

A study on the relationship between commodity index and the commodity price index of Enterprises in China

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ABSTRACT

The corporate goods price index can reflect the level of inflation and the economic fluctuation. It is an important reference index of the central bank monetary policy. With the improvement of the futures market, China commodity index has gradually become China's commodity benchmark, and Chinese commodity index of leading role of enterprise commodity price index is also reflected out. Based on the ECM model and the monthly data from June 2004 to August 2017, the empirical analysis shows that there exists a long-term equilibrium relationship between the price of commodity and the index of commodity price in China, and the elasticity of long-term equilibrium is 0.197515. And there is a short-term equilibrium between the price index and the Nanhua commodity index. The goodness of fit is 0.696. When the short-term volatility deviates from the long-term equilibrium, the error will reverse the adjustment. Nanhua commodity index has a leading role in China's future inflation and economic fluctuations. Investors can predict the direction of monetary policy according to the change of Nanhua commodity index.

Keywords: *Nanhua commodity index, enterprise commodity price index, ECM model, Granger-Test.*

I. INTRODUCTION

Nanhua commodity index includes three categories of industrial products, agricultural products and energy and chemical industries, covering three commodity futures exchanges in Shanghai, Dalian and Zhengzhou, and the comprehensive index of commodity futures varieties. It can reflect the real changes of the futures market, and can objectively and accurately grasp the overall situation of the futures market for the investors. The CGPI is a statistical index that reflects the price change of commodity trading in China's domestic enterprises. It can comprehensively measure inflation level and reflect the comprehensive price index of economic fluctuation. The CGPI survey is approved by the National Bureau of statistics and prepared by the people's Bank of China. The survey covers the whole society's physical products, including investment and consumer goods. The price of the investigation is the centralized transaction price between the enterprises in the initial wholesale process. The index plays a positive role in the judgement of price situation and macroeconomic monitoring. It provides a

comprehensive and timely reflection of China's central bank's formulation and adjustment of monetary policy.

II. LITERATURE REVIEW

There is a study on the index of enterprise commodity price. Zheng Rongzhen (2008) used the GM (1.1) model and residual trend correction method to predict the price index of Chinese commodity trading for half a year, which has a good fitting effect. This indicates that the GM (1.1) prediction model is suitable for the economic index such as price index. Chen Yu (2011) finds that PPI, enterprise commodity price index and M2 have a long-term stable equilibrium relationship with CPI through cointegration analysis. Through Granger causality test, we know that the price index of Chinese enterprises is the Granger reason of the consumer price index, which is more suitable for analyzing the consumer price index's leading indicator. Zhang Jinyu (2011) thinks that commodity index is a good index reflecting inflation. It fluctuates in the same direction with inflation index and fluctuates in the same direction with bond yield. It can be said that the commodity index, to a certain extent, reflects the trend of economic development, and also has a strong convergence of as well as economic fluctuation. Fan Ronghua (2012) thinks that it is of great practical significance to analyze inflation's influence on capital accumulation, price level and stagflation. It is of great practical significance to discuss macro-control measures and effectiveness of inflation control. Liu Tan (2014) put forward that commodity futures price index as an important index of macroeconomic detection and expected inflation, as an information variable to control inflation monetary policy, further improve the effectiveness of monetary policy operation. The regression model established by Meng Yan (2012) shows that the price index of agricultural products accounts for the largest proportion and has the greatest impact on the commodity price index of the enterprise. The second is the proportion of the kerosene price index and the mine product price index, and the proportion of the product price index of the processing industry is least. Li Kun (2013) used Granger causality test to get the guiding relationship between Wen Hua commodity index and CPI in 8 months, and demonstrated the leading role of Wenhua commodity index to CPI. About the study of commodity index, Zhao Zhenying (2015) used

econometrics method to draw a conclusion that futures price index is related to inflation and futures price index can be used as a leading indicator to measure inflation, and is expected for inflation. Zhu Zhengke, Shi three, Zhou Linhua and Xu Yan (2016) established the multivariate time series ARIMAX model of the enterprise commodity price index by using SAS software, and used this model to predict the index from January 2015 to March. Compared with the recent published results, the prediction error is relatively small and the prediction is satisfactory. This indicates that the ARIMAX model has a good application in the prediction and fitting of the enterprise commodity price index .Song Shihao (2017) Nanhua commodity index reflects the change of money supply in the same direction. It first goes to PPI 2 and CPI 6, and reflects more than the general inflation index. The South China Commodity Index is basically able to predict the fluctuation of the future price level, which is closely related to the intermediate variables of the currency. Based on the above research, we can see that the commodity index and the price index can be used to evaluate the price level. The price index can reflect the inflation level and the economic fluctuation comprehensively.

