



NATIONAL BEEF SUSTAINABILITY ASSESSMENT:

ECONOMIC ASSESSMENT

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Note: The National Beef Sustainability Assessment is not intended to compare or rank beef production practices or systems. Rather, its sole intention is to provide a benchmark of the social, economic and environmental performance of the Canadian beef industry, and should be considered in its entirety.

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Executive Summary

Economic sustainability is defined as the ability of a system to maintain productivity in the face of a major disturbance, as well as shifts in consumer preferences. This definition focuses on the resilience of the industry as a whole and its ability to adapt to changing market conditions.

The Framework

The framework to evaluate economic performance of the Canadian Beef Industry utilizes both Producer Viability and Consumer Resilience. Four indicators are used as benchmarks: (1) long-term profitability; (2) long-term per unit cost of production; (3) domestic consumer demand; and (4) international consumer demand.

The Baseline

The 2013 Baseline assessment for each indicator is shown in Table 1.

The beef industry is characterized by small margins at every production stage. In 2013, cow-calf enterprises covered short-term (i.e., cash costs) and medium-term (i.e., including depreciation) costs. Three of the four typical farms also covered long-term costs (i.e., including opportunity costs). In this case, opportunity costs largely represent unpaid labour.

Cow-calf per unit cost of production (COP) declined 12% between 1990 and 2014, in deflated dollars. Feedlot COP declined 33.5% between 2001 and 2010 before higher input prices reversed this trend. In 2013, COP was still 9% below the peak in 2001.

Domestic retail beef demand was 104 (2000=100) in 2013, as it increased from the low of 96.5 in 2010. International demand was 82 in 2013 and has been increasing since the low of 63.6 in 2009 following the global financial crisis.

Table 1. Benchmark indicators for the economic performance of the Canadian Beef Industry

		2013 Baseline	
1. Producer Viability		Nominal \$	Deflated
Indicator #1	Long-term Profitability (2005-14 avg)		
	Cow/Calf (\$/cow)	\$49.35	\$93.03
	Feedlot (cash) (\$/cwt)	\$0.02	-\$0.09
Indicator #2	Long-term Cost of Production (2005-14 avg)		
	Cow/Calf (\$/cwt)	\$1.14	\$1.20
	Feedlot (\$/cwt)	\$101.44	\$106.67
2. Consumer Resilience		Beef Demand	
Indicator #3	Retail Beef Demand Index (2000=100)	104	
Indicator #4	International Beef Demand Index	82	

1. Introduction

The Global Roundtable for Sustainable Beef envisions a world where all aspects of the beef value chain are environmentally sound, socially responsible and economically viable. The initiative was developed to advance continuous improvement in sustainability of the global beef value chain. The Canadian Roundtable for Sustainable Beef is conducting a Sustainability Assessment on all three aspects of sustainability. Deloitte is completing the environment and social analysis, while Canfax Research Services¹ (CRS) conducted the economic assessment.

The cattle industry plays a significant role in Canada's economy with direct and indirect effects in the beef supply chain supporting employment in the domestic market. In 2013, farm cash receipts from cattle and calves totalled \$6.80 billion, accounting for 12.4% of total farm cash receipts in Canada. The combination of the direct impact and the secondary impacts throughout the economy result in the cattle industry being responsible for \$35 billion worth of sales of goods and services to the economy. These sales contribute \$21.8 billion to the national GDP².

The Social Assessment notes that 99% of farms surveyed sourced more than 50% of spending with suppliers located in the same or neighbouring province (Deloitte, 2016). Overall, there are significant forward linkages in the beef industry; this highlights the extent of reinvestment in the local, regional and/or provincial economies.

The cattle industry is also a large generator of employment. In 2013, the beef industry was directly or indirectly associated with the creation of 248,879 full-time equivalent jobs in the country. The cow-calf and feedlot sectors are a source of employment with 13% of beef farms utilizing full time employees (18,315 employees) and 19% of beef farms having seasonal or part-time employees (27,846 employees). Overall, 32% of beef farms employ 46,161 people across Canada (2011 Census of Agriculture). Labour shortages encourage industry to replace human resources with capital resources through innovation. Hence, greater productivity can actually result in less employment overtime as resources are allocated to the most efficient and economical use.

The **objectives** of this economic assessment are to:

1. Develop a framework to evaluate economic sustainability in Canada; and
2. Establish a baseline to measure progress.

This baseline will provide a starting point for continuous improvement moving forward.

¹ Canfax Research Services (CRS) provides market/statistical information and economic analysis that are utilized by the Canadian Cattlemen's Association (CCA), provincial organizations, marketing & research organizations, government, and other industry stakeholders to assist in domestic and export policy issues, business plan development, and performance measurement evaluation. CRS participates in working groups, provides economic support to committees, and is involved with various industry projects and requests on an ongoing basis.

² The cattle industry's total economic contribution to the national economy is comprised of direct and secondary impacts. The direct impact is generated from sales within the industry that can be measured with Farm Cash Receipts (FCR). The secondary impacts are a sum of indirect impacts and induced impacts. Indirect impacts are generated from purchased inputs for cattle production and the business it generates further down the supply chain. Induced impacts are created from workers and other human resources on consumer goods and services re-spending their income. Induced impacts also include employment creation in other sectors from the dollars spent by employees and from trade.

2. Methodology Framework

Defining Economic Sustainability

Economic sustainability is the ability of a system to maintain productivity in spite of a major disturbance, as well as slow shifts in consumer preferences (adapted from Conway 1985). Such a definition focuses on the resilience of the industry as a whole and the ability to adapt to changing market conditions.

In terms of the probability of persistence into some future moment in time - the best proxy is the past, and as such we will be relying primarily on historical evidence in this analysis as a basis for how the beef industry might respond to major disturbances (e.g., disease outbreak, market shocks, weather impacts, changing consumer preferences) in the future.

A History of Declining Terms of Trade

Commodities tend to experience declining terms of trade (NBR, 2014). Declining terms of trade is when the price received for outputs declines relative to prices paid for inputs. This happens when productivity improvements result in supply increasing faster than demand, leading to declining deflated commodity prices. Figure 1 shows how fed, feeder cattle and retail beef prices have lagged behind general inflation since 1980. Retail beef prices only caught up with general inflation in 2014, while fed and feeder cattle prices continue to lag.

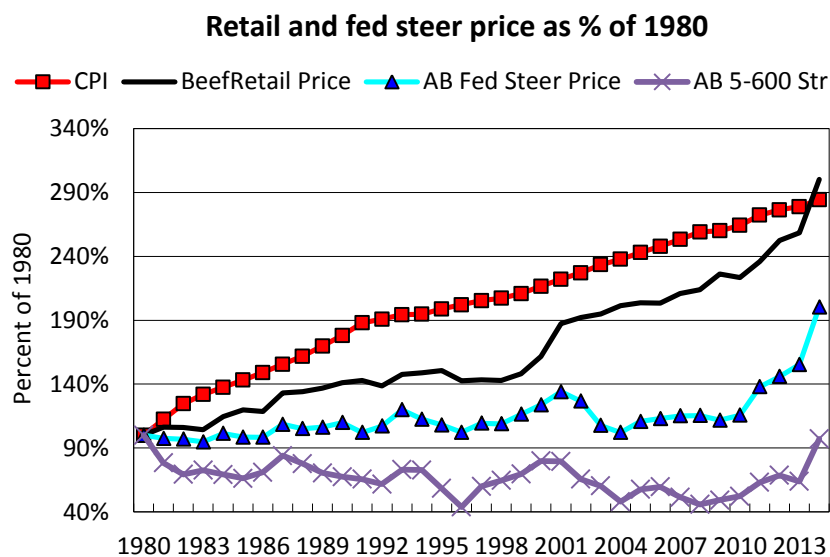


Figure 1. Declining Terms of Trade

Declining terms of trade can be addressed in two ways. First, by increasing demand for the commodity (see Consumer Resilience section); this increase in demand must be greater than any increase in supply to result in higher deflated commodity prices. If the domestic market is mature (i.e., saturated) the next step is the global market.

The second option is for individual producers to improve productivity (i.e., reduce cost of production) to stay ahead of the declining prices. This is also the area within the direct control of the producer. The Western Beef Development Centre reported that in 2012 the top 25% of participating producers in the Saskatchewan cow-calf cost of production analysis had breakevens 20.5% lower than the bottom 75% (Fact Sheet #2012-03). There is opportunity for improvement within industry. The irony is that the cause is the cure.

A Framework

An operation must remain financially viable to survive; this will be compromised if the resources necessary for production (e.g., the land or animals) are impacted. There are many issues that impact the financial health and well-being of the beef industry, including production efficiency, market access, industry investment, technology adoption, risk management, policy, and regulatory costs. Some of these are supported by data and are measurable, while others are not. But all of these issues are eventually captured one way or another through dollars and cents in profitability.

It is recognized that the beef industry has operations of various sizes and structures with single or multiple producers of various ages that are profitable. One type of operation is not better or worse than another and this diversity in the industry provides a measure of sustainability as each operation handles market shocks differently.

Profitability simply addresses the producer, or supply side, of the beef industry. In any market, there must be both a buyer and a seller. Consumer demand is the ultimate driver for the long-term development of the cattle industry. A sustainable cattle industry has to evolve with the consumer market and respond to changes in consumer preferences. Failure to do so leaves an industry without a market and without a market an industry will eventually cease to exist.

Continuous Improvement

The beef industry is a small margin business. Margins are not anticipated to increase continually over time, nor are producers expected to be profitable each year. Cattle production is cyclical, and a full cattle cycle typically lasts for 10-12 years. Different stages of the cycle and the volatility in commodity prices means that a sustainable business may experience short-term financial loss, while remaining profitable in the long run. The intention is to update the sustainability assessment every five years. This is because using annual data would only capture a snapshot of the cattle cycle and not necessarily reflect long-term profitability. The risk of using annual data would be comparing the bottom of the cattle cycle when things are profitable (e.g., 2013) to the top of the cattle cycle when prices are signalling liquidation.

Continuous improvement requires the ability to constantly adapt to the market conditions in which a producer operates. Higher input costs may require not just productivity improvements but changes in marketing practices to ensure the type of product demanded is the product supplied. Failure to respond to changing consumer preferences can result in a shrinking market share, and reduced consumption.

2.1. Approach

Economic assessments vary according to the scope of the study (i.e., at the national, local, or organization level), timeframe (i.e., current progress review or future decision making) and the methodologies for the assessment (e.g., indicators, cost-benefit analysis, life cycle costing, etc.). A list of selected studies or guidelines regarding sustainability assessment with descriptions on their objectives, scope, time horizon and approach can be found in Appendix B. Indicator Review. The following section briefly discusses some of the approaches and the pros and cons of each.

Indicators provide flexibility in the sense that they can be used for entire industries at different geographic levels including global, regional, national and local levels. Spangenberg *et al.* (1998) noted that the non-linear relationship and unpredictable time-lag between a policy and its environmental impact

makes it difficult to assess sustainable improvement using cost-benefit analyses. Compared to other approaches (such as Life-Cycle Cost Analysis and Cost-Benefit Analysis), a group of properly constructed indicators can measure or monitor the status of sustainable development not only in quantitative terms, but also in qualitative and descriptive terms. The simplicity and robustness of the performance indicator approach will provide a firm foundation for the inaugural sustainability assessment of the Canadian beef industry which aims to provide information on a suite of key issues rather than focusing on only one specific topic.

Life Cycle Cost Analysis (LCCA) is a well-known approach in assessing sustainable economic development. This method helps to understand cost drivers of a product system to identify not only the deficiency of the system but also the improvement options (Kamali *et al.* 2012). In the U.S. Beef Industry Sustainability Assessment, a LCCA was conducted, the results showed a price increase (defined as the cost of consumer benefit per one pound of boneless, edible, consumed beef) of 6% between 2005 and 2011³. In this study the consumer price of beef was used to reflect the full cost of the value chain, in order to simplify the intricacies of the cost and price structure in the industry. It was acknowledged that the economic benefit of beef extends beyond consumer price alone, and further research is required in the area of environmental goods and services/ecosystem services (Andrade *et al.* 2013). With the similarity between the Canadian and U.S. beef industry, it can be anticipated that a LCCA for the Canadian beef industry will face the same sort of data issues, and resulting simplifying assumptions.

Cost-Benefit Analysis (CBA) is an approach widely adopted for environmental policy. The underlying theory of CBA is that natural ecosystems provide services that benefit humankind. Therefore natural resources are considered environmental assets that have measurable economic value (Costanza *et al.* 1997). In practice, one of the challenges of using the CBA approach is quantifying the economic values of non-market goods for environmental and social elements. Various approaches have been developed to place monetary values on flows that do not have a market-determined price (e.g., hedonic prices, travel cost, willingness to pay, revealed preferences, stated preferences, etc.). The CBA typically focuses on a specific management practice or policy, and is considered within a Life Cycle Assessment (LCA) in order to compare alternatives (e.g., two beneficial management practices (BMPs) or a BMP relative to the current situation) (CRA, 2011). This is outside of the scope of the current Sustainability Assessment; but it is recommended that future research should include a CBA component on the environmental and social BMPs recommended from the work being completed by Deloitte, as this information would prove to be valuable to the industry.

Total Factor Productivity (TFP) measures the efficiency of all inputs to a production process. This has been used to internalize environmental and social costs (e.g., greenhouse gases (GHG)), providing a complete cost to society from production practices. Research on valuing various environmental costs and ecosystem services have been done, but are often dependent on consumer/producer surveys, and for some ecosystem services this method is debatable. As with the CBA, this method does not explain current producer decisions; that is, it does not consider the current market practice, encountered by consumers or producers. The objective of the current assessment was to create a baseline of what is now occurring in the Canadian Beef Industry in terms of economic sustainability. Hence, this approach considers factors that are outside the scope of the assessment. In the future, if environmental costs are internalized or ecosystem service payments become the norm the practices will be reflected in updates.

Given the objectives and data availability, the economic assessment of the Canadian cattle industry will utilize the indicator approach. This approach allows for measurement in quantitative, qualitative and descriptive terms, and will set the baseline for the current situation from which to monitor future progress.

2.2. Identifying Indicators

In recent years, a number of international organizations have developed guidelines for identifying and reporting sustainability indicators. There are also industry-level studies that surveyed stakeholders on the

³ <http://issuu.com/beefcheckoff/docs/sustainabilityexecutivesummaryweb?e=8298940/6720608>

representative issues regarding sustainability development. A summary of the indicators used in the economic sub-category is provided in Appendix B. Indicator Review.

