Development Economics of China
2025, VOL. 9, NO. 9, 103-110
DOI: 10.47297/wspdecWSP2515-797321.20250909

Dynamic Correlation Analysis of Financial Leverage and Stock Prices under Low Interest Rates

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ABSTRACT
A low-interest-rate environment is a significant feature that the global economy has long faced. This feature has become even more prominent after the 2008 financial crisis and the 2020 pandemic. Against this backdrop, the connection between financial leverage and stock prices has become increasingly complex. How to promote the development of the real economy while balancing financial stability has become a key issue in the new era. This paper takes the data of China's stock market and macroeconomy from 2000 to 2024 as samples and uses the time-varying Parametric Vector Autoregression (TPP-SV-VAR) model to systematically explore the dynamic correlation and transmission mechanism between financial leverage and stock prices under the background of low interest rates. Research findings show that financial leverage has a significant positive promoting effect on stock prices, and the interaction between financial leverage and stock prices as well as economic growth presents a phased evolution feature from weak to strong and from stable to volatile. Moreover, after multiple robustness tests, the core conclusion remains robust. This article, from the perspective of low interest rates, expands the application boundaries of asset pricing and leverage theory, and also provides a theoretical basis and decision-making reference for monetary authorities to balance interest rate regulation and financial stability.

KEYWORDS
Low interest rate Financial leverage Stock price; Time-varying parametric vector autoregressive model

1 Introduction

There is a close and complex intrinsic correlation logic between financial leverage and stock prices. Market participants' use of financial leverage will increase the supply of funds in the stock market. During the stage of rising stock prices, the use of financial leverage will form a positive feedback mechanism. However, once the market trend reverses and stock prices fall, investors, to avoid further losses, will choose to sell their stocks to repay the leveraged funds, causing a sudden increase in stock supply and triggering a rapid decline in stock prices.

After the global financial crisis in 2008, the world economy entered a decade-long period of interest rate cuts. The global spread of the novel coronavirus pneumonia in 2020 further exacerbated the predicament of the global economy. World Bank data shows that global GDP declined by 3.1% year-on-year in 2020, marking the first global synchronous recession in nearly a century. For this reason, central banks around the world have initiated unprecedented loose monetary policies. However, in a long-term low-interest-rate environment, the yields of traditional low-risk assets have continued to decline. Economic entities, in pursuit of returns, have been forced to enhance their risk appetite. By leveraging up to allocate high-risk assets, they have indirectly pushed up the overall leverage level, exacerbating the vulnerability of the financial system.

During this special historical period, an increasing number of documents have begun to focus on the impact of low interest rates on financial leverage and stock prices.

The impact of low interest rates on financial leverage presents multi-dimensional characteristics. The academic circle defines financial leverage as the financial behavior in which economic entities borrow funds to magnify the scale or returns of their investments. Low interest rates reduce the cost of financing transactions, compress the returns of traditional low-risk assets, indirectly optimize the transmission of financing costs, prompt enterprises to adjust their leverage, and make the short-term leverage changes more significant. Moreover, the loose monetary policy brought about by low interest rates affects enterprises' financing choices through interest rate fluctuations, enhances the willingness of financial institutions to lend, and facilitates leverage expansion. However, the expansion of financial leverage brought about by low interest rates is not a one-way positive factor. Chen et al. (2023) found that interest rate liberalization would lead to a decrease in the total leverage of enterprises, with a more significant reduction in short-term leverage. Wang(2021) also warned that the "double leverage cycle" is prone to trigger market fluctuations and crises.

The financial risks brought about by low interest rates also have complex impacts on stock prices. The efficient market hypothesis holds that stock prices quickly reflect all information, including financial risks, but behavioral finance points out that investors' cognitive biases and emotions can interfere with this process. The Capital Asset pricing model also indicates that an increase in financial risk will raise the risk premium, which in turn leads to a decline in stock prices. The adjustment of macro policies in the industry will change the business environment of enterprises. The monetary policy brought about by low interest rates affects stock prices through channels such as interest rates. Expansionary policies

push up stock prices, while contractionary policies do the opposite. At the same time, the imperfect governance structure under the low-interest rate policy will also increase information asymmetry and have a negative impact on stock prices.

