

# Research on China's Emerging Futures Market -- Based on DCE Hog Futures

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## ABSTRACT

Before the listing of hog futures at the beginning of 2021, the price of live hogs in China has fluctuated frequently. Due to the inability to totally control the risk, the life of residents and the income of pig farmers are seriously affected by the sharp rises and falls of hog prices.

This paper firstly illustrates the current hog market development situations in China and the significance of live hog futures as well as the influencing factors. After that, the hog futures is compared with related futures development in the United States. Moreover, a VAR model is used to explore the impact of feed prices on hog prices to reveal the impact mechanism. Meanwhile, the available impact of the listing of live hog futures on related industries is explained.

This work finally summary the reasons for price fluctuations, and table proposals to promote the development of the hog futures market that strengthening the hog industry feed chain and settling appropriate futures delivery mechanisms can help ensure the development of pig breeding.

**Keywords:** Hog futures, Pig cycle, Price fluctuation, VAR model, Market influence

## 1. INTRODUCTION

In the past, due to the gradual expansion of the market transaction scale in China, along with the continuous changes in the quality of live hogs and the market situation, the transaction risks in the spot market have continued to increase.

Before 2018, the pig cycle phenomenon that existed in the Chinese pig market was the main mode of pig price changes, while the African swine fever around 2019 caused drastic changes in pig prices, greatly increasing uncertainty of farmers and the dietary costs of residents. The 2020 virus pandemic has caused fluctuations in economic conditions, promoting the listing of hog futures in 2021 in order to stabilize hog prices and related industries.

On January 8, 2021, hog futures were listed on the Dalian Commodity Exchange, becoming China's first futures trading product in animal husbandry. The importance of futures aims to stable the hog prices based

on the unique status of pork in China.

Since most of the existing related papers were mainly predictions before listing, they had insufficient market information and trading situations to illustrate the hog futures situation as a whole. Given that, this paper concentrate on the development situation of China's live hog market and the impact of listing of live hog futures in 2021. Based on relevant influencing factors and problems, the relevant status quo of the hog industry and analysis of the impact of the futures market was discussed as follows.

## 2. CHINESE HOG MARKET

### 2.1 Definition of hog futures market

The hog futures contract is a standardized contract designed by the futures exchange. All traders in futures need to pay a deposit (called initial margin), usually a small percentage of the overall value of the contract.

In order to avoid economic losses caused by price

fluctuations, investors tend to participate in the futures market to reduce the risk of large price fluctuations. Aiming at avoiding the risky spot fluctuations, both parties to a hog futures transaction sign a futures contract that obliges them to take delivery.

In the hog spot trading market, traders from both sides negotiate on the exchange and sign a transaction contract. If the contract is not closed before the last day, the two parties will deliver the goods in kind.

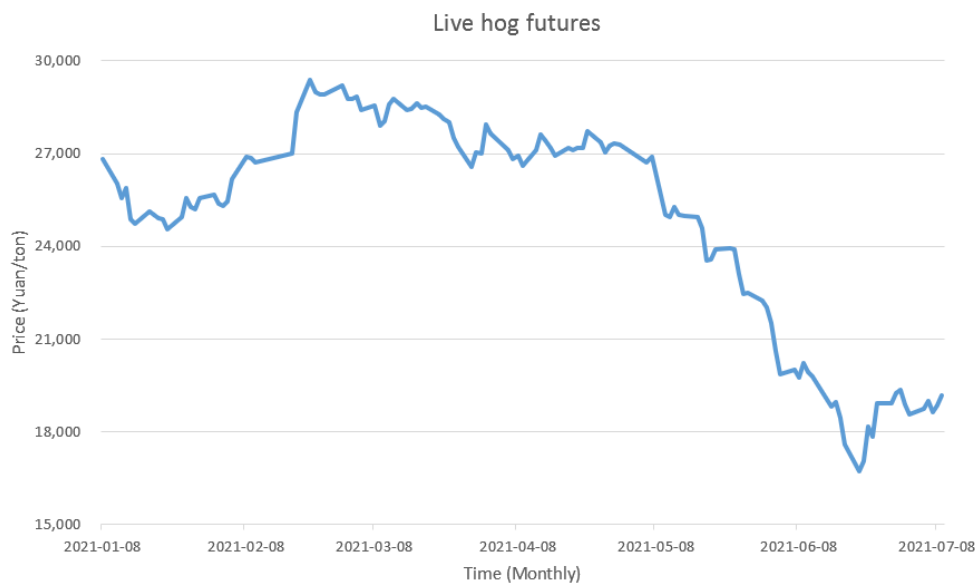
Table 1 shows the basics of hog futures.

**Table 1** Basics of hog futures

Trading varieties	Live Hogs	Trading code	LH
Trading unit	16 tons/lot	Quotation unit	Yuan (RMB)/ton
Listed Exchange	Dalian Commodity Exchange	Minimum price change	5 yuan/ton
Price limit range	4% of the previous trading day's price	Contract delivery month	January, March, May, July, September, and November
Trading hours	Monday to Friday 9:00-11:30 am, 13:30-15:00 pm, and other announced times	Last trading day	The fourth trading day of the contract month
Last delivery day	The third trading day after the last trading day	Delivery grade	Dalian Commodity Exchange live hog delivery quality standard (F/DCELH001-2021)
Initial transaction margin	5% of contract value	Delivery method	Physical delivery

Figure 1 shows the trends of live hog futures prices from January 8 to July 9, 2021. After going through a

slight increase in the first two months, the hog futures price kept fluctuating decreasing until the middle of June.



**Figure 1** Live hogs futures price Source: Dalian Commodity Exchange

### 2.2 Current condition of live hog market

Figure 2 indicates that China's pork production has developed rapidly. Before the 2019 swine fever and the

2020 virus pandemic, the scale of transactions has gradually expanded, while hog prices and economic situations have been constantly changing, leading to increased risks in spot transactions.

