

African Swine Fever Update

Global protein market impact



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September, 2019

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Global impact of ASF is massive



African Swine Fever (ASF) continues to spread

World markets beginning to respond

Chinese herd rebuilding could take years

What does ASF mean for the US protein industry?

Mixed messages add to market volatility



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African swine fever
under control in
China: ministry

China Daily, June 2019

China has lost 100
million pigs to
African swine fever

CNN, September 2019

China to investigate
local authorities'
efforts to control
African swine fever

Reuters, July 2019

Trade war with U.S.
won't affect China's
pork supply:
Chinese ministry

Reuters, August 2019

Beijing admits
'weaknesses' in
handling of African
swine fever crisis

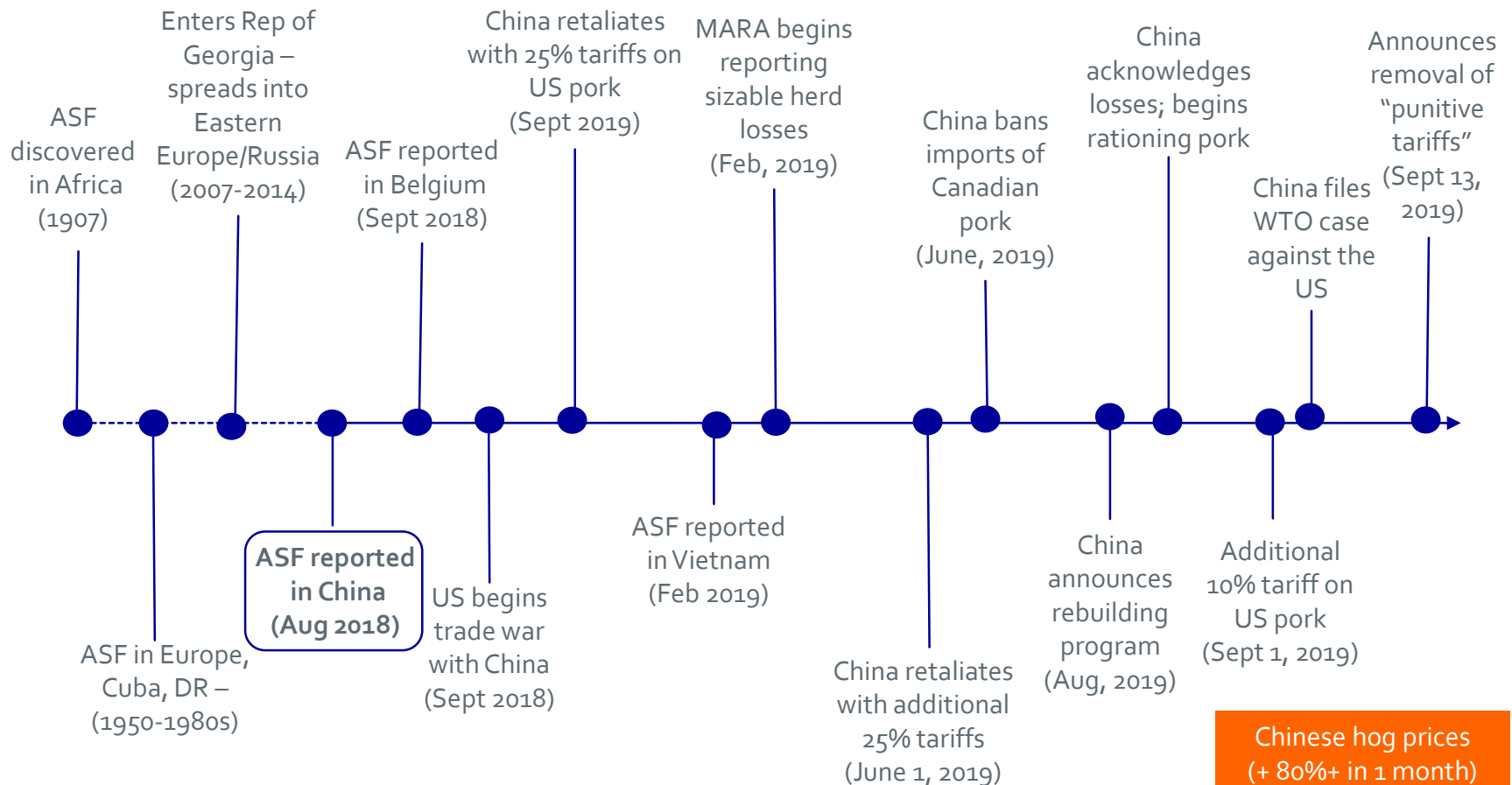
CNN, July 2019



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It has been a very long year

Chinese outbreak and trade tensions complicate global pork trade



Source: Rabobank, 2019

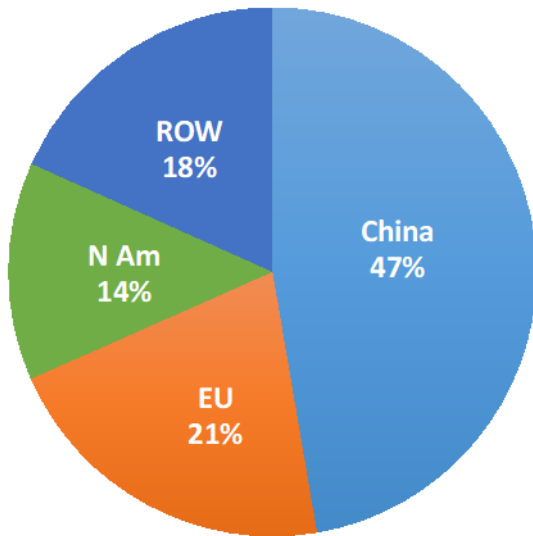
ASF: What you need to know



- ✓ **Current: 3 Continents; 25 countries**
- ✓ **In Africa since 1900s**
- ✓ Nearly **100% mortality**
- ✓ Symptoms in days, death <1 week
- ✓ No cure; **no vaccine**
- ✓ Carried by wild (feral) boars in EU
- ✓ **No human health impact**
- ✓ Can live in processed meat for over a year, 3 years in frozen meat
- ✓ Spread via meat (swill feeding), transport (on/off farm), feed, ticks

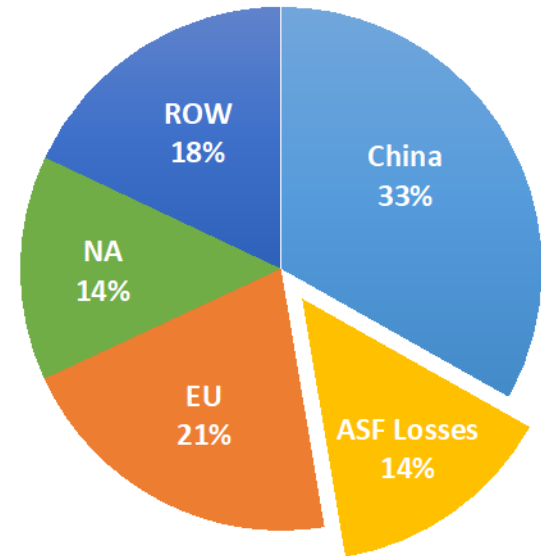
ASF losses in China are devastating

2018 Pork Production



~50%+ of herd
by year-end

2019E Pork Production

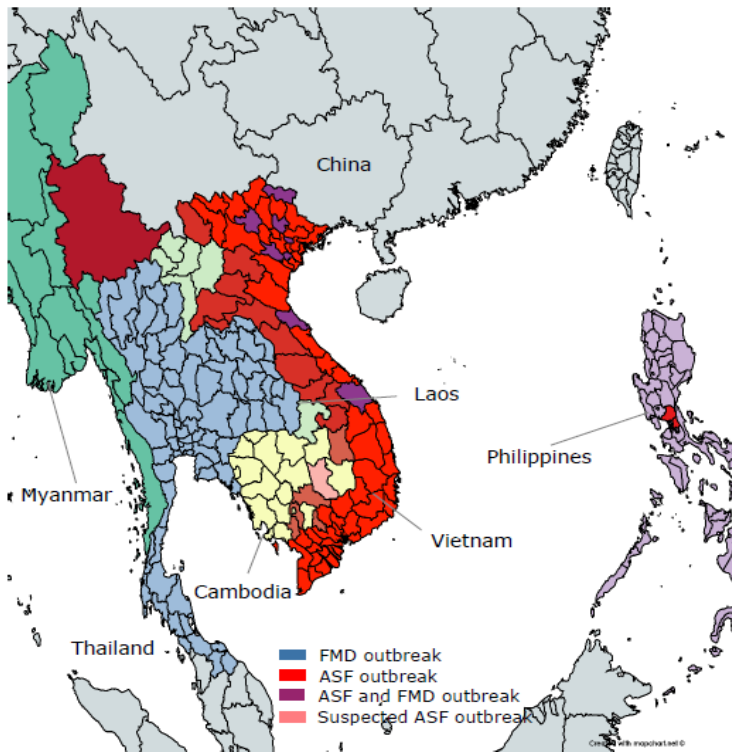


- Nearly $\frac{1}{2}$ of the world's pigs in China
- $\frac{1}{2}$ of these pigs are in backyard operations
- China produces **98%** of its pork; imports **2%**
- **2%** imports to China = **20%** of global pork trade

Source: USDA, Rabobank, 2019

- Chinese pork supply **25%** lower by year-end
- Herd losses (including breeding stock) **~50%**
- Production losses in Vietnam **>30%**
- **2019** ASF losses **14%** of world pork supply
- 2020 losses likely to multiply

ASF continues spreading in SE Asia



Vietnam

- First reported in February 2019; now all 63 provinces
- Impacts of ASF have been exacerbated by FMD outbreaks
- Vietnam has the highest pig herd density in Southeast Asia, facilitating the spreading of the disease.
- About 17 million pigs in Vietnam (out of total 22 million) are based in backyard farms.