The economic indicators collected in previous studies cover a wide range of components. While robustness is the strength of the indicator approach, a focus on comprehensiveness often results in excessively long lists of indicators that create significant implementation challenges (Serecon Management Consulting Inc., 2011). It is important to note that the indicators being assessed in this study are intended not to be a complete list of economic conditions evaluated by an operation or even industry, but rather the *key data points that drive the industry*. Several data limitations are noted throughout the following sections. The accuracy and robustness of each indicator will require ongoing monitoring and improvement to reflect changes in industry practices. Reed *et al.* (2006) provides two criteria the indicators must meet in order to be applicable for local communities: 1) they must accurately and objectively measure progress towards sustainable development goals; and 2) they must be possible for local users to apply them. The selection of indicators for this study follows the SMART criteria, which are Specific, Measurable, Assignable, Realistic and Timely (Schomaker, 1997).

Three categories of indicators were chosen to create an economic benchmark for the Canadian cattle industry and are summarized in Table 2. There are a number of contributing factors for each indicator. For example, risk management, price transmission, debt to asset ratios and off-farm income all must be taken into account when evaluating profitability. But the goal is not to improve risk management programs but to improve profitability. Moving forward, the CRSB may want to add leading indicators that contribute to continual improvement of economic sustainability.

Table 2. Indicators for the Economic Assessment of the Canadian Cattle Industry

1. Producer Viability	
Indicator #1	Long-term Profitability in Cow-calf and Feedlot Sector
Indicator #2	Long-term Cost of Production for Cow-calf and Feedlot sector
2. Consumer Resilience	
Indicator #3	Retail Beef Demand Index
Indicator #4	International Beef Demand Index

The economic component of the sustainability assessment has overlap with the social component, and therefore they are commonly combined into a single socioeconomic category. When possible and where relevant, data from the social life cycle assessment is referenced.

2.3. Future Research

There are a number of data gaps that are recommended for future research.

Cost of Adopting BMPs

The purpose of the Sustainability Assessment is to provide a baseline from which to monitor continual improvement. However, it is recognized that there is interest in having a CBA completed on the recommended environmental and social BMPs resulting from the Environmental assessment work done by Deloitte to help communicate implications of adopting various practices to producers. While outside the scope of the current project, this is an area of future research that will complement the Sustainability Assessment and provide the next step in communicating economic implications to producers.

Natural Capital

Natural capital is the stock of ecological assets which provide a flow of goods and services that people value (Anderson *et al.* 2010).

Beef producers steward large portions of agricultural land in Canada. This natural capital generates economic value in various ways. Canada's natural resource assets including timber, oil, natural gas and other subsoil minerals have been valued by Statistics Canada at around \$1 trillion. As the value of preserving and restoring ecosystems is being increasingly recognized, identifying and quantifying natural

capital has become an important part of environmental planning and management. The goal of providing hard data is that it makes tradeoffs explicit in policy models and fosters better informed public debate. The intention is that this would inform sustainable resource allocation and policy decisions. In recognizing the importance of natural capital, Statistics Canada is scheduled to integrate a portion of energy, mineral, timber and land resource into natural resource stock accounts in December 2015.

Economic valuation of Ecosystem Services (ES)⁴ is the process of assigning monetary value to goods and services that are not normally marketed (Anderson *et al.* 2010). A number of approaches and techniques have been developed to quantify ES values. However, ES valuation faces a number of technical challenges, including: (1) Identifying the relevant components – biodiversity inventory; (2) Social preferences are continuously changing – values will change; (3) Market prices can be poor estimates of value; (4) Ecosystem stability is complicated; and (5) Double counting issues (Daily 1997 and Anderson, J. *et al.* 2010). The solution of these challenges must be based on the understanding on the key components and the economic, environmental and social elements of a system and their relationship.

While CRS recognizes the importance of the capturing the value of the natural capital that the Canadian beef industry stewards, valuations in this area are still unclear. Further research is needed in this area before adding to future assessments.

Niche Markets

It should be noted that with limited production and sales data for Canada's niche beef market, information on the premiums available for certain attributes is just as limited for the producer to make these decisions. In addition, there is limited literature on the cost of producing specific attributes. This means we will not be providing detailed qualitative analysis in this economic assessment. Additional research is needed on the size and scope of niche markets and the premiums they can support.

2.4. Critical Review Panel

Dr. Jill Hobbs (University of Saskatchewan), Dr. Scott Jeffrey (University of Alberta), and one international economist have provided a third party review in addition to the Steering Committee for the Canadian Beef Industry Sustainability Assessment project. Issues mentioned by the external reviewers and responses from Canfax Research Services (CRS) are found in Appendix A.

⁴ Ecosystem services (ES) are the full range of benefits that people obtain from a natural ecosystem, including "the conditions and processes through which natural ecosystems, and the species which make them up, sustain and fulfill life" (Daily 1997a: 3).

3. Producer Viability

Producer viability refers to producer's financial ability and incentive to continue producing a product. Profitability provides the signal for producers to maintain or grow the business. The entire beef supply chain (cow-calf, feedlot and packer) is rarely profitable all at the same time. This is partly due to the fact that when feeder prices are high and supporting cow-calf profitability, the input cost is also high for feedlots, squeezing the margins. Similarly, when fed cattle prices are high, supporting feedlot margins, the input cost is also high for packers, again squeezing the margins. Recognizing this dynamic, the following analysis focuses on long-term profitability of each sector.

Producers are, in general, price takers with cattle prices determined in the U.S. market and adjusted for the exchange rate and basis (i.e., transportation and transaction costs). Therefore, profitability is often impacted by how producers control their cost of production. The Canadian beef industry is a player in the global market, and therefore competitiveness on cost of production is important. While production costs at the cow-calf level determines if the industry expands or contracts, feedlot costs determine where cattle will be finished, and packer costs determine where cattle will be processed with value-added to the carcass. Regulations that add costs to any sector can impact competitiveness, trade and viability. In addition, there has been increasing concern about the lack of a younger generation entering the cattle industry; therefore a closer look at the cost structure can help identify barriers to market entry and provide better support for future development.

This section first examines long-term profit margins for the cow-calf, and feedlot sectors. Following that, cost of production for the cow-calf and feedlot sectors is discussed. And finally, a section describing the packer sector is presented independently, as data for this sector are limited.

McLean *et al* (2014) put forth eight criteria for an economically sustainable beef operation:

1. Return, meet or exceed cost of capital;
2. Fund all current operating expenses and operational capital through internally generated working capital;
3. Pay labour/owners, at least to the standard average wage;
4. Have capacity to re-pay debt principle in a timely manner;
5. Maintain a safe level of equity (e.g., 85%);
6. Provide for the independent retirement of the existing owners;
7. Be able to survive business succession with the business and the family remaining intact;
8. Survive and prosper in the long term without the erosion of environmental capital (over stocking).

Farming is capital intensive (land and infrastructure) and it is possible to continue operating a long time by eroding equity. This is possible when producers fail to distinguish between permanent capital and working capital. It is recognized that the stage of the operation must be taken into account as start-up businesses are unlikely to meet these criteria.

Profitability drives the Cattle Cycle

In the 1990s, annual profit/loss in the Canadian cattle industry was fairly consistent with the overall average (1990-2014) with the exception of the deep losses in 1994-1996 when larger cattle and beef supplies from the previous expansion phase (1987-1995) caused a sharp decline in cattle prices. At that time, the Canadian beef cow inventories peaked at 4.4 million head.

In the 2000s the cattle industry in Canada experienced some significant economic challenges in terms of market access (i.e., due to export restriction following the Bovine Spongiform Encephalopathy (BSE) crisis), environmental conditions (i.e., drought or flooding), increased input costs, as well as the global economic environment (i.e., recessions in 1998, 2001-02 and 2008-09). After the border closure in 2003 cow prices dropped significantly and ranchers responded by retaining cull cows, which pushed beef cow inventories to a record high in 2005 at 5.3 million head. Average profit at the cow-calf sector in this period was down 84% from the previous cycle at only \$2/head. The loss in the feedlot sector deepened nearly seven times to -\$3.95 per hundred pounds (/cwt).

In the last five years, 2010-2014, the North American cattle industry reached the bottom of the cattle cycle with historically low inventories. Tight cattle supplies coupled with lower feed costs and strong global beef demand has pushed the cow-calf profit to a record high. However, there is still no sight of expansion of the Canadian cattle herd, meaning producers are signalling that they need to see a larger incentive through higher profitability in order to justify growing their herd after years of losses.

3.1. Cow-calf Data

The data for cow-calf profit margins and per unit cost of production are sourced from Alberta and Saskatchewan. This represents 70% of beef cow inventories in Canada. Estimating a cost structure for cow-calf operations in Canada is a challenge as there are numerous production factors involved. For instance, there is a wide variety of winter feeding practices from traditional confined feeding to year round grazing and everything in between, generating just as many cost estimates. *agri benchmark* is a global, non-profit network that provides a consistent methodology to compare production systems, cost of production and profitability around the world. Canada has four beef cow-calf farms in the network that will be used in this analysis (Table 3). All farms are identified by the country and number of beef cows (e.g., CA-200 is a Canadian farm with 200 beef cows)⁵. Annual margins are then calculated using cash prices from auction markets, as reported by Canfax⁶.

Table 3. Canadian agri benchmark typical beef farms

CA-200 A – Alberta, Angus cross, cash crops (200 beef cows)
CA-200 B – NW Saskatchewan, British cross, cash crops (200 beef cows)
CA-800 B – NW Saskatchewan, British cross, backgrounding (800 beef cows)
CA-800 A – Alberta, British cross, backgrounding (800 beef cows)
CA-27,500 head marketed annually – Alberta feedlot, purchased beef steers/heifers

As the *agri benchmark* data are only available to 2006, the historical analysis is based on an Alberta cow-calf returns model maintained by Canfax. This model is based on industry averages from publicly available data in Alberta, and assumes no participation in risk management programs. While the estimated return is just that, an estimate, the overall trend and relative magnitude year over year is useful for the purposes of this study. Costs were estimated for an Alberta 1200 lb cow weaning a 550 lb calf with a 95% reproductive efficiency⁷ and 5% death loss. Costs per cow included winter feed (hay, barley, and supplement), summer grazing, herd depreciation, veterinary services and medications, yardage, labour, building maintenance, and equipment depreciation.

Economic profitability accounts for opportunity costs, which is a measure of the consequence for entry or exit of the business. Economic profitability is theoretically driven to zero in a competitive market with low barriers to enter or exit. This does not mean zero financial or accounting profitability. Financial profitability focuses on the performance within a single fiscal year, with long-term investments depreciated over their lifetime. This gives an intermediate view of the viability of the business. Financial losses from one year may not permanently harm the business, but consecutive years of losses where net income is insufficient to cover living expenses may jeopardize the viability of the operation⁸. Ideally economic

⁵ For more details go to: <http://canfax.ca/FactSheets.aspx>

⁶ Canfax is a division of Canadian Cattlemen's Association who provides analysis of markets and trends in the North American beef industry.

⁷ Reproductive efficiency = calves weaned per cow wintered

⁸ <https://www.extension.iastate.edu/agdm/wholefarm/html/c3-24.html>

profitability would be used in this analysis. However, Table 4 shows that neither the *agri benchmark* data nor the Canfax Alberta model account for all requirements of economic profitability. Hence, both indicators are used.

Table 4. Sustainable Profits

Financial Profitability	Economic Profitability
Generally Accepted Accounting Principles (GAAP) for financial reporting. Accrual adjusted revenue and expenses; interest is the cash and accrual interest paid. Profit measures are pre-income tax and do not include land appreciation.	
Raised feed is valued at cost of production (<i>agri benchmark method</i>)	Raised feed at market value (<i>Canfax Alberta Model based on averages</i>)
Breeding stock replacement costs are depreciated using a reasonable lifespan and salvage value.	
Labour and management, if unpaid, is valued at the opportunity cost of what the individual could earn elsewhere (<i>agri benchmark method, all labour is paid in the Canfax Alberta Model</i>)	
	Opportunity cost on land (e.g., cash lease minus property tax and maintenance cost covered in a cash lease) (<i>agri benchmark method</i>)
	Opportunity cost on capital (e.g., return expected on the next most profitable return on investment with similar risk) (<i>agri benchmark method</i>)

3.1.1. Data Limitations

The “average” Canadian beef operation does not exist and given the significant variation in the industry (e.g., herd size, weather) the concept of an average business is flawed. However, it is still useful to present average performance as examined here. Changes in the average over time and differences between the data sets presented can be enlightening and should be focused on more than the concept of the average business.

The Pareto principle holds true in that 63% of cow-calf operations have less than 47 beef cows, representing only 19% of production. Hence, the majority of beef (81%) is produced by the minority of producers (37%). Making the average of producer profitability a skewed number compared to production. In contrast, the sample size of the *agri benchmark* data for typical operations is small and potentially biased toward producers with an interest in financial benchmarking. Both data sets (Canfax and *agri benchmark*) are evaluated conjointly for a better overall result.

However, both the Canfax and *agri benchmark* data used to report feedlot profitability are based on cash prices. Cash trade dropped from 65% in 2009 to a low of 23% in 2013 (CRS Fact Sheet, 2014a). As producers have moved to more contracts and other Alternative Marketing Arrangements (AMAs) this is not representative and a major weakness and limitation of this analysis. Enhanced price collection was implemented by Canfax in September 2014, but it will take time before adequate history is built for robust analysis.

3.2. Cow-calf Profit Margins

The theory of the firm would suggest that over the long term both variable and fixed costs must be covered. Over the short-term a firm may continue to operate as long as variable (cash) costs are covered. If these costs are not covered they will cease to operate.

Over the previous decade the Canadian beef industry has shown that it can survive over the short- and medium-term with negative returns by drawing down equity, drawing on cash reserves, or drawing on alternative income sources (e.g., mixed operations with cash crop income or off-farm income). This shows incredible resilience and persistence in primary production, but it can also be an indication of a lack of response to market signals, specifically demand signals that result in continued supply of a product with presumably deteriorating demand. The ability of the whole farm to continue operations is not in question here, but the beef enterprise specifically. The following discussion focuses on the performance of the beef enterprise.

3.2.1. 2013 Profit Margins

Data from *agri benchmark*'s typical farms in 2013, shown in Figure 2, indicate cow-calf enterprises are covering short-term (i.e., cash costs) and medium-term (i.e., including depreciation) costs. Three of the four typical farms are also covering long-term costs (i.e., including opportunity costs).

