GROUPE AGÉCO

GIRA

"MADE-IN-CANADA" HOG PRICE

PRESENTED TO

Canadian Pork Council
Conseil canadien du porc

FINAL REPORT

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Agriculture and Agri-food Canada Agriculture et Agroalimentaire Canada

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LIST OF ABBREVIATIONS

BN	BILLION
CA	CANADA
CAD	CANADIAN DOLLAR
CL	CHILE
CN	CHINA
CWE	CARCASS WEIGHT EQUIVALENT
DC	DANISH CROWN
DE	GERMANY
DK	DENMARK
DKK	DANISH KRONE
E	ESTIMATED NUMBER, BASED ON PART-YEAR DATA (E.G. 2016E)
F	FORECAST NUMBER (E.G. 2017F)
FTA	FREE TRADE AGREEMENT
FY	FISCAL YEAR STARTING ON APRIL 1 OF THE MENTIONED YEAR
HD	HEAD
HORECA	HOTELS, RESTAURANTS AND CATERING SECTOR
HS CODE	HARMONIZED SYSTEM CODE, USED FOR TRADE DESCRIPTION
KT	THOUSANDS OF TONNES
LC	LOCAL CURRENCY
L&F	LANDBRUG & FØDEVARER – DANISH AGRICULTURE & FOOD COUNCIL
LW	LIVE WEIGHT
MIO	MILLION
P.A.	PER ANNUM
PW	PRODUCT WEIGHT
USD	UNITED STATES DOLLAR
(000 T)	THOUSANDS OF TONNES

1. RESEARCH CONTEXT AND OBJECTIVES

The discovery and communication of producer prices is contentious and disruptive in many parts of the world where large numbers of producers sell their product to a much smaller number of processors and where power in the chain lies in the hands of the latter. Rarely is it transparent—especially in the livestock and meat sector—due to the complexity of the products and the variance between products and specifications. It is generally true that price negotiation is time consuming and an impediment to achieving many other positive developments in the meat supply chain.

This even applies to North America, where there is better quality data, more transparency and much greater use of commodity futures markets than in any other country. Confidence in fair and transparent price formulation is key to the success of the hog sector. The US has long been a price setter for Canadian hog prices due to the amount of live hogs and meat that flow across the border, mainly southward. Clearly, the valorization of different cuts and by-products in the range of different international markets and the domestic Canadian market determine the ultimate value of the hog chain. It is the share of the ultimate revenue which is passed back to the producer and the process by which this price is discovered that are the focus of this project. In this regard, issues related to the relevance of US live hog prices used in hog price formulas in Canada to reflect the value of Canadian hogs pose a real challenge. Canadian hog producers do not have a transparent means of determining the price of Canadian live hogs. Many examples in recent years have shown that the Canadian live hog market is not properly reflected by the US market: available slaughter capacity as well as market access and trade policies differ in some of the major export countries. Moreover, a foreign animal disease outbreak in the US could lead to a total disconnection of the two live hog markets to the great disadvantage of Canadian pig producers.

In this context, the Canadian Pork Council (CPC) wishes to explore the opportunity and feasibility of establishing a "Made-in-Canada" hog price based on relevant indicators to better reflect the value of the Canadian carcass. Groupe AGÉCO and GIRA have been mandated to conduct a research with the following objectives:

a. Determine the value of Canadian pork versus that of major competitors in Canada's key export markets: United States, Mexico, Japan and China.
b. Identify and quantify the factors that contribute to determining the value of Canadian pork in the four markets.
c. Propose a set of market indicators that could be used to develop a "Made-in-Canada" hog price for live hogs based on a carcass cutout.

This report is divided into six sections; following the main steps of our approach, the second section presents the results of the research on the value of Canadian pork in the country's four major export markets, namely the US, Mexico, Japan and China. This analysis is based on available trade data and on interviews conducted with several Canadian pork customers in each country, including importers, customers from the retail and further processing sectors, as well as brokers. Canadian pork is compared to its main competitors (and particularly US pork) to determine if origin is a buying criterion

and if Canadian pork is benefiting from a price premium. Information is synthesized into concise country profiles.

Section 3 covers the price discovery issue. Some basic definitions are presented, followed by an in-depth review of the price discovery mechanisms and issues occurring in the hog and pork meat sectors of five major exporters competing with Canada on its export markets. Germany, Mexico, Chile and Denmark, as well as the USA are thus analyzed. This is completed by the analysis of two examples drawn from situations in other sectors: raw milk in the UK and beef in Western Canada. The purpose is to explore whether any lesson could be learned from them to benefit the Canadian pork industry.

Section 4 focuses on the price discovery process in the main hog-producing Canadian provinces through an analysis of price determination and of the information and marketing systems currently in place in these jurisdictions. Price formulas are presented, and their strengths and weakness are discussed.

Section 5 offers a critical, in-depth analysis of the most appropriate reference prices that could be used in the context of the Canadian pork value chain, covering price behaviour and linkages, along with the distribution of market power between the buyers and sellers of hogs.

Section 6 synthesizes the analysis detailed in the preceding sections, assesses the feasibility of a “Made-in-Canada” price formula for live hogs in Canada and explores options available to design a price discovery mechanism that would allow for a better distribution of the value created by the sector among the partners of the chain.

Finally, section 7 presents the results of the simulations of the three options for a Made-In-Canada hog price reference model retained in the previous section and discusses these results in comparison with the reference prices used in Canada over the period 2013-2019 to price live hogs.

2. VALUE OF CANADIAN PORK

This section presents the analysis of the value of Canadian pork in its major export markets, based on in-depth interviews with buyers of Canadian pork and on a review of available trade data. Approximately eight interviews were conducted with buyers of Canadian pork in each country. We are grateful to Canada Pork International (CPI) and some Canadian packers and exporters for agreeing to share their contacts with the research team.

An interview guide covering the following topics was developed:

- Purchase patterns for Canadian pork and for pork from other origins
- Purchase criteria for pork products
- Origin preferences, if any. If yes, for what reasons.
- Perceived quality of the products from different origins (Canadian, US, European [mainly Denmark and Spain], other)
- Key factors that contribute to determining the relative value and perceived quality of pork products (meat quality, payment terms, volumes, product consistency, boxing & packaging) from different suppliers. Aim at identifying factors related to the carcass or to the packing plant.
- Importance of the nature of the relationship with the supplier
- Comparative price point of the core products from different origins

Results are synthesized into and presented in a concise country profile for each country: Japan, China, Mexico and the US. Appendix 1 gathers excerpts from the Gira Meat Club's Pork Highlight Report for each country covered by this present research. These reports provide some complimentary information on the recent market situation of those countries (supply and/or demand).

Interviews were also conducted with some Canadian packers and brokers to collect their opinion on the value of Canadian pork meat on those markets. The results were consistent with what we were told by foreign buyers.

2.1 GLOBAL IMPORT PRICE ANALYSIS

As a background to the interviews with Canadian pork buyers in the key export markets, import prices have been analyzed to identify any interesting price spread between the various origins of pork products. Data was collected on Trade Map[1] at the HS6 level of pork product codes.

"Frozen pork **boneless cuts** (HS 020329)" and "Fresh pork boneless cuts (HS 020319)" represent 81% of total Canadian pork meat exports. The average import price analysis (Figure 2.1) shows that for the latter products:

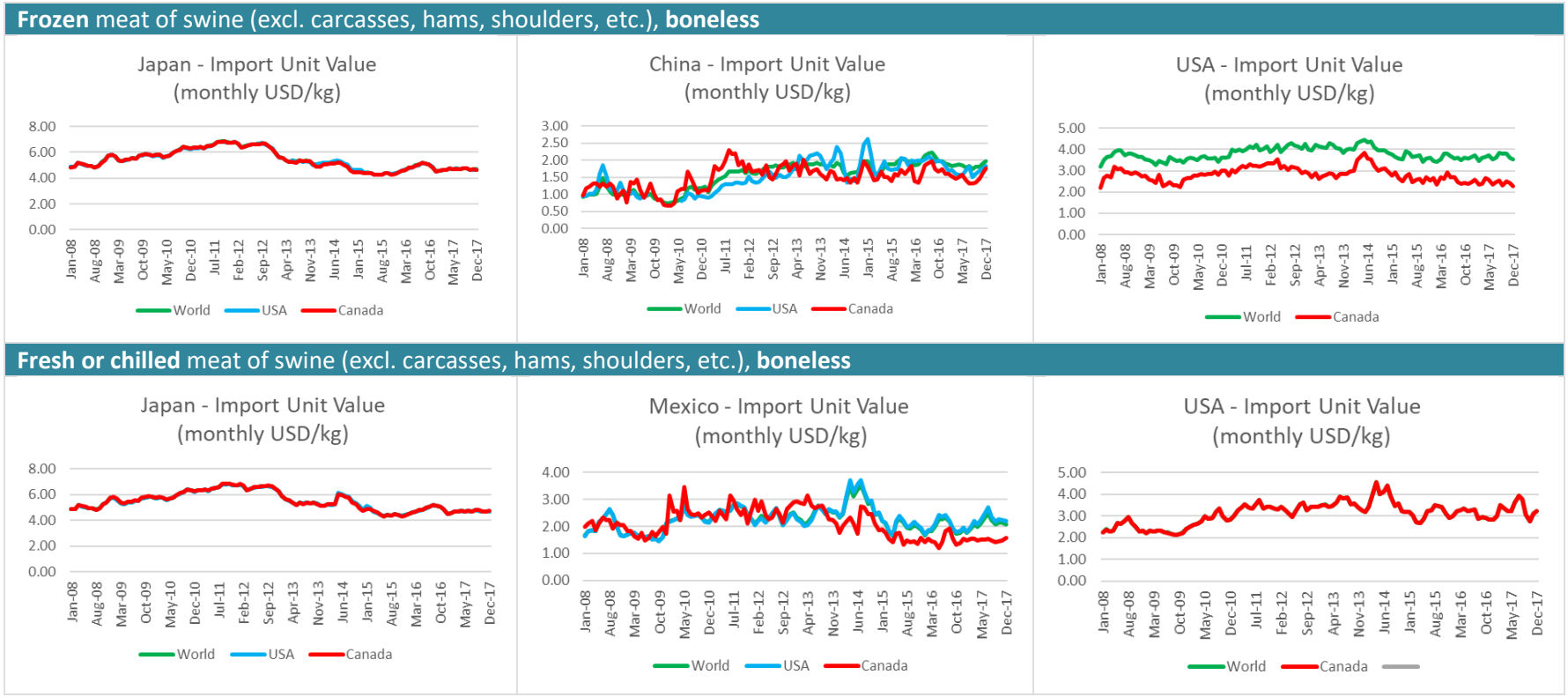
- Import prices are aligned with the Japanese market, with no discernable difference between origins (Canada vs. US). This can be explained by the impact of the gate price system, which regulates tariffs levied on pork products. At this level of aggregation (HS6), the import value tends to converge (price differentiation may occur at a more disaggregated level).
- For "Frozen pork boneless cuts," Canadian exports are cheaper than those from the US on the Chinese market and cheaper than the world average. Similarly, Canadian exports to the US are also well below the world average price for exports to that market, which can be explained by the distance to markets and by the type of cuts that are exported (EU exports to US are composed of a larger proportion of loins).
- For "Fresh pork boneless cuts," it appears that Canadian exports to Mexico are also below the value of imports from the US and below the world average value.

"Frozen pork **bone-in** cuts (HS 020329)" and "Fresh pork bone-in cuts (HS 020319)" represent 18% of total Canadian pork meat exports. The average import price analysis (Figure 2.2) shows that for the latter products, there is no noticeable difference between origins on the main markets.

Information at the HS six-digit level does not bring valuable information for import price comparison. Prices will depend on the specific cuts that are traded, and price can vary widely from a cut to another. Interviews with buyers and statistical data gathered from the export countries' statistical bodies have brought much more valuable information, which is presented in the following sections for Japan, China, Mexico and the US.

[1] Trade Map is a database portal of the International Trade Centre set up by the UN and WTO to provide trade-related data and analyses.

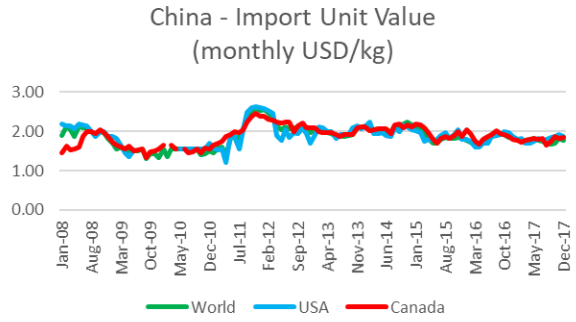
Figure 2.1
Comparison of import prices for pork products by origin (Canada, USA, World) on selected destination markets



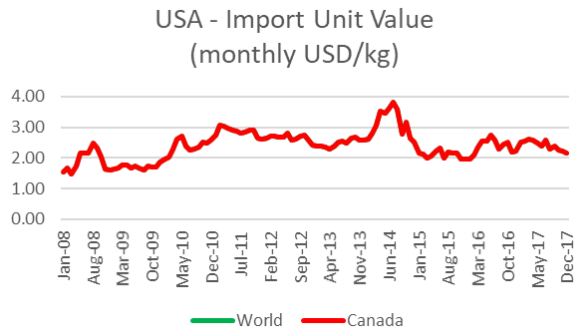
Source: Groupe AGÉCO based on Trade Map data. HS 020329 and HS 020319.

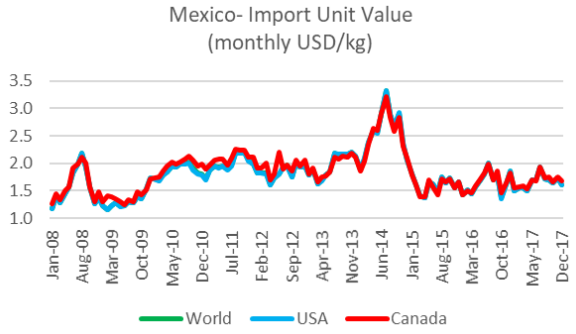
Figure 2.2
Comparison of import prices for pork products by origin (Canada, USA, World) on selected destination markets

Frozen hams, shoulders and cuts thereof of swine, with **bone in**



Fresh or chilled hams, shoulders and cuts thereof of swine, with **bone in**





Source: Groupe AGÉCO based on Trade Map data. HS 020322 and HS 020312.

2.1 JAPAN

- *Pork Imports by Product:* *Chilled products take a larger share of the import market; positive for US & CA.*

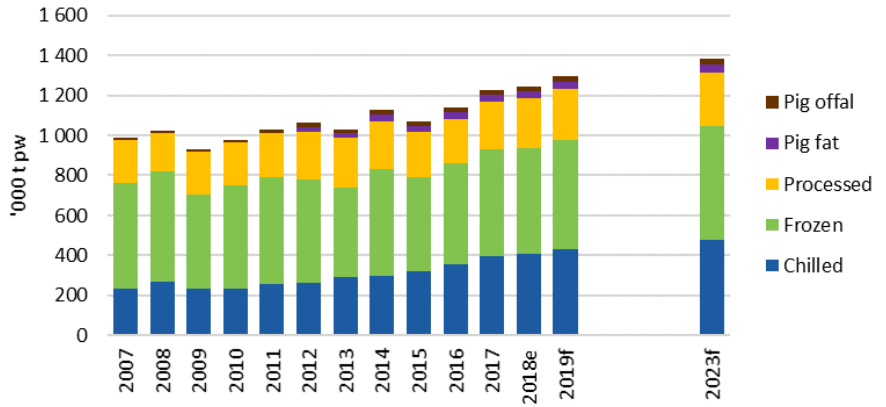
Pork imports are controlled by the gate price and safeguard system.

- Due to the gate price protection, prices for imported chilled pork are close to prices for imported frozen pork.
  - However, containers of imported chilled pork have a different mix of cuts, making chilled the better option for exporters, as they can ship lower-value cuts but hold the price high with the "chilled" value retention.
- The gate price system forces importers to bring in mixed containers of frozen pork cuts of higher quality than is needed for processing; **this makes frozen imports less competitive than chilled imports on the local market.**
- In 2018, fresh pork accounted for 34% of total import volumes (product weight), frozen pork for 43%, processed pork for 20% and offal for 3%.
  - **The share of fresh pork has been rising to the detriment of frozen pork**. Imported chilled pork competes with domestic chilled pork in the retail and foodservice markets. The slight growth of its share is expected to continue.
  - Chilled pork is well suited to the minimum gate price system, but it is not feasible from the EU. **The US and Canada are well positioned here.**
- Both domestic production and chilled imports are destined for table meat (HoReCa sector), which is a more stable and regular market than frozen pork.
  - Frozen pork is mostly used by the processing sector, and demand fluctuates with the price.

Drivers for change:

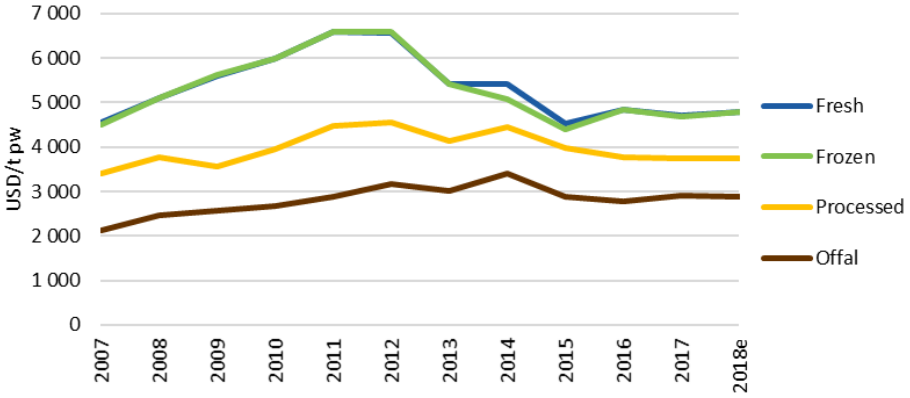
- In 2019, pork imports are expected to continue to increase, pulled by the increasing demand for food service and ready-to-eat food.
- While competition for chilled pork will stem from EU frozen pork growth in the market, major Japanese processors, NH Foods, Itoham Yonekyu Holdings, Prima Meat Packers and Starzen all import large volumes of North American chilled pork.
  - Pork imports are expected to continue growing, partly facilitated by the implementation of the CPTPP and the EU-Japan EPA.
- Although Japanese consumers tend to prefer domestic pork, they are increasingly shifting to imported pork due to higher prices and a fall in the supply of domestic pork.

Pork Import Volume by Product (2007–2023f)



Source: Gira based on Trade Map

Average Pork Import Prices by Product (2007–2018e)



Source: Gira based on Trademap

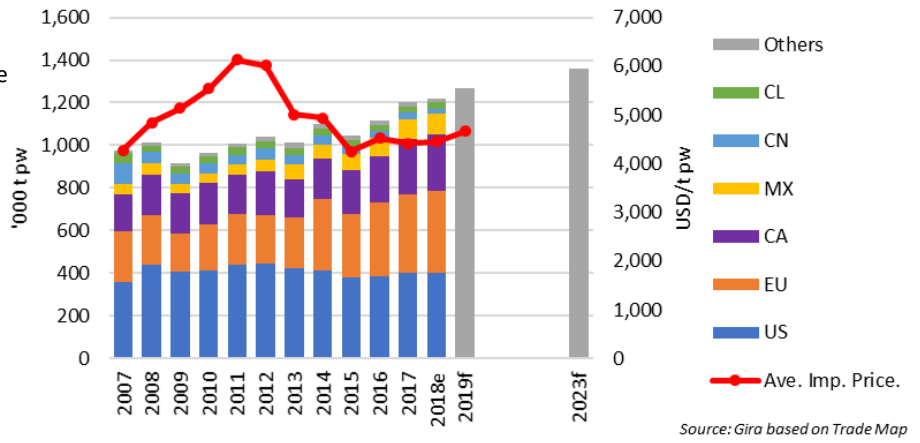
Fresh and frozen pork imports enter at very similar prices. **This is because Japanese pork importers set the CIF price equal to the gate price by combining expensive and cheap pork cuts to minimize its tariff burden.**

***Pork Imports by Origin**: CA is No. 3 in the market; well positioned to grow, particularly in the fresh products sector*

The US, EU and Canada are the main suppliers (combined share of ~86% in 2018).

- The US and Canada focus on chilled pork exports to Japan, while the EU is expanding frozen pork exports to Japan. The US dominates the processed pork exports to Japan.
- Until recently, the US had a more dominant market share in pork imports. However, it has gradually lost shares to the EU. Canada has also been gaining market share against the US in recent years thanks to its expanding chilled pork export share.
  - **US and Canadian chilled cuts became the preferred choice for Japan's retail chains and some specialty foodservice companies.**
  - EU suppliers are too far away to supply chilled products by sea, and air freight rates make it uncompetitive with US and Canadian imports.
  - EU frozen exports have, however, increased following the Russian embargo, in particular with Spain's growing volumes to the market since 2013.
  - Spain is a customer-oriented supplier with a variety of cuts and is quick to adapt to Japanese customer specifications.
  - Mexico has started to increase frozen exports to Japan, while chilled exports remain limited.
- From Jan. 2018–Oct. 2018, chilled pork imports increased by 3% YoY. It was driven by the increase in Canadian supply (+8%), while US supply stagnated (-0.3%).
  - **Pigs from Western Canada are raised on wheat/barley-based diets like their Japanese counterparts, and the meat tastes and looks like Japanese pork**.
  - Pigs from Eastern Canada are fed a corn-based diet, which is more similar to the prevailing US diet.
  - **Canadian farmers are also breeding pigs whose meat suits Japanese tastes.**
  - Although the wholesale price of Canadian pork is a little bit higher than that of US pork, it can be offset by its higher meat yield.
  - Canada Pork has launched the **Verified Canadian Pork™** brand in Japan.

Pork Import Volume by Origin (2007–2023f)



Source: Gira based on Trade Map

Tariff reduction brought on by FTAs

- In coming years, US exporters will be in a disadvantaged position compared to its main competitors on the Japanese market due to the implementation of the CPTPP and the EU-Japan FTA. Its market share could be weakened, unless a bilateral FTA between the US and Japan can be rapidly concluded.
  - The duty applied to low-value cuts is going to be reduced from JPY 482/kg to JPY 50/kg ten years after implementation of the FTA.
  - The 4.3% duty for high-value pork cuts is going to be reduced to zero over 10 years.
  - For processed pork products subject to the gate price system, all tariffs will be reduced to zero over 11 years.
  - For processed pork products not subject to the gate price system (including canned ham, sausages, ground seasoned pork), tariffs will gradually be reduced to zero over 6 years.
  - The FTAs will include annual safeguards instead of quarterly safeguards for pork imports during implementation.
- **The CPTPP will further favour Canada for chilled pork; the EU-Japan FTA will favour the EU for frozen & processed pork.** Mexico and Chile will also gain from the CPTPP.
- As a result of these agreements, US producers will face a distinct price disadvantage for their exports to Japan compared to their major competitors.

Pork Import Prices by Origin: *Gate price hides details in average; specific products from CA at a premium to the US*

Japanese pork import prices are regulated by the gate price (JPY 524/kg or USD 4.70/kg at present), a minimum import price per shipment. This helps set domestic wholesale prices, and the two prices are thus very close.

- **That also explains the stability of import prices, as shippers mix loads** to reach the gate price, allowing them to supply both lower cost products and a selection of high-cost cuts to achieve the most competitive product mix.

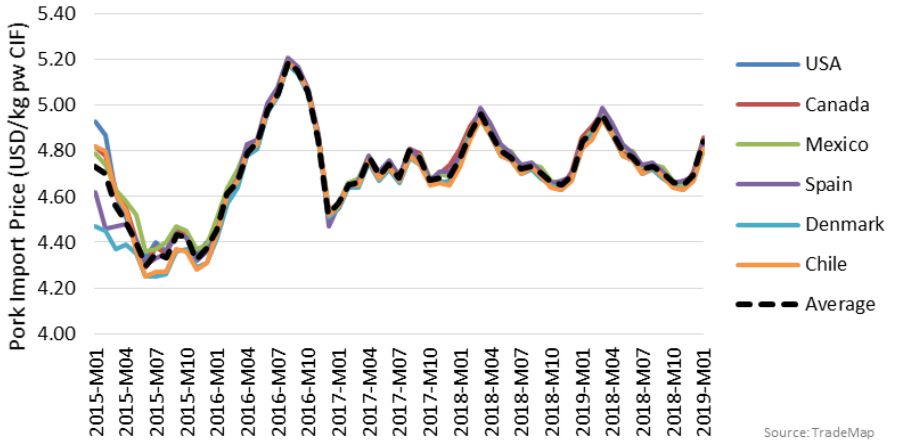
As a result of this gate price, **there is very little deviation in the average pork import prices between the different origins**, particularly since mid-2015.

- Movements in the average import price are partly explained by variations in the exchange rate between the USD and JPY.
- As a result, analysis of individual cut prices by origin is required to understand the relative positioning of different pork origins in the market.

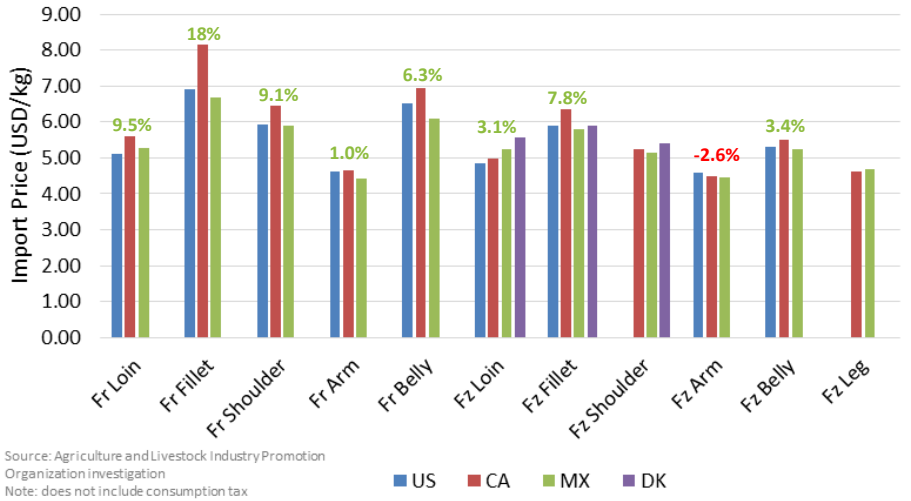
The bottom graph depicts the import prices of key fresh and frozen pork products.

- For fresh products, the main supply channels are Canada and the US, and **Canadian products are entering the Japanese market at a premium to the US.**
  - This premium ranges from 1%–18% but is highest for fresh pork fillets.
  - Excluding fresh arm cuts, the premium over fresh US products is notable.
  - Frozen products also command a premium, arm cuts—a minor product—being the only product at which the Canadian price is lower.
- **This would suggest that importers are willing to pay a premium for comparable Canadian products over those of US origin**. (see below).
- Canadian imports also trade at a premium to all imports originating in Mexico, with the only exceptions being frozen loin and legs.
  - The premiums over Mexican products are mostly higher than those over US products.
- Danish frozen loins and shoulders do, however, trade at a premium to Canadian products, although Canadian frozen fillets enter at an 8% premium to Danish products.
  - However, the frozen channel is of limited importance to Canadian exporters, reducing the relevance of such a comparison.

Monthly Pork (0203) Import Price (M1) by Origin (2015–2019)



Pork Import Prices by Product, Avg. Apr. 18–Mar. 19 & CA Premium over US



Fresh products tend to trade at a premium to frozen products; this premium is larger for products of Canadian origin (compared to those of US origin). This price premium ranges from 4%–28% for CA products, with most at >10%.

Relative Value of Different Suppliers: *Canadian products well-perceived; specific farming and feeding programs are key aspects.*

How are the different origin of products perceived in the market?

- Imports are fundamental to the Japanese market, in particular the catering industry. “Domestic meat products are more for the retail sector and specific restaurants, but in the catering industry, we cannot live without imported products.”
  - **Many operators in Japan mentioned an increasing desire to use imported products**, as these “can be positioned well for a reasonable price compared to their domestic peers.” The quality guarantee of imported products is gaining traction and is backed by an increasing marketing.
- There are preconceptions regarding the quality image of the key supplying markets; these preconceptions impact purchasing decisions. However, subtleties are taken into consideration, as it “does not always depend on the country but on the specific producer and its meat quality”; within countries, some suppliers have established reputations.
- **Canadian products are becoming increasingly well-received in the Japanese market** and are developing a high quality reputation.
  - “They are working on the brand image by introducing specific farming and feeding programs.” **The hybrid species raised in Canada and the herb-mixed feeding program are adding significant value and helping to differentiate Canadian supply in the market.**
- In the US, the ability to ship in bulk was often cited as an advantage, but the **“availability of quality products changes over the years,” which lowers the quality image of US suppliers.**
  - “Good availability in large amounts, and so far as we have production control over the producers; they can be good sources.” The assurance of good quality and traceability was also cited as an advantage of US supply, although this comment was targeted at specific exporters with strict quality assurance guidelines.
- “Chile is gaining a good image as a producer country thanks to its thorough traceability system and disease-free farming environment,” while both Mexico and Chile are “improving their quality and cost performance.”
- Throughout the interviews, **products of Canadian origin were usually noted as being of higher quality than those of other origins**, with occasional exceptions with regard to EU origins. Canadian products generally seemed to surpass those of US origin from a quality standpoint.

What are the key factors determining quality perception?

- Traceability within the supply chain, quality of both the animal rearing system and meat, and food safety were cited by almost all interviewees as key factors influencing the quality perception of imported meat. “Meat quality is of course the highest priority, as is food safety, but for the rest, it has much to do with reliable relations with the suppliers.”
  - “Meat quality and stable supply (farm management must be key). Also, the perceived values, such as the producer’s marketed image and landscape and feeding programs, are the key promotion factors.”
  - “Integrated and quality-assured production from breeding, farming, feed and processing” will certainly help to differentiate and improve the perceived quality of a supplier.
- “Species and farming/feeding practices that are familiar to Japanese consumers are better valued.” This is a factor that is certainly going to be beneficial to Canadian exporters that are supplying products to Japan; **the “herb-fed hybrid species from Canada is perceived as a solid origin alternative to Japanese pork.**” These herb-fed hogs receive an herb additive in the latest stage of finishing to give flavour to the meat.
  - **The higher prices paid for many of the Canadian products, particularly over US origin, is perhaps testament to this.**
- These criteria have not changed significantly over the last few years; it is imported products that are increasingly meeting the desired criteria.
- The nature of the relationship between the supplier and customer “is of great importance, but tight delivery and timely payment are equally important.” A good relationship, among other factors, is built “on a clear and reliable agreement and contract.” However, while the relationship is important, the quality of the products is the primary concern.

One of the main preferences for Japanese importers is **trustworthy and stable suppliers; farming practices and production controls (certificates), in addition to the feeding programs**. These preferences position Canadian exporters favourably, particularly over US counterparts.

- Although a number of exporters in the US have a very strong reputation, overall at a country level, **the interviews conducted would suggest that the Canadian image surpasses that of the US exporters, with the nature of the farming system being the key driver.**

2.2 CHINA

***Pork Imports by Product**: Frozen & offal imports dominate; ASF driven surge expected for several years*

Direct to China via the grey channel

- About 85%–90% of Hong Kong's international pork imports are re-exported to the Mainland (imports from CN, fresh imports + other high-value products stay in HK).

Fresh and frozen meat imports are still high but have fallen.

- 2017 and 2018 have been disappointments for exporters following 2016's massive volumes, but they are still at high historic levels. This was the case in 2018, even with an oversupplied domestic market and low prices.
  - A 2019 **import surge is forecast in reaction to the domestic supply lost in the ASF crisis.**

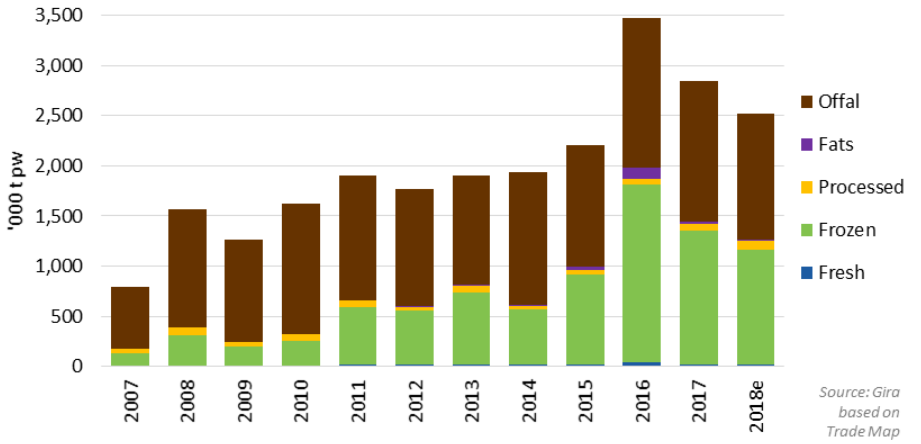
Large frozen bone-in cuts (carcasses, half-carcasses, shoulders and hams) made up about 24% of meat imports in 2018.

- Other bone-in cuts and boneless cuts made up about 38% each.
- Fresh cuts remain a small percentage of imports—less than 2% in 2017—but that is likely to rise as the middle class grows and the cold chain improves.
  - An interesting niche has developed in **supplying e-commerce with imported fresh pork cuts**.
- Processed product imports plunged from more than 30,000 tonnes p.a. before 2013 to around 3,000 tonnes in 2016. China used technical non-tariff requirements to attack US exports, some of which went into the grey channel.
  - There is also the possibility that **meat has been reclassified** to another HS code category in order to **take advantage of reduced tariffs.**
  - There has been a small but significant increase in Western-style hams, such as Parma and Serrano, imported from France, Italy and Spain.
- Offal imports are not expected to rise as much as meat due to the ASF crisis.
- In the long run, however, **China's overall imports will fall** as the industry continues to modernize and consumption growth slows, although the current ASF crisis is slowing down that process.

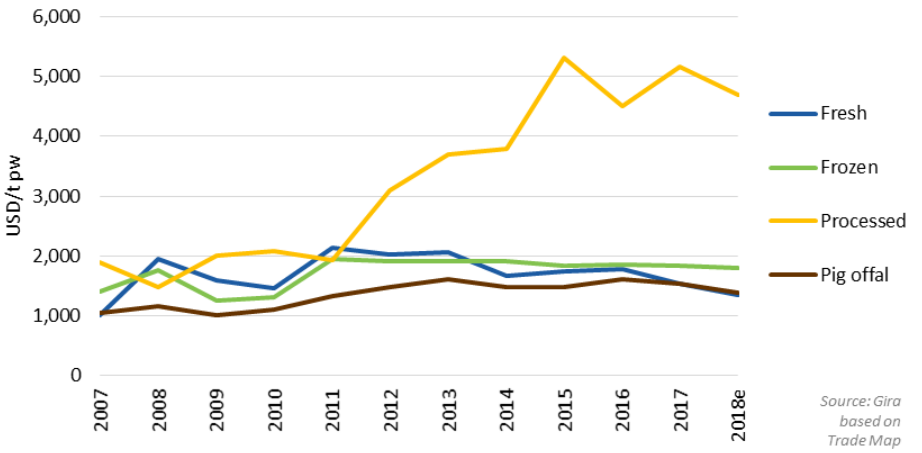
Frozen import prices have remained **surprisingly stable in US dollars terms** over the last seven years, declining slightly on average over that period.

- This may be evidence of a relationship between the pork price and the way the PBOC manages the USD-RMB exchange rate.
- The government keeps a close eye on the retail pork price as it makes economic decisions because it is the dominant protein for most Chinese and because it accounts for ~3% of the CPI basket. It's price is therefore very sensitive!

"Direct" CN Pork Import Volume by Product (2007–2018e)



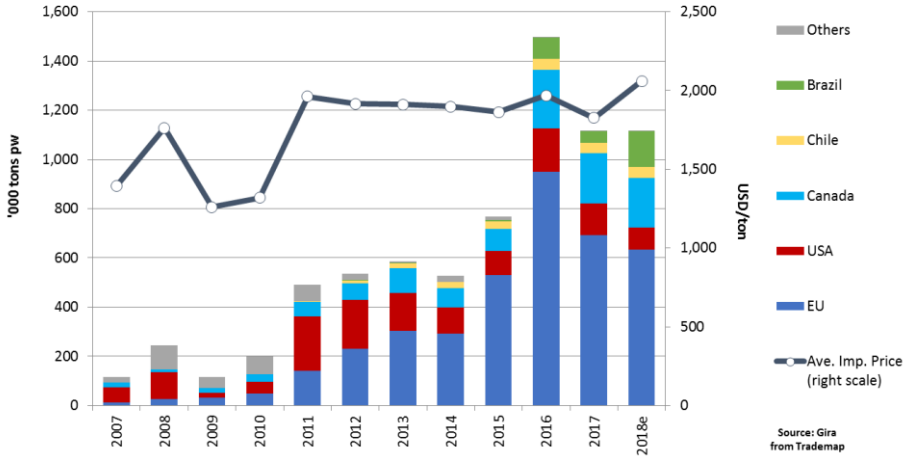
Average "Direct" CN Pork Import Prices by Product (2007–2018e)



Pork Imports by Origin*: EU is the major supplier, although Canadian supply is expanding quickly.*

- While Chinese imports are vast, **they still represent a relatively small share of the overall Chinese pork market at <5%**. This number is rising as the ASF crisis worsens.
- However, these imports are important in balancing supply and demand and are systematically used to control Chinese pork prices.

