

Original Article

Analysis of Influencing Factors of Grain Price Based on Financialization Perspective

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Abstract - Recently, under the influence of a loose monetary environment, epidemic impact, Russia-Ukraine conflict and other factors, international food prices have risen sharply and fluctuated abnormally. This also poses a serious challenge to world food security. It is of great significance to analyze the influencing factors of grain price and put forward corresponding countermeasures. Based on the long-term observation of international food price fluctuations, this paper carries out a typical analysis of four rounds of sharp increases in food prices since 1990. By analyzing various influencing factors, this paper concludes that the structural imbalance of grain supply and demand and the financialization of grain are the two core factors that lead to the sharp rise of international grain prices. By summarizing many factors that led to the rise of grain prices, this paper further summarizes the imbalance of grain supply and demand structure and grain financialization. There is a strong negative correlation between food supply and international food prices. There is a strong positive correlation between grain demand and international grain price. There is a strong positive correlation between financial liquidity and international food prices. There is a strong positive correlation between capital speculative power and international grain prices. On this basis, this paper puts forward some policy suggestions for ensuring China's food security.

Keywords - Supply and Demand Balance, Grain Financialization, Financial Liquidity, Speculative Capital.

1. Introduction

On the one hand, the outbreak of COVID-19 in 2020. In order to effectively control the spread of the epidemic, many countries around the world have introduced strict security isolation measures, which have also had a significant impact on the global food supply system. At the same time, the Russia-Ukraine conflict has led to significant production cuts in Ukraine and Russia, two major grain growers, and a significant decline in global grain exports, which has also pushed up international grain prices. These two factors have had a serious impact on global food security in terms of food cultivation, supply and price. On the other hand, the Federal Reserve once again started the quantitative easing monetary policy, resulting in the depreciation of the dollar and the issuance of additional currency. Some of the "hot money" poured into the international food futures market to speculate. Speculative capital power has not only continued to enhance the interconnectedness of the international food futures market and the spot market but also significantly intensified the impact of the financialization trend on global food prices, resulting in abnormal fluctuations in global food prices.

Recently, China's grain imports have grown rapidly. In 2021, China's net imports of cereals and soybeans will

reach 62.76 million tons and 96.52 million tons, respectively. The increase in China's net imports of grains and soybeans also pushed up China's grain dependency to 9.1% and 85.5%, respectively, both at historically high levels. In the period of major global crises and the significant increase in China's grain dependence on foreign countries, large fluctuations in international grain prices will inevitably impact China's domestic grain market and national food security. Therefore, it is very necessary to analyze the process and influencing factors of the large fluctuations of international grain prices and put forward policy suggestions to ensure China's food security.

2. Literature Review

Traditional theory holds that historically agricultural markets have long been separated from financial markets. Bessembinder (1992) pointed out that international food price fluctuations are mainly determined by the relationship between food supply and demand. The imbalance of traditional supply and demand factors in the grain market can easily lead to soaring grain prices. Gilbert (2014) found relevant factors affecting international food price fluctuations, including food trade policies, agricultural policies of growing countries and supply chain logistics. Bruno (2016) believes that international food price



fluctuations exert influence on China's food market through trade channels and expected effects, and different varieties of food products will have different degrees of differentiated impact.

In recent years, with the rapid development of the global food futures market, related financial derivatives have become increasingly abundant. The potential impact of financialization on global food prices has accelerated. Myers (2006) pointed out that the dynamic correlation between global food prices and the money market, foreign exchange market, and futures trading was significantly enhanced. In particular, after the 2008 subprime crisis, the quantitative easing monetary policy implemented by the United States, Japan, and other countries led to excess liquidity and speculative capital pouring into the food futures market and other derivatives markets, exacerbating the sharp fluctuations in international food prices (Martin, 2015).

This phenomenon, which is caused by the combination of monetary policy adjustment, liquidity turn, and speculative factors, leads to sharp fluctuations in the food futures market and then through the transmission channel and influence mechanism of the futures market, triggering large fluctuations in global food prices, which is called food financialization (Zhang, 2014).

