MLF	-32.2689	-33.7503	0.0000	Stationary
Scale	-34.8972	-37.0879	0.0000	Stationary
Volume	-33.2689	-34.1502	0.0000	Stationary
Turnover	-18.3924	-15.6888	0.0000	Stationary
Exchange	-30.4145	-28.9302	0.0000	Stationary
Rep_r	-38.0734	-41.4073	0.0000	Stationary

Before regression, it is necessary to test the correlation of variables to determine whether there is a multicollinearity problem. Variance expansion coefficient (VIF) is an index to judge multicollinearity. Table 4 conducts VIF test on explanatory variables in this paper, and the specific results are as follows:

Table 4: Multicollinearity test results of variable data

Variable	VIF	1/VIF
Rep_r	3.74	0.267276
Yield_t	3.48	0.287389
Rrr	3.31	0.301938
M2	2.64	0.379289
Exchange	2.37	0.422778
Turnover	1.71	0.586280
Volume	1.21	0.823479
Scale	1.11	0.904373
MLF	1.07	0.931011
Mean VIF	2.33	

It is found that the VIF of the pledge repurchase rate (Rep_r) variable is the largest, and its VIF value is 3.74. However, the average VIF is only 2.33, neither of which exceeds 10. It can be seen that there is no serious multicollinearity among explanatory variables, and panel estimation can be performed.

3.4. Model construction

3.4.1. Panel regression analysis benchmark model construction

In the part of model setting test, Chow test is carried out first. The test is POOL model or fixed effect model. The test results are shown in Table 5:

Table 5: Fixed effect test results

	F-test	Prob>F
LR	20.12	0.9946

It can be seen that the test value of the model is much larger than the critical value corresponding to the significance level of 5%, which indicates that the null hypothesis should be rejected, indicating that the intercept term of the model is changing, and the POOL model should not be established. Next, continue to conduct Chow test to test whether it is POOL model or random effects model, and the test results are shown in Table 6:

Table 6: Random effects test results

	chibar2(01)	Prob>chibar2
LR	0.00	1.0000

It can be seen that the model test value is less than the critical value corresponding to the significance level of 5%, indicating that the random effect is not significant. Based on this conclusion, the Hausman test should be continued for further verification. The results of the Hausman test are shown in Table 7. It can be seen that the Hausman test statistic is 8.52 and the corresponding P-value is 1.0000, indicating that the original hypothesis that the model is an individual random effect can be rejected and the individual fixed effect model should be set. In summary, an individual fixed effect model should be set up.

Table 7: Hausman test results

	chibar2(01)	Prob>chibar2
F	8.52	1.0000

In order to test the comprehensive impact of monetary policy on stock market returns, the overall regression model is first set up:

$$IR_{it} = \alpha_0 + \alpha_1 M2_{it} + \alpha_2 Rrr_{it} + \alpha_3 MLF_{it} + \alpha_4 Control_{it} + \theta_i + \varepsilon_{it} \quad (1)$$

ε_{it} is the random disturbance term, where the subscript i represents the industry, t represents the month, and θ_i is the fixed effect of the industry individual.

3.4.2. Construction of mediating effect model

In order to further explore whether monetary policy will affect the return rate of the stock market industry through three intermediary effects, this paper sets a model to conduct a stepwise regression test on the three intermediary effects. The intermediary effect model is set as follows:

$$Scale_{it} = \beta_0 + \beta_1 M2_{it} + \beta_2 Rrr_{it} + \beta_3 MLF_{it} + \beta_4 Control_{it} + \theta_i + \varepsilon_{it} \quad (2)$$

$$IR_{it} = \varphi_0 + \varphi_1 M2_{it} + \varphi_2 Scale_{it} + \varphi_3 Control + \theta_i + \varepsilon_{it} \quad (3)$$

ε_{it} is the random disturbance term, where the subscript i represents the industry, t represents the month, and θ_i is the fixed effect of the industry individual.