In this case, opportunity costs largely represent unpaid labour; which can be considered a “flexibility” born out of necessity in volatile markets and uncertain weather conditions. Where owner-operators take only as much as they need to live and reinvest the rest of their “salary” back in the business. This means they may be “paid” less in negative margin years and paid more in profitable years. It is this flexibility that has contributed to the long-term stability of agricultural production. It should be remembered that many cow-calf operations have living expenses covered by the operation (i.e., utilities, fuel for vehicles, etc.). It is very difficult to separate accounting and value these “perks”; however, these are a very real component of the unpaid labour that is actually covered. Hence, operators are compensated even if a cheque is not written. The ability to cover unpaid labour, either through off-farm income or diversification of on-farm commodities, is frowned on by those wishing to quantify costs (i.e., accountants and economists). It is potentially not as accepted by younger producers who are more interested in financial profitability than the lifestyle of farming. Creating transparency in what the “perks” are (i.e. compensation) and being clear that the younger generation has the choice to re-invest their wage to build equity or manage it separately is highly recommended in succession planning.

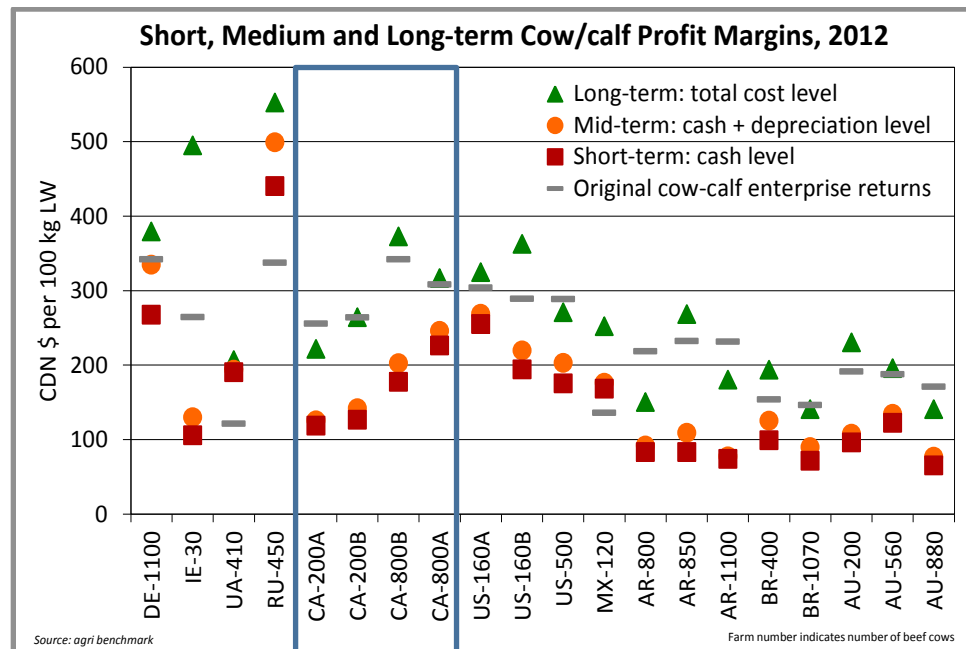


Figure 2. agri benchmark short, medium and long term cow-calf margins

The cattle and grain margins tend to be countercyclical. When grain prices are high, feeder cattle prices are bid down by feedlots and vice versa (Hart and Schulz, 2015). Therefore mixed grain and beef operations are often successful in using diversification to stabilize income. Evaluating whole farm performance rather than individual on-farm commodities improves measurement estimates of annual production costs and returns. This is also necessary to a certain extent, as a producer does not typically know which commodity will be profitable each year due to uncontrollable events such as weather. This makes it difficult for producers to immediately respond to market signals for a single commodity such as beef.

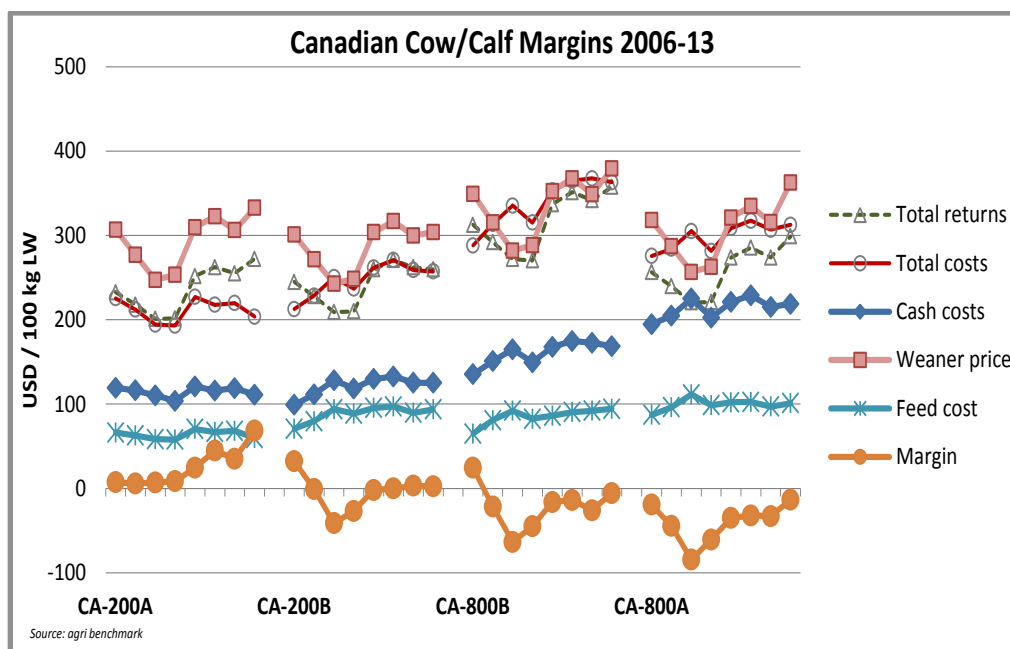


Figure 3. agri benchmark cow-calf margins 2006-13⁹

There is great diversity of cost structures present in the beef industry – particularly in the cow-calf sector. Figure 3 shows the variability in profit margins for four cow-calf operations from 2006 to 2013. Many producers left the beef industry during the liquidation phase from 2006 to 2011. The producers who stayed adapted to a market environment of high feed costs, a par exchange rate and uncertain market access by adjusting feed ration composition, exploring alternative production practices and adopting improved risk management strategies.

3.2.2. Historical profits

It was noted that the cattle cycle impacts profits and therefore a longer time period must be considered. Figure 4. Canfax Alberta Cow/calf Returns, shows historic margins with a 24-year (1990-2014) average of \$48/cow (\$50/cow in 2013 dollars). Long term average margins from a 200 head cow herd¹⁰ of \$9,650¹¹ with paid labour of \$7,909 provides a total annual income of \$17,559 (nominal, excludes government program payments). This is below Statistics Canada's low income cut-off for rural areas in 2013 of \$24,456 after taxes (family of four, Table 206-0092). Therefore, long-term margins on the typical cow-calf operation (i.e., those with less than 200 beef cows) cannot support a family. However, most of these operations are mixed with income from other commodities and therefore do not expect the beef enterprise to provide their entire income. Using the most recent 10-year average (2005-2014, see Table 5), which includes record large profits, results in a total annual income of \$27,468 (including paid labour).

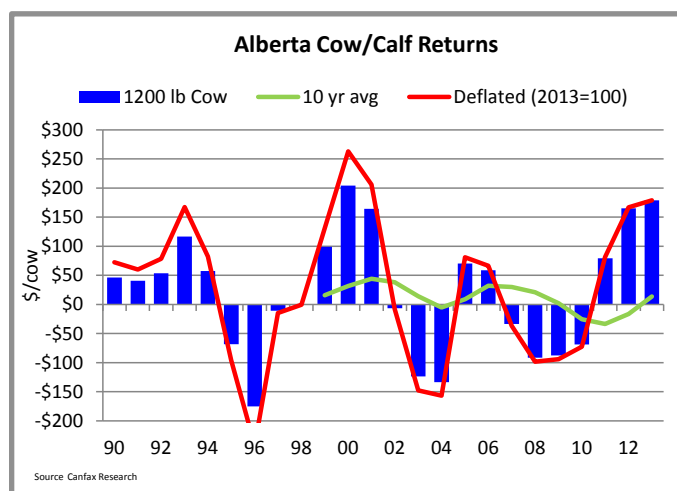


Figure 4. Canfax Alberta Cow/calf Returns

⁹ Weaner price is the price of weaned calves coming to market.

¹⁰ 48% of cows are in herds with less than 122 head (Statistics Canada, 2011, Census of Agriculture)

¹¹ This assumes all profits go to the family and are not re-invested in the operation.

Table 5. Long-term Profit/Loss

	1990s	2000s	2005-2014
Cow/Calf (\$/cow) <i>nominal</i>	31.60	2.02	94.35
Cow/Calf (\$/cow) <i>deflated to 2013 dollars</i> ¹²	42.80	7.30	93.03

The 2011 Census of Agriculture reported that 34% of beef farms had annual gross farm receipts of less than \$25,000. An 800 head cow herd provides a total income¹³ of \$75,500 annually which is close to the Canadian median income for all families of \$74,540 (Statistics Canada, 2012 Table 111-0009). Higher prices in 2014 have reduced the number of cows needed to support a family but this is not anticipated to be the case in the long term. According to the 2011 Census of Agriculture only 5% of farms had over 500 head of cows. Therefore further consolidation or alternative income sources (e.g., other commodities or off-farm jobs) are required.

3.2.3. Debt and Land Values

It should be noted that profits reported above are before interest paid on debt. Long term losses indicate that producers are unable to service debt in a timely manner or address debt reduction. Consequently, alternative income sources or liquidation of assets (on farm and off-farm assets) are likely contributing to debt reduction.

Average Canadian farmland values have increased significantly over the last 20 years (Figure 5). It is recognized that farmland value is driven by cash crop profitability and not the beef sector. However, it is informative. Annual average beef farm liabilities (including feedlots) have increased 8% per year since 2001 with the largest increases occurring in the last five years (Figure 6).

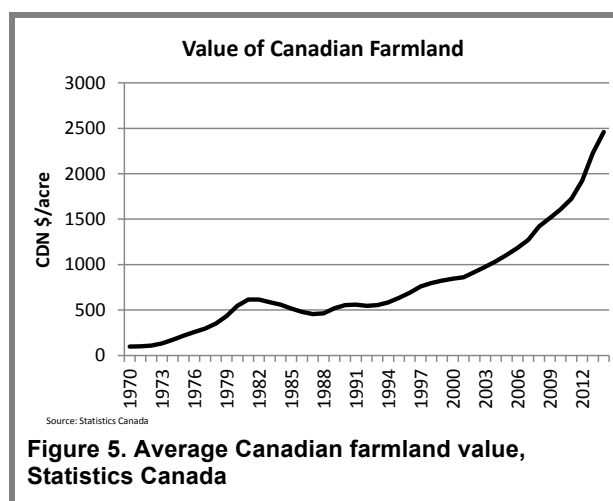


Figure 5. Average Canadian farmland value, Statistics Canada

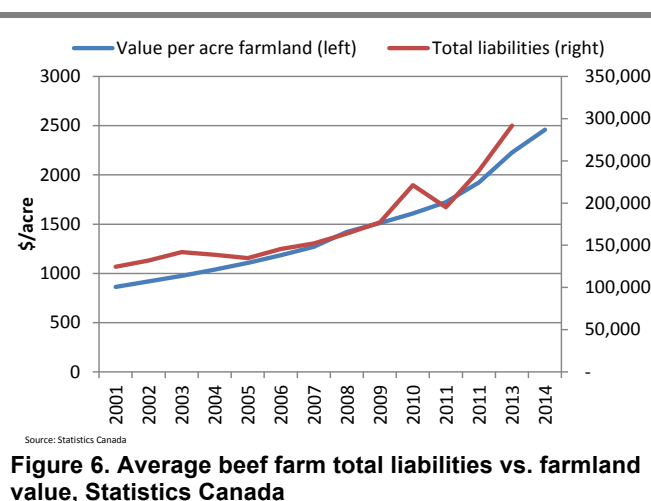


Figure 6. Average beef farm total liabilities vs. farmland value, Statistics Canada

Equity as a percentage of total assets has been steady around 82-85% from 2001 to 2013, which reflects the increase in liabilities acquired as land values have increased. If land prices decline as they did between 1981 and 1988 (-25%), then equity levels would fall, creating extreme financial pressure on operations. This pressure would come from the need to reduce debt principle and at the same time impair the capacity of the operation to raise working capital.

3.2.4. Off-Farm Income

The grains and oilseed sector has reduced its off-farm income from a high of 65% in 2005 to 42% in 2013 (Statistics Canada, Table 002-0035). In contrast, the beef sector (including feedlots) continues to have a

¹² Deflated using Statistics Canada's general Consumer Price Index (CPI) to adjust for inflation.

¹³ Income for the family to live on comes from paid labour and the profit margin on the herd.

high reliance on off-farm income with a high of 84% occurring in 2003 and while it has fluctuated over time it has not been below 75% over the last decade, and was 82% in 2013.

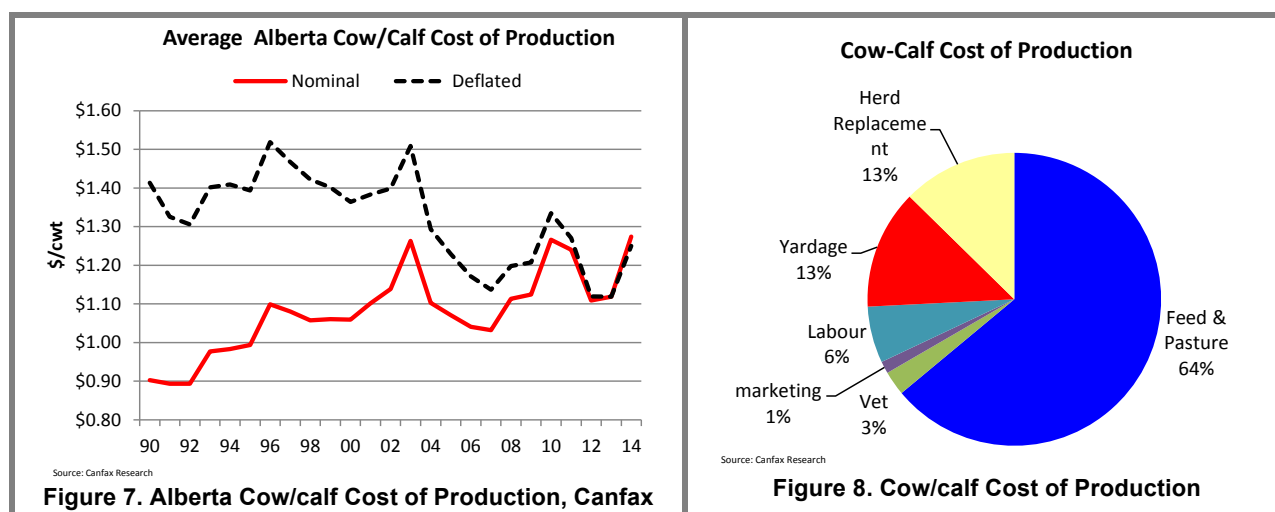
3.3. Cow-calf Cost of Production

Input prices have fluctuated widely over the last decade (2005-2014). Alberta hay ranged between \$60-\$101/ton and Lethbridge barley between \$123-\$254/tonne. Winter fuel prices were up 61% and labour costs were up 23% over the same time period. This makes alternative feed sources and methods of feeding that reduce the use of inputs to produce, harvest, and deliver feed more desirable.

