Price Discovery and Industry Margins in the Beef Industry

A Literature Review, August 2022

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EXECUTIVE SUMMARY

The cattle and beef market are a complex market system with various segments along the supply chain. Price is determined by supply and demand fundamentals, therefore as the cattle cycle progresses leverage shifts from producer to packer and back again depending on the stage of the cycle and the demand pull versus supply push. As a result, margins fluctuate over time and even within segments as market leverage ebbs and flows.

There are discussions currently taking place in the US to address market transparency and price discovery. Given the integration of the North American beef industry it would be expected that these types of changes would have impacts to the Canadian beef industry.

> *Market transparency is important for efficient markets. However, the suggestions made to improve US market transparency include an additional layer of complexity in the Canadian industry due to our current voluntary reporting structure as well added risk in basis and currency.*
>
> *The assumption is that by limiting the use of Alternative Marketing Arrangements (AMAs), negotiated cash trade will increase and therefore the concern around robust price discovery and "thin" markets will be addressed. However, the potential trade off's include increased transaction costs for negotiated trade, loss of value signals, impacts to branded programs and impacts to risk management programs. In addition, in Canada there is no mechanism to limit AMAs at this time.*

The beef supply chain is complex and understanding the different segments is important to decipher the influences on economic decision. Although market price is rooted in the economic fundamentals of supply and demand, there may be other factors impacting supply chain decisions. The report identifies several future research considerations that could be further explored in the Canadian industry.

- Retail Consolidation
    - *What work is needed to improve understanding of retail consolidation and its influence on the supply chain? In addition, what impact will sustainability goals of big retailers and food service operators have on market price signals going forward?*
- Packer Utilization and Concentration
    - *What happens to utilization rates in the coming years and how does this impact packer profitability? How does the cattle cycle limit beef packer expansion?*
    - *How often or what should trigger industry to review market power and subsequent packer margins?*
- Producer Profitability
    - *How do farmland values influence cattle feeders purchasing decisions? Will land values ever fall like they did in the early 1980's and early 1990's resulting in a mass exit of producers due to being over-leveraged?*
    - *How does investor money from outside the industry impact feedlot viability and decision making?*
    - *What does profitability look like when you take into account risk management tools and basis negotiations? Are there times during the feeding period that have provided opportunities for profit? Can some cattle feeders negotiate better than average basis agreements for forward contracts?*
    - *How does risk management of inputs like feed grains impact profit margins?*

- *Are there other streams of revenue influencing cattle feeder decisions? How does sustainable financing such as the sale of carbon credits impact decisions and the pricing signals through the beef supply chain?*
- *What is needed to encourage cow/calf producers to stay in the business? Are there technology improvements that can help with labour costs?*

Understanding how proposed policy changes can impact traditional signals in the market is important. It is the goal of this report to inform and provide support to discussions held by industry associations.

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INTRODUCTION

Market transparency and price discovery are needed for efficient market operations. Transparency allows all players in the market to have the same information and make competitive decisions. In a free-market, price for a product or service is determined by the interaction of demand and supply; that is, the consumers' willingness and ability to buy the product, and the sellers' willingness and ability to produce and sell the product.[1] The topics of price discovery, packer concentration and market transparency are not new. Indeed, little has changed surrounding these issues in the past 30 years and has roots back over a century.

Events in the past 2-3 years have exacerbated the concerns of packing capacity and concentration as well as market transparency. In addition, the US Livestock Mandatory Reporting Act of 1999 was set to expire on September 2020 (it was extended by Congress through September 2021), which has resulted in a litany of discussions surrounding the concerns in the fed cattle market. In December 2021, the U.S. House of Representatives passed H.R. 5290 to extend the authorization for Livestock Mandatory Reporting and H.R. 5609, mandating the creation of a cattle contract library.

Canfax Research Services has commissioned this literature review for use by the Alberta Beef Producers, Alberta Cattle Feeders' Association, and Canadian Cattle Association to support discussions with their members. This is a synthesis of US and Canadian literature and data around market transparency and price discovery within the beef industry, addressing:

- What has changed since the last time price transparency and price discovery was reviewed in 2014?
- How current discussions in the US apply to the Canadian fed cattle market?
- What other consideration could guide discussion in Canada?

The Canadian and US beef and cattle markets are highly integrated, with the US beef industry eight times larger, the close proximity, and the US being a major trading partner. This literature review relies heavily upon information published in *The U.S. Beef Supply Chain: Issues and Challenges* (Fisher, Outlaw, and Anderson) as well as the *Analysis of the Cattle Price Discovery and Transparency Act of 2021* (Anderson, Mitchell, McKenzie). Canadian research papers from 2014-2018 on the Canfax Research Services website have also been utilized.

Out of Scope

This literature review is part of larger study supported by ABP, ACFA, CCA, and Alberta Ministry of Agriculture and Forestry. The other two parts include:

1. Serecon has been hired to understand the barriers to entry and expansion for the packing sector, specifically small and medium processing plants and abattoirs will likely have some unique challenges.
2. Lee Schultz (Iowa State University) and Ted Schroeder (Kansas State University) are examining Price Transparency in Canadian Boxed Beef prices, addressing confidentially concerns and robust price discovery.

[1] *https://www.ag.ndsu.edu/aglawandmanagement/agmgmt/coursematerials/demandsupply*

Results from this research will be available in late 2022.

MARKET TRANSPARENCY

Market transparency is the ability of all players in the supply chain to know what price cattle or boxed beef was traded at. A market is considered transparent if much is known, by many, about: product quality and attributes, quantity available, at what price, and where. Transparency is important since it is one of the theoretical conditions required for a free market to be efficient. Price transparency can lead to higher prices, but does not guarantee that outcome as supply and demand are the underlying factors.[2]

"As trade has moved away from open markets to selling directly to packers there is limited market transparency in some areas. This resulted in the US moving from a Voluntary Price Reporting (VPR) system to Mandatory Price Reporting (MPR) system in 1999 in order to collect formula and contract information from packers."[3]

Changes to US market transparency

As feedlots and processors consolidated in the 1990s and 1980s (see Appendix 1) the use of Alternative Marketing Arrangements (AMAs) became more attractive to both feeders and processors to manage market risk, service niche marketing programs, secure cattle supply, and secure slaughter access. With fewer cattle priced in a public forum, transparency declined. However, over the last decade things have been relatively stable. In 2013, 29% of all US fed cattle transactions were negotiated cash or negotiated grid and 59% were formula based and by 2020 negotiated volumes had dropped three percentage points to 26%[4], making the last decade relatively stable. Although national numbers show a modest drop in negotiated sales, the decline is larger in some regions (i.e. southern Plains). Confidentially requires the MPR program to combine information into regional reports, losing some of the local specific details.

Alternative Marketing Arrangements

So why is there so much animosity towards increasing use of Alternative Marketing Arrangements (AMAs) specifically formula-based trade? Use of AMAs (formula based, forward contract, and packer owned) reduce the volume on the cash market, i.e. thinning of the market. With a thin market, prices may become less reliable in determining value as supported by market fundamentals. Reduction in public market information has been found to increase price variance and decrease production efficiency (Anderson et al., 1998). Negotiated cash sales and market information function as a public good. This makes them vulnerable to being overused and underprovided for in the marketplace.[5]

Economists view more transactions as improving accuracy.[6] However, in 2014 Ward, Vestal and Lee found that the relationship between negotiated and formula prices remained stable even as volumes decline. Furthermore, Anderson, McKenzie and Mitchell suggest that price discovery in the southern Plains is not notably different than regions with a much higher proportion of negotiated trade.

The use of AMAs is multifaceted and have benefits for both the producer and packer. AMAs reward quality, create improved production and processing efficiencies, reduce production costs per head through better plant utilization and spreading of fixed costs, and reduce search and transaction costs for

[2] *https://en.wikipedia.org/wiki/Transparency_(market)*
[3] *Canadian Cattlemen's Association, 2014. Price Discovery Task Force. https://www.canfax.ca/CRS/Price%20Discovery%20Report%20July%2031.pdf*
[4] *Canfax*
[5] *CRS Fact Sheet, April 2014*
[6] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and Challenges, Chapter 3*

cattle (Peel et al., 2020; Koontz and Lawrence, 2010; Anderson, Trapp, and Fleming, 2003; MacDonald et al., 2000). Therefore, the use of AMAs represents the progression to value-based marketing and the economic desire to reduce transaction costs.[7]

Marketing arrangements have become integral in coordinating beef supply chains and have often led to feedlots forming direct ties to a single packer.[8] Reduced costs and limited hook space remain one of the prominent reasons cattle feeders enter into marketing agreements. As the industry has shifted to chronic under capacity in the packing sector this use of AMAs becomes more important to the feedlot producer in managing supplies, specifically pick-up times of ready cattle. This was supported by industry discussions with Schroeder, Coffrey, and Tonsor where it was suggested that feedlots with marketing arrangements during COVID-19 reduced capacity had higher priority, more reliable and more timely market access than those in the cash market. For the packer, marketing arrangements provide consistent, predictable quantities allowing them to be a reliable source to customers such as retail and food service with product specific demands. All of these benefits along the supply chain benefit the consumer.[9]

AMAs can be beneficial to both packer and producer. The packing industry continues to be highly concentrated and the procurement mix continues to favor the use of Alternative Marketing Arrangements over the negotiated cash market. Anderson, Mitchell, and McKenzie state that the results of their analysis of the Cattle Price Discovery and Transparency Act of 2021 show that AMAs do not allow beef packers to increase beef margins and lower cattle prices.

Who is impacted by AMAs?

In addition to the benefits from economies of size (see Appendix 1), large feedlots may have the ability to negotiate more advantageous forward contracts or formula grid arrangements than smaller seasonal feeders. This puts smaller and seasonal feedlot operations at a disadvantage. In the US, C. Robert Taylor refers to "sweetheart deals such as bonuses, packer-backed financing and risk sharing arrangements" and questions the impact on market transparency, implying that there are other factors driving the market outside of supply, demand and pricing (see Other Considerations section for potential areas of further research).

AMAs (formula-based) do not contribute to price discovery, but they do contribute to the weekly volumes and impacts on market "currentness".[10] This is because the base price in the agreement is typically tied to a negotiated price from one to two weeks prior meaning it does not represent current prices. Cash sellers face advance production risk[11], matching risk[12], and negotiation failing risk[13].[14] Sebasi et al., 2013 suggests "it is likely that increased use of AMAs exacerbates these risks for those feedlots only selling cattle via the negotiate cash trade and puts them at a relative bargaining disadvantage." This puts feedlots not allied with a specific packing plant at the most risk.

[7] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and Challenges, Chapter 8*
[8] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and Challenges, Chapter 4*
[9] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and Challenges, Chapter 4*
[10] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and Challenges, Chapter 4*
[11] Advance production risk (inventory loss risk): the risk of loosing some or all of the production cost
[12] Matching risk: the risk of being matched with someone in the market that has already traded and feels less pressure to trade compared to their trading partner
[13] Negotiation risk: the risk of not coming to an agreement
[14] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and ChallengesChapter 3*

Canadian market transparency

In Canada, cattle and boxed beef price reporting to Canfax is completely voluntary. The Price Discovery Task Force report (2014) recommended enhancing cash reporting and subsequently a motion was passed that cash reporting become a requirement for all federal/provincial programs that require fed cattle price data to operate.[15] The government expressed concerns with the proposed cross-compliance approach and has encouraged industry to explore alternative options for fed cattle price reporting.