Existing research has revealed the logic of the effect of low interest rates on leverage and stock price dynamics, but has not explored the internal connection between the two under low interest rates. How can we theoretically clarify the intrinsic logic between financial leverage and stock prices in a low-interest-rate environment and capture the dynamic correlations? Can the theoretical system provide an operational decision-making basis for the monetary authorities to formulate interest rate policies? This is the focus of this article's research.

Based on this, this paper focuses on the real situation of financial market fluctuations under the normalization of low-interest rate policies, builds a dynamic correlation analysis framework among the three, and deeply explores the time-varying characteristics and transmission mechanism between financial leverage and asset prices in a low-interest rate environment with the help of time-varying parametric vector autoregression (TPP-SV-VAR). Research findings indicate that in a low-interest-rate environment, financial leverage has a significant and robust positive driving effect on stock prices, and both exhibit distinct time-varying characteristics.

Compared with previous studies, the marginal contributions of this paper are mainly reflected in three aspects:In terms of research perspective, it breaks away from the limitations of the traditional theoretical framework focusing on financial leverage and stock prices, explores the practical significance of the connection between the two in combination with the specific environment of "low interest rates", and expands the application boundaries of the theory; In terms of research methods, it breaks the shackles of traditional static or comparative static research and introduces a time-varying parameter vector autoregressive model to capture the dynamic evolution of stock prices caused by leverage, making up for the defect of the parameter stability assumption in traditional models. In practical terms, focusing on the time-varying effects and transmission mechanisms of the two under low interest rates provides guidance for monetary authorities and financial regulatory authorities to optimize the coordinated strategies of interest rate regulation and leverage supervision, and also offers decision-making references for promoting a virtuous cycle between finance and the real economy.

2 Theoretical Analysis and Hypothesis Formulation

Based on previous research, capital flow, risk appetite, and market expectations are the three main theoretical directions in which financial leverage affects stock prices.

The theory of capital flow holds that low interest rates act as a catalyst for leveraged funds to flow into the stock market by "reducing financing costs" and "broadening capital channels". From the perspective of cost, Lu Dayong et al. (2019) 's research on margin trading and short selling shows that a decline in interest rates will significantly compress the cost of leveraged transactions for investors, stimulate the demand for margin buying of stocks, and cause leveraged funds to flow rapidly into the stock market in the short term, forming a direct transmission of "cost reduction - leveraged funds increasing positions-stock price rise". From the perspective of channels, Feng Haoyuan et al. (2025) pointed out that in a low-interest-rate environment, the lending standards of financial institutions tend to be more lenient. This not only makes it easier for enterprises to obtain debt financing, but also some funds will flow into the capital market through indirect paths such as real credit and non-core business, further amplifying the supply of funds in the stock market.

Risk appetite theory indicates that low interest rates force investors to enhance their risk appetite by compressing the returns on traditional assets, while financial leverage acts as an "amplifier" of risk appetite, further amplifying stock price fluctuations. Based on the Capital Asset Pricing Model (Sharpe, 1964), investors' demand for risky assets depends on the trade-off between the risk premium and the risk-free interest rate - under low interest rates, the yields of low-risk assets such as government bonds continue to decline (Jiang Chun et al., 2022). To maintain the return level, investors are forced to leverage up to allocate high-risk assets such as stocks. At this point, the "risk exposure amplification" feature of leverage begins to emerge. From the perspective of behavioral finance, Shiller's (2000) "Irrational exuberance" theory points out that low interest rates weaken investors' risk sensitivity, and leveraged operations further amplify optimism, causing stock prices to deviate from fundamentals. The empirical research by Wang Jianjun et al. (2017) also verified that there is a significant positive correlation between leveraged funds and investor sentiment. During the period of high sentiment driven by low interest rates, the pulling effect of leverage on stock prices is 2 to 3 times that of non-leveraged funds.