Cambodia, Laos and Myanmar

- Cambodian provinces near Vietnam first affected, has spread.
- Most of Laos now affected by ASF, outbreaks also in Myanmar
- **Major concern is ASF spreading to Thailand**

Philippines

- First reported outbreaks in September 2019
- 7,000+ pigs were culled in a 1 km radius of the affected areas.
- Philippines has the second highest pig density in Southeast Asia.
- Backyard farms are 62% of total production
- Islands naturally constrain pig transport by truck, the disease may spread more slowly compared with Vietnam

South Korea confirms its first case of ASF

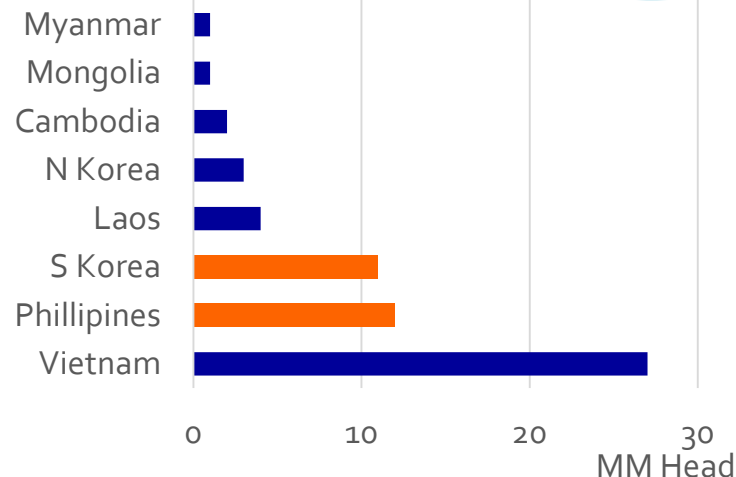
ASF spreads to new geographies

75% of world's pork supply at risk

At Risk

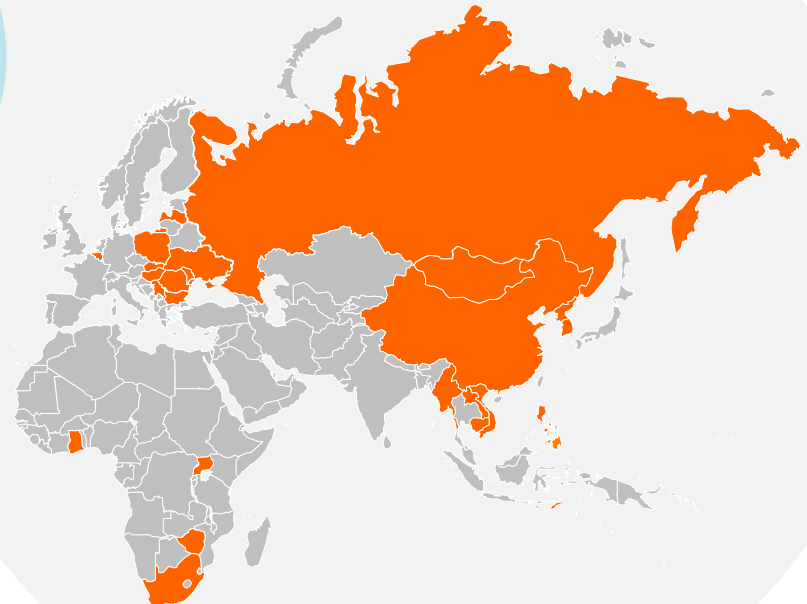


ASF Positive



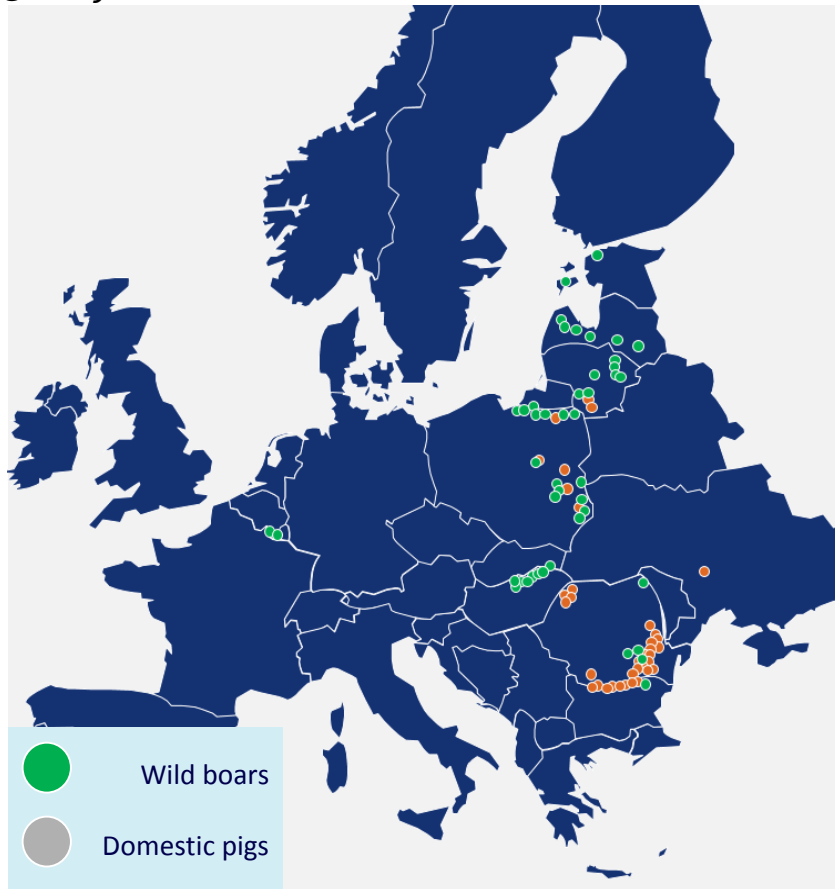
Large hog
populations
still at risk

ASF-positive nations
in 2019

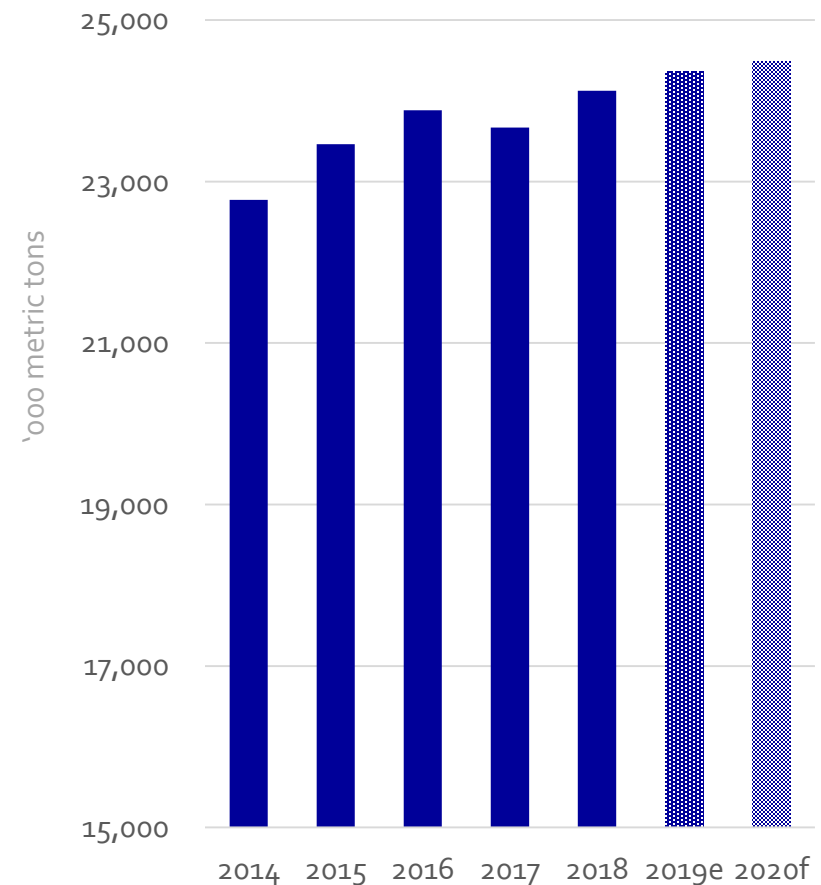


ASF remains a threat in Europe

ASF continues to spread; multiple outbreaks in last 30 days



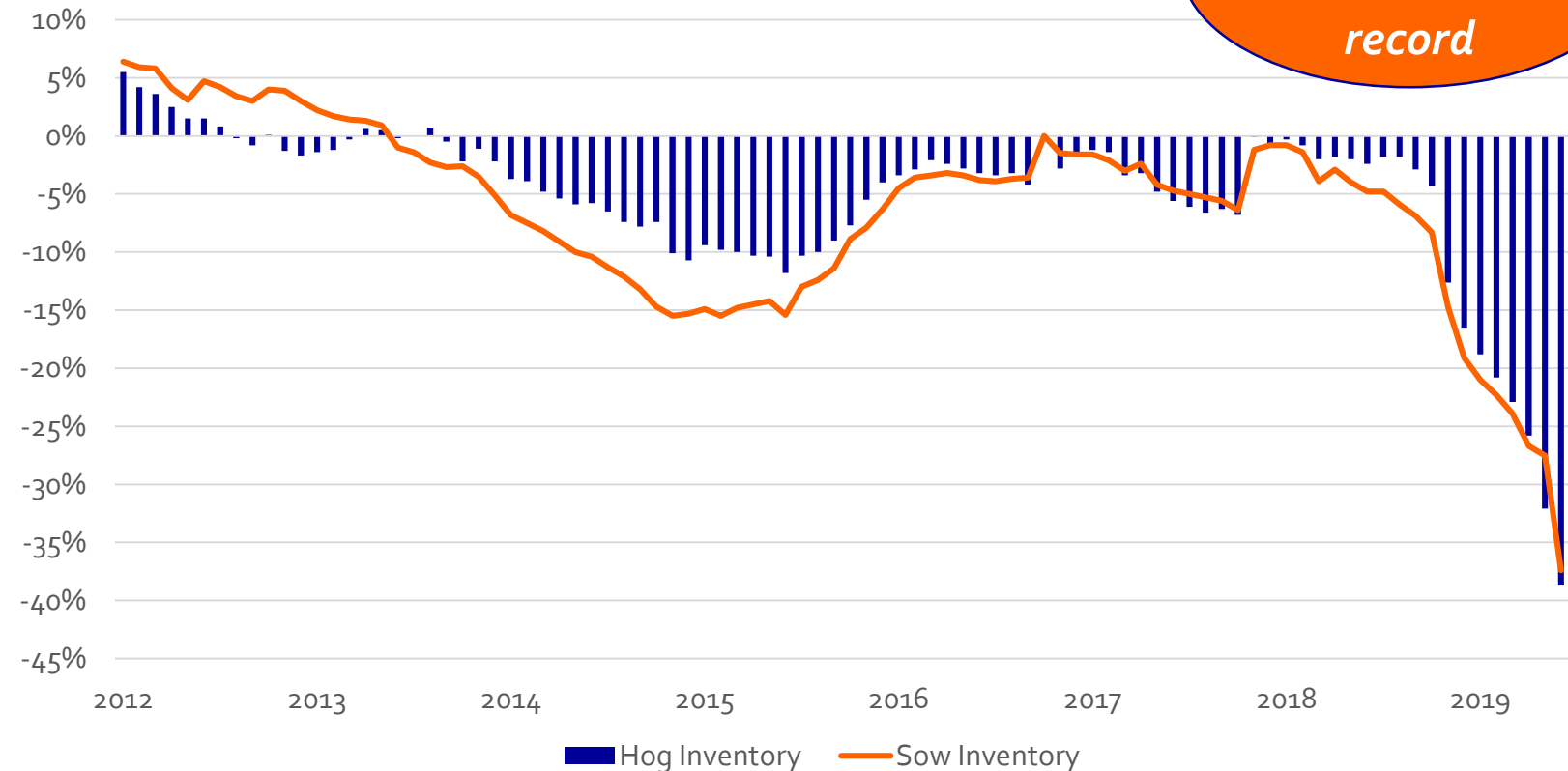
EU pork production response to export demand constrained



