The Shock Effect Study on the Impact of Financial Policies and Fiscal Expenditures on the Agricultural Products' Prices in China

YI Wen[a],*

[a]School of Economics & Management, Southwest University, Chongqing, China.
*Corresponding author.

Abstract

According to the monthly data of agricultural products' prices index from 1999 to 2012 and the related information about financial policies in China, the time series analysis methods has been made use and also I built a vector auto regression (VAR) model and vector error correction model (VECM) to finish the empirical analysis of impact factors on agricultural products .It is shown that money supply shock has a statistically significant impact on China's agricultural products' prices. The results indicate that: (a) In the long term, the growth of M_0 will lead the fluctuations in the prices of agricultural products, while in the short term ,the supply of M_2 and M_1 would play an important role. (b) In the long run, the prices of agricultural products in China have been subject to the level of fiscal expenditures and the exchange rate. But in the short term, the impact of the exchange rate is not significant. (c) By using Granger causality test method, the relationship between broad money supply (M_2) and agricultural products' prices is bidirectional. At last of the paper, some policy recommendations have been put forwards.

Key words: Fluctuations of agricultural products' prices; Financial policies; Granger causality test; VAR model

INTRODUCTION

30 years ago, China has began carrying out the market reforms in rural areas, greatly liberating and developing agricultural productivity, protecting the supply of agricultural products, and increasing farmers' income, the reforms has played an important role in improving the rural people's lives .Especially in recent years, China has entered the period of fastest growing agriculture, greatest change in rural landscape and farmers getting the most benefit, but it also show the integration of the situation: A rise in the overall cost of agricultural production, structural contradiction of agricultural supply and demand, profound changes in the social structure in rural areas. Agricultural products are the basis of China's economic development, social stability and national self-sustaining, so it is vital to guarantee the national security production, supply of agricultural products and the price stability. Maintaining stable prices of agricultural products is a top priority for the country's peace, but also the practical requirements of building a harmonious society.

After years of training, our market system of agricultural products has been developed into the considerable wholesale markets and bazaars, the traditional format and the new format, the tangible and intangible market, the market mechanism is becoming a decisive factor in the allocation of resources. But for now, the overall development of China's agricultural market is still at a low level. From 1999 to 2012, the wholesale price index of agricultural products (Figure 1) was 93.63 in January 1999, rising to 101.9 in December 2012, in March 2011 it rose to the highest level at 120.2, which led the growing domestic inflation, while boosting agricultural prices contributed to the rise in production costs, leaving a serious impact on China's macroeconomic. On the other hand, by looking at the money supply in the country , from the beginning of February 2009, China's M_2 money supply levels began to grow at more than 20% speed and

last in May 2010, the corresponding M_2 47.51666 trillion yuan by the end of 2008, quickly pulled up to 61.022452 trillion yuan at the end of 2009 and 66.335137 trillion yuan in May 2010. While M_1 money supply growth level in January 2010 reached a record high of 38.96 percent in recent years. Price index for agricultural products and the CPI in the next one year have rose fast. In order to maintain relatively stable prices of agricultural products and promote healthy development of agricultural markets, studying the relationship between agricultural prices and monetary policy has become a problem that must be addressed.
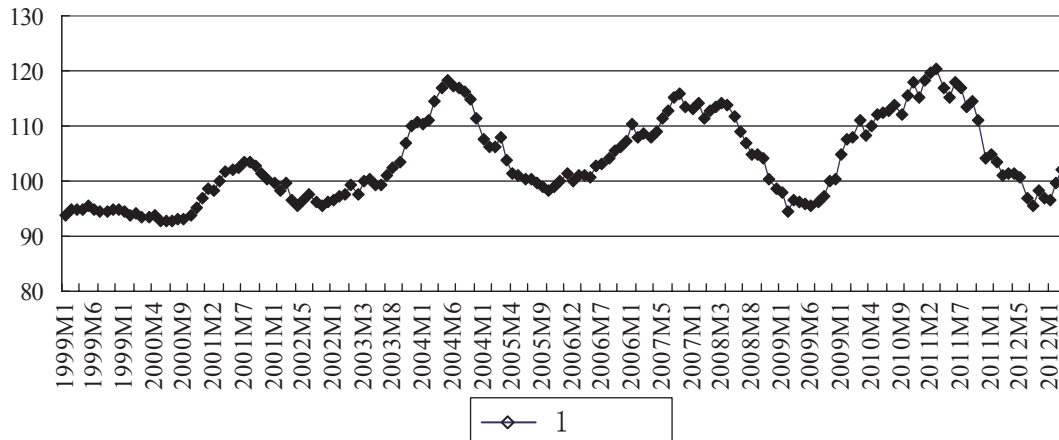

