

Big Trouble in Big China

A Special In-Country Report on
African Swine Fever



FROM THE EXPERTS AT

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The Butcher's Bill

As reported by Reuters in January, the shocking and grotesque scene of a dead pig washed up on a beach on Taiwan's Kinmen island brought a strong rebuke from Taiwan's President Tsai Ing-wen. Kinmen island is located about six miles from the coastal city of Xiamen in Southeastern China's Fujian Province. Subsequent laboratory tests revealed that the deceased pig had African Swine Fever (ASF). President Ing-wen's message to Beijing was unequivocal in stating that China needed to be more transparent about ASF's impact on the pork industry and the steps taken to rein in the outbreak that has persisted since August 2018.

In response, a spokesperson for China's Ministry of Agricultural and Rural Affairs (MARA), Guang Defu, issued a statement arguing that China has always been "being timely, open, and transparent" when reporting cases. Interestingly, MARA, which formerly went by the Ministry of Agriculture (MOA) before last year's reorganization, put out an official announcement in Mandarin and English on January 2, 2019, detailing steps to improve control of ASF and prevent further spread of the disease. The announcement, which can be taken as an official policy decree, articulated specific steps to be undertaken by China's pork industry as part of all slaughtering activities and the transport and circulation of all live pigs.

This official list of instructions was put forth under China's laws and regulations concerning Animal Epidemic Prevention, the Handling of Major Animal Epidemic Emergencies, and Management of Slaughtering of Live Pigs. The details of the guidelines focus on having valid quarantine and inspection certificates prior to slaughter, procedures for reporting positive ASF tests, procedures for suspending slaughtering when ASF is found, and requirements for allowing cross-provincial transfers of animal products. The directive was scheduled for implementation on February 1, 2019.

Through mid-January, various reports and conversations with market analysts in China, have confirmed that just under 1 million pigs exposed to or

at risk of contracting ASF have been culled. MARA has confirmed this figure. Equally important is the fact that the disease has spread far across China. After the first case was found near Shenyang in Northeastern China's Liaoning Province on August 3, 2018, a total of 57 outbreaks involving 4,474 confirmed deaths from ASF, another 6,022 pigs with active illness and a potential 75,000 susceptible pigs were reported by MARA through early November 2018. The World Organization for Animal Health (OIE), which has issued periodic reports covering the recent ASF outbreak in China, as well as other geographies, reported a total of 41 outbreaks in China through the end of November involving 3,710 affected pigs, another 61,300 as being susceptible, and total losses through either the disease or culling at 74,000 pigs.

Subsequent investigations by MARA found that contaminated pigs hidden by forged veterinary certificates, were being circulated as far back as June. That may explain why the disease spread so rapidly, or rather, why confirmed cases suddenly appeared across China in a few months. Notwithstanding the underreporting, by the end of December the number of officially identified outbreaks had risen to 102 cases (according to industry sources) with the total number of pigs killed either as result of the disease or from culling increasing to about 650,000. The OIE, for its part, reported a total of 45 outbreaks through mid-December involving 3,982 cases of ASF affected pigs and total losses due to illness and culling at just over 155,000 head. Through mid-February, OIE reported that total losses due to culling and disease related deaths amounted to just over 238,000 pigs.

The dramatic difference between OIE and MARA's figures could be due to a reporting lag or underreporting at the provincial level. Undoubtedly, however, both sets of numbers should be taken with a large grain of salt as China's official agriculture figures are notoriously inaccurate, as in the case of recent official agricultural census data which had to be restated as a result of falsifications and incomplete surveys. Moreover, official statements indicate that ASF had spread to 25 out of the country's 34 first level administrative divisions (provinces and semi-autonomous regions) through January 2019, which

means that small, backyard family farms have likely been hit as hard as the larger industrial operations. As such, it is difficult to imagine that all the cases have been appropriately identified or triaged.

Bringing a Squirt Gun to a Wild Fire

In late February, government food safety inspectors in the provinces of Hunan and Gansu found traces of the ASF virus in frozen pork dumplings. Meanwhile, Charoen Pokphand Foods (CPF), the largest feed producer in the world and a major player in the shrimp, poultry, and pork industries, told its employees at its China subsidiary, Zhèng Dà, not to eat pork until the government authorities had gotten control of the level of contaminated meat in the marketplace. The announcement was in effort to avoid transmitting the disease to its own pig raising and slaughtering operations. These developments show the extent of how fast and deep the ASF problem has become for China. Equally important, Vietnam's Department of Animal Health announced that the first three outbreaks of ASF in the country had appeared at farms located southeast of the capital city of Hanoi.

