Abstract. The specifics of the current state of the meat market in China are largely determined, like the vast majority of production-consumption relationships in global socio-economic processes, by the current organizational constraints aimed at preventing the spread of the COVID-19 disease. Thus, the Ministry of Transport of the People's Republic of China has developed specific guidelines to prevent the spread of the pandemic through the transportation of meat products. At the same time, the economic and organizational mechanism of the State Council of the Republic, aimed at ensuring the prevention and expansion of pandemic control provides for the implementation of a plan of full chain, closed, tracked regulated imported food products. A negative aspect of the implementation of the said mechanism is the increased threat of disruptions in meat supply with the potential for higher prices for imported pork.

1. Introduction
China is the world's largest meat producer, consumer and importer. According to an industry profile, meat purchases in the Chinese meat market increased at an average annual growth rate of 2.4 percent from 2014 to 2018, reaching a total revenue of $209 billion in 2018. The largest meat retailers in China are the following companies:

1. Shuanghui Group, now WH Group, is the largest meat processing company in China and offers both high temperature and low temperature meat products, fresh and frozen meat. It was the first meat processing company established in 1994. The company's main specialization is in slaughtering and processing pork, with sales of fresh frozen meat generating more than 30% of the company’s total revenue. The group's beef and poultry sector has grown in recent years in response to growing market demand.

2. Yurun Group Limited is one of the largest producers of meat products in mainland China. In 2019, the Chinese market accounted for about 28% of the global meat supply, accounting for 73% of the market value of meat in the Asia-Pacific region. In this case, China's monthly meat imports reached $1 billion. Brazil is the largest supplier of meat, while imports from EU countries such as the Netherlands, Spain and Germany are also on the rise. Thus, for 2019, China imported meat products from 16 countries. With insufficient domestic meat production in 2020, China will be supported by imports of meat products.
One of the key components of China's meat market is the nature of external and domestic supplies of pork and chicken. In this case, we see a decrease in the consumption of the first of these types of meat with an increase in demand for chicken. But at the same time, through the effective state support implemented since 2019, the number of pigs is rapidly recovering with the expansion of the operation of pig farms. This branch of meat production is aimed at compensating for intra-economic losses due to the spread of swine fever. Thus, by November 2019, the number of piglets had increased by 51% and the national pig herd had grown to 260 million head. The main factors of this growth were the expansion of the number of productive sows, as well as the use of successful technologies for their insemination [1, 2].

Despite the identified positive aspects of the increase in pork production, the overall price level for this type of meat remains quite high due to the excess of domestic demand over the real output. This was the reason for the expansion of pork products imports in 2020. According to the Ministry of Agriculture of the Russian Federation, imports of pork for 10 months of 2020 amounted to 3.62 million tons, an increase of 126.2% compared with the same figure in 2019. In particular, only in October of the specified year, the external purchases of China amounted to 330 thousand tons of pork products, which and lower volume for September by 13.2%, compared with the figure for October in 2019 more by 80.4%.

2. Results
Throughout 2020, pork prices in China remained at high levels, but nevertheless were systematically reduced through the implementation of state-administrative measures to stabilize supply. An example of one of these measures was the release of frozen pork from the state reserve into the market. As a result, by December the cost of half-carcass pork fell to 44.03 yuan/kg ($6.8/kg), which in turn serves as a factor in reducing the income of several countries from imports of this type of meat. These suppliers among the international actors of the meat market were the suppliers shown in table 1.

| Table 1. International importers of pork to China. |
|-----------------------------------------------|
| Country | Share in pork imports (%) | Share in imports of by-products (%) |
| USA     | 19                        | 20                             |
| Spain   | 18                        | 16                             |
| Germany | 13                        | 15                             |
| Brazil  | 10                        | -                              |
| Canada  | 10                        | 10                             |

The suppliers listed in table 1 need to expand their search for additional sales destinations in order to optimally overcome instability in the global meat market if China's pork industry fully recovers.