The market expectation mechanism indicates that a low-interest-rate environment will further strengthen the mechanism by which leverage changes affect the money supply through market expectations. According to Jensen&Meckling(1976) 's principal-agent theory, changes in a company's leverage ratio serve as a "signal carrier" of business expectations: when a company actively increases leverage and expands production under low interest rates, it will be interpreted by the market as a positive signal of "improved profit prospects", driving stock prices to react in advance. Conversely, if a company passively increases its leverage, it conveys a negative signal of "intensified financial risks", suppressing the performance of its stock price. For investors, the "easing signal" released by the low interest rate policy itself will strengthen expectations of leverage effects. The research by Bernanke&Kuttner(2005) shows that the market will interpret the low interest rate as a commitment by the central bank to maintain loose liquidity. This further

forms a self-fulfilling expectation of "continuous inflow of leveraged funds - continuous rise in stock prices".

Based on this, this paper proposes the following hypotheses:

H1:In a low-interest-rate environment, there is a dynamic correlation between financial leverage and stock prices.

3 Research Design

3.1 Sample Selection and Data Sources

Regarding the sample selection of financial leverage and stock prices, traditional research often relies on macroeconomic data from the National Bureau of Statistics of China. However, the data it releases is mostly on a quarterly or annual basis, which is difficult to meet the core requirements of research for data integrity and timeliness. To break through the above boundaries, this paper integrates relevant data from the regional financial reports of the People's Bank of China from 2000 to 2024, the National Bureau of Statistics, the China Securities Index Co., LTD., and the People's Bank of China. For some missing values, interpolation methods are used to supplement them, thereby obtaining the unbalanced panel data of China from 2000 to 2024.

3.2 Variable Definition

3.2.1 Core Explanatory Variable

The core explained variable in this article is financial leverage(L_t). To investigate the possible nonlinear relationship between financial leverage and economic growth, as well as the impact of financial leverage fluctuations on economic growth, this paper refers to the practice of Ma Yong and Chen Yulu (2017), and uses the ratio of the balance of various loans of financial institutions at the end of each city to the regional GDP to measure the macro financial leverage level at the city level. That is:

$$L_t = \frac{\text{balance of all loans of financial institutions at the end of the year}}{\text{total regional production}}$$

Meanwhile, to simplify the data processing procedure, this paper acquires data from the four regions of central, eastern, western and northwest to calculate financial leverage.

3.2.2 The Explained Variable

The explained variable in this article is the stock price. To study the macro impact of financial leverage on the stock market, the stock price referred to here is the average stock price in the market. This paper selects the data of the top 300 enterprises in the Shanghai and Shenzhen A-share markets from 2008 to 2024, determines the weights by using the "free float market capitalization weighting" method, and adjusts the calculation parameters in light of the ex-rights and ex-dividends of the constituent stocks and changes in share capital, ensuring that the index continuously conforms to the actual market and truly reflects the overall price fluctuations of the stock market. The calculation method is as follows:

$$S_t = \frac{\sum_{i=1}^{n}(B_{i,t} * C_{i,t})}{\sum_{i=1}^{n}(B_{i,0} * C_{i,0})} * S_0$$

Among them, S_t represents the t-th stock price index,S_0 is the base period stock price index.$\sum_{i=1}^{n}(B_{i,t} * C_{i,t})$ represents the total amount of the current period's constituent stocks flowing into the market,$\sum_{i=1}^{n}(B_{i,0} * C_{i,0})$ represents the total amount of constituent stocks flowing into the market during the base period. i represents the i-th constituent stock, B is the closing price, and C is the current tradable shares of the constituent stock.

3.2.3 Mediating Variables

Channels for capital flow (Li_t). Capital liquidity usually refers to the ability of financial assets to be converted into cash at a low cost. Referring to the approach of Peng Zhen and Hu Changsheng (2020), the absolute value of the ratio of market return rate to total market transaction volume is used to represent the market liquidity situation. The higher the value of this indicator is, the worse the market liquidity situation is.

