Characteristics of Price Fluctuation of Agricultural Products in China

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Abstract This paper introduces the basic trend of the price of agricultural products in China, and analyzes the causation of rigid rise of agricultural product price. It also studies on the fluctuation characteristics of the prices of Chinese and classification agricultural products.

Key words Agricultural product price; Fluctuation characteristics; Trend; China

Since the reform and opening up, agricultural products in China have experienced several greater fluctuations. Prices of agricultural products in China started a new round of rising at the end of 2006. Prices of egg, grain and other agricultural products are raised by the price of pork. Price index of agricultural production in China increased by 18.5% in the year 2007 compared with that in 2006. Consumer price index of meat enhanced by 31.7% compared with the last year, setting a new record within 12 years. Price of agricultural product not only directly influences the interests of consumers and agricultural producers, but also has a significant impact on national economy and social development. After data analysis, we try to find out the characteristics and rules of the price fluctuation of agricultural products in China, in order to offer references for China's price control of agricultural products. It should be noted that the price fluctuation of agricultural products mentioned in this paper refers to the fluctuation of the cost price of agricultural products, not including the fluctuation of consumption price of agricultural products, and it also ignores the impact of circulation on agricultural products prices.

1 Basic trend of price fluctuation of agricultural products in China

1.1 Generally upward trend of the price of agricultural product Tendency of price fluctuation of agricultural products can be determined by the fixed base index. We investigate the fluctuation characteristics of agricultural product price since the reform and opening up, and use the year 1978 as the base period to analyze the trend of agricultural product price. It should be noted that differences in base period selection have a certain impact on the movement analysis of agricultural product price, which is more prominent in horizontal comparison with other price indices. We obtain the chain index of agricultural product price in related years from the China Statistical Yearbook, and calculate the fixed base index according to statistics principle. The equation is: fixed base index at the Nth year = the product of the chain index of the former N years.

Fig.1 illustrates that though there is fluctuation, price of agricultural products in China has shown the trend of linear growth since the year 1978. Fixed base index of agricultural product price has increased at an average annual growth rate of 6.18% in recent 30 years. And it reached its highest point of 603.9 at the year 2007 (price index of agricultural products in 2008 has not yet been published, therefore we can ignore it; index of the previous three quarters is 119.1 and the converted fixed base index is 719.2).

Data come from the production price index of agricultural product in China published by the website of the National Statistic Bureau.

Fig.1 Trend of price fluctuation of agricultural products in China

1.2 Presence of fluctuation in the overall increasing trend Fig. 1 shows that the period from 1983 to 1999 has the greatest fluctuation in price. And prices of agricultural product reach small peaks in the years 1979, 1989, 2004 and 2007. Fluctuations in prices of agricultural products can be divided into three stages: 1979 – 1991, 1992 – 2000, 2000 till now. Price of agricultural product in the first stage (1979 – 1991) fluctuated smoothly, and
reached a local peak in the year 1989 after price increasing by 23.0% in 1988. Price of agricultural product in the second stage (1992–2000) experienced violent ups and downs. Price of fixed base index reached a record high of 550.3 in the year 1996 after a sharp rise in 1994 and 1995, increasing by 142.0% compared with that in 1992. However, price of agricultural product fell to 409.0 in the year 2000 just after four years' down by 26%. Price of agricultural product in the third stage (2000 till now) shows a fluctuant ascending tendency in depression. Agricultural product was in continuous low price before 2004. And then, price rose to a new level with small fluctuation. Price of agricultural product again reached a record high in the year 2007. In short, price rise of agricultural product has strong rigidity; and the price shows an overall increasing trend. After the reform and opening up, basic trend of agricultural product price is upward even though there are ups and downs. And periodically acute fluctuation exists in the increasing trend.

1.3 Analysis of the rigid rise of agricultural product price
Various factors may cause price rise of agricultural product after economical comparison, such as the promotion of production costs, rational return of price, increased amount of money issued, and the extraordinary development of non-agricultural industries. Chakrabarti argues that assuming other conditions remain unchanged, income growth of total industrial output is bound to lead to the price rise of agricultural product. Since the reform and opening up, China's industrial output and income of urban residents have increased rapidly. Therefore, price rise of agricultural products is inevitable. In addition, rigid rise of agricultural product is restricted by agricultural resources. Occupation of arable land in China grows very fast in the periods of " Ninth Five-Year Plan" and " Tenth Five-Year Plan". Arable land reduced from 1.30 x 10⁷ hm² in the year 1996 to 1.22 x 10⁷ hm² in the year 2007 with an annual average decrease of 75.76 x 10⁶ hm² ². Per capita arable land in China was about 0.200 0 hm² in the early stage of liberation. It reduced to 0.106 hm² in the year 1995, and 0.093 hm² in 2007, which was less than 40% of the world average, 1/8 of that in America and 1/2 of that in India ². From the aspect of labor quality and the employed agricultural population, there is a massive outflow of young rural labor force. Problem of rural hollowization is very serious. Profit-driven nature of capital determines that the will of capital flow into agriculture is not strong. Even the peasants themselves are also reluctant to invest in agriculture. Inadequate allocation of agricultural resources is one of the reasons for the rigid rise of agricultural product price.