The financialization of grain is also the dollarization of grain. Mathur (2014) empirically tested the correlation test between the MSCI commodity index, S&P 500 Index and major food price indexes and found that the rise and fall of the food price index had a significant negative correlation with the US dollar index. With the intensification of the trend of food financialization, the decision mechanism of international food prices is more complicated, and the

changing trend of food prices is more closely related to the interest linkage mechanism of the agricultural system and financial market. Wang Dong et al. (2021) pointed out that financial variables such as money supply and exchange rate, together with traditional food supply and demand factors, have become influential factors in international food prices. The information asymmetry of derivatives and the increase of speculative funds and leveraged funds have also led to the outbreak of periodic surges and large fluctuations in international food prices (Clapp, 2019).

At present, most of the studies on the large fluctuations of international food prices have a relatively short observation period of international food price fluctuations and a lack of long-term observation and typical analysis of national food prices.

Relevant studies tend to focus on a single factor and lack a comprehensive investigation of the factors affecting food prices. Therefore, this paper analyzes the process of the recent four rounds of sharp rise in international food prices, looks for the causes of sharp fluctuations in international food prices, and summarizes the core factors affecting international food prices. On this basis, this paper puts forward some policy suggestions to ensure the security and stability of China's grain market.

3. Four Rounds of Sharp Rises in Food Prices

This paper examines the monthly average price data for the four major global staple foods, wheat, rice, maize, and soybeans, between 1990 and 2022 (See Figures 1, 2, 3, and 4, respectively). Since the 1990s, international food prices have experienced four typical increases and large fluctuations: 1994-1996, 2006-2008, 2010-2012, and 2020-2022.

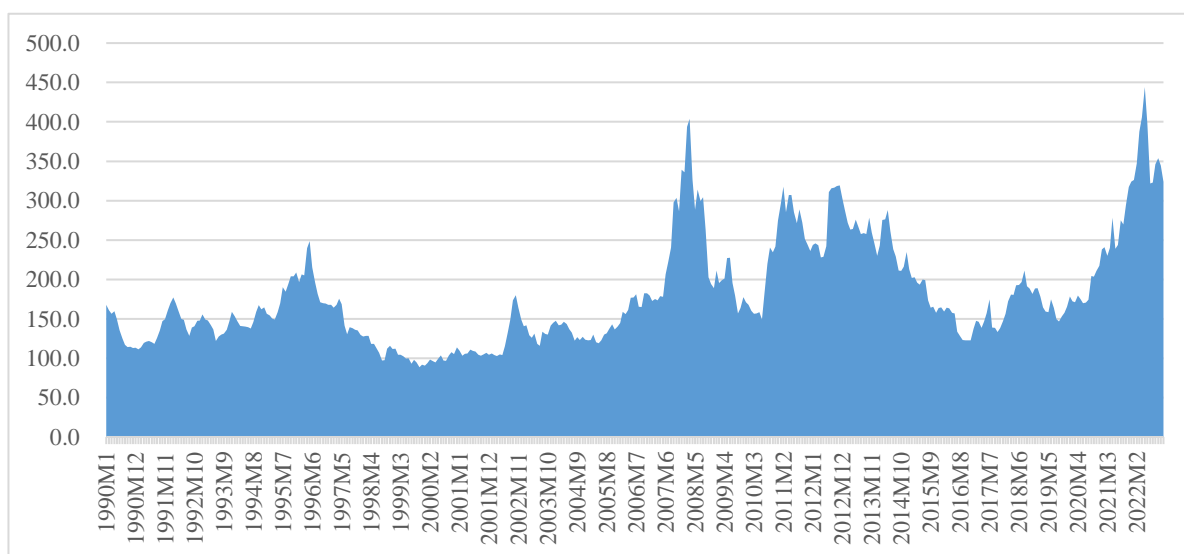


Fig. 1 Fluctuations in international wheat prices, 1990-2022 in US dollars per ton

Source: IMF General Commodity Price Database, compiled by the authors.