Direct CN Pork Import Volume by Origin (2007–2018e)



The EU is China's key pork supplier.

- EU nations shipped around 475,000 tonnes of frozen pork to China through Q3 2018, down about 5% from the same period in 2017. Spain continued to lead the pack, with Germany as runner-up, while other top rankings showed little change.
- However, EU pork shipments to Hong Kong through Q3 totalled only 59,000 tonnes, down more than 40% from 2017. A reduction in German supply was the biggest factor.
- The US was an important supplier to the Chinese market, although the imposition of significant punitive trade war tariffs **that lifted the tariff + VAT load on US pork to 78%** has limited the volume of US pork exported directly to China.
  - As a result, imports through the grey channel are expected to increase.
  - These tariffs could, however, be lifted or circumvented if ASF-induced import demand surges.
- **Canadian direct exports to China have increased**, peaking in 2015 and remaining at a relatively high level.
  - Meat exports to China have recently fallen due to more attractive prices in Mexico, drawing away many of the muscle cuts, particularly hams and picnics.
  - Offal imports from Canada have increased.

The market chaos that followed the beginning of the ASF epidemic had a mixed impact on imports. **Volumes are expected to lift sharply through Q3 2019.**

- The US is likely to benefit, and EU suppliers will divert supply away from other markets, including their domestic markets. Unlike in 2016, stocks in the EU are lower, so the ability to lift volumes will be more strained. Brazilian shipments have almost tripled, and Brazil will look to further expand volumes.
- Canada, Brazil and the EU should supply the lion's share of the anticipated growth in Chinese import volumes, although not enough to offset the Chinese production fall.
- In the long run, however, **China's total PK Imports will fall** as the industry continues to modernize and consumption growth slows.

The EU also provides the lion's share of China's pig offal imports. With US products hampered by the US-China trade war, the EU's position will improve.

- The US is also limited due to the use of ractopamine in pork production, limiting the supply of approved offal available for direct export to China. More US pig offal will move into the grey channel, where it already has a substantial presence. Brazil is expected to boost its offal exports, following in the footsteps of its rapidly rising share in the pigmeat market.
- China's taste for offal remains a boon to abattoirs worldwide trying to valorize the fifth quarter. Trotters, kidneys and liver remain consumers' favourite cuts; pigs head, cheeks, stomach are also consumed. Some parts are thought to have medicinal value.
- Most offal is now directly exported to China, but export prices via Hong Kong are higher because they include premium products that stay in Hong Kong. With the ASF crisis blocking major exporters in Europe and with US products hampered by the US-China trade war + racto, the future looks bright for the grey channel and for the shippers and agents who operate it.
  - **Canada is, however, making progress in expanding volumes through the direct channel, and this is expected to continue.**

Pork Import Prices by Origin: *Product mix driven by origin differences; price variance by plant rather than origin*

Average import prices between origins show significant variance.

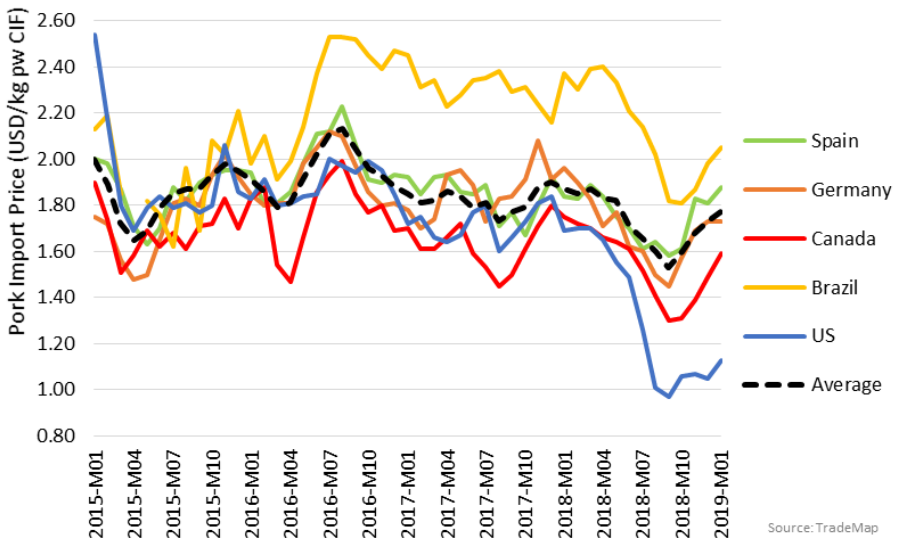
- This is, however, driven in large part by differences in the product mix between the different origins.
- US exports to the market have generally been at the lower end of the price range. Export prices fell sharply through 2018, mainly due to a transition to lower-value products; this was necessitated by the high tariffs in effect since mid-2018 (as the trade dispute worsened), which fundamentally priced US exporters out of muscle cuts.
- **Canadian prices have been the lowest on average between the major suppliers across the product ranges supplied**.
  - The drop in Canadian prices through 2H18 has resulted in part from the falling percentage of muscle cuts in the product mix.
- EU products have generally entered the market at prices above North American suppliers.
- These price relativities have not changed much over time. This reflects the different products that each of these markets specialize in for export to China, with limited variance.
- A significant price increase has taken place recently; this will continue through 2019.

Import prices by product show minor differences between countries.

- However, across all interviews conducted, the major feedback was that no real price premium can be attached in an amalgamate manner to an individual origin.
  - With regard to Canadian vs. US origin products, when viewed at an aggregate level, the price list often cites a joint US/Canadian price, with no tangible difference between the prices from the two origins.
- Price premiums or deductions do, however, exist. "Comparing the prices between the two countries is too general. The difference lies in the plants."
  - The relationship with the plant, in addition to a range of other factors, can cause deviations in the prices.
  - For example, the spot price of Canadian pig heads would be cited by most importers as being CNY 12,500 per tonne. However, after inquiring further, a few importers would mention that heads from several small and less qualified plants in Canada can be cheaper (at CNY 11,000 per tonne). In addition, in a bullish market, such a price difference between plants can be narrowed fast, especially for spot products.

As a result, the Chinese import price variance—or lack of—between US and Canadian products does not show a premium or discount for either supplier. While specific plants may have different prices, this argument alone cannot be used to suggest that a premium label can be attached to Canadian origin products over the US.

Monthly Pork (0203) Import Price by Origin, 2015-19 M1



US/CA Spot Prices of Imported Pork Products (Apr. 2019 vs. Aug. 2018)

	Spot Price in April 2018 (CNY/ TON)	Spot Price in April 2019 (CNY/ TON)	% Change
Front feet/ trotter	24,000	28,000	17%
Heads	8,000	12,500	56%
Masks	12,000	17,000	42%
Picnic / shoulder boneless	18,000	25,000	39%
Picnic / shoulder bone-in	12,500	16,000	28%

Source: Gira interviews

Relative Value of Different Suppliers*: Price remains fundamental, while meeting importers' quality perceptions*

How are the different origin of products perceived in the market?

For China, price and quality are the two key drivers for imports, **although price is the overriding factor**. Interviewees noted differences in quality between origins, although these were rarely nation-wide perceptions; **these rather related to individual products from specific countries and were sometimes different among processors within the different origin markets;** other times they were specific to individual factories owned by some multi-site operators (such as Vion).

- For example, one large importer noted "heads from France are mostly popular because there are tongues in the heads, which means extra value for the importer and its domestic clients. Heads from Canada are also popular, especially those from Plant Xx and Plant Xx. The advantages of heads from the above countries are that they are generally whiter (not red/bloody), and such good appearance is beneficial for retail."
  - "**The pork products from France are generally better than other countries. Pork products from some big Canadian plants are also popular.**" – scale is very important.
  - Canadian exporters' lack of scale, which limits penetration in the market, was cited by two interviewees. "**Canadian pork quality is good, but their supply is not large due to low production capacity.**"
- One large importer did note several differences between key supply origins. The interviewee prefers the following countries: a) Canada: the price is higher due to its relatively smaller pork export volume. b) US: a large volume and stable supply. c) Germany & Netherlands: large volume.
- Interestingly, while a number of countries were often listed, **France, Germany and Canada regularly appeared in the top list; the US was only mentioned as a favourable supplier on a few occasions**. The exception was with companies that required significant scale that could be provided by some US suppliers.
- Imported products are viewed in a very different light to domestic pork. "The import market is completely different from the local market in terms of customer groups and sales channels." The spread of the ASF and the development of consumer concern for local pork products could change this balance.
- **While clear differences were noted, price is the dominant buying criteria cited by all interviewees, often above all other characteristics of the trade, including product origin.**
  - "No. As long as the price is suitable, the company has no preference for certain products from specific countries." Price and the ability to maximize profits from imported products was also a key concern; The interviewee prefers pork products that can bring added value for them. Price is the key determining factor.

What are the key factors determining quality perception?

- “**Meat quality and price are the key factors that contribute to determining the relative value**”; meat quality can most aptly be defined as the **imported products meeting the preconceived expectations of the buyer**. While price is key, meat quality is becoming of increasing importance to importers.
  - “Nowadays, due to the increased labour cost in China, domestic customers and food-processing plants have higher requirements on meat quality than before.”
- The perception of quality among Chinese importers varies based on **specific conditions or factors noted by the interviewees**.
  - P**roduct appearance was a key focus** and regularly cited: “the product appearance (e.g., clean and less bloody) is also one major aspect.”
  - More specific points were given: “The major reason is that the Chinese market prefers meatier riblets, and French exporters have improved their products to meet this demand over the past few years.” Others noted: “the lean meat percentage must be qualified. The cutting method, boxing and packing are also important.”
  - “Ways of cutting the meat, product consistency, stable supply and boxing & packaging are important. Standardizing is key.”
  - “The interviewee’s company pays much attention to the stability and scale of supply by overseas exporters or traders.”
- There appeared to be less emphasis placed on the relationships with suppliers than in other markets. “No. Relationship is not key. Profits are always the most important thing.” “The political relations between China and countries overseas” will have an impact on supply.
  - However, ensuring that they have stable supply and limited disruptions was noted as an important factor; disruptions in supply are not acceptable!

While Canadian suppliers were often cited as being good suppliers for specific products, price remains the major driver, and scale is a key attribute driving the attractiveness of suppliers. This preference therefore makes it difficult to determine whether Canadian exporters are viewed favourably over US suppliers from a quality standpoint.

2.3 MEXICO

***Pork Imports by Origin**: MX strongly relies on imports from the US.*

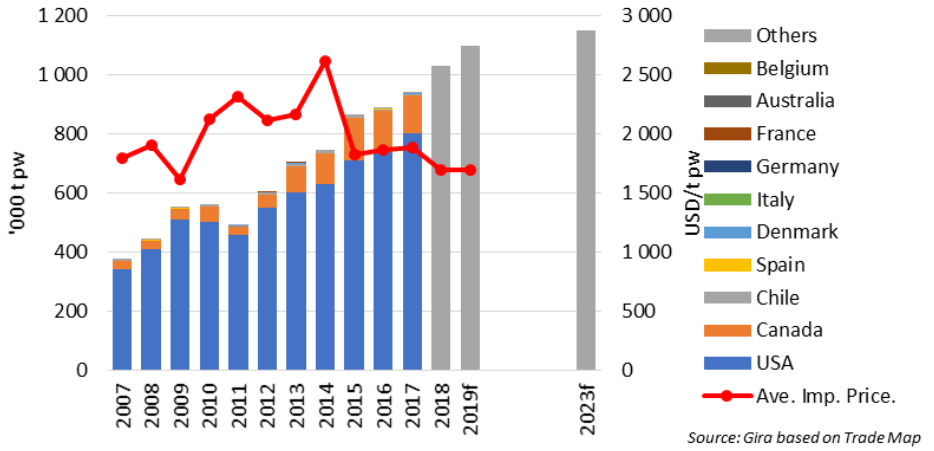
Mexican pork imports registered a 9.4% CAGR from 2007 to 2017, and 2018 saw an additional 10% increase.

- Indeed, trade patterns continued uninterrupted in 2018. The year was most notable for the conclusion of a number of trade negotiations involving Mexico, namely:
  - USMCA (renegotiated NAFTA)—little material changed for Mexico
  - CPTPP – will expand potential access in Asia
  - EU-Mexico FTA modernization; partial meat trade liberalisation with TRQs.
- The trading environment in 2019 is expected to remain unchanged, but the political situation with regard to the US remains uncertain.
- Between 2019 and 2023, Mexico is likely to diversify its export destinations—and maybe its import suppliers—to take advantage of new opportunities.

The US remains by far the major supplier, although its market share did decline.

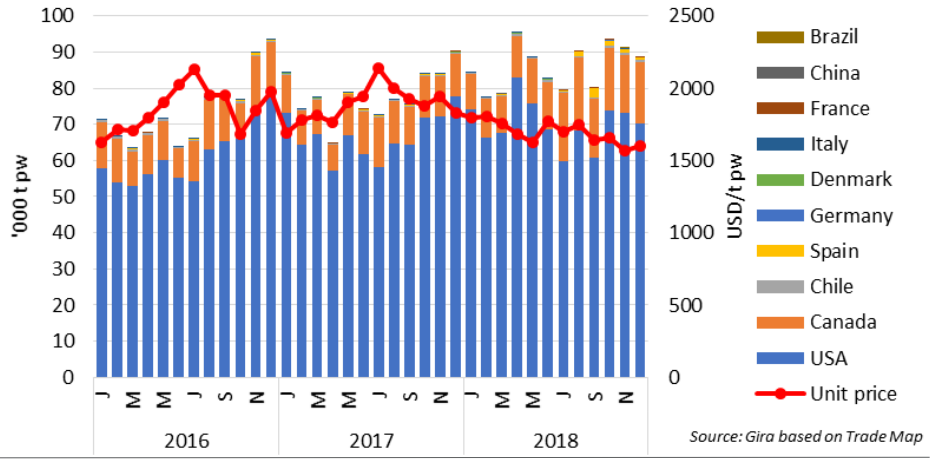
- US accounted for >90% of imports in the late 2000s, but only ~82%–85% nowadays.
  - Simultaneously, Canada's share increased up to 17% in 2018.
  - Others suppliers have market shares below 1%.
- Following the US decision to impose tariffs on steel and aluminium, Mexico responded with a tariff on a number of US products, including pork.
  - To limit a possible market impact, Mexico opened a 350 kt duty-free TRQ up to Dec. 31, 2018, for countries without FTAs with MX, so mostly opened to EU suppliers. Impacts:
  - MX 2018 PK wholesale prices rose by an average of 10.5% over 2017 in May–Dec. (+1.2% in Jan.–Apr.).
  - Export prices for hams and shoulders from the US to MX decreased as of July 2018 to offset the impact of the new tariffs.
  - CA is the only country competing with the US on the ham and shoulders market, and volumes to MX increased as of June 2018 (+27% in June–Sept. 2018 vs. 2017), taking advantage of tariffs on the US to sell at higher prices.
  - Imports from the EU rose sharply in 2H18, although still marginal (~3.4 kt, mainly frozen cuts, especially bellies to enter in bacon production).
  - However, the implementation of those tariffs had less impact than expected. The US by far remained MX's main supplier: the total import volume did not show a significant decrease, and the EU quota is only slightly being used, as the EU cannot provide hams and shoulders that would replace those from the US.
- The lift of those retaliatory tariffs on US pork will depend on how the US manages the tariffs on steel and aluminium for MX and CA.

Pork Import Volume by Origin (2007–2018e)



Source: Gira based on Trade Map

Monthly Pork Import Volume by Origin (2016–2018)



Source: Gira based on Trade Map

Pork Imports by Product: *Fresh pork dominates trade.*

The main imported products (~75%) are fresh or chilled products.

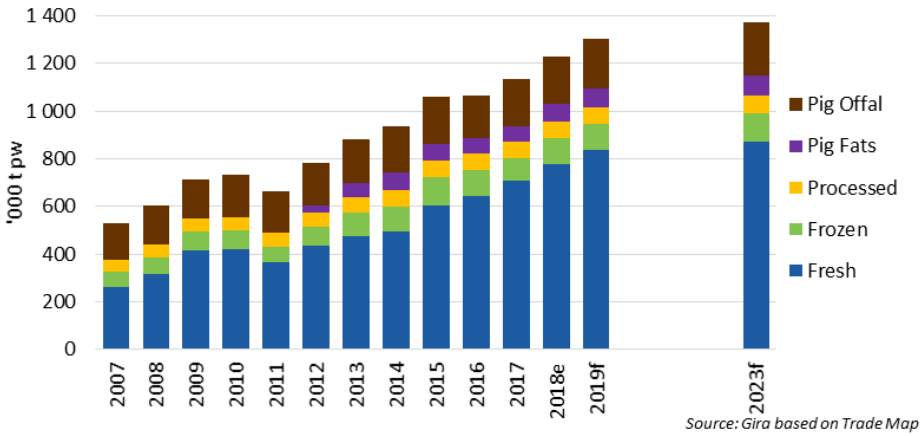
- Fresh or chilled hams, shoulders and cuts of swine with bone in (code 020312) account for the vast majority of these. In 2018, they only came from the US (89%) and Canada (11%).
- Frozen meat now accounts for ~10% of total pork imports; 90% comes from the US, 9% from Canada and then from the EU (mostly Spain) and Chile.
- Pig fat (~7%–8%) comes from Canada (58%), the US (37%) and Chile (5%).
- Processed meat (~6%–7%) comes from the US (92%), Spain (3%), Canada (3%) and then from other European countries (Denmark, Italy, Germany).

In addition to pork, pig offal also amount to large quantities (~200 kt pw) and come from the US (75%), Canada (20%), Chile (4%) and then the EU (Denmark).

The key cuts in Mexico's imports are and will remain hams and shoulders coming mostly from the US at a very low price: less than USD 1500/t in 2018, 1320 in September 2018, while the average producer price in MX is at USD 2200/t in 2018.

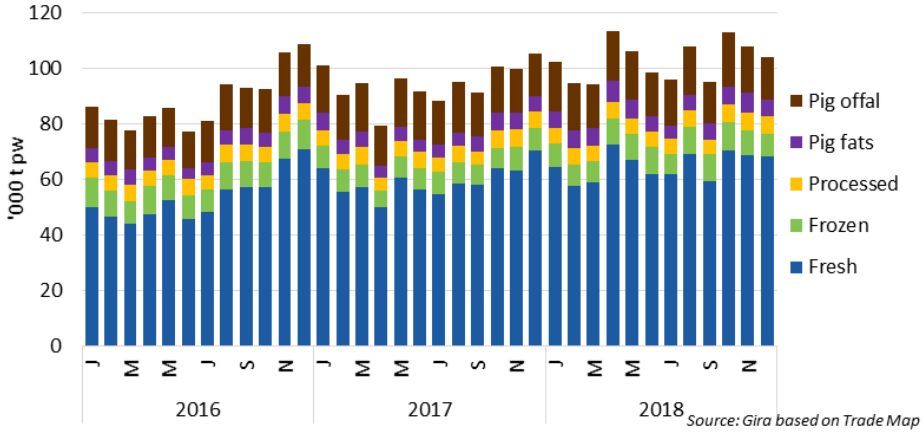
- Those products are intended for the Mexican processing industry. They can be extremely competitive given a lesser demand in the US and limited transport costs due to the geographic proximity.
- Although they more than doubled in 2018, imports from the EU still account for less than 1% of the total volume entering into Mexico (~10 kt in 2018):
  - Of those imports from Europe, more than 85% came from Spain.
  - More than 50% were high-end cuts at an average price of USD 11,500/t, and around 25% were high-end processed products at an average price of USD 7,800/t. The rest were frozen bellies at an average price of USD 3,100/t (the US price was $2,200) and high-end hams with bone in at a price of more than USD 25,000/t.
  - Since tariffs on pork coming from the US were implemented, imports from Spain have increased sharply, especially in the frozen meat category (code 020329, +1,600%).
    - Most of this frozen meat is likely to be frozen belly cuts.
    - Prices are higher than those from the US (USD 2,500/t compared to USD 1,800/t from the US), so this is more a decision to open imports from other destinations than a pure economic decision.

Pork Import Volume by Product (2007–2018e)



Source: Gira based on Trade Map

Monthly Pork Import Volume by Product (2016–18)

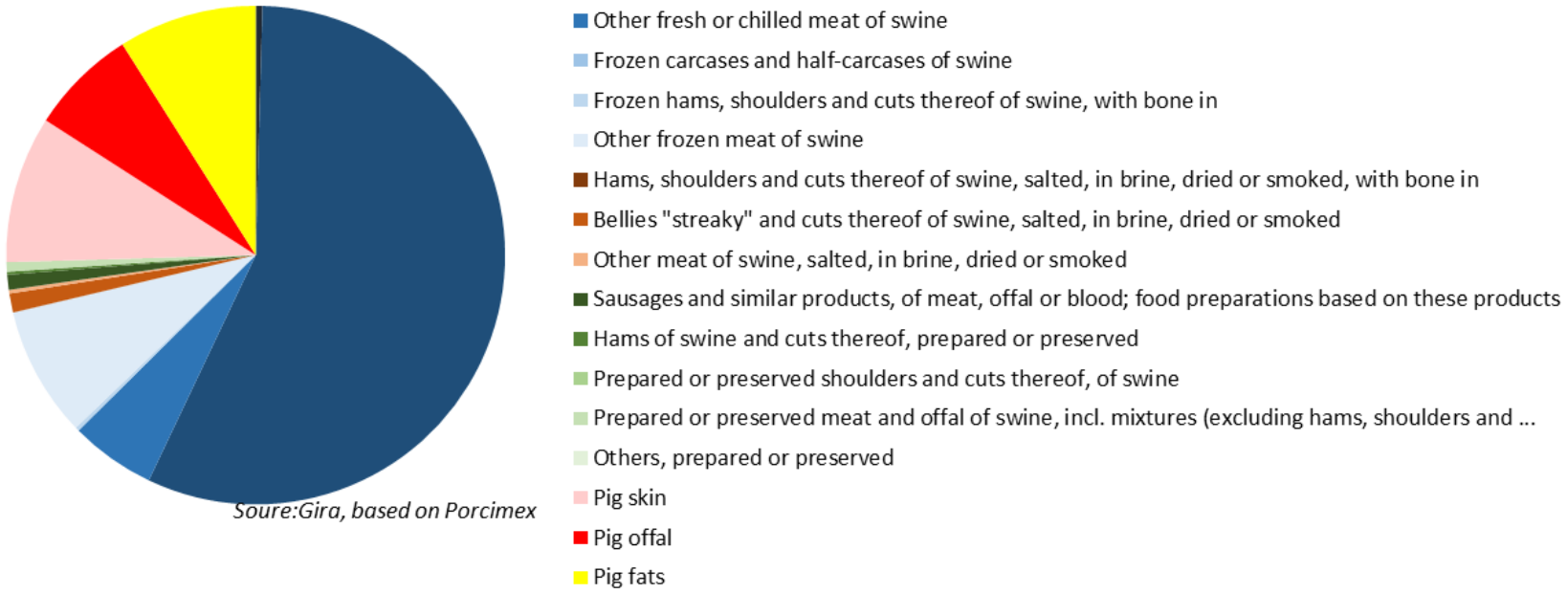


Source: Gira based on Trade Map

- There is no strong seasonality in imports, although there usually is an increase in volumes at the end of the year.

Pork imports by Product: *Fresh pork cuts dominate imports.*

Breakdown of Pig-Based Product Imports By Volume (2018)



Soure:Gira, based on Porcimex

Most (57% in 2018 when including skins, offal and fat in the total; 76% if not) of MX pork imports are fresh or chilled bone-in hams, shoulders and cuts thereof; the other significant category is the "Other frozen swine meat."

- Specifications for these imports are very much standard.
- They usually specify that the meat must come from ~100 kg carcass pigs (excluding meat from sows).

Pork Import Prices by Origin: *The average unit import price is very close to the US price.*

Given the dominance of the US origin in total Mexican imports, it is no surprise that the global average unit price is very close to the US unit price.

- Up to 2011, the average Canadian prices in MX were very close to US prices, after which they suddenly fell significantly below them (by 20%–25%). Since 2013, CA has seen increasing exports of pig fat, thereby changing the average value of the product mix sent to MX.
- The difference was reduced in 2018 as a result of the new tariff on US products.

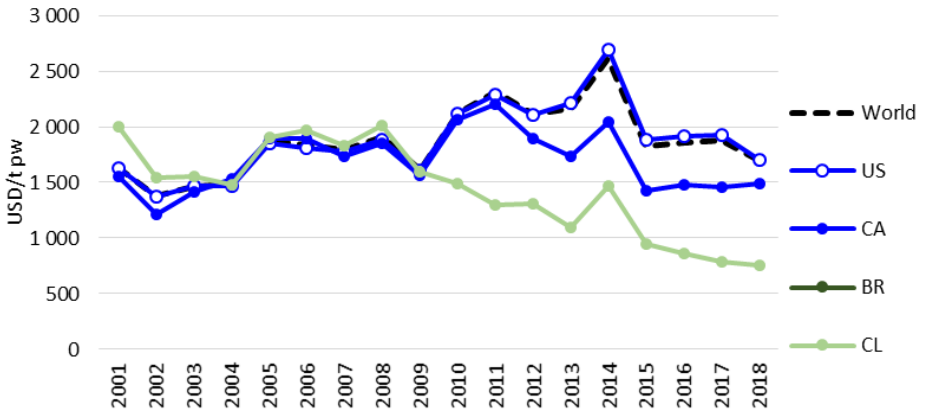
Unit prices from other suppliers are less relevant given the small volumes involved.

- Nevertheless, CL prices are even further below the US prices (by 40%–60% recently).
- EU prices, on the other hand, are much higher, as exporters focus on high-end cuts and further processed products.

MX used to be considered as a "dumping ground" for US products; nevertheless, it seems that importer requirements have increased and that they are ready to pay a premium for better quality (see subsequent pages).

- Average unit prices had increased by nearly 4% p.a. from 2001 to 2014, before falling again in 2015.
- The same is true for offal, some products having evolved from "garbage" to quality products (e.g., stomachs, ears, tails).

Mexican Pork Import Price by Origin — All categories (2001–2018)



Source: Gira based on Trade Map

Pork Import Prices by Origin:

The average unit import price is very close to the US price.

The table on the right shows the prices of the various HS6 categories (ranked by declining volume), ranging in 2018 from USD 1,444/t pw in the large volume, fresh bone-in cut category (and even less than that for pig fat) to close to 28,000/t pw in the bone-in processed ham category.

In the important 020312 fresh bone-in cuts category (see graph), CA and US prices have been moving very close to each other.

- CA unit prices were:
  - 5%–7% above US prices from 2009 to 2012
  - Roughly equivalent to US prices from 2013 to 2017
- But CA prices were 16% higher than those of the US in 2018, following the dip linked to the higher retaliatory tariff on US pork.

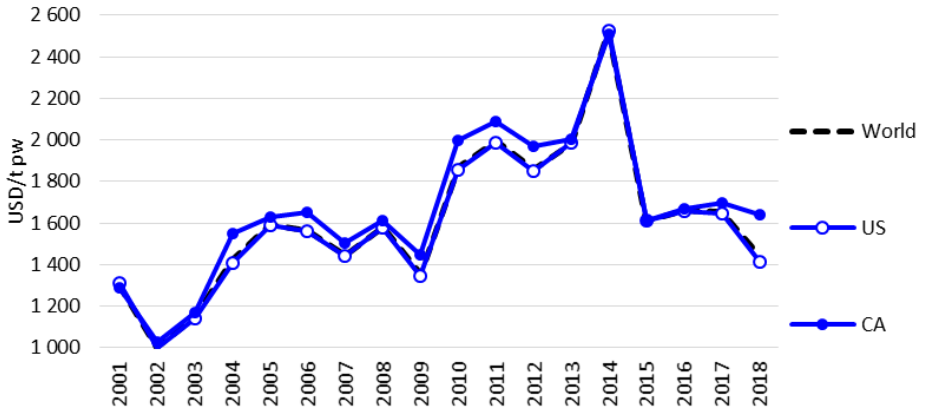
In the 2nd most important category—frozen cuts (020329)—CA unit prices were:

- 14%–18% below US prices from 2010 to 2016
- The difference fell to -7% in 2017 and rose up to +2% in 2018.

In the same category, Spain unit prices were 25% higher than those of the US in 2018.

- But, once again, volumes are minimal, reducing the scope for comparison.

Mexican Pork Import Price by Origin (020312) (2001–2018)



Source: Gira based on Trade Map

Mexican Import Prices of Selected Pork Products — USD/t pw (2009–2018)

Code	Product label	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
'020312	Fresh or chilled hams, shoulders and cuts thereof of swine, with bone in	1351	1870	1992	1859	1986	2521	1611	1659	1653	1444
'020329	Frozen meat of swine (excluding carcases and half-carcases, and hams, shoulders and cuts thereof, ...	1575	2169	2381	2139	2235	2820	1980	2043	2204	2065
'160100	Sausages and similar products, of meat, offal or blood; food preparations based on these products	3298	3251	3348	3456	3492	3678	3691	3786	3971	3954
'020319	Fresh or chilled meat of swine (excluding carcases and half-carcases, and hams, shoulders and ...	1703	2308	2534	2310	2416	2857	2005	1937	2091	1931
'021012	Bellies "streaky" and cuts thereof of swine, salted, in brine, dried or smoked	2871	3371	4000	4010	4465	4405	4109	4231	4798	4276
'020910	Pig fat, free of lean meat, not rendered or otherwise extracted, fresh, chilled, frozen, salted, ...				1039	991	1116	694	747	805	786
'160249	Prepared or preserved meat and offal of swine, incl. mixtures (excluding hams, shoulders and ...	3944	4043	4414	4785	5803	5804	5887	5971	6096	5447
'021019	Meat of swine, salted, in brine, dried or smoked (excluding hams, shoulders and cuts thereof, ...	3919	5533	6624	7116	6059	6437	4382	4103	4624	6956
'160241	Hams of swine and cuts thereof, prepared or preserved	5593	6415	7640	7556	7030	7176	6478	5821	5319	5302
'020311	Fresh or chilled carcases and half-carcases of swine	1444	1853	2080	2005	1976	2422	1676	1559	1555	1583
'020322	Frozen hams, shoulders and cuts thereof of swine, with bone in	1646	1965	1872	2006	2078	2818	1820	1895	2160	1925
'021011	Hams, shoulders and cuts thereof of swine, salted, in brine, dried or smoked, with bone in	17648	30426	19766	15599	11289	14500	13124	20788	21848	27871
'160242	Prepared or preserved shoulders and cuts thereof, of swine		7364	59167	42800	44800	48200	4207	2783	3044	6474
'020321	Frozen carcases and half-carcases of swine	1857	1000	2096				4500	1706		
	Total pork	**1614**	**2127**	**2311**	**2111**	**2168**	**2611**	**1824**	**1861**	**1882**	**1692**

Source: Gira, based on TradeMap

***Route to Market and Contracts**: Differences by product but not so much by supplier*

Route to market

- Some MX companies are directly negotiating with US or CA packers.
  - Sukarne, a large beef processor, does not produce pork and imports for all its needs, amounting to ~100 kt p.a. It is the largest importer … requiring this pork for its processed meat production.
- A number of traders have also traditionally been active on the MX market, serving two types of clients:
  - Processors—who add value to the product (skin, defat, debone, separate the main muscles, possibly further processing)—and then sell to grocery stores, butcher shops and further processors. There is a labour cost advantage of doing these operations in MX vs. in the exporting country. Processors account for ~2/3–3/4 of volumes imported through traders.
  - Distributors, which only resell the product on the market, accounting for ~1/4–1/3 of volumes imported through traders. They play an important role for traders, especially for the lower-priced products, as they bear the payback risk instead of the traders.
- Over the past decade, traders have noticed the following trends on the market:
  - The number of distributors has been growing sharply, and there is strong competition. Some of them are only active when the market is good.
  - Most packers have been, to some extent, short-circuiting traders by directly negotiating with the larger processors (those that are institutional clients)—repeated orders and thus limited non-payment risks.

Most products are usually sold through short- or medium- term contracts, with little difference between origins.

- With monthly contracts, especially for products for which there is a seasonal demand, no party wants to be tied. For example for jowls, belly skins, ham skins, cutting fat, ham fat, etc.
- Quarterly contracts used to be the rule for products likes fat (cutting fat, ham fat, skins, etc.), but there has been a trend toward shorter, monthly contracts.
- Annual contracts; this frequency applies notably to the large volumes of fresh bone-in hams in combos for which demand is constant throughout the year.
- Importers also buy on the spot market (interviewees from a large company mentioned that spot market purchases accounted for an estimated 15%–20% of their needs).
- Some lower-priced products (ham skins, belly skins, jowls, etc.) are also frequently sold through tenders.

In contracts, negotiated prices are variable, the actual price being linked to a formula and a published reference price.

- USDA closing prices the day prior to shipping are considered as a reference price.

Relative Value of Different Suppliers*: A few product differences*

As industrial pork production is quite homogeneous across the world, the market leaves little room for differentiation; but, interviewees did highlight some points:

Geopolitical situation: CA, US and MX form a natural block, with easy merchandise flows facilitated by the NAFTA and—hopefully—the USMCA, its successor.

- It takes maximum 3–4 days to send meat from any location in CA and the US to the MX border. Logistics therefore play in favour of the development of fresh and chilled meat trade in bulk loads (combos), which benefit both the exporter (reduced labour and packaging materials) and the importer (no thawing, possibility to process immediately).
- Trade from more distant origins (EU, BR, CL) generally is in frozen form.
- A classic trailer accommodates 24 combos of fresh pork vs. ~800 boxes of frozen pork.

Intrinsic quality

- It was mentioned that CA genetics are superior to those prevailing in the US, with a lower incidence of PSE meats and eventually a longer shelf life for fresh products.
- CA hams have the reputation of having a better meat yield with less weight loss.
- CA regulations prohibit injecting trimmings, which is considered by MX importers as being a guarantee of quality.
- CA pork fat has more lean meat than that coming from the US, which is appreciated by MX importers given the impact on taste when fried.

CA packers were said to pay more attention to detail, have a more artisanal labour with a better finishing given lesser scale, provide better supervision, etc.

- E.g., belly skins are properly flat packed in CA vs. squared in boxes in the US.
- The result is that a number of MX end-users will be very specific about the origin of their product (i.e. "I like belly skins from X company.").

Product specifications are not that different between US and CA packers. Nevertheless:

- One difference relates to the boneless picnic.
  - The CA product provides a better yield, having a 78%–82% chemical lean content vs. only 70%–72% in the US, as US packers separate the picnic cushion, while CA packers leave it in the picnic.
  - On average, MX importers may prefer the US product as it is cheaper, but quality-wise, the CA product is preferred if its price comes close to the US counterpart (e.g., in periods during which Asian demand is low).
  - Conversely, the picnic cushion is a product appreciated by MX importers, which CA packers do not sell (sold in 30-pound boxes by US packers).
  - But many MX processors will prefer to buy bone-in picnics and debone them themselves.
- Loins as prepared by CA packers may be too long (MX processors smoke them in jars and therefore have to cut the ends).
- MX importers often request that jowls not be slashed during the skinning process (as they may re-export them to JP). Most US packers would not meet this specification.
- In the US, jowls come with the glands, while CA packers take them out.
- Trimmings: CA packers are reputed to offer a wider range of chemical lean content in trimmings than their US counterparts.
  - From 45% to 95% in 5% steps from CA, whereas US packers would only offer 42% and 72%, sometimes 80% or 9%0. MX importers often require 45% to 60%.
- There also are some differences in offal.
  - CA packers sell full heads in Asia, while US packers process them and are able to sell various parts (e.g., snouts).
  - For some offal, interviewees mentioned CA packers do not meet the MX specifications (e.g., frozen pork brains, stomachs).

Obviously, there is also the ractopamine issue for the products intended to be re-exported.

Experience with EU suppliers is too limited to provide general answers.

Relative Value of Different Suppliers*: Ultimately, Mexico essentially remains a price-driven market.*

In terms of packaging, there are few differences between US and CA suppliers.