Table 6. Per Unit Cost of Production

	1990s	2000s	2005-2014
Cow/Calf (\$/cwt) <i>nominal</i>	\$1.01	\$1.10	\$1.14
Cow/Calf (\$/cwt) <i>deflated to 2013 constant dollars</i> ¹⁴	\$1.40	\$1.29	\$1.20

Per unit cost of production (COP) for the Alberta cow-calf sector was up 41% from 1990 to 2014 in nominal terms, but when **deflated**¹⁵ (2013=100), it had **actually declined 12%** (Table 6, Figure 7). Productivity advancements have been able to offset some of the higher costs and are reflected in a lower COP, particularly over the last 15 years as producers have focused on reducing costs.



If continuous improvements in margins are unrealistic, what about continuous improvement in per unit cost of production? While dramatic improvements were made from 2003 to 2008, further reductions in cash costs could not continue indefinitely; the decline was made possible with limited investments in infrastructure and replacement animals, and as the liquidation phase ended, renewed investments were made. Feed is the major cost item in the cow-calf sector accounting for 50-70% of total production costs, followed by herd replacement costs at 10-20% (Figure 8).

3.3.1. Productivity Advancements

In the cow-calf sector pounds weaned per cow averaged 553 lbs in 2013, up 28 lbs from 1998 with an average growth of 1.87 lbs per year (Western Canadian Cow-calf Survey¹⁶). The measurement method of pounds weaned per cow accounts for changes in reproductive efficiency, death loss and weaning weight. This is primarily driven by changes in genetics and management. An alternative metric would be pounds weaned per cow divided by average cow weight, as heavier cows tend to wean heavier calves.

¹⁴ Cost of production has been deflated to take out the variability in prices over time leaving only the variability in input levels.

¹⁵ Adjusted for inflation, as all prices increase over time but commodities are also impacted by annual supply and demand conditions. Hence, inflation is removed to only show market impacts.

¹⁶ <http://www.beefresearch.ca/blog/western-canadian-cow-calf-survey-results/>

The production goal is to bend the growth curve to result in more pounds weaned while maintaining the cow size (e.g., go from 38% to 40%).

Over the last decade (2003 to 2013) cow-calf producers have focused on reducing cash costs. This has been done by changing winter feeding practices to be more extensive where possible (e.g., in-field winter feeding to eliminate hauling manure, swath-grazing, fall grazing, bale grazing). Summer grazing practices have also changed from being dominated by continuous grazing to use of rotation and deferred grazing to improve pasture productivity, average daily gains, and calf-pounds weaned per acre.

In general, producers have adopted new technologies and products for animal health as they become available (e.g., vaccines, parasite control). The Social Life Cycle Assessment reports that 52% of farms surveyed invest 1-10% of revenue in research and development (Deloitte, 2016).

In the feedlot sector feed efficiency has improved from 10 pounds of feed needed to produce every pound of beef (10:1) in the 1950s to 6:1 in the 2010s (BCRC, 2012). All other practices being consistent, steer carcass weights have increased on average 7 pounds per year. Beef quality has also improved over time and is discussed in more detail in Section 6.3.

Bottom line: fewer cows are needed today to produce more pounds of beef. While it varies from year to year with cow slaughter and the cattle cycle, the efficiency increase averages to 4 pounds per year per cow over the last 25 years.

3.3.2. Economies of Scale

Western Beef Development Centre (2012) reports Saskatchewan cow-calf cost of production based on actual financial information. They show economies of scale with larger operations able to spread fixed costs (i.e., yardage) over more head to reach lower per cow costs. The largest difference occurred when expanding beyond 150 head with diminishing returns occurring for every expansion after that.

The *agri benchmark* data show total costs were lower for the smaller operations of 200 head as compared to the larger 800 head operations. The larger operations typically had more machinery and paid labour compared to the smaller operations which would indicate that there is a tipping point at which economies of scale work.

McLean *et al.* (2014) note that in Australia strong economies of size are evident as producers expand to 3,000 head, and beyond that diseconomies of scale occur. This is likely due to the lack of very large operations in the data set but this also identifies the coordination problems inherent in any large organization.

What is driving consolidation? If profit margins are stable, not decreasing and not increasing over time, but the cost of living increases then more head of cattle are required to support a family of four at the median income. If a 200 head operation provided the income for the average family of four in 1990, this had doubled to 400 head in the year 2000 and 800 head by the year 2013 (i.e., see Figure 9 and Section 3.2.2. Historical Profits). This implies operations must double every decade for the family to maintain their standard of living. This also creates challenges for succession, as an operation would need to double to support another family when the next generation joins the operation (see Section 5.1.6. for more discussion on succession).

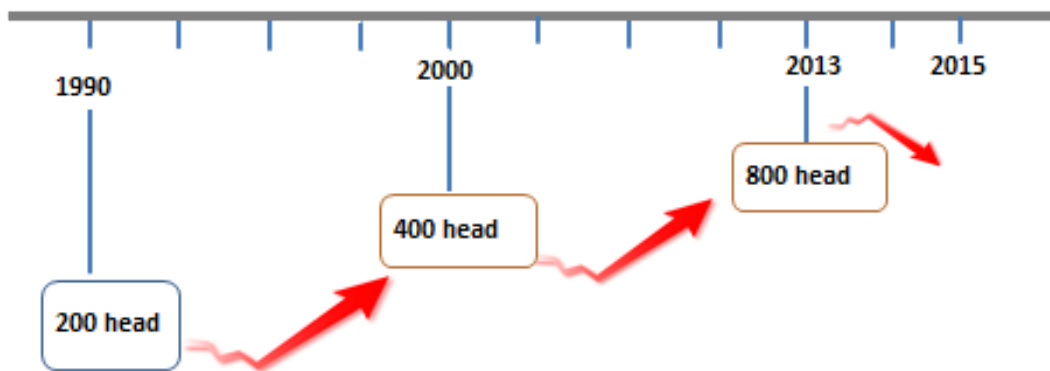


Figure 9. Sustainable Farm Size

3.4. Cow-calf Competitiveness

Producers will invest land, labour and capital into the commodity that will provide the best return. Hence, being profitable does not necessarily mean production will continue if more profitable alternatives are available. This is impacted by the beef industry's ability to compete with other commodity producers for resources in the domestic market. As an export dependent industry, the beef industry is also impacted by its ability to compete internationally. If Canada is unable to keep up with productivity improvements globally it could be priced out of the market.

3.4.1. Other Commodities

The cattle sector also has smaller profit margins compared to the crop sector. According to the Expense-to-Receipts ratios sourced from the Census of Agriculture, (Figure 10), the ratio for beef cattle farms range between 91-94% in 2000-2010 while the ratio for oilseed and grain is 76-87%. Being able to compete with other commodities for land, labour and capital is necessary for long-term viability. Smaller margins, a longer time frame to see a return, and differences between availability of risk management tools for various commodities and across Canada can skew investment in land, labour and capital. These factors have the potential to impact producer expansion plans.

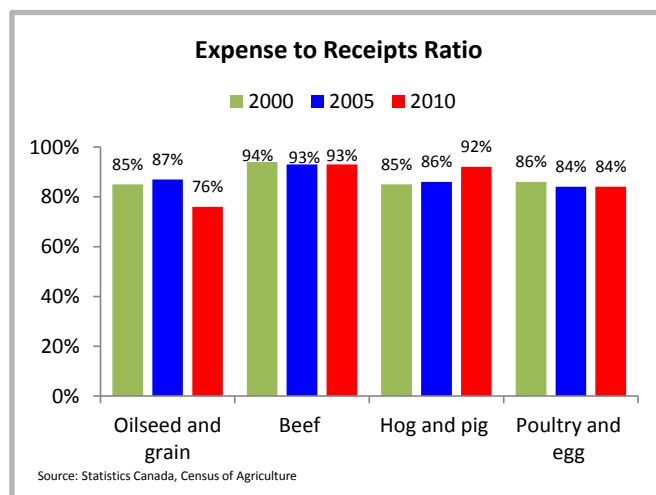


Figure 10. Statistics Canada, Expense to Receipts Ratio

3.4.2. International Comparison

Other major cattle producing countries are similar to Canada in that they are able to cover short and medium term costs but struggle to cover long-term costs (Figure 11). It should be noted that the *agri benchmark* data contains only a small sample for each country and may not be entirely representative due to self-selectivity.

Cow-calf cost of production in Canada is very similar to the United States with some regional variations. There are a range of cost structures in every country and it is not necessarily a certain country that stands out as competitive internationally so much as a group of low cost producers within each country (CRS International Comparison, July 2014).

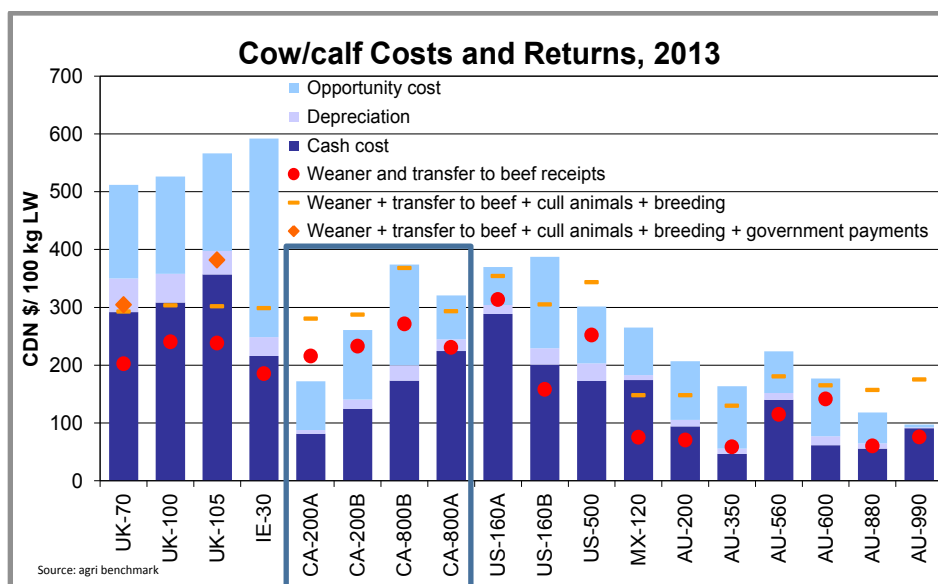


Figure 11. agri benchmark cow-calf costs and returns, 2013

U.S. producers have also experienced increased costs. However, differences in profitability have come from the price received. During this period of increased costs Canadian producers have faced depressed prices due to a stronger Canadian dollar (relative to the U.S. dollar), higher cost of gain and wider fed cattle basis, all of which impacted the price feedlots were willing to pay for feeder cattle. It has only been recently with tighter cattle supplies that price spreads have narrowed.

In comparison to other major grain-fed cattle exporters, Canadian cow-calf systems have **higher labour costs, lower forage yields, higher machinery & building costs, and higher veterinary & medicine costs**; all putting Canada at a global disadvantage for cost competitiveness.

In the global market, previous low cost producers of beef (e.g., Brazil) have seen land values, labour, and feed prices all increase with increased competition for land and growing demand for grain, oilseeds and sugar. While input costs become more homogeneous globally competitiveness in beef producing countries will come from productivity.

3.5. Feedlot data

The data for feedlot profit margins and per unit cost of production are sourced from Alberta, as this province represents 70% of feedlot production. Data are sourced from both *agri benchmark*, as noted in the cow-calf section, and the Canfax monthly TRENDS report for yearling steers. Costs for the analysis include: feeder cattle, feed, transportation, vet and medicine, interest, overhead, and death loss. Long-term margins are only available calculated based on cash prices, but hedgeable margins (calculated from the CME (Chicago Mercantile Exchange) live cattle futures, exchange rate, and historical basis at the time feeder cattle are placed) are available for recent years.

3.5.1. Data Limitations

It is recognized that producers are moving away from the cash market and using more forward contracts. However, profitability has historically been calculated using the cash market as it is often difficult to adequately reflect final contract price. Research in the U.S. has shown that long-term profitability based on cash prices merges with long-term profitability of producers who consistently use risk management tools such as contracts (Ward, AGE-616). In the short-term significant differences in margins do occur during bull and bear markets, with cash margins higher during bull markets, and lower during bear markets.

Both data sources (*agri benchmark* and Canfax TRENDS) are based on a cereal silage and barley ration. It should be recognized that feedlots frequently take advantage of cheaper alternative feed sources that are locally available. These may include dried distiller grains (DDGs) from an ethanol plant or by-products from a sugar beet or potato plant. These local alternatives result in lower cost of production and greater diversity in structures than what is presented here for simplification purposes.

3.6. Feedlot Profit Margins

Unlike the cow-calf sector, which is still dominated by family labour, the feedlot sector is dominated by large operations with paid labour. The January 2015 Canfax Feedlot Demographics report shows that 64% of bunk capacity in Alberta and Saskatchewan is found in lots with greater than 10,000 head. Economies of scale have proven to be a key part of this sector's competitiveness. Not only in terms of production (e.g., number of head at a single location), but also from bulk purchasing of inputs and marketing of cattle. Consequently, instead of expanding an existing feedlot¹⁷, an owner may have multiple locations in order to maximize the economies from logistics. Opportunity and depreciation costs are minimal in this sector, with cash costs representing 98% or more of total costs in Canada and the U.S. (Figure 12). These businesses must be financially viable to survive. Unprofitable businesses close, change product (e.g., switch to backgrounding versus finishing), or are leased out.