In comparison, Australia in terms of exports of meat and edible meat by-products to China in 2019 was $ 2.76 billion, which is expressed in quite a wide range table 2.

| Table 2. Supply of meat to China from Australia. |
|-----------------------------------------------|
| Meat and meat products                        | Cost                        |
| Frozen cattle meat                            | $1.60 billion               |
| Meat of sheep or goats fresh, chilled or frozen| $847.61 million             |
| Meat of cattle, fresh or chilled               | $254.43 million             |
| Edible by-products, beef, pig, sheep, goat, horse| $60.72 million             |
| Meat and edible by-products not elsewhere specified, fresh, chilled or frozen| $92.91 thousand |
| Meat of horses, donkeys, mules, Hinny fresh, chilled or frozen| $33.56 thousand |
| Pork meat (pork) fresh, chilled or frozen      | $10.66 thousand             |
| Meat and edible by-products of poultry, fresh, chilled or frozen| $78.32 thousand |
The share of Australian sheep meat exports to China is slightly higher than that of beef, increasing from 24% in 2018 to 33% in 2019. In contrast, however, the export risks of New Zealand sheep are much higher, increasing from 46% in 2018 to 54% in 2019.

In 2021, China plans to further expand poultry production capacity and rebuild pork production. Given the size of the market and the growing middle class, demand for Chinese pork is currently influencing the global pork industry. In doing so, there has been a decades-long increase in Chinese pork consumption, and today, thanks to China’s unprecedented economic growth, the country has become a global center for the purchasing power of this product [3]. Since the Chinese market has almost 1.4 billion inhabitants, through the action of official regulations and requirements in trade and promotional brands, Chinese consumers are paying increased attention to the strict food safety standards, increased quality of pork that imported meat products must have. One of the key drivers of activity in the Chinese meat market is a fairly high price for quality pork, which exceeds the level of domestic supply by Chinese producers. This significantly increases the opportunities for foreign meat suppliers to offer organic meat and top quality beef (or veal) products to satisfy the more sophisticated tastes of Chinese consumers.

The PRC’s poultry industry structure sees an increase. Thus, in 2019, the country’s broiler production increased by 20% to 13.8 million tons. In 2020, the level of supply of these products continued to grow, so that in the 11 months of this year there was an increase of 10% compared to the same period the previous year, reaching 15.8 million tons. But as pork production volumes recover, a situation of oversupply may arise and, consequently, the demand for chicken meat on the domestic market may decrease [4,5]. In many respects this was primarily due to the expansion of the capacity of slaughterhouses with reduced sales of imported frozen meat due to detection of traces of COVID-19 virus in it.

Nevertheless, from January to October 2020 the volume of imported chicken meat to China due to the shortage of animal protein due to the reduction in pork production was 1.24 million tons. This is 100% more than during the same period a year earlier and is a ten-year record.

The structure of chicken imports into China in 2020 is divided as follows: 34% are for chicken feet, 31% for carcasses and 28% for wings, in keeping with Chinese tastes and culinary traditions. The rest of the chicken products in imports account for only 7%. In terms of the operation of various domestic market actors for broiler meat sales in 2019, demand from wholesale markets, supermarkets and caterers decreased, while demand from online retailers increased. The overall level of demand for poultry meat from the Chinese food industry was lower than expected [6].

It should be noted that the main supplier of broiler meat to the PRC is Brazil, which exported 581,200 tons of this type of meat to China in 10 months of 2020, representing 47% of total imports. The volume of imports from the U.S. reached 290.6 thousand tons, which is about 23.5% of chicken supplies to the country as a whole. While Russia sent 120 thousand tons of broiler meat to the PRC in January - October 2020.

In the first 9 months of 2019, China's frozen beef imports rose 48.3% year over year, while poultry imports rose 46.1%.

China continues to be the largest cattle meat market in Asia (total consumption of 7.5 million tons), accounting for 35% of the total.

China is also the largest producer of cattle meat in the Asia-Pacific region (total production of 6.5 million tons), accounting for 34% of total production. Moreover, the production of beef in China exceeded the production of the second largest producer, India (2.6 million tons), twice as much.