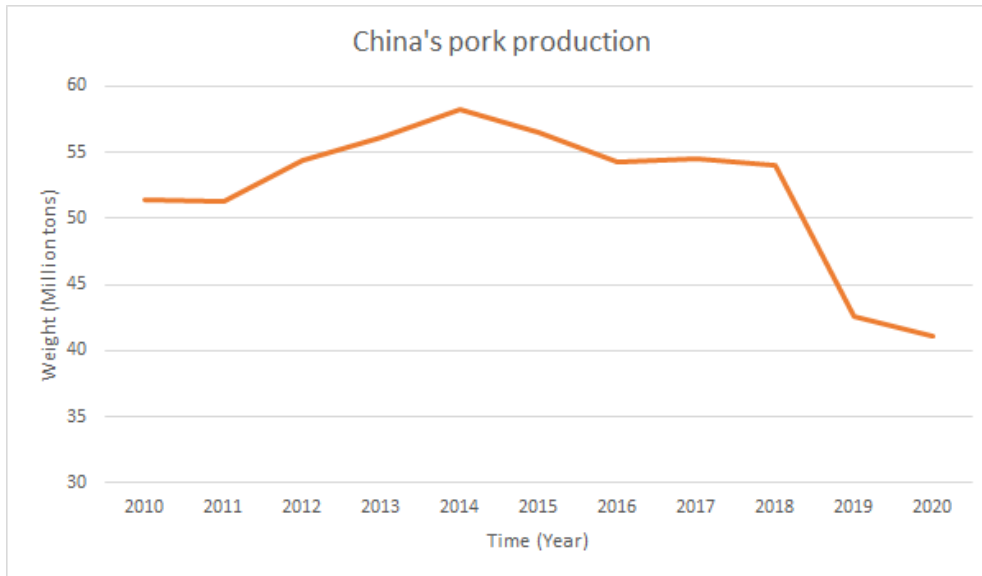


Figure 2 China's annual pork production between 2010 and 2020 Source: Statistics Bureau of China

In recent years, the hog market has encountered several price cycles. Since 2006, China has experienced three obvious pig cycles: from 2006 to 2010, 2010 to 2015, and 2015 to present. The pork price bottomed in

2018, reaching the lowest price in the latest five years. Figure 3 below shows the change in the price of pork per kg since 2006.

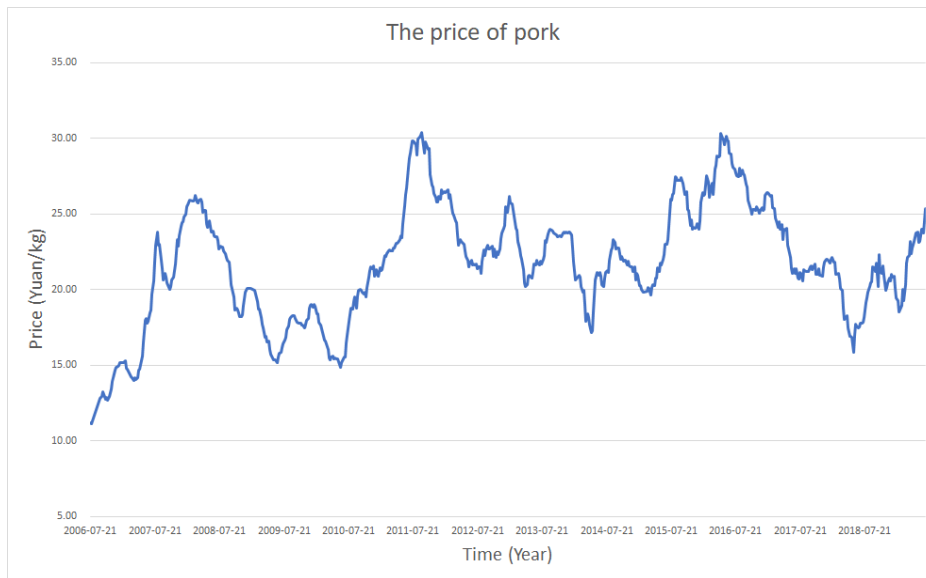


Figure 3 Price of pork per kg Source: Wind terminal

### 2.3 Literature reviews

Prior to the listing of hog futures in DCM, there were some related researches in terms of the prediction of the futures in China. Besides, since the livestock futures in the US has been operated for several decades, there can also be some similar trends researches for promoting the development.

By looking through the literature on the influencing factors of farmers' participation in pig insurance and combined with the field survey results in Jiangxi Province, China, there was research analyzing the influencing factors of farmers' willingness to participate in hog futures[1]. By using the ISM (Interpretative Structural Modeling Method) model, it studied the influencing factors and their correlation from five

dimensions, such as individual characteristics and family characteristics.

The results showed that age, the degree of cognition and understanding of pig futures, and gender are the direct factors. Nine factors including pig breeding cost, breeding specialization, and breeding scale are the indirect factors in the middle level. Price fluctuations in the pig markets, education level, strength, and attitude of government support are the underlying root factors in some parts of China.

As innovative commodity futures, hog futures are expected as a more effective risk management tool, which can contribute to the steady development of the hog industry. In 2020, the US hog futures development was studied to find similarities in the Chinese hog futures market and provided reform plans to avoid potential problems in the industrial chain [2].

The reform plans suggested removing intermediate trade links, developing long-term orders instead of open market trades, encouraging vertical integration, and creating leading enterprises that can both achieve quality control and manage the market risk caused by price fluctuation.