2 Range features of agricultural product price in China
We use the chain index of price (the last year =100) to investigate the range features of agricultural product price in China in order to explore its regularity. Production price of agricultural products in China is relatively stable from 1978 to 2007. And the average range within the 30 years is 6.8% (Fig.2). Fluctuation of agricultural product price has the following characteristics:

![Fig. 2 Range of the price of agricultural products in China](image)

(1) Increasing years of the agricultural product price are more than the decreasing years in China. There are 23 years in which the price rises, accounting for 76.7% in the total 30 years (price index is more than 100 compared with that over the same period of last year, and the contrary to price decline). There are 7 years in which the price declines, accounting for 23.3%. The decline years occur mainly in the early and late stages of the 1990s and the early stage of 21st century.

(2) Price of agricultural product has experienced relatively big rises for 5 times (above 10%). And their average fluctuation cycle is six years. The price increases by 22.1%, 23.0%, 39.9%, 13.1% and 18.5% in the years 1979, 1988, 1994, 2004 and 2007, respectively.

(3) According to the interval distribution of fluctuation range, price fluctuation of agricultural products within –5% – 10% is in the normal range, accounting for 2/3 of the total times. Among them, price rise within 0 – 5% occurs the most frequently for about 10 times, accounting for 1/3. The price rise within 5% – 10% occurs 4 times. And the range of a price drop within –5% – 0% appears 5 times, accounting for 1/6 (Table 1).

<table>
<thead>
<tr>
<th>Amplitude %</th>
<th>Number of times</th>
<th>Probability of occurrence/%</th>
<th>Year</th>
</tr>
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<tbody>
<tr>
<td>Above 20</td>
<td>3</td>
<td>10.0</td>
<td>1979, 1988, 1994</td>
</tr>
<tr>
<td>–10 – –5</td>
<td>1</td>
<td>3.3</td>
<td>1998</td>
</tr>
<tr>
<td>Below –10</td>
<td>1</td>
<td>3.3</td>
<td>1999</td>
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(4) Price of agricultural product has smaller probability of acute fluctuation. There are three years of price rise higher than 20 percent, which are 1979, 1988 and 1994. And the year 1994 has the biggest price rise (39.9%). Price decline of more than 10% occurs only in 1999, which is 12.2%.

(5) According to the periodic characteristics, price before the middle of 1980s is relatively stable. And price of agricultural product increases greatly in the middle of 90s, and decreases
sharply in the late 90s. After entering the 21st century, price has been in a steady increase stage. And price rises greatly in the year 2007. In the 1990s, agricultural product price goes up and downs dramatically. Return rate of agricultural production enhances greatly. Therefore, peasants’ enthusiasm for production is aroused, which causes high yield but no bumper harvest. For instance, grain production reaches the highest level in 1998, but the price reduces from 1.50 yuan/kg in 1995 to 1.24 yuan/kg, and finally falls to 0.96 yuan/kg in the year 2000. The average cost profit of rice, wheat and corn is negative (-0.9%), and grain production reduces in turn.

3 Fluctuation characteristics of classification agricultural products

We analyze the fluctuation in food price and the price fluctuations of farming, forestry, fisheries and animal husbandry within agriculture field, and carry out the horizontal comparison among the price index of overall agricultural products, grain and planting industry (Fig. 3). Furthermore, fluctuation characteristics of classification agricultural products are investigated.

![Fig. 3 Price trend of classification agricultural products](image)

3.1 Price fluctuation of planting, forestry, fishery and animal husbandry industries

(1) Classification price indices of agricultural products have basically the same trend. Price indices of planting, forestry, fishery and animal husbandry products are the same with the price of fixed base index of agricultural products. They all show the same rising and falling in the vast majority of the years, except the forestry industry. Forestry industry reaches its peak value in 1999, while other industries achieve their record highs in the year 1996 and then decline after several years. In addition, just like the overall price index of agricultural products, the rest four industries can be divided into three stages, which are 1978 – 1990, 1990 – 2000 and 2000 till now.

(2) According to the fitting degree of overall price index of agricultural products, the production price indices of animal husbandry and planting industries are highly accord with the trend of the overall price index of agricultural products. The two are tightly around the price line of agricultural product with one high and the other low. These three indices reach their peak values at the years 1989, 1996 and 2007. However, price indices of fishery and forestry industries have deviated greatly from the overall price index of agricultural products, especially the price index of forestry industry.

(3) Taking the overall price index of agricultural product as a reference, price fluctuation of forestry and fishery products are greater, and that of animal husbandry and planting industries are smaller. In recent 30 years, the average increasing rates of planting, animal husbandry, forestry and fishery products prices are 5.9%, 6.5%, 7.4% and 6.8%, respectively.

(4) From the aspect of absolute level of price, the prices of animal husbandry, forestry and fishery products are all higher than the overall price index of agricultural products. The order of classification price index is forestry industry > fishery industry > animal husbandry > the overall price index of agricultural product > planting industry. This indicates that compared with the price level in the year 1978, price increase of planting industry production is lower than that of agricultural product and other products within primary industry.