- Packers in both countries provide the same types of packaging, such as combos, 30 or 60-pound boxes, master boxes, etc.
- However, there may be some small differences:
  - For some cuts, US packers were said to use more Cryovac vacuum packaging, which MX importers prefer, as it allows to store the product for a longer time.
  - CA packers were said to be more consistent in their packaging materials (usually PE bags in cartons).

Similarly, there are no significant differences in payment terms; any difference relates more to the importing client rather than to the supplier.

- Some processors are paid late by their own customers and therefore need to match their own paying terms.

Interviewees did mention some differences between US and CA packers in terms of customer care.

- CA packers do not export at the same scale as their US counterparts.
- US packers are massive sellers and may place customers behind efficiency.
  - E.g., A MX importer was used to and appreciated the way skins were prepared and delivered by a specific Smithfield plant. But following internal reorganization, the possibility to request products from that specific plant disappeared, as the output from all Smithfield plants were pooled together.
- CA packers are much smaller and have the reputation to take better care of their brand and customers.
  - They are said to understand the value of what MX brings to the table and to be more loyal to their customers, supplying MX customers even in periods when they are not the highest paying.

The result is that the MX market is essentially a price market.

- Freight costs only play a minor role in selecting a supplier.
  - According to interviewees, they account for USD ~0.15/kg and vary very little between the different origins.
- Operators from CA and the US try to be competitive, which results in very little difference in production costs.
- The most relevant variable in deciding where to purchase a product is the appreciation by each potential supplier of the supply and demand (domestic and export) evolution for each individual cut.
- A number of US offal are said to be much cheaper than in CA—possibly linked to the scale of the operations—e.g., tongues, uterus.
  - CA packers are said to have more sophisticated and better return markets in Asia for several offal products.

2.4 The US

***Pork Imports by Origin**: Change in suppliers to Europe*

US pork imports declined by 2%–3% in 2018. That compares to a ten year annual increase of about 1%–2%.

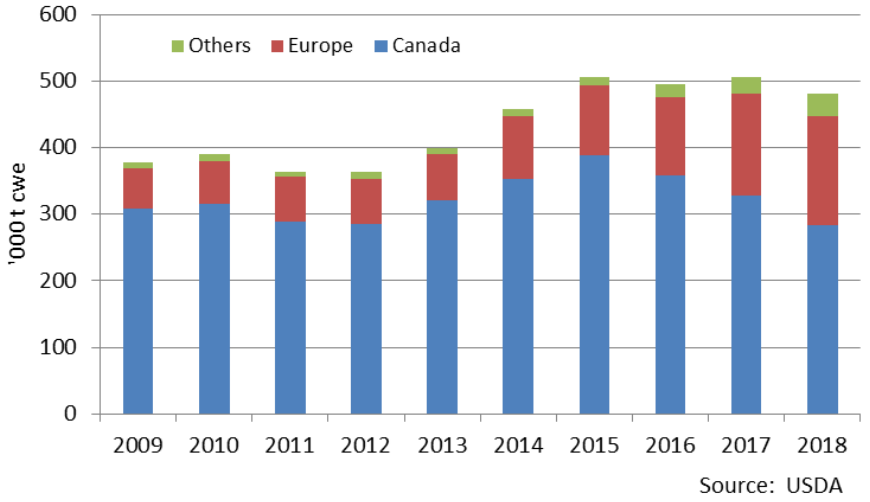
- Imports were lower in 2018 given the large increase in US production.
- Imports comprised 5% of US pork consumption.
- CA comprised 65% of US imports as part of the ongoing North American pork trade. Canadian exports are a mix of fresh, ready-for-retail trade products, such as loins, ribs and butts, and products destined for processing, such as bellies and hams.
  - While the Canadian tonnage dominates, the Canadian share has been declining. In 2013, the Canadian share was 80%.
- **EU countries have been gaining share in the US market**.
  - This gain in share began in earnest in 2014 with the shortages caused by the US PED outbreak.
  - American importers became familiar with EU products and suppliers. There has been a strong flow of bellies in the import mix from the EU.
  - The share of US imports garnered by EU countries stood at 34% in 2018. That compares to 16% in 2009.
- A wide variety of other countries ship a very small, remaining share of imports to the US.
- It is interesting to note that the share of imported products has been changing from overwhelmingly fresh products to more of a balance between fresh and frozen.
  - The change in product mix toward EU countries coincides with the move toward more frozen products in the import mix.

Imports are expected to decline by 1%–2% in 2019.

- Imports will be lower partly due to the big, ongoing increases in production.
- Imports would have been expected to be even lower, but the large increase in exports should provide more room for imports.
- **EU countries should continue to increase market share in the US, largely at the expense of CA.**

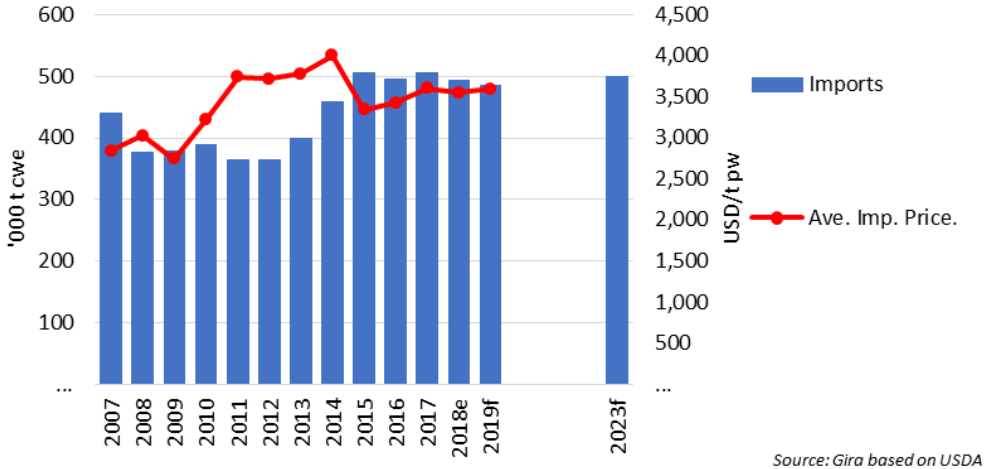
Imports through 2023 are expected to flatline at 2018 levels.

Pork Imports by Origin (2009–2018)



Source: USDA

Pork Imports and Price (2007–2019f & 2023)



Source: Gira based on USDA

Relative Value of Different Suppliers*: Differences by brand but not by origin*

US vs. Canadian pork

- The market is highly integrated.
- There is no difference in terms of production. Pork products are similar. Butt yield is the same for ham production.
- Products of both countries are perceived as being of high quality.
  - The difference is rather at the level of companies (whether in the US or Canada) and brands.
  - The value given to a product depends on how it is sold. The service provided (cuts that meet specific needs), packaging and traceability are the elements that give value to the products.

- Customers are asking for specific brands of pork, not Canadian pork. Customers look for a brand not an origin.
  - There is some patriotic demand for US pork in the US, but it is not widespread.
- Formerly, there was a difference for bellies (bacon); the Canadian product was deemed superior. Presently, there is no perceived difference; both are the same quality.
- The quality of the partnership with the supplier is what gives value to pork products or influences the choice of a supplier.
  - The treatment given by the supplier to the customer, the branding
- Pork is a commodity market; price is the most important factor.
  - For the same price, the American pork will be preferred to Canadian pork, unless a specific brand is sought.
  - The Canadian product must be offered at the same price as the US pork, otherwise buyers will choose the US pork.
- In the Midwest, the price is higher (10%–15% more expensive) regardless of the cut due to high transportation costs.

- Canadian pork is sometimes smaller.
- Sometimes its colour is better than US pork; other times the two products (US and CAN) are very similar.
- Canadian pork is preferred for some specialty markets:
  - Bellies are very popular in Japanese cuisine because they are smaller.
  - The hocks of Canadian pigs are longer and appreciated.
- The most important factors that contribute to the purchase:
  - Price is always number one.
  - The supplier’s reputation, service, delivery (must be on time), relationship with the supplier, quality and traceability
  - Ready to pay 3%–4% more for a supplier that offers good service

3. HOG PRICE DISCOVERY: BACKGROUND AND BENCHMARK CASE STUDIES

Apart from the Japanese market, the value of Canadian pork is mostly aligned with the value of pork supplied by the major exporters into the principal Canadian foreign markets. Hence, it is necessary to understand how pork and live hogs from these key competitors are priced in order to understand the drivers of competitiveness.

The definitions of key concepts are presented first: price determination, discovery and transmission. Then, the price discovery process for five of the most important exporters is summarized, and a critical assessment of the key issues faced by the market participants with regard to their respective pork value chain is provided. Finally, to enrich this analysis, the price discovery processes for two other sectors (raw milk in the UK and beef in Canada) are considered.

3.1 DEFINITIONS FOR PRICE ANALYSIS

3.1.1 PRICE DETERMINATION

Price determination is the interaction of the forces of supply and demand that determine the market price level at a macro level. For hog production, supply forces include input prices, technology, price expectation and regulatory and social constraints. Demand forces include the price of pork, the price of competing products, consumer income and consumer tastes and preferences. All these forces play both at the domestic and international levels.

3.1.2 PRICE TRANSMISSION

Price transmission refers to the process by which prices are related:

- In vertical price transmission, it refers to the linkage between upstream and downstream prices in a given supply chain.
- In horizontal price transmission, it refers to the linkage between prices at the same level of the supply chain between different locations or between different sectors.

3.1.3 PRICE DISCOVERY

Price discovery is the process by which buyers and sellers arrive at a transaction price for a given quality and quantity of a product at a given time and place.

Price discovery involves several interrelated elements: the market structure (number, size, location, and competitiveness of market players); market behaviour (supply chain management strategies, including pricing methods, distribution and use of market power); market information and price reporting (amount, timeliness and reliability of information); transaction costs; and risk management alternatives.

In the pork industry, price discovery occurs at two levels (Figure 3.1):

- At the farm gate (for live hogs)
- At the plant gate (for pork cuts)

Figure 3.1
Price discovery in the pork industry

3.2 PRICE DISCOVERY FOR HOGS IN THE US

The core of the price discovery mechanism in the US swine industry is the regulatory framework for the marketing and pricing of livestock.

3.2.1 REGULATORY FRAMEWORK FOR THE MARKETING AND PRICING OF LIVE HOGS

LIVESTOCK MANDATORY PRICE REPORTING ACT

Since 1999, a mandatory price reporting system—Livestock Mandatory Price Reporting (LMPR) Act—has been in place in the US for livestock, including swine. This Act must be reauthorized by the US Congress every five years. The next reauthorization is scheduled in 2020. In 2013, mandatory reporting was extended to pork cutout prices.

The Act requires federally inspected plants that pack or process more than 100,000 barrows or gilts, which represents 200,000 sows or boars on average, to report swine/pork prices daily. Currently, 21 packers (operating 50 plants in 19 states) report swine information under the LMPR, accounting for 97% of swine sales and production in the US.

PACKERS AND STOCKYARDS ACT

The amended Packers and Stockyards Act requires that a library or catalogue of the types of contracts offered by packers to swine producers for the purchase of swine (including swine that are purchased for future delivery) be established and maintained. As of April 2019, some 800 contracts/formulas were referenced in the library. For each formula, the library provides:

- The reference price: one or more of the reported prices—including pork cutout price—either the price at a given date, the average price over a given period or the cost-of-production formula using the published benchmark price (corn, soybean)
- The contract premium schedule
- The carcass merit premium schedule

3.2.2 PRICE REPORTING

CONFIDENTIALITY

The 3/70/20 confidentiality guideline requires the following three conditions for publishing data:

- At least three reporting entities need to provide data at least 50% of the time over the most recent 60-day time period.
- No single reporting entity may provide more than 70% of the data for a report over the most recent 60-day time period.
- No single reporting entity may be the sole reporting entity for an individual report more than 20% of the time over the most recent 60-day time period.

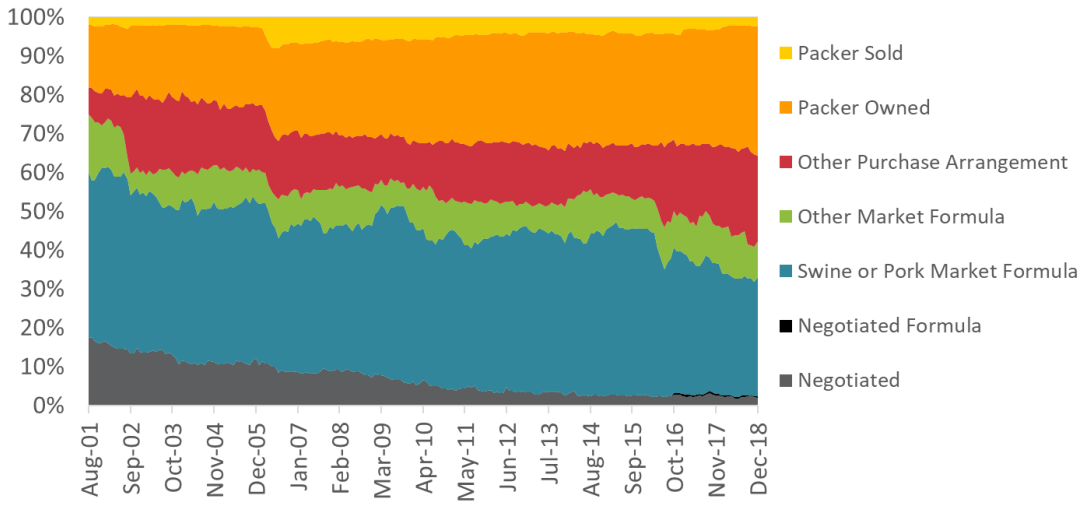
LMPR SWINE SALES REPORTING

USDA AMS market reporters review between 7,000–11,000 swine data records daily. This data is used to publish 20 daily and two weekly swine reports. Under the LMPR, swine sales must be reported across the following categories:

- Negotiated purchases: spot cash market, seller-buyer interaction with delivery within 14 days of the sale. For hogs, the prices are reported on a live basis or on a carcass basis. The price is known at the time of the negotiation.
- Negotiated formula purchases: based on a market formula determined by negotiation on a lot-by-lot basis and scheduled for delivery to the packer no later than 14 days after the agreement is concluded.
- Swine or pork market formula purchases (SPMF): formula price based on a market other than swine/pork futures or options contracts but including the CME Lean Hog Index.
- Other market formula purchases (OMF): formula price based on one or more swine/pork futures or options contracts.
- Other purchase arrangements (OPA): all the other types of marketing arrangements. This includes all swine raised under special production practices (antibiotic-free, organic, crate-free, beta-agonist-free, etc.).
- Packer-owned purchases: swine owned by the packer or one of its subsidiaries or affiliates for at least 14 days before slaughter.
- SPMF, OMF, OPA and packer-owned purchases constitute what is commonly named Alternative Marketing Arrangements (AMAs).

In 2018, the negotiated market represented about 2% of swine sales (Figure 3.2), while SPMF represented about 31%, packer-owned and packer-sold 34%, OPA 22%, and OMF 11%. Over the last two decades, we noticed a significant shift with OPA and packer-owned sales gaining ground.

Figure 3.2
National Daily Direct Hog Prior Day - Slaughtered Swine, Distribution of marketing arrangements



Source: USDA - AMS, LM_HG201 report.

Swine prices are reported as either "Purchased" or "Slaughtered."

- Purchased = price before slaughter occurs. It is reported on a live weight or carcass weight basis. These prices do not include any premium or penalty. They are reported on a weighted national average basis and on three regional bases: Eastern Cornbelt, Western Cornbelt and Iowa-Minnesota.
- Slaughtered = price after slaughter occurs. It is reported on a carcass basis. The prices are reported on a base price basis and on a net price basis that include premium and penalties detailed in a specific report (carcass and non-carcass merit).
- For a given lot of hogs, purchased and slaughtered prices cannot be reconciled.

Two prices are reported:

- The base price: price determined before any premium or discount.
- The net price, which includes the following premiums or discounts:
  - Non-carcass merit premium: volume, transportation, delivery time, breed, pork quality assurance, beta agonist free, other (animal welfare, antibiotic free, diet/feed, genetics, meat quality, process verified program, sow housing). Data about these premiums (value range and average) are reported on a weekly basis by the USDA (LM_HG250, Table 3.1).
  - Carcass merit premium: carcass yield, lean percent, back fat, loin eye, loin depth.

Table 3.1
Example of the National Weekly Direct Swine Non-Carcass Merit Premium Report

FOR WEEK ENDING Saturday, May 4, 2019

	Value Range*	Average*
VOLUME	0.00 - 0.00	0.00
TRANSPORTATION	0.38 - 3.13	1.79
DELIVERY TIME	0.25 - 3.00	0.77
BREED	0.00 - 0.00	0.00
PORK QUALITY ASSURANCE	0.00 - 0.00	0.00
BETA AGONIST FREE	0.30 - 1.00	0.60
OTHER **	0.30 - 15.00	4.71

* Prices reported per hundred pounds carcass basis
** OTHER category includes: Animal Welfare, Antibiotic Free, Diet/Feed, Genetics, Meat Quality, Process Verified Program, Sow Housing and Weight

Source: USDA LM_HG250.

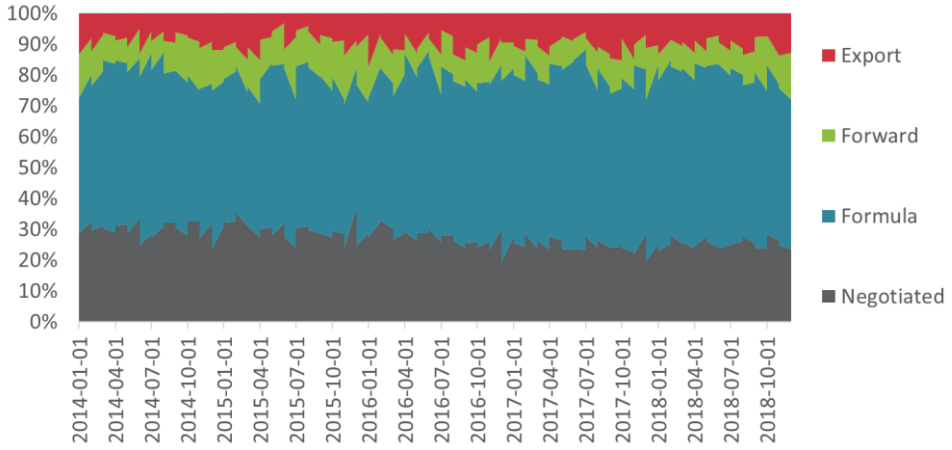
LMPR PORK SALE REPORTING

Pork sale must be reported within the following categories with both the FOB Plant and FOB Omaha prices:

- Negotiated sales: seller-buyer interaction with delivery no later than 14 days after the date of agreement. The prices reported include a composite carcass cutout value that represents the reconstituted value of the carcass before entering the cutting room (i.e. excluding some operation costs, such as labour, shrinkage and packaging). These prices are reported daily.
- Formula marketing arrangement sales: price established in reference to publicly available quoted prices. These prices are reported weekly and do not include any composite carcass cutout value.
- Forward sales: seller-buyer interaction with delivery no later than 14 days after the date of agreement. These prices are reported weekly and do not include any composite carcass cutout value.
- Export sales: sales for delivery outside of the US, excluding Mexico and Canada. These prices are reported weekly and do not include any composite carcass cutout value.
- A comprehensive report is published weekly by the USDA, providing a carcass cutout value incorporating all pork AMAs.

The negotiated sales of pork represent about 30% of the volume of pork cuts for which prices are reported (Figure 3.3).

Figure 3.3
Weekly pork price reporting — Distribution of volume (loads) by marketing arrangements



Source: Compilation by Groupe AGÉCO from USDA – AMS reports LM_PK610, 620, 630, and LM_PK640.
1 load = 40,000 lbs

OTHER PUBLISHED REFERENCE PRICES

In addition to the prices reported under the LMPR, market participants, sellers and buyers will use two other reference prices for hog and pork, both published by the Chicago Mercantile Exchange (CME):

- **CME Lean Hog Index**
  - Used for the cash settlement of the CME Lean Hog futures and options contracts
  - Calculated using data reported by the USDA in the National Daily Direct Hog Prior Day Report – Slaughtered Swine:
    - Sales in the following categories: Negotiated + Swine or Pork Market Formula + Negotiated Formula. Based on 2018 data, this represents 32.6% of annual volume.
    - Weighted average of average net price based on head count and average carcass weight
- **CME Pork Cutout Index**
  - Published daily based on the USDA's National Daily Pork Report Fob Plant – Negotiated Sales – Afternoon
  - Five-business-day weighted average of carcass value based on the USDA carcass cutout model[2]. The model uses wholesale prices for cuts and includes adjustments for packaging costs, labour costs and shrinkage. The cutout price represents the value of the carcass at the entry of the cutting room.
  - Does not include export sales nor other AMAs for pork products

ISSUES RAISED FOR THE NEXT REAUTHORIZATION OF THE LMPR ACT IN 2020

In preparation of the 2020 reauthorization of the LMPR Act, the USDA conducted several consultations with industry stakeholders[3] about the need to:

- Review the rules of allocation of swine to the relevant category of marketing arrangements to increase the number of hogs sold as "Negotiated."
- Increase the transparency of non-carcass merit premiums, such as those related to quality attributes. This would facilitate the transfer of hogs sold as "OPA" to "Negotiated" or "SPMF" and thus reduce the thinness of the market used for establishing the CME Lean Hog Index. The transparency of premiums attached to quality attributes would allow to determine a base price for these hogs that is comparable to the base price of commodity hogs.
- Include data on volume sold using a formula based on the pork cutout price.
- Review the definition of affiliates. One proposal is under discussion: Any person owning more than 0% will be considered an affiliate of the packer (against 5% presently). This would affect all producer-owned packers and increase the allocation of hogs to the packer-owned category. This issue has not reached any consensus yet. If approved, the proposed change will lead to more hogs being accounted as packer-owned, and the negotiated market may become even

[2] https://www.ams.usda.gov/sites/default/files/media/National%20Daily%20Carlot%20Pork%20Overiew%20PDF.pdf.
[3] https://www.ams.usda.gov/sites/default/files/media/LMR2018ReporttoCongress.pdf.

thinner than 1.5% of hog sales, along with the formula-based market (although the change is more difficult to estimate), according to Professor Tonsor (Kansa State University)[4].

- Address the day-to-day volatility of the pork cutout price by using a two-day rolling average.

[4] Personal communication (May 3, 2019)

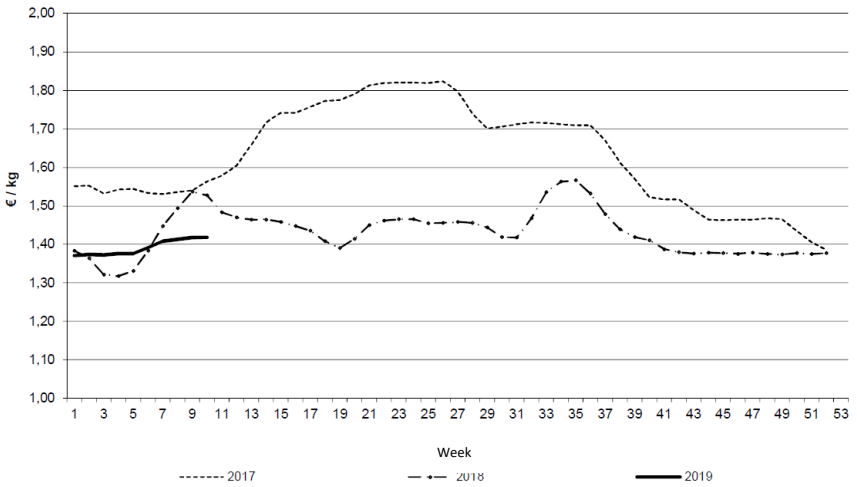
3.3 GERMANY

The price setter in Europe; producer organization plays key role in price setting

The German price is the most important pig price in Europe, as it is the biggest market and because it is the price benchmark for most European countries, whose processors take the lead from what is happening in Germany.

- While cooperatives are present in Germany, **there are a notable number of middlemen, including traders, making this a more convoluted market than Denmark**.
  - Westfleisch (active in the NW) is a successful farmer-owned processing cooperative.
  - However, most pigs are sold through farmer selling groups and traders to the processors, who do not normally have a direct relationship with farmers. The selling groups include primary marketing cooperatives. Even Westfleish will procure itself pigs through intermediary groups.
  - Some slaughter pigs are sold in the spot market through the Börse, although volumes are limited.
- **Relationships in the chain are fractious,** and there is a lack of vertical alignment between the farms and the processors.
- The German meat industry has dramatically concentrated over the past 20 years.
  - The other main coops, Sudfleisch and Nordfleisch, were on the brink of failure before being acquired by Vion >10 years ago; Vion subsequently struggled to restructure the organization effectively and lost share of kill.
  - Tönnies, a privately owned firm with the largest and most modern scale-efficient plants, has been the big winner and is the market leader.
  - Danish Crown has acquired de-boning businesses and slaughterhouses in its important German market.
  - Most primary processors have forward integrated into further processing to some degree.

German Slaughter Pig Price (2017–2019)



Within Germany, there is a specific pork price that is released on a weekly basis, although this is done 1–2 weeks after the event, as obliged by the Commission Delegated Regulation (EU) 2017/1182 and the Commission Implementing Regulation 2017/1184. Afterwards, it is left open as to how member states collect prices.

- In Germany, this regulation is executed in compulsory price information being submitted by slaughter plants processing >200 pigs per week. The total number of reporting plants is 100–120, representing 75%–80% of total German production.
- **However, this price release takes place after the event; there are no regulations as to the forward setting of German pork prices**.

It was the convoluted nature of the German market and the considerable number of middlemen that led to the establishment of the producer organization, Vereinigung der Erzeugergemeinschaften.

- **It is not a legal entity and has no legal framework,** but it has been in existence for a long time and is accepted by most actors in the market. **This organization is largely made up of a range of producers and producer organizations.**
- During a weekly conference call, the concluded prices that farmers and groups have contracted for the week to come are exchanged. The committee can do this, provided the information represents already concluded contracts, as it is exempt from competition legislation. However, in reality price expectations are also included. In the past, the action has been challenged at the cartel office, but the claim was unsuccessful.
  - **The organization then comes up with a quotation price, which is also known as the North West Price.**
- This quoted price is a price for a certain quality: the “VEZG-FOM-Basispreis MFA 57%” price for a product with a lean meat content of 57% processed by plants that use a hand probe and the “VEZG-Auto-FOM MFA 59%” price for a product with a lean meat content of 59% processed by plants with automatic measurement.
  - Pigs with different lean meat content have deductions or additions to the base price, which vary by processor.

Committee price can be overruled by processors, notably when pig supply is short.

The price set by the committee serves as a starting point for pork prices in Germany.

- While this committee price is only a reference, **the actual price paid by plants is usually very close to it**.
- However, sometimes slaughter plants will pay a different price than that set by the committee. If a processor disagrees with the North West Price because it feels the price is too far from market reality, **a house price (lower) will be set**; if other processors disagree, then they will follow. However, if only one processor sets a house price, it is likely that they will pay a fee on top of the house price to farmers to ensure pigs are not sent elsewhere.
  - Disagreements between the committee and slaughter plants are often seasonal and usually relate to pig supply. If the supply of pigs is sufficient, greater power lies with processors, and house prices are more common (especially in winter).
  - However, if the supply of animals is short, the power shifts to the farmer, and the committee price often holds, usually at an increasing level!
  - As a result, the price paid for pigs is fairly constant, particularly among the four major processors.
- **The house price is based on a range of inputs, which vary by processor, but the selling price of a range of cuts is often used to calculate a value for the carcass from which a live pig price can be established.** However, processors are very discreet about the inputs in this calculation.
- **Fundamentally, the German pig price is heavily impacted by the supply and demand of slaughter pigs and meat**. For example, the offer of live pigs is reduced at the moment (April 2019), while demand is strong particularly on the export side; therefore the prices for live pigs have risen.

The prices reported are all base prices based on the pigs' arrival at the slaughterhouse; plants have different pricing mechanisms to adjust the committee or house price.

- **The market is further convoluted by the fact that a range of fore-costs are imposed on suppliers**; these fore-costs vary depending on the supply contract.
  - These fore-costs encompass anything that the slaughter plant has had to pay to get the animals to the plant, such as transportation and insurance; this varies across Germany and depends on which elements of the price have to be borne by the producer and which must be borne by the plant.
- **The price is then subjected to a range of classification criteria, which can reduce the price**. These changes are rather opaque due to the presence of independent traders who compete with the producer groups in selling to the slaughterhouses.
  - These changes largely pertain to the weight of animals, lean meat content and a range of health-related tests.

This methodology for calculating the price has remained relatively constant, with very few changes made in many years.

- Regional price differences do exist. Base prices are often higher in the south, partly due to the demand for fatter pigs, while the larger farms in the north are paid a slightly lower base price. However, as detailed below, fore-costs vary between regions, and higher deductions are taking place in the south; the end price paid to farmers therefore often balances out between the regions.

The German model is more convoluted than that of Denmark. **However, Canadian farmers could look to replicate the committee live pricing model that has long been established in Germany.**

- While the fundamental power still lies with the processor, the establishment of a committee price could give more power to the farmers; **the impact of live pig supply and demand would be stronger, and the demand side would certainly be impacted by the relative movement of export market access and demand**. This would therefore meet the criteria of a mechanism that could help farmers benefit from increased export market performance.
- As in Denmark, the development of primary marketing (not necessarily processing) cooperatives is certainly something worthy of consideration.

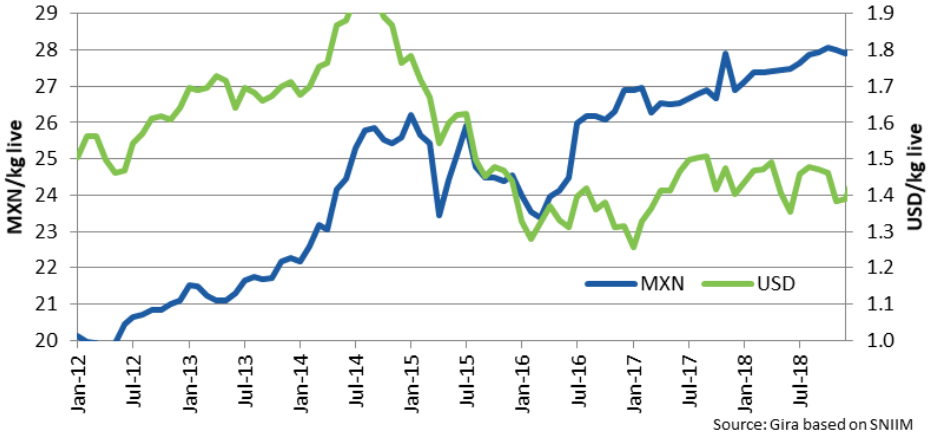
3.4 MEXICO

Spot basis is the rule for everything that is not integrated.

Pig farming in Mexico can be subdivided into 3 types of systems:

- Small-scale or rural family farms with less than 50 sows in urban or peri-urban areas and with little access to technology and proper sanitary conditions; they account for ~20%–25% of total pig numbers.
- *Sistemas semi-tecnificados* (small commercial producers) whose limited economic resources prevent further intensification and use of technology; they account for ~25%–30% of pig numbers.
- *Sistemas tecnificados* (technologically advanced producers) that use modern management, nutrition and sanitary technologies. Many such farms belong to large integrated corporations, such as those mentioned on the previous page; they account for ~50% of pig numbers but for a higher share of production.

Monthly Live Pig Price – MXN and USD/kg live (Jan. 2012–Feb. 2019)



Source: Gira based on SNIIM

With a large share of pig production in the hands of integrated companies, the cash price of live pigs loses some of its relevance, especially since there could be strong regional contrasts and very local cash markets.

What is not integrated or vertically aligned is described as a totally free market functioning on a purely spot basis system.

- Production contracts (outside of vertical integration) are extremely limited.
- Prices are negotiated between the buyer and seller on the basis of supply and demand.
- As a basis for discussion, both parties can refer to the daily series published by a department under the Ministry of Economy, the SNIIM (*Sistema Nacional de Información e Integración de Mercados,* http://www.economia-sniim.gob.mx), on its website.
  - Farmers inform their local pig producer group of their selling prices. The data is then sent to the Ministry of Economy and published in the above-mentioned series.
- Another series is published by Porcimex (Mexican Confederation of Pig Producers, http://www.porcimex.org). It may differ slightly from the SNIIM series.

Operators can thus compare historic prices for live pigs or for carcasses and decide at what price they would like to buy and sell.

- The SNIIM site allows to see price differences according to the origin of the animals and to the various slaughterhouses of the country.
- Access to the website is, however, not very user friendly.
- Operators can also have access to prices on their smartphones.

The market of Mexico City strongly weighs on national prices, and demand for processing is the major driver for prices.

With imports accounting for up to 40% of total supplies, US prices have quite a significant influence on the Mexican market.

3.5 CHILE

Chilean price formation is of little relevance to CA.

Odepa (*Oficina de Estudios y Políticas Agrarias*, Office of Agrarian Studies and Policies) is the organisation publishing agricultural statistics in Chile.

- It is a centralized public service under the Ministry of Agriculture that aims to provide regional, national and international information to help agroforestry operators make their decisions.
- Most of pig production in Chile is vertically integrated, thereby reducing the meaning of "pig producer price."

The prices of live pigs reported by Odepa correspond to auction prices registered by the association of livestock fairs (*Asociación de Ferias Ganaderas*).

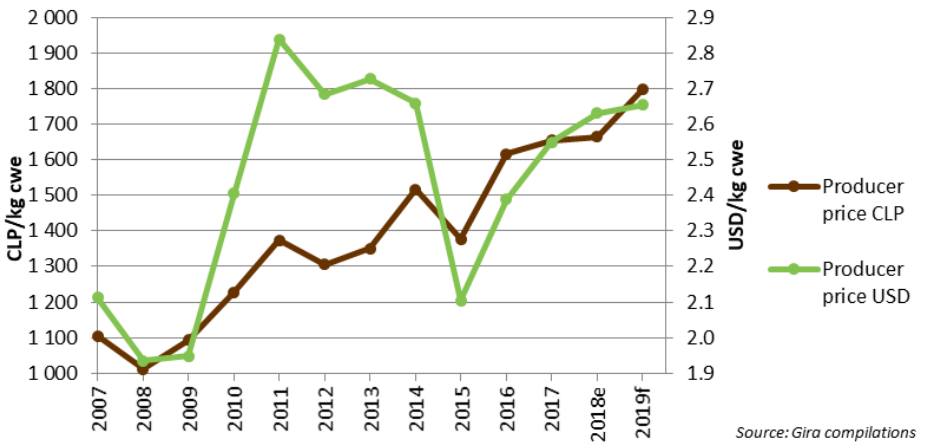
- However, the number of animals traded in these fairs is very low, as most of pig production in Chile is vertically integrated.
  - During the 2015–2017 period, an average 43,300 pigs per annum were traded in fairs, representing < 1% of total slaughter (given an annual slaughter of an average 5 million head).
- According to Odepa, the producer price series it is publishing is therefore not representative of the reality of pig production in Chile.
  - The notion of a pig producer price is even irrelevant to some extent.

In Chile, pig carcasses include the feet and head. By default, Gira uses a 0.79% live to carcass ratio.

With the supply and demand balance being as it is in CL, producer prices reflect the classic combination of:

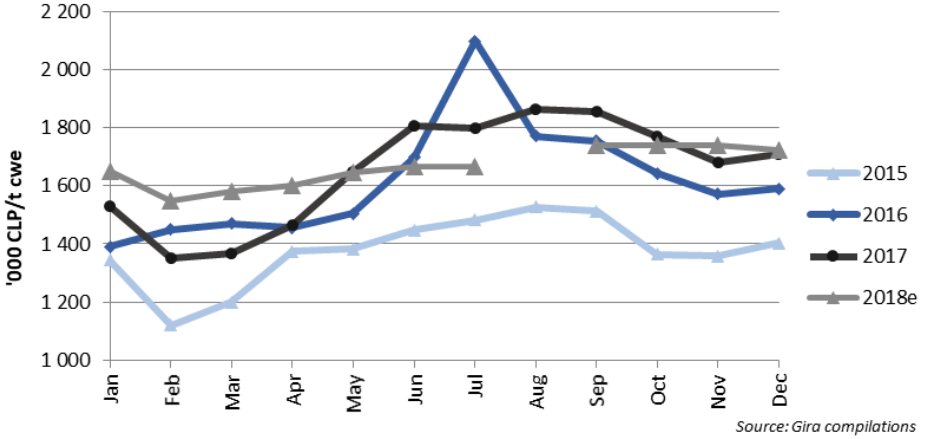
- Strength of domestic demand
- Export market conditions
- Import competition
- Currency
- Feed costs

CL Annual Producer Price (2007–2019)



Source: Gira compilations

CL Monthly Producer Price (2015–2018)



Source: Gira compilations

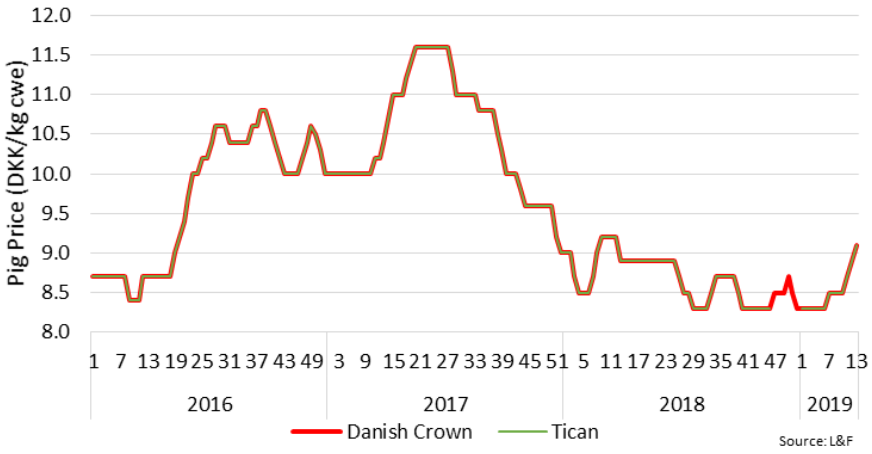
3.6 DENMARK

Transparency removed with industry concentration; exports weigh heavily in price.