#### **2.4 Compare Chinese hog futures with US**

Hog futures listing can gradually lengthen the "pig cycle", making price changes more gradual. The current Chinese "pig cycle" is short in time and the price in the pig market is fluctuating greatly, which makes it is easy to "crowd out" the scattering pig raising households and brings operational risks to large breeding enterprises. Therefore, large-scale pig breeding enterprises and pork traders directly purchase pig futures, corn futures, and soybean meal futures in the financial market to lock in the transaction prices before they come, so as to realize hedging and reduce the spot market price risk.

This mode enables pig-breeding enterprises and pork traders to directly participate in the futures market, purchase insurance, and lock in sales profits in advance, and therefore avoid the loss of price decline at a lower cost. If the price rises, the policyholder can directly sell live pigs at a high price in the spot market; If the price of pigs falls below the target level, the policyholder will be compensated from the price difference, thus ensuring the income of enterprises and the stability of operations.

This mode allows pig-breeding enterprises and pork traders to transfer some of the uncertain risks of hog price in the spot market to the futures market, so as to reduce the risk of loss caused by the instability of hog price and promote the sustainable development of the husbandry industry.

On the one hand, the price of hog futures can provide guidance on the forward hog prices, which helps breeding enterprises to control the breeding cost, determine the

production plan and feeding scale by using the futures trading cycle. On the other hand, the standardized delivery method of pig futures will promote the pig industry to form a set of national unified standards for breeding, quarantine, and listing, and relatively solve the price inconsistency problem in the national pig market.

However, the Chinese hog futures market is still way from standardized compared to mature markets such as the US hog market.

Firstly, the large-scale production of hogs is at a relatively low level in China. With a top-ranking hog breeding and consumption in the world, China's pigs accounted for about half of the global pig production. However, China has a vast territory and a deep-rooted culture of traditional breeding and animal husbandry. Swine breeding is dominated by small farmers. After years of large-scale development, the proportion of standardized production in large-scale breeding farms is only 50%. Most hogs in China are produced locally and sold to individual slaughterers. Therefore, influenced by local customs and breeding habits, there is no standardized management system for piglets, feed, veterinary drugs, quarantine, quarantine, technical indicators, etc. Meanwhile, in the US, CME (Chicago Mercantile Exchange) set the subject matter in lean pig futures contract as lean pig carcass and strict accordance with the trading rules and regulations of the exchange futures trading. This prompted the American pig industry to accelerate the scale management and vertical integration among industries, and successfully explored a new industry type. And by the mid-1990s, the standardized production of live pigs in the United States had enabled 70 percent of live pigs to meet futures exchange delivery grade, and with the development of transportation systems and logistics technology in the United States, the porks can now be shipped directly to processors without the need for a final transaction in the Midwest Pork Clearing Center.

Second, the Chinese hogs industry lacks expertise in futures trading. The lack of professional futures trading talents and unfamiliarity with futures trading rules result in the low participation of the hogs industry chain in the live pig futures. And the low professional level of futures traders may affect the role of futures in avoiding risks. Current Chinese hog futures conducts the way of physical delivery, which is difficult to operate, and the cost of quarantine, transportation, and storage is high. With the hogs futures taking hogs as delivery objects when the live pigs reach the deliverable weight standard stipulated in the recent futures contracts, it is difficult for live pigs to be stored further and cannot wait for the delivery of the futures contracts in the longer term, even if the futures prices do not reach the expected level. This dilemma will increase the market risk of hedging customers, resulting in the discontinuous correlation between futures and spot

prices, which will reduce the enthusiasm of pig breeding enterprises to participate in futures trading.

While in the US, in consideration of the changes in the industry and market trade situation, CME changed the live pig Futures to Lean Hogs Futures in February 1997, and the delivery method was also changed from physical live delivery to cash delivery. The settlement price is determined by CME's Lean Hog Index (LHI). In addition to the innovation of the delivery method, other trading rules in the lean hogs futures contract also have detailed provisions on the rest of the futures transaction, including quotation unit, trading unit, minimum price change, daily price fluctuation limit, position limit, last trading day and delivery month[3]. After cash delivery of live pigs futures replaces physical delivery, the market participation increases, and the futures market plays a better role in reducing the volatility of the live pigs market.

### **3. FLUCTUATION ISSUES OF HOG FUTURES**

#### ***3.1 Reasons for the pig cycle***

There are three main reasons for the pig cycle.

The first is the characteristics of breeding. In China's pig farming, there are many retail farms with serious scale problems related to the "cob-web model". When the pork price rises, the scale of production expands rapidly, then the increased supply can cause the prices to decline. With low prices rapidly shrinking farming scale, the pork prices are more likely to grow due to the decrease in production[4].

The second is the long production cycle. From the beginning, it takes about 6-9 months to raise a matured pig, which means once price fluctuations occur, it takes at least more than half a year to adjust prices through the relationship between supply and demand.

Finally, the disease problem: every epidemic will cause price fluctuations. In fact, there are hogs actually infected by the disease, but once there are signs of epidemics, pigs in various places will be slaughtered in advance to prevent infection, which within a short period could result in a significant increase in pork supply and thus a decline in prices. After that, when the batch of pork sold in advance is sold out, there will be a shortage of supply, and the price will rise rapidly.

To summary, spot prices have always lagged behind the decision-making guidance, and the volatility of hog spot market prices cannot be effectively eliminated, which seriously reduces the profitability of stakeholders in production. In addition, cyclical spot price fluctuations have been hindering the steady development of the agriculture industry.

#### ***3.2 Importance of the price stability***

The significance of the stability of hog prices in China is mainly due to its involvement in the interests of many related industries and the situation of residents in daily consumption.

The pig industry chain generally revolves around pig breeding. Therefore, the price fluctuation of hogs can considerably affect the price stability of the entire industry chain. Following are some details about the chain.