Schroeder noted that "Turning the clock back to drive more negotiated cash price discovery is not a simple, inexpensive, or highly probable endeavor. Furthermore, turning the clock backwards is not necessary for fed cattle markets to function efficiently going forward. However, the transition from reported cash prices being central to short term information to being simply one among a larger set of relevant market information requires development of new information and new ways of pricing and valuing fed cattle and in collecting and reporting relevant market information".[16] Enhanced fed cattle price reporting (for forward contracts, formulas and grids) was implemented by Canfax from September 2014 to September 2017, but was discontinued due to lack of feedlot participation.

In Canada, the fed cattle procurement mix was last reported publicly in 2013 with cash representing 23% of fed cattle sales. The largest category of AMAs in Canada was forward contracts at 48% in 2013. [17] With a lack of more current data available, concerns over pricing accuracy have prevailed.

In 2016, Schroeder and Belasco recommended that Canfax increase their efforts to collect cash information as well as to obtain packer data samples to assess price reporting accuracy[18], however to date this has not taken place due to lack of packer participation. Efforts on cash trade have reduced the number of weeks with no price reported. Schroeder and Balasco (2016) found that "To be 95% confident prices reported are within $0.50/cwt of the negotiated fed cattle market price each week, CanFax would need at least 17 transactions included in their weekly report."[19] In 2020 and 2021, estimated average transactions per week were above this target. The Alberta weekly average fed cattle cash volumes have increased from the 2014 low through 2021.

In January 2020, with the support of the Beef Farmers of Ontario (BFO), Canfax started an Ontario fed cattle price series comparable to the Alberta data series with information collected directly from Ontario feedlots. This price series has made the Eastern Price Insurance Index for fed cattle possible.[20]

Canadian Boxed Beef Prices

Canadian boxed beef prices have not been reported since March 2020. This is an important segment of the beef supply chain and not having access to this information forces market participants to use US cutouts converted to Canadian dollars as a reference price. The Alberta Beef Producers and Alberta Cattle Feeders' have contracted economists Lee Schultz from Iowa State University and Ted Schroeder from

[15] *Canadian Cattlemen's Association. 2014. Price Discovery Task Force report*
[16] *Schroeder. June 2014. Effective Canadian Fed Cattle Price and Market Information*
[17] *CRS Fact Sheet, April 2014*
[18] *Schroeder and Belasco. As assessment of the Reliability of Canfax Reported Negotiated Fed Cattle Transactions and Market Prices, 2016*
[19] *Schroeder and Belasco. An Assessment of the Reliability of CanFax Reported Negotiated Fed Cattle Transactions and Market Prices, 2016*
[20] *Kaastra. July 2021. Volume Analysis of an Eastern Canada Fed Cattle Index*

Kansas State University to explore options that would meet confidentiality and still allow for Canadian reporting.[21]

In Canada, the increase in Alberta fed cattle cash volumes reported to Canfax and the development of the Ontario fed cattle price series has improved market transparency for that sector. This, in turn, supports the Livestock Price Insurance program. The lack of boxed beef reporting leaves a gap in local market information.

PRICE DISCOVERY AND PRICE DETERMINATION

Price determination is the interaction of supply and demand which determines the market price level whereas price discovery provides the means for achieving price determination (e.g. auction, private tender, AMAs, etc.) and the equilibrium supply and demand of the market.[22] Price determination represents the macro level perspective on equilibrium price, while price discovery represents the micro-level perspective on the variability of prices around that equilibrium.[23]

Price determination represents the macro level perspective on equilibrium price, while price discovery represents the micro-level perspective on the variability of prices around that equilibrium.

Factors that impact price discovery include knowledge of supply and demand, trading institutions, risk traders face, risk preferences of traders, and expectations of value formed from using old and new market information.[24] It is a dynamic process and constantly is updated with new and updated information against a traders' perception of risk, quality, and animal value. While improving price discovery can not be expected to improve prices as this is based on price determination (supply and demand), it can make prices more efficient.[25]

A market is efficient if prices in that market reflect all available information (Fama, 1970). In addition to market power, economies of size could directly influence price discovery (Bailey and Bronson, 1987). As Anderson, McKenzie and Mitchell describe, "larger firms have more total information simply by virtue of the volume of transactions to which they are party and if this information is more accurate than public information alone, it can affect price discovery.

The cattle and beef market on both sides of the border are a complex market system. The supply chain consists of a highly dispersed cow-calf herd funneled into a concentrated feedlot and packing industry before widening out into various channels to the consumer. Price is determined by supply and demand fundamentals. Although supply starts with the cow herd and is influenced by the stages of the cattle cycle, beef production has continued to grow with increased carcass weights, improved management, and production efficiencies. Demand, a consumer's willingness to purchase a given quantity at a given price, has been strong both domestically and globally. The demand side of the equation comprises of domestic retail and foodservice trade as well as beef exports. As the cattle cycle progresses leverage shifts from

[21] *Canfax. Personal communication with Brenna Grant*
[22] *CRS Fact Sheet April 2014*
[23] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and Challenges, Chapter 2*
[24] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and Challenges, Chapter 3*
[25] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and Challenges, Chapter 2*

producer to packer and back again depending on if there is a demand pull or supply push (see Appendix 1 for further discussion.

What has changed?

Historically, periods of high cattle prices have reduced producer concerns about price transparency and price discovery, only to see them revived when there is a strong demand pull increasing cutout and retail prices, but there is also a large supply push right before the cattle cycle bottom's (e.g. 2013/14) keeping cattle prices within a historic trading range. Since 2019, there have been multiple supply and demand shocks to the North American beef and cattle market (e.g. fire at a beef packing plant in Holcomb, Kansas; COVID-19 pandemic) that have disrupted processing, labour availability, and increased costs at packing plants while domestic retail and international demand have been strong.

Processing disruptions, as seen during COVID-19, impact both up and downstream sectors. Not only do they limit the packer demand for fed cattle causing a back up in feedlot marketings and subsequently add carcass weights, but the reduction in wholesale supplies is also felt by the consumer as they compete for less product. The rapid rise in consumer retail demand spurred by at home eating during the pandemic sent wholesale and retail prices higher; while fed cattle prices failed to keep up. This was especially true during 2020 Q2 with COVID outbreaks at plants resulting in reduced slaughter, down 19%[26] in Canada and 22% in the US[27].

The subsequent increase in retail and boxed beef prices have been followed by general inflation of all commodities with input prices rising faster than output prices, squeezing margins. During such times of market volatility and squeezed margins, accuracy of price discovery is being questioned.

Price Spreads

In Figure 1, The inflation-adjusted US weekly farm-to-wholesale beef price spread trended sideways from 2005-2013, then the spread increased to be on either side of $100USD/cwt from 2014-2016, before finding a new range until the COVID-19 pandemic. During this time, there were two periods of noticeable spikes in the spread characterized by the US ban in beef imports from Brazil in 2017 and the fire in Holcomb, KS Tyson plant in 2019. In the first three months of 2020, wholesale prices were mostly flat around $225USD/cwt (not adjusted for inflation), while US fed cattle prices ranged between $108-124USD/cwt (not adjusted). Following the initial pandemic response, retail demand spiked while food service activity was reduced. Fed cattle prices on the other hand did not respond. As a result, the farm-to-wholesale beef price spread widened and was similar to the spread noted during the processing disruptions due to the fire in Holcomb. During the bottleneck period, weekly farm to wholesale spreads exploded, more than doubling previous highs.[28]

[26] *Canadian Monthly Slaughter by Class (Federally Inspected Only), www.canfax.ca*
[27] *Lusk, Tonsor, Schulz, 2020, Beef and Pork Marketing Margins and Price Spreads during COVID-19*
[28] *Lusk, Tonsor, Schulz, 2020, Beef and Pork Marketing Margins and Price Spreads during COVID-19*

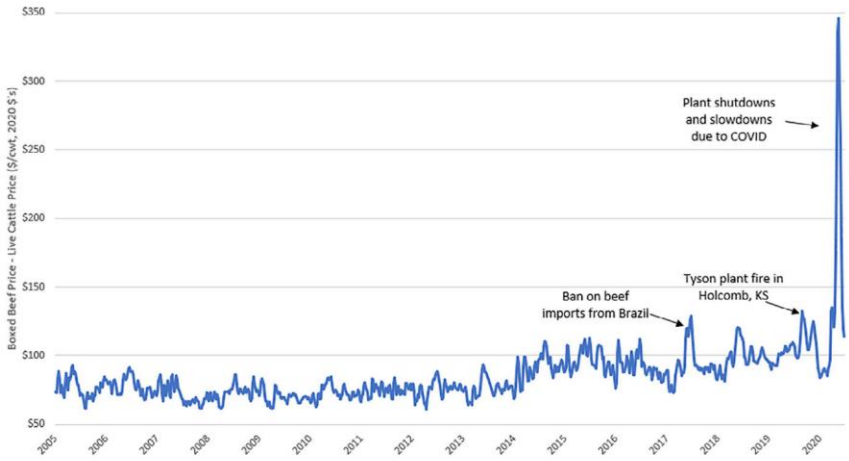

Figure 1. Inflation-adjusted Weekly Farm to Wholesale Beef Price Spread, January 2005 to June 2020
Source: Beef and Pork Marketing Margins and Price Spreads during COVID-19 (Lusk, Tonsor, Schulz)

USDA choice cutout values have come down to $267 CDN/cwt in July 2022, but remain second highest on record for this time of year and are 22% higher than 2017. Meanwhile, the US fed steer prices are the strongest since 2017 at $142 USD/cwt for early July.[29] Indicating that while the farm to wholesale price spread has declined from the record high levels, it remains historically high.

In Canada, Kevin Grier (2022) found that "there were very strong price relationships between the cattle farm and beef packer sectors from 2010 through 2017. The two prices moved almost in tandem together. From 2018 to 2021 there was almost no relationship amongst prices at the farm and packer levels."[30] Similarly, he found a strong relationship between the packer and retailer from 2010 to 2017 but a much weaker relationship from 2018 to 2021. He concluded "that unusual events such as the Tyson fire and COVID, in combination with basic supply and demand factors, contributed to the dichotomy between the beef cutout and the retail and farm price." [31]

The Alberta live steer-to-retail spread (Figure 2) has ranged between 15-23% since 1999. Although retail prices increased during 2020 due to COVID impacts, the annual live steer-to- retail spread was similar to the range seen during 2016-2019. In 2021, the live steer-retail spread narrowed to 15% and while this is the second lowest point referenced on the chart, it is within ranges seen during 2004 and 2009. Showing that on an annual basis the current market situation in Canada, is not unprecedented and in fact is what is expected at this point in the cattle cycle when demand is strong signaling expansion should occur and weather patterns are forcing liquidation resulting in large cattle supplies.