Based on the precious relevant research mentioned above ,this paper establishes ECM model to analyse the relationship between China commodity index and corporate goods price index, and the prediction effect of China commodity index on the macroeconomic impact and the prediction of the people's Bank of Chinese issued inflation policy.

III. EMPIRICAL ANALYSIS

3.1. Data selection and preprocessing

The monthly data of the enterprise commodity price index covers in June 2004 to August2017, which are selected from the people's Bank of China. The South China Commodity Index takes the monthly closing point data of August June 2004 ~2017 as the research object, and it comes from wind information. In this article, the commodity price index of the enterprise is recorded as CGPI, and the Nanhua commodity index is recorded as SPZS. In order to make the data more meaningful, the logarithms are recorded as LNCGPI and LNSPZS respectively. The time sequence diagram of the commodity price index of the enterprise and the South China Commodity Index are shown in Figure 1.

It can be seen from the figure 1 above that the trend of corporate commodity price index and that of South China Commodity Index are basically the same, and there should be some correlation between them.

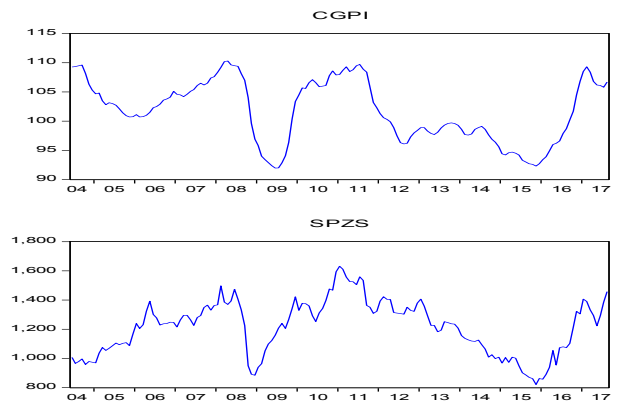


Figure 1 the time sequence diagram of the commodity price index and the South China Commodity Index

3.2. ADF test

In this paper, the correlation between South China Commodity Index and CGPI index are all time series data, and in the time series data analysis, the most common is the "pseudo regression" phenomenon, so we need to test the stability of the time series of variables In this paper, the test method is ADF test. The unit root test of LNCGPI, LNSPZS, ΔLNCGPI and ΔLNSPZS after the first-order difference are respectively carried out. The test results are shown in table 1.

Table 1 ADF test

variable	ADF statistics	threshold		result
		1%	5%	
LNCGPI	-0.039295	-2.57977	-1.94286	unstationary
LNSPZS	0.560767	-2.57977	-1.94286	unstationary
ΔLNCGPI	-4.681078**	-2.57977	-1.94286	stationary
ΔLNSPZs	-10.2949***	-2.57977	-1.94286	stationary

From the test results, it can be concluded that LNCGPI and LNSPZS are non-stationary variables, which are stationary variables after the first-order difference, indicating that they are first order single time series.

3.3 Cointegration test

Cointegration test is to test the existence of long-term equilibrium between variables, there are two ways to test: EG proposed two-step method for two variables and Johansen's multivariate maximum likelihood method. Therefore, we choose the two-step method proposed by Engle and Granger to test whether there is a long-term equilibrium relationship between LNCGPI and LNSPZS sequences. The test results are shown in Table 2, which shows that LNCGPI and LNSPZS have a long-term and

stable equilibrium relationship.

Table2 E-G test

	Value	Prob*
Engle-Granger	-3.624365	0.0265
tau-statistic		
Engle-Granger	-20.65284	0.0417
z-statistic		

and the relation between them can be obtained through OLS:

$$LNCGPI_t = 3.220777 + 0.197515LNSPZS_t$$

t – value (9.91) (21.12)

It can also be concluded from the relationship that the long-run equilibrium elasticity is 0.197515 .as the CGPI increases with the growth of the South China Commodity Index.