4. Results

4.1. Parameter estimation

Table 8 reports the impact of the digital economy on the total factor productivity of enterprises obtained by the least square method. In Table 8, column (1) shows the regression results without adding control variables, while column (2) adds control variables. It can be seen from the empirical results that the increase of broad money supply $M2$, the decrease of deposit reserve ratio Rrr and the increase of medium-term lending facility MLF will promote the increase of stock market returns, that is, the expansion of monetary policy will affect the stock market and have a positive effect on the stock market returns, which can increase the stock market returns. Therefore, hypothesis $H1$ is verified.

Table 8: Parameter estimation result

Variables	(1) IR	(2) IR
M2	1.101*** (2.69)	1.231*** (2.16)
Rrr	-0.230** (2.11)	-0.211** (2.32)
MLF	1.596*** (8.10)	1.713*** (8.28)
Volume		6.068*** (9.56)
Turnover		0.384** (0.53)
Exchange		-1.077 (1.03)
Rep_r		1.663*** (3.79)
Constant	3.579** (2.22)	14.671* (1.65)
Observations	1,190	1,190
Number of name_id	10	10
Adjusted R-squared	0.046	0.051
name_id	Yes	Yes

4.2. The mediating effect of credit channel

In order to verify the mechanism of whether monetary policy can affect stock market returns through credit conditions, we test the intermediation effect of credit channels. According to the regression results, M2 has an intermediary effect on stock market return IR through social financing Scale, and it is a partial intermediary effect, that is, there are other intermediary effect indicators and channels besides it.

Through comprehensive analysis, the easing of monetary policy has boosted the stock market through credit channels and increased the return on investment in the stock market, thus confirming the correctness of hypothesis H2.

Table 9: The mediating effect test of credit channel

Variables	(1) IR	(2) Scale	(3) IR
M2	1.231*** (2.16)	1.722*** (3.14)	2.342*** (4.16)
Rrr	-0.211** (2.32)	-0.296** (3.17)	-0.441** (5.02)
MLF	1.713*** (8.28)	1.864*** (9.13)	1.624*** (7.78)
Scale			0.152*** (0.67)
Volume	6.068*** (9.56)	5.452*** (-2.96)	7.854*** (5.69)
Turnover	0.384** (0.53)	0.856** (-1.21)	0.444** (0.75)
Exchange	-1.077 (1.03)	-6.053 (-2.14)	-4.654 (4.37)
Rep_r	1.663*** (3.79)	1.321*** (-3.79)	1.345*** (-3.79)
Constant	14.671* (1.65)	1.781* (-1.65)	12.144* (2.31)
Observations	1,190	1,190	1,190
Number of name_id	10	10	10
Adjusted R-squared	0.046	0.058	0.071
name_id	Yes	Yes	Yes

5. Results

This study takes the intermediary role as the starting point to explore the effect of monetary policy adjustment on stock market returns. At first, this study collated the relevant literature and made reference to these data. Then, this paper briefly introduces the theoretical basis of the effect of monetary policy on stock market returns, and briefly analyzes the correlation and action path in the theory. Further, from the perspective of mediating effect, two mechanisms of action are explained and three hypotheses are proposed. On this basis, this paper selects the monthly stock return rate data

of the whole industry of the Shanghai Stock Market from January 2015 to November 2024, a total of 119 months, and takes this data as a sample for empirical research, in-depth analyzes the specific impact of monetary policy on stock return through the two channels of credit and asset allocation, and draws the following conclusions:

First, the financial policy has a significant impact on the return on investment in the securities market. The relaxation of the financial policy can promote the growth of the return on the securities market, while the tightening of the policy will reduce it. The positive changes of financial policy factors make the market more abundant capital, and market participants will benefit from the relative abundance of capital. The optimization of corporate financing environment and the improvement of transaction credit are conducive to enterprises to increase investment, thereby increasing profitability and improving corporate valuation.

Additionally, the loose monetary policy promotes the stock market through the credit effect and increases the investment return of the stock market. From the macro level, the loan limit of enterprises increases correspondingly, and the increase of the loan limit means that enterprises will increase capital investment and expand production, the number of valuable projects of enterprises will increase, and the profit prospect will be bullish, thus improving the overall value of enterprises, and thus promoting the rise of stock prices.

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