[29] *Cattlefax*
[30] *Grier, Kevin. 2022. Ontario Beef and Cattle Pricing 2016-2021: An examination of Price and Margin Trends in the Ontario Cattle and Beef Industry.*
[31] *Grier, Kevin. 2022. Ontario Beef and Cattle Pricing 2016-2021: An examination of Price and Margin Trends in the Ontario Cattle and Beef Industry.*

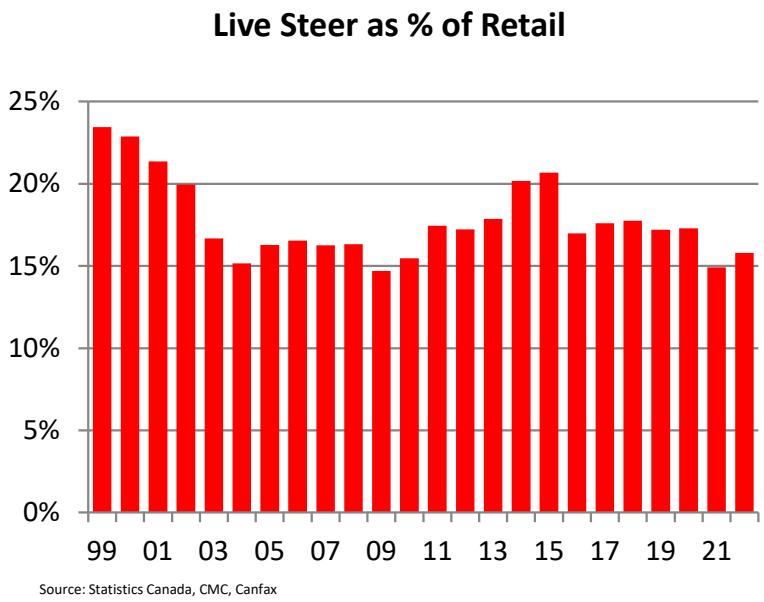

Figure 2. Live Steer as % of Retail (Canadian)
Source: Statistics Canada, CMC, Canfax

Grier found that "given the much slower rate of increase of farm prices compared to retail and packer, there is no basis to assert that farm prices are the cause of higher retail prices." In fact, "retailers have not been fully passing along the increased beef cutout costs. Instead, retailer margins on beef have likely been shrinking over the past two years".

Limitations

As Lusk, Tonsor, Schulz (2020) state "margins for meat packers and livestock producers fluctuate over time, and even within segments, as market leverage ebbs and flows, meaning price spreads between wholesale and farm levels are not precise reflections of marketing costs at any point in time".[32] They also note that packer gross margin and price spreads are not the same thing. Price spreads lump together costs for several segments, while gross margins apply only to costs for specific segments (Ross 1984). In addition, data is not readily available on fixed costs needed to calculate net margin and it is unknown the magnitude on COVID-19 based cost increases. Tomek and Robinson (1972) cautioned "The per unit margin (farm-retail spread) statistics and especially the related concept of the farmer's share of the consumer's dollar are subject to misinterpretation. This concept is perhaps the most frequently quoted, but misused, number published by the USDA. There is a tendency to use the number to indicate the 'well-being' of farmers or to indicate that marketing costs are 'too high.' In fact, the farmer's share statistic has little to say about either problem (pp. 115–116)."[33]

Profitability

Although not unseen, it ca be challenging for all sectors of the supply chain to be profitable at the same time, as the output from one sector (e.g. feeder or fed cattle) are the inputs for the next. So that high prices received in one place, imply higher costs for another. In addition, as the cattle cycle progresses

[32] Lusk, Tonsor, Schulz, 2020, *Beef and Pork Marketing Margins and Price Spreads during COVID-19*
[33] *Brester, Marsh, Atwood, 2009. JARE, Evaluating the Farmer's-Share-of-the-Retail-Dollar Statistic*

leverage shifts up and down the supply chain. Each sector has experienced times of abnormally large margins and abnormally large losses. This stresses the importance of risk management and protecting equity at every stage (e.g. cow-calf, feedlot, packer).

Packer

Grier estimated that Ontario beef packer margins moved from normal levels in 2016-2018 to be very profitable in 2019 and to exception profitability in 2020-21. He noted that exceptional estimated margins were enjoyed by packers across North America. However, he stated that there were obvious reasons for high packer prices related to both supply and demand forces, as well as unusual events. [34] Canfax Research Services estimated packer margins for Alberta are consistent with these findings.[35]

In contrast, while it is possible that packer profitability increased during COVID-19 disruptions, Lusk, Tonsor, Schulz (2021) state "changes in the stock prices of companies with significant packing operations do not suggest substantial windfalls corresponding with COVID-19 driven developments, and indeed the performance of publicly traded packing companies has lagged that of the overall market since the first of the year.[36]

Feedlot

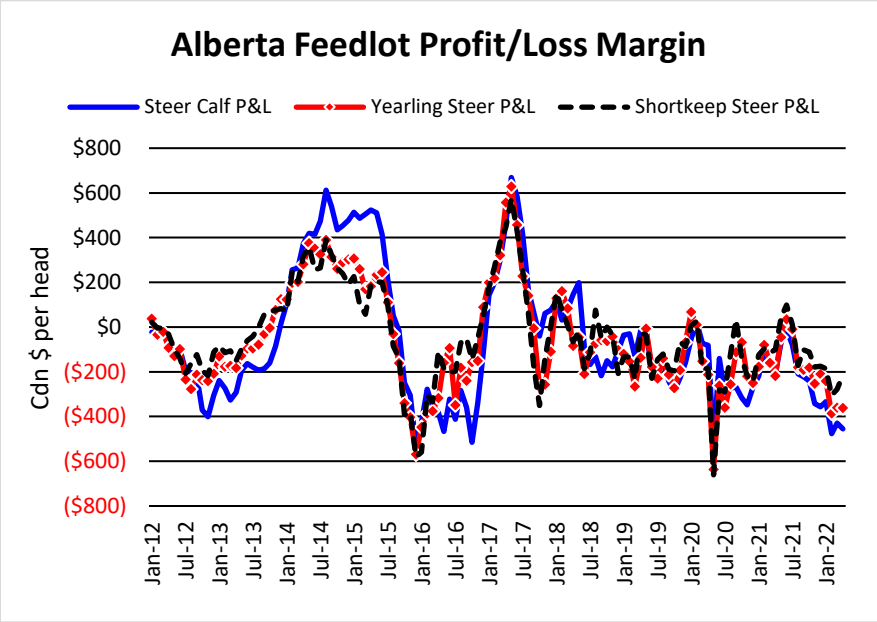

Figure 3. Alberta Feedlot Profit/Loss Margin
Source: Canfax TRENDS

Profitability, on a cash basis, in the feeding sector at times can be very challenging as shown in Figure 3 using the Canfax TRENDS data. Although there have been periods of large profits (+$600CDN/head) and losses (-$600CDN/head), since 2019 profitability has ranged mostly between breakeven and $200CDN/head loss, except for Q2 2020 when all classes of cattle were projected to have a loss upwards

[34] *Grier, Kevin. 2022. Ontario Beef and Cattle Pricing 2016-2021: An examination of Price and Margin Trends in the Ontario Cattle and Beef Industry.*
[35] *Canfax. Personal communication with Brenna Grant*
[36] *Lusk, Tonsor, Schulz, 2020, Beef and Pork Marketing Margins and Price Spreads during COVID-19*

of $600CDN/head. This coincided with the packer disruptions, which backed up cattle marketings. Since mid-2021 profitability as been trending worse with the rapid appreciation of grain prices spurred by drought. The unexpected aspect is that Alberta and Saskatchewan finishing bunk capacity has increased 19% from 2015 to 2022.[37] This dichotomy is discussed further in the "Other Considerations" section.

Grier found Ontario cattle feeder margins have been consistent and generally negative from 2016 through 2021. Margins on feeding yearlings were very negative in 2016 and recovered briefly in 2017, from that point margins remained in a serious loss position. [38]

Cow-Calf

For the past 5 years, Canfax Research data has shown average Alberta cow/calf returns above $250CDN/cow but with a steady decline since 2017. The forecast for 2022 is the first average loss since 2010 as cow/calf producers have been faced with increased input costs following the 2021 drought.[39] Based on these profits the beef cows in Canada increased 1.2% between 2016 and 2021 as reported by Census of Agriculture.

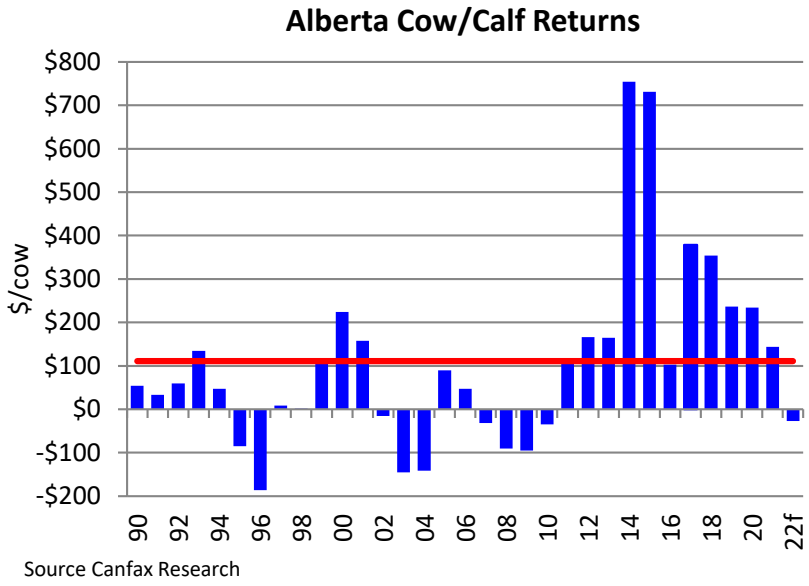

Figure 4. Cow/Calf Returns, CDN Dollars
Source: Canfax Research Services

US Industry

Although a similar profitability trend, US cow/calf producers have experienced profits for a longer period than Canadian producers. As with Canada, US producer had the largest profits in 2014/2015 with declines into 2020, but unlike Canadian producers, US cow/calf producers saw profitability grow slightly in 2021

[37] *Canfax Annual Demographics Report.*
[38] *Grier, Kevin. 2022. Ontario Beef and Cattle Pricing 2016-2021: An examination of Price and Margin Trends in the Ontario Cattle and Beef Industry.*
[39] *The Alberta Cow-Calf returns model is based on a costs from weaning to weaning. Therefore, the higher feed costs for the 2021/22 winter show up in the 2022 calf crop margin.*

and are expected to have another increase in 2022. The impact of the 2022 drought in the US will impact costs for the 2023 calf crop. The US feedlot industry has had more variability than the cow/calf producer and like the Canadian industry has had profits and losses on either side of breakeven. For the past decade, US feedlots have had losses in 7 out of the 10 years with slight profits in 2021 and a larger expected profit in 2022.