This has been facilitated by the continued stability in cattle breeding over the past decade. While, the other producing countries recorded the following average annual production growth rates, for example, India grew by 0.6% per year and Pakistan by 3.4%.

In 2019, the main importers of cattle meat in the global market, which accounted for 63% of total imports were: China (1.1 million tons); Japan (617 thousand tons); South Korea (444 thousand tons); Hong Kong (365 thousand tons).
At the moment, among others, the main beef supply to China, comes from the following countries: Australia, New Zealand, Canada, USA.

This diversity of meat suppliers indicates that China is striving in every way to reduce its dependence on any one supplier by making its market available to a significant number of countries [7, 8]. For example, in terms of external beef purchases, by the end of 2019, China was importing beef from 26 countries, up from 10 in 2014. In the relatively small but growing area of value-added chilled beef trade, China increased the number of approved countries to 10 in 2019, up from one (Australia) in 2015. That same year, China's monthly imports of meat products reached $1 billion, with Brazil being the top meat supplier, while imports from EU countries, including the Netherlands, Spain and Germany, grew the fastest.

Analyzing the external supply of Russian meat, it should be noted that the largest buyer is China, whose share of purchases is 37%. In February 2019, Chinese purchases of poultry meat began, and by the end of this year they increased 1.8 times - to $265 million. In 2020, the Chinese market also opened for Russian producers of cattle meat, resulting in the shipped volume of 8.7 thousand tons worth $48 million - more than half of all Russian exports of beef.

Exports of Russian poultry meat to China in 2021 amounted to $ 160.4 million, and thus, China currently accounts for 67% of all exports of these products from Russia. This is facilitated by state support measures, in particular from the Ministry of Agriculture, which consist of concessional lending and partial reimbursement of the cost of certifying agricultural products in foreign markets.

In 2020, China became the main destination for domestic poultry products, but this market is not yet available for pork exports, which is a negative factor for the further expansion of Russian pork production. Thus, pork production in Russia continues to increase and the market has reached 100% saturation. This is why the Chinese market is essential for pork sales in this respect. This can be facilitated by the fact that due to the spread of African swine fever in the country, the number of pigs in China has decreased by 44%, reaching its lowest level in February 2020 - 194 million animals.

With regard to expanding activity in the Chinese market, Russian producers need to identify trends in the consumption of certain varieties of meat and meat products with a focus on a particular market niche [9, 10]. In particular, it is possible to concentrate on the supply of various components of chicken carcasses, which are in particular demand among Chinese consumers - individual parts of wings, cleaned paws.

In the first half of 2020, China imported 79.9 thousand tons of Russian meat. Meanwhile, 40.9 thousand tons were transported to Ukraine. The specified growth of Russian exports was due to an increase in supplies of poultry meat. Added to this was the fact that domestic producers were allowed to supply frozen beef to China, although the role of exports in this market segment is still not so high.

Exports from Russia to China of goods from the group "Meat and edible meat by-products" for the period from February 2020 to April 2020 amounted to 77.3 million U.S. dollars, a total weight of 42 thousand tons. It is necessary to trace the dynamics of the value of Russian meat exports to China over a period of six years table 3.

| Year | Export value (U.S. dollars) | Share in total exports | Percentage change from the previous year |
|------|----------------------------|------------------------|----------------------------------------|
| 2016 (november) | 1.369 | 0.00 | -93.52 |
| 2017 (november) | 14 590 | 0.00 | 965.74 |
| 2018 (november) | 30 821 | 0.00 | 111.25 |
| 2019 (november) | 45 701 493 | 0.34 | 148.180.37 |
| 2020 (november) | 82 626 248 | 0.73 | 80.80 |
| 2021 (february) | 314 092 628 | 0.64 | 117.78 |

The volume of pork imports to China largely depends on the gap between domestic and import prices for pork on CIF terms. According to Russia’s Main Customs Administration, China imported a total of
1.192.828 tons of pig and 946.730 tons of by-products in 2019, down 2.0% and 23.4% year-on-year, respectively.