Chinese Herd -39%; Breeding -32%

Rabobank estimates a 40-50% herd loss in 2019

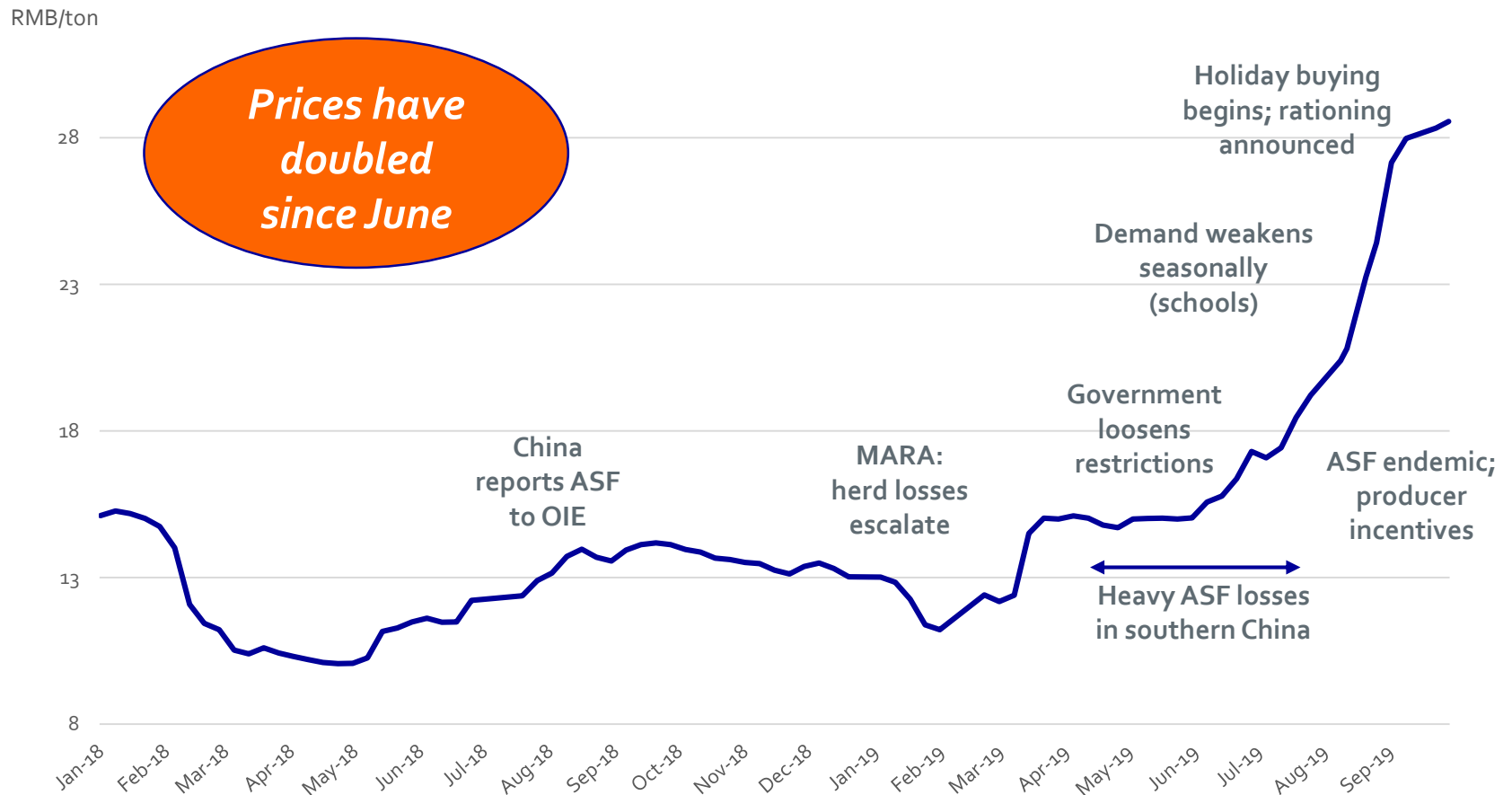
YOY Change



Source: MARA and Rabobank, 2019

Chinese hog prices skyrocket...finally

Heavy inventories and seasonal demand weakness delay increase



Source: MARA and Rabobank, 2019

China admits the problem; why now?

Comments from Chinese Vice-Premier Hu (Sept 2, 2019)

“Pork prices threaten to spoil the 70th anniversary of National Day (Oct 1)

“...would affect the joyful and peaceful atmosphere to celebrate the 70th anniversary of the founding of New China”

Failure to control prices will “seriously affect the effectiveness of building a comprehensively well-off society and undermine the part and government”

Rising prices could affect “economic stability”