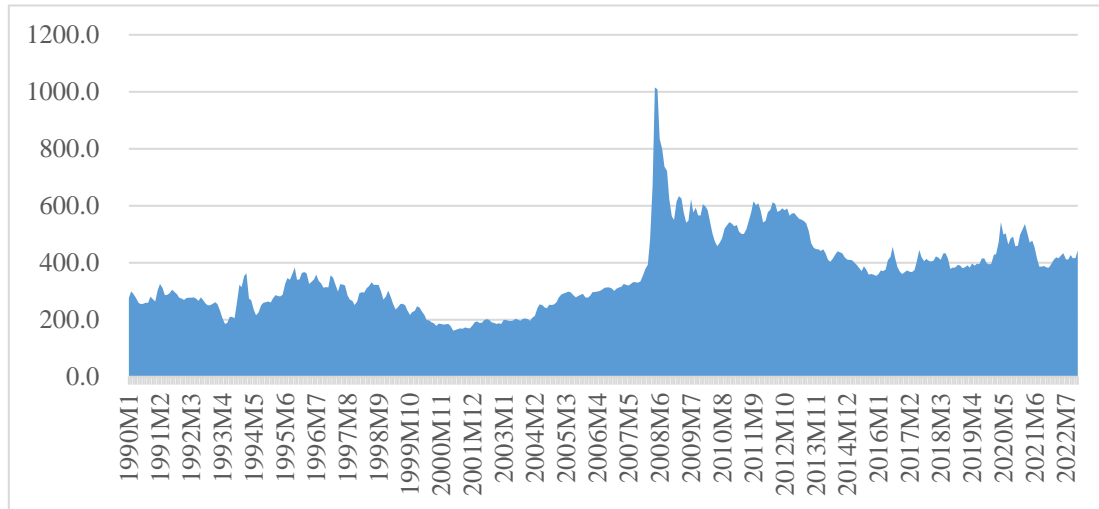


Fig. 2 International rice price fluctuations, 1990-2022 Unit: US \$/ ton

Source: IMF General Commodity Price Database, compiled by the authors.

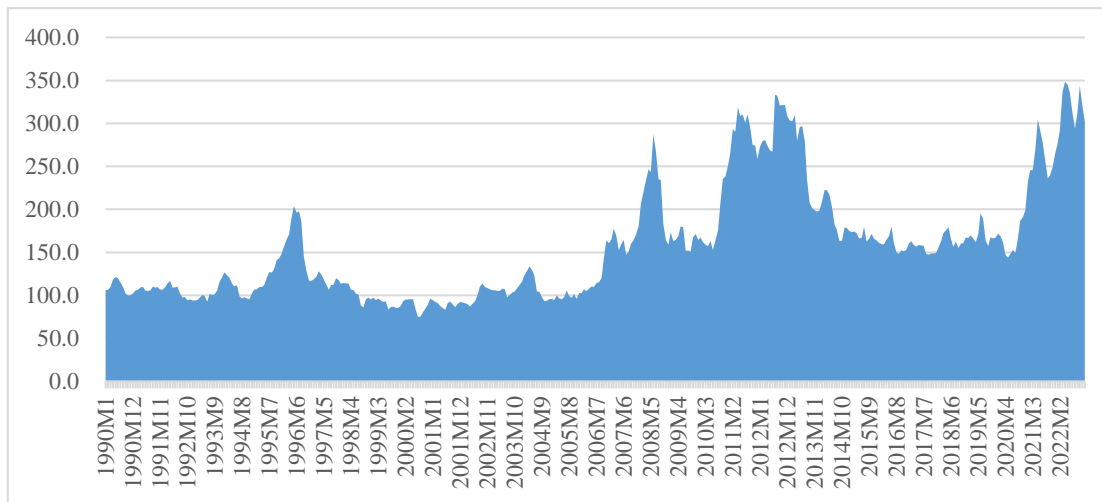


Fig. 3 International maize price fluctuations, 1990-2022 in US dollars per ton

Source: IMF General Commodity Price Database, compiled by the authors.