The pricing process was historically very transparent in Denmark, which for >100 years has been dominated by the very well-organized Danish cooperatives. Farmers were obliged to commit their pigs to their specific coop and in return were paid a standard price calculated based on wholesale market returns, supplemented by a crucial annual bonus (the 13th payment), which reflected the actual commercial performance of their individual coop.

- In tune with cooperative theory, the coop was an extension of the farm activity, processing farm output into a saleable form and marketing the cuts—largely for export—to their best ability. Having deducted their operating costs and retained a proportion of the surplus for re-investment, the objective of the coop was to maximize price on behalf of their members.
- A common, standard national pricing system was used by the farmer-owned cooperatives. This was calculated by what is now called L&F on a weekly basis.
- On the revenue side, all the main specific cut prices achieved were examined in proportion to carcass balance (such as tenderloins and including the prices for by-products).

Weekly Pig Producer Price – DC and Tican (2016–2019)



- On the cost side of the equation, standard average operating costs were estimated (taking into consideration the slaughtering and cutting costs).
  - A fair slaughter pig price could therefore be calculated. L&F would then say whether the price should increase or decrease for the next week depending on processor margins.
  - The few private slaughterhouses and live exporters followed the coop price.

Over the decades, that changed with the consolidation of the industry (two major players), and then one coop remained: DC. DC's pricing is now relatively opaque.

- DC was blocked from merging with Tican, the last independent coop. Tican was then acquired by the leading German processor, Tonnies, an arch competitor to DC. As a result, data availability on the actual pricing process is now rather limited.

The Danish live pig price is now set by DC itself, using similar principles to those historically employed.

- Tican and the private companies fundamentally match this price; over the last few years, the base price offered by Tican and DC has been almost identical.
- The DC price is based on a number of parameters, primarily focused on the value attained for a wide range of cuts. Given that 90% of Danish pork is exported, this channel naturally weighs heavily on the price paid to farmers; many of the cut prices used are export prices, such as cuts from the "middle" to Japan and the UK.
- However, the group's overall profitability also has an impact on the price. The weak performance of DC's subsidiary, Tulip Ltd (in the UK), in 2018 has been one of the key factors that has resulted in a lower Danish slaughter pig price.
  - When the DC price is dragged down by weaker performance, Tican and the private companies tend to be more profitable; however, when DC is generating significant value through extra-EU sales driving a high pig price, margins for other companies are more pressured, as they are forced to pay a higher price than their ability to valorize the pigs would dictate.

- The German price is also a notable factor, both in terms of slaughter pigs and live piglets. The Danish price must always remain in contact to prevent the live export of slaughter pigs, which has not happened in the last decade. However, the live export of piglets is a concern; if the German price is significantly higher, farmers may choose to export piglets rather than fatten the animals themselves in Denmark.
  - Other markets in Europe are also observed to ensure that the price offered remains competitive.
- There are no regional differences in pig price in Denmark.

Cooperatives lend more power to operators back up the value chain.

The settlement model for the major players is relatively standard in the adjustments and deductions that are applied to the base price.

- Logistics play a role, and the number of pigs supplied is taken into consideration; the weight variance and meat percentage changes also result in penalties/additions, while further penalties are imposed concerning the non-castration of boars, disease issues, etc.

Vertical integration accounts for the majority of sales arrangements, which are driven in large part by the dominance of Danish Crown.

- There are limited spot market sales or contracts; Tican and the private firms operate in a similar manner to Danish Crown.

Given the importance of cooperatives, the power structure is weighted more toward farmers than most other markets globally. Good coops maximize the price for their farmer members.

- One longstanding fundamental strength of the Danes is the farmers' commitment to supply their pork directly to the coop slaughterhouse; this is something that is historically engrained.

Danish Crown & Tican: Key Premiums and Penalties to Base Price

DC Meat Percentage Scale	
61.1-65%	+10 øre/%point
61% (base)	0
59.0-60.9%	-10 øre/%point
57.0-58.9%	-15 øre/%point

Tican Meat Percentage Scale	
>61%	+10 øre/%point
59.0-60.9%	-10 øre/%point
57.0-58.9%	-15 øre/%point
<57.0%	-20 øre/%point

Tican Weight Penalties			
Weight (kg)	Kr./kg	Weight (kg)	Kr./kg
50-61.9	-5.00	88-92.9	0.20
62-64.9	-4.00	93-99.9	0.10
65-67.9	-3.00	100-100.9	-0.10
68-69.9	-2.00	101-101.9	-0.50
70-70.9	-0.25	102-102.9	-0.80
71-71.9	-0.15	103-105.9	-1.20
72-87.9	0.10	106-109.9	-2.50

- The presence of primary marketing groups (some of which are cooperatives) is also important, adding further weight to the farmers' negotiating position.
  - The Bonusgrisen cooperative—with its 500–600 k heads sold annually—is a good example; last year it moved from Tican to DC, causing notable issues for Tican.
- There are no traders involved in the sales process, except in the live piglet export business; this has grown strongly, mainly because the Danes are constrained by manure capacity. The coops do also have a share of this live piglet export business.

The 13th payment is significant in Denmark; this is paid by Danish Crown but also by the other payers in the market. The DC 13th payment is made at the end of the year or bi-annually, depending on farmer preference.

- DC's 13th payment is based on the group's earnings, which are subdivided between investments in the group's operations and the bonus payment made to farmers.
- Tican and the other private companies also make a 13th payment, which is largely based on that of DC. If they do not make a 13th payment, they will not maintain their supply base.
  - At times, these processors will pay a small fee throughout the year (split 13th payment) to ensure supplier loyalty.

There is very little regulation with regard to the marketing and pricing of live hogs.

- The only exception is in relation to the common grading system that has been established; this is controlled by the Ministry and regulates the meat percentage for pigs and gives comfort to farmers that animals are graded fairly by processors.
- The length of the contract to which farmers must commit to cooperatives is also capped at 6–12 months in the case of Danish Crown.

While the Danish model is perhaps an aspirational model for Canadian farmers to replicate from a live pricing perspective, this is unlikely to be achievable. It originates through farmer-ownership of the coop processor, which dominates the kill. A key part of its success has been the effective access to third-country markets, in which prices are higher. This translates into a higher producer price when export pork prices are firm; however, periods of weaker performance will result in more pressure at the farm gate.

- Additionally, the strong cooperative presence and the model of farmers selling directly to plants are something that would be very difficult to replicate.
- The development of primary marketing (not necessarily processing) cooperatives is, however, certainly something worthy of consideration.

3.7 CANADIAN BEEF SECTOR

Price discovery, transparency and availability of data are major concerns within the Canadian beef industry. Some producers will go so far as to say that the price system is broken. Much of this is due to the structure of the industry (there are two major packers/buyers: Cargill and JB), the high proportion of packer-owned cattle and private treaties (forward contracted cattle or formula-based pricing) for direct sales to feedlots.

The most common word used when discussing beef prices is the term "basis," which represents the difference between a reference price (usually a US-based price) and the price being offered to a Canadian producer. The basis can be positive or negative, although it is traditionally negative (i.e. Canadian beef prices are lower than US prices). Since most producers are looking at prices several months into the future, the reference price is the CME futures price for the target month during which the cattle will be sold.

The basis in Canada is a function of several factors: the US price, the exchange rate, local market conditions, distance to the packer, grade and other premiums. Ultimately, the local packer decides what the basis will be. Generally, the Canadian price follows the US price, but local conditions do apply. Arguably, the price in Canada can be called a "Canadian price" (unlike pork pricing, which is virtually 100% correlated to US reported cash prices).

Beef price reporting in the US is mandatory. All sales negotiated between a willing buyer and a willing seller must be reported to the USDA. However, this does not include packer-owned cattle that were purchased as feeders months in advance and fed on contract. Also, this does not include forward contracted cattle that are priced based on an agreed formula (usually based on the Chicago Mercantile Exchange – CME futures price plus premiums, minus some agreed basis in the US market).

Meanwhile, there is no mandatory price reporting in Canada. Instead, packers are very private about the pricing details within which individual contracts are negotiated with feedlot operators. Canadian prices are reported on a voluntary basis to CanFax, a division of the Canadian Cattlemen's Association, which has been established as a single and sole-purpose organization and as the complete source of price information for the Canadian beef industry.

The lack of transparency is a concern; CanFax, for example, relies on voluntary reporting to provide public information on pricing. It should also be understood that in some cases packers are very jealous of their supply relationships with selected feedlots; they may use these feedlots to feed their own cattle on contract.

Further, this relationship (feedlot operators feeding packer-owned cattle) offers an assured arrangement with the packer to market their cattle. Any hint that the feedlot may be negotiating with a competitive packer may not be regarded favourably. Also, there may be pressure on the feedlot operator not to disclose price information. Some feedlot operators are reluctant to (voluntarily) share price information with CanFax for confidentiality reasons or fear that the source of this information may become known to the packer.

Consequently, very few cattle are sold on the cash or spot market. For example, an average of 40,000 heads of market weight cattle is marketed each week. Cash sales may be as low as 1,000 heads or as high as 8,000 heads. This number (according to the proportion of cattle being marketed) continues to decline.

Recently, unusual or erratic swings in the CME futures markets have further complicated the price discovery process, since most forward contracts are based on future pricing. This was especially the case in the fall of 2015 when beef prices suddenly took a sharp drop.

Many explanations have been offered, but one factor appears to be the unusual activity in the futures markets referred to as "High Frequency Trading" (HFT), which appeared to have little to do with market conditions; it is a tool used by speculators. This has raised concerns and led the National Cattlemen's Beef Association to undertake a major review of beef pricing entitled, "Price Discovery Research Project" by Dr. Stephen Koontz, Colorado State University[5], whose main findings are:

- The thinning cash, fed cattle market is the result of participants making use of alternative marketing arrangements (AMAs).
- Negotiating in the cash market involves the risk that efforts fail, resulting in fed cattle being marketed at higher costs later. Making use of formulas or forward contracts reduces transaction costs by $15–$25 per head.
- Cash market information is important for upstream and downstream industries that rely on this information for their business decisions.

Several initiatives are underway in Canada or the US to address this concern:

- A recent resolution by Alberta Beef Producers to support the US-based National Cattlemen's Beef Association (NCBA), encouraging the NCBA to lobby the CME for greater transparency with respect to cash and futures prices
- The establishment of a US-based Fed Cattle Exchange in 2016 as an open system with full price reporting. The objective of this electronic exchange is to encourage feedlots across the US to offer a proportion of their market weight cattle for sale to packers. To date, the Exchange has attracted both suppliers and buyers, although it remains in the early stage. While actual numbers of cattle being sold through the Exchange are modest, the Exchange does provide transparent pricing information that is welcomed by the industry.

In summary, price discovery in the beef industry is far from a settled matter and continues to be a major issue. The challenge originates from:

- The structure of the industry (two packers/buyers dominate the market). Both are US based (technically one packer is Brazilian but has a major US presence). Together, they account for over 70% of the cattle slaughtered each year. Both are in Southern Alberta. Both have excess capacity and compete vigorously for cattle to maximize the utilization of facilities and the work force.

[5] http://www.canfax.ca/report/downloads/special/Kootnz%20Price%20Discovery%20Interview%20Findings%20Report%202015-12.pdf

- There is no mandatory price reporting in Canada. All pricing is provided based on voluntary reporting to CanFax, who also reports (daily) a full range of US prices that are mandatory (live, rail and cutout prices).
- The volume of fed cattle actually sold on a cash basis is low (estimated to be 20% or less of all cattle sold). Note: 20% would be a maximum; some weeks this proportion would be below 5%.
- Feedlot operations (the sellers) are reluctant to report settled price information for commercial and confidentiality reasons.

New measures to maintain (or improve) transparency and price discovery are continuously being suggested or implemented. For example, the Fed Cattle Exchange system is one such example; recently, AFSC—the organization offering the Western Livestock Price Insurance Project—has implemented a pilot project to collect price information from a sample of feedlot operators (some of whom are not reported to CanFax). The results of the test are still being evaluated.

The case of the Canadian beef price discovery process highlights that price reporting on a voluntary basis has its limits. The producer's business model somewhat determines the sensitivity to price transparency issues. Contract producers seem to think they have an advantage in not sharing information. This is an issue if contract prices are based on the information available and if this information is representative of a biased sample (and not of the actual whole market). That explains why US hog producers may sell some "good pigs" on the spot market to try to correct the quality bias observed on the negotiated cash market (see section 5.3).

3.8 RAW MILK IN THE UK

From the early 1930s to the mid-1990s, milk in the United Kingdom was sold through marketing boards. The UK's entry into the European Economic Community in 1973 gradually led to the dismantling of these boards to harmonize with European competition rules and the CAP. In the following years, producer prices decreased significantly, as did milk production during the 2003–2004 period. Between April 2003 and October 2009, production decreased by almost 9% (DEFRA), and the number of producers decreased by 6% to 8% per year. During the same period, consumer prices rose, as did processing and retail margins[6].

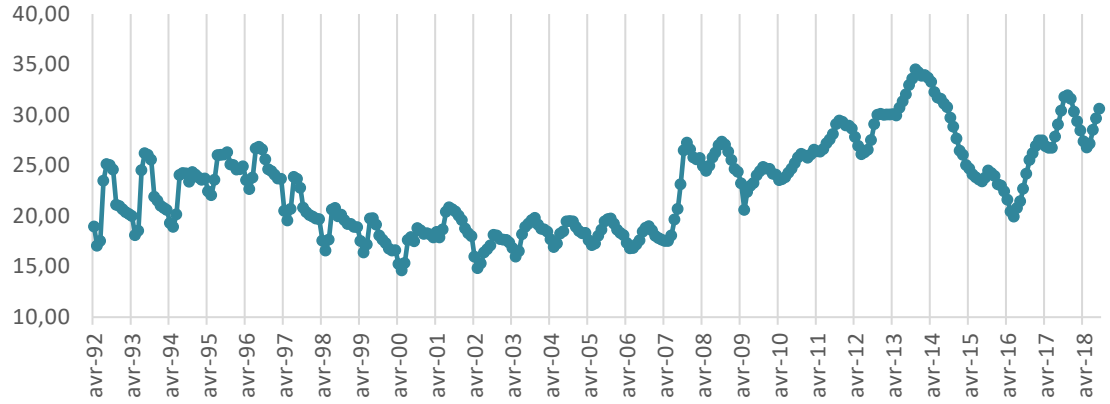
Faced with declining production and the fear of not being able to secure a local supply—as milk became scarcer and scarcer—retailers set up a direct link with producers by offering them "Retail Aligned Contracts" for drinking milk sold under their own brands, which the processor transformed on a fee-for-service basis. These contracts established a milk price based on the cost of inputs. The implementation of these contracts from 2007–2008 onwards resulted in a very significant increase in the price of milk paid to the producer, which jumped by nearly 50% between 2003–2007 and between 2008–2012. This increase in producer prices occurred to the detriment of processors, who saw their margins decrease by more than half, while retailers' margins remained the same[7]. This can be

[6] Royer, Annie. (2015). Déréglementation dans le secteur laitier : les cas Suisse et Anglais. Congrès CILQ, 3 octobre 2015, Orford.
[7] It should be noted that the increase in producer prices in the UK coincides with the increase in prices on the international market. However, the fact that relatively high prices were maintained during the 2009 and 2015 crises and the fact that there was an increase

explained by the competition among processors to obtain private label milk contracts with retailers. Dairy production rebounded, and after a spike in 2012–2013, it experienced a very high growth rate, reaching a peak of 14,790 million litres in 2015–2016.

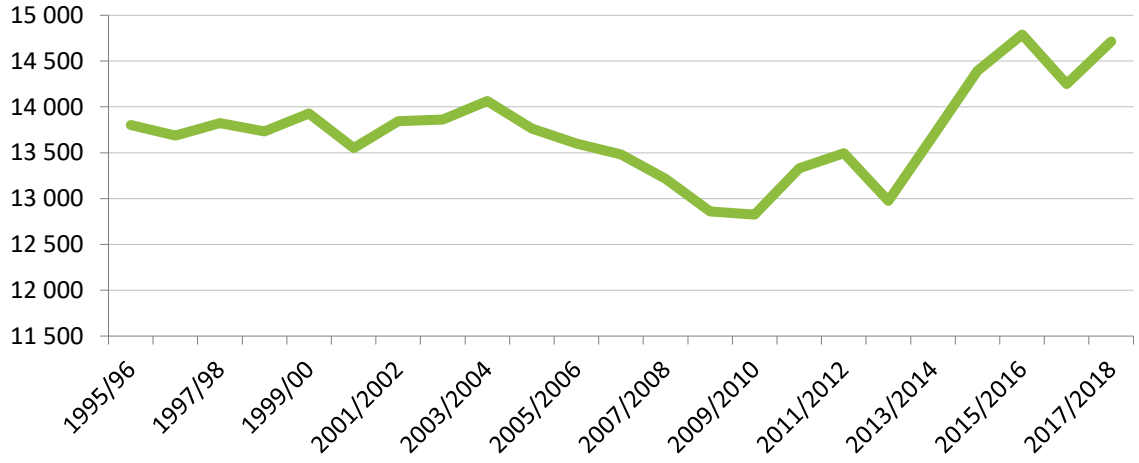
Figure 3.4
Price paid in the United Kingdom (1992–2017)*

Pence per litre, current currency



Source: AHDB, https://ahdb.org.uk.
*90% of the milk collect

Figure 3.5
Evolution of milk production in the UK in million litres (1995–2017)



Source: DEFRA.

Supermarket-aligned contracts (SAC) account for only 10% of total milk supply. The price paid to producers covers the cost of production and includes a premium. It shields them from market volatility, thus providing them with more stable income.

in the producer's share of the consumer dollar show that these contracts have resulted in an improvement in the producers' situation, confirmed by farm net income data.

The spread between the price received by producers who are under SACs and the other producers is growing and has been be very high in periods of low prices, such as during the 2009–2010 and 2015–2016 periods. This two-tier dairy industry is a source of division between producers.

In the recent year, one major retailer (Tesco) announced its intention to review the scheme of its contracts, which could mean an additional market component in the contracts. This review is motivated by the upheaval of the dairy market. Some also argue that the cost-of-production deals do not encourage farmers to boost efficiency. The implementation of these contracts was possible due to:

- Low processed product requiring only pasteurization and packaging
- Existence of private brands for the product (liquid milk)
- Ability to compete with enough processors for contract processing

These contracts definitively had the effect of rebalancing the margin distribution across the value chain, to the benefit of producers who had previously seen their share of the consumer's dollar melt in favour of retailers and processors.

However, it is difficult to imagine that such contracts could exist between retailers and producers in the pork sector and, more generally, in the meat sector. This is mainly due to the multitude of products that come out of a pork carcass cutout, which are products that cannot be fully balanced through a single marketing channel, such as a retailer. One of meat packers' major roles is to balance the carcass and maximize its value through the different marketing channels (retail, export, secondary processing, catering, etc.). It is difficult to imagine how a retailer could establish a direct production contract with producers for its pork supply.

As a side note and to illustrate the same issue, there has been a similar situation in Australia, where milk has been used by retailers since 2011 as an appeal product in a price war, again resulting in a significant decrease in producers' margin. Faced with the crisis experienced by producers and subsequent threats to the domestic milk supply, retailers undertook to increase the price of milk by 10 cents by guaranteeing consumers, through labelling, that these 10 cents would be paid directly to the producer.

It is also worth noting that the UK dairy market is highly focused on domestic market sales, whereas the Canadian pork sector has significant exposure to export markets; this yields greater power to the retailers in the chain, who represent a relatively dominant sales channel for UK-produced dairy products. Additionally, UK retailers have an almost anomalous share of power in the value chain when compared with other markets, significantly increasing their negotiating power.

However, the concept of a cost-based pricing model is something that could be considered for use in determining the base price paid to Canadian pork producers. Canada's scale and the different cost structures within the regions could, however, complicate the establishment and implementation of this model. If somehow incorporated into the price calculation, this should provide greater comfort to farmers during periods of notable cost increases and volatility.

4. AN OVERVIEW OF HOG PRICE DISCOVERY ACROSS CANADA

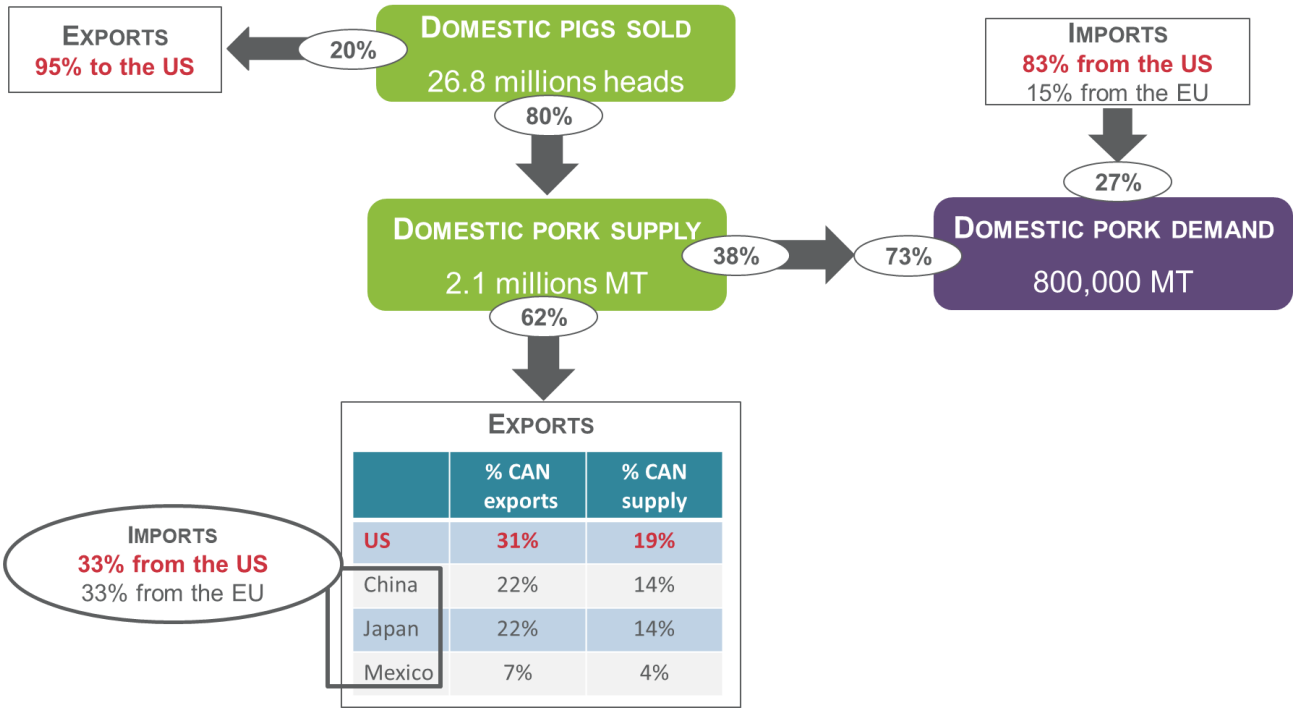
4.1 PRICE DETERMINATION FOR CANADIAN LIVE HOGS: KEY FACTORS

PRICE DETERMINATION FACTORS AT THE MACRO LEVEL

When considering the Canadian pig and pork supply and demand structure (Figure 4.1), one can notice the extent of the linkage with the US industry and market:

- 18% of all pigs produced in Canada are exported live to the US.
- 23% of pork meat consumed in Canada comes from the US.
- 19% of the Canadian pork production is exported to the US.
- The US is a major competitor on most Canadian export markets (non-US exports represent 43% of the Canadian pork production).

Figure 4.1
Canadian pig and pork supply and demand (2018)



	% CAN exports	% CAN supply
US	31%	19%
China	22%	14%
Japan	22%	14%
Mexico	7%	4%

Source: Groupe AGÉCO based on data retrieved from Statistics Canada and Trade Map.

Consequently, US price references remain a key market indicator for price determination across the Canadian pork value chain, as US supply and demand dynamics will necessarily affect those in Canada.

Simply said, Canadian packers are competing with US-sourced pork meat on all markets. Their price references are the US pork cutout prices. The arbitrage on cuts is made at the North American scale, while the arbitrage on live hogs is not. However, the US live hog prices are relevant for the Canadian stakeholders as they provide market information about the cost of supply for the main competitor and price setter.

PRICE DETERMINATION FACTORS AT THE LOCAL LEVEL

Other local factors will affect live hog prices in Canada.
On the supply side:

- Income expectations for the farmers: price
- Risk management: existence of government programs
- Regulatory constraints for hog production expansion: environmental and animal welfare
- Operational constraint for hog production expansion: labour shortage
- Packing efficiency: capacity use and labour shortage
- Distance to markets: cost of transportation, arbitrage opportunity

On the demand side:

- Domestic demand growth expectations: household income, consumption patterns, competitiveness with other proteins
- International trade environment: trade agreements, trade conflicts

4.2 PRICE DISCOVERY IN QUEBEC

The process for determining the price of live hogs has been governed since the early 1980s by the Quebec Hog Producers' collective marketing plan. Under this system, hog producers collectively negotiate a sales agreement with slaughterhouses, usually for 4 years. The agreement lays down all the conditions for the sale of pigs.

The hog marketing system has evolved since its inception to adjust to the changing environment of the pork packing industry, which has become increasingly concentrated. Since 2009, pigs other than those produced under integration (Owners Pigs) are sold according to a price formula based on the US price. This approach "allows producers to receive a price for their hogs equivalent to that of the North American market and guarantees buyers a raw material at a competitive cost[16]." Packers have a guaranteed hog supply ensuring some equity between them.

Since 2013, the agreement has authorized the use of special agreements for pigs that meet precise specifications and that are audited by a third party. These "Special Agreement" pigs (formerly known as "Specified Pigs") are the subject of a direct agreement between a buyer and a producer with specific sale conditions, including prices, premiums, penalties and grading rules different from regular hogs. Fitting in this category are pigs sold under the Nagano brand, organic pigs, animal by-products, antibiotic-free pigs, "Certified Humane" pigs, etc.

Between 2009 and 2019, the price of hogs other than "Owners" or "Special Agreement" was based on the price of the LM-HG201 Negociated and Swine or Pork Market Formula, adjusted for the average ranking index, exchange rate and carcass yield difference (0.74 for the US / 0.8 for Canada). Since 2016, all regular ractopamine-free hogs are paid a price premium, which depends on the packer: fixed premium of $1/100 kg or a premium that varies with the cost of grain (in one case, with the cost of grain and manure hauling).

With the new convention, the price formula has been modified to include a price range related to the US pork cutout. This formula includes a ceiling price and a floor price corresponding, respectively, to 90% and 100% of the cutout price (LM PK 602 Negotiated Sales - Afternoon). The new formula also includes a premium of $2/100 kg for hogs sold under the Qualité Québec agreement[8,9].

The *Régie des marchés agricoles et agroalimentaires du Québec* (*Régie*), which regulates marketing plans in Quebec, has recognized a value to the quality specifications met by Quebec hog producers in comparison to US hogs. It considers, in its recent ruling, that this value results in an added value for the packers, which must be shared with the producers. In the absence of a Quebec cutout model, recourse to the American cutout appears as "the best short-term solution to ensure producers a price more representative of the value of their pigs on the markets" (p. 3).

The ruling is based on several arguments:

- The loss of representativity of the reference LM-HG 201 and the increased use of the reference LM_PK602, with the addition of the LM_PK680 report, which will further improve the quality of this reference price
- The payment of a premium for meeting quality specifications is a reasonable step.
- Underinvestment on the farm, which demonstrates the inadequacy of producers' incomes (p. 6) in comparison with significant investments by processors, underscoring the profitability of their activities
  - Cited as an example are the very large margins achieved by US pork packers between 2016 and 2018 as an index of the profitability of packing activities in Quebec—in the absence of Quebec data—as well as the great success of Quebec packers on the export markets in a context where 70% of Quebec production is exported and where Canada currently enjoys a competitive advantage over the United States thanks to a better access to the Chinese[10] and, until recently, the Mexican markets.
  - In the meantime, the *Régie* points out the 10% decrease in hog production in Quebec between 2009 and 2018, while it increased by 10% in the United States and 7% in Ontario

[8] Qualité Québec pork is pork that meets the AQC's requirements (or, when it comes into effect, Pork Canadian Excellence) plus certain requirements agreed upon between producers and buyers under the agreement. All hogs sold in Quebec must meet those criteria.
[9] At the time of writing, the interpretation of what is covered by this premium is interpreted differently between producers and buyers. For producers, it should be added to the premium they already receive for hogs produced without ractopamine, while for buyers, this premium includes the ractopamine-free component. This dispute will be settled by the *Régie* in the coming weeks.
[10] The recent events affecting Canadian pork exports to China (trade restrictions on sanitary ground) is a reminder that competitive advantages can change rapidly.

> over the same period. It also notes the increase in the percentage of integration of production from 12% to 50% between 2010 and 2018 (p. 6).

According to the *Régie*, it is therefore necessary to "introduce a correction mechanism to take into account the price of pork in the US market" since the current reference (LM HG 201) no longer allows for an equitable distribution of revenues along the value chain.

By limiting the premium to $2/100 kg, the *Régie* also takes into consideration the risk of a potential increase in the supply of hogs from Ontario, which went up from 200,000 to 1.5 million hogs between 2009 and 2017. In doing so, it remains focused on the principles that prevailed in deciding to base the price of Quebec pork on the US reference in 2009 but considers that this reference must be adjusted to better reflect the conditions of today's competition to ensure "an efficient and orderly marketing [which] assumes an equitable distribution of the value of pork among partners in Quebec's pork industry" (p. 11).

All special agreements are public and can be found on the *Les Éleveurs de porcs du Québec*[11] website. Premiums, quality grids and all other conditions are also disclosed.

4.3 PRICE DISCOVERY IN ONTARIO

Marketing channels are distributed as follows in Ontario:

- About 30% of the hogs produced in Ontario go to a producer-owned packing plant. The price paid to producers will be derived directly from the wholesale value of pork (cutout value).
- 60% to 65% are marketed through contracts, including 25% marketed through the marketing division of Ontario Pork (individual contracts plus the pooling program).
- 2% or less are negotiated on the cash market.
- The remaining is owned by Quebec integrators.

Live hog prices are under mandatory reporting in Ontario. Packers must report price paid for live hogs produced in Ontario. Three categories of hogs are reported: low 15%, middle 70% (average), high 15%. Prices will not be weighted by plant.

Prices are reported as $/100 kg Total Value DW F.O.B. Yard (Dressed weight, Freight on Board yard), including all premiums and discounts applied. The mandatory report also includes carcass quality parameters.

In the meantime, Ontario Pork publishes a reference price based on the following formula:

(US base price - US$0.56/cwt)
x US dressing percentage 0.74
x Metric conversion 2.2046
x Exchange rate (Bank of Canada daily average)

[11] At www.*accesporcqc.ca.*

divided by Ontario dressing percentage of 0.80
divided by 1.1195 divisor (Index adjustment)
= 100% Ontario Base Formula Price 100 Index

The current US base price is calculated using the CME Lean Hog Index and the LM_HG201 report (before 2003, other reports were used). The US prices used are net prices (i.e. including carcass and non-carcass merit premiums and discounts).

The $0.56 figure was added to make the formula revenue neutral when the US base price changed in 2003[12]. Similarly, the 1.1195 divisor replaced the previous 1.057 index divisor in 1999 because 1.1195 made the new formula price calculation revenue neutral when compared with the previous formula price using the Indiana/Illinois live prices[12].

This reference price is intended to provide information to market participants. It is also used in contract formulas, along with US reference prices, and serves as a benchmark price for AgriCorp's Hog Risk Management Program.

The spread between the reported price and the 100% formula price has been increasing over the last few years, highlighting the increased packing capacity in Ontario and better margins at the packers' level (Figure 4.2).

Figure 4.2
Spread between the Ontario live hog reported price and the Ontario 100% price formula

Source: Groupe AGÉCO based on data from Ontario Pork.

[12] McEwan & Duffy (2006). Hog price comparison update.
https://www.ridgetownc.com/research/documents/mcewan_Hog_Price_Comparison_Oct_31_2006.pdf

4.4 PRICE DISCOVERY IN WESTERN CANADA

In Western Canada, most of the pigs are either owned by the packer (integrated) or traded between the packer and the producer according to a contract in which prices are based on a formula. It is estimated that virtually no pigs are sold on a cash or spot market basis.

In terms of structure of production, the key points are:

- Olymel now owns approximately 60% of its required throughput.
- Maple Leaf owns approximately 35%.
- HyLife owns 80%.
- Sunterra owns 100%.
- Hutterites account for approximately 40% of production across the Prairies.

The two major processors are: Olymel based in Red Deer, Alberta, and Maple Leaf Foods based in Brandon, Manitoba. There are also a few smaller plants: HyLife in Neepewa, Manitoba; Sunterra in Trochu, Alberta and a smaller Maple Leaf plant in Lethbridge.

In simple terms, the contract price between the packer and the producer is calculated as follows:

US price (adjusted by exchange rate) x FACTOR = price paid to the producer

The "FACTOR" is where all the calculations take place. Each processor will have its own set of parameters to determine this all-important determinant, including:

- The choice of USDA reference price
- Conversion rate from live to carcass
- Conversion from cwt to kg
- Conversion of dressing percentage
- Basis or spread (local conditions)
- Etc.

The US price reference used varies with the packer, and a given packer may use different reports for different formulas. Some examples of price references are:

- LM HG204
- LM HG 201
- LM HG 212 (Western Cornbelt)
- A combination of LM HG 203 and 204 (whichever price is higher)

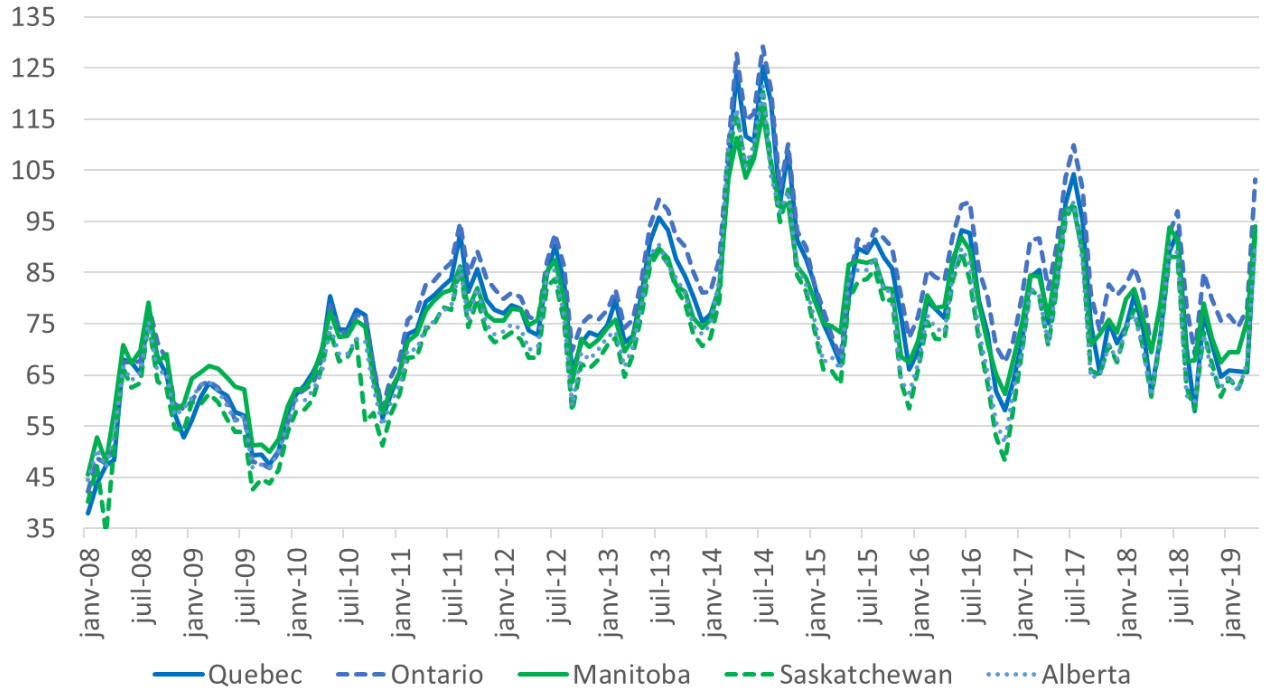
Two marketing agencies provide marketing, assembly and contract services:

- HAMS provides a range of services to producers in Manitoba and Saskatchewan and publishes prices.
- Western Hog Exchange (WHE) has essentially operated as Olymel's procurement arm but has just introduced a block contracting program that regroups pigs from several producers and works to establish contract pricing with packers other than Olymel.