**Mid-Autumn
Festival**

Sept 13-15th

**Golden Week
70th Anniversary**

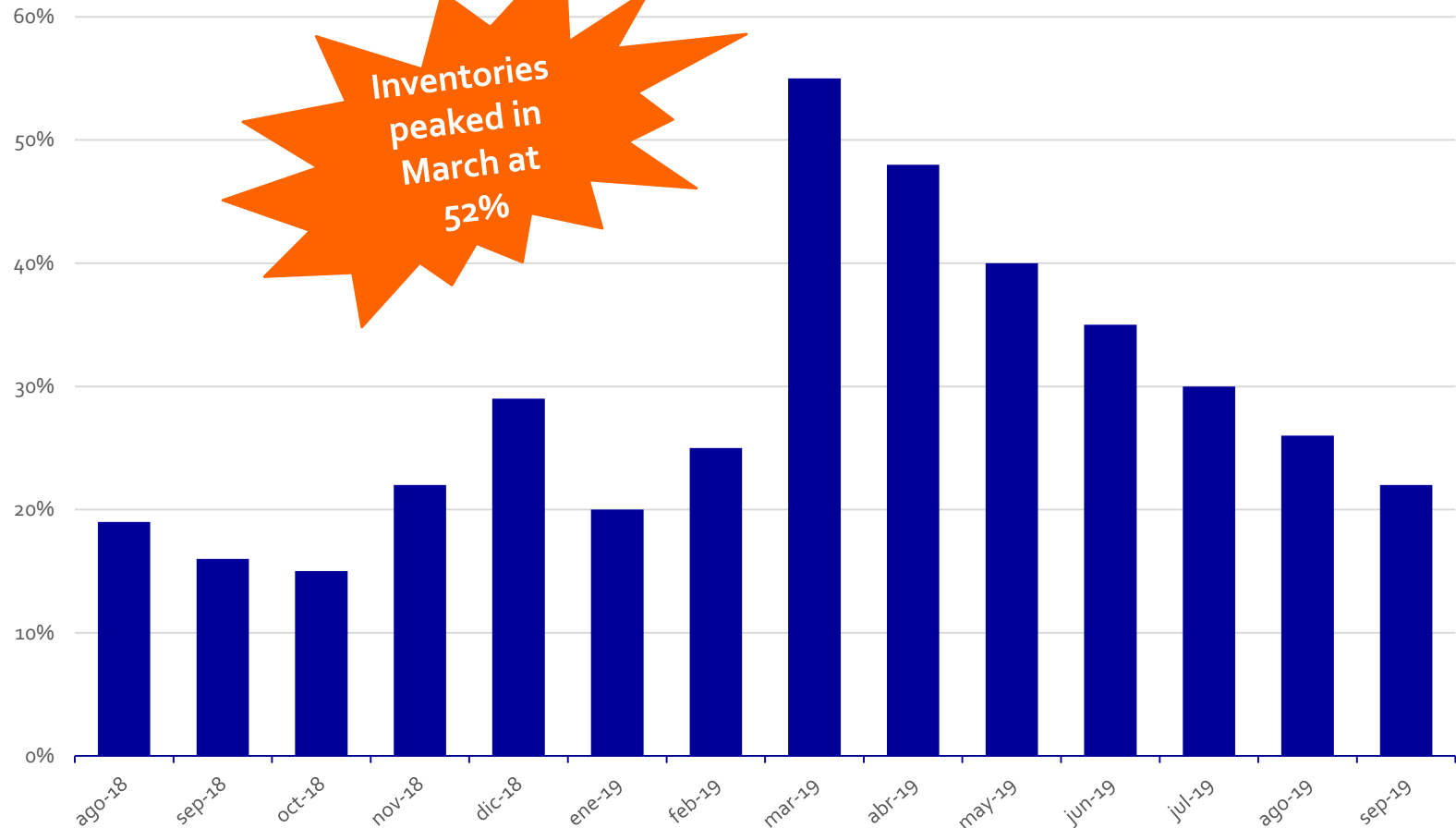
October 1-8

**Chinese
New Year**

Jan 24--30

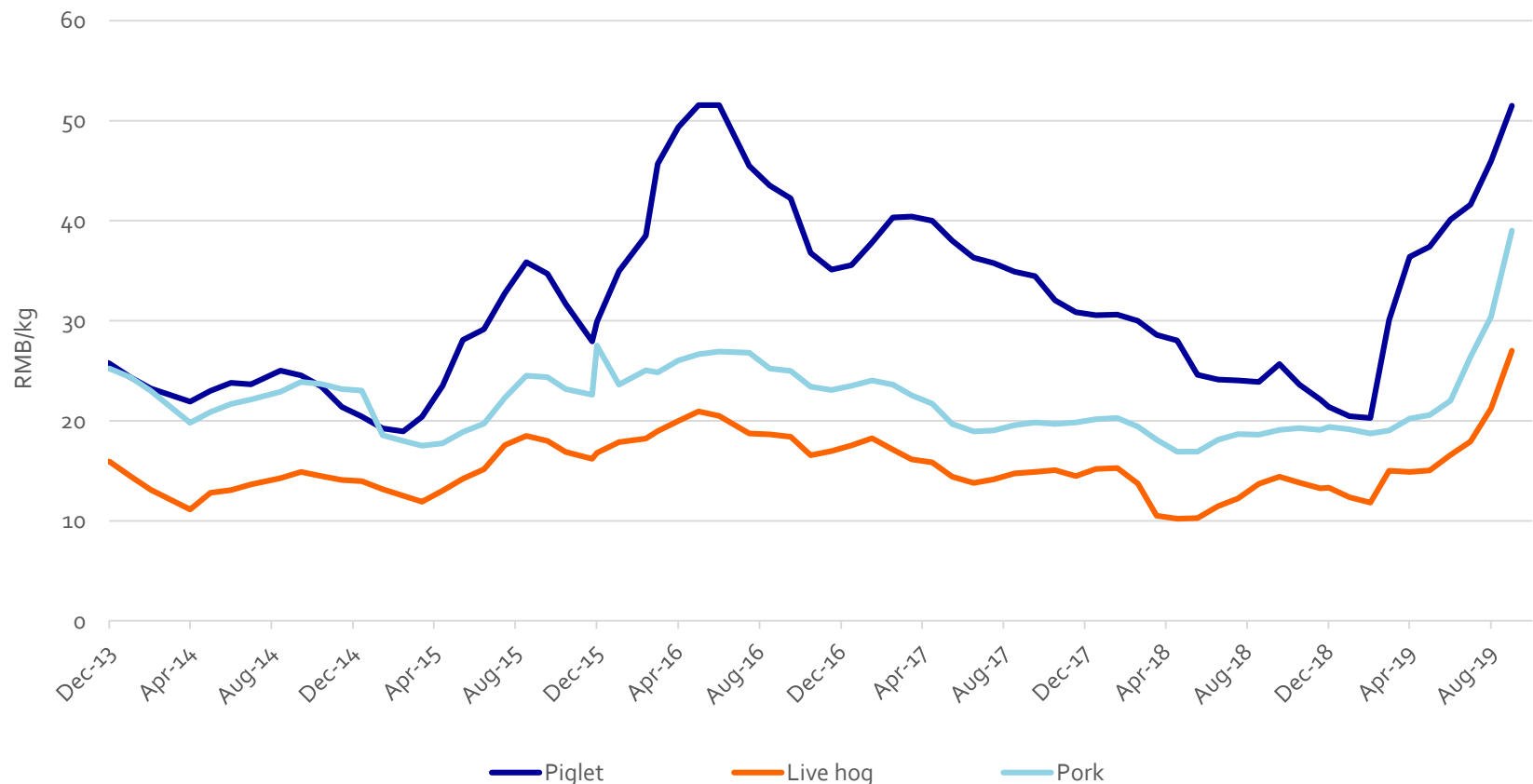
Frozen stocks nearing cyclical lows

% of total



Lower demand at higher prices likely

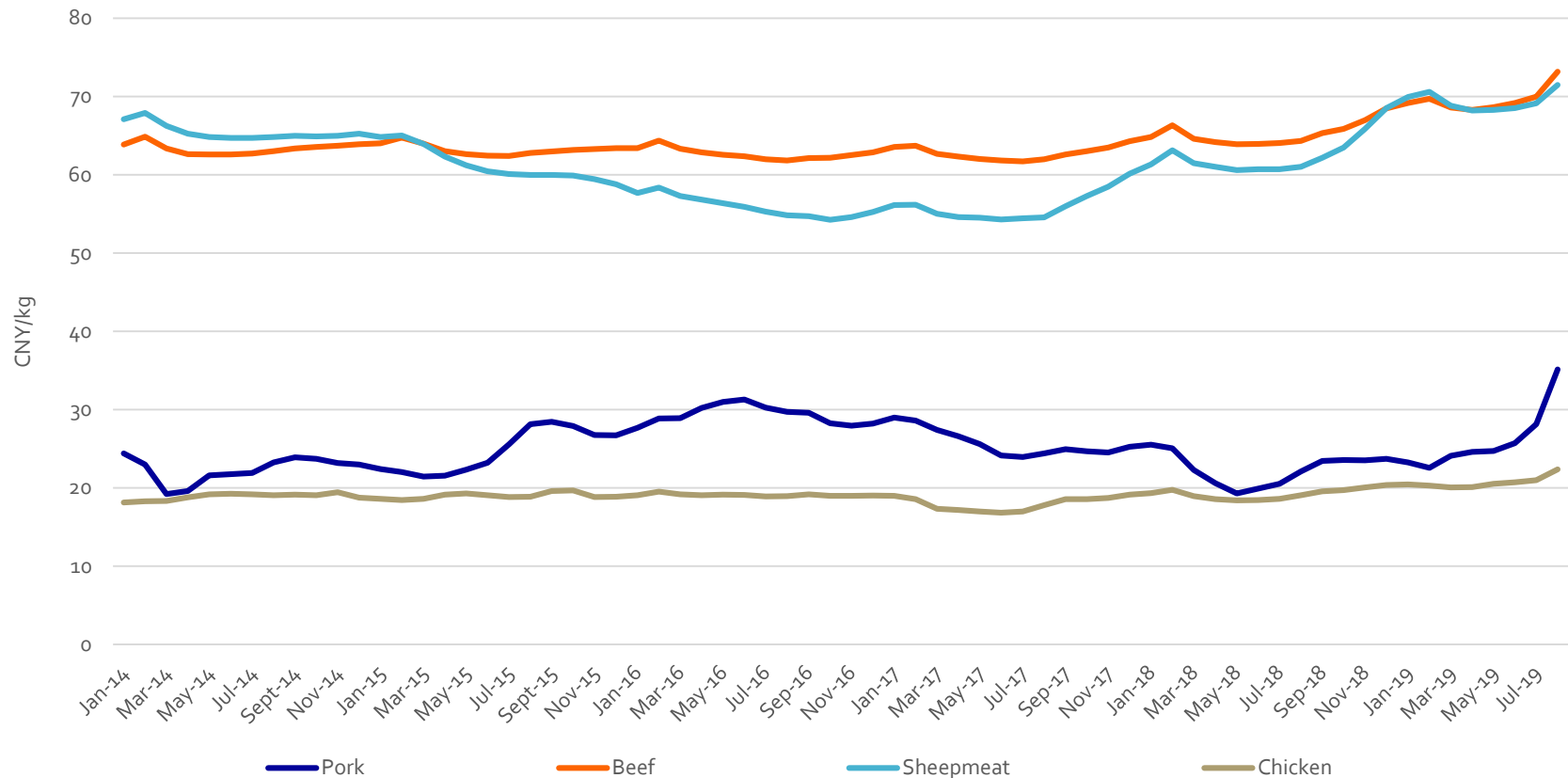
Prices have risen, but frozen stocks delayed increase



Source: Boyar; Chinese Ministry of Agriculture and Rural Affairs; Rabobank, 2019

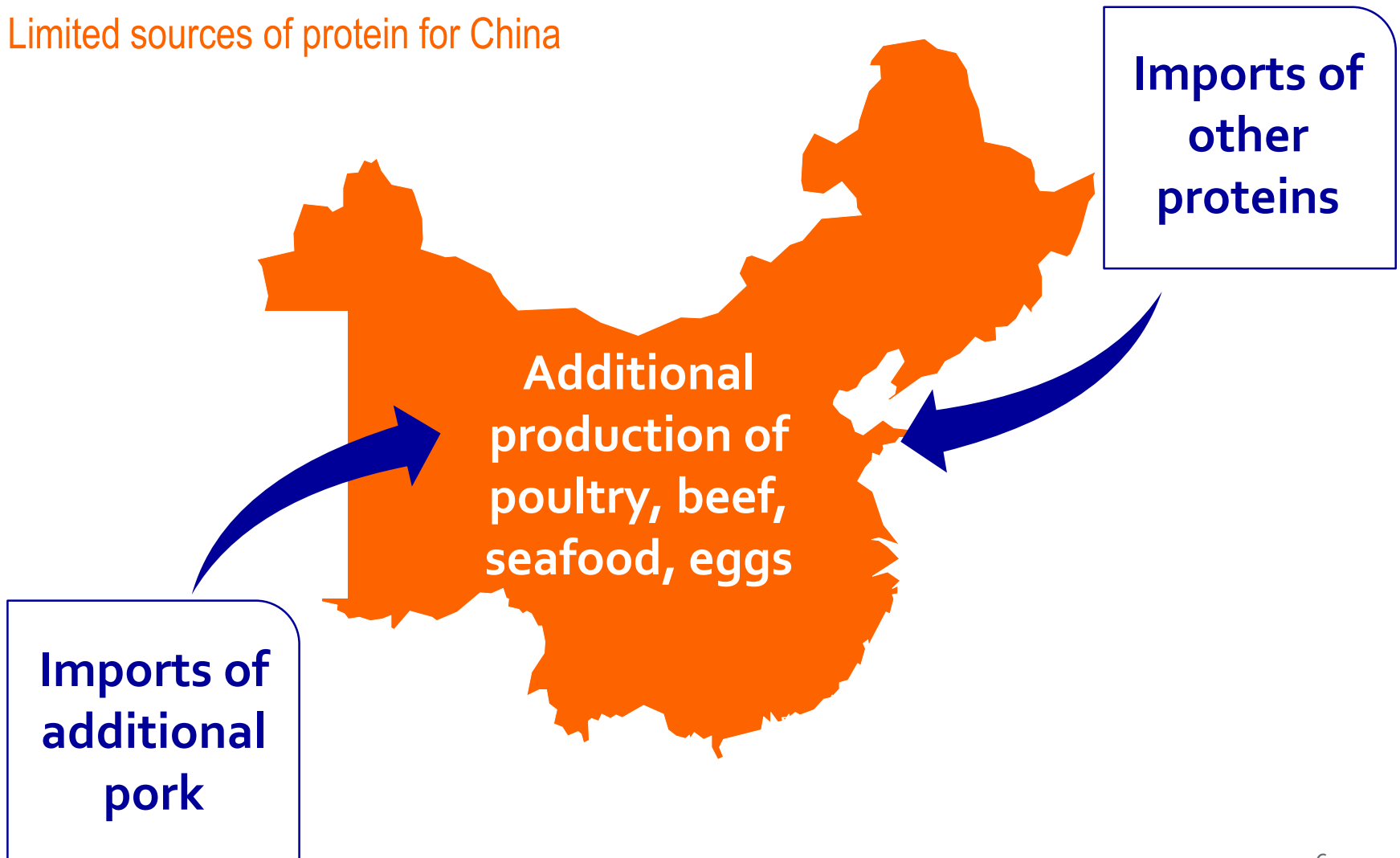
Other protein prices at new records

Pork prices correlate with poultry; beef and lamb sell at a premium

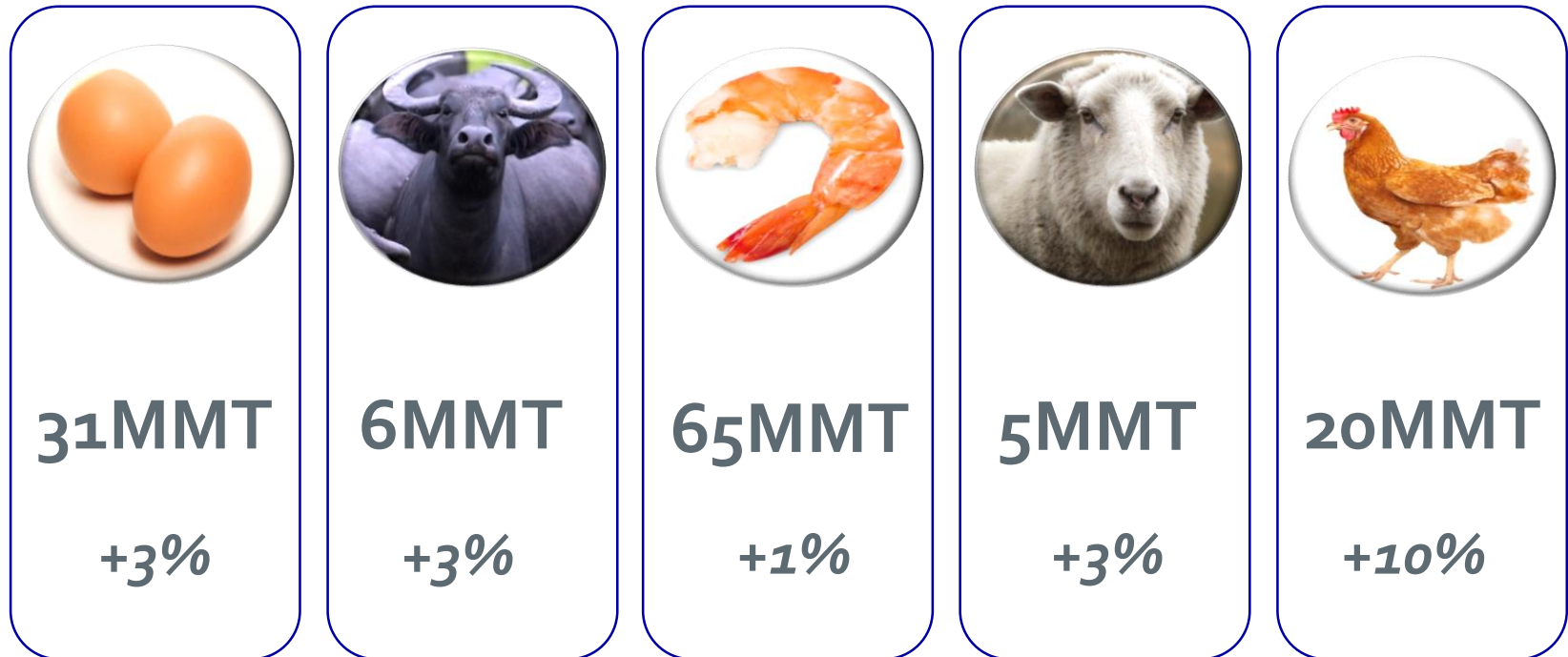


How will China respond?