Investor risk appetite(R_t). Generally, the average daily turnover rate of the stock market is used to measure the size of investors' preferences. The larger the value of the indicator is, the higher the risk appetite that investors exhibit in the market.

Business expectations (E_t). It is measured by the proportion of companies whose net profits are expected to increase in their performance forecasts to the total number of companies in the same industry. The larger the value of the indicator is, the more optimistic the business expectations conveyed by the market are.

3.2.4 Control Variables

Referring to the research of Zhu Kuiquan (2024), this paper controls for the following factors that may affect stock prices: economic growth (G_t), the year-on-year growth rate of GDP can control the impact; Inflation (P_t), the interference evaluated by the year-on-year growth rate of CPI; Money supply (M_t), using the year-on-year growth rate of M2 on a monthly basis, reflects the degree of market liquidity easing.

Table 1 Variable Definition Table

Variable type	variable name	symbol	measurement method
Explained variable	Stock price	S_t	The closing index of the Shanghai Composite Index at the end of the year
Core explanatory variable	Financial leverage	L_t	Loan balance /GDP(%)
Control variable	Economic growth	G_t	Year-on-year growth rate of real GDP (%)
	Inflation	P_t	Consumer Price index
	Money supply	M_t	Year-on-year growth rate of M2 (%)

3.3 Empirical Model Setting

This paper draws on the practices of existing studies (Jiang Chun et al., 2022) and adopts the TVP-SV-VAR model to construct a dynamic correlation mechanism between financial leverage and stock prices in the context of low interest rates. This article takes the sustained low interest rate as the research background, sets up two stimulus time points, 2008 and 2020, and divides the research into normal interest rate, moderate low interest rate and deep low interest rate periods.

3.3.1 Observation Equation

Set the variable vector as $y_t = (R_t, L_t, S_t, G_t, P_t, M_t)'$, and the observation equation as:

$$y_t = c_t + A_{1,t} y_{t-1} + A_{2,t} y_{t-2} + \cdots + A_{p,t} y_{t-p} + \epsilon_t$$

Among them, c_t is a 6×1 time-varying constant term vector, and $A_{k,t}(k = 1,2,\cdots,p)$ is a 6×6 time-varying coefficient matrix, reflecting the dynamic changes in the influence intensity between variables; $\epsilon_t \sim N(0, \sum t)$, $\sum t$ is a,6×6 time-varying covariance matrix, depicting the random fluctuation characteristics of the disturbance term.

3.3.2 Time-Varying Parameter Dynamic Equation

$$\theta_t = \begin{pmatrix} c_t \\ vec(A_{1,t}) \\ vec(A_{2,t}) \\ \vdots \\ vec(A_{p,t}) \end{pmatrix}$$

Time-varying parameters follow a random walk process: $\theta_t = \theta_{t-1} + v_t, v_t \sim N(0, Q)$

3.3.3 Machine volatility setting

To simplify the estimation by performing Choleky decomposition, then,

$$\sum t = S_t H_t S_t'$$

Among them, S_t is a 6×6 triangular matrix. The diagonal element is 1, and the non-diagonal element($S_{i,j,t}$) is a time-varying parameter, depicting the time-varying characteristics of the concurrent association between variables.

And $H_t = diag(\exp(h_{1,t}), \exp(h_{2,t}), \cdots, \exp(h_{6,t}))$ is the diagonal matrix, is the logarithmic volatility, follows the random walk, where,

$$h_{i,t} = h_{i,t-1} + \eta_{i,t}, \eta_{i,t} \sim N(0, \delta_i^2)$$

The variance of logarithmic volatility(δ_i^2) reflects the intensity of the fluctuation.

4 Analysis of Empirical Results

4.1 Sample Analysis of Statistical Results

Based on the constructed database, this paper conducts a detailed statistical analysis of the statistical results. This article takes the 2008 financial crisis and the 2020 COVID-19 pandemic as key time points, and divides the samples into three stages for analysis. The descriptive statistics of each stage are shown in Table 2.