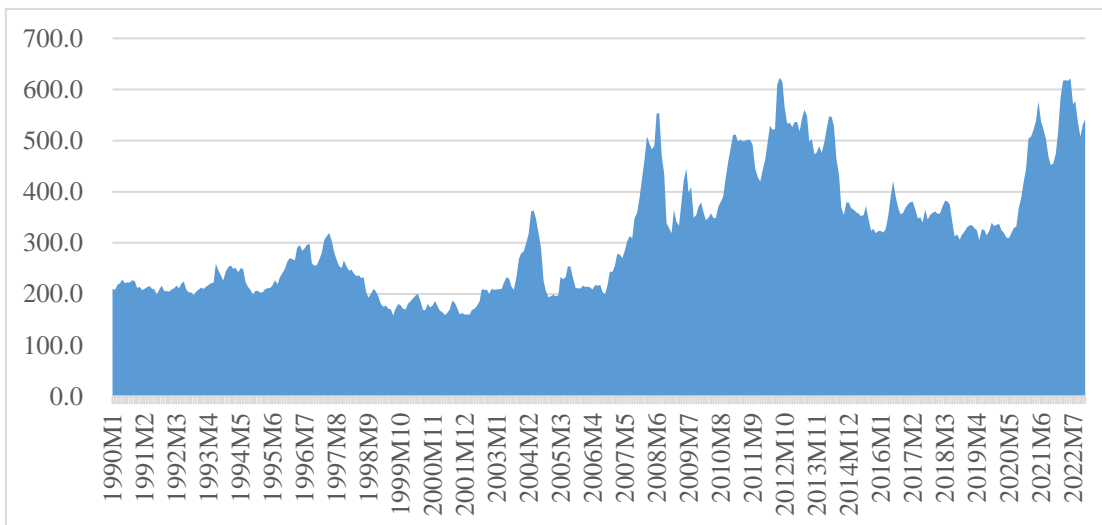


Fig. 4 International soybean price fluctuations, 1990-2022 Unit: USD/ton

Source: IMF General Commodity Price Database, compiled by the authors.

3.1. The First Round of International Food Price Rise and the Main Reasons

The first major spike in international food prices occurred between 1994 and 1996. In the same period, the international grain price index soared from 54 points to 98 points, a cumulative increase of 81.5%. According to the specific situation of the four main grains, taking the grain price in July 1994 as the base period, the price of wheat rose to 248.6 US dollars/ton in May 1996, an increase of 80.7% compared with the price of wheat in the base period. The price of rice rose to a high of \$382.6 / ton in October 1995, an increase of 69.3% compared with the base rice price. Corn price rose to a high of 204.0 US dollars/ton in May 1996, an increase of 106.7% over the base corn price. Soybean prices rose to a high of \$297.5 / ton in September 1996, an increase of 33.3% from the base soybean price.

The first round of sharp rise in international food prices was mainly due to the imbalance in the structure of food supply and demand caused by the global food production reduction and the rebound in food demand. First, the world economy recovered after 1992, and food demand rebounded. Second, cuts in agricultural export subsidies combined with rising fertilizer costs have led to a decline in global food supplies.

In early 1994, the GATT signed an agreement on agriculture in which countries adjusted their agricultural policies and gradually reduced agricultural support and agricultural export subsidies. At the same time, fertilizer prices continued to rise, and the international fertilizer price index rose from 30.4 points in 1993 to 44.2 points in 1996, an increase of 45%. Higher agricultural prices have significantly increased the cost of growing grain, leading to reduced production in food-growing countries and a decline in global food supplies. Between 1993 and 1995, global cereal stocks declined for three consecutive years. By 1995, the cereal stocks-to-consumption ratio had fallen to 26.6 per cent. It can be seen that the imbalance of the global food supply and demand structure has emerged, resulting in a sharp rise in international food prices this round.