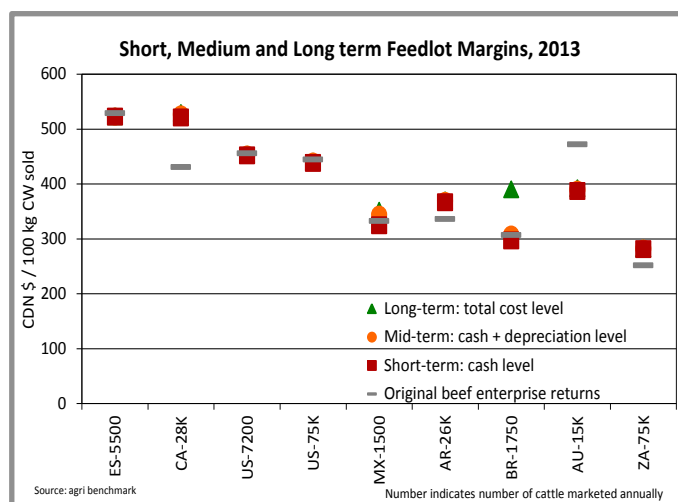


Figure 12. agri benchmark Feedlot Margins, 2013

Concerns have been raised about large-scale production, as they are vulnerable to large losses in the event of a disease outbreak. These production impacts can move markets, influencing the profitability of all producers. For example, in the swine and poultry industries, biosecurity measures in response to Porcine Epidemic Diarrhea virus (PEDv) (2013/14) and Avian Influenza (2015) have shown the ability of large scale operations to respond promptly to disease threats and minimize market impacts. Although untested at this point, feedlots could feasibly do this as well, but may find it challenging due to the open nature of production systems.

3.6.1. 2013 Profit Margins

High feed grain prices had a major short-term influence on margins in 2013. Data from *agri benchmark*'s typical farm in 2013 indicate feedlot enterprises were unable to cover even short-term (cash) costs when selling on the cash market (Figure 12). Figure 13 shows Canfax TRENDS reports hedgeable margins for yearling steers (averaging -\$1.37/cwt or -\$19.15/head) had a smaller loss than cash margins (-\$5.37/cwt or -\$75.15/head). However, this fails to account for risk management done on the input side. Feedlots address the volatility of feed grain prices as much

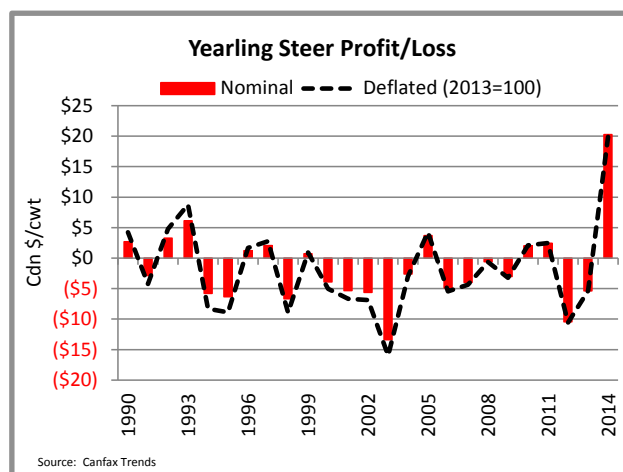


Figure 13. Canfax Annual Yearling Profit/Loss based on cash prices

¹⁷ Expansion and development of new feedlots are constrained by provincial environmental regulations. Hence, acquiring a location that already has gone through the process and is approved for confined feeding.

as the volatility in fed cattle prices in their risk management programs in order to be competitive against U.S. counterparts who are bidding on the same feeder cattle.

The use of Alternative Marketing Arrangements (AMAs) has increased across North America over the last decade as feedlots have adapted to changing market demands. Pricing has shifted from being predominantly on a live basis (i.e., sold on the average), to a rail basis, in an effort to more accurately capture quality and send a signal on the specific attributes desired back to producers. Grids and formulas with premiums and discounts for certain grades and yields of cattle create a clear signal from packer to producer on what type of cattle to produce in the most efficient way. Greater volatility in commodity markets and a desire to protect equity in a small margin business have resulted in a variety of risk management practices used (e.g., hedging, price insurance, AMAs), all of which provide greater confidence in production. With tightened supplies at the bottom of the cattle cycle, improved efficiencies by planning supply movements have translated into reduced costs for both the buyer and seller. As a result, the majority of fed cattle (48%) in Alberta were sold by forward contract in 2013 (CRS Fact Sheet, 2014a).

3.6.2. Historical profits

Thin margins and large volumes characterize the feedlot sector. The long-term (1990-2014) margin of finishing a yearling steer reported by the Canfax Trends model was -\$1.45/cwt. Margins in the 1990s and 2000s were negative on a cash basis, before hitting breakeven between 2005-2014 (Table 7).

Table 7. Feedlot Long-term Profit/Loss

	1990s	2000s	2005-2014
Feedlot (cash) (\$/cwt) <i>nominal</i>	-0.92	-3.95	0.02
Feedlot (cash) (\$/cwt) <i>deflated to 2013 constant dollars</i>	-1.27	-4.71	-0.09

This is a highly competitive sector with participants entering or exiting with economic signals. The reduced barrier to entry and exit tends to quickly drive the long-term economic profitability of any sector to zero quickly. This is not a problem when all opportunity costs (e.g., unpaid labour) are included in the profit calculation; in that case having zero economic profit means all resources used in production are “paid for”. The flexibility of entry and exit, despite the need for a certain amount of infrastructure, comes from the capacity in existence in Western Canada. Many of these facilities have the ability to switch between finishing year-round or seasonally, backgrounding year-round or seasonally, and taking a season off and focusing on cash crops.

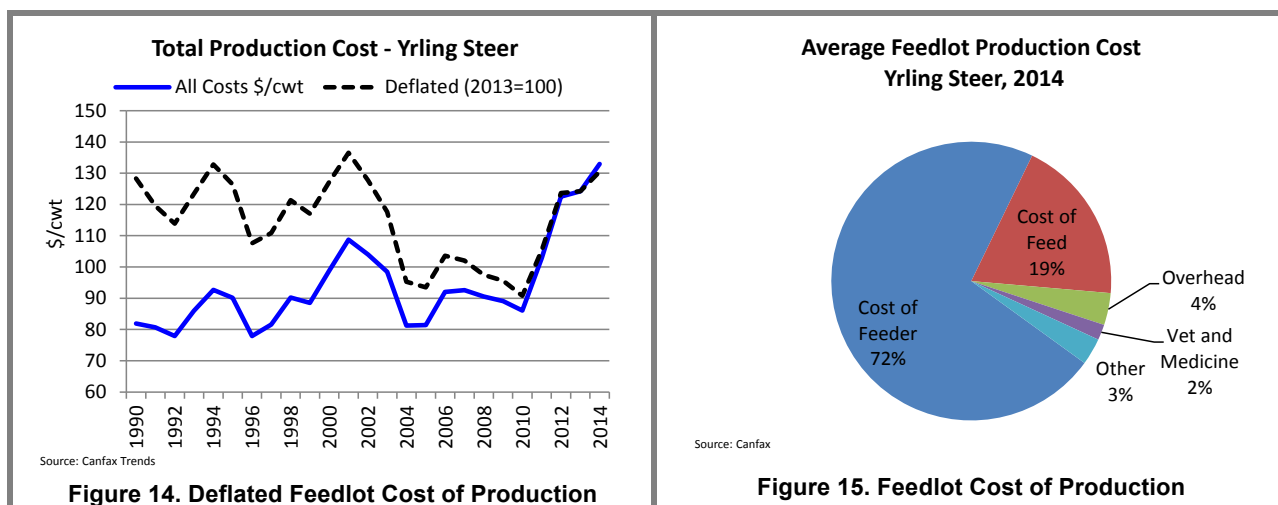
3.7. Feedlot Cost of Production

Feedlot per unit COP (all costs) for a yearling steer has declined 33.5% in deflated terms between 2001 and 2010 (Figure 14, Table 8). As seen in the cow-calf sector, significant productivity improvements were made decreasing per unit costs before higher input prices reversed the trend in 2011. In 2013, at \$124/cwt per unit COP was still 9% below the peak of \$136.50/cwt in 2001 (deflated to 2013 constant dollars).

Table 8. Feedlot Per Unit Cost of Production

	1990's	2000's	2005-2014
Feedlot (\$/cwt) <i>nominal</i>	\$84.74	\$93.69	\$101.44
Feedlot (\$/cwt) <i>deflated to 2013 constant dollars</i>	\$120.12	\$109.66	\$106.67

Feedlots have been very focused and successful at improving productivity in order to reduce per unit COP and stay competitive, particularly as the historical advantage provided by a lower Canadian dollar disappeared between 2002 and 2011 as the Canadian dollar went to par with the U.S.



Productivity has come from improved feed efficiency, higher average daily gain, fewer days on feed, higher carcass weights, and improved dressing percentage. *agri benchmark* data would suggest there are further productivity gains that could be made in the Canadian industry (CRS Fact Sheet, 2013b).

The feeder animal and feed are the two major costs for feedlots, accounting for more than 90% of total production costs (Figure 15). Typically, when feed price declines, feedlots are willing to pay more for feeder cattle, following the countercyclical nature of grains and cattle mentioned earlier.

3.8. Feedlot Competitiveness

Differences in feedlot **profitability** between Canada and the U.S. come from both a lower price received and higher cost of production. While higher costs have been seen globally between 2010 and 2013, Canadian producers have faced depressed prices during this period due to a stronger Canadian dollar and wider basis. The fed cattle basis was impacted by local supply and demand conditions and a thicker border with mandatory Country of Origin Labelling (COOL) in the U.S. (Schroeder *et al.* 2009).

Despite productivity gains, higher input costs have resulted in feedlot costs moving sharply higher from 2010 to 2014 (Figure 16). For finishing feedlots, higher feed costs are the major Canadian disadvantage, along with higher calf prices. This impact of an uncompetitive feedlot sector is amplified when the fed cattle basis is weak, resulting in U.S. feedlots willing to pay more for calves, and Canadian feeder cattle being exported. As noted earlier cash prices were used in this model, while the majority of cattle were contracted in 2013.

Land costs were higher than other major beef exporting countries— this is partly due to how feedlots are set up in Canada. Elsewhere, feedlots may only own the land where their facilities are located and purchase 100% of their feed needs; whereas in Canada feedlots tend to produce at least their own silage and a portion of their feed grain needs. Owning land can be advantageous for these operations as land values increase.

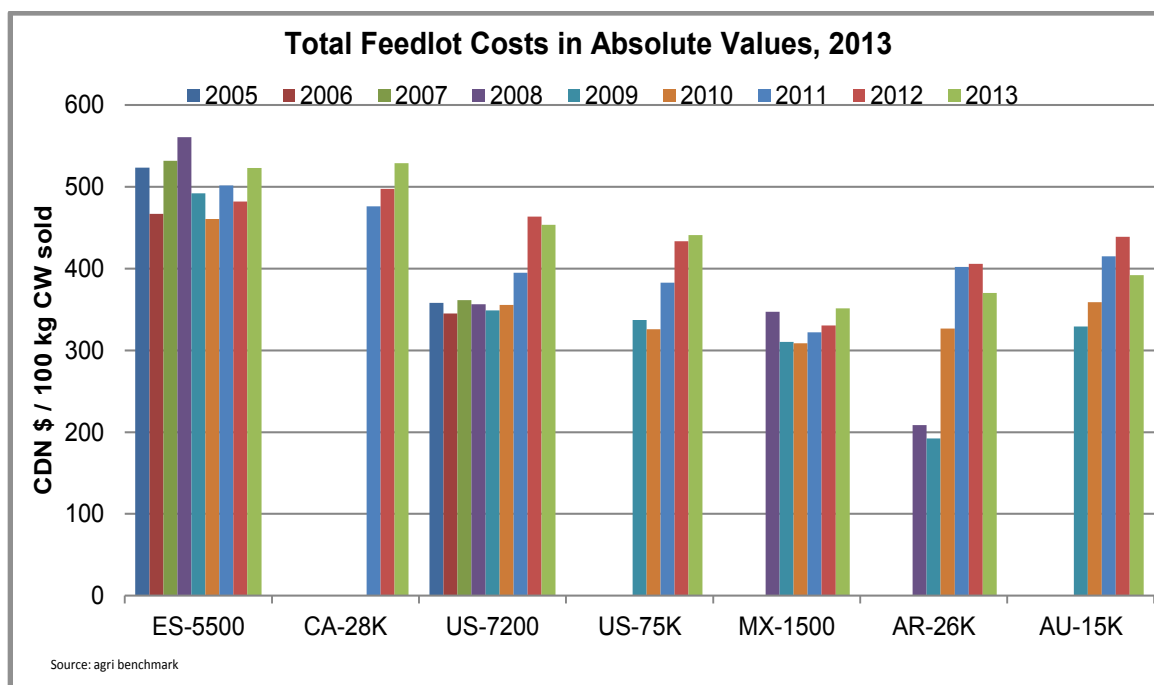


Figure 16. Total feedlot costs in Absolute values, 2014

Chart Legend: Country - number of head finished annually. E.g. CA-28K = Canadian feedlot finishing 28,000 head annually
 ES- Spain, MX-Mexico, AR-Argentina, AU-Australia

Labour costs were on par with Australia but higher than the U.S. and other countries. Capital costs were similar to Mexico but higher than anywhere else. ***In comparison to other major exporters, Canadian finishing feedlots have higher cost for land, labour and capital, but the big differences were due to higher feed costs (productivity) and wages (labour supply). Average daily gain was lower than in the U.S., Brazil and Australia – this is partly impacted by placement weights in each country.*** The U.S. had a slightly higher dressing percentage – mainly due to differences in carcass definition (CRS Fact Sheet, 2013b).

3.9. Packers

Cow-calf and feedlot production connects with consumer demand through the packer/processor. This sector must be viable in order for the entire value chain to be sustainable. The packer disassembles the carcass with the goal of maximizing the carcass value by selling to the highest value market for that specific cut. From 2005 to 2014, for every \$1 increase in the AAA cutout value, \$0.90 was passed on to the feedlot. This has varied over the years with the feedlot receiving more when supplies are tight and less when supplies are ample.

Data on packer profitability are unavailable. Yet they are a key aspect of the supply chain. In general we know that they are a small margin operator similar to the cow-calf and feedlot sectors. Consolidation has occurred in the industry over the past 25 years resulting in fewer, larger players. These larger operations have the advantage of economies of scale with fixed costs spread over many animals. However, Canadian packers rely on large volumes to stay competitive, making them inflexible when considering small branded programs that do not fill an entire shift volume or that require segregation from normal operations. In Canada, there are two major players in the West and a few medium size packers in the East.