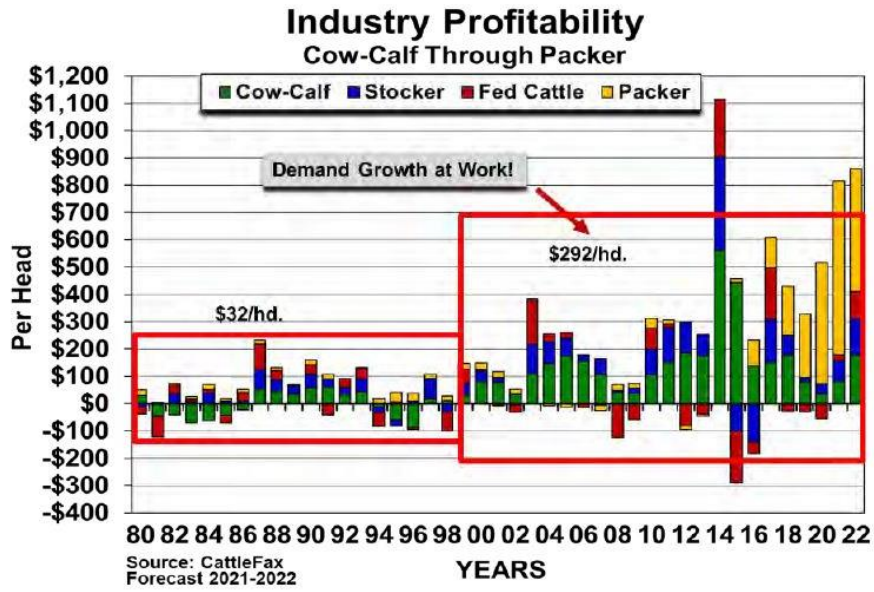

Figure 5. US Industry Profitability by Sector
Source: Cattlefax

Price Transmission and Leverage

Price discovery and price determination should not be confused with price transmission. Price transmission is the ability of market signals to be passed through the supply chain from the consumers back to the cow-calf producers so that they can respond by producing more/less of what they want/don't want. Vavra, P and B. Goodwin (2005) state "The adjustment to price shocks along the chain from producer to wholesale and to retail levels, and vice versa, is an important characteristic of the functioning of markets."[40]

During the cattle cycle, leverage shifts from producer to packer and vice versa as the supply/demand fundamentals are exerted. From 2005-2015, Dr. Peel calculated that the US industry operated with an excess of fed cattle packing capacity (approx. 0-9%).[41] However, between 2000-2013 there was a reduction in packing capacity with permanent plant closures. Combine this with the US herd expansion from 2004-2019 and it is estimated that since 2016 there has been a shortage of cattle packing capacity.[42] As Dr. Peel states "this fundamental change in fed cattle supply and demand balance is impacting fed cattle markets in ways not seen for many years". In other words, leverage has favored the packer in this situation.

[40] Vavra, P and B. Goodwin, 2005, Analysis of price Transmission Along the Food
[41] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and Challenges, Chapter 2*
[42] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and Challenges, Chapter 2*

In summary, margins fluctuate over time and even within segments as market leverage ebbs and flows. While there is little argument that price spreads between farm and wholesale widened out with the largest spreads noted during packing disruptions in 2020 due to the COVID-19 pandemic, less is understood about how net packer margins were impacted. Feedlot profitability continues to be challenging and while the cow-calf sector has been profitable, returns have been decreasing since 2017.

CURRENT DISCUSSIONS AND HOW THEY APPLY TO CANADA

In recent years market disruptions resulting from limited live cattle processing caused low demand for fed cattle, high demand for some beef products and tight supplies.[43] This situation refuelled the concerns around price discovery, fed cattle prices, market power, capacity, and utilization, and fed cattle procurement.[44] In the US, various solutions have been suggested and selections are discussed below with comments on how they may pertain to the Canadian market.

Market Transparency

Market transparency is important for efficient markets and there have been a few suggestions made in the US to tackle this. Anderson et. Al. (1998) found the loss of public information hurt production efficiency and therefore increased feeding costs and impacted feeders more than packers. There are four areas of discussion around market reporting and transparency, outlined in Table 1.

Table 1. Alternatives to market reporting and transparency

	Pro	Con	Canadian considerations
Utilize Live Cattle Futures as formula agreement base price	Provides an alternative base price that is transparent for producers. Addresses time matching concern.	The link between cash markets and CME cattle futures is not perfect. Does not contribute to price discovery	For Canada there is the additional layer of risk (currency and basis) when using the live cattle futures for pricing.
Create a contract library	Provides transparency in market terms (e.g. grid premiums and discounts, formulas, contracts) so that producers know what options are available when negotiating.	The ability to mine information from a contract library goes to packers who have economies of scale to use information about their competitors.	In Canada, how this is accomplished would need to address voluntary reporting and confidentiality
Utilize Electronic trading platform	A double auction is the most efficient. Transaction costs may be reduced.	Success is dependant on having a sufficient number of both buyers and sellers.	Lack of uptake in the US and Canada for fed cattle.
Improve market reporting	Improvements to the MPR definitions of reporting and the confidentiality rules could help with market transparency	While MPR provides transactional data there may be limitations in using it for supporting regulatory decisions.	In Canada, voluntary price reporting is critical to support Livestock Price Insurance, AgriStability and calculate basis numbers for numerous risk management applications.

Schroeder, Coffey and Tonsor suggest that base prices in formula agreements could be switched to live **cattle futures** or some other price that matches the delivery date and while that may address the time matching concern it would not address the concern about contributing to price discovery. As C Robert Taylor notes "theoretically, cash markets and CME cattle futures are linked, although the link is not

[43] *Martinez et al., 2020*

[44] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and Challenges, Chapter 9*

perfect." In Canada there is the additional layer of risk (currency and basis) when using the live cattle futures for pricing.

In 2015, Koontz provided ***10 alternative prescriptions*** to thinning markets that ranged from adoption through industry associations to legislative mandates.[45] Included in these suggestions were a *Market Maker Approach* where a trader who provides liquidity to the market is compensated, while the one using the liquidity is charged a fee.[46] One different suggestion made by Maples and Burdine is the development of a *contract library*, similar to the Swine Contract Library in the US. This would provide information to the industry on formula and forward contracts specs in addition to the price information that is currently known through MPR, therefore increasing market transparency. However, the cost/benefit of this suggestions would need to be considered. In December 2021, the U.S. House of Representatives passed H.R. 5290 to extend the authorization for Livestock Mandatory Reporting and H.R. 5609, mandating the creation of a cattle contract library.[47] For detailed proposals see Appendix 2.

In Canada, considerable work would need to be done to determine how to collect and disseminate forward contract information based on the current voluntary reporting methods. In addition, confidentiality would be a concern given the market structure of the Canadian packing industry.

Peel at al. (2020) proposed an ***electronic trading platform*** for spot market transactions and research from Menkhaus et al., 2003 suggests that a double auction would be the best fit for this type of trade. Transaction costs may also be reduced, however it is dependant on having sufficient number of both buyers and sellers. In the US, The Fed Cattle Exchange has been operating an electronic sale since 2016 at limited volumes. In the first 5 months of 2022, 55% of the auction dates resulted in a no sale.[48] It appears that AMAs and other ways of direct negotiations between feedlots and packers are preferred over electronic trading platforms, which reduces the number of buyers and sellers needed for this recommendation to be successful.

In the Canadian market, electronic trading platforms (TEAM and DLMS) have been utilized in the past but have been more successful in the feeder market than the fed market.

Several suggestions were made to ***improve MPR in the US***. Authors in the US Beef Supply Chain: Issues and Challenges acknowledged that improvements to the definitions of reporting and the confidentiality rules could help with market transparency and provide a larger net benefit to the producer than other proposals.[49] It is also important to recognize that while MPR provides transactional data there may be limitations in using it for supporting regulatory decisions.

In Canada, market reporting has been a concern not only surrounding price discovery but also how the information is used to support the industry. As discussed in the 2014 CRS Fact sheet, the Livestock Price Insurance program relies on a cash price for the settlement index and without this the viability of the program is called into question.

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[45] *Koontz. Marketing Method Use in Trade of Fed Cattle: Causes and Consequences of Thinning Cash Markets and Potential Solutions (2015)*

[46] *Anderson, Mitchell, McKenzie, 2022, Analysis of the Cattle Price Discovery and Transparency Act of 2021)*

[47] https://www.drovers.com/news/industry/cattle-raisers-applaud-passage-market-transparency-bills

[48] *Central Stockyards (centralstockyards.com)*

[49] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and Challenges, Chapter 4*

For Canadians a cash price is needed to establish an accurate and trusted basis figure. Historical basis figures provide an integral piece of information for cattle feeders as well as industry. For cattle feeders specific to the fed market, basis can be used in negotiating current cash trade, negotiating forward contracts, and determining which risk management tools to utilize. As it pertains to the feeder market, basis information is used in procurement calculators and projections as well as influences the direction of feeder exports/imports. For industry, historical basis figures are used when evaluating the performance of the Canadian market relative to the US market and have been used to evaluate damages incurred through trade action suits.[50]

Price Discovery

Schroeder (2014) recommended a long list of data that could be added to the Canadian industry to improve understanding of supply and demand dynamics in order to improve price discovery. As it is when there are short-term disconnects between supply and demand that prices are more volatile. [51] However, with a voluntary reporting structure, it is important to prioritize and dedicate resources to key pieces of data such as Price Series (Basis), Cattle on Feed, Weekly Slaughter, and trade that can be readily used by different segments of the industry.

Limiting use of AMAs

In the past 2 years there have been numerous proposals discussed in the US from industry associations and government representatives to address the volume of transparent trade.

Table 2. Examples of US Proposals to address transparent trade

	S.4030 Cattle Price Discovery and Transparency Act of 2022	75% Plan
Supporters	Sen Fisher + 19 co-sponsors	NCBA
Objective	Would mandate a minimum required volume of negotiated cash for slaughter within 14 day period	"Increase frequent and transparent negotiated trade to regionally sufficient levels, to achieve robust price discovery determined by NCBA funded and directed research in all major cattle feeding regions"
Enforcement	Legislated	Voluntary

[50] CRS Fact Sheet, 2014

[51] Schroeder. June 2014. Effective Canadian Fed Cattle Price and Market Information

There are four main areas of discussion around limiting the use of AMAs:

Table 3. Limiting AMAs

Pro's	Con's
1. Increased negotiated trade volume	1. Increased transaction costs for negotiated trade
	2. Loss of value signals provided by a formula grid
	3. Impacts to branded programs
	4. Impacts to risk management strategies

The assumption is that by limiting the use of AMAs, ***negotiated cash trade will increase*** and therefore the concern around robust price discovery and "thin" markets will be addressed. However, Fischer and Outlaw note that "with respect to fed cattle prices, AMAs do not create market power, because they do not change underlying supply and demand fundamentals".[52] In addition, sellers will still face advance production risk and some level of matching and negotiation failure risk regardless of mandated cash negotiated volumes.[53] AMAs are know to reduce transaction costs for both the packer and the feeder. Plants with higher AMA use had higher monthly slaughter and processing volumes.[54] Subsequently you would expect the cost to increase with less AMA use which would be passed on both downstream to cattle producers (fed, feeder and calf) and upstream to consumer, ultimately widening the farm to wholesale spread.