Table 2 Staged Descriptive Statistics

	2000—2007年		2008—2019年		2020—2024年	
Variable	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
S_t	0.82	5.31	1.05	8.27	-0.23	10.52
L_t	125.6	32.4	168.3	45.7	210.5	58.2
G_t	12.3	2.1	8.5	3.2	5.1	4.3
P_t	2.3	1.5	2.6	1.8	2.9	2.1
M_t	16.5	3.2	13.8	2.5	10.2	2.8

The results of the unit root test for each variable are shown in Table 3. It can be seen that the ADF test values of financial leverage, economic growth, inflation and money supply are all less than the critical value -3.46 at the 1% significance level, and the P values are all less than 0.01, which are stationary sequences. The ADF test value of the stock

price is -3.12, which is less than the critical value of -2.88 at the 5% significance level, and the P value is 0.024, also representing a stationary sequence. All variables have passed the stationarity test and can be directly used for subsequent empirical analysis.

Table 3 The Results of the Unit Root Test for Each Variable

Variable	ADF test value	Standard value	P value	Judgment result
		1%	5%	
S_t	-4.23	-3.46	-2.88(0.000)	True
L_t	-3.12	-3.46	-2.88(0.024)	True
G_t	-5.87	-3.46	-2.88(0.000)	True
P_t	-4.92	-3.46	-2.88(0.000)	True
M_t	-6.15	-3.46	-2.88(0.000)	True

4.2 Benchmark Regression Results

The benchmark regression results(Table 4) show that the coefficient of L_t is greater than 0 in each period, which indicates that financial leverage has a significant positive promoting effect on stock prices, suggesting that an increase in regional financial leverage levels will drive up stock prices.

Table 4 Benchmark Regression Test Results

Variable	2000—2007年	2008—2019年	2020—2024年
L_t	2.35***(0.52)	3.82***(0.87)	5.17***(1.23)
G_t	0.42*(0.23)	0.35(0.25)	0.28(0.22)
P_t	-0.31(0.21)	-0.52*(0.28)	-0.78**(0.35)
M_t	0.65***(0.12)	0.42***(0.15)	0.31**(0.14)
Control variable	True	True	True
Sample size	1200	1440	540
R^2	0.38	0.45	0.52

*, **, and *** indicate significance at the 10%, 5%, and 1% levels respectively. The errors in parentheses are standard errors

4.3 Sample Parameter Simulation

In this paper, the lag period of the model is set to 2, and the Markov Monte Carlo Simulation (MCMC) algorithm is used to conduct 10,000 samples on the model, discarding the first 1,000 samples. As shown in Table 5, the mean values of all parameter tests are within the 95% confidence interval, and the CD convergence diagnostic values of the Geweke test are all less than the 5% significance level.

Table 5 Simulation Results of Sample Parameters

Parameter	Mean	Standard deviation	Lower limit of 95%
S_{b1}	0.7652	0.1055	0.5584
S_{b2}	0.8574	0.1052	0.6512
S_{a1}	0.8956	0.1509	0.5998
S_{h1}	0.7409	0.1049	0.5353
S_{h2}	0.9326	0.1609	0.6172

S_{b1} and S_{b2} represent the volatility of the regression coefficients, reflecting the stability of the influence of the independent variable on the dependent variable. S_{a1} describes the free elements of the covariance matrix of the error term; S_{h1} and S_{h2} respectively represent the volatility of the residuals in the two equations.