The pig industry chain mainly includes six links: feed production, vaccine production, pig breeding, slaughtering and processing, meat production, and product sales. Among them, feed production that provides raw materials and services are the core of the upstream industry, while slaughtering and processing, and meat production are the main downstream industries.

The ingredients for pig feeding mainly include grain feeds such as corn and wheat and protein feeds such as soybean meal and fish meal. According to the data from the National Bureau of Statistics of China(NBS), in recent years China's domestic corn production has remained almost flat while continuously destocking. However, as the demand side increased, the number of corn imports continued to increase since 2018 to make up for the demand gap. Soybean meal is a by-product of soybean processing, while China's soybeans mainly rely on imports, of which the current import dependence rate exceeds 80%.

As for the downstream industry, live pigs enter some slaughter and processing companies and meat processing companies and finally flow into supermarkets, farmer's markets, catering industries, and other places through cold chain logistics.

In the final consumption, the price of pork has a considerable impact on residents' daily consumption since the Chinese had a large proportion of having pork as a daily meal. China is the world's largest pork consumer, and China's total pork consumption in 2020 is about 41.13 million tons, accounting for about 42% of global pork consumption, with China's per capita pork consumption of about 30kg. Meanwhile, pork nearly dominates the Chinese diet structure. According to 2020 data from NBS as Figure 4 shows, pork occupies an incomparable position (53.09%) in the common meat structure of Chinese people, compared to other meats such as beef (8.68%) and lamb (6.35%). As a consequence, a sharply increased price of pork would result in a struggled diet consumption situation for residents.

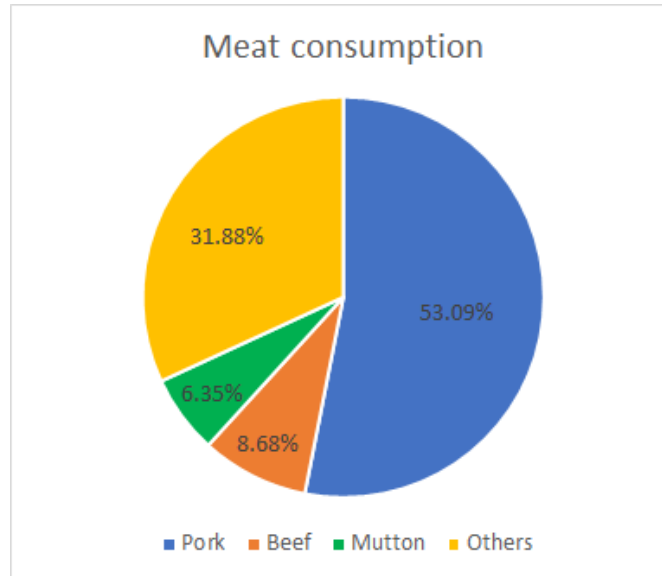


Figure 4 China's meat consumption in 2020 Source: Statistics Bureau of China

In addition, CPI is a common indicator used to judge the level of economic consumption. According to data released by the Bureau of Statistics, the current CPI weight of pork exceeds 4%, which means the fluctuation of pork prices would bring the misinterpretation of the economic index.

Concluded above, the uncertain price of pigs promotes the issuance of hog futures. Hog futures, as a positive role in improving the mechanism of hog price formation, can better manage the risks and construct a stable market. After relevant companies understand the expectation of hog prices in a period, firms can better adjust the scale of hog production, avoid the risk of large price fluctuations, and protect the stable development of the industrial chain.

### 3.3 Factors that can cause the hog price to fluctuate

#### 3.3.1. Macroeconomic situation

Since any economic activity must be carried out in a specific environment, the hog price is affected by the macroeconomic situation. When the macroeconomic development is booming, on the one hand, the income of residents will increase, driving the consumption of porks and increasing the demand for hogs; on the other hand, a prospering economy can contribute to the accumulation of investment. The rapid development of the national economy can accelerate the growth of the money supply and the influx of foreign funds, pushing up domestic prices, and the hog price will rise as well.

#### 3.3.2. Government policy

The impact of the policy on hog prices is multifaceted. It is possible to influence the hog prices by

affecting the supply and demand or to directly control through policies.

Before 1985, China implemented a unified purchase and sales policy for hogs, and the price was completely set by the government. In 1985, the price control was relaxed, but the government still consciously increased the price, which released the previously over-repressed hog prices, resulting in a rapid increase in the price. After the comprehensive introduction of the socialist market economy in 1992, the intervention measures on hog prices have been significantly reduced. China's hog price policy has changed from direct price intervention to macro-control under the full play of the market price mechanism.

#### 3.3.3. Market expectation

Market expectations generally have been seen to affect the prices of hogs in China. The drop in hog prices was mainly affected by the market's expectations of future hog supply and demand trends. The recent hog price is even lower than the cost to raise pigs, therefore, resulting in a panic slaughter and selling. The price drop indicates the pressure on the food market. If the price rebounded faster at the end of the year, it would have a certain disturbance to the CPI. However, the PPI will go downside at that time, which measures the wholesale price indices for manufactured goods and raw materials. The current market is relatively optimistic about the supply of hogs in the second half of 2021. The market generally believes that under the premise of no severe epidemics, for example, COVID-19 and African swine fever, the hog prices should return to normal, and there will be a renewed periodic adjustment.

### 3.3.4. Supply & Demand

As a commodity, the price of hogs is mainly affected by its supply and demand. The factors affecting domestic demand for live pigs include people's disposable income, consumption habits, total population, seasonal factors, etc. The influencing factors of domestic supply include the number of pigs and piglets, the number of imported meats, the amount of national reserve meat, pig disease, the cost and profit of pig breeding.

