

# Analysis of the Rise and Fall of Pork Prices and Prediction of the Future Pork Market

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## ABSTRACT

In the past two years, data from the National Bureau of Statistics showed that domestic pork prices fluctuated repeatedly. Prices are rising internationally. COVID-19 has ravaged the world for two years. Pork production capacity declined rapidly in 2019. Then came the second blow of the COVID-19 pandemic. In the second half of the year, as production capacity recovers and demand falls, pork market excess capacity. Based on the data of 2020 and 2021, this study will focus on pork stock and the prices of corn to forecast the trend of pork prices in 2022. Rooted in the pork market in 2020 and 2021 and international and domestic corn prices, pork prices are forecast to continue to rise in the second half of 2021 and 2022.

**Keywords:** *Pork, Market, Corn, Prices, Self-sufficiency, Overcapacity*

## 1. INTRODUCTION

Pork is one of the most important meat consumer goods in the world and the most popular meat food in China. China has a long history of eating pork. Pork also plays a vital role in people's lives. In 2017, China provided about 48.19% of global pork production[1]. Pork prices in China have long been stable. The self-sufficiency rate of pork remains above 97 percent, so the pork market depends on domestic production. However, in 2019, as an important producer and consumer of pork in the world, China's pork productivity has been considerably affected by infection with the African swine fever virus(AFS). By early 2020, the COVID-19 outbreak had thwarted the resumption of pork production in 2020. Domestic production cannot immediately resume. Pork productivity cannot be restored in time, leading to the rapid rise in pork prices. The domestic market began to rely more on imports. Before 2019, pork prices remained stable at around 22 yuan/kg. From 2019 to 2021, pork prices experienced a surprisingly rapid rise and then fell below their pre-AFS levels. This study systematically collected the data about pork output and stock summarized the data related to pork. The purpose of this study is to explore the reasons for the rapid rise and fall of pork prices, analyze

the pork market situation in 2021 and guide consumers' expectations.

## 2. PORK SUPPLY SITUATION IN 2019 AND 2020

### 2.1. *Pork production declined significantly*

Affected by AFS, hog stock and the number of breeding hogs in China continued to decline in 2019. This situation continued until 2020. Compared with 428.171 million pigs at the end of 2018, the number of pigs in 2019 decreased by 11,776.42 million. At the end of 2019, the number of pigs in China fell 27.5 percent year on year, while the number of pigs sold dropped 21.6% [2]. The significant decrease in pig production capacity led to a significant decline in pork production. There were 42.55 million tons of pork production in 2019, down 11.49 million tons from 2018, down 21.3% [3]. In 2020, the pork market was hit by the COVID-19. Neither state farms nor retail farmers can expand production. Pork production did not recover, and even fell by a further 1.42 million tons for the year compared with 2019. Eventually, pork production cannot meet the demand for meat.

**Table 1** Pork production, import and export volume, 2015-2020

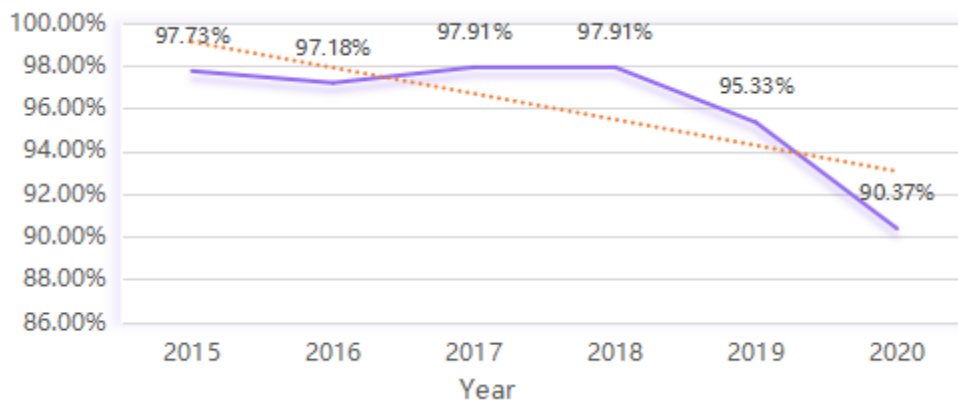
Year	Production (million tons)	Imports volume (million tons)	Year-end stock(million)	Export volume (million tons)
2015	56.45	1.377	458.03	0.071
2016	54.25	1.620	442.09	0.048
2017	54.51	1.216	441.59	0.051
2018	54.03	1.192	428.17	0.041
2019	42.55	2.108	310.41	0.026
2020	41.13	4.392	406.50	0.011