The evolution of the outbreak and the ineffectiveness of China's initial responses in August and September 2018 are due in large part to an industry undergoing massive transition. Back in 2013 and 2014, a number of high profile environmental and food safety incidents involving the dumping of dead pigs in waterways, including the disposal of 16,000 dead carcasses which were found floating in the Huangpu River in Shanghai, prompted the central government to enact new regulations. The combination of environmental reforms coupled with a push to relocate hog production to the north and western portions of the country began a process of consolidation away from small, backyard farms to larger scale, industrial enterprises.

In 2015, roughly 57 percent of swine operations in China were classified as small family-backyard entities, while by 2017 that number had fallen to 52 percent, according to a report from COFCO Meat.

Although it is likely that number fell further in 2018, especially with the ASF problem, China's swine population is estimated at 440 million head in 2019 according to USDA-FAS post estimates. This figure includes an estimated inventory of 44.75 million sows and total production forecast of 720 million hogs for calendar year 2019. Given the sheer size and the diversity of an industry in transition, implementing an effective quarantine and disease management operation would be challenging under any circumstance. That fact makes MARA's repeated claims that the situation has been controlled, particularly at the outset of the first outbreak, all the more problematic and remarkably myopic.

First, the initial speculation that the outbreak began in August was questioned upon revelations that the farm in Shenyang, where the first case was reported, purchased 100 piglets from a trader in Jilin that was later tied to the ASF outbreak. This farmer then sold 45 piglets to another farmer in his district. Concurrently, provincial and district level veterinary officials were issuing falsified health certificates allowing contaminated swine to be transported to provinces on the other side of the country.

In response to the first outbreaks, MARA began offering RMB 800/head (\$118.34/MT) subsidy to encourage farmers to cull sick and exposed pigs. However, that amount was far below the average regional price for a 100-kilogram hog, which was fetching RMB 1,250-1,390/head (\$185-205/head). As the problem with implementing effective quarantines persisted, a number of high-profile arrests were made of farm managers and local officials who either transported infected pigs or issued fraudulent health certificates. Then the central government and regional provinces began banning the use of restaurant and other food waste as a feedstuff. Local city governments in impacted regions even began offering citizens cash rewards for information on farms using food waste as feed. At the end of September 2018, the quarantines placed on the provinces originally impacted were lifted, only to be followed by outbreaks in new areas throughout the remainder of 2018.

The government, led by MARA, increased the culling subsidy to RMB 1,200/head (\$177.50/head) later in the fall. However, conversations with industry representatives and producers revealed some farmers who had outbreaks never received a visit from the local government agencies or never received a subsidy to cull the remaining pigs in their herds. In other cases, private reports have surfaced of local officials pressuring small farms to cull their herds even though the presence of ASF among those herds was not confirmed. As a result, smaller operations became disinclined to report for fear of being treated in a discriminatory manner. The video below was taken at a small hog operation in Henan Province, a leading hog production region. The producer who took the picture told WPI that he has neither received a visit from provincial officials regarding the ASF outbreak on his farm, nor has he been offered financial compensation for his losses.

Apart from issues with the culling incentive, corruption, and bureaucratic incompetence, the systemic issues of note impacting China's efforts to curtail the ASF problem are technical. The directive put out by MARA in January 2019 stipulated that pig slaughtering houses should implement a system of examination and clinical inspections on all swine being slaughtered and scheduled for slaughter. If ASF is suspected in either the holding pens or on the slaughtering line, then all slaughtering activities are to be suspended. Samples of blood and tissue, including internal organs, from sick pigs are to be collected and tested.

While these procedures may seem logical, one major problem is the lack of qualified veterinary staff even at sizable hog operations. For example, through conversations with industry insiders WPI learned that at the largest farm with a confirmed ASF outbreak to date, with an inventory of nearly 74,000 hogs in Mingshui County in Heilongjiang Province, only recently hired veterinary staff with limited professional experience as of November 2018. This is despite development investments in the farm of almost RMB 700 million (\$104 million). This particular outbreak transpired over the course of a month as the illness spread across the farm. In fact, once the farm received a positive test confirming the presence of ASF among

its deceased pigs, it waited another four days before informing the appropriate provincial officials.