3.9.1. Regulatory environment

Differences in regulatory environment (e.g., food safety protocols) can impact the competitiveness and viability of Canadian packers. The Canadian packer has some distinct disadvantages in the North American marketplace. First the long list of Specified Risk Material (SRMs) results in additional costs for Canada packers (~\$25-30 per head) and fewer options on how to dispose the product. Second, Canada tends to have higher labour costs. Given the packers dependence on labour to disassemble the carcass this impacts margins as well as willingness to partake in labour intensive activities such as value-added products or specialized cuts for export markets.

Higher cost of production in Canada, compared to the US encourages cattle to move south for processing when the cost of exporting is equal to transportation and transaction costs. Any additional costs (e.g., COOL) can offset this incentive.

3.9.2. Consolidation & Market Power

Consolidation in the packing sector has left two major buyers in Western Canada. This raises concerns about the ability of packers to exercise market power, specifically if they have the ability to suppress prices received by feedlots through coordination of price signals. Church and Gordon (2012) found that market power increased sharply during BSE; but dropped after the U.S. border opened in 2005. The post-BSE period actually saw a lower level of market power than the pre-BSE period. Rule II resulted in a small decline in market power, while COOL and the sale of Lakeside from Tyson to XL Foods in 2009 increased market power by 44-150% from a low level. The Researchers were not able to separate the sale of Lakeside (cleared Feb 27, 2009) and COOL (final rule in effect March 2009). Overall the results are consistent with the exercise of market power, but not with coordinated market power by packers. The impact on Alberta fed cattle prices was reported to be 5¢/cwt below competitive level post-BSE. Transfers did occur from feedlots to packers, but it is unknown if the amount is too much or just enough to cover larger fixed costs as utilization levels have declined with the current reduced marketing of cattle.

U.S. packers play a key role in competition for Canadian fed cattle. Market access to the U.S. in 2005 was found to be critical to limiting the ability of Canadian packers to exercise market power. Canada exports on average 25% of slaughter cattle marketings to U.S. packers. From May 21 to July 15, 2003 the industry felt the implications of not having sufficient domestic slaughter capacity when the border temporarily closed to live cattle. Again the impact was felt in the fall of 2012 when the Lakeside plant at Brooks, Alberta temporarily closed because of food safety issues. This left producers with limited selling options.

3.9.3. Packing Capacity & Utilization

Federally Inspected slaughter capacity for beef in Canada was around 63,000 head per week in 2013 with an average utilization rate of 81% (Figure 17). Total slaughter capacity has been steady from 2012 through 2015, but federally inspected slaughter has declined in that period. Historically, when utilization levels drop below 75% for prolonged periods of time facilities have closed. In January to November 2015, the average utilization rate has been 76%. Packers have been aggressive, keeping a larger proportion of fed cattle in Canada to support utilization rates in 2015.

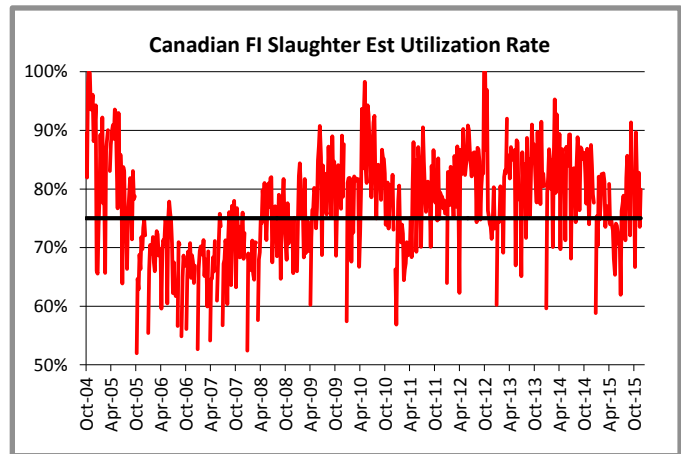


Figure 17. Weekly Packer Utilization Rates, Canfax

Having only two large packers in Western Canada makes the industry vulnerable to any further decreases in cattle numbers over a prolonged period of time that may lead to a plant closing. This would require more cattle to be exported to U.S. packers and leave a single domestic buyer in the region.

3.9.4. Adding Value

For every worker employed in the packing and processing sector another 4.2 workers are employed in Canada (including direct and indirect¹⁸ impacts) and almost seven workers are employed if all impacts are included. The economic contribution of the cattle industry varies with per unit value of the product. Keeping fed cattle in Canada for processing and adding value creates more jobs within Canada, contributing to the overall economy.

Labour shortages impact packers in two ways. First, it reduces the capacity to add value to products. Incapacity to provide the right cut to the right market, limits the packers ability to maximize the cutout, reducing the returns to producers. Second, it reduces the capacity of the packer to maximize utilization rates as line speeds are slowed to match available labour, resulting in higher fixed costs and again reducing the price paid to producers.

¹⁸ Indirect employment can include transportation, support services and retail.

4. Consumer Resilience

Economic resilience is the industry's ability to cope, recover and minimize economic losses in the face of adverse economic shocks. From a producer's perspective, economic resilience comes from having equity to draw on when facing challenging market conditions (e.g., at the top of the cattle cycle, trade disruption, etc.). This goes back to profitability and risk management, both of which were addressed in the Producer Viability section.

A key aspect of the industry's economic resilience is the consumer market. Consumer demand is the ultimate driver for the long-term development, and even survival, of the cattle industry. A sustainable cattle industry has to evolve with the consumer market and respond to changes in consumer preferences. The industry's ability to do so can be reflected in beef demand, which measures consumer willingness to pay. Demand is impacted by many factors. Branded programs that highlight certain attributes give price signals through the supply chain to producers on the value consumers place on these attributes. In this way, production decisions are influenced by consumer decisions.

4.1. Consumer Demand

Demand is a buyer's willingness to pay for a specific quantity of a good or service. It refers to the quantity of a product or service that is desired at various prices. The demand curve for normal goods, and beef is a normal good, is downward sloping. Figure 18. Consumer Demand for Beef shows that when supplies decline (from Q_0 to Q_1), prices increase (from P_0 to P_1) to ration product to the highest paying customer; the demand curve remains unchanged. Demand may remain constant throughout a cattle cycle with only price and quantity changing.

When there is a shift in demand (from D to D'), the entire demand curve shifts up or down. The changes in prices or the quantity of consumption alone do not cause the demand curve to shift.

Rather, it is changes in consumer preference, taste and budget constraints that cause shifts in demand. For instance, if the disposable income of a consumer increases, their demand curve for a normal good would shift to the right.

The Canadian Retail Demand Index and International Demand Index are the two key indicators for consumer demand. The Canadian Retail Demand Index measures domestic demand for beef at the retail level. The domestic market is the largest market for Canadian beef. The International Demand Index measures demand for Canadian beef in the global market. About 46% of Canada's beef production, including live slaughter cattle exports, is exported, making the international consumer as important as the domestic consumer for the sustainable development of the Canadian cattle industry.

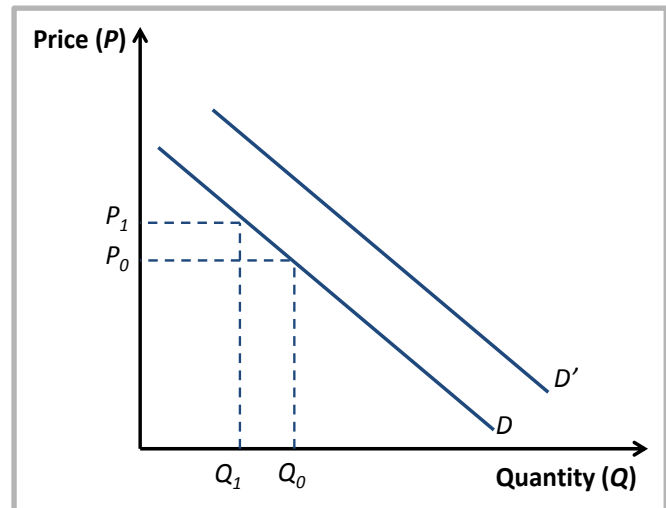


Figure 18. Consumer Demand for Beef

Consumption & Expenditures

Per capita beef consumption has declined over the last three decades (Figure 19. Canadian Beef Expenditures vs. per Capita Consumption). While this is frequently lamented, per capita consumption is not an indication of demand. It represents quantity, not willingness to pay. When the availability of beef increases and prices decline, consumers buy more beef because beef is cheaper not because they are willing to pay more for beef. What gets produced must eventually disappear (be consumed domestically, exported or wasted). On the flip side, if consumers are willing to pay more for beef, demand will grow even if consumption is constrained by limited supplies. This has been the situation in Canada since 2010. Canadian consumers are not eating more beef, but they are paying more for it.

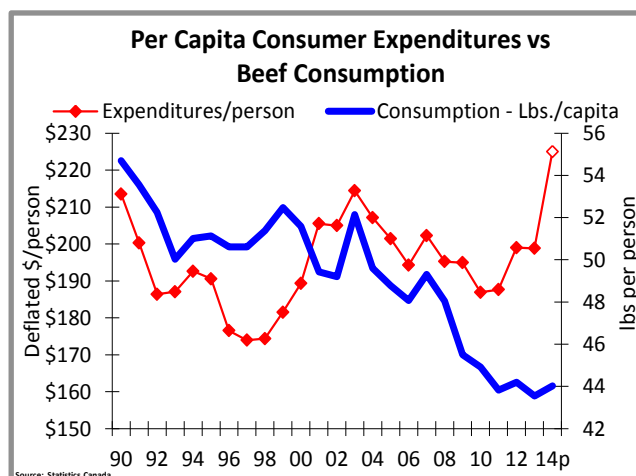


Figure 19. Canadian Beef Expenditures vs. per Capita Consumption

In contrast to consumption, per capita expenditures (quantity x price) on beef is a good proxy for domestic demand and tracks closely with the retail beef demand index.

4.1.1. Demand Drivers

Demand drivers can be divided into long-term trends, medium-term perceptions of beef, and short-term market impacts. Long-term trends include a growing middle class and shifting consumer demographics with more urbanization. Medium-term trends include perceptions around the health and nutrition of red meat, beef quality, and food safety. Shorter-term market impacts include relative protein prices and options.

It is important to distinguish between food *trends* and food *fads*. Trends are the result of the fundamental changes in technology, society and the economy that play out over years or even generations. Fads are driven by changes in current consumer inclinations; they come and go. However, heightened food awareness – around what consumers are eating, who made it, how it was produced and what is in it – has made it more difficult to distinguish between passing fads and longer term trends.

4.1.2. Long Term Trends

Population Growth

In the global market, population growth and increased urbanization will continue to push beef demand for the next several decades. By 2050, the world's population is projected to be over 9 billion, with an estimated 3 billion joining the middle class. Currently, about 50% of the world's population lives in urban areas; this is projected to increase to 70% by 2050. Increased urbanization will lead to a change of food consumption patterns with fewer grains and other staples and more consumption of meat, dairy products, vegetables, fruits and fish. In fact, the United Nations Food and Agriculture Organization (FAO) predict a 60% increase in consumption of meat, milk and eggs by 2050. This long-term trend will be an underlying factor for the expansion of the global livestock sector in the coming decades.

Consumer Demographics

Changes in demographic characteristics also influence the demand for meat. The increased **percentage of females in the labour force** is an important factor that has changed the meat consumption pattern over the past decades. In 2014, women represented 47.3% of the labour force, up from 45.7% in 1999 and 37.1% in 1976. As the percentage of women employed outside of the home increases, the time available for food preparation at home declines and the demand for products that are convenient and

quick to prepare increases. These factors (represented by the female labour force participation) have had a negative impact for beef demand. A U.S. study from 1982 through 1998 found that for each 1% increase in female labour force participation, beef consumption declined by 1.51% (Schroeder *et al* 2000).

Ethnic diversity is one of the leading demographic trends in Canada, and it is reshaping the meat consumption structure and culinary culture in the country. According to demographic projections, by 2031 29% to 32% of Canada's population—between 11.4 and 14.4 million people—could belong to a visible minority group, which is nearly double the proportion (16%) and more than double the number (5.3 million) reported in 2006. South Asians—the largest visible minority group—could represent 28% of the visible minority population by 2031, up from 25% in 2006. The Arab and West Asian groups could more than triple (Statistics Canada, 2011). Many of these ethnic groups have a higher dietary preference for poultry and pork. However each minority group has its own culinary culture and preferences for beef cuts, and increased ethnic diversity provides an opportunity to introduce new products.

Age structure - seniors make up the fastest-growing age group in Canada, and this trend is expected to accelerate in the next decade with the **Baby Boomer generation** (born from 1946 to 1965, Figure 20. Canadian Demographics, Statistics Canada). Elderly consumers are likely to be more health conscious and tend to eat smaller portions, making them more sensitive to health information and contributing to reduced per capita beef consumption over time.

The **Millennial generation** (born between 1980 and 2000) is becoming a major consumer group in the market. While some studies have found that Millennial parents consider chicken to be easier to prepare and more kid-friendly than beef, and that they perceive other meats as more heart-healthy than red meat, when compared with Generation X (i.e., people born in the period previous to the Millennials, the 1960s to 1980), the Millennials consume more beef (Harsh and VanOverbeke, 2015). In general the Millennials have less knowledge about different beef cuts and less experience in preparing beef dishes compared to the Baby Boomer generation. They tend to buy the same cuts rather than diversify their choices, but many are very open to learning and have indicated that they would buy more beef if they knew more about the different cuts (Harsh and VanOverbeke, 2015).

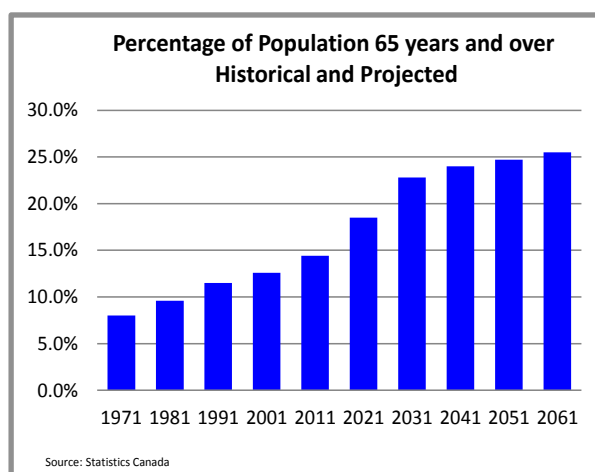


Figure 20. Canadian Demographics, Statistics Canada

Income

In recent years, global demand for beef has been growing at an unprecedented rate. While there is a strong positive relationship between the level of beef demand and household disposable income, beef demand is more responsive in developing countries as compared to higher income nations.