**2.2. Pork self-sufficiency rate declined**

The rate of self-sufficiency of agricultural products reflects the extent to which the agricultural consumption of a country is satisfied by the domestic supply, which is related to the trend of agricultural policy of a country and the international agricultural trade relations[4]. For a long time, China's pork market has been influenced

only by domestic pork production. As a result, pork prices have remained stable for a long time. Imported pork does not affect the price of pork. According to formula, assuming that the sum of total production and net exports represents total demand, the self-sufficiency rate is equal to total production divided by total demand. (Formula 1).

$$\text{self - sufficiency rate} = \frac{\text{total production}}{\text{total production} + \text{import volume} - \text{export volume}} \times 100\% \tag{1}$$



**Figure 1** self-sufficiency rate

From 2000 to 2010, the import and export of pork in China were basically balanced, and the self-sufficiency rate fluctuated between 99.38% and 100.51% [1]. According to Figure 1, China's pork self-sufficiency rate remained at about 97% from 2015 to 2018. Since 2011, the self-sufficiency rate of pork has shown a downward trend. But, under the impact of ASF and COVID-19, the self-sufficiency rate of pork further dropped to 90.37% under the situation of pork production has fallen sharply and imports have risen sharply. This shows that, to a certain extent, the pork market has begun to rely on foreign markets to regulate prices. For the domestic market, this will make retail investors face stronger competition in the pork market. If self-sufficiency falls further, retail farmers without any protection will find it harder to survive in the competition.

**3. ANALYSIS OF PORK PRICES IN CHINA**

**3.1. The gap between supply and demand led to a surge in prices**

The relationship between supply and demand is the basis of prices. At the beginning of 2019, farms drastically reduced the number of pigs in stock due to AFS. In June of nineteen, the total amount of pork production fell sharply because of the decrease in production. There is a huge gap between pork supply and demand. Pork prices began to skyrocket. Starting from April, pork prices continued to rise rapidly, reaching the mid-year peak of 56.94 yuan/kg in October. Then the pork price began to fall, falling below 51 yuan/kg. At the end of 2019, the decline in pork prices

was mainly caused by changes in pork supply and demand. First, China accelerated the delivery of pork stocks. In the first three quarters of this year, pork imports increased by 44% year on year. From September to the end of the year, China released 170,000 tons of central pork reserves [1]. In early 2020, pork prices rose to 57.97 yuan/k. This is because there is a general increase in prices before the Spring Festival. On the other hand, people's demand for meat also

increases due to the festival. The rise in demand led to a further rise in prices. After the festival, pork prices then fell for four months, falling to 45.44 yuan/kg. However, the recovery of pork production in 2020 fell short of expectations due to COVID-19. Pork production remained low. In April-June and August-October, affected by multiple festivals, pork prices rose first and then fell. Overall, pork prices fluctuate between 55 yuan/kg and 45 yuan/kg.