3.2 Fluctuation in grain price

As a major agricultural product, fluctuation of grain price has shown great significance to the investigation on overall fluctuation of agricultural product price. Grain price in this paper refers to the average selling price when peasants sell the grain, namely grain production price. Grain price is the nominal price, including the impact of inflation. Fig. 4 shows that grain price in China has fluctuated since the reform and opening up, and can be divided into 6 stages: 1978 – 1989, 1990 – 1991, 1992 – 1995, 1996 – 2000, 2000 – 2002, and 2003 till now.

![Fig. 4 Average selling price of major grain products](image)

Data of 1978 – 1989 are from the China’s Grain Production Costs in 20 Years written by Bao Ping; data after the year 1990 come from the Compilation of the Cost and Profit of National Agricultural Product.
(2) Slight fallback stage of grain price (1990 – 1991). Grain price in the year 1991 reduces by 4.05 yuan compared with that in 1989. Price in 1990 and 1991 decreases by 11.0% and 2.7%, respectively, compared with the past year.

(3) Significant increase stage of grain price (1992 – 1995). Grain price reaches a record high (75.11 yuan) in the year 1995, increasing by 188.0% compared with that in 1991. The average increase rate of the four years is 30.2%. And price rise in 1994 is the fastest, reaching 66.0%.

(4) Sharp decrease stage of grain price (1996 – 2000). Grain price in the year 2000 is 48.36 yuan, which is 23.93 yuan lower than the year 1996. Range of price drop is 33.1%. Among them, price drop in the years 1997 and 1999 is the most significant, which are 10.0% and 14.5%, respectively.

(5) Depressed stagnation stage of grain price (2000 – 2002). In this stage, grain price is in the minimum level from the middle 1990s to 2002. Grain price in the year 2000 is only 48.36 yuan, and reaches 51.5 yuan at 2001, increasing by 6.5%. But the price falls to 49.24 yuan in the year 2002, reducing by 4.4%.

(6) Recovery growth stage of grain price (since 2003). Grain prices hit a record high in the years 2004 and 2006, which are 70.73 and 71.98 yuan, respectively. Grain price obtains the most obvious increase rates in 2003 and 2004, which are 14.8% and 25.1%, respectively.

3.3 Fluctuation comparison among grain, planting industry and overall agricultural product price  
Fig. 3 shows the fluctuation characteristics among grain, planting industry and agricultural product price.

(1) The overall trend of price index of grain production price is the same with the overall price indices of agricultural products and planting industry. The three are going through a phase from steady increase and sharp rise to sharp decline. They reach their peak values in the years 1989, 1996, 2001, 2004 and 2007, and then fall to low points in 1991 and 2000.

(2) Grain price index is always higher than the price indices of agricultural products and planting industry, and the degree of deviation is increasing. Grain price is an important component of the price indices of farming products and agricultural products. Fluctuation in the price has a great impact. However, the degree of deviation from the two becomes more and more serious, indicating that the leading role of grain price is weakened.

Fig. 5 and 6 show that the proportion of grain higher than the fixed base index of farming product and agricultural product prices is increasing over the same year. Although there are declines in some years, the growing trend is obvious. This shows that the leading role of grain price in the prices of overall agricultural and farming products is weakening, which is particularly significant in the mid- and late stage of the 1990s. In a word, fluctuation directions of the price of classification agricultural products are similar, but their fluctuation ranges are different. Grain price deviated from the prices of farming products and the overall price level of agricultural products tends to be enlarged. And the leading role of grain price becomes weak. Fitting degree is better between the overall price index of agricultural products and the index of planting and stockbreeding products.

References

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4 Conclusion

It is not enough for the township enterprises to improve the technological environment of township enterprises just by relying on their own efforts. The support and help of government are also needed, such as establishing various intermediary organizations, and setting up service system for the technological innovation of township enterprises. Government support for township enterprises should focus on the improvement of their poor technological environment, but not just help them to resolve the financial difficulties. Township enterprises can get rid of the competitive disadvantage, and seek long-term development only by improving their technological environment.

References


技术环境与乡镇企业技术创新

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摘要 介绍了技术环境和技术创新的内涵；分析了技术创新的障碍，提出了乡镇企业技术创新的措施。从技术创新的机制和途径分析，提出了乡镇企业技术创新的途径和方法。

关键词 技术环境；乡镇企业；技术创新

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中国农产品价格波动特征研究

郭晓慧1，葛积强2（1.西南财经大学宏观经济研究中心，四川成都 607042；2.河南财经税务高等专科学校会计系，河南郑州 450002）

摘要 根据中国农产品价格波动定基指数的走势，研究了1978～2007年农产品价格波动的基本趋势。农产品价格总体上升趋势中存在波动。初步分析农产品价格波动的主要原因，包括生产成本的推动，价格向价值的理性回归，货币政策的增加，非农产品的发展，农业综合资源配置不足等。

关键词 农产品价格波动；波动特征；趋势