Limited sources of protein for China

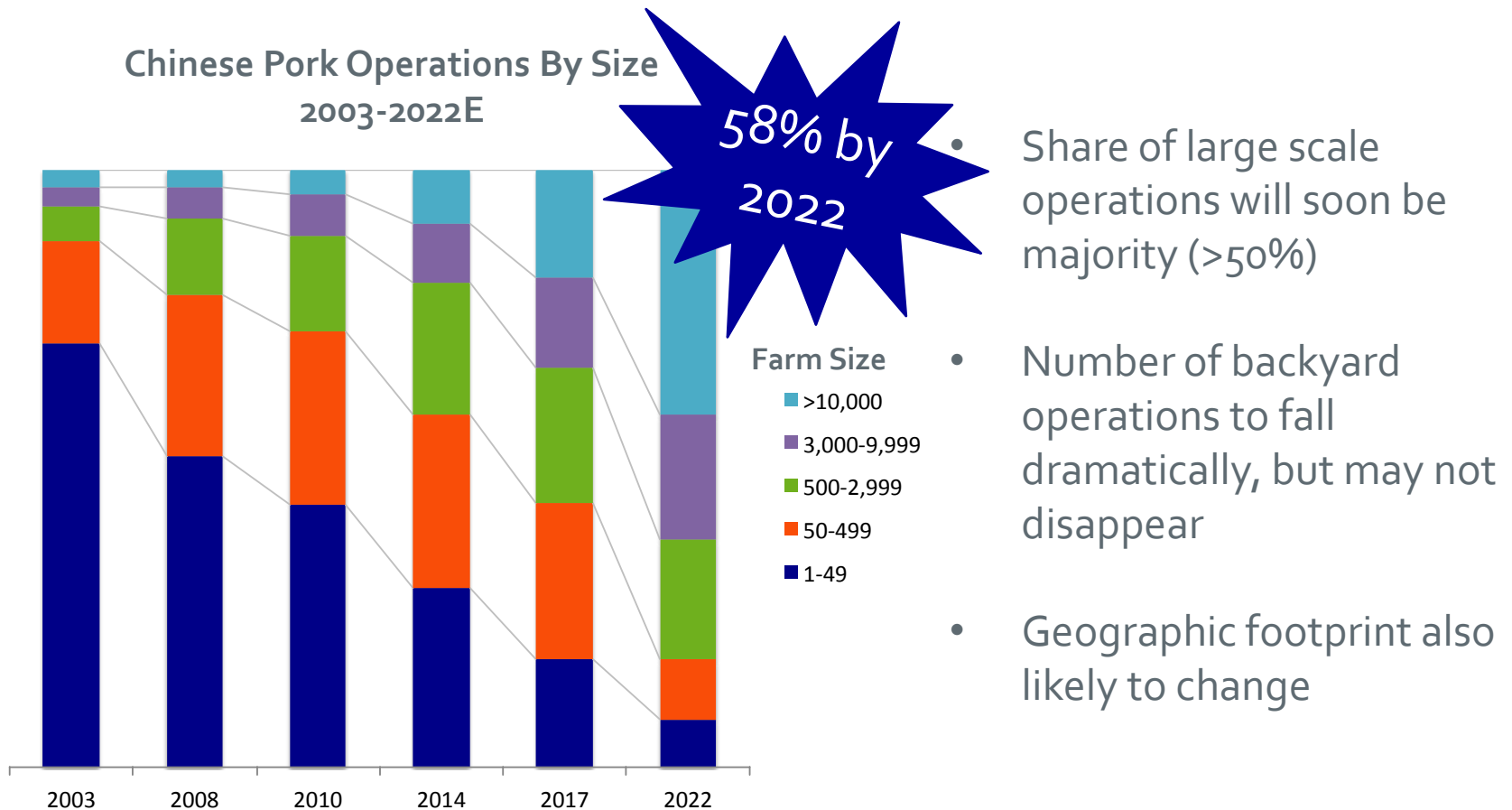


China can add 4MMT more protein



**China may be increase raise production
other proteins 4MMT**

China Pork Structure Will Change



Source: MARA and Rabobank, 2019

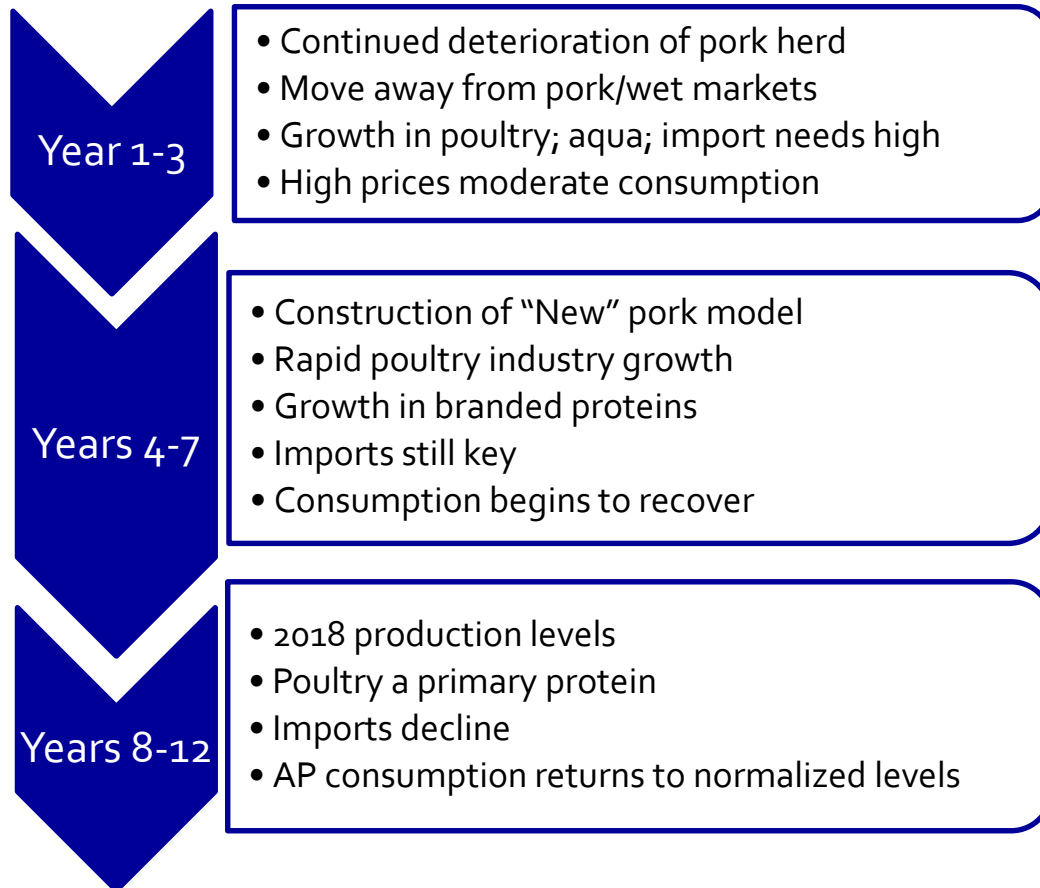
An effective vaccine still years away

- Vaccine could take years; “up to 8 years from commercialization” (Ibach)
- Illegal vaccines common in China; promoting spread of the disease
- At least 2 strains of ASF, will make finding a vaccines more difficult
- Many labs working on a cure -Spain (Latvian), China, US



"Properties that make ASF more difficult to mutate, also make it more difficult to cure"

Will take years to rebuild China's pork industry

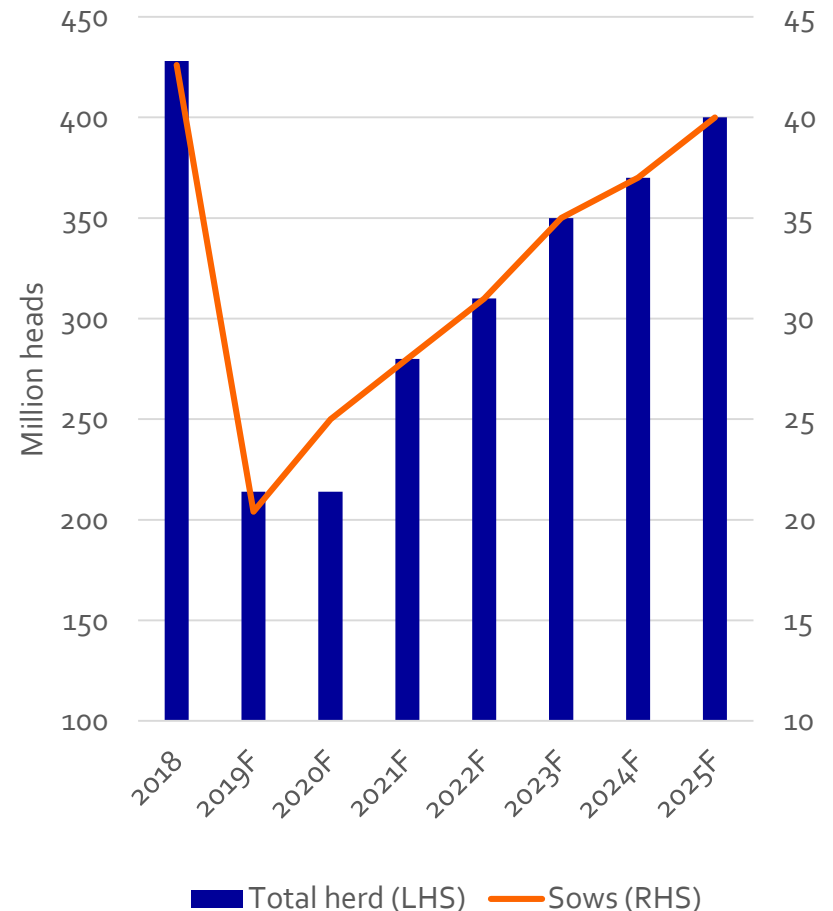


China faces significant challenges in rebuilding herd



Key challenges for rebuilding

- Need effective biosecurity solutions
- Land access challenges
- Investment hurdles substantially higher
- Vertical integration requires significant equity investment
- Environmental protection pressure
- High risks of disease/virus infection



Government takes drastic measures

Subsidies to 800M (out of 1.4B)
10% below average of last 10 days

Rationing pork purchases
Limit of 1kg per day per family

Releasing strategic reserve

Green passage – Pig/pork transport
exempt from tolls



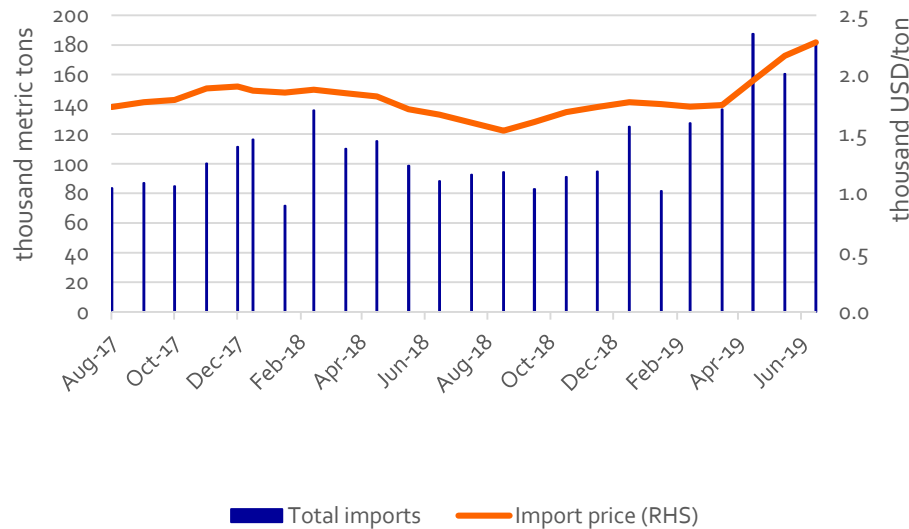
Source: South China Morning Post

“China could release emergency pork reserves after losing 100 million pigs to swine fever” — CNN, Sept 2019