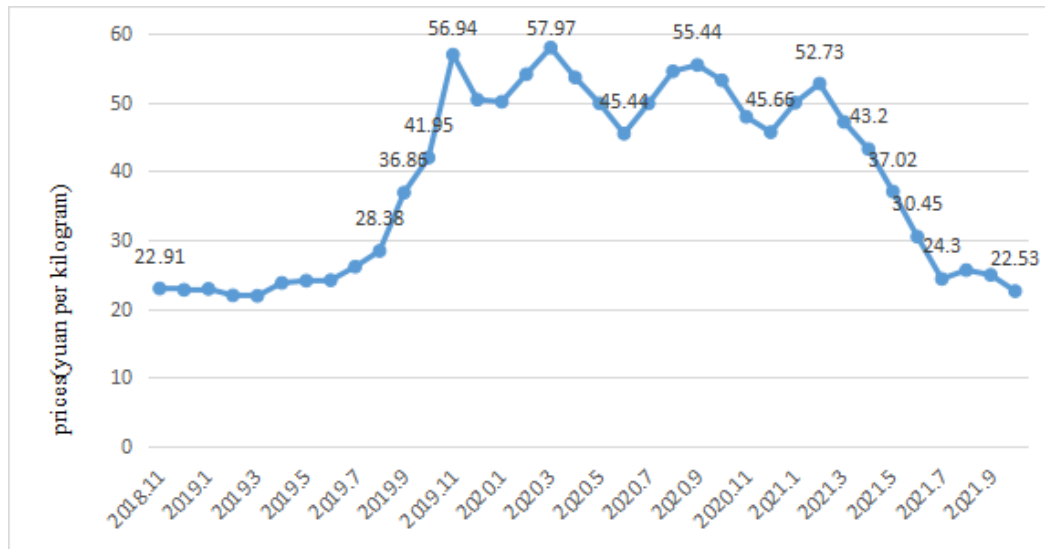


Figure 2 prices of pork in 2018 to 2021

**3.2. Pork production capacity gradually recovered in 2020**

In the second half of 2020, China brought the epidemic under control nationwide. This has provided important conditions for China's resumption of work and production. In November 2020, breeding hogs inventory increased by 3.8% month-on-month and 31.2% year-on-year, marking the sixth consecutive month of positive growth, while live pig inventory increased by 4.3% month-on-month and 29.8% year-on-year, marking the fifth consecutive month of positive growth. According to the official data released by the Ministry of Agriculture and Rural Affairs, the number of viable sows and pigs in China by the end of November 2020 exceeded 41 million and 400 million, respectively, and the pork production capacity has recovered to more than 90% of that at the end of 2017 [5]. Pork prices have fallen steadily for ten consecutive months. By June 21, pork prices had almost returned to the previous AFS level.

**3.3. Pork overcapacity in 2021**

The relationship between supply and demand is the basis of price movement, which in turn affects the evolution of the relationship between supply and demand [6]. Asf has the biggest impact on pork price shocks. The price of chicken, a "perfect substitute" for pork, is less affected [7]. For a long time, pork prices

have long been high. Meanwhile, chicken prices are stable, with the exception of pricier beef and lamb. Chicken gradually replaced pork and satisfied the demand for meat. As a result, the gap between supply and demand has been eliminated. The number of pigs stock returned to normal, production has recovered excessively. Production and the demand do not match. In addition, the policy did not provide a significant stimulus to demand, so the situation of falling prices[8]. Pork production capacity began to oversupply From July of 2021, pork prices fell further. Pork prices even fell below 20 yuan/kg. December may be the year's highest pig demand. Especially around the winter Solstice, pork use concentration and stock increase, will form a support for pork prices[9].

**4. PORK MARKET OUTLOOK IN 2021**

**4.1. The price of corn increases the cost of farming**

Generally, the cost price of 1 kg pork is equivalent to the price of 6 kg feed corn. And the ratio price of 6 : 1 pig feed corn is the break-even point. If the ratio is greater than 6, it means that farmers are profitable to raise pigs. And the greater the ratio, the greater the profit. If the ratio is less than 6, the farmers will lose money[5]. At the beginning of 2020, pork prices soared, pushing the ratio to 18.68 in January. And the ratio stayed around 16 until September. In this period, the

farms made huge profits, including some retail farms. In recent years, corn prices continued to elevate. But from the third quarter of 2020, corn prices have skyrocketed suddenly. And the trend is continuing. In the

international market, corn prices have been rising rapidly since the end of 2019. Prices are still high. The author believes that in the next few months, corn prices will continue to rise or maintain the current price.

