

# Research on the Relationship Between CPI and the Shanghai Composite Index

Chen Feng

Nanjing University of Science and Technology, Nanjing, China

**Abstract.** Previous literature has primarily used the price-to-earnings ratio method to analyze stock indices. Given the current phenomenon of the inverted relationship between CPI and PPI in China, empirical research on the impact of CPI on stock indices has attracted scholarly attention. Therefore, this paper employs a VAR model, selecting monthly data on CPI and the Shanghai Composite Index (SZSE) from December 2009 to March 2024 for empirical research. Using the VAR model, it is discovered that the first lag of CPI has a positive relationship with the SZSE, while the second lag exhibits a negative relationship. However, this study does not establish a Vector Error Correction Model to verify the long-term impact of CPI on the SZSE.

**Keywords:** CPI, Shanghai Composite Index, VAR Model.

## 1. Introduction

### 1.1. Research Background

The stock market, as a platform for investment and financing, provides products and returns for investors while absorbing substantial idle funds, which are then allocated to enterprises in need of capital to promote their development and operations, thereby improving capital allocation in the real economy. As an emerging stock market, China has seen rapid expansion in market capacity and influence, yet it still lags behind the mature markets of developed countries. The development level of a country's financial industry is a significant indicator of its economic development. Studying the relationship between finance and the economy is crucial for understanding future economic trends. The stock market is often referred to as the barometer of a nation's economy, as macroeconomic fluctuations are strongly correlated with securities market movements, and the securities market can anticipate macroeconomic conditions.

Since 2022, major developed economies have experienced high inflation not seen in decades. In contrast, China has adhered to a prudent monetary policy, focusing on ensuring supply and price stability, thereby keeping inflation within a moderate range. Over the past one, five, and ten years, the average annual increase in CPI has been around 2%. This year, the decline in CPI growth is mainly due to a combination of domestic and international factors, including imported and cyclical factors, as well as the high base effect from the previous year, also reflecting the current mismatch between supply and demand recovery.

In developed countries with mature stock markets, there is a high correlation between economic development and stock price fluctuations. Given the current low level of China's CPI and the inverted CPI-PPI relationship, this paper conducts an empirical study on the impact of CPI data from December 2009 to March 2024 on the Shanghai Composite Index.

### 1.2. Research Significance

Stock prices directly reflect stock value, and the average price of sample stocks, calculated according to specific rules, constitutes the stock index. The stock index is a reference indicator that comprehensively reflects the overall fluctuations of the stock market. Market participants can use stock indices to macroscopically understand market volatility and the balance between bullish and bearish forces, thereby forming judgments about future trends and informing investment strategies. Simultaneously, as a vital force supporting a country's macroeconomic development, the stock market, to some extent, reflects the state of macroeconomic development, directly or indirectly manifested in the overall trend of the stock index.

## 2. Literature Review

Early foreign scholars extensively researched the impact of CPI on stock returns. Fisher (1930) argued that the expected nominal return on assets equals the expected real return plus expected inflation. Therefore, stock returns should be positively correlated with inflation. However, Fama and Schwert (1977) found a negative correlation between nominal stock returns and inflation. Mandelker and Tandon (1985) discovered a negative relationship between stock returns and expected inflation, but an insignificant and mixed relationship with unexpected inflation. Feldstein and Summers (1979) suggested that US tax rules could explain the negative relationship between inflation and real stock returns.

Domestic scholars have attempted to study stock indices through CPI. Liu (2004), studying stock indices through macroeconomic variables, concluded that the stock index has a positive relationship with GDP and CPI, and a negative relationship with money supply and interest rates. Du and Li (2008) proposed that the stock index is the Granger cause of CPI, but CPI is not the Granger cause of the stock index. This implies that stock market development significantly influences inflation and can exacerbate it; although CPI can affect stock market fluctuations, its impact is limited. Duan (2012), based on grey correlation degree and VAR models, suggested that the Shanghai Composite Index has a high grey correlation with fixed asset investment and CPI. Furthermore, cointegration tests revealed a long-term equilibrium relationship between the stock index, fixed asset investment, and CPI. Sun (2012), studying China's CPI, Shanghai Composite Index, and Shenzhen Component Index, proposed that there is no significant relationship between stock price indices and the inflation rate; rising inflation does not cause changes in stock prices, meaning it does not affect stock market trends. Guo and Liu (2012), using an error correction model and VAR model, empirically studied the relationship between the CPI-PPI difference and the stock index in China. They found a long-term correlation between the CPI-PPI difference and the Shanghai Composite Index. Changes in this difference significantly impact changes in the Shanghai Composite Index, and the distribution of this influence over time provides an empirical basis for formulating phased investment strategies (especially regarding timing) and determining their validity periods. Liu (2020) found a long-term stable relationship between CPI and the Shenzhen Component Index, and based on this, proposed that transforming government functions and adjusting investment mechanisms are powerful means to promote the continuous development and growth of China's stock market.

## 3. Empirical Research

### 3.1. Data Selection and Variable Description

#### 3.1.1. Data Selection

To study the relationship between the CPI and the Shanghai Composite Index (SZSS), this paper selects monthly data from December 2009 to March 2024, sourced from the National Bureau of Statistics and iFinD.

#### 3.1.2. Variable Description

As this paper employs a VAR model, the Shanghai Composite Index (hereafter referred to as SZSS unless otherwise specified) and the CPI are treated as the explained variable and explanatory variable, respectively. No control variables are included in this study.