3.4. Error correction model

LNCGPI and LNSPZS are first-order single-integer sequences and have long-term equilibrium relationship. In the short term, unbalance may occur. To improve the accuracy of the model, an error correction model (ECM) can be established. The residual term is obtained from (1). Because the constant term does not pass the T test, so give up, so the error correction model is:

$$\Delta LNCGPI_t = 0.054\Delta LNSPZS_t + 0.038\Delta LNSPZS_{t-1} + 0.636\Delta LNCGPI_{t-1} - 0.041ET_{t-1}$$

t (5.341) (3.528) (13.172) (-3.593)

From the above estimation results, we can see that the short-term fluctuation of LNCGPI described by short-term volatility model (2) is fluctuated by $\Delta LNSPZS_t$, $\Delta LNSPZS_{t-1}$ and $\Delta LNCGPI_{t-1}$, and the previous equilibrium error, 0.054, 0.038 and 0.636 Short-term influence, -0.041 is the error correction coefficient. That is, when the current fluctuation deviates from the long-term equilibrium, the error correction term reversely adjusts the CGPI by 0.041, and returns the unbalance to the equilibrium state.

3.5. Granger causality test

The Granger causality test can be used to test causal relationship between two variables. The idea of Granger causality test is very intuitive, that is, whether the economic variable X can explain another economic variable Y, or whether the economic variable Y can explain Economic variables X, or economic variables X, Y can explain each other. From the above test results, we can know that LNCGPI and LNSPZS are first-order single integer sequences and have cointegration relationship. In order to understand the causal relationship between the enterprise commodity price index and the South China Commodity Index, the

Granger causality test is needed. The test results are shown in Table 3.

Table3 Granger causality test

	Null Hypothesis	LNSPZS does not Granger Cause LNCGPI	LNCGPI does not Granger Cause LNSPZS
1	F	16.8324	0.56441
	P	7.E-05	0.4536
2	F	9.99893	1.22072
	P	8.E-05	0.2979
3	F	6.77613	0.41120
	P	0.0003	0.7452
ags 4	F	5.75113	0.75396
	P	0.0003	0.5569
5	F	4.28267	1.16445
	P	0.0012	0.3296
6	F	3.8917	0.78394
	P	0.0013	0.5839

It can be seen from Table 3 that under the 1% significance level, rejecting LNSPZS is not an assumption of LNCGPI Granger causality in lagions 1-6, accepting the assumption that LNCGPI is not Granger causality of LNSPZS It can be shown that LNSPZS is a one-way Granger causality of LNCGPI, and it can be seen that the condition is satisfied in lag 1. Therefore, changes in the South China Commodity Index will result in changes in the commodity price index, indicating that the South China Commodity Index is leading.

IV. CONCLUSIONS

Based on the above empirical analysis, we can draw the following conclusions:

First, there is a cointegration relationship between LNCGPI and LNSPZS, that is, there is a long-term stable equilibrium relationship between LNCGPI and LNSPZS. And through the cointegration equation, it can be seen that there is a positive relationship between LNCGPI and LNSPZS. In the long run, with the South China Commodity Index Growth, corporate commodity price index will grow. Long-term equilibrium elasticity is 0.197515.

Second, it can be concluded from the ECM model that there is also a short-term equilibrium between the corporate commodity price index and the South China Commodity Index with a goodness-of-fit of 0.696, indicating that the short-term equilibrium is relatively stable. If the short-term fluctuations from the long-term equilibrium state, there is a 0.041 force to reverse the adjustment, and ultimately the two again to achieve long-term equilibrium.

Third, according to the results of Granger causality test, LNSPZS is the one-way Granger reason of LNCGPI.

Therefore, we can see that the commodity index has the leading factor. According to this month's South China Commodity Index, the trend of next month's corporate index. However, the index of enterprise's commodity price, as a measure of inflation, has some lag, so it can estimate the future level of inflation through the South China Commodity Index, and also estimate the fluctuation of economic operation. The stability of China's currency and the central bank will be released to forecast monetary policy.

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