From the demand perspective, people's disposable income, consumption habits, and the total population are the three main factors that determine the total consumption of hogs. Chinese people mainly obtain protein from soybean products, eggs, and meat. Since meat is the most expensive category, the intake of meat will increase only when people's disposable income increases. In addition, the urban residents will purchase more pork because of their higher-income compared to the rural residents.

Moreover, the change in the total population directly affects the change in the total consumption of hogs. At present, China's population structure is gradually entering an aging society. Although it is relatively stable in the short to medium term, pork can be considered as a critical issue in long-term demand since the elder's intake of protein is lower than the young. Thus, the elder's demand for hogs is significantly lower than that of the young. Due to the acceleration of the aging of the population, the demand for hogs will further slow down in the Chinese market.

The seasonal characteristics of hog demand are very obvious due to the influence of weather and holidays, and the hog prices, therefore, have obvious seasonal fluctuation. Based on the Chinese custom of making curing bacon in the south and making sausages in the north, the peak of hog demand starts in December each year, which is earlier than the stocking time of other agricultural products, and the demand gradually drops after spring festival ends. In addition, the second peak of hog demand is in September and October during the Mid-Autumn Festival and National Day. As the summer heat slowly recedes, the proportion of meat in people's diet has begun to increase again. The worst demand in previous years was in March and April. Hog prices fell after the Spring Festival and reached a low point in the second quarter.

For the supply side are farming costs and profits. Due

to the long growth period of pigs, feed costs accounted for 60% of the total cost of pig breeding. Swine feed is mainly composed of corn and soybean meal. Corn mainly provides energy, soybean meal mainly provides high-quality protein. Its price has a greater impact on the cost of pig breeding. It is precise because of this factor that the hog industry can be regarded as the downstream industry of corn and beans. The price has a transmission effect in the entire breeding industry chain.

In order to ensure market supply and stabilize the large fluctuations in market prices during special periods, the country also has a pork reserve system. The disease is the biggest risk faced by this industry. The occurrence of the epidemic can not only affect the current slaughter volume of hogs but also affect the enthusiasm of farmers to replenish hogs, thereby affecting the future supply of hogs. Also, due to the high risk of hog breeding, smaller companies and farmers are not willing to replenish, which also led to a sharp increase in hog prices in 2019.

## 4. EMPIRICAL RESEARCH ON CHINESE HOG MARKET

### 4.1 Trends of variables

As the main upstream industry of the hog chain, the feed accounts for up to 60% of the cost of live pig breeding in China. The main components of pig feed are corns and soybean meals, which means the fluctuations of their prices are more likely to affect the cost of pig breeding. That will transmit to the price of live pigs, but it is less likely to be reflected in the price immediately due to the lag effect.

Therefore, this work select the corn prices and soybean meal prices as independent variables to figure out to what extent they had an impact on hog prices volatility during the past decade.

Figure 5 shows the trend of live hog trading prices since 2010. According to the chart, from 2010 to the first half of 2019, the price moderately fluctuated between 10 and 20 yuan/kg due to the pig cycle. However, in late 2019, because of African Swine Fever, the reduced supply of live hogs led to a sharp growth in the price, which exceeded 40yuan/kg. Then, under the influence of the 2020 virus pandemic, the price experienced drastic fluctuations. Since 2021, the price of live pigs has continued to decrease, rapidly falling below 20 yuan.

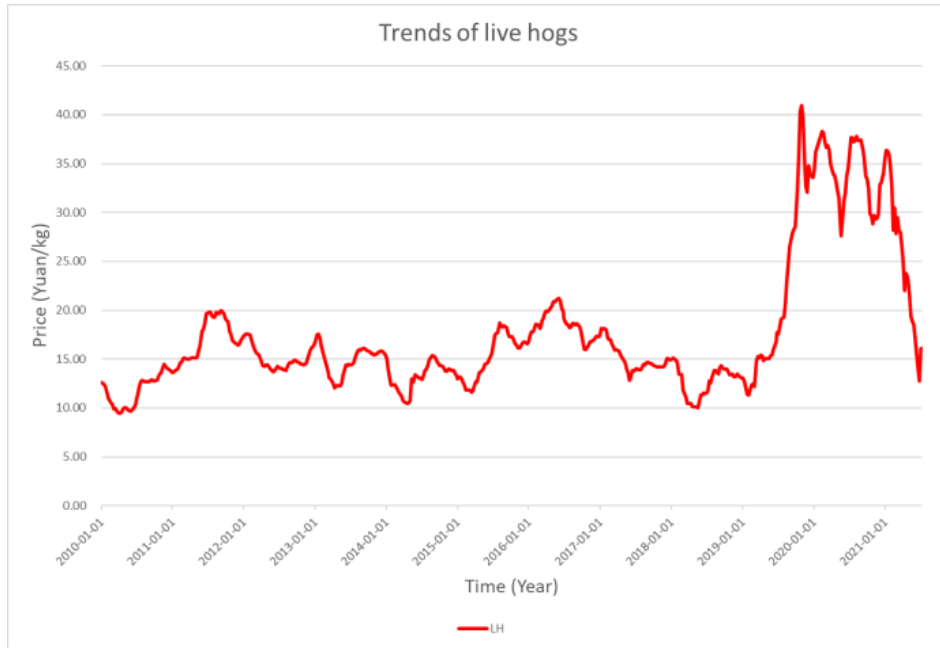


Figure 5 Trends of Hogs price Source: Wind terminal

Figure 6 shows the trends of the main feed, corns, and soybean meals, changed from January 1, 2010, to July 9, 2021. The price of corn was quite stable with some

moderate changes during the time. Differently, the price of soybean meal had a greater degree of change than corn in the past ten years.