Alberta Pork publishes a weekly report of hog prices across Canada.

Producers in Saskatchewan and Alberta tend to receive the lowest price among Canadian provinces (Figure 4.3).

Figure 4.3
Price paid to producers for live hogs by province (2008–2018) in CAD/cwt[1]



[1] Includes all premiums and discounts.
Source: Statistics Canada.

The way prices are discovered influences business decisions across the entire value chain, as it determines at least partially how price information is interpreted. Currently, there is a high level of dissatisfaction among Western Canadian producers with the price discovery process, as producers are perceiving that packers are consistently making profitable margins on hogs while feeling that these are not being shared fairly with them, and that is, based on their reading of the consistent negative price differential with Eastern provinces (Figure 4.3). All available market information received by hog producers in Western Canada point to a rather one-sided price discovery system benefiting the packers. This translates into an unwillingness to invest and expand production, even in the Hutterites colonies, which are among the lowest-cost producers in North America.

5. CRITICAL ANALYSIS OF REFERENCE PRICES FOR LIVE HOGS: HOW TO CHOOSE THE RIGHT ONE

The previous section has shown that the different price discovery mechanisms implemented in Canada use US reference prices. Therefore, it is necessary to have a more thorough and critical understanding of these US reference prices before designing any "Made-in-Canada" hog price model.

5.1 DATA AVAILABILITY

Confidentiality rules play a significant role with respect to the availability of data and to the thinness of the negotiated market. Some hogs with specific attributes are sold directly between a seller and a buyer for immediate delivery but are accounted for as OPA because confidentiality requirements preclude transparency about the premium paid for their quality attributes. No price is reported for packer-owned swine sales, which means that about a third of swine sales escapes price discovery at the farm gate.

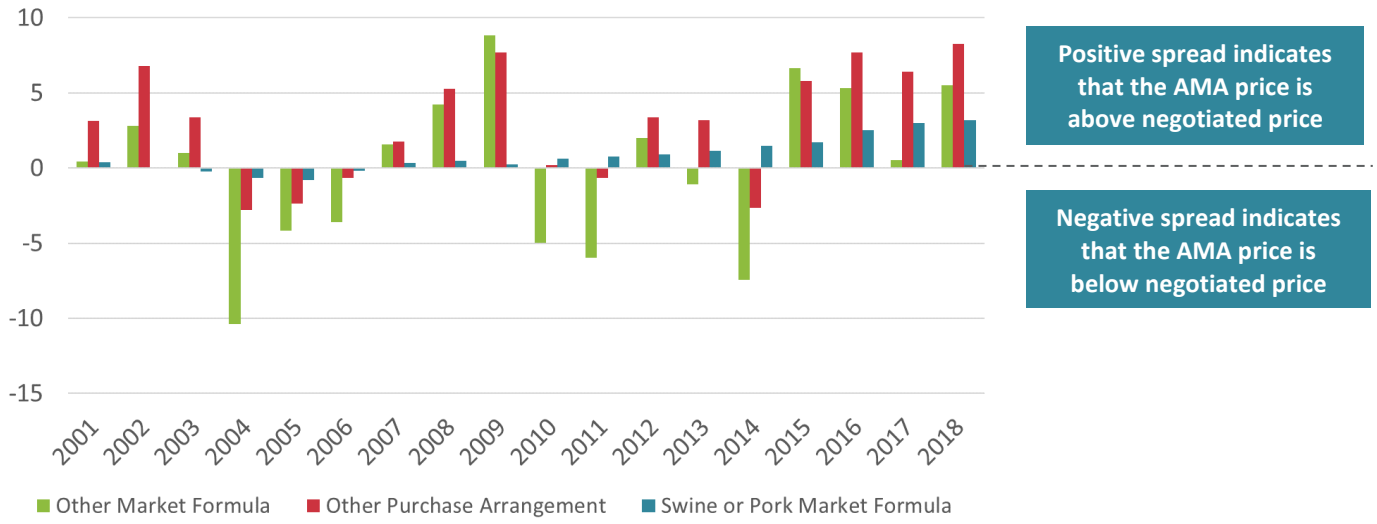
Daily pork price reporting is constrained by the confidentiality rule applied to a concentrated sector, meaning that, on certain days, there are not enough transactions/participants to publish a price for one or several cuts.

5.2 PRICE SPREAD AND BEHAVIOUR: DIFFERENCES BETWEEN MARKETING ARRANGEMENTS

THE NEGOTIATED PRICE IS AT A DISCOUNT

Carcass base price levels are different between marketing arrangements and, over the last 4 years, negotiated price has been consistently lower than alternative marketing arrangements (AMAs, see section 3.2); in the past the spread has been quite cyclical (Figure 5.1).

Figure 5.1
Price spread between negotiated price and AMAs (carcass base price in USD/cwt)



Source: Groupe AGÉCO based on USDA - AMS, LM_HG201 report.

On the negotiated market, sellers and buyers have a lot of market information available when negotiating (CME, USDA), but there are significant differences regarding quality expectations. Buyers face a lot of uncertainty about the quality of hogs they are buying, so their starting price is discounted compared to what it would be with more certainty about quality (Tonsor, 2018)[13].

Kim and Zheng (2015) have demonstrated that "AMAs benefit packers, as they pay lower prices on the spot market, to the detriment of farmers who only have access to the spot market, as they receive lower prices and face more price risk in the spot market[14]." They have also shown how the increasing use of AMAs generates more volatility of the negotiated market while decreasing its price level, mostly by influencing the supply and demand conditions in the negotiated market.

WHAT LIES BEHIND THE REPORTED PRICES?

The reported prices show differences depending on the marketing arrangements (Figure 5.2):

- Currently, the negotiated market is made of hogs destined to the commodity market and is mainly supplied by surplus hogs or by hogs whose owners want to influence the negotiated market price, which is used as a reference in many formulas (SPMF, OPA, OMF). As mentioned, the negotiated price is somewhat discounted because of the uncertainty about the quality of the carcass. Consequently, a large producer producing consistently high-quality carcass may feel that the negotiated market does not fully recognize that quality. By sending enough hogs to the negotiated markets to be bought by its usual packer who will recognize the quality, it may be able to influence the base price on the negotiated market due to its thinness[15].
- Besides, day-to-day variations in the reported negotiated price are partly explained by which packer is buying or not, regardless of market fundamentals[16].
- Negotiated prices have a lower spread between the highest and lowest price reported, outliers having a lesser influence on the average price than in other marketing arrangements. The difference in behaviour has been significant over the last five years.
- The spread between net and base prices provides information about buyers' commercial strategy and how they use marketing arrangements and pricing to manage their supply; OPA seem to have less spread between net and base prices while having a higher base price (Figure 5.1).

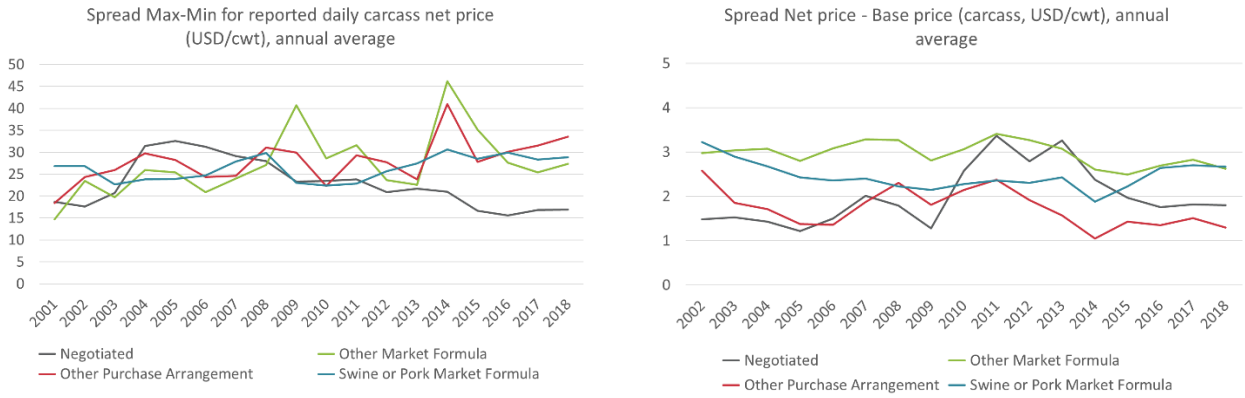
[13] Tonsor (2018). US Hog and Pork Pricing Situation. Presentation to *Éleveurs de Porcs du Québec*

[14] Kim & Zheng (2015). Effects of Alternative Marketing Arrangements on the Spot Market Price Distribution in the U.S. Hog Market., Journal of Agricultural and Resource Economics 40(2): 242–265

[15] Professor Tonsor (Kansas State University), personal communication.

[16] AJEWOLE, K., SCHROEDER, T., & PARCELL, J. (2016). PRICE REPORTING IN A THIN MARKET. Journal of Agricultural and Applied Economics, 48(4), 345-365. doi:10.1017/aae.2016.19

Figure 5.2
Comparison of price behaviour by marketing arrangement (annual average)



Source: Groupe AGÉCO based on USDA - AMS, LM_HG201 report.

The reported hog prices show different behaviours and characteristics between marketing arrangements. The next sections will provide key elements explaining these differences that will guide the design of the “Made-in-Canada” hog price model and the choice of the price references to be used.

5.3 DIFFERENT HOGS FOR THE DIFFERENT MARKETING ARRANGEMENTS

There has been a noticeable change in the average carcass profile between the various categories of marketing arrangements. While 10 years ago, differences in average carcass weight and lean percentage were slim, they are now marked, meaning that very different hogs are marketed through the various types of arrangements. (Figure 5.3)

Figure 5.3
Evolution of the average carcass quality by marketing arrangement
Comparison 2007–2009 vs. 2016–2018

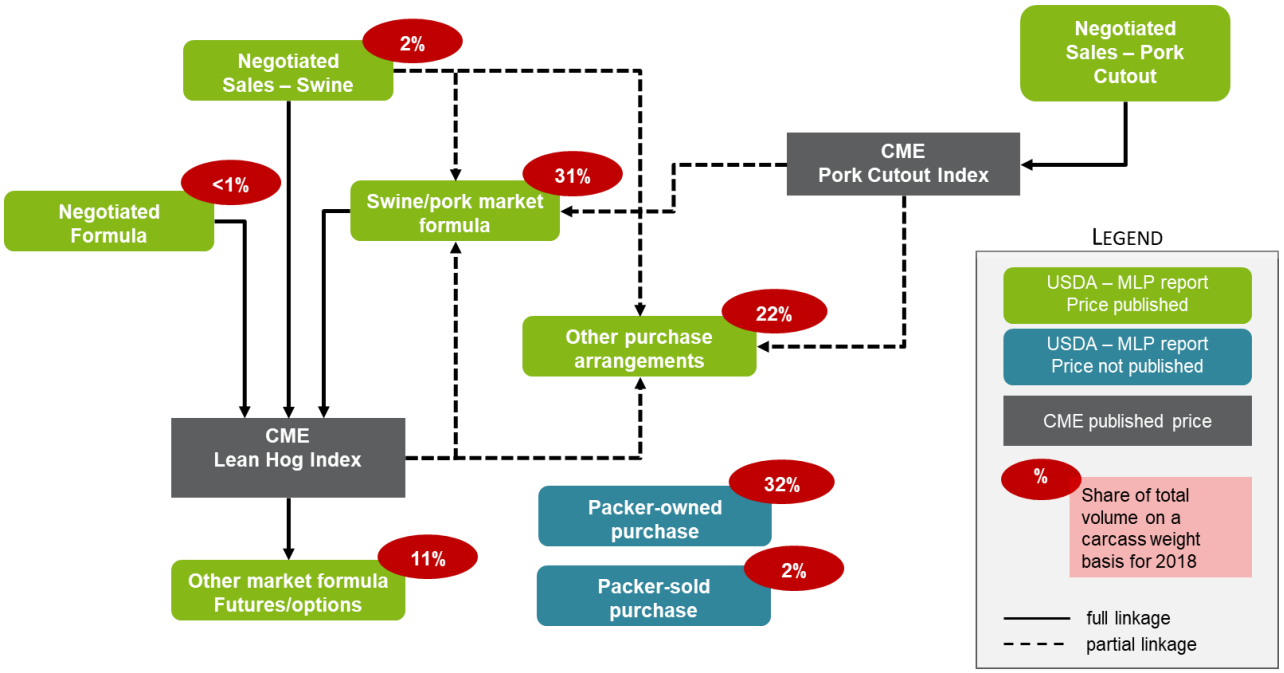
Source: Groupe AGÉCO based on USDA - AMS, LM_HG201 report.

This reflects evolution of the demand and of industry drivers (differentiation of the pork products, such as quality attributes, branding, etc.) and the emphasis on control of carcass quality and reliability of supply.

5.4 LINKAGE BETWEEN PRICES

The negotiated sales for swine play a central role in price discovery and is leveraged in price formulas covering a large part of the production (about 66%, Figure 5.4). **Consequently, the relevance of the negotiated price and its consistency with market fundamentals is critical for the hog industry**.

Figure 5.4
Linkage between reported and other published prices



Source: Groupe AGÉCO based on USDA.

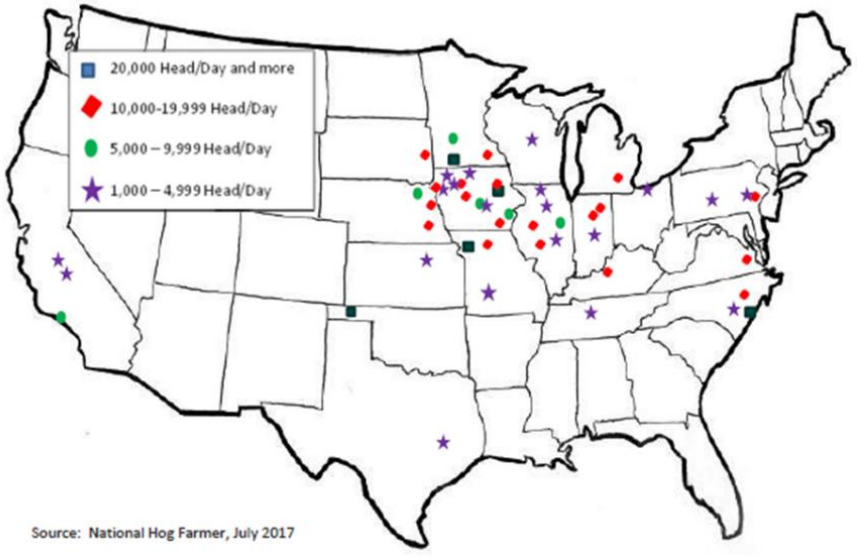
According to Professor Glynn Tonsor, about a third of the hogs may be sold under a contract whose formula has a cutout component. More and more contracts have a cutout component. For him, this trend may last for at least two to three more years, but a reversal cannot be excluded later if the cutout reference becomes less favourable. Based on his historical analysis, price formulas, including a cutout component, seem to be fairer over the long term—with more value being distributed along the supply chain—depending on the weight given to it in the formula (from only-partially-cutout-based formulas to fully-cutout-based formulas).

5.5 MARKET POWER AND PRICE NEGOTIATIONS

The pork packing sector is very concentrated, with the top three packers (22 plants) owning 61% of the total US slaughter capacity and the top five (26 plants) owning 72%.

Geographically (Figure 5.5), some regions have multiple plants operated by different companies ensuring a certain level of competition that may benefit the hog producers (Central Cornbelt). In other regions, certain packing plants enjoy a near monopoly.

Figure 5.5
US pork packing plant locations



Kerns & Associates

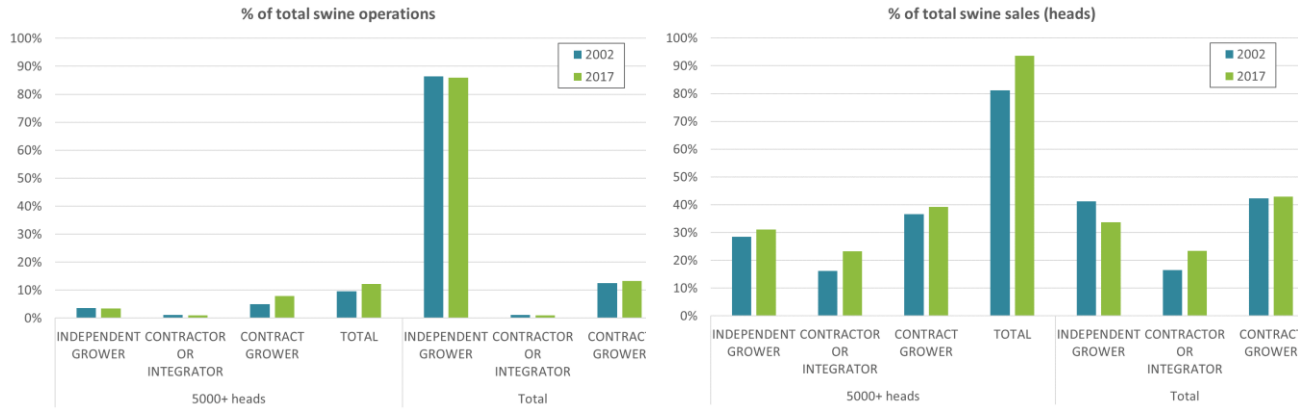
Source: Meyer (2018), https://www.ipic.iastate.edu/presentations/MeyerISD18.pdf.

Meanwhile, there is some level of market concentration at the hog producers' level. According to the latest USDA agricultural census (2017), hog operations with more than 5,000 heads in inventory represent 10% of the total number of operations but 90% of total swine sales (Figure 5.6).

Data from 2012 showed that 145 producers having more than 50,000 heads in inventory held 60% of the total US inventory (this data has not been updated in 2017). According to Pork Powerhouses[17], the 40 largest swine producers owned almost two thirds of US breeding in 2018.

[17] https://www.agriculture.com/pdf/pork-powerhouses-2018.

Figure 5.6
Distribution of swine operations and sales by type of producer and size of operations



Total number of swine operations
2002: 83,236
2017: 64,871

Total swine sales
2002: 191.7 million heads
2017: 235.3 million heads

Source: Groupe AGÉCO based on USDA – NASS (Agricultural Census 2017).

Hence, we could say that the reported prices are derived from transactions between a very limited number of market participants. A few producers will have a significant market power, while most will be price takers.

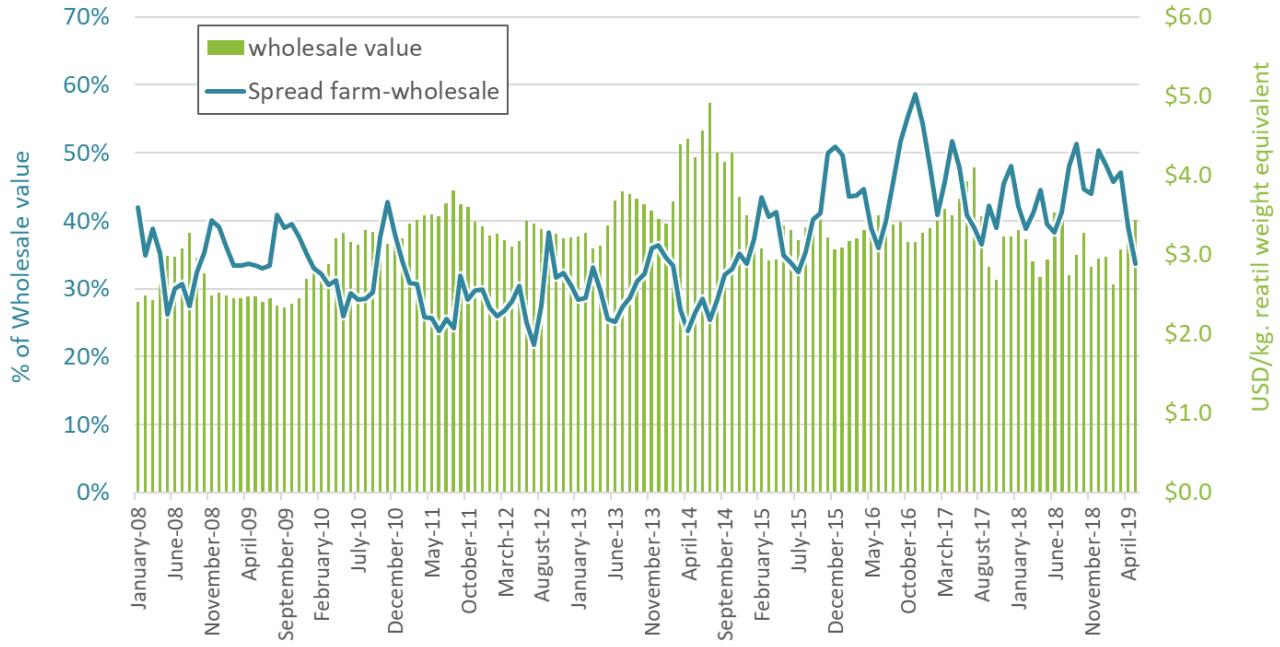
Business relationships are getting closer and closer between large producers and packers, which means that surplus hogs under contract are bought under the terms of the contract rather than sent to the negotiated markets, as reliability of supply is key for packers' competitiveness. Depending on the producer and their business relationship, the packer may offer a larger set of contract options.

Marketing strategies for producers are very complex, and the pricing mechanism is usually determined for a given volume over a given period. Hence, a large producer may have multiple price formulas set at the same time for all of its ongoing production. This means that a same producer may have hogs with prices reported under different marketing arrangements.

With respect to how the value is shared between the packer and the producer, one can observe a significant shift in mid-2014 in the value of the price spread between the producers and the packers relative to the wholesale value of pork meat[18], which is an indicator of the gross margin level at the packing level (Figure 5.7). Until mid-2014, the margin oscillated between 25% and 40% with a slight downward trend. In April 2014, it gave place to an upward trend, and the margin has never gone under 30% since then, being above 40% most of the time. Over the last five years, the packing sector has been capturing a larger share of the pork value in the US.

[18] We are using data from the USDA Meat Price Spread. Value at the different stages of the value chain are calculated on a retail weight equivalent. What is compared here is the relative value and price spread of the pork meat at and between each level. By-products are not included.

Figure 5.7
Evolution of the wholesale value of pork in the US and of the spread between farm gate and wholesale prices

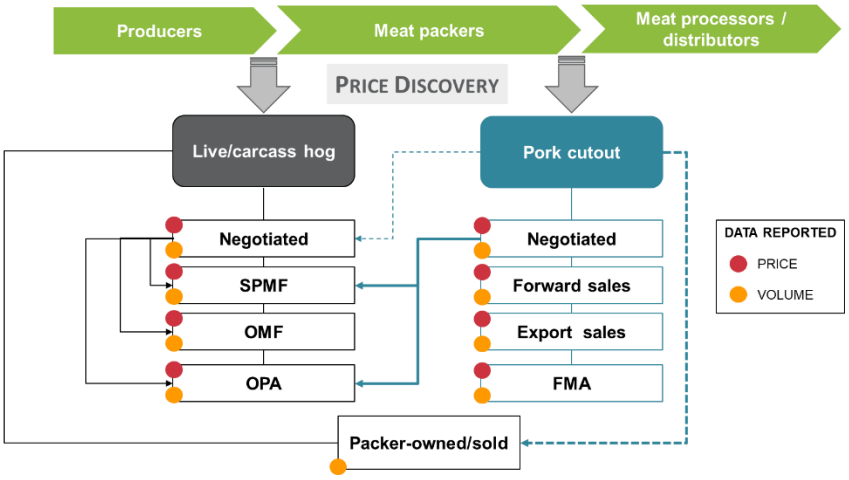


Source: Groupe AGÉCO based on USDA – Meat Price Spread data. The price data are monthly averages of reported price under the LMPR.

5.6 A COMPOSITE PRICE IS MORE MEANINGFUL

The mapping of the data reported for swine and pork and used for price discovery shows how meaningful data on pork cutout prices is for the discovery of the US swine price, as they also provide information on the underlying price of packer-owned swine (Figure 5.8).

Figure 5.8
Mapping of reported data used for price discovery in the US swine and pork industry



A pork cutout component in a price formula allows to capture more relevant market information. It is thus a necessary component of any price reference for live hogs.

Moreover, as discussed previously, the swine negotiated price tends to be discounted, as it originates from marginal transactions that are not at the core of swine producers’ business model. Consequently, the swine component of any price reference should be a composite of reported swine prices, as is the CME Lean Hog Index (see section 3.2).

6. DESIGNING A "MADE-IN-CANADA" HOG PRICE REFERENCE MODEL

Canadian pig production is characterized by marked differences between Eastern and Western provinces in terms of production systems, supply chain structures and market regulations. This makes the elaboration of a single price formula that is relevant for all live hogs sold in Canada very challenging. Among the key factors varying across provinces:

- Average carcass index
- Share of live pigs exported to the US
- Share of pork supply exported to Japan
- Market access cost (transportation)
- Share of integrated production
- Production system and cost structure
- Level of competition between packers

However, it is possible to define a general model for a "Made-in-Canada" hog price by following a structured approach, starting by setting a general framework for its design.

6.1 GENERAL FRAMEWORK FOR THE DESIGN OF A "MADE-IN-CANADA" HOG PRICE REFERENCE MODEL

Usually, the price formula used to determine the price paid to producers for their hogs is structured as follows:

$$PRICE\_Paid = REF\_Price \times ConversionCoeff + Basis + Premium/discount$$

where

- "REF_Price" will reflect the market conditions at a macro level.
- "ConversionCoeff" will allow to obtain an equivalent price (technical factors, exchange rate, etc.).
- "Basis" will reflect local market conditions (rarity of supply, over/under packing capacity, cost of market access, transportation). It can be positive or negative.
- "Premium/discount" will reflect specific quality attributes and the packer's business model.

As mentioned above, the basis and premiums grid translate local market conditions and business practices that cannot be captured into a Canada-wide price. Consequently, this research focuses on designing a model for a "Made-in-Canada" price reference for live hogs (CAN_REF).

The general model for this CAN_REF price reference would be:

$$CAN\_REF = REF\_Price \times ConversionCoeff + CAN\_Premium$$

where

- "REF_Price" is a function of existing reference prices used to set the price level for live hogs.
- "CAN_Premium" reflects general efforts made by producers to create added value for the packers (ractopamine-free, Canadian Pork Excellence program).
- "ConversionCoeff" integrates different conversion factors.

The general framework being set, the different components will be discussed in the following sections.

6.2 Choice of the reference prices for a "Made-in-Canada" price reference model: Cost of production, live hog or cutout

The first step is to choose one or several reference prices that will reflect the market conditions under which Canadian hogs are sold. The use of either a hog cost of production reference, a live hog price reference, a cutout price reference or a composite must be decided based on the industry's overall objective.

Cost of production reference

The reference price could be derived from the components of the pig cost of production, as is done in some hog contract formulas in the US or in the UK retail-aligned contract for raw milk.

However, this option is not retained. Indeed, it would exacerbate the risk borne by packers with regards to the volatility of the cost of their hog supply as the asymmetric price transmission along the pork value chain would limit the ability of packers to manage any margin squeeze. Besides, the diversity of cost structure across Canada calls for different formulas for each province, making that option somewhat less relevant and feasible.

Besides, this type of price reference is not widely used in the US and is generally used in combination with other market indicators. Hence, to avoid any hog marketing misalignment between the Canadian and US pork industries, it would be preferable not to use a price reference based only on a hog cost of production. A cost of production reference could, however, be used as a floor price to protect against a surge in grain price. A cost of production reference also remains a relevant market indicator when it comes to evaluating if a price formula is sustainable and ensures the viability of production in the long term.

Cutout reference

Integrating a cutout component allows the downstream value of pork to be shared more explicitly with the producers and facilitates the alignment of business interests. As mentioned previously in this report, there has been a shift from using live hog prices to using pork cutout prices, alone or in

conjunction with live hog prices in the US. Quebec (over 7 million hogs) recently adopted a price formula using a cutout component.

There are strong arguments in favour of using a cutout price component in the reference price for live hogs:

- A cutout reference price would alleviate some of the effects of volatility spillovers and of price transmission asymmetries[19].
- Cutout prices capture more market information than live hog prices because of the growing share of integrated value chains in the pork industry (either corporate-owned or producer-owned) for which price discovery occurs when selling pork.

LIVE HOG REFERENCE

Live hog price references are also relevant, as they reflect market fundamentals on the supply side. The live hog price reference will provide information on the cost of hog supply in relation to packers' competitiveness (capacity utilization rate, expansion and profitability).

In light of the elements discussed above, three options will be considered:

- A live-hog-only reference
- A cutout-only reference
- A composite reference with live hog and cutout components

The analysis of the pros and cons of each alternative is presented below in Table 6.1.

[19] Zheng Y. (2016). Modelling market linkages along the vertical supply chain: price transmission and volatility spillovers in the US pork industry. 2016 Annual Meeting Agricultural and Applied Economics Association, Boston
Emmanoulides C. & Fousekis P. (2014) Vertical Price Transmission in the US Pork Industry: Evidence from Copula Models, Agricultural Economics Review, Greek Association of Agricultural Economists, vol. 15(1), pages 1-12
Boetel B. & Liu D. (2010) Estimating Structural Changes in the Vertical Price Relationships in U.S. Beef and Pork Markets, Journal of Agricultural and Resource Economics, Vol. 35, No. 2, pp. 228-244
Kuiper, W. and Lansink, A. (2013), Asymmetric Price Transmission in Food Supply Chains: Impulse Response Analysis by Local Projections Applied to U.S. Broiler and Pork Prices. Agribusiness, 29: 325-343

Table 6.1
Price references: Pros and cons

Pros	Cons
Live-hogs-only	
• Well-known reference by all market participants	• Reference prices available are less and less representative. • Producers do not receive all market signals, making alignment of business interests more difficult. • Canadian producers are exposed to a risk of disequilibrium in the US live hog market (under capacity). • Canadian packers are at risk of a disequilibrium in the US live hog market (over capacity, disease outbreak). • Price with higher volatility ending up in a higher overall risk for market participants
Could create an incentive for producers to further integrate packing activities	
Cutout-only	
• Risks and profits are shared along the entire value chain. • Both producers and packers receive the same market signals, allowing more alignment of business interests. • Follows the current trend of including a cutout component in US hog contracts • Less volatility • Stabilizes packers' profit margin • More of the value created by the packers has to be shared with producers, strengthening the incentive to add value for packers.	• Issues getting a price reference, including all markets targeted (domestic and export) • Despite less volatility, weaker link with costs of production for hogs compared to a live hog price reference
Could create an incentive for packers to further integrate hog production to keep more of the value created. It depends on the return on investment required to integrate upstream.	
Composite: General considerations	
• Limits the impacts of a possible disequilibrium in one of the markets (live hogs or pork meat) for both producers and packers • Alignment with the trend of including a cutout component in US hog contracts	• Canadian producers still vulnerable to a large disruption in the live hog or pork meat markets in the US • More complicated than a single price reference
Composite: Weighted average	
• Better share of profits and risks among value chain partners • Considers more market conditions than only one reference • Better alignment of the value chain with market conditions	• Difficult to attribute a weight to each price component – somewhat arbitrary
Includes the cons and pros of both references	
Composite: Live-hog based with cutout window	
• Risks are circumscribed for both producers and packers. • The new Quebec formula is a field test of such an approach.	• Limits packers' ability to benefit from price transmission asymmetries
Composite: Cutout-based with live hog window	
	• In theory, it would shield packers from a live hog price surge. Losses would be shared with the producers if live hog prices became higher than cutout prices. Floor prices make no sense.

6.3 WHICH PRICE REFERENCES ARE MOST RELEVANT?

LIVE HOG PRICE REFERENCE

As highlighted before, the live hog reference price ought to be a US reference price, as the reference must be representative of the commodity hog market.

The most relevant reference is the USDA LM_HG201 report, which uses a weighted average of Negotiated, Negotiated Formula and Swine/Pork Formula prices.

- If the base price is to be used as a reference price in a contract formula having its own grid for carcass and non-carcass merits, then the base price published in the report must be used.
- If the base price is to be used to provide a benchmark price for the industry (i.e. a reference of the whole price paid to producers), then the net price could be used, as it includes all the premiums and carcass and non-carcass merits. An adequate live hog price reference could be the CME Lean Hog Index, which is directly based on a weighted average of reported prices for live hogs (see section 3.2).

If regional differences need to be considered, other reports may be more relevant for Western Canada (LM_HG204 and 208). These reports present purchased prices and not slaughtered prices, providing only the base price (excluding all premiums and carcass and non-carcass merits), which is fine for setting a reference price before any premium is paid. Again, one must use the weighted average prices for the following marketing arrangements to obtain a representative price: Negotiated, Negotiated Formula, and Swine/Pork Formula.

PORK CUTOUT REFERENCE

Ideally, the cutout price reference must reflect the Canadian pork packers' markets as much as possible. This means that it should be geographically representative and also based on an appropriate cutout model.

There is no official cutout model for Canadian pork nor any published cutout price.

WHAT ABOUT ESTABLISHING A CANADIAN CUTOUT PRICE REFERENCE?

A Canadian cutout price reference should be based on representative and reliable data to establish confidence. More specifically, it should include sales to export markets to capture the apparent premium on some export markets—such as Japan—which is the worthiest piece of information of a Canadian cutout reference.

Similarly, data collection must be consistent over time.

In addition, defining a Canadian carcass cutout model similar to the USDA model would be key in developing the cutout price reporting system to enable the aggregation of pork cut prices at the carcass level.

There are two possibilities for reporting a Canadian pork cutout price; either reporting is voluntary or it is mandatory.

In the case of mandatory reporting, the very small number of packers may be a challenge with respect to confidentiality rules and private information disclosure, especially in Western Canada. For instance, AAFC stopped its wholesale pork price reporting in 2016 because there were not enough reporting entities, and thus the collected data was not representative. However, initial contacts made with AAFC and Statistics Canada regarding the confidentiality rules for reporting a pork cutout reference price and the reporting parameters— such as frequency (daily, weekly), geography (national vs. regional) and scope (carcass cutout, individual cuts, domestic vs. export sales)—were not conclusive. An in-depth analysis should be made in consultation with industry stakeholders and governmental agencies that could be involved in a mandatory price reporting system to determine the data framework of this system.

In the case of voluntary reporting, a third party would have to administer the reporting. Besides, data collection and treatment should meet the requirements relating to the publication of carcass cutout prices (representativeness, consistency, reliability). Also, to maintain confidence in the voluntary price reporting system, the third party should be subject to joint monitoring by producers and packers.

In both cases, the data infrastructure and data collection could be expensive. It should thus be demonstrated that the overall benefits of having a Canadian pork cutout price reporting system out-weigh its costs. For example, in 2005 the USDA's budget to administer the LMPR was set at 9 million USD annually, and the cost of compliance for packers was estimated between 1 and 3 million USD annually[20]. Additionally, in both cases, a delay between any decision on a cutout price reporting system and its actual implementation should be expected. Hence, the joint leadership of packers and producers is necessary to carry such an initiative forward, especially since the current business environment prevailing across the Canadian pork value chain is not very conducive to such effort.

Consequently, in the absence of a Canadian pork cutout price in the foreseeable future, a US cutout price reference could be used:

- Considering that US packers are direct competitors of Canadian packers on all their markets, both domestic and foreign;
- Assuming there are no significant differences in cuts between the US and Canada (i.e. cutout models are similar, Table 6.2); and
- Keeping in mind that some adjustments may be needed to reflect specific market situations (Japan, China, Mexico) where there is a difference between US and Canadian marketing conditions and commercial environments.