3.2. The Second Round of International Food Price Rise and the Main Reasons

The second round of sharp increases in international food prices was from 2006 to 2008. In the same period, the international grain price index rose from 95 points to 213 points, a cumulative increase of 124.2%. According to the specific situation of the four main grains, taking the grain price in January 2006 as the base period, wheat price rose to 403.8 US dollars/ton in March 2008, an increase of 179.3% compared with the base period wheat price; Rice prices rose to a high of \$1015.2 / ton in April 2008, an increase of 256.8% over the base period rice prices; Corn prices rose to a high of \$287.1 / ton in June 2008, 179.8% higher than the base corn price; Soybean prices rose to a high of \$554.1 / ton in July 2008, an increase of 158.9% over the base soybean price.

The second round of sharp rise in international food prices is due to the global food production reduction, the increase in food demand for bio-energy fuels, and the financialization of food. First, natural disasters combined with rising fertilizer prices have led to a decline in global food production. Affected by hurricanes, floods and other natural disasters, the output of many major grain-producing countries has declined. Second, the current surge in oil and energy prices has promoted the rapid development of the biofuel industry. This has led to a surge in food demand for bio-energy fuels such as wheat, corn and soybeans and the rapid depletion of global cereal stocks. Some grain exporting countries have reduced production and adopted export restrictions on bioenergy grains, raising grain export tariffs and reducing grain exports. Third, the role of grain financialization factors began to emerge. From 2003 to 2008, the dollar depreciated as advanced economies pursued loose monetary policies. Global excess liquidity, not only to promote international oil prices skyrocketing, driven by biofuels fuel food demand, but also due to global food production, prices are expected to rise. With excess liquidity, international speculative forces have entered the grain futures market in large numbers. Grain global stocks and grain options trade volume have become the main speculative trading materials, and the corresponding total position of futures options has continued to fluctuate upward, further raising grain futures prices and spot prices.

3.3. The Third Round of International Food Price Rise and the Main Reasons

The third round of sharp rises in international food prices ranged from 2010 to 2012, during which the international grain price index rose from 88 points to 155 points, a cumulative increase of 76.1%. According to the specific situation of the four main grains, taking the grain price in June 2010 as the base period, the wheat price rose to a high of 319.5 US dollars/ton in November 2012, an increase of 114.1% compared with the base period wheat price. The price of rice rose to a high of \$615.5 / ton in September 2011, an increase of 34.2% over the base rice price. Corn prices rose to a high of \$333.0 / ton in July 2012, an increase of 117.8% over the base corn price. Soybean prices rose to a high of \$622.9 / ton in August 2012, an increase of 78.7% from the base soybean price.

The sharp rise in the third round of food prices is mainly due to global food production cuts and food financialization factors. The first is that extreme weather has led to a large area of global grain production. Affected by natural disasters such as floods and droughts, production in major grain-producing countries such as Russia, Ukraine and the United States has declined. The ratio of world cereal stocks to consumption declined for two consecutive years in 2010 and 2011, continuing to cause food shortages. Second, in response to the subprime crisis, developed economies implemented quantitative easing monetary policies, resulting in rapid depreciation of the US dollar and excess global liquidity. A large number of speculative

capital poured into the grain futures market, taking advantage of the grain production reduction expectations and trade export restrictions. In February 2011, the average open position of the US CBOT wheat futures contract hit a stage high of more than 720,000 contracts. The total position of futures options corresponding to the global stocks of cereals continues to shake up, leading to a rapid rise in food commodity futures prices, and is transmitted to the food spot market, which continues to push up food prices.