In Canada, expenditures on food account for about 10% of an average household's total expenditures. Beef demand is found to be positively related but not highly responsive to disposable income. The income elasticity of beef demand in Canada is estimated at 0.54, meaning a 1% increase in income would result in a 0.54% increase in demand. In the US, the estimated income elasticity varies in different studies with a range between 0.4 (USDA, 2012) and 0.9 (Tonsor *et al.* 2011), with the differences likely relating to differences in data and methodology. Despite the variance in magnitude, the positive income elasticities in Canada and the US – the two largest markets for Canadian beef – have a positive implication for the industry, as disposable income level is expected to rise with projected economic recovery in North America.

Canadian beef demand tends to be more responsive to changes in disposable income (income elasticity ~0.54) compared to competing meat prices (cross-price elasticity for pork 0.096 and chicken 0.07). However, with the sharply higher relative price for beef, the positive impact of higher income could be outweighed by the negative impact of prices in the short-term (Figure 21. US Real/Deflated Disposable

Income). Nonetheless, higher income levels are expected to benefit beef demand in the longer term. It is worth noting that in a mature market like Canada or the U.S., growth in incomes is likely to have a larger impact on demand for quality rather than quantity, which will support the demand for higher-grade products.

Compared to higher-income countries, expenditures on food in low-income countries can be as high as three-quarters of a household's total income, with most of their food expenditures going to cereals and other staples. In these countries, beef is a luxury good and the demand for beef is highly sensitive to the changes in disposable income. For example, in China the income elasticity of beef demand is estimated to range from 0.68 to 1.56 (Tadayoshi *et al.* 2010) and in some West African countries it is estimated at 1.2 (ILRI, 2000). This means a 1% increase in income results in a 1.2% increase in beef demand, much higher than in Canada. With strong income growth and large populations, developing countries are expected to represent the strongest increases in beef demand over the next decade. The long production cycle of the cattle industry, relative to other animals used for meat production, means that it will be difficult for domestic production to meet this demand growth. However, as global import demand grows, there are robust opportunities for Canada to expand its export market.

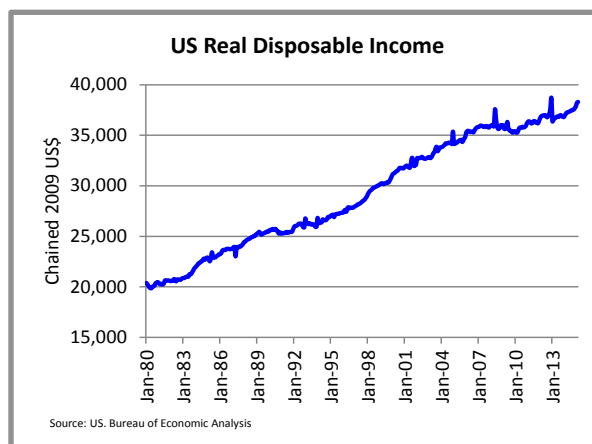


Figure 21. US Real/Deflated Disposable Income

4.1.3. Medium Term Perceptions

Higher levels of education result in a more aware and demanding consumer. Food awareness extends to food safety and the environmental impact of food production. However, even seemingly strong environmental attitudes, such as support for organic farming, can be interpreted as concern for food quality. Food Safety and Product Quality are consistently the top two demand shifters with Health ranked third (Schroeder *et al.*, 2013). Further supporting the health claim, surveys have found that the vast majority of Canadians read nutritional labels when making purchasing decisions (Conference Board of Canada, 2011).

Food Safety

Consumer awareness of food recalls has increased following a number of high-profile events. These include large-scale *E. coli* recalls in the U.S. and Canada (e.g., Jack in the Box, 1993; Topp's Meat, 2007; XL Foods, 2012), and the *Listeria* recall in Canada (Maple Leaf, 2008). Most consumers' reaction to a food recall incident is that they would simply dispose of or return the affected food and stop buying the product over the short term. On average, consumers generally go back to their normal consumption pattern fairly quickly once the problem is resolved.

While consumer confidence in the food safety system as a whole has not waned in the long run, food safety events can have important short- and medium-term impacts. Based on data from 1998-2010, Cranfield (2013) found that one additional beef recall in Canada led to a 2.26 million kilogram reduction in beef demand. In dollar terms, this is equivalent to about \$26 million at the retail level, or about 1% of Canadian beef expenditures.

Food safety also impacts international demand. Some markets such as South Korea and China are very sensitive to food safety issues. A number of food safety incidents in China (e.g., contaminated baby formula, the gutter oil scandal, and expired meat sold to global brands) have all signalled to Chinese consumers that food safety measures are important for their families' health and well-being. While Chinese consumers are losing confidence in food safety of domestic products, they tend to trust the quality of imported meat products and are willing to pay a premium for products with safety assurances. This trend represents an opportunity for Canadian products known for their high food safety standards.

On the other hand, it also means that ensuring the safety of Canadian beef has become increasingly important as any food safety recalls can dampen international trust, and ultimately demand.

Beef Quality

Consumers desire consistent high quality products with excellent flavour, color, tenderness, juiciness, and freshness. However, when consumers buy a better quality cut of beef, they may be buying less quantity. Such quality-quantity trade-offs (i.e., a higher unit price for a better cut of beef) leads to consuming less beef and is consistent with the expenditure data shown earlier where dollars spent remain constant as per capita consumption decreases. Cranfield (2013) reported that a 1% increase in beef quality (measured by AAA and Prime as a percentage of all A grades) is estimated to lead to a 0.2% reduction in Canadian beef demand. It should be noted that an increase in quality impacts both the supply curve (through higher costs) and the demand curve. Increased quality leads to increase consumer satisfaction - demand can be maintained, but consumption might decrease due to the shift of the supply curve.

While many demand drivers (e.g., competing meat prices, disposable income level) are outside of the industry's control, product quality is an area that can feasibly be influenced through research, technology adoption, and innovation. Increasing overall beef demand requires increasing the total value of cuts from the entire carcass. Predictable, consistent eating quality in middle meats (i.e., the loin and ribeye) are important, but it has been found that beef quality research that leads to increased consumer satisfaction with and consumption of end cuts (i.e., rounds and chucks) is equally important to support demand. The goal is to increase both quality and consumption at the same time.

Producers have responded by increasing production of AAA and prime product as a percentage of all A grade from 45% in 2000 to 58% in 2013 (Figure 22. Canadian Production of AAA and Prime Product).

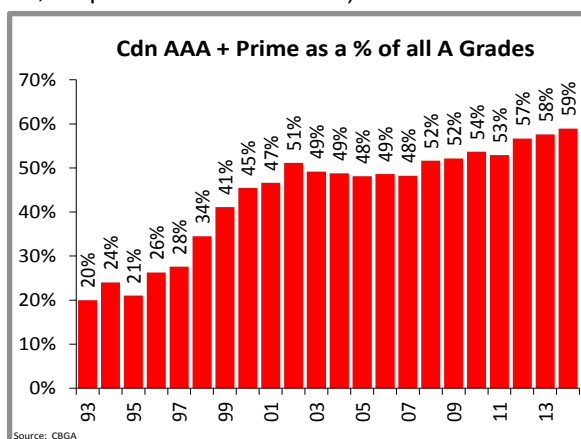


Figure 22. Canadian Production of AAA and Prime Product

Health Information

A number of studies have found that consumers change consumption patterns in response to the evolving information regarding the healthfulness of eating beef. Historically, changes in beef demand have been closely linked with health information and recommendations. In response to the health information linking cholesterol and heart disease in the 1990s, beef demand dropped sharply and chicken exceeded per capita beef consumption for the first time in 1993 (Figure 23. Canadian per capita meat consumption). In the late 1990s and early 2000s, beef demand responded positively to the promotion of the Atkins diet with high protein and low carbohydrate consumption. Most recently "The Big Fat Surprise: Why Butter, Meat and Cheese Belong in a Healthy Diet", a book that investigates the past sixty years of low-fat nutrition advice, has increased consumer confidence in saturated fat, including red meat. The Scientific Report to the 2015 Dietary Guidelines Advisory Committee (DGAC) states that previous recommendations of limiting cholesterol intake to no more than 300 mg/day will not be continued because available evidence shows no appreciable relationship between consumption of dietary cholesterol and serum cholesterol levels.

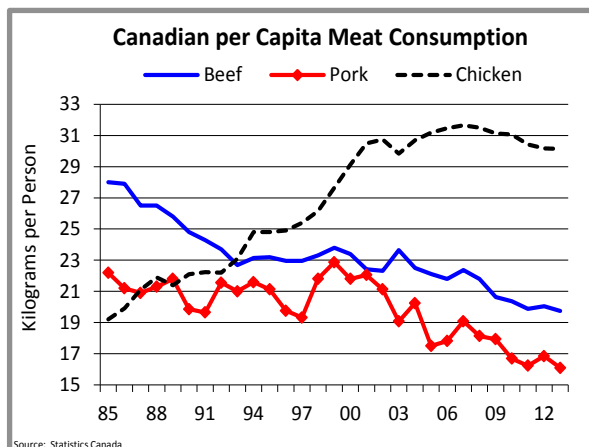


Figure 23. Canadian per capita meat consumption

As consumers are becoming more health conscious, effectively communicating beef's nutritional properties and health information is an important component in supporting and developing beef demand.

4.1.4. Shorter Term Market Impacts

Basic market considerations continue to be the most important factor with an interest in value for money. Consumers will change consumption patterns in response to price. However, these tend to be short-term impacts, leaving the underlying consumer tastes and preferences unchanged.

Price

Research conducted in Canada and the U.S. found that price is one of the most important determinants in the purchasing decision of a consumer (ALMA, 2012 and Schroeder *et al.* 2013). However, it should be noted that Canadian consumer demand for beef is not highly responsive to the changes in beef prices. Based on historical data from 1998-2010, the own-price elasticity of Canadian beef demand is estimated at -0.43 (Cranfield, 2012). This means that, on average, when beef price increases 1%, the quantity consumed only declines 0.43%. A similar result was found in the U.S. where beef own-price elasticity is estimated at around -0.62 (USDA, 2012). This moderately inelastic relationship between price and quantity partially explains why a 21% increase in deflated beef prices from 2011 to 2014 did not cause a sharper fall in consumption.

Competing Meat Prices

Beef demand is influenced by price of competing meats. When beef prices are comparatively high, consumption will decline as consumers move to other protein options. The real question is: how sensitive is beef demand to the change in competing meat prices? Research shows that pork and poultry are weak substitutes for beef with cross-price elasticities of 0.27 and 0.35 (not statistically significant at 10% level), meaning a large drop in the price of pork or poultry relative to beef leads to small declines in demand for beef.

In the past few years, lower prices of pork and poultry were not a big concern for beef demand since the price relationship was fairly steady. From 2008 to 2013, the beef/poultry price ratio averaged 2.03 while the beef/pork price ratio was 1.44 (Figure 24. Canadian Retail Meat Ratios, Statistics Canada). In 2014 and 2015, beef prices have moved sharply higher resulting in the beef/poultry ratio reaching record high levels, at over 2.5. The beef/pork ratio has remained in line with historical levels as high beef prices have supported the pork market despite lower wholesale pork prices.

While weak cross-price elasticities suggest that beef demand is not highly responsive to competing meat prices, a large drop in poultry and pork prices relative to beef is expected to have a negative impact on beef demand in the short-term.

Looking back to the 1980's and 1990's, a noticeable trend is that any dramatic change in the price relationship is typically followed by a sharp correction in the next few years (e.g., Beef/Poultry in 1990-1996 and Beef/Pork in 1993-1999). This suggests that the negative impact of cheaper competing meat prices on beef consumption is a short-term effect if consumer preferences remain the same; that is, once beef production has responded, the price relationship will fall back in line. Realistically, consumer preferences may change as product differentiation and value-added products that address the desire for convenience may lead to consumers substituting between proteins. If the beef sector is not active in product development to meet consumer needs, strong competition will result in lost market share.

Switching between Cuts

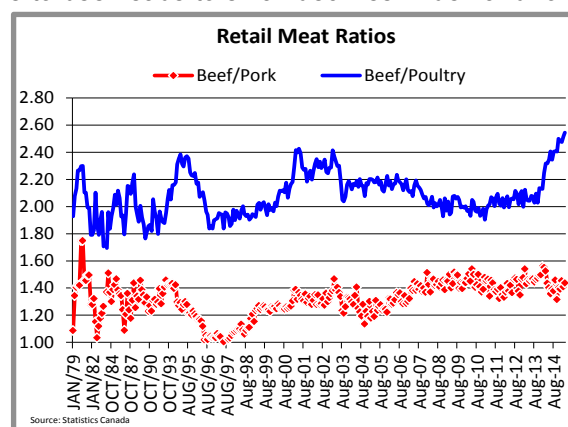


Figure 24. Canadian Retail Meat Ratios, Statistics Canada

Following the global financial crisis in 2008, consumers looked for budget-friendly beef cuts such as rounds, chucks, and thin meats. Demand for ground beef has been exceptionally strong with its great flexibility in use and convenience in cooking. The switch towards cheaper beef cuts resulted in larger price increases for end meats and ground beef compared to middle meats. In March 2015, the retail price for regular ground beef was over double the price in March 2008, while prices for sirloin steaks had increased only 45% over the same period (Figure 25. Canadian Sirloin Steak to Ground Beef Ratio, Statistics Canada).

While beef remains a dinner staple in North America, consumers have become more flexible in adjusting their protein choice by switching between species and/or cuts. According to the recent Power of Meat report (Food Marketing Institute, 2015), the 2014 price increases for both beef and pork caused shifts in buying behavior among 40% of shoppers. For the beef sector, this trend is expected to result in increased demand for alternative products compared to middle meats, especially considering in the current high-price, tight-supply situation.