[20] (https://www.everycrsreport.com/files/20061006_RS21994_0ee83a255aec7200238f3d7ad73ca4e6d9a0c868.pdf)

Table 6.2
Comparison of cutout model: Canada and the US

	USDA		Canada Pork International (CPI)
	Cutout model	Adjusted to same basis as CPI	
Ham yield	25%	27%	28%
Loin yield	25%	27%	25%
Butt yield	10%	11%	13%
Picnic yield	11%	12%	11%
Side ribs yield	5%	5%	5%
Belly yield	16%	18%	19%
TOTAL	**92%**	**100%**	**100%**

Source: Canada Pork International[21], USDA[22]

CHOOSING A US PORK CUTOUT PRICE REFERENCE

USDA cutout prices cover sales of US pork in the US but also sales to Canada and Mexico, so they are really a North American price. The cutout price for the carcass does not account for packaging and labour costs incurred by pork packers, nor does it account for by-product revenues.

Consequently, an adjustment is needed to recognize that meat packers must cover operational costs, as the purpose of the price reference model is not to hinder packers' competitiveness.
Currently, a Canadian benchmark for pork packers' operating costs is lacking. As a result, setting the share of the cutout price going to the producers could be done by relying on data from the US, which supports a 90% to 95% share (assuming operating costs of $15–$25/head[23] and a drop value of $5/head)

The Quebec new price formula and several US contract formulas are using a window contract with a minimum and maximum adjustment to the cutout reference price.

The USDA LM_PK602 and 603 reports are published daily and cover pork negotiated sales (about 30% of pork sales reported), either FOB Plant (602) or FOB Omaha (603). The FOB Plant price is more relevant, as it reflects actual business practices more directly.

The CME Pork Cutout Index is based on the USDA LM_PK602 report.

The new USDA comprehensive pork cutout report (LM_PK680) launched in May 2019 provides a cutout average value, including all alternative marketing arrangements (AMAs). It is published on a weekly basis, but historical data is sparse since it is a new report. Preliminary data shows that the comprehensive report indicates an apparently consistent premium over the negotiated pork cutout price (Table 6.3).

[21] http://www.canadapork.com/en/industry-information/meat-yield.
[22] https://www.ams.usda.gov/sites/default/files/media/National%20Daily%20Carlot%20Pork%20Overview%20PDF.pdf.
[23] https://www.ridgetownc.com/research/documents/mcewan_Processing_Jan_2010.pdf (p22).

Table 6.3
Comparison of the weekly reported cutout price for the negotiated sales report and the comprehensive sales report (USD/cwt)

Date	Negotiated	Comprehensive	Spread
	LM_PK610	LM_PK680	680 - 610
06/14/2019	83.31	85.82	+2.51
06/07/2019	83.59	86.28	+2.69
05/31/2019	83.74	87.45	+3.71
05/24/2019	84.86	88.61	+3.75
05/17/2019	87.02	89.26	+2.24
05/10/2019	85.30	86.86	+1.56

The LM_PK610 report is a weekly summary of prices reported in LM_PK602.
Source: Groupe AGÉCO based on USDA-AMS.

The pork cutout reference could be prices reported by the USDA LM_PK602, LM_PK680 or CME Pork Cutout Index.

After reviewing the different reference prices that could be used in the model, two other key components for a "Made-in-Canada" hog price reference need to be discussed to properly reflect the value of Canadian hogs with regard to US hogs: the Canadian premium and the conversion coefficient.

6.4 Establishing the Canadian hog premium

Recognizing the Japanese premium

The analysis of the value of Canadian pork on export markets has shown that Canadian fresh pork products benefit from a premium on the Japanese market over similar products sourced from the US. This premium is based on both the work of meat packers (branding) and that of producers (production certification, carcass quality).

This premium is not captured in any US cutout price reference. Hence, the latter should be adjusted accordingly to reflect Canadian pork markets.

The costs incurred by producers to comply with the Japanese market requirements apply to all hogs produced, regardless of their actual destination. Therefore, it would only be fair to share this Japanese premium.

The Japanese premium distributed over the whole carcass would be:

- Calculated as the sum of the value of premiums on the Japanese market for each cut over the US price, expressed in $/100 kg, distinguishing fresh and frozen cuts;
- Weighted by the share of each cut in the carcass cutout; and
- Weighted by the exposure to the Japanese market, which would be equal to the share of Canadian output exported to Japan for each cut, distinguishing fresh and frozen cuts.

The result would be a premium expressed in $/100 kg that could be used directly in the model without any further weighting.

Regarding data availability:

- The detailed data for exposure to the Japanese market is not currently available. Consequently, a detailed and comprehensive estimate of the Japanese premium is not possible.
- Regarding the premiums on the Japanese market, the available data is that presented in this research and covers the major cuts.
- The cut weight in the carcass cutout could be sourced from the USDA cutout model or other models.
- These parameters should be updated regularly to follow changes in the premium and in the share of exports to Japan. The update frequency would depend on data availability.

The whole set of data needed to calculate the Japanese premium is not currently available. However, a tentative estimate was made for illustrative purposes only. It is based on:

- The share of total exports made to Japan multiplied by the share of Canadian output that is exported (62%);
- The premium observed on the Japanese market for fresh and frozen products using a weighted average; and
- The assumption that the percentage of the Canadian output that is exported is uniform across cuts.

Table 6.4
Tentative estimate of the Japanese premium for pork cutout value
(*for illustrative purposes only*)

Cuts	Cutout [1]%	Japanese premium per cut [2]	Exposure to Japanese market [3]
Butt	23%	7 USD/100 kg	3%
Loin	21%	37–66 USD/100 kg	32%
Belly	13%	26 USD/100 kg	16%
Shoulder	20%	35 USD/100 kg	25%
Total Japanese premium (carcass basis)		**5–7 USD/100 kg**	

[1] From Groupe AGÉCO (2009). [2] Per data collected by Gira for this research. Based on a weighted average accounting for fresh and frozen products. Cuts price converted to carcass price using a 76% meat yield.
[3] Groupe AGÉCO based on Trade Map data. Source: Groupe AGÉCO and Gira.

The tentative estimate results in a Japanese premium of US$5 to US$7 per 100 kg.

USE OF RACTOPAMINE

Current market conditions are such that ractopamine-free hogs command a premium in the US; it is thus necessary to include this parameter in our model.

Based on a review of industry publications, the share of US ractopamine-free hog production was around 30% in 2013[24] and would currently be 50%[25]. There has thus been a significant increase, which could explain the decreasing premium for ractopamine-free hogs.

USDA data shows that the average ractopamine (beta-agonist) premium has continuously decreased since 2016[26] (Table 6.5).

Table 6.5
Average annual value of the beta-agonist premium in the US

USD/cwt	2016	2017	2018	2019
Average	$0.89	$0.83	$0.75	$0.63
Maximum	$1.57	$1.69	$1.50	$1.18

Source: USDA

Based on the current data available, the premium could be set at a value of 1–3 CAD/100kg.

While a premium for ractopamine-free hogs is presently justified for a "Made-in-Canada" price reference model—since it is not captured in the US base price that is used as reference—it must also reflect the evolution of the business environment in the US. It is not unlikely that hogs produced using ractopamine will sooner than later be priced at a discount, making a premium in Canada irrelevant.

6.5 COMPONENTS OF THE CONVERSION COEFFICIENT

EXCHANGE RATE

As the reference prices are quoted in US dollars, they must be converted to Canadian dollars.

TECHNICAL FACTORS

A conversion factor must be used to convert prices quoted on a pound basis to a kilogram basis.

An adjustment factor is needed to correct for differences in carcass yield on live weight (0.74 in the US / 0.80 in Canada).

Another adjustment must be made to correct differences in average carcass index between Canada and the US.

24 https://www.centerforfoodsafety.org/files/ractopamine_factsheet_02211.pdf

25 https://www.globaltrademag.com/features/when-pigs-and-tariffs-fly/

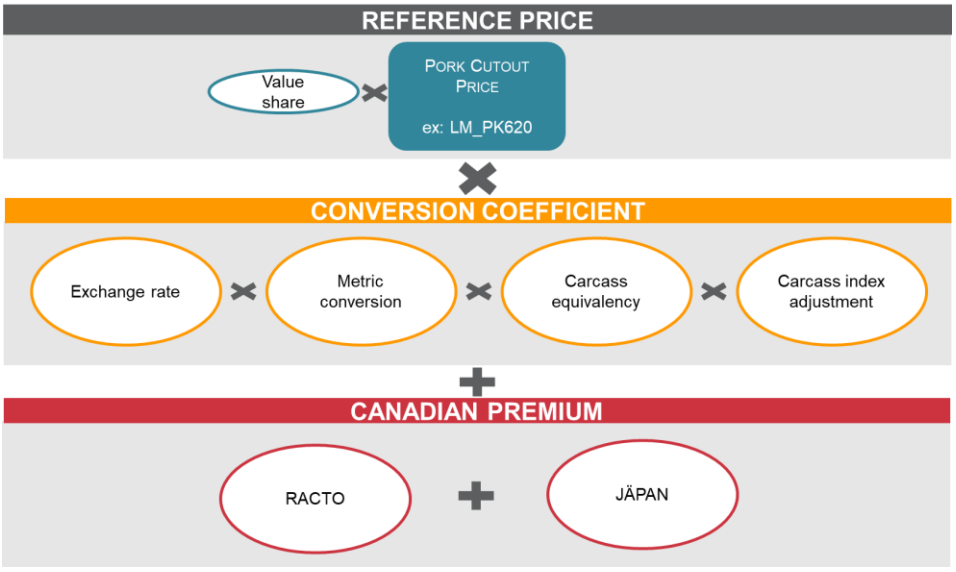
26 first year the data were collected

6.6 PROPOSALS FOR A "MADE-IN-CANADA" LIVE HOG PRICE REFERENCE MODEL

Integrating all the elements presented above, the proposed models for a "Made-in-Canada" hog price reference model are presented below:

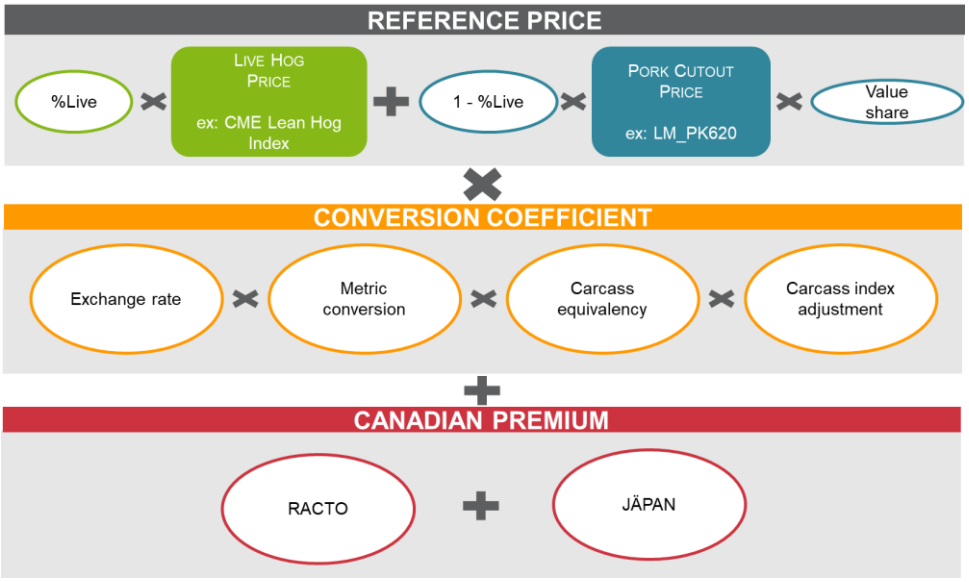
- Cutout-only reference price in Figure 6.1: The value share corresponds to the percentage of the cutout that would be paid to the producer. This percentage would have to be determined (see section 6.3).
- Composite reference price (weighted sum) in Figure 6.2: A reference price composed of a live hog reference and a cutout reference. The weight to be attributed to each component would have to be determined. The percentage of live hogs exported to the US is used to set the weight of the live hog price component in this example. The value share ratio would also have to be determined for the cutout component.
- Composite reference price (live hog price with cutout window) in Figure 6.3: The reference price is based on a live hog reference with a floor and ceiling price based on a share of the cutout reference. This corresponds to the new Quebec Formula. The value share would have to be determined for the floor and ceiling prices. Those values are respectively 90% and 100% in the Quebec Formula.

Figure 6.1
"Made-in-Canada" Hog Price Reference Model:
Cutout-only reference price



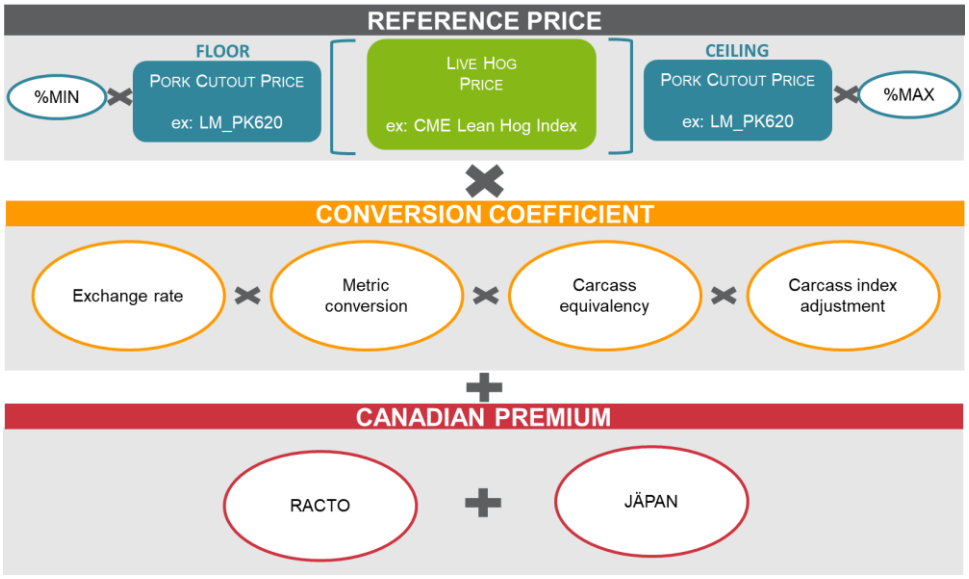
JAPAN = premium derived from exports to Japan; RACTO = premium for ractopamine-free hogs.
Value share = percentage of the cutout value received by producers.

Figure 6.2
“Made-in-Canada” Hog Price Reference Model:
Composite reference price (weighted sum)



%Live = weight given to the live hog price reference.
JAPAN = premium derived from exports to Japan; RACTO = premium for ractopamine-free hogs.
Value share = percentage of the cutout value received by producers.

Figure 6.3
“Made-in-Canada” Hog Price Reference Model:
Composite reference price (live hog price with cutout window)



JAPAN = premium derived from exports to Japan; RACTO = premium for ractopamine-free hogs.
%MIN = weight given to the cutout price to set the floor reference price.
%MAX = weight given to the cutout price to set the ceiling reference price.

7. TESTING THE THREE OPTIONS OF THE ''MADE-IN-CANADA'' HOG PRICE REFERENCE MODEL

7.1 DATA

The database includes the average weekly exchange rates (Bank of Canada) and average weekly prices for the following:

- CME Pork Cutout Index: 2013 to date (CME)
- CME lean Hog Index: 2013 to date (CME)
- Quebec formula (*Éleveurs de Porc du Québec* - EPQ)
- Ontario 100% formula (Ontario Pork)
- Base price for key contracts available in Western Canada: Olymel "OlyW2019", Maple Leaf "ML Sig4", and Hylife "Hylife" (Commodity Edge/Alberta Pork)

The three options for the ''Made-in-Canada'' hog price reference model have been simulated:

Option 1 = cutout only (see Figure 6.1)
Option 2 = weighted average of live hog and pork cutout prices (see Figure 6.2)
Option 3 = live hog price with a pork cutout window (see Figure 6.3)

The US price references used are the CME Lean Hog Index for the live hog component and the CME Pork Cutout Index for the cutout component. The value of the parameters used for these simulations are detailed in Table 7.1. Note that the Japanese premium is shared equally between the producers and packers.

Table 7.1
Parameters for the three options of the "Made-in-Canada" hog price reference model

TECHNICAL FACTORS	
Carcass weight equivalency (US to CA)	0.9250
Index correction	0.8986
Metric conversion (cwt to 100 kg)	2.2046

OPTION 1 - CUTOUT ONLY	
Share of cutout to producer	95%

OPTION 2 - WEIGHTED SUM	
Share of cutout to producer	95%
Weight of live hog price	18%

CANADIAN PREMIUM	
Japanese premium (USD/100 kg)	$6
Share of Japanese premium to producer	50%
Ractopamine-free premium (USD/100 kg)	$1

OPTION 3 - WINDOW	
Share of cutout to producer - Ceiling, Max.	100%
Share of cutout to producer - Floor, Min.	90%

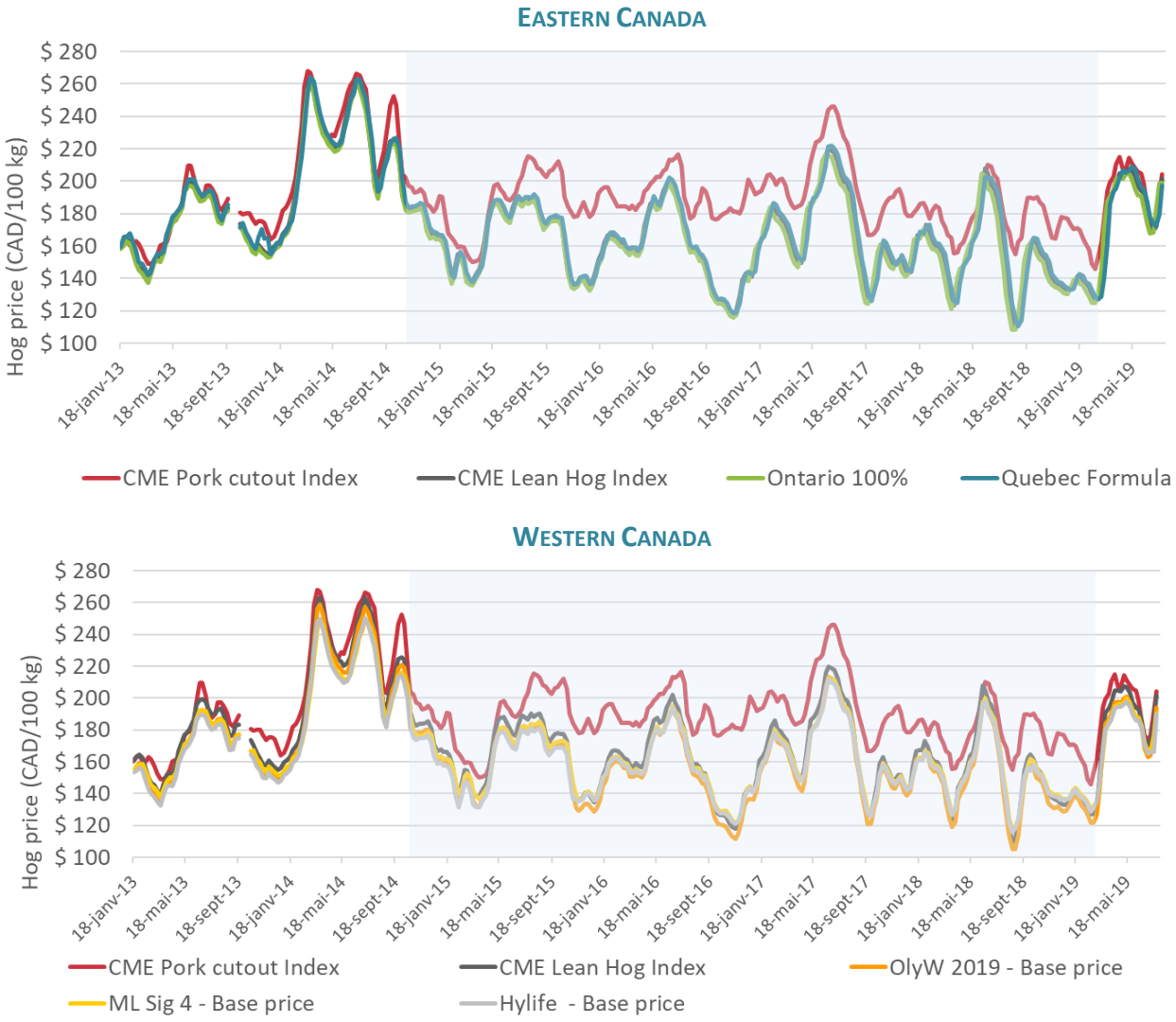
7.2 Results

7.2.1 Overview of the behaviour of selected reference prices currently used in Canada

Over the period during which the models were simulated (2013 to date), three different sub-periods were identified:

- 2013–2014: Live hog prices and cutout prices are relatively in sync, with the spread moving within a relatively stable band.
- 2015–2018: The pork cutout price dynamics diverge from live hog prices, with a lesser volatility and seasonal peaks of the spread.
- 2019 to August: The prices seem to revert to the pre-2015 dynamics.

Figure 7.1
Evolution of the US pork cutout price reference and of selected Canadian hog price references between 2013 and 2019



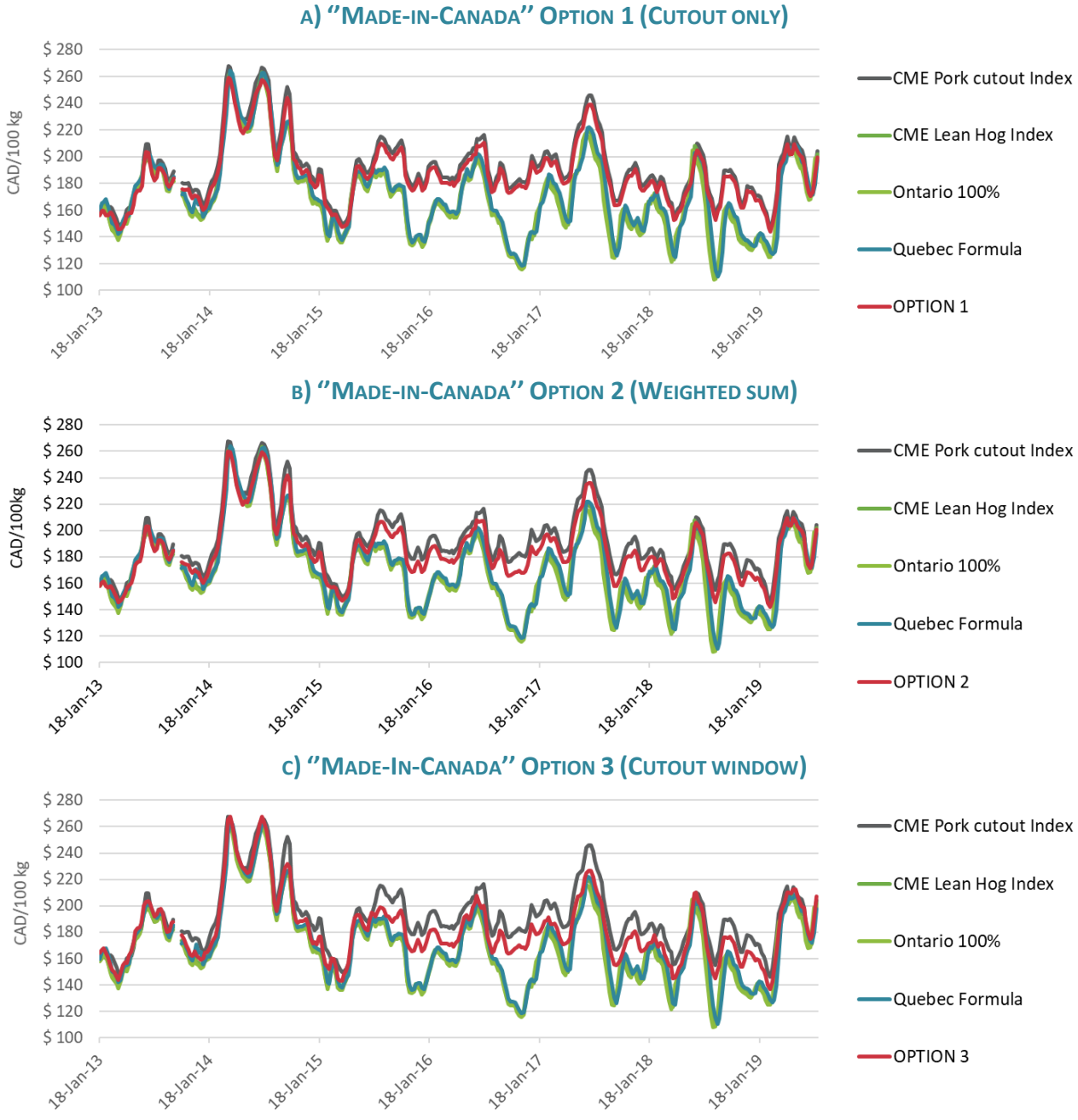
Source: CME, Éleveurs de Porcs du Québec, Ontario Pork, Commodity Edge.

7.2.2 ANALYSIS OF THE BEHAVIOUR OF THE THREE OPTIONS FOR THE "MADE-IN-CANADA" HOG PRICE REFERENCE MODEL

The analysis starts with a simple comparison of the simulated price for the three options of the "Made-in-Canada" hog price reference model using the actual reference prices used in Canada over the 2013–2019 period.

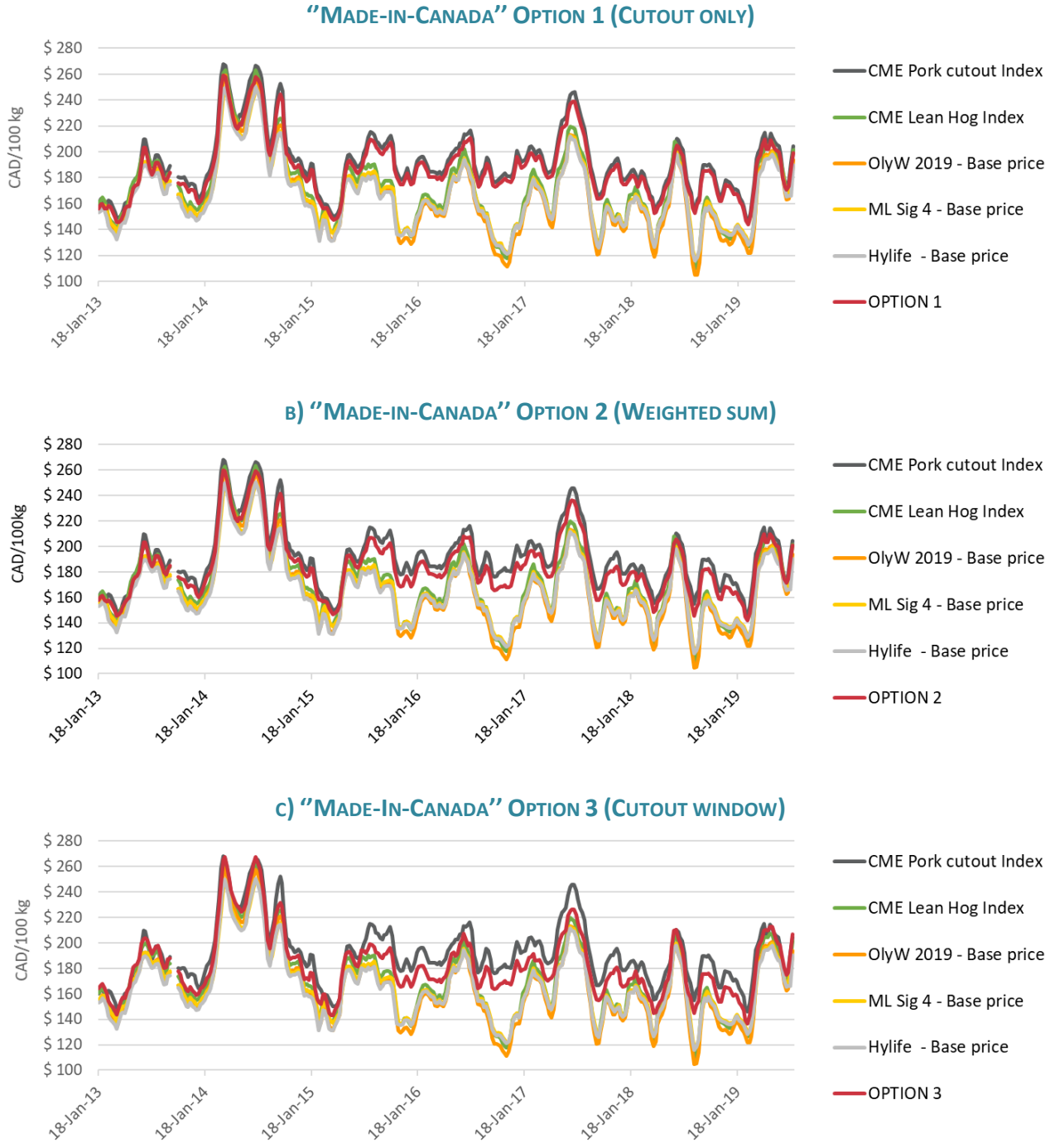
The three options (red line in Figure 7.2 and Figure 7.3 a), b) and c)) would lead to a much stronger alignment of the Canadian live hog price with the US pork cutout price (dark grey line in same figures).

Figure 7.2
Comparison of the live hog reference prices and pork cutout prices with the three options for the "Made-in-Canada" hog price reference model, Eastern Canada



Source: Groupe AGÉCO, GIRA, CME, Éleveurs de Porcs du Québec, Ontario Pork

Figure 7.3
Comparison of the live hog reference prices and pork cutout prices with the three options for the "Made-in-Canada" hog price reference model, Western Canada



Source: Groupe AGÉCO, GIRA, CME, Commodity Edge

7.2.3 Assessment of the impact of using the ''Made-in-Canada'' hog price reference model on the spread between the US pork cutout reference and the Canadian hog price references

To assess the impact of each of the three options of the ''Made-in-Canada'' hog price reference model, the analysis focuses on the spread between the US pork cutout reference (CME Pork Cutout Index) and the hog price references used in Canada, assuming that the US pork cutout reference is a conservative proxy of the undocumented Canadian pork cutout price reference[27].

On an annual average basis, the use of the ''Made-in-Canada'' hog price reference model would result in an improved reference price for Canadian hog producers in all three options (Table 7.2). The average gain over the actual reference price used across Canada throughout the 2013–2019 period would have been around 17 CAD/100 kg. The increase is significant across Canada from 2015 onwards and in Western Canada from 2013 onwards. The only exception would have been in Quebec in 2013, as a slightly lower (Options 1 and 2) or similar (Option 3) reference price would have come from the proposed ''Made-in-Canada'' hog price reference model.

Table 7.2
Annual average of the spread between the three options for the ''Made-in-Canada'' hog price reference model and selected live hog reference prices used in Canada (CAD/100 kg)

	2013	2014	2015	2016	2017	2018	2019
OPTION 1							
Quebec Formula	-$1	$3	$16	$28	$24	$20	$11
ON 100%	$3	$6	$19	$31	$28	$23	$11
OlyW2019_Base	$7	$9	$23	$35	$32	$27	$16
MLSig4_Base	$6	$12	$20	$31	$29	$21	$14
Hylife_Base	$10	$14	$24	$32	$30	$23	$16
OPTION 2							
Quebec Formula	-$1	$3	$13	$24	$21	$17	$10
ON 100%	$4	$6	$17	$27	$24	$20	$10
OlyW2019_Base	$8	$9	$21	$31	$28	$24	$16
MLSig4_Base	$7	$13	$18	$27	$25	$19	$13
Hylife_Base	$10	$14	$22	$28	$26	$20	$15
OPTION 3							
Quebec Formula	$1	$3	$10	$19	$14	$13	$10
ON 100%	$6	$7	$14	$23	$18	$17	$10
OlyW2019_Base	$10	$9	$18	$27	$22	$20	$15
MLSig4_Base	$8	$13	$15	$22	$19	$15	$13
Hylife_Base	$12	$15	$19	$24	$20	$16	$15

Source: Groupe AGÉCO, GIRA, CME, Éleveurs de Porcs du Québec, Ontario Pork, Commodity Edge.

[27] This report has demonstrated that Canadian pork is valued at par with US pork on all key markets, except in Japan where it is valued at a premium over US pork. Consequently, there is no indication that a Canadian pork cutout price reference would be lower than the US pork cutout price reference.

The proposed ‘’Made-in-Canada’’ hog price reference model would have resulted in a much lower spread between the US cutout price and the reference price for live hog (Table 7.3). This is particularly true from 2015 onwards.

Table 7.3
Annual average of the spread between the CME Pork Cutout price and the three options for the ‘’Made-in-Canada’’ hog price reference model as well as selected live hog reference prices used in Canada (CAD/100 kg)

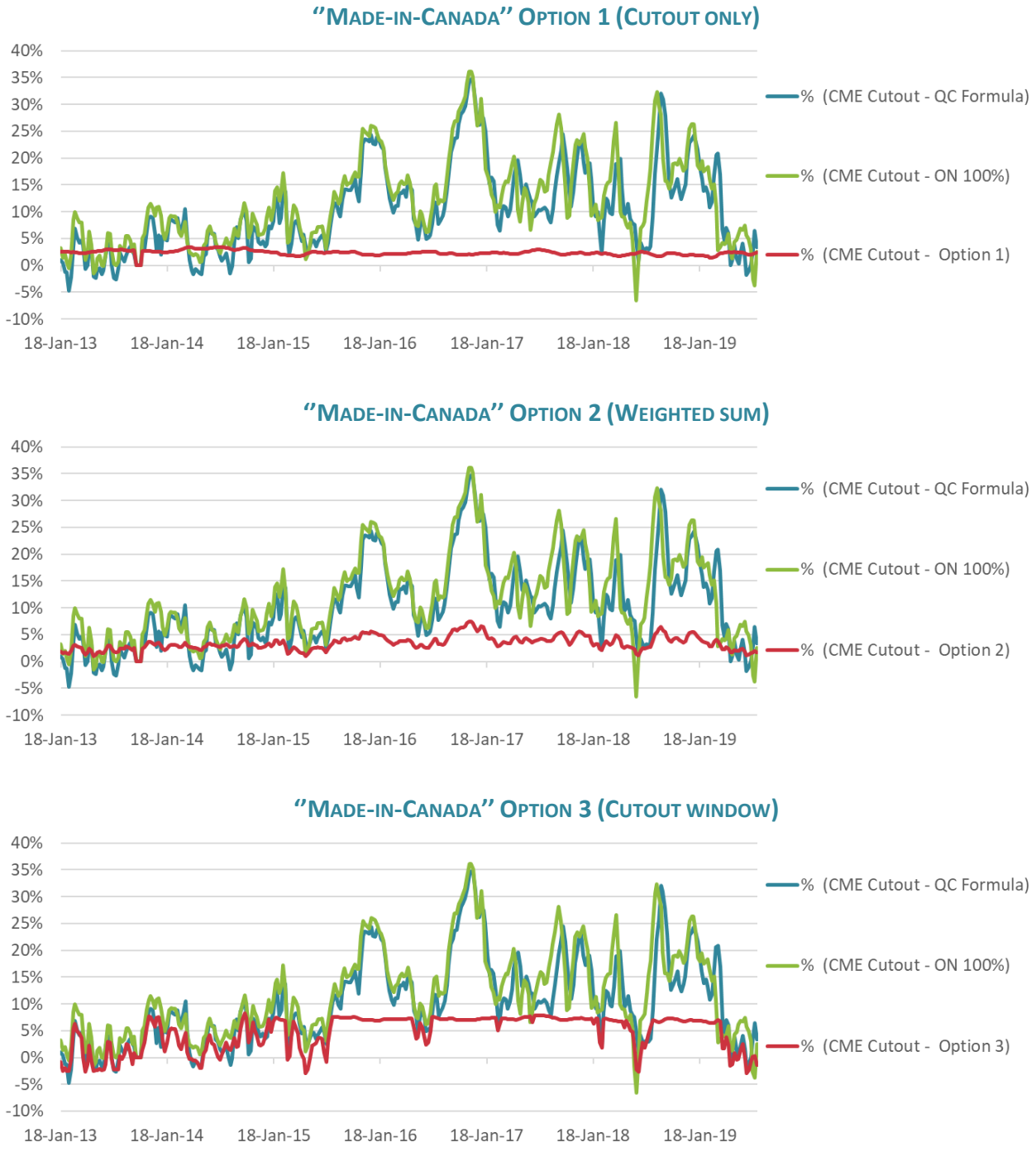
	2013	2014	2015	2016	2017	2018	2019
Option 1	$5	$7	$4	$4	$5	$4	$4
Option 2	$4	$7	$6	$8	$8	$7	$5
Option 3	$2	$6	$10	$13	$15	$10	$5
QC Formula	$4	$9	$20	$32	$29	$23	$15
ON 100%	$8	$13	$23	$35	$32	$27	$15
OlyW2019_Base	$12	$15	$28	$40	$36	$30	$20
MLSig4_Base	$11	$19	$24	$35	$34	$25	$18
Hylife_Base	$14	$21	$28	$36	$35	$27	$20

Source: Groupe AGÉCO, GIRA, CME, Éleveurs de Porcs du Québec, Ontario Pork, Commodity Edge.