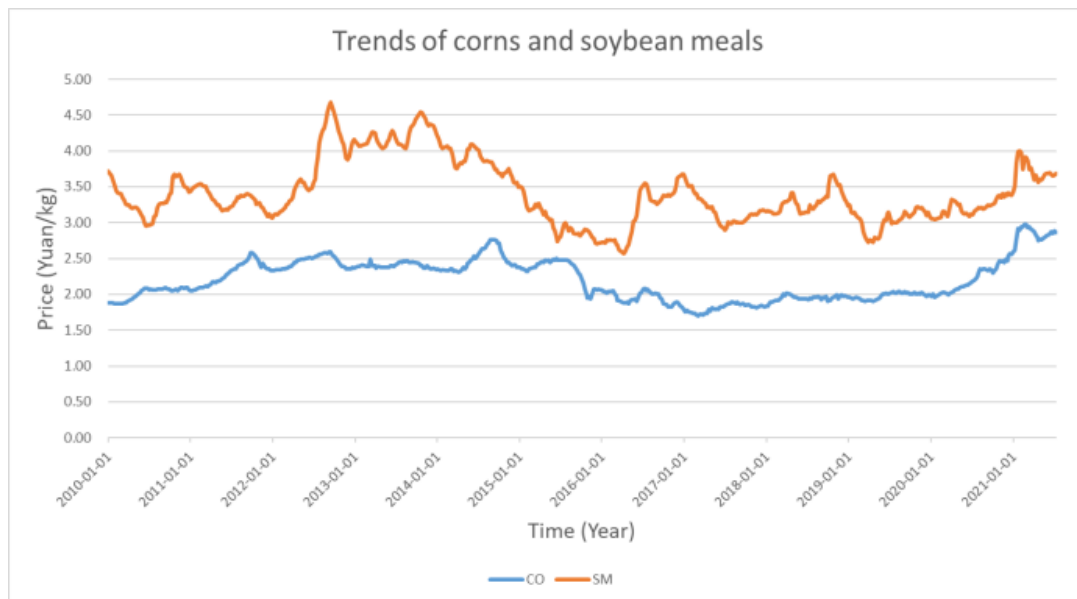


Figure 6 Trends of corns and soybean meals Source: Wind terminal

#### 4.2 Selection of data

The vector auto regressive (VAR) model was chosen to analyze the internal relationship of each variable.

This paper selects the weekly price data of the trading price of the live hog (LH), corn (CO), and soybean meal (SM) for empirical analysis, with a unit of yuan/kg.

In view of the availability and timeliness of economic data due to recovery from the 2008 crisis, the sample interval of the data used is from January 8, 2010, to July

9, 2021, with a total of 510 sample data. The above-mentioned weekly price data of products comes from the China Animal Husbandry Information Network and the Wind terminal.

#### 4.3 The process of data analysis

Firstly this paper took logarithm processing of the data to reduce the heteroscedasticity of the data, denoted as LNLH, LNCO, and LNSM respectively, and then performed an ADF test to ensure the stationarity of



sequences. Then the lag test was used for determining the lag period. Moreover, the Granger causality test was used to judge the causality relationship between the sequences. Finally, impulse response was tabled for further discussion.

**4.4 Empirical analysis**

1. The work found that at the significance level of 1%, lnLH, lnCO, and lnSM were non-stationary sequences. But on the first-order difference processing D(lnLH), D(lnCO), and D(lnSM), the results all showed that they are all I(1) (integrated of order one) and met the conditions for VAR models.

2. The lag results indicated that the lag period of lnLH and lnCO was 4 and the lag period of lnLH and lnSM was 3.

3. Before performing subsequent discussions, it was necessary to check its model stability. The results of inverse roots of the AR characteristic polynomial proved the two models were both stable and suitable for subsequent discussions.

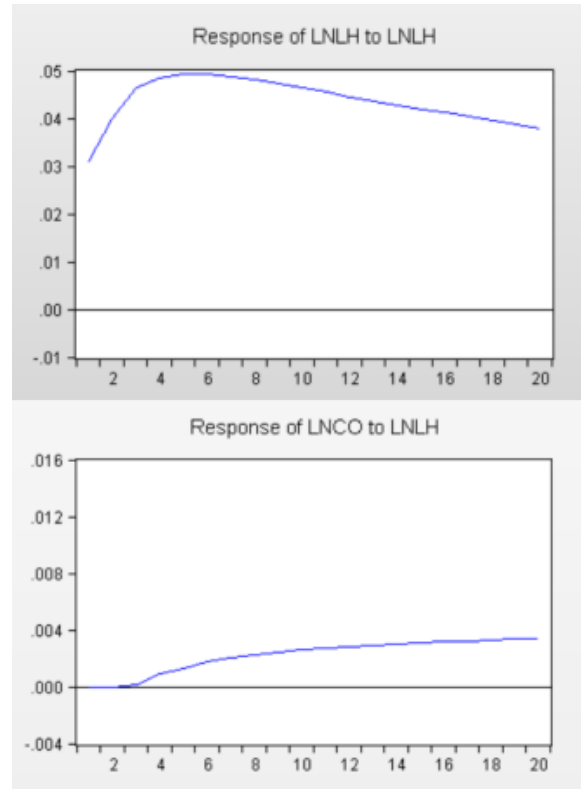
In addition, the Trace test indicated at a 5% significance level there was a cointegration relationship between hogs and soybean meals, which indicated the two variables can have a stable and dynamic influence on each other.

4. The Granger causality test method is used to judge the statistical causality relationship between the sequences.

From the results, at the 5% significance level, the two feeds both had an impact on the volatility of hogs prices respectively.