#### 3.1.3. Model Equations

Referring to Guo and Liu (2012), the established model equations are:

$$SZSS_t = C + \sum_{i=1}^p \alpha_i \times SZSS(-i) + \sum_{j=0}^q \beta_j \times CPI(-j) + \varepsilon_t \quad (1)$$

$$CPI_t = C + \sum_{i=1}^p \alpha_i \times SZSS(-i) + \sum_{j=0}^q \beta_j \times CPI(-j) + \varepsilon_t \quad (2)$$

### 3.2. Regression Analysis

#### 3.2.1. Descriptive Statistics

According to the descriptive analysis results, the maximum value of CPI is 6.45, and the minimum value is -0.5; the maximum value of the Shanghai Composite Index is 4611.7, and the minimum value is 1979.2.

**Table 1.** Descriptive Statistics for CPI and SZZS (2009M12-2024M3)

Variable	Obs	Mean	Std	Min	Max
CPI	168	2.2743	1.3899	-0.5000	6.4500
SZZS	168	2920.108	501.5179	1979.2	4611.7

#### 3.2.2. Baseline Regression Analysis

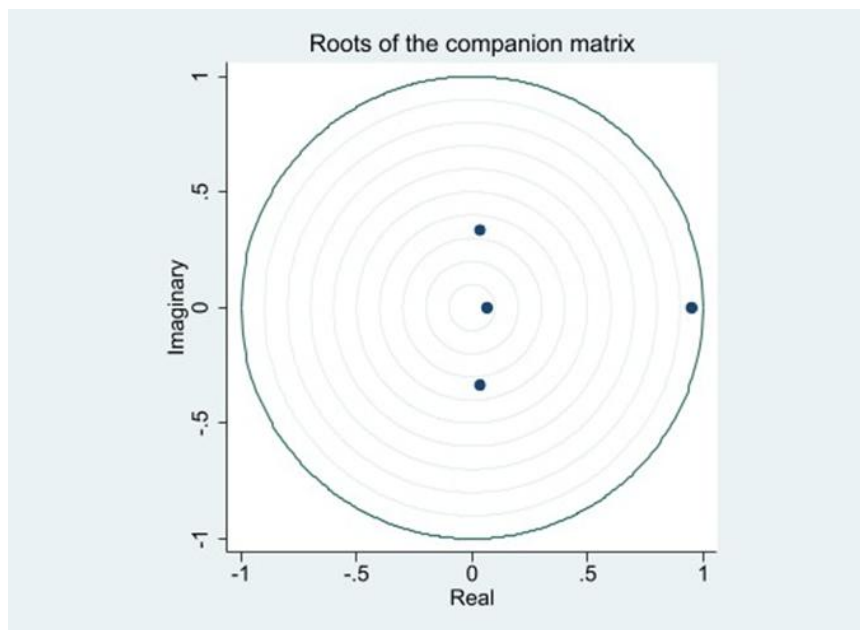
**Table 2.** Baseline Regression Results for CPI and Shanghai Composite Index

	$\Delta \ln \text{SZZS}$	$\Delta \text{CPI}$
C	-0.0002 (-0.05)	-0.0184 (-0.48)
$\Delta \text{CPI} (-1)$	0.0071** (2.03)	-0.0325 (-0.43)
$\Delta \text{CPI} (-2)$	-0.0174** (-2.01)	0.0951 (1.25)
$\Delta \ln \text{SZZS} (-1)$	0.0764** (2.00)	0.1497 (0.22)
$\Delta \ln \text{SZZS} (-2)$	-0.1253* (-1.65)	0.962 (1.45)
$R^2$	0.0564	0.0232

Note: Z-statistics in parentheses; \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

The table shows that when  $\Delta \ln \text{SZZS}$  is the dependent variable, the first lag of the first-differenced price index ( $\Delta \text{CPI}(-1)$ ) has a significant positive effect on the SZZS at the 5% level, while the second lag ( $\Delta \text{CPI}(-2)$ ) has a significant negative effect at the 5% level. This negative effect can offset the positive effect of the first lag. Similarly, the first lag of the first-differenced SZZS ( $\Delta \ln \text{SZZS}(-1)$ ) positively affects the current SZZS, while its second lag ( $\Delta \ln \text{SZZS}(-2)$ ) has a significant negative effect at the 10% level, with the inhibitory effect stronger than the promotive effect. In the equation where  $\Delta \text{CPI}$  is the dependent variable, none of the explanatory variables have a significant impact. Therefore, in the empirical relationship between CPI and the SZZS, the price index first promotes and then suppresses the stock index, which is consistent with Hypothesis 1. Theoretically, a slight rise in the price index might create money illusion for producers, who haven't formed rational expectations, leading to increased employment. Workers, producing more, gain enhanced consumption capacity, stimulating the national economy. Economic growth increases per capita GDP, and investors with more deposits may purchase stocks, thereby driving stock market development and raising the stock index. However, over time, persistent price increases may lead rational investors to lose confidence in the market, making them reluctant to invest in stocks, consequently causing the stock index to fall.

As shown in the figure below, all unit roots lie within the unit circle, indicating that the established VAR model is stable. Therefore, this model can be extended for forecasting the index system and used for related predictions.



**Figure 1.** VAR System Stability Test

#### 4. Conclusion

This paper utilizes a VAR model to analyze the relationship between the CPI and the Shanghai Composite Index. The findings are as follows:

By constructing regression equations, it is found that the impact of the price index on the stock index initially exhibits a positive relationship followed by a negative one. This result is further confirmed by the impulse response function.

Based on the above results, the following recommendations are proposed:

1. Improve the quality of listed companies and attract more high-quality enterprises to list domestically, thereby expanding the scale and maturity of the capital market. Standardize corporate behavior and expand company scale during periods of market and economic policy transition, accelerate the reform of China's capital market, and strengthen the predictive function of the stock market.

2. In response to the continuous decline in China's Consumer Price Index, the government should implement expansionary monetary policies while strengthening macro-prudential regulation to prevent inflation. Guide financial institutions to better serve the real economy.

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