Another concern with limiting the use of AMAs would be the ***potential loss of value signals*** (quality, yield, branded programs) sent to cattle feeders if the assumption was that those sales would then be negotiated spot trade. However, these value signals could still be achieved through negotiated grid sales. In the last 5 years, 5% of US fed cattle procurement as reported in LMR has been negotiated with a grid[55], therefore this type of trade could increase while still relaying the important value signals. An example of this would be the Fed Cattle Exchange, an online auction sale where sellers have the option to list cattle as a Bid-The-Grid™ transaction, however year to date volumes have been low.[56] Negotiated grid trade has also been known to happen in Canada, albeit volumes are not known due to voluntary reporting.

Specific branded program or certification can have additional costs to the producer for such things as production practices, genetics, etc. Marketing agreements allow for financial rewards for incurring those costs that may not be guaranteed if those same animals were sold as negotiated cash.[57] If AMAs were limited would branded programs be as successful if the packer was not as confident in accessing a consistent source?

When speaking of AMAs in the US, it is typically referring to formula-based agreements, AMAs also include forward contracts, which are more prevalent in Alberta. If limiting AMAs included forward contracts this

[52] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and Challenges, Introduction*
[53] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and Challenges, Chapter 3*
[54] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and Challenges,Chapter 5*
[55] *C Robert Taylor, 2022, Harvested Cattle, Slaughtered Markets?*
[56] *Central Stockyards (centralstockyards.com)*
[57] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and Challenges, Chapter 4*

would reduce or remove an important ***risk management tool*** available to both buyers and sellers. Forward contracts allow for producers to price anytime during the feeding period from the time the contract is signed until delivery month which offers flexibility for pricing in a profit or limiting a loss.

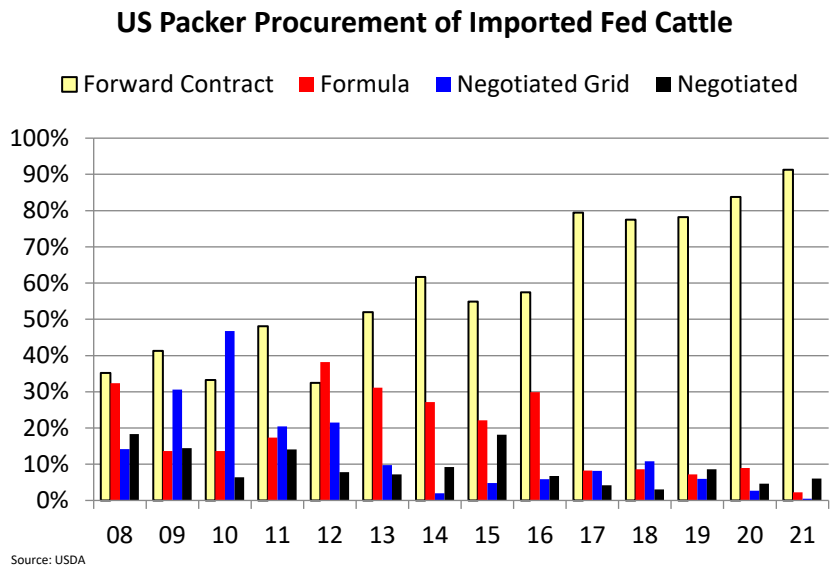

Figure 6. US Packer Procurement of Imported Fed Cattle (Canadian)
Source: USDA

As the Alberta fed cattle profitability chart (Figure 4) shows based on the cash market the last couple years, sellers have not marketed at profitable levels, but that is not to say that there was not opportunity to do so during the feeding period. Recent expansion in the Alberta feeding sector in the face of negative feedlot profitability (based on a cash market model) leads one to ponder how many opportunities exist to capture a profit during the feeding period and therefore if the use of AMAs includes forward contracts how does that impact the approximately 250,000-300,000 head of Canadian fed cattle that are exported to the US annually of which 80-90% are non-cash (Figure 6).[58] In addition, risk management programs can be seen as a benefit providing, confidence to some financing agreements[59] as well as attracting outside investor capital[60]. Finally, there is no mechanism to limited AMAs in Canada at this time.

As Koontz summarizes, "limiting the uses of AMAs by the cattle feeding and packing industries will decrease efficiency, increase processing and marketing costs, and has the potential to reduce beef quality". He estimates in today's dollars that impact could be at least $10USD per head for the packer and least $25USD per head for the cattle feeder.[61]

Market Power and Economies of Scale

Any discussion pertaining to the fed cattle pricing and industry price spreads would be amiss to exclude concerns over packing capacity and potential market power as fed cattle prices and packing capacity are so closely linked. A lot of research over the years has been dedicated to seeking evidence of such

[58] *USDA Mandatory Price Reporting by US Packers*
[59] *C Robert Taylor, 2022, Harvested Cattle, Slaughtered Markets?*
[60] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and Challenges, Chapter 5*
[61] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and Challenges, Chapter 5*

behaviour, but the research has consistently found little support for negative price effects of concentration (Ward, 1997; Ward, 1999; Crespi, Saitone, and Sexton, 2012).[62] Peel et al., 2020 also states "the small but significant price of impacts of market power are outweighed by several magnitudes in cost efficiencies that benefit producers and consumers." In Canada, Rude, Harrison, and Carlberg found little evidence of oligopsony market power with an open border.[63]

There have been continued calls for limiting packer concentration as well as funding for new packing facilities in the US. In July 2021, the Biden Administration announced funding to help bring on additional capacity and while that may address the current environment of fed cattle supplies exceeding packing capacity this will not always be the situation, which can be anticipated by decline in North American cow inventories currently taking place.

Economies of scale in the packing industry are well documented with large plants having significant cost advantages over smaller plants. In addition, a plant's costs are the lowest when operating closest to the potential capacity of the facility. Koontz states "Reducing the operating rate of packing plants increases the costs of operating and increases costs at an ever-increasing rate". As the authors recognized *expanding smaller, regional packing capacity will need to be done in a sustainable and economically viable way.*[64]

In Canada, CAPI commissioned a feasibility study on small plants as a way to mitigate risk in the supply chain as was felt during COVID-19 in 2020. The study's author, Rude, found that *simply building more, smaller/regional meat processing plants; engineering mandatory excess capacity into meat plants to provide additional space for workers; and increased use of automation in processing plants- would not independently secure meat supply chain resilience*. In addition, the report warned against public investment into new smaller plants.[65]

Portions of the current discussions taking place in the US are applicable to the Canadian beef industry because our markets are so highly integrated. Calls for limiting the use of AMAs, such as the 30/14 or 50/14 proposals or NCBA's 75% Plan would have impacts to the US and Canadian market. And while market transparency may be improved with increased negotiated cash trade that does not guarantee stronger prices. Multiple suggestions have been made to improve market transparency which is important for a market to operate efficiently.

The Canadian cattle industry has an added layer of challenge given our voluntary reporting methods currently being used. Finally, although we recognize that supplies have been larger than packing capacity since 2016, that will not always be the case and caution must be taken when considering the expansion or building of packing capacity.

[62] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and Challenges, Chapter 2*
[63] *Rude, Harrison, Carberg, 2010, Market Power in Canadian Beef Packing*
[64] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and Challenges, Introduction*
[65] *Mussell and Robinson, 2021, Managing Surge Capacity and Boosting Resilience in Meat Supply Chains*

FURTHER RESEARCH CONSIDERATIONS FOR THE CANADIAN BEEF INDUSTRY

The beef supply chain is complex and understanding the different segments is important to decipher the influences on economic decision. Although market price is rooted in the economic fundamentals of supply and demand, there may be other factors impacting supply chain decisions. Understanding how proposed policy changes can impact traditional signals in the market is important. The following discussion identifies further research considerations that could be further explored in the Canadian industry.

Retail Consolidation

In the past a lot of resources have been dedicated to the fed cattle/wholesale spread and potential market power of the packing industry, but much less has been done with regards to the influence retailers exude on the market. The focus has been on the concentration of the big four in the US packing industry, yet consolidations has happened on the retail stage as well.

- *What work is needed to improve understanding of retail consolidation and its influence on the supply chain? In addition, what impact will sustainability goals of big retailers and food service operators have on market price signals going forward?*

Packer Utilization and Concentration

Packing plant utilization rates have been over 90% since 2010, but differ regionally. In the West, federally inspected packer utilization averaged 96% in 2021 compared to 88% in the east.[66] As mentioned in the market structure section of this report, economies of size are important, but also the throughput (utilization). As Koontz states, "for any given facility, the costs are lowest when running the plant at closest-to-potential capacity".[67] While imports of US feeder cattle have supported the fed slaughter volumes recently with a stable/declining cow herd, the US cow herd continues to be impacted by drought with January to June 2022 cow slaughter +6.2%. In an industry where packer concentration is already high, the risk of loosing a packer and reducing competition is concerning.

- *What happens to utilization rates in the coming years and how does this impact packer profitability? How does the cattle cycle limited beef packer expansion?*
- *How often or what should trigger industry to review market power and subsequent packer margins?*

[66] Canfax

[67] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and Challenges, Chapter 5*

Producer Profitability

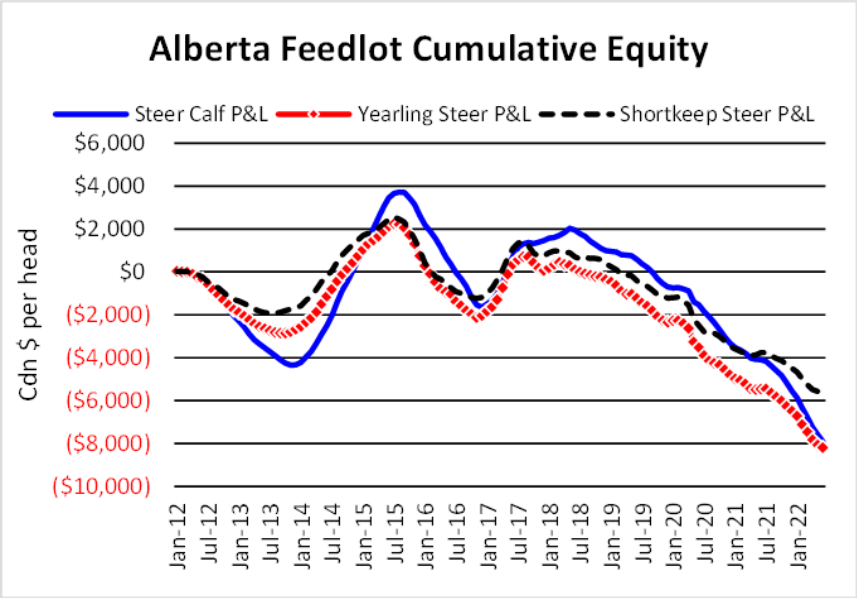

Figure 7. Alberta Feedlot Cumulative Equity
Source: Canfax TRENDS

Fed cattle profitability on the cash market suggest that cattle feeders have continued to lose equity on all classes of cattle since 2019, however expansion has occurred particularly since 2018. Further work is needed to understand what is driving feedlot expansion/contraction and the factors influencing the economic drivers that were not as prevalent previously such as farmland values, risk management options, and other revenue streams.