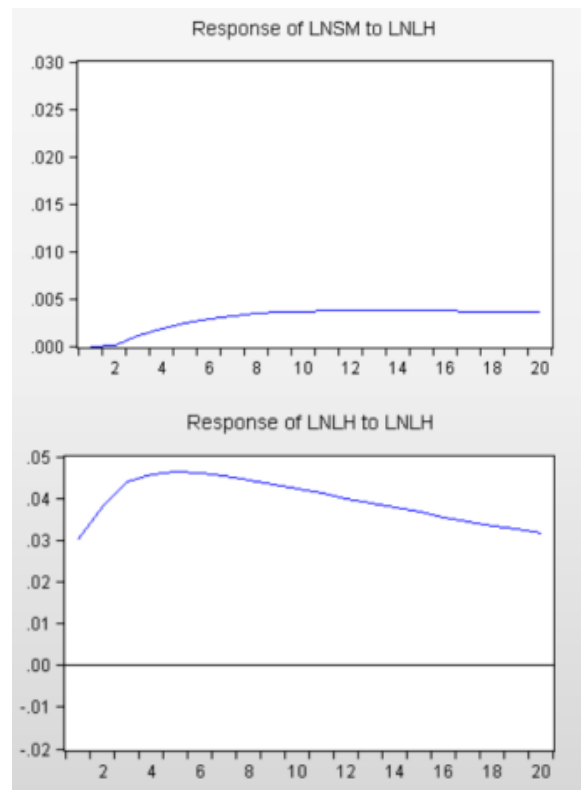
5. The impulse response function method describes how one variable had an impact on another. In the results the abscissa axis represents the impact time, the ordinate axis represents the degree of change, the solid line represents the impulse response function, and the dashed line represents the impulse response confidence interval.

Figure 7 indicates corns began to have an impact on hogs at the fourth period and kept increasing while hogs can influence themselves, reaching the highest point at the sixth period and gradually decreasing.



**Figure 7** Dynamic response of CO and LH on LH

Figure 8 indicates corns started to have an impact on hogs at the third period and maintained increasing while hogs can influence themselves with peaking at the fifth period and then gradually decreasing.



**Figure 8** Dynamic response of SM and LH on LH

#### 4.5 Summary

1. Both corn and soybean meals can have a considerable impact on live hogs. The upstream industry of the hog industry has a continuous short-lag effect on the fluctuation of hog prices. The lag period for soybean meal is around 3 weeks while that for corn is 4 weeks.

2. Among the degree of influence, the live hog market itself has the greatest impact, while soybean meals and corn have gradually affected the hog prices starting from the lag period.

3. In addition, it may be due to the above-mentioned off-site factors that cannot be easily digitized such as the macroeconomic situation and government policies that cause the fluctuation of live pig prices.

### 5. FUTURE ANALYSIS

#### 5.1 Pros and Cons of the listing of hog futures

##### 1. Pros of the listing

###### (1) Improvement of price system

The purpose of live hog futures is to ease the cyclical fluctuations, reduce the risk of hog price fluctuations and have a shock-absorbing effect.

Before the hog futures were listed, producers, traders, and consumers can only adjust production and consumption to adapt to the changes in market conditions based on limited information. Producers and macro-control departments make production input adjustments and policy adjustments solely based on spot prices. The "invisible hand" of the market and the powerful "visible hand" of the government have superimposed effects, which can easily lead to a blind expanding production in hogs when prices are rising, and compressing when prices are falling. This will aggravate the tension between supply and demand, increasing the fluctuations of the market prices.

With the hog futures, the government or macro decision-making department can conduct effective prediction of economic operation based on complete price information rather than past and current price information only, and more accurately understand and grasp the changing trend. So as to formulate macroeconomic policies in a more targeted manner, scientifically guide the pig-related industries to adjust the scale and direction of production and operation.

###### (2) Improvement of risk management and hedging tools

In the past, every enterprise and farmer in the Chinese live hog market has been developing without direction, and the judgment of hog prices is based on intuition and experience[8]. Therefore, a tool to predict the future price and offset risks is needed.

Live hog futures, as an effective risk aversion tool, can provide supply and demand judgments for hog companies, traders. Manufacturers can manage the risks of rising raw material prices and falling product prices through locking upstream raw material procurement costs and returns can achieve relatively stable production.

For the breeding, corn, soybean meals, and others constitute an important part of the production cost, and the corn and soybean meal futures have been listed in China. At present, a large number of feed manufacturers and large-scale pig breeding companies have begun to use corn and soybean meals futures and had achieved good results. Thus, combined with raw materials futures, a whole price risk management system for the industrial chain is roughly accomplished.

###### (3) Promotion of the industry

The development of the hog futures market is expected to be combined with modular development and industrial integration.

Firstly, the construction of model breeding farms and communities will speed up to expand the scale of pig breeding. Moreover, the construction of hog circulation infrastructure will be supported, creating positive and favorable conditions for hog futures. In addition, strengthen the vertical integration of the upstream and downstream of the industrial chain and cultivate multiple integrated organizational forms.

Based on those, the improvement of efficiency and standardized hog industry can attract investors to new technologies for production. Strengthening the research of new technologies can promote the improvement of the production level of large-scale breeding pigs.

##### 2. Cons of the listing

###### (1) Risky poor awareness of diseases

The contagious disease risk restricts the development of live pig futures. The scale of live pig production and breeding in China is relatively scattered, the farmers' ability to withstand economic losses is weak, and the farmers' level of education is different, their understanding of the economic market and knowledge of livestock and poultry diseases are insufficient[9]. This results in loss of expenses or the possible spread of diseases. It can lead to a large-scale reduction in pig production and cause short supply.

###### (2) Difficult delivery

In the futures market, the terms of futures contracts are all standardized and formulated. However, China has a vast territory, a large spot of live hogs, and high hogs production. The breeds of pigs raised in each place are quite different. Meanwhile, because of the epidemic, the supply of live pigs in the spot market cannot be guaranteed, which limits the functions of risk avoidance and price discovery, and increases the difficulty of

making standardized contracts.