Among all pork exporters to China, Germany ranked first with a market share of 19.1% and a year-on-year growth rate of 7.8%.

Pork exports from Brazil to China increased 208.1% over the same period in 2018 to 150.091 tons.

Although imports of all types and categories of meat products increased, due to various market access restrictions, domestic supply and demand factors, beef and pork saw the largest volume increases, followed by poultry and sheep table 4.

Table 4. Imports of meat and by-products from China (excluding Hong Kong).

|                     | 2019, (thousand tons) | Change in volume 2019/2018% |
|---------------------|-----------------------|----------------------------|
| General             | 5.921                 | + 46%                      |
| Beef                | 1.660                 | + 60%                      |
| Pork                | 1.994                 | + 67%                      |
| Pork by-products     | 1.017                 | + 7%                       |
| Lamb                | 392                   | + 23%                      |
| Poultry and meat by-products | 795     | + 58%                      |
| Other by-products and other meats | 62     | + 7%                       |

At the same time, in the last quarter of 2019 there was increased volatility in the Chinese market, which was caused by a number of accompanying economic and organizational obstacles such as:

- Delayed payments for transportation of meat products.
- Revision or cancellation of supply contracts.
- Reduction in the price level.

It is noted, however, that red meat imports show a seasonal drop during and immediately after the month of the Chinese Lunar New Year. Thus, the record volume of meat imports into China in 2019 has resulted in many key suppliers entering this single market, which carries a level of risk. This risk is particularly present for beef shipments from Argentina and Uruguay, which depend to some extent on purchases from China, which accounts for 76% and 70% of both countries' exports, respectively. Brazilian beef shipments to China exceed 50% of exports if Hong Kong is included.

Looking at the overall picture of beef exports in relation to participation in the Chinese market, it should be emphasized that 90% of such purchases come from such countries as Brazil, Australia, Uruguay, New Zealand, Argentina table 5.

Table 5. Share of total beef exports to China.

|        | 2015 | 2016 | 2017 | 2018 | 2019 |
|--------|------|------|------|------|------|
| Argentina | 31%  | 35%  | 46%  | 57%  | 76%  |
| Uruguay  | 45%  | 47%  | 53%  | 56%  | 70%  |
| New Zealand | 50% | 47%  | 21%  | 27%  | 8%   |
| Brazil   | 9%   | 15%  | 18%  | 24%  | 32%  |
| Australia| 11%  | 9%   | 11%  | 14%  | 24%  |

The contents of table 5 show that China has become Australia's main beef export market in 2019, increasing its share of Australian exports from 14% in 2018 to 24% in 2019, Australia is less exposed to China than other key suppliers. By doing so, Australia as an exporter has achieved favorable access to a variety of valuable markets, which is critical to industry growth and the ability to mitigate trade risks.
Factors such as border closures and a drop in consumer demand as a result of the spread of coronavirus have not been able to disrupt meat export plans, and Russian producers have had favorable opportunities to increase exports of meat products, with a corresponding increase in income [9].

In 2021, the volume of Russian pork exports may reach 300,000 tons only due to Chinese consumers. At the moment, the main buyers of domestic pork products are Vietnam and Hong Kong, which account for 60% of total supplies.

About 38% of total Russian exports of meat accounts for China, which supplied 119 thousand tons worth 235 million dollars. - 3.9 times more than last year’s figure in value terms and 4.4 times more in physical terms.

The bulk of Russian exports of meat accounts for poultry, shipments of which increased in physical terms by 60% to 210 thousand tons. The growth in value terms was 71%, to USD 317 million.

The mentioned growth became possible due to the positive dynamics of shipments to China, the market of which opened at the end of 2018, and which takes the leading position in purchases and consumption of meat. In particular, in January-September 2019, poultry meat exports to China increased 4.2 times to 113 thousand tons worth $208 million.

An example of this leadership is China's purchase of Russian beef, and thus now the PRC market already accounts for more than half of all shipments. In 9 months of 2019 more than 5 thousand tons of Russian beef worth $25 million were exported to the PRC.