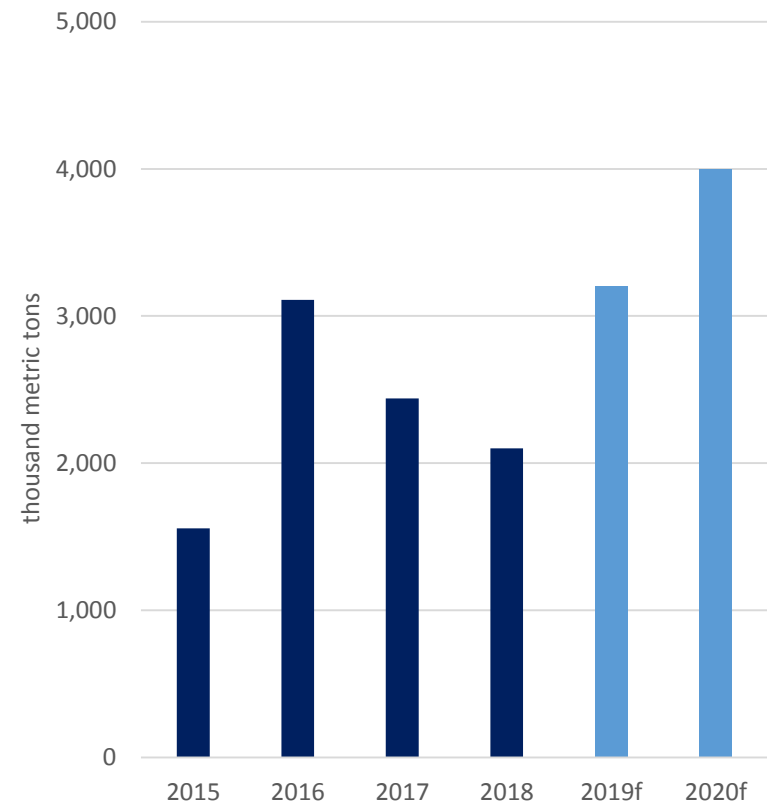
Pork imports already rising... and will move higher



Pork import volume +12%YOY in 1H19

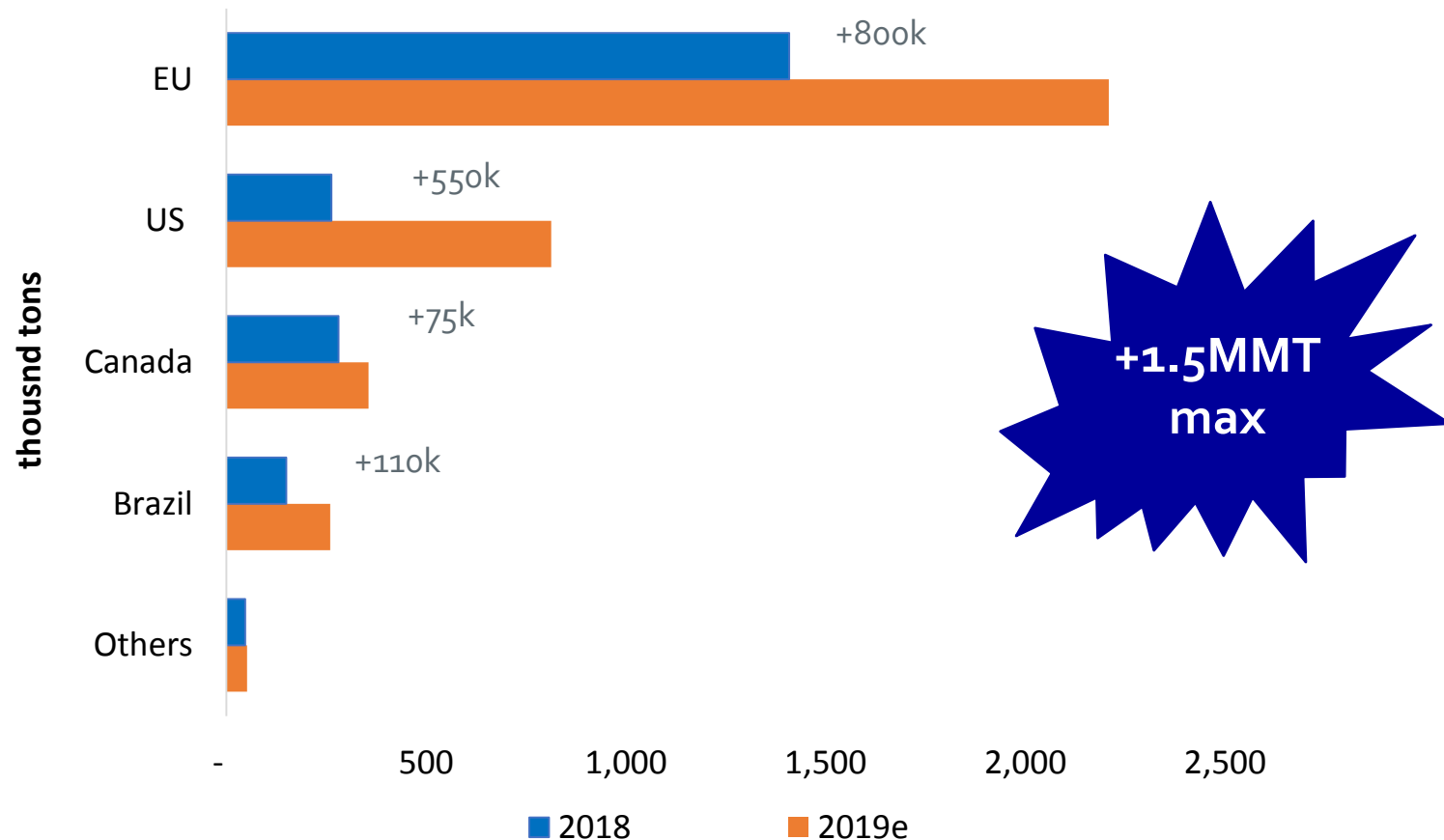


China's pork imports to hit record levels in 2019



- EU is the leading pork exporter; high prices and cautious production response will limit exports
- US-China trade war limits the role of US pork exports
- Canada remains excluded from pork trade
- Brazil could ship more pork to China, if supply increases.
- Expect further ASF outbreaks in Asia and in Europe