(click on picture for video)

The lack of veterinary expertise is not only an issue at the company level, it is also a problem with local government authorities. Back in August 2018, a veterinarian with China's Academy of Agricultural Sciences noted the absence of qualified veterinary staff and animal health testing equipment at the local level. Over the course of the fall, it does not appear much has been done to change that fact, which will make it difficult to implement MARA's recent industry guidelines. This includes MARA's mandate for allowing a slaughterhouse or farm impacted by an ASF outbreak to return to commercial activity, which entails bringing in local veterinary authorities to ensure that all exposed pigs are culled, the facilities are disinfected, and all byproducts such as blood and tissue are disposed of in a biologically safe manner. Then, after a 48-hour window, the facility is eligible to apply for a reassessment, including testing. For live pigs that have been properly quarantined, an official certificate

showing a negative polymerase chain reaction (PCR) test must be issued in order to transport them across provincial boundaries. All testing results are to be signed off by on-site veterinarian officials.

In conversations with regional industry contacts, it was reported that local veterinary authorities have been reluctant to issue certificates due to a fear that the testing might not be adequate. After the series of arrests for fraudulent behavior in late September and early October 2019, local government technical staff have been afraid that if pigs that have been transported to other provinces happen to contract the illness *en route* and are then tracked back to their point of origin, they may be accused of falsifying documents. Transporting live pigs in warm humid conditions over long distances can exacerbate stress, lead to increased vomiting and waste production, and thereby open them to exposure to pigs sickened with ASF. Given the large volume of hogs sent to slaughter in the fall in advance of the Harvest Moon Festival, it is a distinct possibility that poor transportation infrastructure and excessive animal stress helped spread the outbreaks to other regions.

Even with the transportation issue being highlighted as a source of the problem, leadership in Beijing opted to ease interprovincial transfers in late December. This included permitting farms producing breeder pigs and piglets in counties without ASF outbreaks to ship to other provinces. For those farms located in infected counties, breeder pigs and piglets were only allowed to be shipped within the affected province. The central government, however, made an exception for farms in infected counties, classified as having strong biosecurity measures, to ship market ready pigs to slaughterhouses with capacities of 150,000 pigs per year or more.

This waffling in the face of a troubled market points to a third but ultimately crucial technical failure in China's efforts to bring ASF under control: the lack of adequate tracking and traceability for exposed hogs and contaminated meat. While some of the problems with traceability of quarantined pigs have been due to falsified ear tags and health certificates, the

overarching issue is revealed in MARA's new industry guidelines which:

- State that if a positive case is detected at a slaughterhouse, then the local animal husbandry agency and veterinary department should organize and implement a tracking system for all live pigs and pork products that have entered and/or left the facility.
- Places the burden on the local animal husbandry and veterinary departments for clarifying requirements on sample collection and testing and then standardizing efforts for recording and reporting them.
- Note that if a live pig is marketed with faked testing results and the subsequent testing reveals no latent ASF, the plant is required to terminate production for just 15 days before applying for a reassessment of its facility by local authorities.

This absence of clear direction and standardization for tracking, traceability, and recall from the central government coupled with a relatively minor penalty for faked testing results provided there are no signs of ASF make it rather obvious why China's domestic pork has become beset with contaminated product throughout its food chain.

Despite these policy holes, as of January 20, 2019 quarantines have been lifted for 83 of the 104 infected counties. The removal of the transport restrictions has impacted the following provinces: Henan, Liaoning, Zhejiang, Anhui, Jilin, Yunnan, Jiangxi, Tianjin, Beijing, Shanghai, Hunan, and Hubei. This was seemingly done to aid the industry in advance of the New Year's celebrations in February. However, following the lengthy holiday whispers from industry insiders pointed to a worsening of the ASF epidemic in Henan, Hubei, and Shandong provinces.

An Industry in Crisis

Senior government officials in China, including researchers from the country's Animal Disease and

Prevention and Control Center, have pushed back on the criticisms and maintain that the situation has been brought under control. They contend that strict procedures have been implemented when facilities with affected pigs have been identified. They also point to a myriad of factors that led to ASF's widespread presence in a short period of time, including smuggled pork meat from foreign countries, the entry of wild pigs carrying the disease into China, long distance transport of pigs as result of consumer demand for fresh pork meat, poor sanitation among backyard farms, contaminated trucks and workers, and the use of food waste a feedstuff. Moreover, the lengthy incubation period of ASF, during which pigs can be highly contagious but asymptomatic for up to three weeks, makes catching the virus extremely difficult.

Despite the government's stance, a private industry session of hog producer executives and traders took place in late January 2019 in Henan Province. Conversations with several attendees revealed an industry in panic and an extremely pessimistic outlook for 2019. In addition, feedback from the meeting pointed to the problems of underreporting as one company said during that session that it did not report outbreaks at a couple of its farms and simply culled the herds. The company then turned to restocking the affected farms with new breeds as a solution for combating future ASF outbreaks.