Figure 1
Price Index of Agricultural Products

1. CONSTRUCTION OF THE THEORETICAL MODEL

1.1 Selected Variables

1.1.1 Explained Variables
Agricultural Products' price index (P_A), the index of each year are based on the same month of last year. According to the availability of data and life span, the paper uses the chain price index of agricultural products, from January 1999 to December 2012

1.1.2 Explanatory Variables
(a) Broad money supply index (M_2), it not only reflects the reality of purchasing power, but also reflects the potential purchasing power, changes of aggregate demand and pressure conditions of inflation in the future. (b) Narrow money supply chain index (M_1), it reflects the funds changes of residents and enterprises, which is a leading indicator of the economic cycle fluctuations. (c) Currency in circulation supply index (M_0). (d) Government expenditure index (FISCAL), it reflects the government's support for agricultural production and purchase behavior. (e) Exchange Rate Index (E), used in this paper is direct quotation, thus a unit of the US dollar is the base, converting into a amount of RMB. (f) Consumer Price Index (CPI), it reflects trends and changes of goods and services consumed in a given period.

It shows: (a) There is a strong positive correlation between the P_A and CPI, but the change of CPI always lags behind than the volatility of agricultural prices, indicating the price fluctuations of agricultural products lead to the fluctuations of CPI . (b) The fluctuations of M_0, M_1 and M_2 are familiar with CPI and agricultural products' price, but the latter two have some lag.
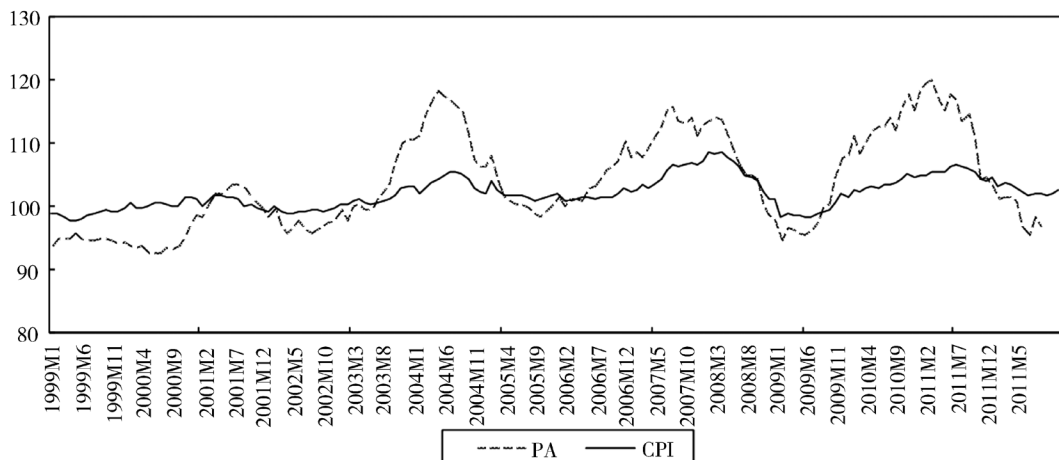

Figure 2
P_A **and CPI From January 1999 to December 2012**

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Table 1
Descriptive Statistics of Variables

Variables	Number of samples	Average value	Standard deviation	Median	Min	Maximum
P_A	168	103.71	7.50	101.5	92.6	120.2
FISCAL	168	120.35	14.29	118.30	82.48	184.91
M_2	168	117.47	3.55	117.21	112.03	129.64
M_1	168	116.28	6.32	115.87	103.08	138.96
M_0	168	112.14	5.48	111.77	91.51	142.45
E	168	97.10	3.11	97.72	90.10	100.04
CPI	168	102.04	2.51	101.65	97.8	108.7

1.2 Research Methods

In order to fully reflect the various levels of money supply index, expenditure index, exchange rate index and CPI for the influence of change in the price index of agricultural products, combined with select relevant variables, we establish three different model to test its impacts, as follows:

Model 1: $PA_t=\beta_0+\beta_1 M_2+\beta_2 FISCAL_t+\beta_3 CPI_t+\beta_4 E_t+\mu_t$
Model 2: $PA_t=\beta_0+\beta_1 M_1+\beta_2 FISCAL_t+\beta_3 CPI_t+\beta_4 E_t+\mu_t$
Model 3: $PA_t=\beta_0+\beta_1 M_0+\beta_2 FISCAL_t+\beta_3 CPI_t+\beta_4 E_t+\mu_t$

2. EMPIRICAL ANALYSIS

2.1 ADF Test

First, we make seasonal adjustments of CPI, M_2, M_1, M_0, E and P_A. After testing, it is found that the variables are non-stationary. Dealing with non-stationary variables with the differential method, the results are shown in Table 2. As can be seen, all of the data after the treatment at 1% significance level are stationary.

Table 2
Variables' ADF Test

Variables	Level value		First-order differential value	
	Test model	ADF	Test model	ADF
PA	（C, 1, 0）	-1.856375（-3.469691）	（C, 1, 0）	-10.87084（-3.469933）[***]
CPI	（C, 1, 0）	-1.925267（-3.469691）	（C, 1, T）	-11.04528（-4.014288）[***]
FISCAL	（C, 1, 0）	-2.274324（-3.469933）	（C, 1, T）	-17.82903（-4.014635）[***]
M_0	（C, 1, 0）	-1.530025（-3.469933）	（C, 1, T）	-16.53376（-4.014635）[***]
M_1	（C, 1, 0）	-1.786938（-3.469691）	（C, 1, T）	-14.27926（-4.014288）[***]
M_2	（C, 1, 0）	-2.310545（-3.469691）	（C, 1, T）	-13.11215（-4.014288）[***]
E	（C, 1, 0）	-2.243498（-3.469691）	（C, 1, 0）	-13.09038（-3.469933）[***]

2.2 Cointegration Test

We should use Johansen cointegration test (JJ) test to determine whether there is cointegration relationship between variables, which are a good method for multivariate cointegration test.The results shows that the model 1, model 2 and model 3 are cointegrated, Table 3 shows the there is long-run equilibrium relationship between variables from January 1999 to December 2012, as follows: (a) Between January 1999 to December 2012, M_0 are significant and positive relationship can be seen in the long-term, so highly liquid money supply lead to fluctuations in agricultural prices. (b) Expenditure regression results in three models show a significant result and there is a positive correlation between agricultural prices with it. (c) Exchange rates in three models have shown significant positive correlation with the prices of agricultural products ,but also show the long-term appreciation of the RMB will suppress the rise of agricultural products' prices.

Table 3
**The Estimated Results of the Model 1, Model 2 and
Model 3**

Explanatory variables	P_A		
	Model 1	Model 2	Model 3
M_2	0.059214 [0.15396]		
M_1		- 0.005574 [-0.01943]	
M_0			1.408403 [4.65822]***
FISCAL	1.622161 [10.8861]***	1.876972 [9.96705]***	0.970954 [7.69457]***
CPI	0.992375 [4.81111]***	0.292262 [0.39781]	1.552509 [3.52297]***
E	2.236641 [4.81997]***	2.454964 [4.24914]***	2.432608 [6.42304]***
C	-417.3052	-390.1787	-566.1516
F value	3.090568	3.296835	3.064441

We choose to use error correction model （ECM）
to reflect the short-term dynamic relationship between
variables. (a) In the ECM of model 1, the coefficient error
correction term in the 10% significance is positive, lagged
one variable of the broad money supply (M_2) at the 5%
significance level can pass the test, in the short term, M_2
has a positive impact on prices of agricultural products.
Lagged one variable of fiscal spending (FISCAL) at the
5% significance level could pass test and effects on the
prices of agricultural products showed negative ,which
can be seen in the short term ,the price inhibition policy of
government imposed are effective; Lagged one variable of
CPI pass the test at the 10% significance ,but lagged one
variable of exchange Rate Index (E) is not significant. It
shows that: the short-term changes of exchange rate do
not affect the price fluctuations of agricultural products.
(b) In the ECM of model 2, coefficient of error correction
term (ECM) at the 10% significance level could pass the
test, lagged one variable of narrow money supply (M_1) at
the 5% significance level could pass the test.In the short
term, M_1 pulls forward the prices of agricultural products.
Lagged one variable of fiscal spending (FISCAL) at the
5% significance level could pass test and it could inhibit
of agricultural products' prices. Lagged one variable of
CPI and E is not significant. (c) In the ECM of model 3,
coefficient of error correction term (ECM) at the 10%
significance level could pass the test and lagged one
variable of M_0 at the 5% significance level is significant.
While lagged one variable of FISCAL at the 10%
significance levelcould pass the test, in the short term,
government's macro-control measures will help curb the
price of agricultural products' prices. Lagged one variable
of CPI at the 5% significance level pass the test and there
is limited impact on prices for agricultural products.
Lagged one variable of E is not significant, indicating