The use of the three options would have resulted in a larger share of the pork cutout value being distributed to producers, especially over the 2015–2018 period. In Figure 7.4, the red line indicates the spread between the CME Pork Cutout Index and the ‘’Made-in-Canada’’ hog price reference model.

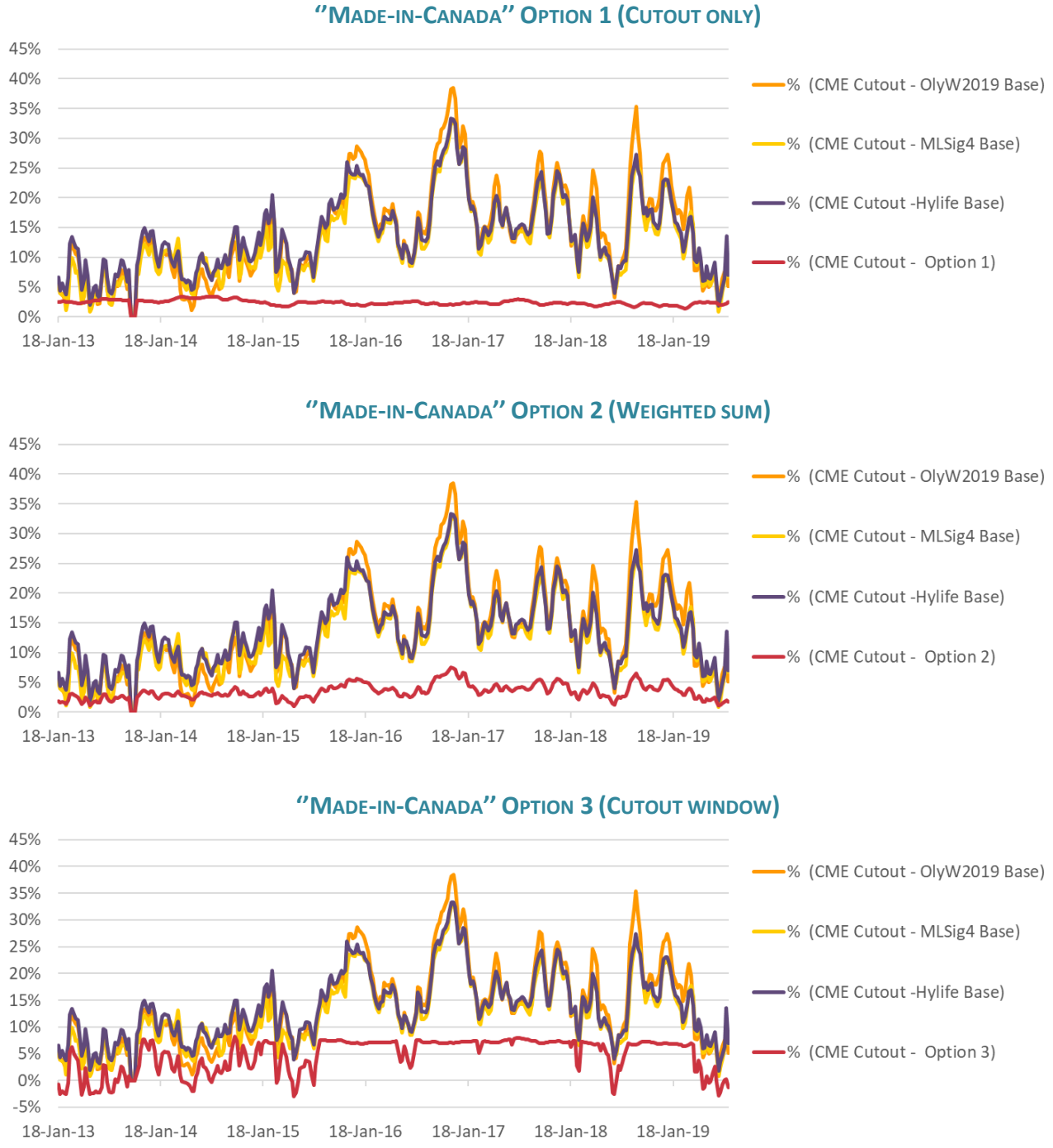
Figure 7.4 shows that, in the case of Option 3, the ‘’Made-in-Canada’’ hog price reference more closely follows the spread variations when the US live hog price reference and the US pork cutout price reference are aligned (2013–2014 period and 2019); it also shows that the ‘’Made-in-Canada’’ hog price reference contains the upswing of the spread (2015–2018 period).

Figure 7.4
Comparison of the spread between the CME Pork Cutout Index and the live hog reference price as a percentage of the CME Pork Cutout Index, Eastern Canada



Source: Groupe AGÉCO, GIRA, CME, Éleveurs de Porcs du Québec, Ontario Pork

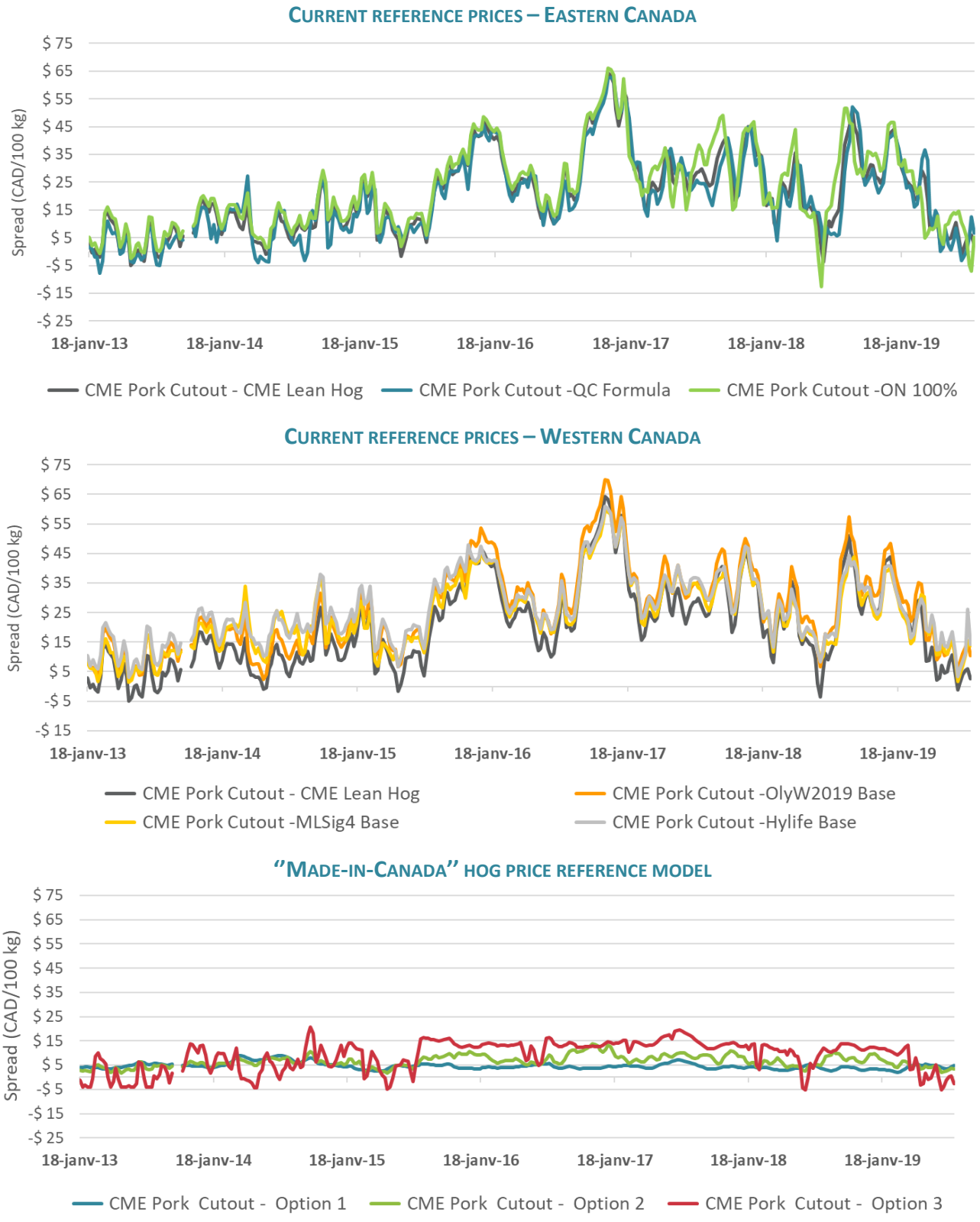
Figure 7.5
Comparison of the spread between the CME Pork Cutout Index and the live hog reference price as a percentage of the CME Pork Cutout Index, Western Canada



Source: Groupe AGÉCO, GIRA, CME, Commodity Edge

Figure 7.6 shows that the volatility of the spread would be significantly reduced and stabilized.

Figure 7.6
Comparison of the spread between the CME Pork Cutout Index and the live hog reference price



Source: Groupe AGÉCO, GIRA, CME, Éleveurs de Porcs du Québec, Ontario Pork, Commodity Edge

Another interesting and crucial finding is that Canadian packers were able to function during the 2013–2014 period with spreads between 5 and 15 CAD/100 kg. Assuming there were no apparent major shifts in packing operating costs during the 2015–2018 period, they could have remained competitive without the spread reaching values above 25 CAD/100 kg over extended periods of time between 2015 and 2019.

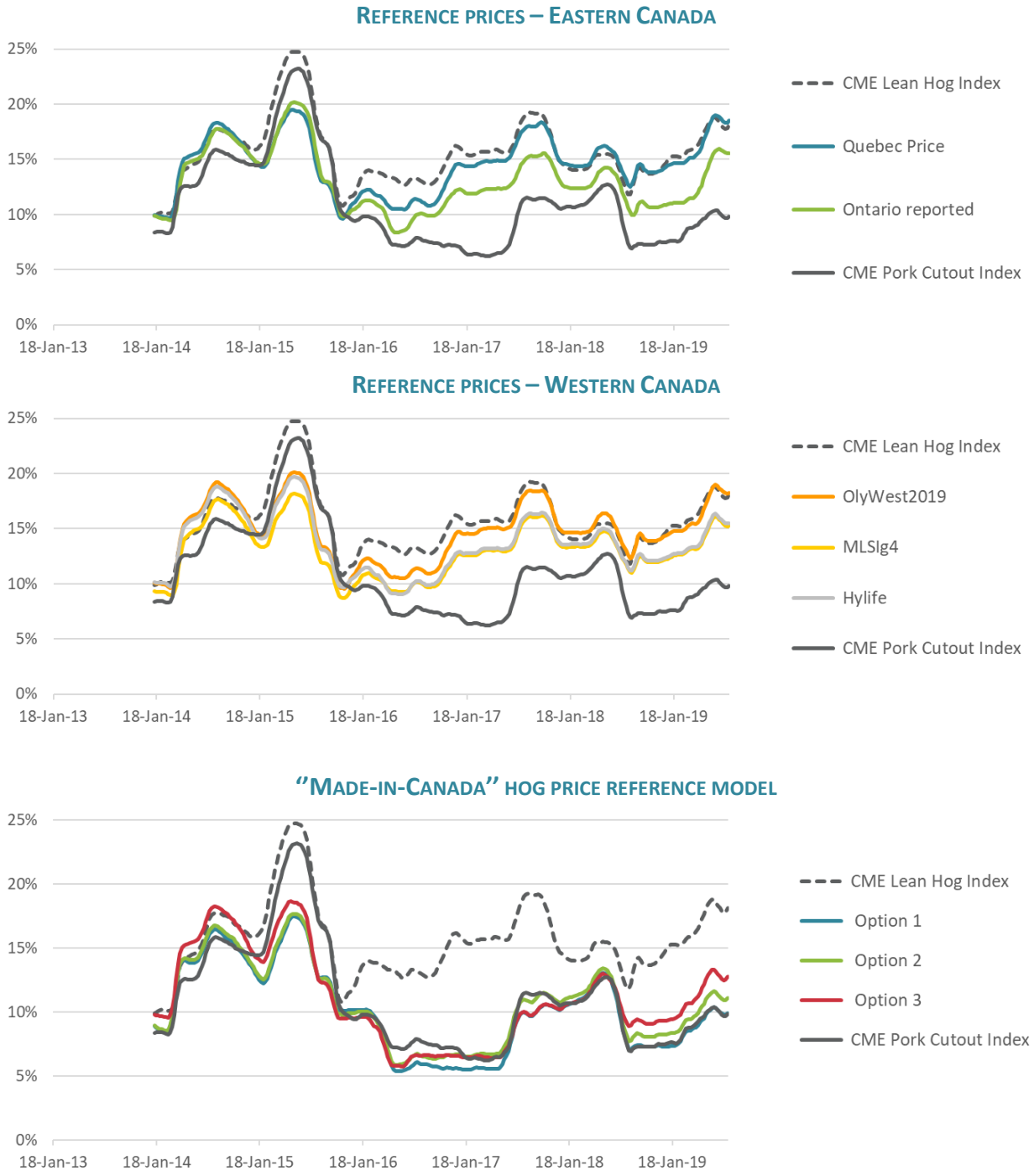
Figure 7.6 shows that using Option 3 of the ‘’Made-in-Canada’’ hog price reference model would have maintained the spread close to the range of the 2013–2014 period, while Options 1 and 2 would have caused a more significant spread reduction over the 2015–2018 period compared to 2013–2014.

7.2.4 ANALYSIS OF THE VOLATILITY OF THE HOG PRICE REFERENCES IN CANADA

Volatility is expressed as the ratio between the moving standard deviation over the latest 52 weeks and the moving average over the same period.

The three options for a ‘’Made-in-Canada’’ hog price reference model would significantly reduce volatility compared to the current reference prices used in Canada (Figure 7.7), with a level much closer to that of the US pork cutout price.

Figure 7.7
Comparison of the volatility (52 weeks) of the live hog reference prices and of the three options for a "Made-in-Canada" hog price reference model



Source: Groupe AGÉCO, GIRA, CME, Éleveurs de Porcs du Québec, Ontario Pork, Commodity Edge

7.2.5 SENSITIVITY ANALYSIS OF THE THREE OPTIONS FOR THE "MADE-IN-CANADA" HOG PRICE REFERENCE MODEL

The three options for the "Made-in-Canada" hog price reference model each have parameters that influence the level of the simulated price references. To evaluate the spread's sensitivity to change between the three options and the selected actual price references used in Canada, three scenarios were defined (Table 7.4).

Table 7.4
Scenarios for the values of the parameters of the Made-in-Canada hog price reference model

SCENARIO	A	B	C
OPTION 1 - CUTOUT ONLY			
Share of cutout to producer	95%	93%	90%
OPTION 2 - WEIGHTED SUM			
Share of cutout to producer	95%	95%	90%
Weight of live hog price	18%	50%	50%
OPTION 3 - WINDOW			
Share of cutout to producer - Ceiling, Max.	100%	97%	95%
Share of cutout to producer - Floor, Min.	90%	90%	90%

Sensitivity is evaluated based on changes in the spread between live hog price references calculated using the proposed options and the US pork cutout price reference, averaged over the entire 2013–2019 period.

The results of the sensitivity analysis (Table 7.5) show that there is room to adjust the value of the parameters while maintaining an overall decrease of the average spread with the US pork cutout price reference over the 2013–2019 period, indicating that a greater share of the pork value was distributed to the Canadian hog producers. Indeed, the average spread between actual reference prices[28] across Canada was $23.8/100 kg over the 2013–2019 period. In the meantime, the simulations of the three options for the "Made-in-Canada" hog price reference model ranged between $4.6 and $16.7/100 kg. Option 3 is thus the less sensitive to changes in the value of its parameters.

Table 7.5 also highlights the relative importance of the cutout component in reducing the spread between the hog price reference and the US pork cutout price reference. Indeed, by setting the Canadian premium (Japan market and ractopamine) at $0, the spread obtained for the three options would still be significantly inferior to the spread obtained with the actual hog price references over the 2013–2019 period.

[28] Quebec formula, Ontario 100%, OlyW2019 base, ML Sig4 base and Hylife base.

Table 7.5
Impact of changing the values of the parameters of the ''Made-in-Canada'' hog price reference model on the spread with the US pork cutout reference
(Average spread over the 2013–2019 period)

Spread with US pork cutout (CAD/100 kg)		Japanese premium (USD/100 kg)			
OPTION	SCENARIO	$6	$3	$0	$0 *
1 Cutout only	A	$4.60	$6.50	$8.30	$9.60
	B	$8.50	$10.30	$12.20	$13.40
	C	$14.20	$16.10	$17.90	$19.20
2 Weighted sum	A	$6.60	$8.40	$10.30	$11.50
	B	$10.00	$11.90	$13.70	$15.00
	C	$14.80	$16.70	$18.50	$19.80
3 Cutout window	A	$8.90	$10.70	$12.60	$13.80
	B	$9.40	$11.30	$13.10	$14.40
	C	$10.30	$12.20	$14.00	$15.20
Average across Canadian reference prices**		$23.80			

* In addition to the Japanese premium being set at $0, the ractopamine premium is also set at $0.

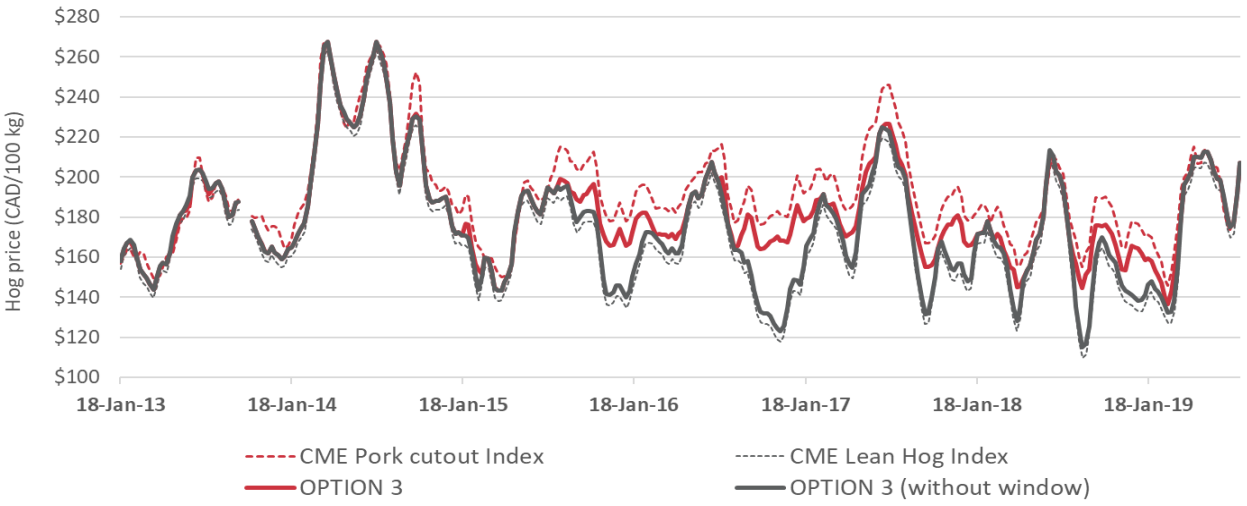
** Average, over the period 2013-2019, of the spreads between the CME Pork Cutout Index and each of the following Canadian reference prices: Quebec formula, Ontario 100%, OlyW2019_Base, ML Sig4_Base and Hylife_Base

Source: Groupe AGECO.

7.2.6 Effect of the cutout window in Option 3 of the ''Made-in-Canada'' hog price reference model

For Option 3 (Cutout window), the ceiling only came into play for a short period and only with a slight correction (a few weeks during spring 2013). However, the floor price was triggered for extended periods of time with a significant correction (Figure 7.8): Oct. 2015–Feb. 2016, Sept. 2016–Feb. 2017, Sept. 2017–Jan. 2018 and Aug. 2018–Jan. 2019. Figure 7.6 illustrates the seasonality of these periods; autumn to early winter is when the floor price was triggered. It also clearly shows how the cutout window allows to keep the hog price reference aligned with the US cutout price.

Figure 7.8
Effect of the cutout window in Option 3 of the ‘’Made-in-Canada’’ hog price reference model



Source: Groupe AGÉCO, GIRA, CME, Éleveurs de Porcs du Québec, Ontario Pork, Commodity Edge.

7.3 Discussion

Based on the 2013–2019 price history, each of the three options proposed for a ‘’Made-in-Canada’’ hog price reference model would have had a significant impact on the prices paid for hog produced in Canada. This impact would have been felt mainly over the 2015–2018 period, when there was a rapid and sustained increase in the difference between the price of meat (cutout) and the price of live hogs (live hog price).

Option 1—by completely aligning the price of live hogs with the American cutout—would set how the value of pork meat is shared along the value chain. It therefore considerably reduces the volatility of the price of live hogs.

Option 2 sets a price reference on both the price of live hogs in the United States and the price of pork (cutout). It therefore retains more volatility since it incorporates the volatility of the price of live hogs, which is higher than that of meat. The weight of the live hog price component was set at 18% in the model, corresponding to the percentage of Canadian hogs sold live in the United States. The value of this parameter would certainly be subject to debate. This parameter is difficult to establish based solely on an economic argument. Any increase in the weight given to the live hog price in the model would increase volatility, and if the 2015–2018 price environment were to be reproduced, it would lead to a lower price compared to the one obtained with a lower weight for the live hog price component.

Finally, Option 3 retains a price reference based on the price of live hogs while protecting market players from possible stalls at one price or the other (live hog or pork cutout). The use of such a price reference would have resulted in significantly higher live hog prices during the 2015–2018 period and in greater volatility than the other two options, as it is further influenced by the price of live hogs.

However, volatility would still have been lower than for actual hog prices in Canada over the period analyzed (2013–2019).

The sensitivity analyses show that the price levels resulting from the 3 options are more sensitive to changes in the values of the parameters applied to the reference price than to changes in the level of the Canadian premium (Japan and ractopamine). For instance, the introduction of a cutout reference would have had much more of an impact on the price paid for live hogs over the 2015–2018 period.

8. CONCLUSION

The objectives set at the onset of the research were threefold:

1. To determine the value of Canadian pork versus that of major competitors in Canada's key export markets: United States, Mexico, Japan and China
2. To identify and quantify the factors that contribute to determining the value of Canadian pork in the four markets
3. To propose a set of market indicators that could be used to develop a "Made-in-Canada" live hog price based on a carcass cutout

Regarding the first two objectives, the key findings can be summarized as follows:

- In most markets, the Canadian origin of pork products does not determine how buyers perceive their value per se. The main factors shaping product value in the eyes of the buyers are the price, the brands carried by packers and general quality specifications (ractopamine-free for the Chinese market).
- The only market where the Canadian origin constitutes a differentiating factor is the Japanese market, resulting in an observable premium. One should note that the impact of the Canadian origin is compounded by the branding effort undertaken by Canadian packers. So, the premium value on the Japanese market is the result of the joint effort of all players across the Canadian pork value chain.
- In all markets, US pork is a direct competitor of Canadian pork.

With respect to the third objective, our research—which is based on an extensive and critical analysis of the price discovery process for live hogs in the Canadian provinces, the USA and other exporting countries as well as an analysis of two other sectors—found the following:

- The evolving structure of the pork industry, with its increasing vertical integration (either corporate-owned or producer-owned) and contract production, has been accompanied by a shrinking cash market for live hogs whose relevance is nowadays somewhat questionable.
- With this evolution of business models within the pork value chain, the use of a cutout-based price reference has spread. Unfortunately, in Canada, there is no transparency with respect to the value of the pork cutout because of a lack of market information.
- The price discovery process tends to reflect the prevailing business models. Hence, it cannot be designed single-handedly by one set of actors within the value chain and pretend to maintain its relevance over time.
- Considering the current structure of the Canadian pork industry, a "Made-in-Canada" live hog price reference model should rely on the following market indicators:
  - A cutout reference price or a composite price reference based both on a live hog and cutout-based carcass price reference

- A Canadian premium:
  - Recognizing the premium enjoyed by Canadian products in the Japanese markets, eventually weighted by the exposure of the Canadian pork production to the Japanese markets
  - Recognizing the effort made by producers to raise hogs without using ractopamine to allow access to diverse markets
- A conversion coefficient:
  - Accounting for the exchange rate, as the price reference would be derived from US data
  - Correcting for technical equivalency (metric conversion, carcass weight, average carcass index)

The proposed model for a "Made-in-Canada" hog price will determine the reference price upon which the final price paid to the farmer will be set. However, it does not consider the other components of this final price: the basis reflecting the local market conditions, including the cost of access to the market and the set of premiums and discounts specific to the packers' business strategy.

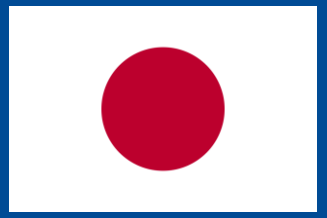
Ideally, transparent market information would be available to establish a proper Canadian cutout value. If producers and packers were ready to invest in developing such a reference, it could lay the foundations of a renewed partnership across the Canadian pork value chain.

However, in the current context, it has been demonstrated that the development of a solely Canadian price reference for hog and pork is difficult to envision, and thus the pricing process in the Canadian pork sector must remain linked to US price references. Although this option is well suited to a business-as-usual situation, the risks associated with disruptive events in the Canadian and US markets (e.g. closure of the Canada-US border) must not be overlooked. In this context, the Canadian hog industry should provide mechanisms to deal with such eventualities.

While we have proposed a price reference model that could lead to improved returns at the farm level and more accurately compensate farmers for the real value of Canadian pigs, we cannot ignore the great challenge of implementing such a price model in the Canadian hog industry. Without leverage, whether this be regulatory or through the generation of increased selling power, it is difficult to see, at first glance, how to force packers and producers to use this price model in their trade relations. It is indeed difficult to imagine packers voluntarily complying with a practice that may have the effect of reducing their margins. However, the proposed "Made-in-Canada" hog price reference model could lead to a stronger and more sustainable partnership between packers and producers by better sharing the profits and the risk burden. This would create a business environment conducive to investment.

APPENDIX 1
PORK HIGHLIGHT REPORTS BY COUNTRY

Pork Highlights – Country reports



Germany
Mexico
Chile
Denmark

USA
China
Japan

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Abbreviations & acronyms

Bn	Billion
CA	Canada
CL	Chile
CN	China
cwe	Carcass Weight Equivalent
DC	Danish Crown
DE	Germany
DK	Denmark
DKK	Danish Krone
CN	China
e	Estimated number, based on part year data (eg: 2016e)
f	Forecast number (eg: 2017f)
FTA	Free Trade Agreement
FY	Fiscal Year starting on 1 April of the mentioned year
hd	Head
HoReCa	Hotels, Restaurants and Catering Sector
HS code	Harmonized System Code, used for trade description
Kt	Thousands of Tonnes
LC	Local Currency
L&F	Landbrug & Fødevarer – Danish Agriculture & Food Council
Lw	Live weight
mio	Million
p.a.	Per Annum
pw	Product weight
USD	United States Dollar
(000 t)	Thousands of Tonnes

Pork Highlights in Germany

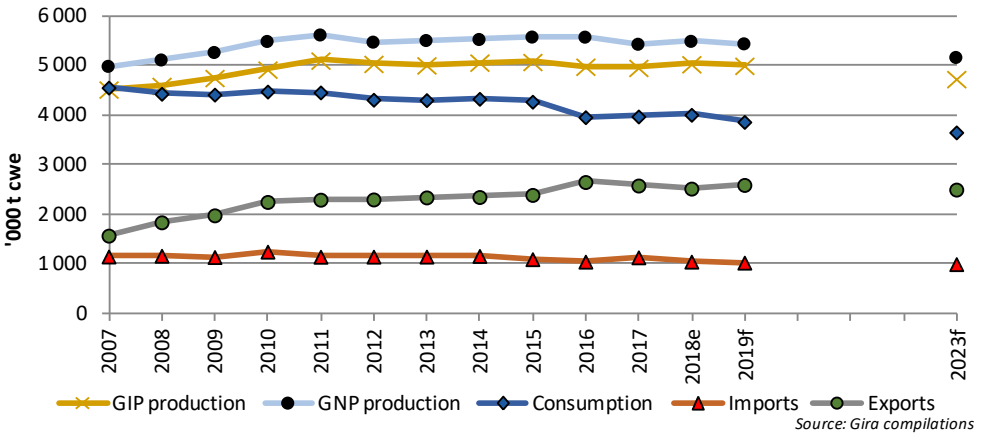
Stable GIP production, downtrend of GNP production

Germany is the largest pork market (and producer) in the EU. GIP has long been supplemented by the import of live piglets (from Denmark) and slaughter pigs (from NL and BE mainly), as well as imported meat. This reflects the better prices in Germany, and its lower relative labour cost through use of contract labour.

2018e: German production increased by +1.5%, enabled by a slight herd increase.

- With a stability in sow numbers (-0.2%), the total herd has slightly increased (+0.7%), with large regional differences:
  - The livestock-intense & well invested North-West region of Germany is more resilient to sector pressures and falling farm numbers. The herd (sows and pigs) contracted more sharply in Southern Germany.
  - Concentration of livestock is accumulating in the North-West, accounting for 63% of the country's pig herds. Rules for the construction of barns are becoming stricter regarding the environmental impact (nitrates, ammonia). Family farms and medium-sized farms achieve very good levels of technical performance thanks to investments made since the 2000s. In ten years, the production of sows has jumped by 7 piglets weaned per sow per year. The situation of the breeders is more complicated, though, with strong competition from the Dutch and Danish neighbours.
  - In the South of Germany, farms are smaller and do not reach the same level of technical performance. Productivity is lower (than the NW) by 5 pigs weaned per sow per year. Farm margins, however, are comparable with the North-West, because of lower feed costs and the good valuation of pigs.
- Due to lower productivity than neighbouring DK and NL, incomes of farmers have been eroding and the attractiveness of breeding has declined.
- **In 2018, German consumption was marked by an upward trend** (+0.8%), mainly due to higher supply and lower exports.
  - According to the GfK consumer panel, German pigmeat consumption continued to decline in the first half of 2018. Compared to 2017, purchases of fresh pork fell by almost -3%, and processed products by -2%. However, the rise in average purchase prices helped to maintain pork consumption in value terms. The decline of home consumption was partially offset by the good performance of out-of-home consumption, benefiting in particular from the football world cup.
  - Among the other meats, only poultrymeat consumption is growing (+1% in volume) while beef consumption dropped by -2% (following the increase in 2017).
- **Exports decreased by –2.4%,** with opposite trends in intra- and extra-EU markets:
  - Germany has been less present on the European market, while shipments to China has been growing throughout the year.
- **Imports followed a downtrend** (-6.2%) for both pigmeat and live animals.

German Pigmeat Balance Summary, 2007-2019f, 2023f



Source: Gira compilations

2019f: Gira forecasts a slight decline of production, but growing exports to China

- Production forecast for 2019 indicate an erosion of German production by -0.7%, mainly due to a drop in pig herds (-1.7%).
- Despite the decline in production, German producers should receive a bonus from China: around +2.5%. increase in German exports is expected.
  - However, this forecast is mostly dependent on the ASF situation both in China and in Europe, especially if the virus spreads out of Belgium and infects German regions. This is likely. Unless the Chinese adopt regionalisation principles (unlikely), German exports direct to CN will be blocked, and forced through the (less profitable) grey trade via Hong Kong.
  - Germany is the No 1 supplier of China. Losing the Chinese market would depress German prices, and EU prices generally until offset by a trade shift to other European producers.

2023f: The downward trend of production is forecast to continue.

- Production is likely to decrease by –1.2% p.a.
  - Based on a ISN study published in January 2018, 52% of German breeders will stop their activity in the next ten years. Smaller farmers will be more affected than the others.
  - The pig herd will also decrease; only 7% of larger farms are considering to increase their pig population. Moreover, ~15% of farmers are considering to invest in fattening activity.
- The accumulation of regulatory constraints, in particular on the housing of sows in maternity and mating, castration and tail docking, is the main reason for the cessation of the activity, followed by the lack of prospects and the social climate, far ahead of economic reasons.