3.4. The Fourth Round of International Food Price Rise and the Main Reasons

The fourth round of sharp increases in international food prices ranges from 2020 to 2022. Within this range, the international grain price Index rose from 88 points to 170 points, a cumulative increase of 93.2%. For the specific situation of the four main grains, taking the grain price in March 2020 as the base period, the wheat price rose to a high of 444.2 US dollars/ton in May 2022, an increase of 160.1% compared with the base period wheat price; Rice prices rose to a high of US \$535.8 / ton in September 2021, an increase of 24.5% from the base rice price; Corn prices rose to a high of \$348.5 / ton in April 2022, an increase of 137.1% from the base corn price; Soybean prices rose to a high of \$621.2 / ton in June 2022, an increase of 100.4% from the base soybean price.

The fourth round of sharp increases in food prices is mainly due to global grain production cuts, the impact of the novel coronavirus pandemic, food financialization and geopolitical conflicts. One is that extreme weather reduces global food production. According to IMF data, between 2020 and 2022, global wheat and corn production has been lower than demand for three consecutive years. Wheat stocks in 2022 fell to their lowest level in nearly five years. The outbreak of COVID-19 has disrupted food cultivation in some parts of the world. The decline in food production and the disruption of the global supply chain have led to the imbalance of food supply and demand structure and pushed up food prices. Second, in order to cope with the impact of the epidemic and recover the economy, many countries have adopted loose monetary policies and injected large amounts of liquidity into the market. The dollar has fallen, driving up the prices of dollar-denominated commodities, including food. This not only triggered the phenomenon of food financialization in the food market a large number of speculative capital poured into the futures market to excite, driving up food prices. Third, geopolitical conflicts have led some countries to reduce production and restrict grain exports. After the outbreak of the conflict between Russia and Ukraine, more than 20 major grain-producing countries, including Russia, Ukraine, Argentina and India, implemented grain export restrictions and introduced policies to restrict grain exports in order to ensure their own food security. The food crisis has been exacerbated by geopolitical conflicts, contributing to food panic and rising food prices.

4. Analysis of Influencing Factors of Sharp Rises in International Grain Prices

This paper analyzes the process of four global food price spikes since 1990 and finds that the factors affecting food prices include Natural disasters that have reduced grain production. Fertilizer prices have increased the cost of growing food, bio-energy fuels have increased food demand, food trade policy changes, food financialization, the impact of COVID-19, supply chain constraints, and geopolitical conflicts. For further analysis of the above-influencing factors, this paper summarizes two core factors: one is the structural imbalance of food supply and demand, and the other is the financialization phenomenon caused by quantitative easing monetary policy.

4.1. The Imbalance of Grain Supply and Demand Structure

Changes in the supply and demand structure of a commodity will lead to changes in its market price. From the process of four rounds of international food prices rising sharply, various natural disasters caused grain growers to reduce production. The rise in fertilizer prices has led to a rise in the cost of growing grain, leading to a decline in grain production. Increased demand for food due to the substitution of biofuels for oil; Some countries have changed their trade policies due to their own food security concerns; As well as the impact of the COVID-19 pandemic, supply chain constraints and geopolitical conflicts, all have a direct impact on the supply and demand of the international food market. Production in the food market fell, and demand exceeded supply, which led to a spike in food prices. According to IMF research, a 1% decline in global food production corresponds to a roughly 9% increase in food prices.

At the same time, the world's major food producers and trading countries are highly concentrated. When the situation of grain production reduction and supply shortage occurs in these countries, the contradiction of regional grain supply and demand structure imbalance may be deepened. If there is a continuous decline in food stocks and changes in liquidity factors, it will exacerbate the sharp fluctuations in international food prices. In addition, food stocks are an important means to balance food supply and demand. The inventory consumption ratio is an important index reflecting the balance of supply and demand. When the grain stock is high, it can partially offset the impact of grain supply and demand fluctuations on grain prices. When stocks are too low, the ability of stocks to hedge the impact of crop failure is insufficient, food prices are more vulnerable to the impact of influential factors, and the risk of price volatility increases. IMF research also supports this conclusion, showing a significant negative correlation between international food prices and the stocks-to-consumption ratio. When the ratio of inventory to consumption tends to decline, the grain price tends to rise. When the stock-to-consumption ratio rises, the level of food prices tends to fall. Based on this, this paper points out that

there is a strong negative correlation between food supply and international food prices. There is a strong positive correlation between grain demand and international grain price.