Other companies that had tried this solution noted that it had failed as ASF had impacted the newly introduced breeds as well. Reportedly, executives at the meeting discussed how such responses were inherently risky as the ASF problem and their attempts to resolve it were no longer operational issues but rather potential legal landmines that could lead to indictments and jail sentences.

Attendees expected production to fall 20 to 30 percent in the next few months, which could further deteriorate in 2019 if ASF problems continue to persist. In late January, MARA said that swine inventories across China were down 4.8 percent in December 2018 compared to December 2017, while the stock of breeding sows had declined by more 8 percent from the year before. Equally important, slaughtering

houses in Henan indicated that their cold storage capacity is nearly filled with unsold frozen pork, and they are hopeful that a reduction in output will give them a chance to clear inventory as prices recover later in the year.

A separate report by a team of market analysts from the Thailand Futures Institute who visited Henan in late January showed additional areas of concern. Their report noted that the ASF epidemic has unequally impacted as northern counties have suffered more than other localities. In fact, farms in these areas engaged in panic slaughtering throughout most of January, selling smaller pigs with an average weight of 50 to 80 kg/head (110 to 176 lbs./head) at discount prices. Moreover, the relatively high prices of corn and DDGs, coupled with the lower returns, put even large-scale farms in a difficult situation of having to secure short-term operating capital through these emergency sales as China's tightening credit markets have made securing regular bank financing more challenging.

The combination of tight credit and disease threats have persuaded some integrated operations in Henan to stop sourcing pigs from outside producers and instead focus on maintaining their own sow herds, while others have responded by pushing for a contract farming model where the slaughtering operation identifies qualified producers to raise company-owned pigs. The team of analysts also spoke with a local veterinarian who expressed concern about the industry's move to lower protein diets in light of the trade war with the U.S. and how this could actually reduce disease resistance among China's pig herds – further exacerbating the spread of ASF.

On the consumer front, the presence of ASF in food products has led to food safety fears, even though the virus is not a threat to human health. Some of this concern is owed to the central government's problems of dealing with the impact of avian influenza and the H7N9 strain, which has caused more than 600 fatalities in China and almost twice as many illnesses

since 2013¹. This is in addition to the other food safety crises that have emerged in the past decade in China involving everything from recycled cooking oil to contaminated infant formula.

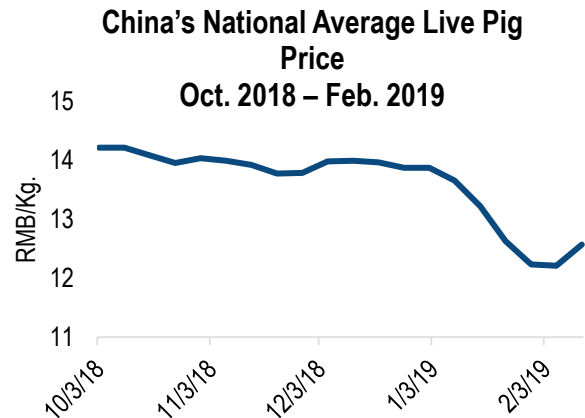
The public's lack of confidence has opened the door for rumor and the dissemination of false reports, and in the case of ASF, a person in Hebei Province was arrested for transmitting pictures of dead pigs shot at a local village across several social media platforms with the captions, "Is pork safe to eat?" and "ASF has arrived!". According to official state media the pigs in question died from illnesses unrelated to the ASF outbreak, and authorities considered this particular act as an unhelpful attempt to spread unnecessary fear.

Falling Prices and Credit Tightening Hit Big Companies Hard

Through the first five months of 2018, China's national average live pig price fell dramatically from RMB 15.22/kg (\$2.25/kg) at the beginning of January to a five-year low of RMB 10.47/kg (\$1.55/kg) in the fourth week of May. When the initial outbreaks first occurred, prices were in the process of recovery, partly due to the retaliatory tariffs imposed on pork imports from the U.S. The average live pig price continued to climb through early October 2018, reaching RMB 14.21/kg (\$2.10/kg). From that point until the end of December, China's average live pig price fell seven out of eleven weeks finishing 2018 at RMB 13.96/kg (\$2.07 kg).