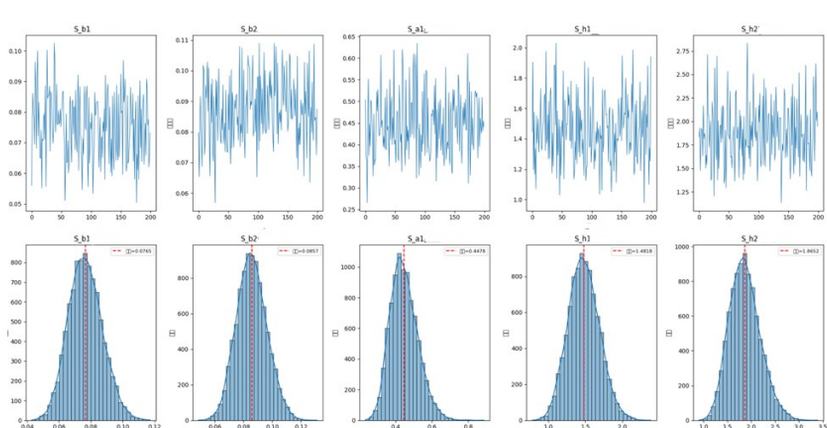

Figure 1 Visual Analysis of Sample Parameter Simulation

Figure 1 presents the parameter diagnosis results based on the Markov Chain Monte Carlo (MCMC) method. The upper row of autocorrelation graphs shows that the autocorrelation coefficients of each parameter rapidly decay with the increase of the lag order, reflecting the weak sampling autocorrelation and high efficiency. In the lower row of the kernel density plot, the distribution of each parameter shows a single-peak and concentrated form. The core estimated value (red dotted line) is in line with the density peak, indicating that the posterior distribution of the parameters converges well. The efficiency and convergence of sampling have been verified, providing a reliable parameter basis for subsequent model analysis.

4.4 Impulse Response Analysis

Impulse response analysis was conducted on each variable under different regions (Figure 2). The three rows correspond to the periods before 2008, 2008-2020, and after 2020 in sequence. From left to right in each row, they represent the reverse impact of financial leverage on stock prices, the reverse impact of stock prices on leverage, and the regulatory impact on economic growth. By comparison, the phased evolution of variable linkage can be seen.

Figure 2 Core Trends of Impulse Response

Before 2008, the responses to the three shocks were all mild. After the impact of financial leverage on stock prices, the slight fluctuations in stock prices then converge. The stock price has a weak reverse impact on leverage, and the feedback chain has not been formed. The regulatory effect on economic growth is not obvious, and the interaction between the real economy and finance is at a low level. From 2008 to 2020, the response amplitudes of the three shocks increased significantly. Under the impact of financial leverage on stock prices, if the stock price rises in the current period and peaks in 2-3 periods before falling back, it will still be in a positive range. The peak of the stock price's reverse impact on leverage has increased several times compared to before. The regulation of the linkage by economic growth is more prominent and sustainable until the medium term, and the connection between the real economy and finance is deepened. After 2020, the shock response has shown the characteristics of "intense in the short term and unstable in the long term". The impact of financial leverage on stock prices has the highest increase in the current period, but then it fluctuates and falls back, or even turns negative. The peak of leverage impact on stock prices is higher but converges faster, and the pull lacks sustainability. The initial strong adjustment of economic growth followed by a weak one, and the unstable recovery of the real economy made the market vulnerable to short-term factors.

Overall, the variable linkage in the three periods shows an evolution trajectory of "from weak to strong, from stable to fluctuating". The low correlation and low volatility before 2008 was a stable state dominated by the real economy. The high correlation and moderate volatility from 2008 to 2020 reflect the positive interaction in the process of financial deepening. The high correlation and high volatility after 2020 have exposed the market vulnerability under short-term stimulus policies.

5 Robustness test

5.1 Endogeneity Issues

To alleviate the endogeneity of the bidirectional causality between financial leverage and stock prices, this paper selects the intensity of regional financial development policy shock (IV_pol) and historical credit expansion inertia (IV_inertia) as instrumental variables of financial leverage. The first stage examines the explanatory power of instrumental variables for financial leverage, and the second stage examines the impact of financial leverage on stock prices.

The regression results are shown in Table 6. The stronger the impact of regional financial policies and the higher the inertia of historical credit expansion, the greater the probability of an increase in regional financial leverage levels. After alleviating endogeneity, the positive promoting effect of financial leverage on stock prices still holds, and the benchmark results are stable and reliable.