that the exchange rate in the short term will not affect the
prices of agricultural products.

2.3 Granger Causality Test

Table 4 reflects the Granger causality test results at
different levels of money supply, fiscal spending and
prices of agricultural products. In the case of the optimal
lag 2, M_2, M_1 and M_0 are Granger cause of agricultural
products' prices, agricultural products' prices are also
Granger cause of M_2 and M_1. In the broad sense, this is
further reflected that there is a narrow two-way causal
relationship between money supply and prices of
agricultural products.

Table 4
Results of Granger Causality Test

Variables	Null hypothesis	Optimal lag	P value
M_2	M_2 is not Granger cause of P_A	2	0.0001
	P_A is not Granger cause of M_2	2	0.0065
M_1	M_1 is not Granger cause of P_A	2	0.0000
	P_A is not Granger cause of M_1	2	0.0012
M_0	M_0 is not Granger cause of P_A	2	0.0339
	P_A is not Granger cause of M_0	2	0.1113
FISCAL	FISCAL is not Granger cause of P_A	2	0.2154
	P_A is not Granger cause of FISCAL	2	0.0105

CONCLUSION AND POLICY RECOMMENDATIONS

The empirical results show that: Monetary policy have
a strong impact effects on agricultural products' prices.
In long term, the supply of money in circulation will
cause rise in agricultural products 'prices ,while in short
term, the growth of broad money and narrow money
supply are the main factor leading to rising prices of
agricultural products. Because agricultural products are
more sensitive and the most vulnerable to the damage
caused by expansion of monetary liquidity, which led
to China's monetary policy has become an important
variable of agricultural products' price. In addition, by
implementing positive fiscal policy to subsidize prices of
agricultural products, expanding agricultural expenditure,
it will maintain stability of agricultural products' prices.
In the short term, positive fiscal policy still play a role in
boosting agricultural products' prices. In the long-term
appreciation of the RMB is conducive to curb rising prices
of agricultural products, and in the short-term, impact on
the prices of agricultural products is not significant.

Based on the above empirical results, in order to
ensure the healthy development of agricultural markets
and promoting the improvement of the price system

of agricultural products, we should take the following measures:

(a) Optimize the structure of fiscal expenditure and improve the efficiency of expenditure. The central and local governments need to put improving people's livelihood in a more prominent position of the implementation of fiscal policy ,by financial support for agriculture ,governments should raise subsidies of agricultural products' prices to ensure farmers' enthusiasm for production and make the subsidies institutionalized and legalized as soon as possible. For different regions, different time, different sizes to take a different way of subsidies, governments ought to optimize the way of subsidies paid, so as to maintain stable prices of agricultural products. Fiscal policies encourage financial institutions to support agriculture and focus more funds on rural areas. Making use of grants, loans and other preferential policies. Governments will combine the credit funds with financial support for agriculture.

(b) It should be reasonable to use monetary policy to strengthen the liquidity management at all levels, in particular, in order to make strict capital controls to prevent hot money speculation on agricultural products; to improve the legal and economic policies.

(c) To improve the reserve system for important goods and major agricultural temporary storage system. It is vital to construct high standard farmland, promote advanced technologies and enhance agricultural production capacity. Governments should strengthen rural infrastructure, basic public service system and promote the integration of urban and rural development. Stabilize agricultural production ,management team and cultivate new farmers.

(d) Steadily promote the reform of the exchange rate market, adjust imports and exports, reduce the adverse effects of international factors. Pay more attention to price regulation and protection of agricultural products, in order to prevent price rises' impact on people's basic living.

(e) Deal with Macroeconomic policy's continuity, stability, flexibility and effectiveness. Governments should maintain stable and rapid economic development, restructure the economy and manage inflation expectations.

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