Heading into the Chinese New Year's celebrations the impact of the quarantines in the fall began to really reduce prices particularly in those producing provinces with limited outlets due to the shipping restrictions. In addition, it appears that the dynamic that played out in Henan Province, where producers in affected counties opted to reduce their herd sizes by selling smaller pigs at a discount, likely played a role in the sharp price drop that transpired from the start of 2019 until the first full week of February. Over that six-week period, the average live pig price declined by nearly 12 percent to

RMB 12.21/kg (\$1.81/kg.) The week following the holiday saw the biggest week-on-week jump of RMB 0.36/kg since the first week of August.



Source: Ministry of Agriculture and Rural Affairs

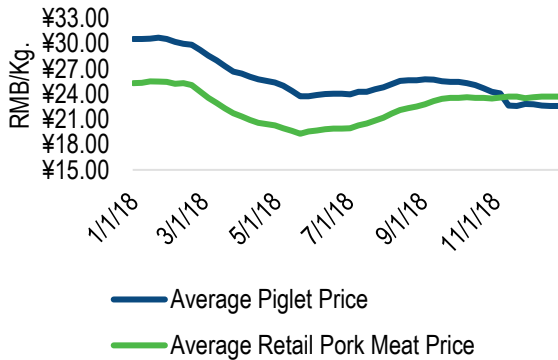
Interestingly, average weekly price trends for live piglets and retail pork meat also describe the situation resulting from the quarantines in producing provinces like Henan. While both ended 2018 down from where they started, the average piglet price had shed RMB 7.96/kg (\$1.17/kg) by the end of December. In contrast, the national average retail price for pork meat hit its low point at the end of June dropping to RMB 19.91/kg (\$2.95/kg) from RMB 25.35/kg (\$3.75/kg) at the start of the year. The interruptions in supply due to the quarantines that were imposed in September through the end of the year actually helped restore the average retail pork price to RMB 23.70/kg (\$3.51/kg) at the close of 2018. Nonetheless, the national average retail price for pork is well off its peak from mid-2016 when it topped RMB 31/kg (\$4.60/kg).

The plummeting prices for live pigs, soft retail demand, and provincial quarantines could not have come at a worse time for domestic companies in China's pork and feed sectors. Prior to Beijing's move to curtail shadow banking and excess lending in 2017, some major players in China's ag space had become engaged in a host of unrelated agricultural activities, including commercial real estate investments, online gaming, insurance, and their own lending operations. With the central government authorities dialing down

¹ UN Food and Agricultural Association. (FAO).

the money spigot, the cash flow crunch from lower operating margins on hog production has been severe.

China's National Average Weekly Live Piglet and Retail Pork Prices, 2018



Source: Ministry of Agriculture and Rural Affairs

Chuying Agro-Pastoral, a company listed on the Shenzhen Stock Exchange, states it is primarily a breeder and distributor of livestock and poultry. Reportedly, the company also became engaged in online gaming and its own shadow lending activities. The lack of adequate cash flow hurts its ability to supply its herds with adequate feed, while the quarantines prevented it from transporting finished hogs to areas with high demand. In the fourth quarter, several of the company's pig farms were demolished by local officials for failure to comply with environmental regulations. Overall, Chuying expects to report net losses of between RMB 1.9 and 3.3 billion (\$280 to \$490 million) for 2018, which is RMB 300 million (\$44 million) worse than what the company had estimated in its third quarter report.

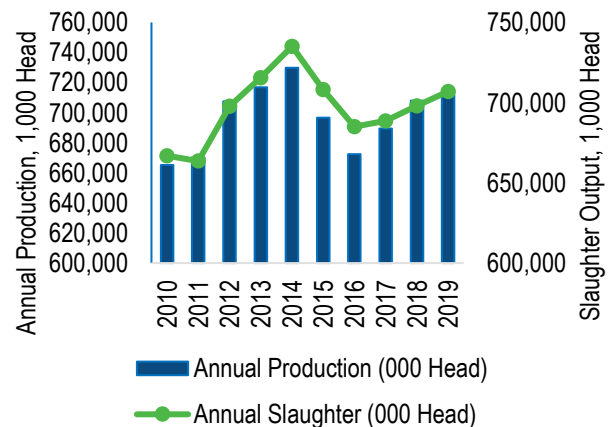
Xinjin Nong, a supplier of pig feed, feeder pigs, and veterinary medications, estimates its net loss for 2018 will be in the range of RMB 240 to 290 million (\$35 to 43 million) based on a 46 percent decline in swine sales during the second half of 2018. By contrast, the company reported a net profit of RMB 67.6 million (\$10 million) in 2017. The losses have forced Xinjin to put a merger with a livestock company in Hubei Province on hold. Shuanghi Group, which is part of WH International, the parent of Smithfield Foods, said that

its four consecutive declining quarters in sales income in 2018 were due to declining pig prices and the six-week closure of its Zhengzhou processing plant after ASF was found in a shipment of live hogs in August. Finally, An Joy Foods, a manufacturer of food ingredients for the popular hot pot dishes, saw its market value shrink by RMB 600 million (\$88.8 million) after it was reported that meatballs from a subsidiary were found to be contaminated with ASF.