## **5.2 Potential Influences on the hog industry**

### **1. Industry scale**

Markets in China generally experience industrial scales where many scholars have predicted that the industry of hog is likely to prosper[10]. There is the emergence of the new source of potential demand in China for overseas pork exports has played an important role to farmers, policymakers, and business leaders.

The hog industry scale has been mainly attributed to the volatility of the entire industry chain where imported pork becomes more competitive within the boundaries of China. Due to animal disease outbreaks, food safety concerns, environmental threats, pork production costs are able to rise, which constrain the entire industry as well when it attempts to grow[11]. Nevertheless, the hog futures are expected to benefit the hog scales because of the upgrade of the relative industrial system and the decrease of costs.

Preceding several reforms that have been done on the market, the hog industry has realized rapid development, nevertheless with societal and commercial changeovers where the engineering face a variety of challenges that has a high potential of restricting long-term growth within the production scale[12]. A few technical efficiencies include technological progress, allocated efficiency, official efficacy, and gauge productivity.

Several studies indicated that Total Factor Productivity (TFP) of hog production increased by more than 64% from 1980 to 2010, together with allocated efficiency concerning the efficiency of the entire scale that realized improvements and contributed to the growth of TFP[13]. As a result of the study, the most important and enduring long-term and stability within the development of China's hog creation involve forecasting the enhancement of Aggregate Factor Production and consolidating the arrangement of creative growth for the entire scale.

The development and progress that has been witnessed in the Chinese hog industry where pig production started from backyard to large-scale, have seen several challenges which include the African swine fever outbreak that was experienced in 2018 and 2019[14]. Several other drivers are considered to have influenced the industrial scale of the hog industry in China includes population growth, urbanization, better marketing, and income growth. There are some restraints in the industry as well like social pressure, negative publicity, together with the increased growth of vegetarianism.

### **2. Transaction cost**

Transaction costs occur and are formed in the course

of commodity futures transactions including commissions, margin interest, and delivery fees. Transaction costs are generally recognized to affect farmers especially with the aspect of choosing a variety of vertical cooperative modes or societies in China[15]. Given that, the hog futures can help farmers and relative companies lock down the hog prices in advance, meanwhile, the costs can be reduced by proper finance.

Transaction cost has been seen to take a wider role and magnitude with the inclusion of universities and various research institutions joining hands to provide research and discussion on rural finance that will be able to help in solving the problem of weak rural finance. The promotion of such research through the encouragement of financial institutions can get into the rural market and increase the capacity of loans to ensure that there are sufficient funds to run the business[16].

Aiming at further serving the breeding industry, according to the regional characteristics of China's pig breeding and consumption, and combined with the quality of hogs and the distribution of large enterprises, most of the main pig production areas in China like Henan and Shandong were set as hog futures delivery areas to reduce transaction costs and promote delivery stable and smooth, ensuring the effective functioning of the futures market.

## **5.3 Related laws and regulations issues**

The futures market is a risk-management market. It is necessary to prevent and control its own risks, and resolutely maintain the bottom line of avoiding systemic risks. On April 26, 2021, PRC Futures Law (Consultation) draft was deliberated at the 28th meeting of the Standing Committee of the National People's Congress for the first time, which has significant meaning in regulating and promoting the futures market.

The draft would pay equal attention to financial market development and risk prevention, and make arrangements for the entire chain of risk prevention and control in terms of trading mechanism, monitoring, and supervision, and management.

It is clear that futures trading shall use implement centralized trading, margin trading, position limits, and forced liquidation by an insufficient margin to clarify the procedures for the settlement of defaults, and establish the principles of bankruptcy protection for margin and related properties.

According to delegate Baoming Luo, in order to ensure the effectiveness and safety of futures trading, a unique risk control system has been created in the futures field. The formulation of the futures law can fix the effective risk control system in the futures market in the form of law and improve its legal effect. The purpose is to better protect the security of the futures market.

In terms of cracking down on illegal activities, the draft enriches the types of manipulation in the futures market, clarifies the constituent elements of insider trading in the futures market, severely cracks down on fabricating and disseminating false information, greatly increasing the number of administrative fines [17].

## 6. CONCLUSIONS

1. There are three main reasons for the cyclical changes in the price of live pigs, the change in the scale of breeding, the relatively long pig breeding period, and the panic caused by related pig diseases. To alleviate cyclical fluctuations, it is recommended to establish authoritative information release systems. Moreover, the hog futures can be used to hedge, and in the long run, large-scale breeding is expected to reduce the fluctuations.

2. The macroeconomic environments, government policy, market expectations, and the supply and demand of the live hogs are the main factors that influence the hog price to fluctuate.

3. The impact of the corns and soybean meals on the price of the hogs appeared on average after about 25 days, and it has a clear boosting effect. Since the pig feed is mostly imported, the government can implement relatively preferential tariff policies for related import and export trade to stabilize the upstream.

4. However, the Chinese hog futures market is still way from standardized compared to mature markets like the US hog market and there are no sufficient standardized management systems for related processes. Besides, the Chinese hogs industry lacks experts in futures trading, which may affect the role of futures in avoiding risks.

5. The hog futures has several benefits. Firstly the pig price system can be improved as it can ease the cyclical fluctuations. Moreover, it improves enterprise risk management and enriches the hedging tools of the industry chain to protect the rights of stakeholders. Additionally, it promotes the development of the industry by attracting more attention and investments.

Nevertheless, the poor awareness of monitoring and prevention of diseases could cause large-scale death in hogs and price issues. Meanwhile, the big differences in pig breeds and quality are hard to standardize the future contract, therefore resulting in unfair trade.

6. The new Futures Law draft gives a positive hint in terms of the Chinese government's determination to promote a more standardized and low-risk financial market.

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