In the FCC 2021 **Farmland Values** Report, farmland values increased nationally by 8.3% in 2021 (Table 4), the largest annual increase in the past four years, but below the double-digit increases recorded from 2012-2015. FCC attributed this to sustained demand, historically low interest rates (Figure 8), favorable commodity prices, and tight supply of farmland available for sale.[68] In southern Alberta where approximately 60% of AB/SK feedlot capacity[69] takes place, farmland values increased 6.2% in 2021, while Ontario had the largest provincial increase with farmland values increasing 22.2%.[70] FCC notes that "in many cases the increase in farmland values has contributed more to the wealth of the farm than the income derived production".[71]

- *How do farmland values influence cattle feeders purchasing decisions? Will land values ever fall like they did in the early 1980's and early 1990's resulting in a mass exit of producers due to being over-leveraged?*

Table 4. Canadian Annual % change in farmland Values

2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
19.5%	22.1%	14.3%	10.1%	7.9%	8.4%	6.6%	5.2%	5.4%	8.3%

[68] *2021 FCC Farmland Values Report*
[69] *Canfax 2021 Annual Report, Demographics*
[70] *2021 FCC Farmland Values Report*
[71] *Farm Economics The Basics, FCC*

Source: 2021 FCC Farmland Values Report

Historically low interest rates at banks have made barrowing money against assets like land attractive. In addition, there is outside investment custom feeding cattle. But it is unclear on how prevalent this is in the industry or how it impacts feedlots.

- *How does investor money from outside the industry impact feedlot viability and decision making?*

Source: Bank of Canada

Figure 8. Average Canadian Business Borrowing Costs 2017-2022
Source: Bank of Canada, FCC

As with any model, the Canfax TRENDS report has limitations based on the assumptions worked into the model. Profit/loss is calculated using the cost of feeding the animal. This would assume a total cost of gain (TCOG) which includes yardage and margin collected by the owners of the feedlot. Therefore, losses reflected in the data may not be to the same degree if feedlots were able to manage their projected versus actual feed costs. Although this can be possible during relatively stable feed prices, the rapid appreciation of feed grain prices during 2021-22 caught many off guard. In addition, the Canfax TRENDS report is based on a cash-to-cash market of which the procurement mix suggests is a smaller proportion of sales (23% in 2013).

- *What does profitability look like when you take into account risk management tools and basis negotiations? Are there times during the feeding period that have provided opportunities for profit? Can some cattle feeders negotiate better than average basis agreements for forward contracts?*
- *How does risk management of inputs like feed grains impact profit margins?*

The Canfax Trends Report calculates profit and loss in the Alberta feedlot sector as revenue from the sale of the animal less the cost of purchasing and feeding the animal. Although, other revenue streams may be a small consideration currently, there is potential for that to grow in the future.

- *Are there other streams of revenue influencing cattle feeder decisions? How does sustainable financing such as the sale of carbon credits impact decisions and the pricing signals through the beef supply chain?*

Many cow/calf producers have been profitable for the past ten years. However, when comparing the return to labor costs compared to that of the grain industry, producers may find themselves debating whether the profitability has been enough to justify maintaining or expanding their herds. Recent droughts, increasing costs of inputs, and lack of labour availability have amplified their frustrations. Kevin Hursh of Hursh Consulting and Communications stated in a 2022 article that cow/calf producers are fighting an uphill battle and that return on labour, management and investment are lower than grain farming.[72]

- *What is needed to encourage cow/calf producers to stay in the business? Are there technology improvements that can help with labour costs?*

[72] *Hursch Consulting and Communication, May 2022, https://hursh.ca/2022/05/cattle-struggle-to-compete-with-grain/*

APPENDIX 1: North American Cattle Market Structure

When looking at the various profitability across sectors in the beef complex, it not surprising that there is frustration within the industry. One only must look at the increases in retail and boxed beef prices to question whether the producer is receiving their share as consumers pay more. In its entirety, the cattle and beef industry represents an extraordinarily complicated set of cattle production and marketing activities which provide the source of a massive set of beef products marketed through a diverse set of final markets and all coordinate by a multitude of interrelated market transactions.[73] As Dr. Darrell Peel from Oklahoma State University terms it, the US cattle and beef industry may well be the most complex set of markets in existence. Given the integration of the North American beef industry, one would expect this situation to be the same for the Canadian cattle and beef industry as well.

The illustration below depicts how concentration narrows going from the rather dispersed cow/calf sector into a concentrated feedlot and highly concentrated packer sector before widening out again through processing and outlets to the consumer. The beef carcass is transformed into thousands of beef products and marketed through retail grocer, food service, and exports.

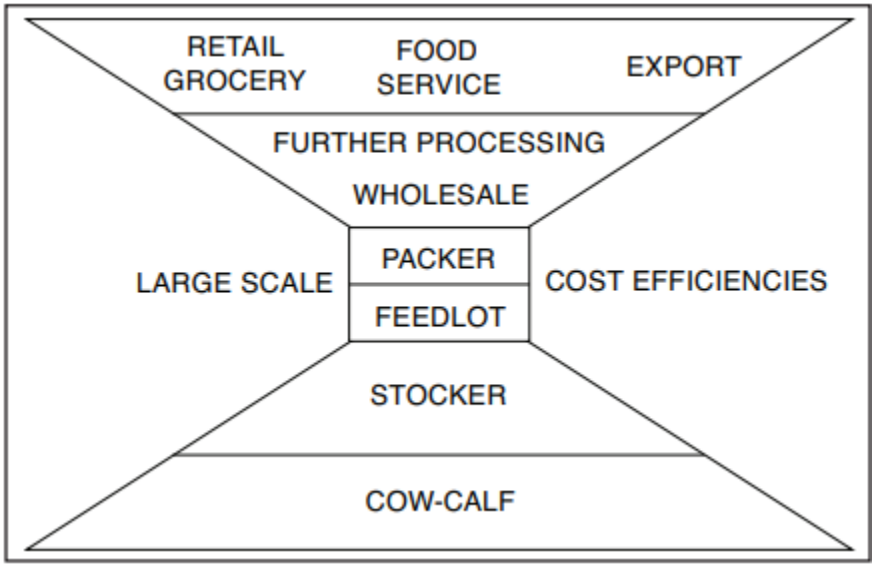

Figure 9. US Beef Industry Structure[74]
Source: US Beef Supply Chain: Issues and Challenges (Fisher, Outlaw, Anderson)

[73] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and Challenges, Chapter 1*
[74] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and Challenges, Chapter 1*

As Dr. Peel stated, in the US there have been structural changes and an evolution of industry characteristics and practices that have led to the current state of the industry. The table below chronicles the US industry impacts Dr. Peel referred to. In addition, information pertaining to changes to the Alberta beef industry have been included for context.

Table 5. Structural Changes and Industry Practices

Time Period	United States Beef Industry	Alberta Beef Industry
1960-1980	• Introduction of boxed beef • European continental genetics • Development of commercial feedlots in US Plains area	• Development of feeding sector • Increase in livestock sharing, feeding and leasing arrangements • Consumer demand for higher grade beef • Grain surplus in late 1960's that resulted in converting grain to dollars through feeding cattle
1980-2000	• Increased packer concentration • Growth in cattle feeding • Increased beef grading • Development of value- based cattle marketing • Changes to beef marketing • Growth in international beef and cattle trade • Captive supply concerns	• Beef Carcass Grading system changes in 1992 • Increase in fed cattle exports post CUSTA (1989); NAFTA (1994) and removal of the Crow Rate • Concentration of packing capacity in Alberta • Development of new beef export markets and products • Evolution of fed cattle marketing from public stockyards to sealed bids • Development of large commercial feedlots in late 1990s • Net feeder importer in 1999 and 2000
2000-2010	• Beef demand recovery from late 1990's • Increase in alternative fed cattle marketing arrangements • Growth in ethanol industry • Development of branded specialized beef markets	• 2001/2002 drought • 2003 BSE • Rapid appreciation of Canadian Dollar • Ethanol demand increased feed grain prices • Increased use of forward contracts to manage market risk and volatility
2010-current	• Historical US drought in 2011-2013 • Reductions in packing capacity • First significant cyclical expansion in cattle numbers in 25 years • Growth and expansion in global beef trade • August 2019 fire at Halcomb, Kansas packing plant • COVID-19 pandemic • Increased use of beef semen in dairy cows, resulting in more dairy-beef crosses in feedlots	• Introduction of Cattle Price Insurance • Feeder cattle increased use of satellite sales • Development of Branded beef products e.g. Aspen Ridge, Certified Sustainable Beef Framework Dec 2017 (Cargill's Certified Sustainable Beef program) • Enhanced Price Reporting by Canfax from Sept 2014 to Sept 2017, to capture formula and forward contracts • Expanded feedlot capacity 2016-2020 • US NW plants announced they are not taking dairy-type cattle due to capacity limitations in mid-2017 • Net feeder importer 2019-2021 • Increased use of beef semen in dairy cows, resulting in more dairy-beef crosses in feedlots
Sources: *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and Challenges* *Nielson and Prociuk, 1998, Start to Finish* *CRS Fact Sheet October, 2018* *CRS Fact Sheet April, 2021*		

Supply

Supply is the sellers' willingness to produce and sell the product.[75]

The Cattle Cycle

The common assumption is that the cattle cycle repeats the cyclical pattern of cattle numbers from low to low over 10 years, however in the US the last seven cycles have lasted between 9-14 years. The last peak of US of all cattle and calves inventory happened in 2019 at 94.8 million head, while January 2022 saw US total cattle and calves inventory at 91.9 million head (3% reduction). Of the 39.48 million total cow herd in the US, 76% are beef cows, but it is important to remember both beef and dairy cows source the calf production that supplies cattle for the beef industry.