China's Slowing Pork Market

In order to understand the potential magnitude of these impacts, it necessary to look where China's domestic pork industry was trending prior to the crisis. As noted, environmental concerns and food safety problems persuaded the central government to institute reforms in 2014 and 2015 designed to shift the industry away from backyard production. The industry was heading toward greater consolidation of modern livestock operations and vertically integrated meat producers. Over the past decade China's total swine stocks peaked in 2013 at nearly 476 million head, of which more than 50.4 million consisted of sows². In 2018, total beginning stocks had declined by 42.67 million head since 2013 for an annualized rate of decrease of 1.9 percent.

China's Total Swine Production and Annual Slaughter Output, 2010 – 2019F



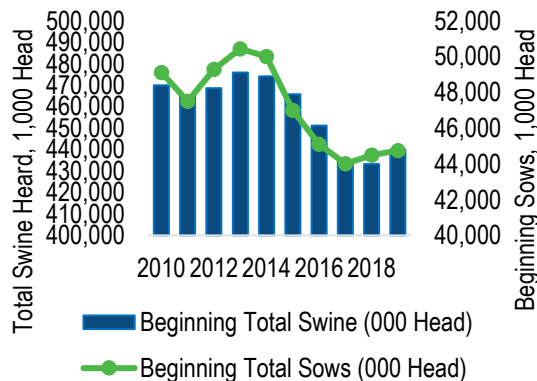
Source: USDA PS&D database

² USDA Production, Supply, and Distribution statistics.

By comparison, beginning sow inventories in 2018 had dropped to 44.5 million head, a decrease of nearly 6 million head over the past five years or roughly 2.5 percent per annum. The drop in China's domestic herd size pushed down total annual swine production from a peak of almost 730 million head in 2014 to a five-year low of 672.5 million head in 2016. Production rebounded slightly to 708 million head in 2018. USDA figures show a peak slaughter output of 735.1 million head in 2014 followed by a decline to 685 million in 2016 before two years of modest recovery with a total of 698 million in 2018.

China's statistical figures show that there is significant deviation from USDA data. According to China's National Bureau of Statistics, the total hog inventory for 2018 ended the year at 428.2 million head, down 13.3 million head or 3 percent from the end of 2017. Similarly, a total of 693.8 million head were reported slaughtered in 2018, which amounted to a decrease of 8.4 million head or 1.2 percent from the previous year.

China's Beginning Total Swine and Sow Stocks, 2010 – 2019F



Source: USDA PS&D database

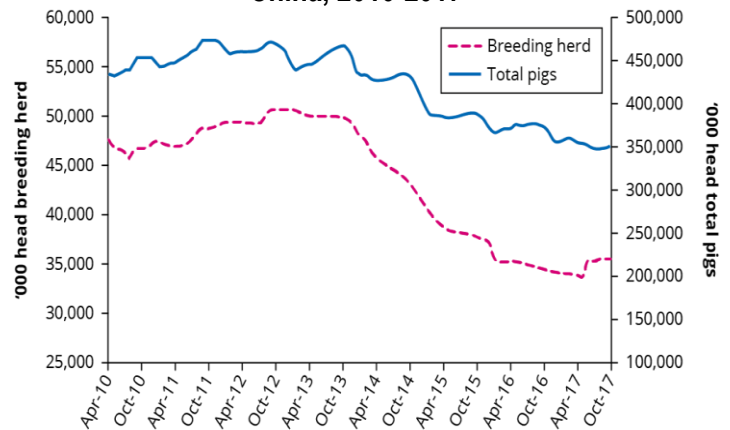
Some older data from MARA, which was published in late 2017, show China's total hog inventory peaking at around 450 million head in late 2013 before falling to 350 million head four years later. The drop in the breeding pig or sow inventory is even more pronounced according to MARA declining from around 50 million in the fourth quarter of 2012 to about 37 million by the end of 2017. However, as noted

³ U.N. statistics

previously, fraudulent census data and a failure by provincial officials to adequately document their outreach to rural areas has forced MARA to reexamine its figures, meaning future revisions are likely.