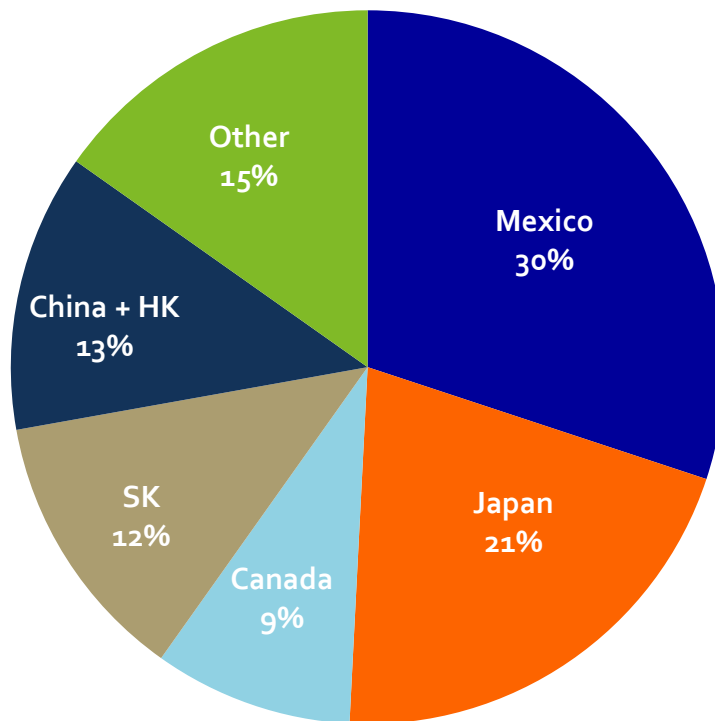
Additional pork imports could add 3%



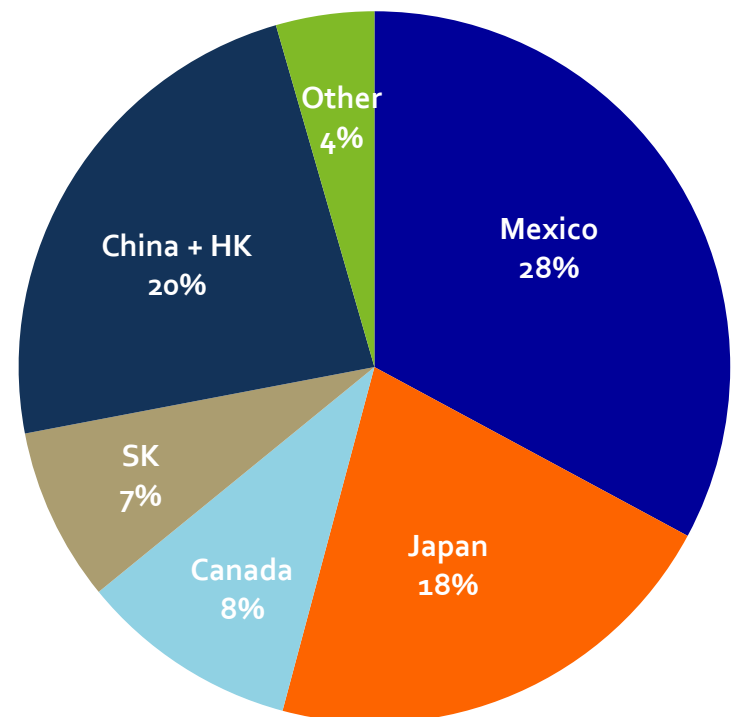
Source: USDA Rabobank, 2019

US pork exports are redistributed

US Pork exports, by volume, 2018

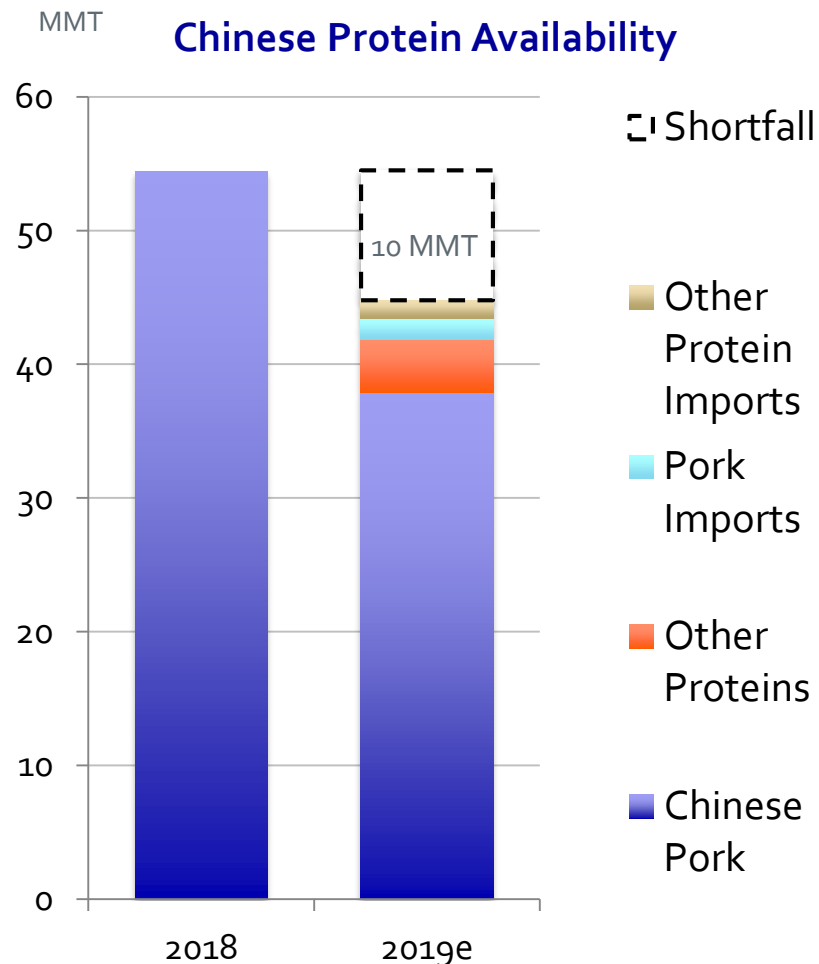


US Pork Exports, by volume - July 2019



Source: USDA, Rabobank, 2019

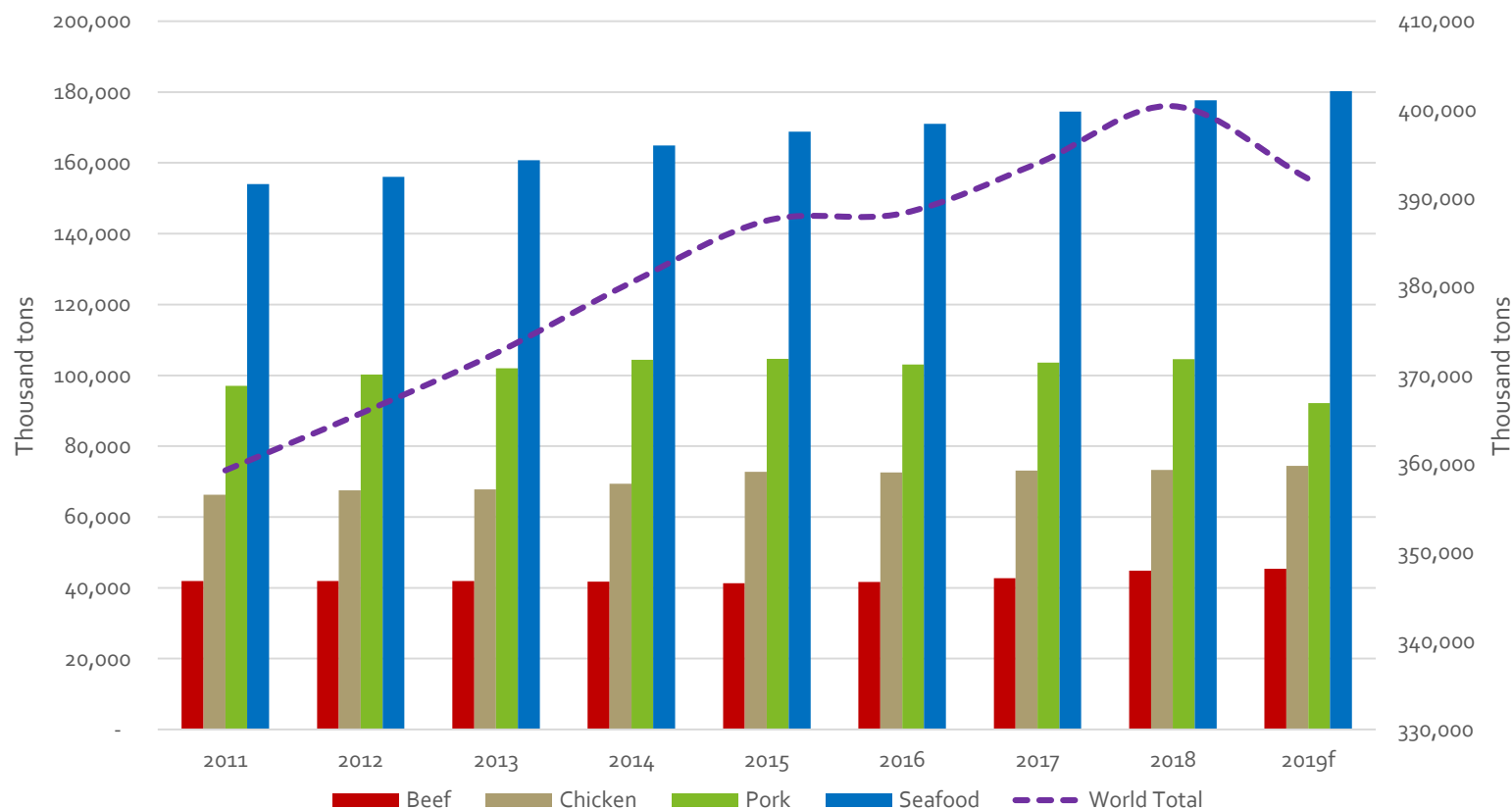
World unable to fill the supply gap



- Increased domestic protein production, frozen stocks and imports will supply ~6MMT
- Chinese poultry production limited due to breeder constraints; AI
- Imports of pork from the EU, Brazil and Canada likely to be limited, US faces tariffs
- Expect imports of all proteins (beef, poultry, seafood) to have limited near term impact
- Prices for all proteins will rise
- Gap in 2020 likely to expand (2x)

Global protein production to slow

Declines in Chinese pork production outpace world's ability to offset



Challenges to expanding exports

1. Structural limitations

- Infrastructure will not support a dramatic increase in exports (blast freezers/cold chain/containers)
- Volumes will shift from one market to another

2. Ractopamine ban on pork/traceability in beef

- ~50% of U.S. pork racto-free; sufficient to meet needs
- China unlikely to change policy
- Challenging to 100% eliminate from the system

3. Trade dispute with China –tariffs, poultry ban

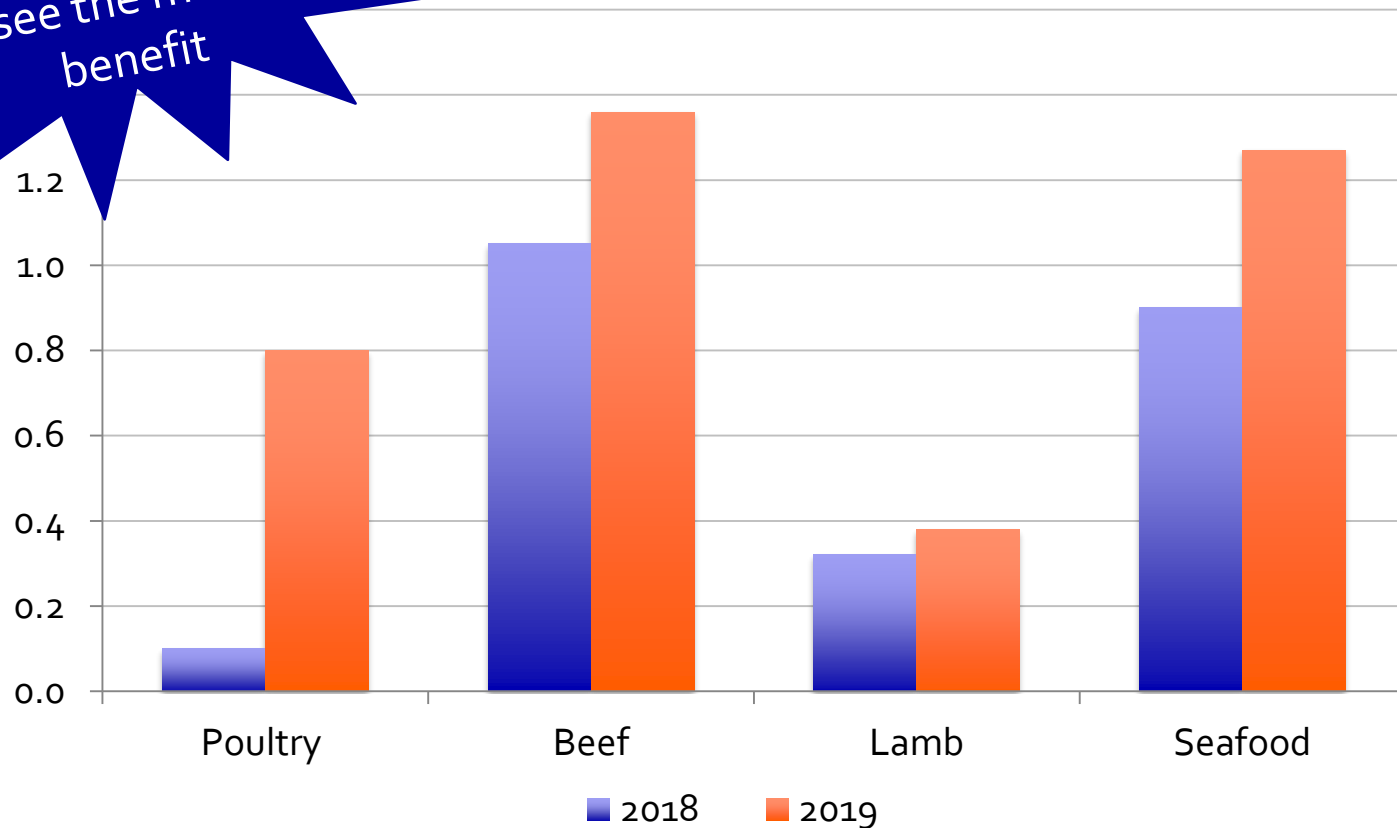
- Pork moving in through government purchases
- Grey channel active