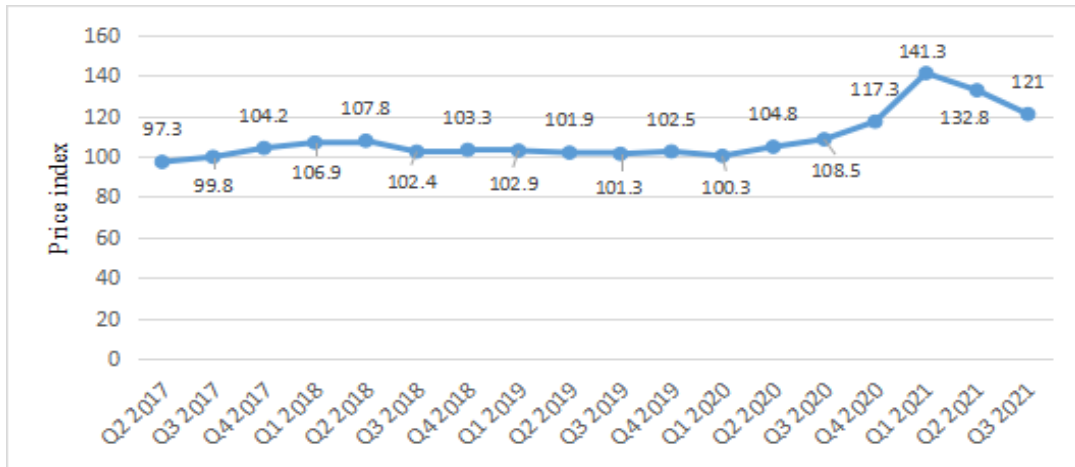


Figure 3 Corn price Index in 2017 to 2021 in China

In international markets, CBOT soybean futures closed higher after usda's weekly crop report showed the U.S. soybean harvest was 79% complete, slower than expected at 81%. In the short term, domestic corn prices will continue to rise. If the recent snowfall in northeast

China has an impact on transportation and new grain production, corn prices in producing areas and ports may break through the early highs[10].

4.2. Pork farming profits fell

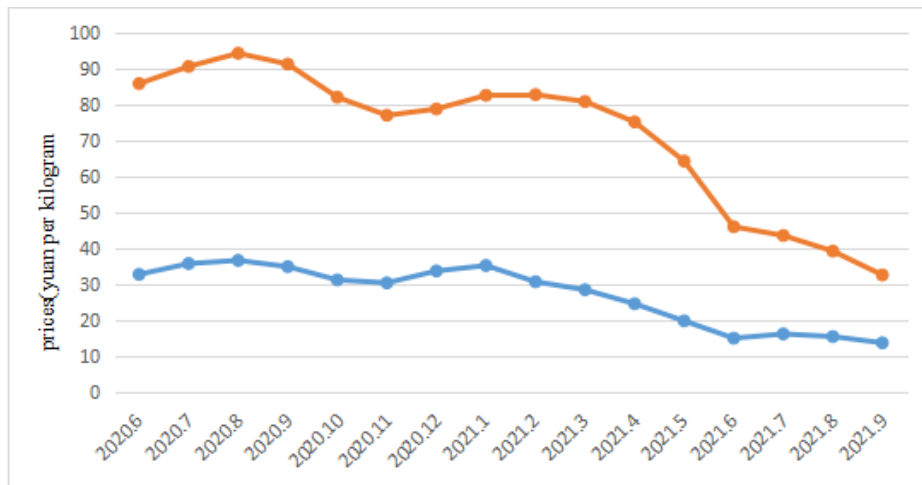


Figure 4 Live pig prices(blue) and piglets prices(orange)

From 2020, the price of piglets reached a very high level. Until September of '21, the price gradually went down. During this period, farm profits were reduced by the rising prices of piglets and corn. However, the price of live pigs has risen rapidly along with the price of pork. The farms were still profitable. But as pork prices have fallen, farms have lost profits because of falling live hog prices and the high cost of corn, even though the price of piglets has also fallen.

experienced three shocks around the holidays. With good control of the epidemic, pork production has recovered significantly. Output has largely returned to its original level. And the prices have returned to normal levels. However, for a long time, the high price of pork has reduced the demand for people. And demand for pork began to be replaced with cheaper and more stable chicken. This, combined with concerns about COVID-19 and AFS in cold-chain foods, has led to lower demand for pork. Pork production capacity began to excess, pork prices fell further. At the same time, with the decrease in corn production worldwide, international and domestic corn prices keep rising

5. DISCUSSION

Pork prices have risen due to a sharp drop in domestic pork production. In 2020, pork prices

rapidly. The price of raising pork has also risen. To make matters worse, the price of pork has fallen further due to overcapacity caused by previous pork production. This reduces the profitability of pork farming. Especially for retail farmers, it is difficult for them to remain profitable in this situation. In the future, the author predicts that pork prices will rise quickly and remain volatile for a period of time until international corn prices return to normal levels.

## 6. CONCLUSION

This study is set out to guide retail farmers and consumers. Pork prices are expected to rise again in the coming year. Price increases will continue to increase along with international corn prices. At present, the cost of raising pork is increasing and the price of pork is low. Farmers' willingness to raise pork fell before prices rose to a high level. This step could lead to future pork shortages. For consumers, chicken is a good substitute for pork to meet the demand for meat. A limitation of this study is that the study only focuses on the market of pork. From November 2019 to November 2020, fluctuations in pork prices were also affected by the release of state reserves of meat. It is undeniable that the adjustment of economic policy will definitely have a huge impact on the corn and pork markets in the future.

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