While the North American cattle industry is integrated, the Canadian cattle cycle has not always followed the US cycle. External market factors such as drought, competition with farmland, profitability in other enterprises, and increased input costs to name a few have exacerbated the liquidation phase of the current cycle. The Canadian cattle market is still largely influenced by the US herd and its cycle.[76]

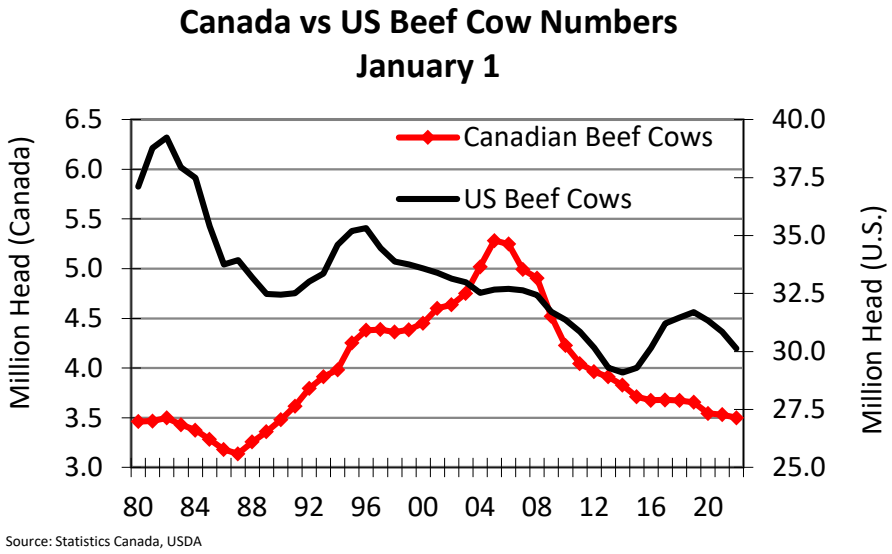

Figure 10. Canada vs US Beef Cow Number, January 1
Source: Statistics Canada, USDA

C. Robert Taylor, board member of the American Antitrust Institute would argue that cattle cycles have flattened out over time and are becoming much less important than in the distant past.[77] As pounds per cow produced increases, the changes in the cow herd will be smaller than what has been seen historically.[78] In the US, beef production per cow has increased more than 400 lbs from 1950-2020.[79]

[75] https://www.ag.ndsu.edu/aglawanmanagement/agmgmt/sourcematerials/demandsupply
[76] *CRS Fact Sheet, March 2022*
[77] *C. Robert Taylor, 2022, Harvested Cattle, Slaughtered Markets?*
[78] April 2021 CRS Fact Sheet
[79] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and, Chapter 1*

However, the biological lag from when a market signal is received and the industries' ability to respond with either more or less beef means there will always be a cattle cycle, to some degree.

Beef production is the output combination of the number of head and weights slaughtered. Despite the overall decline in the cattle herd on both sides of the border, beef production has continued to grow through increased productivity as a result of increased carcass weights (US steers up 251 lbs and heifers up 288 lbs from 1960-2020), improved management, and production efficiencies.[80] In Canada, beef production increased 25% from 2015-2019 supported also by feeder imports from the US.[81]

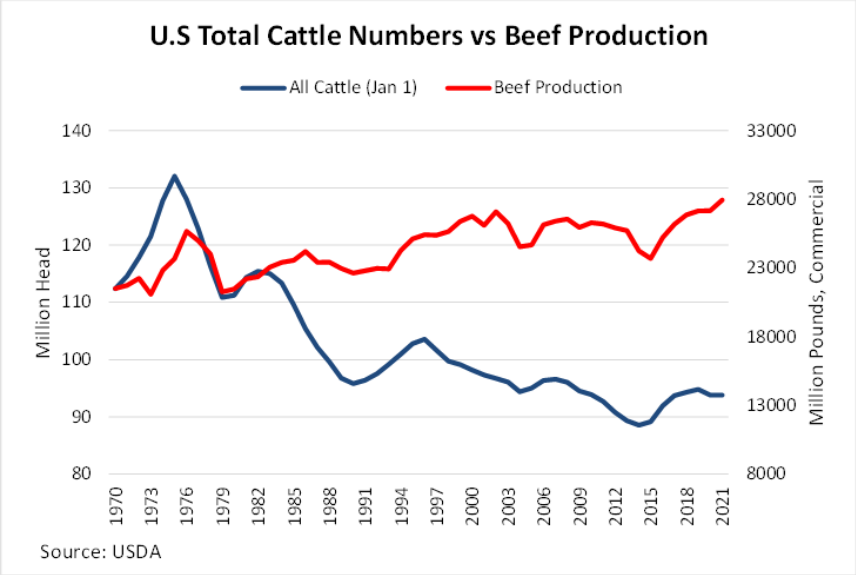

Figure 11. US All Cattle and Calves Inventory and Annual Beef Production 1970-2021
Source: USDA, Canfax

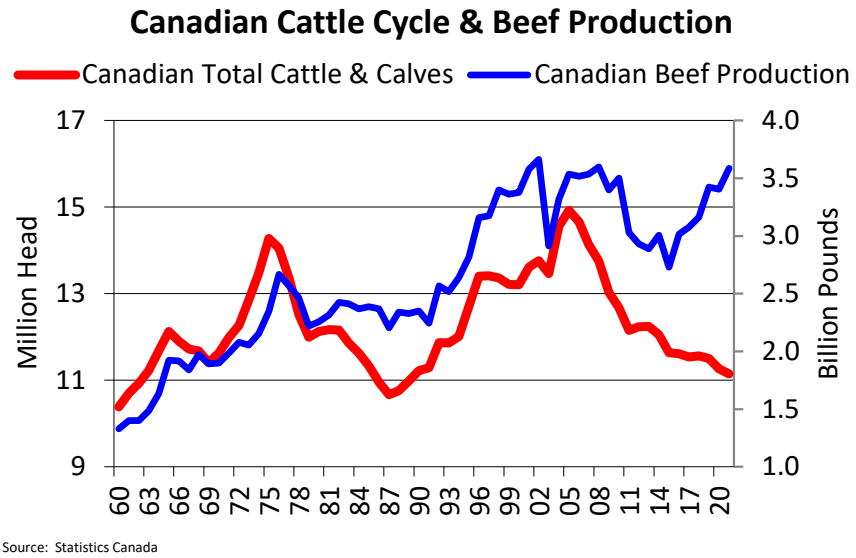

Figure 12. Canadian Cattle Cycle and Beef Production

[80] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and Challenges, Chapter 1*
[81] *CRS Fact Sheet, April 2021*

Source: **Statistics Canada, Canfax**

Feedlot Capacity

The US feedlot capacity has increased roughly a million head in the past 20 years despite declining cattle numbers.[82] US producers have achieved this by reducing turnover rates and adapting their distribution of placements. In Canada, the majority of cattle feeding takes place in Alberta and Saskatchewan and the AB/SK Cattle on Feed has been reported by Canfax since 2001. Bunk capacities during 2001-2012 ranged between roughly 1.6-1.7 million head, although there was a steady decline starting in 2008. The decline in bunk capacity continued until 2015 to a low of 1.4 million head. Feedlots respond to beef demand both domestically and globally.[83] In recent years feedlot capacity in both the US and Canada have increased. On January 1, 2022, US feedlot capacity was at 17.2 million head, while AB/SK was at 1.69 million head. In Canada, CRS has suggested the condition of a two- stage cycle, where there is a declining to stable cow herd, while the cattle feeding capacity has increased. This increase as been supported by feeder imports from the US.

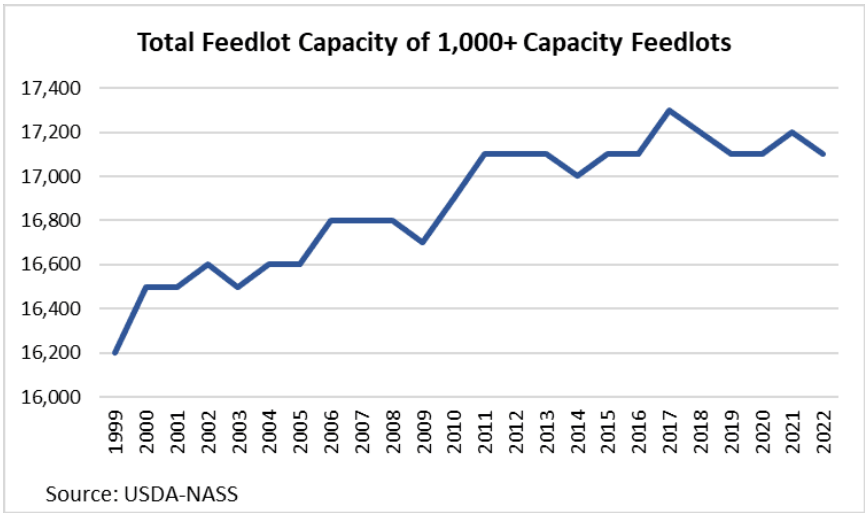

Figure 13. US Feedlot Capacity, Jan 1, 1000 head, 1999-2021
Source: USDA-NASS, complied by LMIC[84]

[82] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and Challenges, Chapter 1*
[83] *CRS Fact Sheet, April 2021*
[84] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and Challenges, Chapter 1*

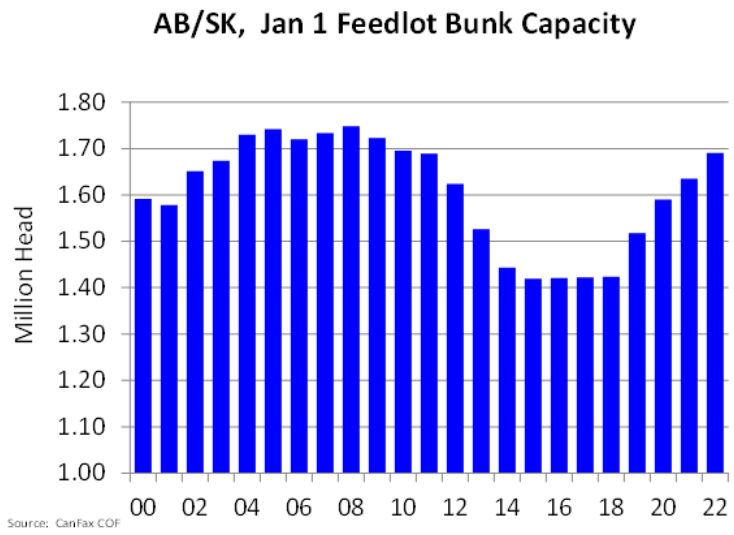

Figure 14. AB/SK Jan 1 Feedlot Bunk Capacity
Source: Canfax, COF

Feedlot Concentration

Consolidation has taken place in the Canadian feedlot industry as well. In the early 2000's, the number of feedlots in Alberta and Saskatchewan as reported by the Cattle on Feed Demographics Report ranged between 230-240 finishing yards and shrunk to 150 yards by 2015. Sector capacity began to expand in 2019 and has grown further into 2021 with 169 yards with a capacity of 1.69 million head. As with the packing industry, economies of size also pertain to the feeding industry. In 2021, large feeders (>10,000 head capacity) represented just under 75% of the capacity compared to just under 64% in 2012. Whereas small and midsize feedlots represent 8% and 17% of capacity respectively in 2021 down from 14% and 22% respectively in 2012. In addition to economies of size, large feedlots may have the ability to negotiate more advantageous forward contracts or formula grid arrangements than smaller seasonal feeders.