Other protein imports +1.4MMT

Poultry to
see the most
benefit

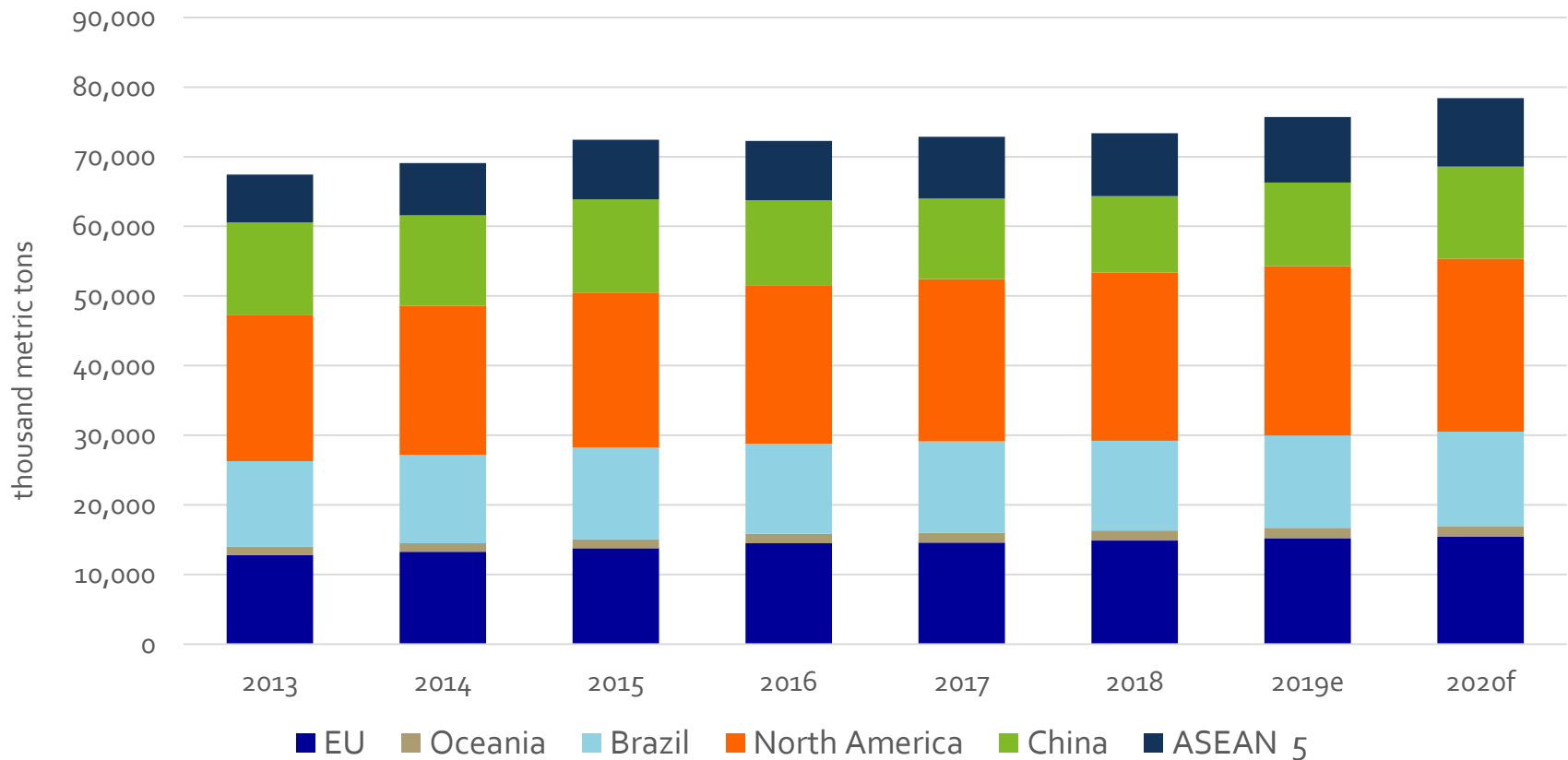
Chinese protein imports, 2018-19e



Global poultry to expand in all regions

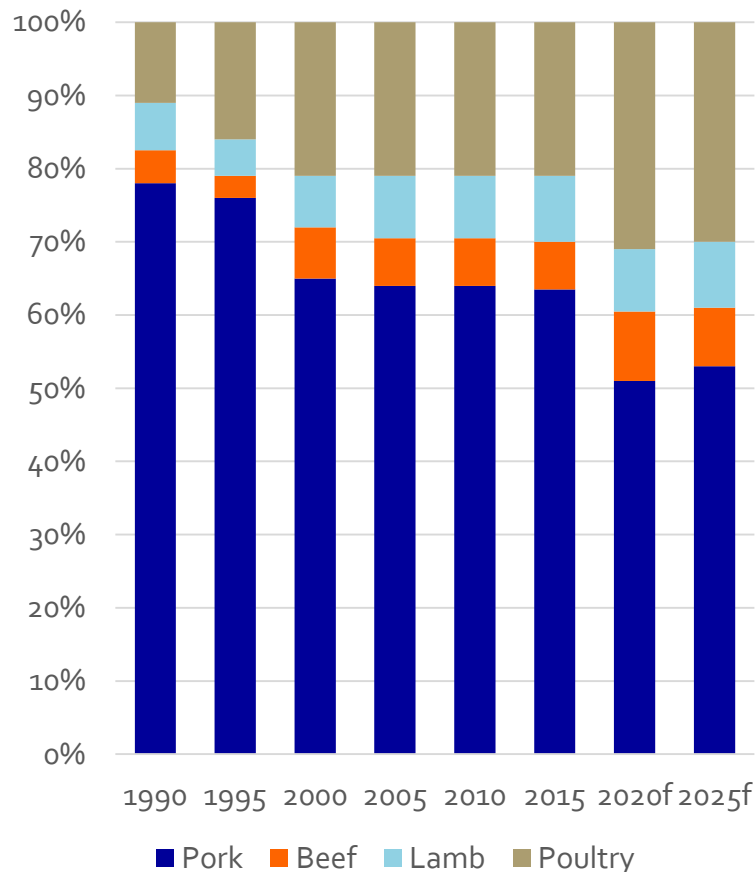


Brazil primary beneficiary; China a net exporter until recently



Poultry consumption likely to rise

Consumers shift away from pork on food safety concerns and price



Pork is an integral part of rural life, so consumption will ultimately rebound



Poultry benefits from trends of eating out, rising health awareness, product innovation

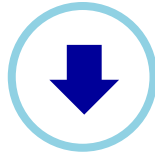


Beef demand driven more by premiumization than by substitution for pork

ASF Impact: Up & Down the Food Chain



Impact



US pork industry on high alert

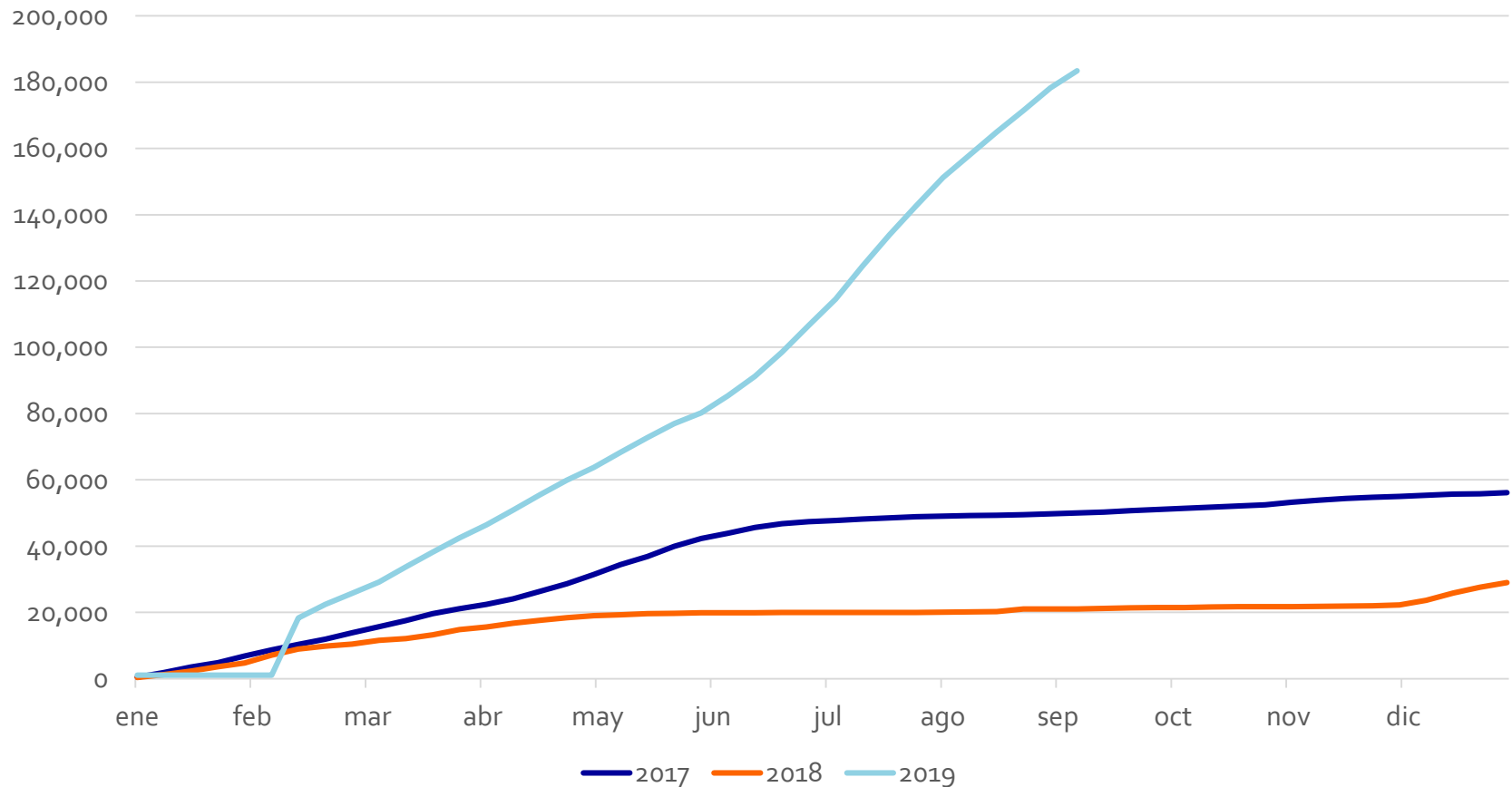
- More countries with ASF = more potential sources
- Likely to come to US on a plane (tourists carrying food)
 - NJ port - 1M pounds of smuggled pork (Mar, 2019)
 - Strong financial incentive to export suspect product
 - Beagle Brigade
- Large-scale commercial outbreak unlikely, but not impossible
- Impact of ASF in the US
 - Exports would stop immediately
 - Market would crash
 - Compartmentalization



US pork exports up sharply despite tariff headwinds

In tons

Accumulated Pork Exports to China, 2017-19



Source: USDA, 2019

US:
Trade war with China; USMCA to be ratified; Japan trade deal

Brexit:
Future trade flows to UK uncertain

Central-Eastern Europe:
Production growth displaces Thai and Brazilian product

China:
Trade war with US; ASF implies strong demand growth

CPTPP:
New trade access to Asian markets

Saudi Arabia:
New halal rules and Brazil suspension

Brazil:
Trade restrictions from EU

Lean hogs move on ASF, too early...



Source: CME, 2019

Markets moved in anticipation of exports

US producers able to lock in strong profits for 2019/20

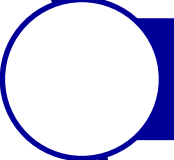
US pork exports are delayed

Trade dispute has complicated outlook; some forward movement

Key Takeaways



ASF has decimated Chinese hog production, ravaging SE Asia and parts of Europe
All key production areas on alert; stepped up biosecurity is essential



Price response in China delayed; but now affecting markets
Higher pork prices hurting demand; all protein prices higher




Poultry industry to benefit in the intermediate term
Structural shift in long-term consumption patterns likely



It will take years to rebuild the Chinese swine industry
Self-sufficiency goal will facilitate investment; move toward larger farms



There are likely to be unintended consequences – positive & negative
Medical, labor, political unrest, infrastructure, alternative protein



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