As with production, there are some uncertainties surrounding consumption trends among in China. However, pork output figures appear more consistent as China's National Bureau of Statistics reported 2018 pork production figures at 54.04 MMT, which was down .9 percent from 2017. Domestic consumption also peaked in 2014 at 57.2 MMT and then experienced three straight years of decline to a total of 54.8 MMT in 2017. In 2018, USDA reported a modest uptick of more than 900 MT to 55.7 MMT.

Total Swine and Breeding Herd Inventories in China, 2010-2017

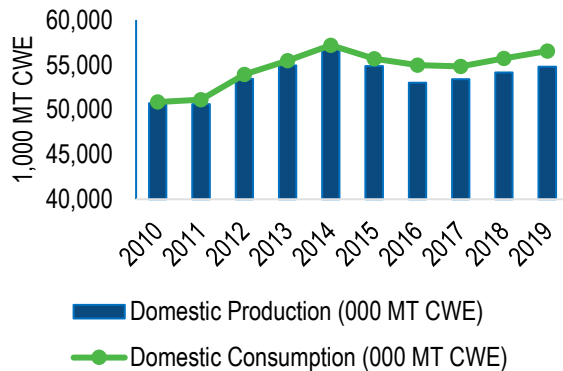


Source: Chinese Ministry of Agriculture.

As the preferred protein in China, consumption has remained about 54 MMT since 2012, largely due to the country's population growth. China's current population is estimated at 1.42 billion inhabitants³, which means that the average per capita consumption of pork in 2018 amounted to nearly 87 lbs./person, placing the country in the top three of pork consuming countries after Vietnam and the European Union. This figure is probably inflated due to the lack of accounting for waste and destroyed product due to disease outbreaks. In 2013, the last year that China's National Bureau of Statistics collected separate data on rural and urban consumption and reported an annual per

capita consumption of just 44 lbs./person. Although China’s economy has grown and household income has steadily risen, this implied per capita pork consumption has surged by a compound annual growth rate of 14.6 percent. That would seem implausible given that beef and fish consumption have also grown during the same period, while other research has pointed toward a stepped-up trend of healthy eating and less meat consumption among younger urban consumers.

China’s Domestic Pork Production and Consumption, 2010 – 2019F

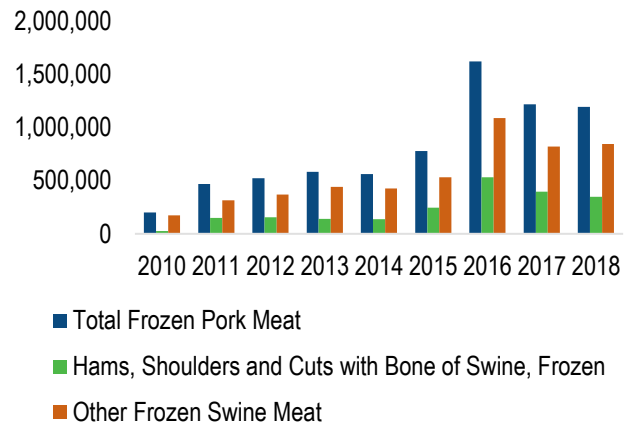


Source: USDA GATS

China’s pork imports peaked in 2016 at a total of 3.3 MMT worth about \$5.85 billion - more than double the previous year. A key driver in that increase was the outbreak of highly pathogenic avian influenza (HPAI) in the U.S. in 2015, which resulted in China instituting a ban on U.S. poultry products. At the same time, record domestic pork prices opened the door to foreign suppliers, which could provide meat and offal at more competitive pricing. The average live pig price at the end of May 2016 peaked at \$1.43/lb. whereas the average price per pound for pork meat, offal and related pork meat products for imports amounted to \$.81 per pound. In 2017, China’s pork and pork product imports retreated to 2.65 MMT worth about \$4.5 billion. Last year, they fell to their lowest level since 2014 with a total of 2.2 MMT worth \$3.7 billion. The average price per pound of imported pork and pork products for 2018 was \$.76/lb. down from an average of \$.765/lb. in 2017.

In terms of categories, frozen pork meat represents the biggest share according to data from the Global Trade Atlas. In 2018, frozen pork, including bone-in hams and shoulders accounted for 55 percent of the total quantity of pork and pork products imported by China. By comparison, frozen offal represented 44 percent of the total volume.