Packer Concentration

Figure 9 referred to the highly concentrated packing industry. In the US, four meat packers (Tyson, JBS, Cargill, National Beef) account for 85% of the market share. This has been relatively stable since 1990 following the rapid concentration that took place during the 1980's.[85] Regional concentration ratios are generally even higher (Ward, 1988). In Canada the packing industry is also highly concentrated. From a national perspective, 78-79% of federally inspected fed cattle slaughter has been in the West the past 5 years with 2 meat packers, Cargill and JBS, dominating 87% market share, up from 81% in 2007.[86] Since 2012 with the addition of Harmony Beef, packer concentration in the West for the 3 packers has been at 95%. In Eastern Canada, with roughly 20% of fed cattle slaughter, one packer (Cargill) has made up 60-73% market share over the last five years.

Boxed beef technology was introduced in 1967 by Iowa Beef Processors and by the 1970's was the dominant wholesale beef technology used.[87] Since then, packers have continued to add fabrication

[85] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and Challenges, Chapter 1*
[86] Canfax
[87] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and Challenges, Chapter 1*

facilities to produce value-added products (marinated, cooked, case-ready fresh retail beef). As Dr. Peel describes, now major packers produce thousands of products from a fabrication process that begins with several hundred carcass products and by-products of slaughter and fabrication.

Demand

Demand is a customer's willingness to purchase a given quantity of product at a given price.

Retail Beef Demand

In the US, retail beef demand indexes show a decrease from the 80's into the late 90's, followed by an increase into 2004 before dropping during 2010/2011 and resuming increases since.[88] However, as Dr. Peel notes, while retail beef prices provide a general indication of beef demand they are an imperfect measure. As well the retail sector only represents one consumer channel, which became even more apparent during the COVID-19 pandemic. Prices for foodservice are not know.[89]

In Canada, the retail beef demand index peaked in 2020, the highest since 1989. The domestic market is the largest most stable market for Canadian beef, however reliance on the domestic consumer is not as significant as it was in the 1980's, making the global economy more important as the driver of beef demand.[90]

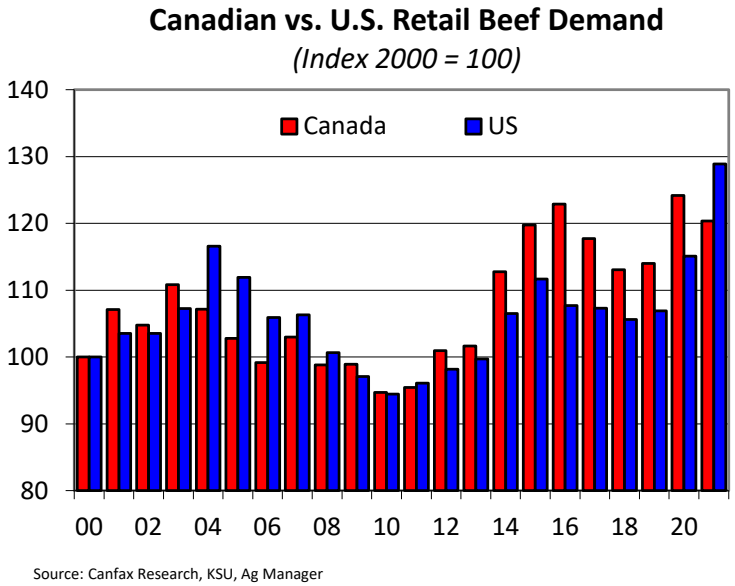

Figure 15. Canadian vs US Retail Beef Demand (Index 2000=100)
Source: CRS, KSU, Ag Manager

Beef Trade

[88] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and Challenges, Chapter 1*
[89] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and Challenges, Chapter 1*
[90] *CRS Fact Sheet October 2020*

US beef exports have grown significantly in the past 30 years except for the set back caused by BSE in 2003 and in 2021 the US was projected to be the number two global beef exporter.[91] Like Canada, the US exports beef products that have higher value in the foreign markets but are less desired domestically such as variety meats. As Dr. Peel states "the value and importance of the international beef and cattle trade to the US beef industry continues to grow". For Canada, exports have mostly trended higher since 2012 and in 2021 were the second highest in volume and the highest in value.[92] At the same time annual beef imports volumes have been generally declining.[93]

Boxed Beef

US Boxed beef prices are calculated from about 50 reported wholesale cut prices and attempt to capture the wholesale value of beef. However, the composition of products included in the boxed beef price has changed over time making historical comparisons more difficult. Overall boxed beef prices have generally increased since the late 1990's. For Canada the boxed beef report ended reporting in March 2020, so the US boxed beef prices are used for reference. Users know they need to take into account currency and basis fluctuations.

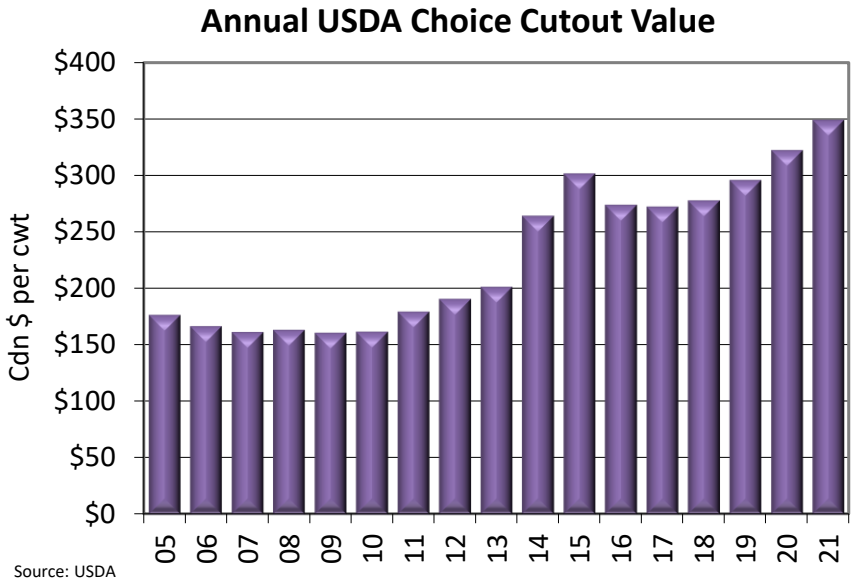

Figure 16. Annual USDA Choice Cutout Value in CDN$/cwt
Source: USDA

[91] *Fisher, Outlaw, Anderson, 2021 U.S. Beef Supply Chain: Issues and Challenges, Chapter 1*
[92] *Beef Watch, Canadian Cattlemen's, May 2022*
[93] *Canfax. Personal communication.*

Appendix 2. US MPR Proposals

In March 2022, four Senators called for legislation to reform U.S. cattle markets and have released an updated version of the Cattle Price Discovery and Transparency Act. The four senators are: Deb Fischer (R-Neb.), Chuck Grassley (R-Iowa), Jon Tester (D-Mont.), and Ron Wyden (D-Ore.), the bill was first introduced in November 2021. The revised bill comes after several months of working with staff at the U.S. Department of Agriculture to make technical changes that will allow them to best implement the bill. "I frequently hear from *Iowa's independent cattle producers* about their struggle to get a fair price for their cattle" stated Senator Grassley[94]. The updated bill would:

1. Require the Secretary of Agriculture to ***establish 5-7 regions*** encompassing the entire continental U.S. and then ***establish minimum levels*** of fed cattle purchases made through approved pricing mechanisms. Approved pricing mechanisms are fed cattle purchases made through negotiated cash, negotiated grid, at a stockyard, and through trading systems that multiple buyers and sellers regularly can make and accept bids.
2. ***Establish a maximum penalty*** for covered packers of $90,000 for mandatory minimum violations. Covered packers are defined as those packers that during the immediately preceding five years have slaughtered five percent or more of the number of fed cattle nationally.
3. The bill also includes provisions to create a ***publicly available library of marketing contracts,*** mandating box beef reporting to ensure transparency, expediting the reporting of cattle carcass weights, and requiring a packer to report the number of cattle scheduled to be delivered for slaughter each day for the next 14 days. The contract library would be permanently authorized and specify key details about the contents that must be included in the library like the duration of the contract and provisions in the contract that may impact price such as schedules, premiums and discounts, and transportation arrangements.

In June 2022, the Cattle Price Discovery and Transparency Act of 2022 (S. 4030)passed on a voice vote with only two recorded no votes in the Senate, according to Deb Fischer (R-NE). The U.S. House also passed its version of the special investigator bill, which was opposed by the North American Meat Institute, National Cattlemen's Beef Association (NCBA), National Pork Producers Council and National Chicken Council. NCBA said the proposal would subject every cattle producer in the country to a business-altering government mandate. Julie Anna Potts, President and CEO of the Meat Institute, said in a statement, "The Grassley-Fischer bill being marked-up in the Senate Agriculture Committee this week will cost producers in the largest cattle producing region millions of dollars, and producers around the country will lose the ability to market their cattle as they choose."[95]

This has been revised from:

1. Requires USDA to establish 5-7 regions covering the continental United States and that reasonably reflect similar fed cattle purchases.
2. Designates a set of approved pricing mechanisms for covered packers that contribute to price discovery and transparency. These include fed cattle purchases through negotiated cash, negotiated grid, at stockyards, and through trading systems where multiple buyers and sellers can make and accept bids.
3. Requires USDA to set minimum levels of purchases through approved pricing

[94] https://www.drovers.com/news/ag-policy/senators-revise-cattle-price-discovery-and-transparency-act
[95] https://www.drovers.com/news/industry/cattle-market-reform-bills-advance-senate

mechanisms that covered packers – those controlling five percent or more of fed cattle slaughter – must make.

4. Mandates that each regional mandatory minimum be not less than the average of that region's negotiated trade for the two-year period of 2020-2021. Additionally, sets a maximum threshold for any region at 50 percent.
5. Requires USDA to conduct an initial review of mandatory minimums after two years.
6. Allows USDA to work with the cattle and beef industry to periodically review and modify regional minimums after a public notice and comment period.[96]

The NCBA policy book shows that in 2020 motions were passed.

THEREFORE BE IT RESOLVED, NCBA supports a voluntary approach that:

1. Increases frequent and transparent negotiated trade to regionally sufficient level, to achieve robust price discovery determined by NCBA funded and directed research in all major cattle feeding regions.

2. Includes triggers to be determined by a working group of NCBA producer leaders by October 1, 2020.

BE IT FURTHER RESOLVED, if the voluntary approach does not achieve robust price discovery, as determined by NCBA funded and directed research, and meet the established triggers that increase frequent and transparent negotiated trade to a regionally sufficient level, and triggers are activated, NCBA will pursue a legislative or regulatory solution determined by the membership.[97]

At the 2022 NCBA summer meeting the membership acknowledged that while the industry had not been successful in avoiding the triggers set by the 75% plan, they did see improvement in volumes of negotiated trade in areas such as the south. Therefore, the NCBA membership voted 80% to oppose S.4030 and does not support any government intervention that mandates how cattle producers market their cattle.[98]

[96] https://www.fischer.senate.gov/public/_cache/files/b618a7af-5f34-498e-ac26-1988edb432d2/cattle-market-transparency-one-pager-updated-2-.pdf

[97] https://www.ncba.org/Media/NCBAorg/Docs/2022-ncba-policy-book-master-copy.pdf page 94

[98] Conversation with Tanner Beymer; NCBA senior director, government affiars

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