Russia has never supplied beef to China and the elimination of various obstacles to this supply has lasted for about seven years. Regarding Russian beef production and external sales, it should be emphasized that Russian beef production is stagnant, as evidenced by the lack of growth in 2019 compared to 2018 and amounted to about 1.62 million tons in slaughter weight [10]. Imports were 370,000 tons and exports were 9,000 tons. The main buyers of Russian beef are Vietnam, Belarus, Kazakhstan, etc.

For Russian producers, beef supplies are an additional opportunity to expand their exports with increased profitability of cattle breeding by selling certain parts of animal carcasses at a more attractive price. This is facilitated by the fact that China is actively increasing its purchases of beef around the world. Both low-cost boneless meat and premium beef can be in demand on the Chinese market.

Qualitative differences and, to some extent, competitive advantages, Russian meat in relation to meat products of other countries can be the following distinctive features [11]:

- By color - the meat of animals raised in other countries with hormones has an unnaturally bright red color,
- By fat - foreign meat, as a rule, is monolithic in appearance, there are no layers of fat in it.
- In terms of smell - the meat of animals raised on artificial additives does not smell of milk. In addition, there is almost no blood.

The process of meat production in Russia in 2020 due to the restrictions of business activity in connection with the spreading of COVID-19 slowed down, which was noted in April. In particular, the production of pork in live weight slowed down, and the volume of beef and poultry meat production decreased. But in May of the same year the rate of production of livestock products began to recover. These phenomena take place due to the fact that meat production reacts to the crisis phenomena in the economy with a lag of 3 months to a year. This is due to the length of the production cycle: companies' ability to quickly adjust their production plans to changes in demand is limited [11, 12]. With the slowdown in the dynamics of consumption due to the decline in real incomes of the population and its business activity, prices for various types of goods may decrease, which will put pressure on the profitability of companies [13, 14]. An additional negative factor for the demand for meat products was the restriction of catering in most countries of the world.

According to estimates of the Russian company Cherkizovo, the share of production costs that directly or indirectly depend on the exchange rate is 45%. In the poultry industry alone, the figure is estimated at 25-30%. Among the components of the cost of meat production, fluctuations in the cost of
feed are of particular importance. So the increase in this cost in April 2020 was 12% to the previous month, in May prices began to exceed the level for 2018 by 6-10%, depending on the class of wheat.

The volume of Russian meat exports to China for the three quarters of 2020 amounted to 360 thousand tons of meat and by-products worth $610 million. For the year, shipments increased 69% in volume and 79% in value. During the first nine months of 2020, growth was seen in all major categories of meat products. In particular, exports of poultry meat in money terms increased by 71%, pork - 2.4 times, beef - 2.9 times. About 38% of meat supplies, 119 thousand tons worth $235 million, came from China. On an annualized basis, China's share in Russian meat exports increased by 3.9 times in money terms and 4.4 times in kind.

In particular, 9.4 thousand tons of beef were exported - 2.6 times more than in the first nine months of 2019. In value terms, sales of cattle meat to foreign markets increased 2.9 times (to $48 million). The Chinese market, which opened in mid-January 2020, accounted for more than 50% of shipments. The PRC bought more than 5,000 tons of Russian beef worth $25 million. In addition to poultry meat, the PRC exports products that are not much in demand in other countries, such as chicken feet.

3. Conclusion

Thus, the supply of Russian meat has a number of prospects to expand in the future, which provides additional conditions for the stable activities of a number of Russian meat producers. Back in January 2018, a list of 23 Russian enterprises (including Miratorg, Cherkizovo, Prioskolye, GAP Resurs, Belgranskorm, Agrocomplex named after N.I. Tkachev, Damate and others) specializing in poultry meat production was published, to which China has granted the right to supply products to its territory. And on February 28 of the same year the first shipment of 54 tons by sea was made. These positive moments in foreign economic activity on export of the Russian meat are a basis for expansion of mutually advantageous partnership of Russia and China in sphere of agroindustrial production.

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