Table 6 Robustness Test: IV Estimation

Variable	Phase One(L_t)	Phase Two(S_t)	Phase One(L_t)	Phase Two(S_t)
IV_temp	4.627***(0.099)	—	—	—
IV_coef	—	—	4.422***(0.084)	—
L_t	—	1287.3***(215.6)	—	1123.5***(198.7)
G_t	Control	52.3*(28.7)	Control	48.6*(26.1)
P_t	Control	-78.5*(43.2)	Control	-85.2*(40.1)
M_t	Control	35.2***(10.5)	Control	32.1***(9.8)
Control variable	True	True	True	True
CD statistic	15958.491	—	114702.393	—
KP statistic	197.484	—	197.117	—
Sample size	68	68	68	68
R^2	0.425	0.325	0.418	0.352

*, **, and *** indicate significance at the 10%, 5%, and 1% levels respectively. The errors in parentheses are standard errors

5.2 Re-Measurement and Re-Division of the Explained Variable

To verify robustness, this paper adjusts the measure of the explained variable in three ways and regresses it again. Referring to the approach of Zhang Ming and Wang Zhe (2024), the monthly closing price logarithms of the Shanghai Composite Index are replaced by the logarithms of the Shenzhen Component Index and the CSI 300 Index. The stock price index lags behind one period for regression, and the sector index is used for regression by industry according to the "Industry Classification Guidelines (Revised in 2023)". The results(Table 8) show that there is no significant difference in the coefficient direction and significance between the adjusted estimation results and the benchmark regression, and the core conclusion is robust and reliable.

Table 8 Robustness Test Results of Re-measurement of the Explained Variables

The adjustment method of the explained variable	Financial leverage coefficient	Significance	Model goodness of fit
Benchmark regression	0.28***	p<0.01	0.78
Replace it with the logarithm of the Shenzhen Component Index	0.26***	p<0.01	0.76
Replace it with the logarithm of the CSI 300 Index	0.30***	p<0.01	0.80
Logarithm of the financial industry index	0.27***	p<0.01	0.77
Logarithm of the financial industry index	0.22***	p<0.01	0.79
Logarithm of the cyclical industry index	0.29***	p<0.01	0.76
Growth industry index logarithm	0.32***	p<0.01	0.81

All regressions control for fundamental variables such as economic growth, inflation, and money supply, as well as supplementary control variables such as market liquidity and fiscal policy. *** indicates significance at the 1% statistical level; The coefficient standard error is a heteroscedasticity robust standard error.

6 Conclusions and Policy Implications

Based on multi-dimensional empirical analysis, this paper divides the samples into three stages for autoregressive testing, MCMC simulation and impulse response analysis, taking the 2008 financial crisis and the 2020 COVID-19 pandemic as nodes, to clarify two core findings. Financial leverage has a significant positive promoting effect on stock prices, and the conclusion is highly robust. Meanwhile, the interaction between financial leverage and stock prices as well as economic growth shows a phased feature of "from weak to strong and from stable to volatile", reflecting the deepening of the positive interaction between finance and the real economy.

Based on the above conclusions, the policy level needs to implement precise measures in stages to match the interaction characteristics between the real economy and finance in different periods. In response to the vulnerability of

the market after 2020, which is characterized by "short-term sharp fluctuations and long-term instability", it is necessary to establish a dynamic early warning mechanism for financial leverage and stock price fluctuations, and incorporate industry leverage ratio thresholds and monthly stock price fluctuation ranges into monitoring indicators. In addition, it is necessary to rely on economic growth to consolidate the foundation of market stability. By supporting the recovery of the manufacturing industry, small and micro enterprises and other real sectors, the regulatory role of economic growth on the linkage between financial leverage and stock prices should be strengthened to prevent funds from "shifting from the real economy to the virtual economy", and ultimately achieve a virtuous cycle between finance and the real economy.

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