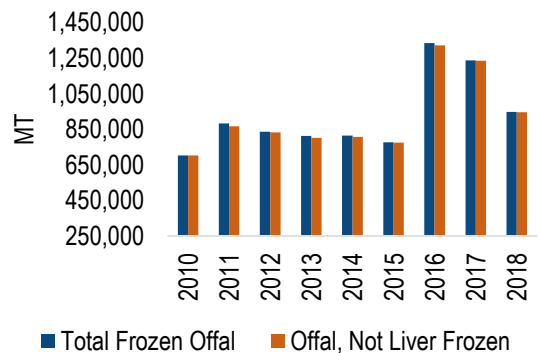
Chinese Frozen Pork Meat Imports, Top HS-6 Categories



Source: Global Trade Atlas

The big drop-off in Chinese pork and pork products imports in the past two years has been primarily in frozen offal category. Whereas the import quantity of frozen pork meat fell by 25 percent from 2016 to 2017 figures and then another 2 percent from 2017 to 2018, offal imports contracted by 7.3 percent from 2016 to 2017 and another 23.4 percent from 2017 to 2018.

China Frozen Pork Offal Imports, Total and Top HS-6 Categories



Source: Global Trade Atlas

Trends in pork and pork product exports from the U.S. differ substantially from China's overall import history of pork and products during the past nine years. U.S. pork and pork product exports peaked in 2011 but then shrank due to China's ractopamine ban in its own industry and requirement that all imported pork to be certified ractopamine-free. In 2016, as the U.S. company Smithfield, which was acquired by Shuanghui in 2013, completed the conversion of a number of processing facilities to meet China's certification requirements, U.S. pork and offal exports surged to 334,892 MT worth \$581 million. Total export volume retreated to 275,953 MT in 2017 worth \$489 million before falling to their lowest level since 2010 at 171,763 MT worth \$305 million as result the trade war.

Only the Strong and Focused Will Survive

ASF's highly contagious and unpredictable nature make dealing with it not for the faint of heart. A similar analogy can be drawn with the prolonged drought that impacted the U.S. cattle industry in 2012 and 2013, which reduced the total herd to its lowest level in six decades. In that instance, successful livestock companies either their own feed resources or the means to purchase additional feedstuffs. Those that did were able to persevere and took advantage of rising prices in subsequent years.

In China, the lack of quality testing and false positives have made navigating the crisis difficult as some companies (like the pig breeder Tangreshen) were reported to have manufactured feed contaminated with ASF. The initial test turned out to be a false positive. The company has since responded by raising new capital and pushing ahead with plans to build a state-of-the-art million-head slaughter facility in Hebei Province along with two 300,000-head breeding farms in the provinces of Henan and Hunan and a 1,200-sow breeding farm in Gansu Province. Other forward-thinking companies are implementing animal welfare practices, realizing that unnecessary animal stress is not conducive to a healthy herd. The high density of pig populations in the eastern and central portions of the country is also pushing companies to build

modernized multi-story buildings that can house several thousand head while providing structures for easier disease management and quarantine procedures. As for small backyard producers, the heartier entities, which require less working capital than the larger behemoths, will likely persist without additional pressure to leave the market.

Looking Ahead, An Uncertain Future

The ASF outbreak comes at time of slowing economic growth in China, a major trade war, and a push to retool the country's livestock systems for both food safety and environmental reasons. One challenge will be the country's willingness to follow through with its aims. China's central government has a long industry of launching bold initiatives only to succumb to bureaucratic ineptitude, rent seeking by well-organized and well-financed interest groups with strong party ties, and a reliance on failed methodologies and frameworks.

On the other hand, China's leadership is acutely aware of the populace's dissatisfaction and cynicism regarding the country's recurrent food safety and environmental scandals. China's President put forth ambitious plans to relocate and reconstitute the livestock and in particular, the hog sector, precisely due to concerns over social harmony. The challenge will be for China to develop and/or adopt standardized practices that are transmitted from the central government and provide direction and leadership to local provinces. That might be a tall task given that standardization and industry certification systems generally come from outside of the country, which will mean China will have to open its economy and actually respect intellectual property.

Furthermore, China will need to address and improve data quality. China's food and agricultural sector is too big and too far developed to have such poor data collection and analysis. The central government's crackdown on independent consultancies has not help in this area either. Restricting access and open debate actually runs contrary to some of Xi's stated

objectives. Finally, the divergence in growth between the coastal megapolises and China's interior, as well as the cost of living burdens now confronting younger upper middleclass Chinese citizens in cities like Beijing, Guangzhou, and Shanghai, needs to be understood in the context of new meat consumption growth and demand drivers.