Mexico Pigmeat Highlights

Strongly relying on imports from the US

The pig farming sector has been rapidly developing over the past ten years, and the trend is expected to strengthen through 2023 thanks to

- A strong drive to vertical integration (all stages of production from genetics, feed processing, to slaughter, also on-farm energy sources, meat distribution and retail) with continued investments
  - In 2018 Grupo Kuo (Keken) announced investments of USD 350 million to support its expansion through 2025
  - Granjas Carroll, the result of a merger between Agroindustriales Unidos de México and Smithfield, planned investments of USD 550 mio over 2017-2020to develop new farms and increase production
- Improving genetics encouraged by government programs (Program for Genetic Improvement) and imports from the US, enabling a higher productivity
- Large investments, infrastructure expansion in the South of the country
- Sustained domestic demand and increasing export opportunities to Asian markets
  - Helped by a good sanitary situation (in 2018 the US recognized MX as CSF-free)
- Relatively low feed costs from feed imported from the US

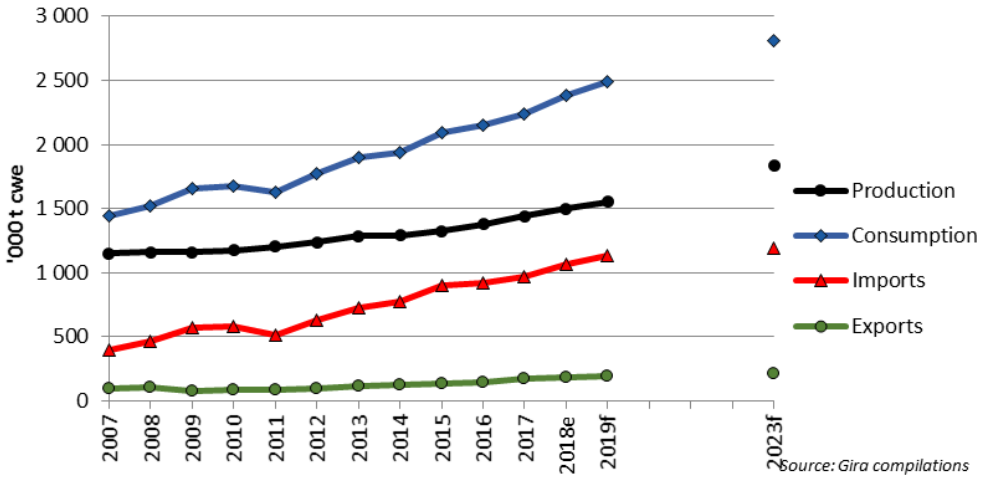
This situation is expected to continue in the next few years given a firm domestic demand and the perspective of a higher demand in Asia due to ASF there

- The new president, Andrés Manuel López Obrador, has clearly indicated that self-sufficiency in many commodities will be his priority
  - While this also covers pork production, the objective is somewhat optimistic and Gira believes Mexico will remains dependant of pork imports for several more years
- 2018 production volume was up by around +4.0% and similar growth rates are expected through 2023
  - We can expect a stronger development of the herd and production with governmental and industrial support in the coming years, maybe even stronger than our forecasts depending on government support

Total pig slaughterings are estimated between 17 and 18 mio head in 2018

- The daily capacity of the 10 companies mentioned in the table on the right corresponds to ~50% of total slaughterings … if that daily capacity is fully used
- These companies are largely integrated, from feed down to processing

MX pork balance summary, 2007-2019f, 2023f



Source: Gira compilations

Major Pork Processors & Daily Capacity, 2018

	daily capacity (head)	Website
Keken	5000	www.keken.com.mx
Caroll	5000	www.granjascarroll.com
Proan	4000	www.proan.com.mx
Kowi	3200	www.kowi.com.mx
Sasa	2900	www.sasapork.com
Norson	2600	http://www.norson.net
Granjero Feliz	2400	www.granjerofeliz.com
Soles	1800	www.soles.com.mx
Ojai	1250	www.ojaialimentos.com.mx
Gena	1000	www.gena.com.mx

Source: Gira, based on Mexicanpork.org

CHILE pigmeat highlights

Production developing quickly, perhaps too quickly, and may be threatened by imports

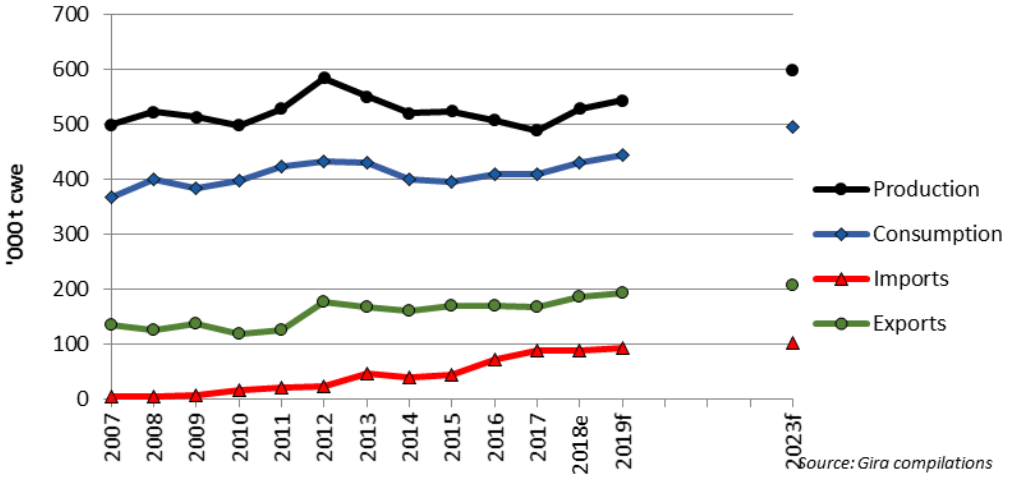
Chilean pork production had been growing at a sustained fast rate since the early 1990s until a peak of nearly 600 kt cw was reached in 2012

- This sustained growth (+8.3% p.a.) had been driven in a first stage by a focus on domestic consumption and then, from the early 2000's, by a strong focus on exports with efforts to open new markets, which was rather successful
- The industry is modern and dynamic, with a high level of sanitary control helped by Chile's geographic isolation. It is collectively managed by Asprocer (*Asociación de productores de cerdos de Chile*, the association of pig producers)

Production nevertheless declined from 2012 to 2017 (-3.5% p.a.) given a number of challenges, of which

- More international competition both in the domestic and export markets, limiting export growth and letting-in imports (from the US, Canada and Brazil) put more pressure on domestic producers
- Need to import feed and/or grain, mostly from Argentina
- Sustainability issues with a need to manage negative externalities towards the environment and communities (strong focus on methanisation projects)

CL pigmeat balance summary, 2007-2019f, 2023f



Source: Gira compilations

New production projects should be operational by the end of 2019/early 2020 but there have been no recent foreign investments in the sector

- The balance graph provided here was prepared before the recent very serious news on the ASF front in Asia, with a limited export increase and future production developments linked with a further increase in domestic demand, even though the domestic market already absorbs ~24 kg/capita
- The present ASF situation in Asia should provide a stronger than expected boost to production, with export demand increasing more than initially planned but with a potentially higher volatility as well
- Chilean producers will nevertheless have to work on their prices and assure feed procurement to be competitive in the future on the international markets

The pig farming sector is well organized

- Asprocer groups 25 small, medium and large producers, accounting for 94% of national production
- Agrosuper, the top food processing company in the country, is the undisputed leader in the country. Founded in 1955 in the poultry sector, it is a fully vertically integrated company from their own genetics, feed, farms, processing plants to distribution worldwide. It entered pig production in 1983; with an estimated 150,000 sows, it is part of the 'Global Mega Producer' list. In 2017, Agrosuper accounted for 75% of Chile's total pork production
- Five companies are leading the market

Cial Alimentos is the major pork further processing company with a market share of ~25-30%

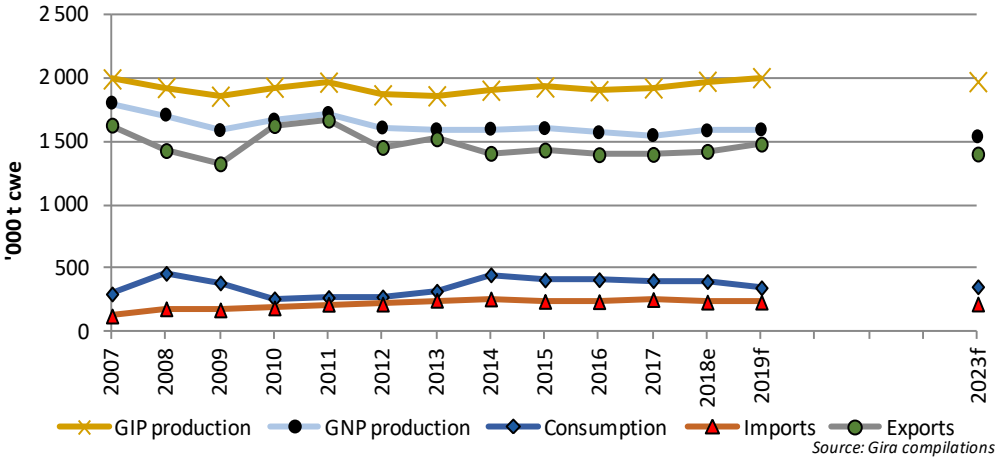
Pork Highlights in Denmark

A peak in production is expected in 2018 and 2019

2018: Production growth has been driven by herd increase

- Danish pigmeat production increased by +2.7%, similar to that of the dynamic Spanish.
- Profitability for Danish farmers was high in 2017, which prompted farmers to increase pig and sow herds (by +4.5% and +1.9%, respectively). The herd increase has been the main driver of production in 2018.
  - In 2017 feed prices remained stable and pig prices jumped by +9%. The net results of farms reached record levels (+0.2 €/kg carcass in the farrow-to-finish stages, according to InterPig).
  - Since 2017, pig fatteners may spread as much nitrogen per ha as the EU limit (170 kgN/ha), i.e. more than earlier (140 kgN/ha).
- The slaughtering activity was also dynamic in 2018: 17.9 million pigs were slaughtered (+2.4% on 2017). Margins were squeezed by lack-lustre prices and rising feed costs.
- Danish consumption decreased by –1.9%.
  - It can be assumed that Danish meat stocks are empty. The risk of ASF pushes companies to ship products immediately to export markets.
  - Danish consumers are increasingly sensitive to labelling products meeting animal welfare requirements. According to Danish Crown, the animal welfare label "Bedre Dyrevelfærd" is well received by consumers. These products represent a quarter of fresh products sold.
- Exports from Denmark jumped by +2.2% in 2018
  - The Danish pig sector is based on pigmeat exports also increased by +1.7%, mainly to other European markets (Germany, the UK, Poland).
  - 14m piglet exports, mainly to Germany and Poland are also a key dynamic – enabled by the extraordinary Danish productivity. Exports of live pigs grew by +4% in 2018. Exports to Germany are stabilizing, but more and more piglets are shipped to Poland in spite of the looming ASF threat. Polish producers are highly dependent on Danish piglets.
- Danish Crown (DC) – the dominant Danish processor (which is owned by the farmer-owned DC cooperative) has invested in the processing sector to strengthen its position.
  - Continual investment in Danish processing plants and also foreign subsidiaries which safeguard its route-to-market.
  - The investment bank NIB (Nordic Investment Bank) will lend €100 mn to DC to finance three projects, including: the acquisition of the Danish company DK Foods, European leader in the supply of pizza toppings (salami etc); the acquisition of Gzella Meat, which produces 70kt of pork per year and has a network of 250 stores in Poland, and the construction of a secondary processing plant in China near Shanghai. The plant should be opened in 2019 with a cutting & packing capacity of 14,000 tons p.a.; the raw material meat will be imported from Denmark.
  - In early June, Tulip, a subsidiary of Danish Crown, signed an agreement on the acquisition of the Dutch bacon producer Zandbergen. Despite a drop in world market prices and a slightly decreasing turnover, Danish Crown's operating profit recovered by 1.5% over the 2017/2018 financial year: it amounts to 140 million Euros, or 3.5% of the turnover.

Danish Pork Balance Summary, 2007-2019f, 2023f



Source: Gira compilations

2019f: The growth trend should continue.

- Production is expected to grow by +1.5%, boosted by the rise of the pig population – and anticipation of an export bonanza to Asia arising from the ASF crisis there.
- Exports will also increase by some +4.3% on 2018.
  - Danish breeders will ship more piglets to Poland.
  - Pigmeat export will also grow by +4.3%.
- The westward spread of ASF from Eastern Europe is a major threat. The Danes are proactively taking steps to reduce the risk to Denmark, notably through the construction of a wild-boar proof fence on its border with Germany, and other biosecurity measures.

2023f: Stabilisation is expected … as the high livestock density and its manure capacity implications are a long-term constraint.

- Following the peaks of 2018-2019, the Danish pork market is expected to stabilize.
  - The Danes lose export market share to Spanish suppliers, their main competitors.
  - Moreover, negative consumption trends will affect the Danish pigmeat market.
- This scenario of stabilisation is highly threatened by ASF further spreading in the EU. For now, biosecurity programs are applied and seem to work, and Danish breeders keep on exporting to Poland.

US Meat Industry Summary

2018 was the year of the trade dispute!

2018 will be remembered as the year that President Trump engaged in trade disputes with several countries around the world.

- The disputes began with US duties on steel and aluminium which were quickly followed by retaliatory duties by major trading partners such as MX and CN.
- There was also significant and additional bi-lateral trade friction between the US and CN involving hundreds of billions of dollars.
- Not surprisingly, the meat industry was caught up in these disputes with tariffs being placed on US beef and pork products by MX, CN and CA. The entire meat complex felt the repercussions in the form of lower prices and less access.

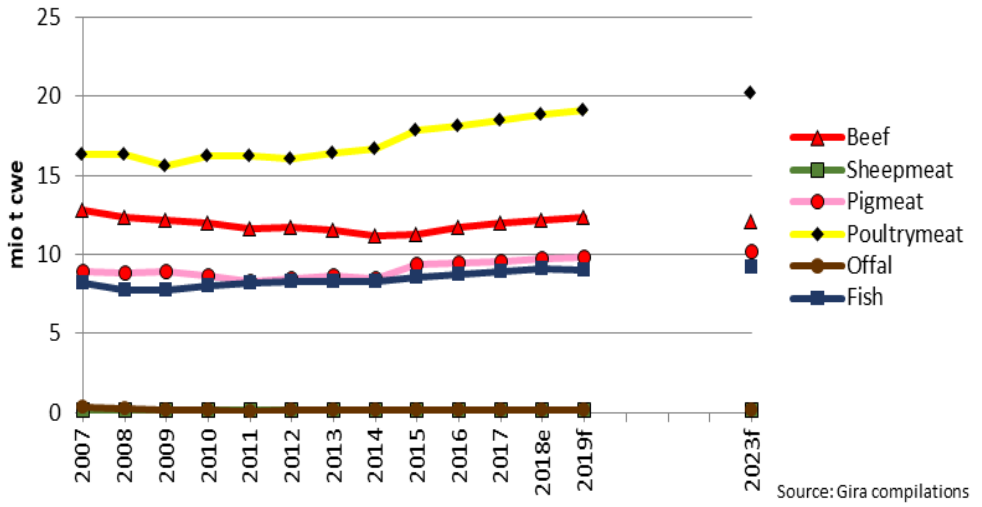
Another overriding issue faced by the meat industry in 2018 was the ongoing fall-out of Chinese African Swine Fever.

- While 2018 ends with very little concrete insight into the extent of the ASF impact on pig production**, Gira intelligence estimates that it is very serious**.
- The entire meat complex understands that the potential impact of significantly reduced Chinese pork production could have ramifications throughout the protein chain. That is going to be the story of 2019 regardless of the depth of the problem.

Finally, the other big overriding factors are simply “supply” and “demand.”

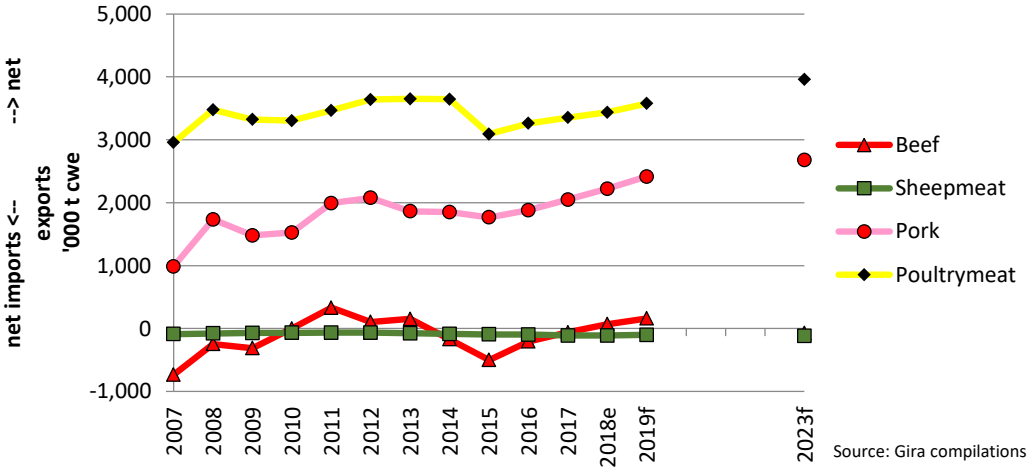
- It may seem too simple to say that, but those two economic factors were significant in 2018. On the supply side, the three main US meats saw massive output increases.
- Poultry and pork each saw new records, while beef production bounced back sharply. The meat protein pipeline is full. On the demand side, meat demand is very strong and a source of profits and optimism for the entire meat and poultry complex.
- Meat demand is a good news story in the US as consumers turn to meat and poultry for their protein in a healthy diet.
- The main issue for 2018 and 2019, however, is that demand can only take the industry so far.
  - That is, it is starting to look like the massive production expansion is taxing demand. **Supplies are not exceeding demand but they are straining price level**s. Profits, therefore, are staring to show so stress.

Consumption by species, 2007-2019f, 2023f



Source: Gira compilations

Net trade by species, 2007-2019f, 2023f



Source: Gira compilations

USA Pork Highlights

Exports increase in importance

The big issue impacting the US pork industry was **the huge increases in production**.

- The 10% increase in US packing capacity started to come on stream in 2018 and production soared. Prices were pressed lower due to production as well.
- The sow herd grew by an impressive 3.5% in 2018 and the pig crop was nearly 4% more in 2018. Live imports from CA were down by 5%.
- Total slaughter was up by 2.5% while production increased 2.6%.
- Pork imports, not surprisingly, declined by 2.6% while exports jumped by just over 6%.
- Consumption of pork increased by 1.5% in the US as pork demand was strong.
- **One of the key factors in the market in 2018 was trade disputes**. CN and MX imposed duties on US pork in response to US duties on steel and aluminium.
- The other main factor is that the large increases in US packing capacity came gradually on stream during the year.
- Finally the looming development of African Swine Fever in CN was behind stronger futures market movements in the second half of 2018.
- Prices were lower due to large production gains and the trade disputes.

Looking to 2019, the year will be all about Chinese ASF. If the problem is as bad as estimated by Gira, it will result in stronger prices.

- **The sow herd is likely to grow another 2% in 2019 as production grows to meet capacity needs**. Production is expected to increase by nearly 3% in 2019 due to ongoing increases in capacity.
- Exports will surge by 7% even as Chinese duties remain in force. This is due to the expectation of ASF in CN causing production to decline notably.
- Prices will rebound due to ASF.

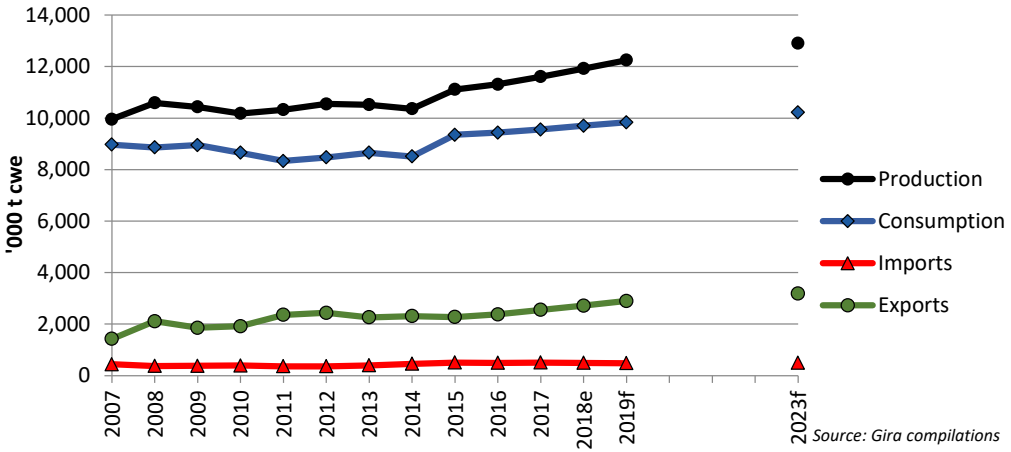
Production increases will continue as capacity increases continue through 2020.

- Exports will grow in line with production as US becomes an even large presence in global pork markets.

The top five packers in the US have about 72% share of total slaughter in 2018. That is down modestly from the 73-74% share in 2007.

- Generally speaking the pork packing industry was profitable in 2018, just not as profitable as in the record breaking 2016 and 2017.
- **The overall focus of the industry in 2018 was the adjustment of supply chains and pork marketing efforts as the industry adjusts to the historic expansion**.

USA pork balance summary, 2007-2019f, 2023f



Top five U.S. pork processors

	Company Name	Number of Plants	Kill Capacity (Annual 000 hd)	Turnover (billion USD)	Production Volume (000 t cwe)
1	Smithfield Foods	10	32,575	7.9	3,200
2	JBS USA	5	23,250	5.8	2,300
3	Tyson Foods	7	20,325	4.9	2,000
4	Hormel Foods	2	7,375	1.8	800
5	Hatfield Meats	2	5,925	1.4	600

Source: Gira compilations

Chinese Meat Industry Summary

The goal is to match the developed world

Raising the bar: China is aiming to become a **high middle-income country** – the goal is to reach the living standards of Japan, Taiwan or the United States by 2035.

- President Xi Jinping represents a **newly confident and assertive China**, and many Chinese believe **he is taking the country back to its natural role as world leader.**

Meat volume growth slows; consumers look for higher quality, health and taste.

- Overall population growth has almost entirely halted, and total meat consumption growth is slowing down.
- Urbanisation is slowing as a driver of consumption volume, but there is still room for growth in third and fourth tier cities.
- Major cities are spawning an increasingly well-to-do and demanding middle class, looking for healthier lifestyles and more and better sources of protein.

ASF is jolting the pork sector and will **boost demand for alternative proteins, especially chicken**.

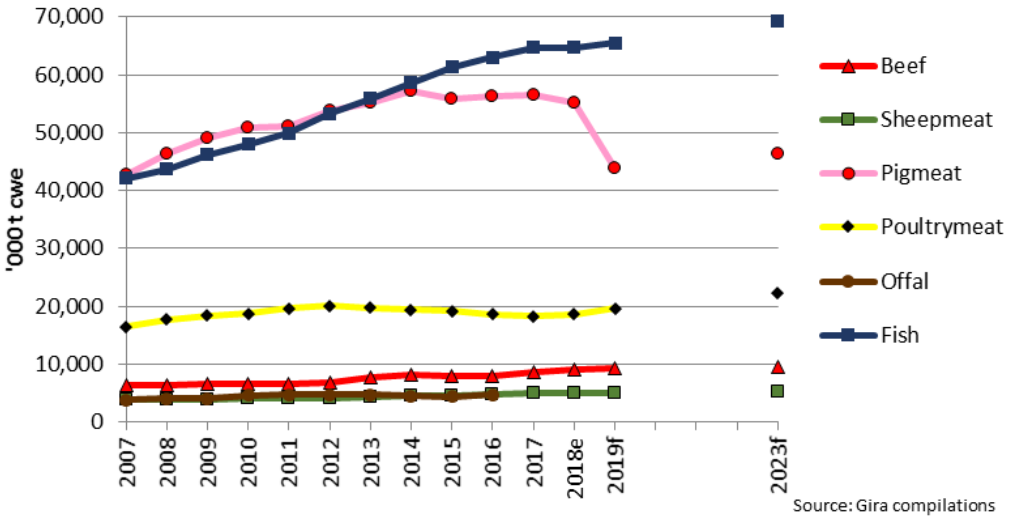
The "Trade War" with US has **distorted trade** flows worldwide.

- High import tariffs especially affect soya and pork.
- **It's not just the US** – Political and diplomatic tensions are causing trade issues with other nations too.
- ASF outbreaks will lead to higher imports for all protein in the near and mid-term.
  - Potential ASF outbreaks in Europe may affect pork import sourcing.
- The Hong Kong grey channel remains important for poultry, and a safety valve for other meats. The India-Vietnam channel remains important for beef.

Key Pig issues:

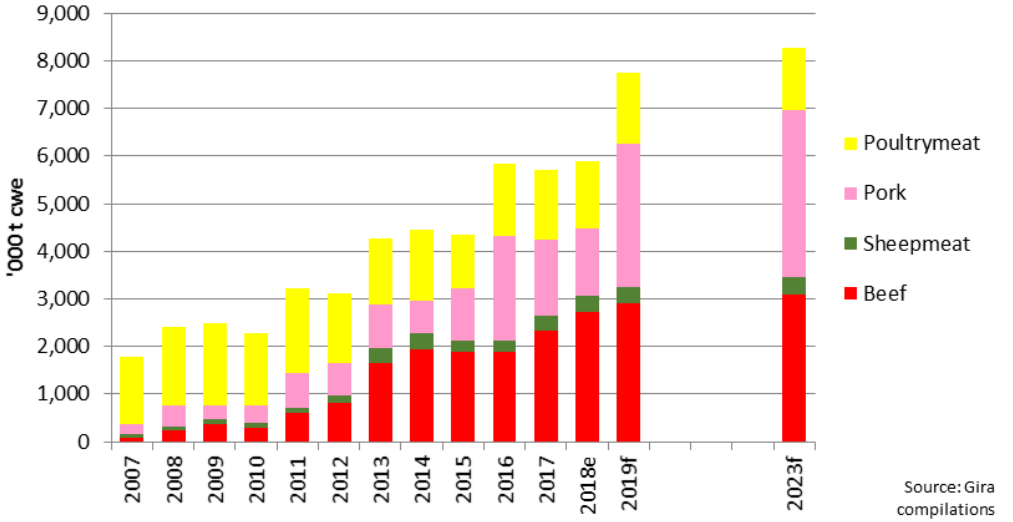
- **African Swine Fever is a disaster,** but it's an ill wind that blows nobody good.
- Like a heat-seeking missile, ASF found the gaps in China's restructuring pork sector and will remain dangerous for the short and medium term. But modern producers with good biosecurity resisted the infection and are **expecting to benefit** as ASF drives more small players out of the market.
- Consumers are substituting chicken and other proteins, which may permanently reduce pigmeat's dominant share of the meat protein market.
- High demand for pork imports in 2019 will ease by 2023.

Consumption by Species, 2007-2019f, 2023f



Source: Gira compilations

Import Trade by Species, 2007-2019f, 2023f



Source: Gira compilations

Chinese Pork Highlights

African Swine Fever scrambles the pigmeat sector

The GAMC18 forecast for 2018 was on target, but then along came ASF …

- We predicted a price plunge due to oversupply, with a slow recovery late in the year as destocking took effect.
- We also predicted reduced imports due to the surplus in domestic supply.
- Those predictions were **correct**, even though the outbreak of African Swine Fever in August scrambled the picture.

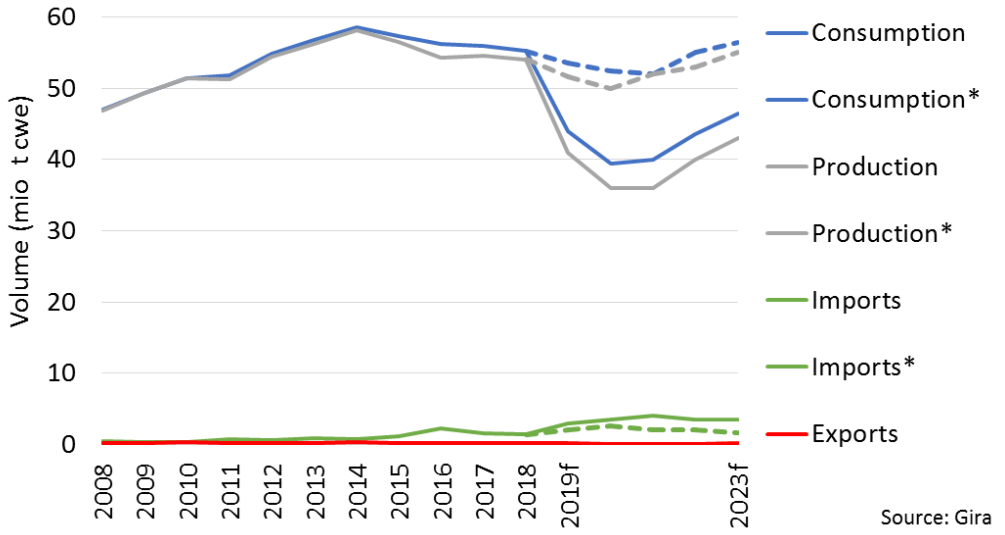
Main summary of key developments in 2018.

- Extremely low prices due to overproduction and slack demand hit the sector in the first half of the year.
- African Swine Fever broke out in August 2018 and spread rapidly. Genetic sequencing indicated the outbreak originated in Russia.
- **ASF seemed custom-designed to exploit the flaws in China's partially modernized pork sector.** The disease **hit every link** in the pork production value chain.
- The epidemic led to **regional price splits** as transportation restrictions hampered market clearance, causing gluts in some provinces and shortages in others.
- Imports remained weak as extensive **culling and destocking** by nervous producers kept domestic supplies adequate.
- **Piglet prices plunged** as growers found it hard to source piglets due to transportation restrictions, and were also reluctant to build herds in the face of uncertainty about ASF and its effects on the market.

Main summary of expected developments in 2019.

- Culling and destocking will trim the herd by at least 6%, and perhaps as much as 20%.
- **Production and consumption were both expected to fall by at least 6% and 4% respectively Y-on-Y.** By April 2019, it is becoming clearer, that the ASF outbreak is having an even more devastating impact on domestic production, with -20% being Gira's latest estimate: and with a slower recovery than originally forecast.
- Some of the most onerous transportation regulations have been being modified.
- Modern pig producer **stock prices soared** in early 2019 as investors anticipated they would **benefit from pork shortages** caused by ASF later in the year.
- **Pork imports were also expected to surge** after Chinese New Year due to reduced farrowings and low piglet restocking in the face of risk and uncertainty.
- Meanwhile, some sceptical consumers are backing off pork even though ASF does not affect humans.

Chinese Pork Balance Summary, 2007-2019f, 2023f



Source: Gira

* Pre-ASF outbreak projections

Main summary of expected developments by 2023.

- **The big players will benefit** as ASF speeds the **ongoing restructuring** of the sector.
- Millions of small, bio-insecure growers will be driven out of the market.
- A smaller but more productive herd: more piglets weaned per sow, better FCR, higher carcass weights.
- New abattoirs will be built closer to pig production zones, as in the US and Canada, to reduce live transport.
- Vertical integration will slowly take hold among the big players.
- Consumption will recover from a low in 2019 but due to demographic, economic and cultural factors **will not return to its 2014 high.**
- The industry will gain control of ASF through consolidation and improved biosecurity, but **the disease has become endemic** and occasional outbreaks will occur.
- As production becomes more efficient and ASF management improves, **demand for imports will fall.** This now looks like it will be >5 years away.

Japanese Meat Industry Summary

Meat consumption to grow at 1.1% p.a. for next 5 years; imports key driver

Key consumption (and demand) issues:

- Japanese consumers increasingly turning to cheaper imported meat
- Although declining population limits the overall consumption growth, Bf, Pk and Py consumption has kept growing in recent years thanks to evolving consumption habits and increased import availability.
  - They also benefit from issues in fish (increased price and lower quality).
- Pigmeat and poultrymeat account for 81% of total meat consumption, which is expanding at the expense of fish consumption.

Trade overview

- Total meat imports accounts for 52% of total meat consumption (2018e). This share is expected to grow slightly to 54% by 2023.
  - The share of imports in total meat consumption are expected to increase further in the next five years.
- New FTA's continue to open up a tightly controlled market, notably TPP11 and EU.

Key Cattle issues

- High producer price constrains domestic production's competitivity and demand for domestic beef. Domestic production is expected to decrease.
  - Imports will grow, although will be limited by global market supply (+0.5% p.a.).
  - Per capita consumption will increase (+0.6% p.a.).

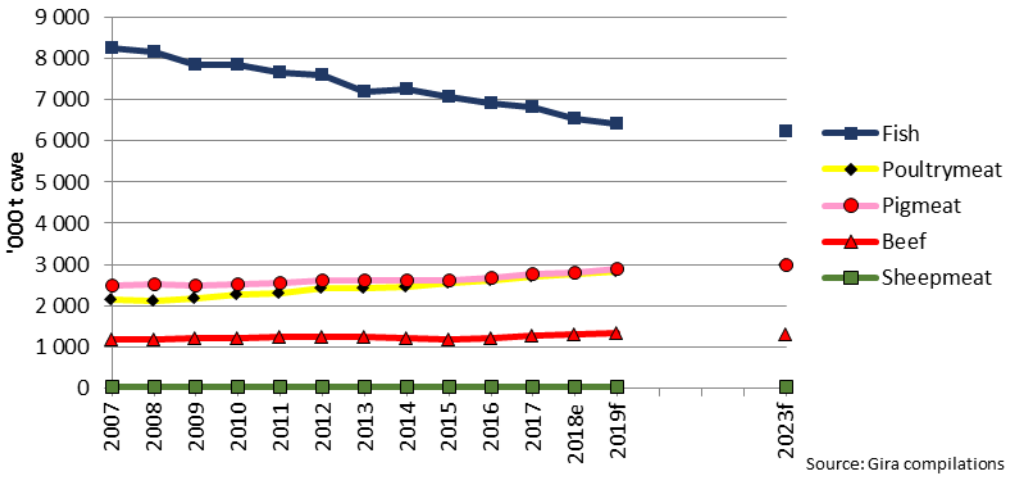
Key Pork issues

- Domestic production is expected to decrease slightly.
- Imports are forecast to expand at 2.1 p.a. to 2023, accentuated by the implementation of new FTAs.
  - Per capita consumption will increase (+1.5% p.a.).

Key Poultry issues

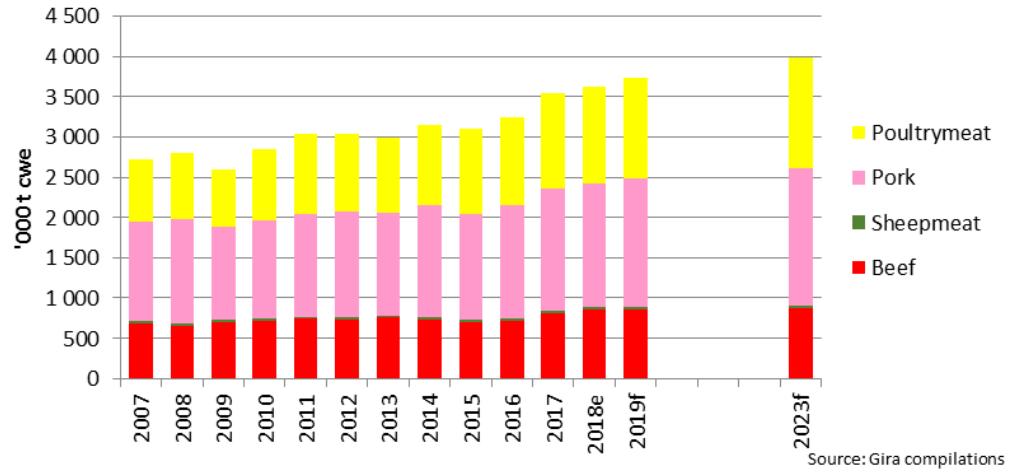
- Both domestic production and imports are expected to grow.
  - Imports will grow more rapidly since Japanese processors and importers have invested in supply base overseas.
  - Per capita consumption will grow (+1.9% p.a.).

Consumption by Species, 2007-2019f, 2023f



Source: Gira compilations

Import by Species, 2007-2019f, 2023f



Source: Gira compilations

Japanese Pork Highlights

Growing gap between imports and production, despite farm concentration

Per capita consumption continues to grow in spite of rising retail price, especially during recent years.

- The share of pork consumption in total meat consumption is relatively stable (40-41%).
  - It fell slightly in recent years due to the growth of poultry consumption.
- The high producer price constrains domestic production competitiveness & demand.
  - The PED outbreaks in 2014 pushed pork prices up sharply and since then, prices have remained at a high level due to the lower production level.
  - Japanese pork prices are high by international comparison. This is largely explained by the high production cost (imported feed + expensive labour).
  - **Imported pork is competitive compared to domestic pork, in spite of the latter's greater suitability for the Japanese consumer.**
- Japanese pork processors have established company-affiliated farms in major producing areas. NH Foods is the largest meat company in Japan and have a 20.2% market share of pork meat sales.

Production remained flat in 2018. Consumption however continues to grow, driven by the expansion of imports.

- **Chilled and processed pork import volumes increased, while frozen imports decreased slightly.**

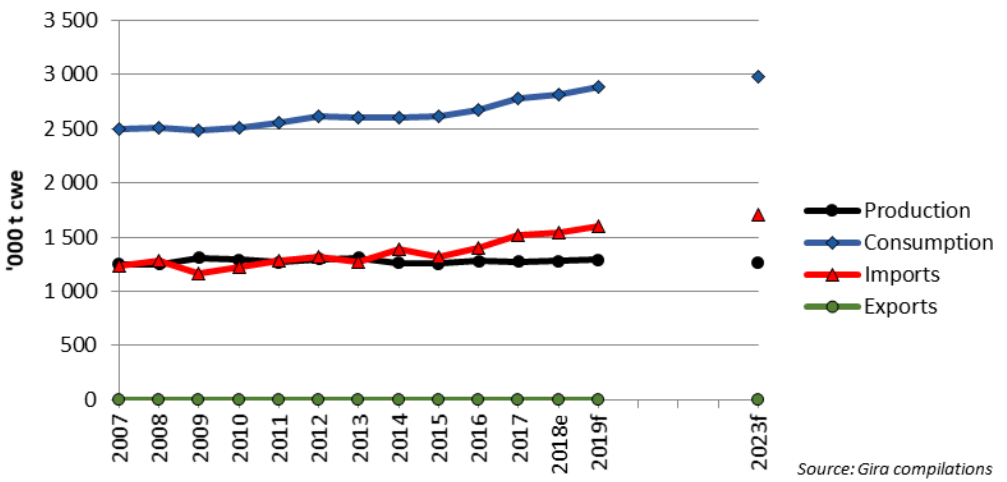
In 2019, imports are expected to grow by 4%, thanks to abundant supplies from the U.S. and the EU, although competition from China may change this.

- Import prices are expected to increase due to the market tension brought about by ASF in China.

In the mid-term, the market trend of increasing import penetration will continue.

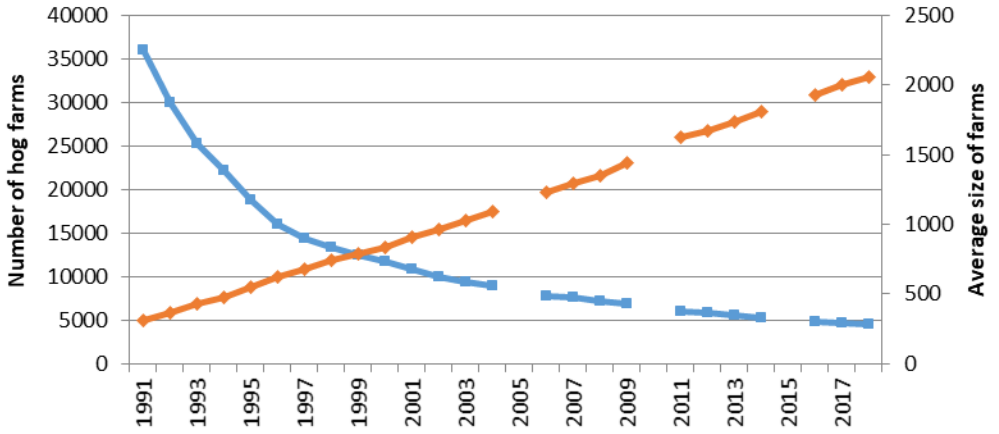
- Imports are expected to continue growing with the implementation of CPTPP and EU-Japan EPA (+2.1% p.a.), although the full tariff reductions will still not be fully realised.
- Domestic production is expected to slowly trend down (-0.2% p.a.), due to the continuous exit of small-scale operators and the competition from imports
- The impact of FTAs upon domestic production may be less than we think, since some Japanese importers have limited the historic impact of higher tariff by declaring wrong prices.
- Consumption will continue to grow (+1.1% p.a.), with consumers switching from fish to meat and with solid foodservice and ready meal demand.

Japanese Pigmeat Balance Summary, 2007-2019f, 2023f



Source: Gira compilations

Number of Hog Farms (blue) & Average Head per Farm (orange), 1991-2018



Source: Gira based on MAFF