4.2. The Food Financialization Factors

According to traditional theory, food price fluctuations are mainly determined by global food supply and demand. However, this situation has changed significantly in recent years. Under the background of food financialization, the traditional food supply and demand are no longer the whole reason affecting international food prices. Observing international food prices and global macroeconomic trends, it can be found that large fluctuations in international food prices are closely related to speculation in the food futures market and financial liquidity generated by the Federal Reserve's quantitative easing monetary policy. Grain, as an international commodity, generally adopts the futures trading model, and its pricing is based on the futures price. With the rapid development of derivative markets such as grain futures, the financial attributes of grain are gradually enhanced. The Fed's monetary policy has become a key factor affecting international food prices. International food prices are increasingly sensitive to changes in various financial variables such as money supply, interest rates, and exchange rates.

First, long-term historical data show that there is a significant negative correlation between the US dollar exchange rate or the US dollar index and international food prices. When the US dollar depreciates or the US dollar index declines, the international food prices in US dollars will rise. When the dollar rises, or the dollar index rises, international food prices will fall. In the last three rounds of food crises, international food prices were directly affected by the depreciation of the US dollar exchange rate under the QE policy and soared in the combined effect of inflation factors and the declining purchasing power of money.

Second, the global grain production reduction caused by various factors has caused an imbalance in the supply and demand structure of the international food market, leading to food security panic. This has also created speculation materials for international speculative capital, which has led to a rise in food futures prices and increased expectations of future spot prices. Grain suppliers are reluctant to sell, resulting in grain prices deviating from the trending price determined by the fundamentals of supply and demand in the short term, and there is an unreasonable surge.

Third, in response to the global subprime mortgage crisis and the impact of the novel coronavirus epidemic, the Federal Reserve and other central banks have repeatedly

launched QE policies. A large amount of excess financial liquidity poured into the grain futures market and option trading, resulting in the total position of grain futures contracts and options rising again. The spillover effect of the direct linkage between the food futures market and the spot market has led to periodic surges and sharp shocks in international food prices many times.

Based on this, the paper points out that financial liquidity has a strong positive correlation with international food prices. There is a strong positive correlation between capital speculative power and international grain prices.

5. Conclusion

Based on the long-term observation of international food price fluctuations, this paper carries out a typical analysis of four rounds of sharp increases in food prices since 1990. The factors that lead to the sharp rise in international food prices include natural disasters resulting in reduced grain production; Rising fertilizer prices have pushed up the cost of planting; Biofuel fuels leading to a surge in food demand; Food trade policy changes, food financialization, COVID-19 shocks, supply chain constraints, and geopolitical conflicts. Based on the analysis of the above factors, this paper concludes that the structural imbalance of grain supply and demand and the factors of grain financialization are the core factors that lead to the soaring grain prices.

The imbalance of supply and demand structure is the objective basis for the sharp rise in international grain prices. The factor of food financialization is an important driving force for the sharp rise in international food prices. In the context of food financialization, in addition to the traditional food supply and demand factors, financial liquidity and international capital speculation also have a significant impact on international food prices.

To this end, China must first adjust and optimize the industrial and planting structure of agriculture, strengthen the fundamentals of grain supply and demand, alleviate the shortage of some grain varieties, and build a diversified grain supply system.

The second is to strengthen the regulation of the grain market, strengthen the supervision of grain price speculation in the grain futures market and the capital market, and severely crack down on malicious capital speculation. Third, we should give due consideration to hedging the risk of large fluctuations in international food prices through exchange rate instruments and make every effort to ensure the supply of domestic food markets and the stability of food prices to ensure food security.

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