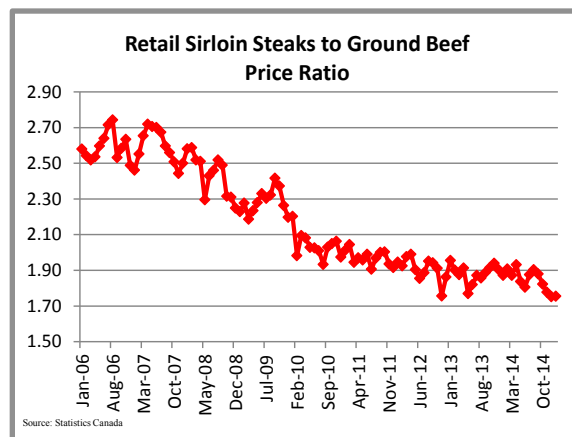


Figure 25. Canadian Sirloin Steak to Ground Beef Ratio, Statistics Canada

4.2. Domestic Demand

The Canadian Retail Beef Demand Index¹⁹ (2000=100) is calculated based on deflated retail beef prices and per capita consumption. Retail beef prices are calculated based on the average prices of six beef cuts²⁰, and the price of each beef cut is a weighted average of prices in 26 cities across Canada (source: Statistics Canada). It should be noted that the seven-cut average price does not completely reflect the retail value of the whole carcass in terms of magnitude since it does not take account for the differences in carcass weight proportions of these cuts. However, it is an accurate measurement of year-over-year change of retail beef prices²¹.

Table 9. Canadian Retail Beef Demand Index

	1993	2003	2013
Canadian Retail Beef Demand Index (2000=100)	98	114	103

For the benchmark year of 2013, the Canadian Retail Beef Demand was 103 (Index 2000=100). Over the past three decades, domestic beef has seen some major trends and turns (Figure 26. Canadian Retail Beef Demand Index). During 1980 through 1997, retail demand weakened nearly every year with the exception of 1985 and 1994. Following this long-term decline, beef demand started to strengthen in the late 1990's. From 1998 through 2003, the demand index increased from a low of 91.26 to a peak of 114, before weakening again from 2004 through 2010. Demand bottomed in 2010 and has rebounded to reach 115 in 2014. This is the second strongest annual demand since 1990 with only 1990 being higher.

In recent years, Canadian consumers have shown strong resilience to high **beef prices**. While deflated retail beef prices climbed higher on a yearly basis in 2010-2014, domestic beef demand was also rising. **Food safety** issues cause short-term turbulence in beef demand, but consumers appeared to return to their normal consumption pattern fairly quickly once the problem was resolved. Consumer confidence in the food safety system as a whole has not waned in the long-term. **Disposable income** and beef demand has a positive relationship. Increasing disposable

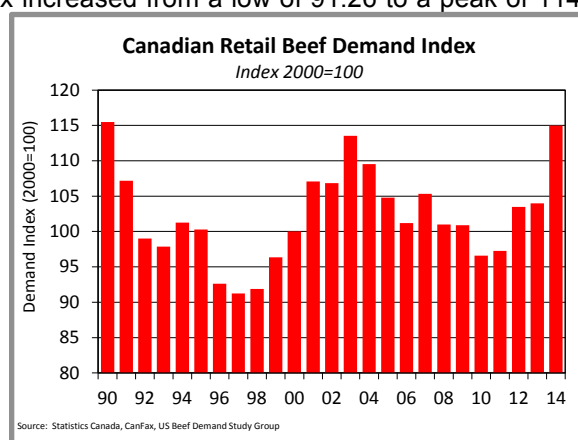


Figure 26. Canadian Retail Beef Demand Index

income levels along with the projected economic recovery in North America has been supportive, but *in a mature market like Canada, the growth in income is likely to have a larger impact on demand for quality rather than quantity, which will support the demand for higher-grade products.* Recent **health information** regarding dietary fat and cholesterol has supported protein consumption. Changes in various **demographic characteristics** have also influenced change in the demand for meat. Some major trends such as a larger percentage of females in the labour force, ethnic diversity, and an aging population are leading to increased demand for convenient, diversified and high-quality products. *The industry needs to adapt and respond to changing preferences to support domestic beef demand.*²²

Over the short term, as supplies are smaller and prices are at a record high, competition from alternative protein options (including pulses and dairy products) that are more budget friendly provide an incentive for consumers to substitute beef. Therefore, product differentiation and development (e.g., additional processing and value-added meal options) are necessary in the beef category in order to remain a competitive meat protein source of nutrition. The beef industry has been successful with this in the past, but tends to lag behind pork and poultry in innovation, which has contributed to loss of market share

¹⁹ Unconditional, uncompensated elasticity. Similar to the US index includes own price elasticity.

²⁰ The Retail Beef cuts reported by Statistics Canada include: Round Steak, Sirloin Steak, Prime Rib Roast, Blade Roast Boneless, Stewing Beef and Regular Ground Beef.

²¹ Retail Margins. May 2010. Canfax Research Services. <http://cattle.ca/assets/Uploads/IA/702-retail-margins.pdf>

²² Consumer Demand. CRS Fact Sheet. May 2015. <http://www.canfax.ca/Samples/Consumer%20Demand%20May%202015.pdf>

(based on volume). Still, consumers in Canada are willing to pay the most for beef, as compared to pork and poultry protein substitutes, with the largest share of the dollar at retail.

4.3. International Demand

The International Demand Index (2000=100) for Canadian beef is based on total export volume and average per unit price of export beef. Unlike the retail demand index, which is on a per capita basis, the international index is based on total export volume. The intention of this indicator is to capture the international markets' willingness to pay for the Canadian product. Whether Canada is exporting 521,500 tonnes valued at \$2.22 billion representing 58% of production in 2002 or 278,000 tonnes valued at \$1.3 billion representing 43% of production in 2013 the goal is to maximize the cutout value of beef exports. The cutout value was \$188/cwt in 2002 compared to \$195/cwt in 2013.

Table 10. International Beef Demand Index

	1993	2003	2013
International Demand Index (2000=100)	73.7	94.0	82.1

International Demand for Canadian beef was 82 in 2013 (Index 2000=100). The Index peaked in 2001 then declined until 2009 with market access closures and restrictions following the May 2003 BSE case (Figure 27. International Beef Demand). The global financial crisis in the fall of 2008 also negatively impacted international demand. It has since rebounded, and in 2014 is close to the peak demand seen in 2001, even though some markets have still not restored full access and in recent years non-tariff trade barriers have introduced new restrictions to certain markets.

In recent years, global demand for beef has been growing at an unprecedented rate with the support of population growth, higher income levels, and increased urbanization. Developing countries are expected to represent the strongest increase in beef demand in the next decade. This long-term trend will be an underlying factor for the expansion of the global livestock sector and influence cattle cycles in the coming decades. Despite the relatively long production cycle of the cattle industry, projected increases in global import demand means that robust opportunities for Canada to expand its export market.

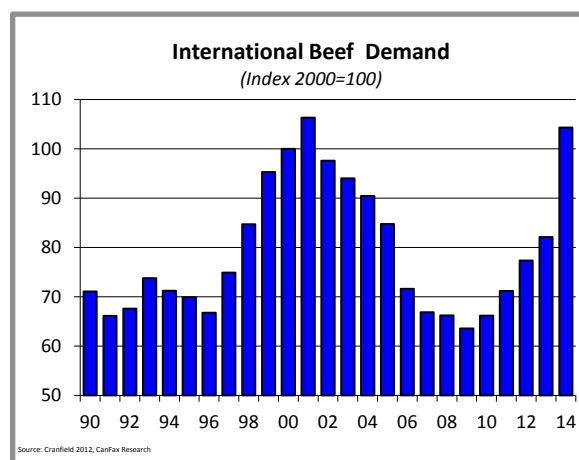


Figure 27. International Beef Demand

In order for Canada to fully take advantage of the international opportunities there must be: (1) Market access; (2) Cost competitiveness of Canadian beef with other high quality grain-fed beef exporters; and (3) Sufficient production – you cannot export what you do not produce.

5. Discussion

5.1. Producer Viability

Producer viability refers to the producer's financial ability and incentive to continue producing a product. Profit margins are impacted by reduced income, increased costs or both. Declining terms of trade have negatively impacted producer viability.

5.1.1. A Non-Agriculture Context

This section provides a brief overview of the financial performance of non-agricultural small and medium enterprises (SMEs) to provide context on general SMEs in Canada in 2013. According to the Key Small Business Statistics (Industry Canada, 2013), there were 1,107,540 employer businesses in Canada as of December 2012, of which 98.2% were small businesses, 1.6% were medium-sized businesses and 0.1% were large businesses.

- **Survival Rate** - In 2009, 80% of SMEs had survived for one year (established in 2008), and 72% had survived for two years (established in 2007). Conversely, 20% of businesses established in 2008 had closed after one year and 28% of business established in 2007 had closed after two years.
- **Long-term Net Profit** - Net profit²³ is calculated as net profits after taxes divided by sales. It demonstrates how much of every dollar in revenue a firm keeps as profit after deducting the costs of doing business. From 1999 to 2012, the majority of agricultural and non-agricultural sectors in Canada recorded positive average net profits. Businesses in the agriculture, forestry, fishing and hunting sector has the highest margins at 8.4%, followed by the professional, scientific and technical services sector (6.3%), and construction sector (4.6%). Businesses in the mining, quarrying, and oil and gas extraction sector lost money over the period and operated on negative margins averaged at -16.9%.

Only 58.7% of businesses in the agriculture, forestry, fishing and hunting sector were profitable in 2013²⁴; while the percentage of profitable businesses in the cattle ranching and farming (as a sub-sector) was as low as 29.4%. In comparison, 70-80% of businesses in other non-agriculture sectors were reported profitable in 2013.

5.1.2. Producer Profitability

Beef producers, by necessity of the cattle cycle, have invested long-term. The cattle industry is a small margin business with long-term profitability close to breakeven. **Thin margins and volatile commodity prices are a threat to producer viability**, as they require producers to **use cash reserves, equity, unpaid labour and alternative income** sources in periods of negative margins in the cattle cycle. The severity of the losses determine how much of each of these are used.

Over the previous decade the Canadian beef industry has shown that it can survive over the short- and medium-term with negative returns by drawing down equity, drawing on cash reserves, or drawing on

²³ Net profit/loss is the profit or loss resulting from normal business operations, recorded before income taxes, extraordinary items and other income not related to normal operations. For unincorporated firms, the owners' or partners' salaries and withdrawals are included. Source: Statistics Canada-Small Business Profiles, 2013

²⁴ Statistics Canada-Small Business Profiles (2013) on firms with annual revenues at \$30,000-\$5,000,000

alternative income sources (e.g., mixed operations with cash crop income or off-farm income). This shows incredible resilience and persistence in primary production, but it can also be an **indication of a lack of response to market signals, specifically demand signals that result in continued supply of a product with presumably deteriorating demand.**

Long-term margins on the average cow-calf operation of 200 head cannot support an average family. These operations must rely on other sources of income – which is common on a mixed operation which uses diversification as a risk management tool and does not require a single commodity to provide 100% of the income. An 800 head cow herd provides a total income²⁵ of \$75,500 annually which is close to the Canadian median income for all families of \$74,540 (source: Statistics Canada). Higher prices in 2014 have reduced the number of cows needed to support a family but this is not anticipated to be the case in the long term. According to the 2011 Census of Agriculture only 5% of farms had over 500 head of cows. Therefore further consolidation or alternative income sources (e.g., other commodities or off-farm jobs) are required.

Unpaid labour, erosion of equity and the inability to service debt in a timely manner are all threats to producer viability. In addition, the increase in average debt levels, mirroring land values has maintained equity as a percentage of total assets at 85% in 2013. If land values decline producers will face significant financial pressure.

Based on the eight criteria (see below) from Mclean *et al.* (2014), the average beef cow operation of 200 head would not be economically sustainable, but an 800 head beef cow operation would be. If deflated margins decreased over time or even if they are steady while the cost of living appreciates then the number of beef cows needed to support a family increases. Over the last 25 years the herd size needed to be profitable has steadily increased from 200 head in the early 1990s, to 400 head by the late 1990s and now to 800 head. This implies that to be economically sustainable a beef operation must not only meet these eight criteria but must also be continually expanding. If there is not enough profit to cover the eight criteria listed below, then there is not enough to invest in expansion.

1. Return, meet or exceed cost of capital
2. Fund all current operating expenses and operational capital through internally generated working capital
3. Pay labour/owners, at least to the standard average wage
4. Have capacity to re-pay debt principle in a timely manner
5. Maintain a safe level of equity (e.g. 85%)
6. Provide for the independent retirement of the existing owners
7. Be able to survive business succession with the business and the family remaining intact
8. Survive and prosper in the long term without the erosion of environmental capital (over stocking)

Criteria 1-4 simply require economic profitability or long-term costs (including cash, depreciation and opportunity costs) to be covered. As discussed earlier, *agri benchmark* data reported in 2013 cow-calf enterprises are covering short-term (i.e., cash costs) and medium-term (i.e., including depreciation) costs. Three of the four typical farms were also covering long-term costs (i.e., including opportunity costs).

Consequently, operations depending exclusively on beef for income will become more economically unsustainable and will decrease as a percentage of the agriculture community; mixed operations and those with off-farm income will replace these operations. The statistics show that these already make up a significant proportion of the industry. *The question is are these operations less responsive to market signals and less interested in beef specific programs as the majority of their time is spent elsewhere (either on other commodities or a full-time job)?* Research in Norway has shown that the likelihood of off-farm work and proportion it contributes to income increases with age (up to 39 years) and with lower relative yields compared to other farms in the local area. They did not find any difference in farm productivity and technical efficiency between part-time and full-time farmers (Lien et al. 2007).

²⁵ Income comes from from paid labour and profit margin on the cows

5.1.3. Risk Management

Beef producers face two major types of risk: prices and weather. Higher and more volatile input markets have resulted in greater financial risk for cattle producers, requiring careful business planning and risk management. Risk management is an important tool to protect equity against market volatility and disaster situations.

History has shown profitability is vulnerable to outside market impacts which depress prices. Government disaster programs played a critical role following BSE in 2003. Since then more risk management tools are available to producers. These include: the Western Livestock Price Insurance Program (WLPIP), Alternative Marketing Arrangements (e.g. forward contracting), and federal business risk management programs (e.g. Agri-Stability, Agri-Invest). However, some of these tools are only available regionally. Use of risk management strategies to address market volatility helps producers manage cash flow. There is increased use of risk management tools throughout the supply chain with price insurance available to cow-calf producers and the increasing use of forward contracting by feedlots. The Social Life Cycle Assessment notes that 59% of farms surveyed use both insurance and formal risk management plans (Deloitte, 2016).

Diversity in operational structures (e.g., size, production systems, producer age, and use of technology) means that each operation handles market shocks differently, providing a level of stability to production. In addition, the price cycles for cattle and grain tend to be countercyclical, meaning mixed grain and beef operations are more successful in using diversification to stabilize income. Producers do not know which commodity will be profitable each year. ***This provides stability in production but makes it difficult for producers to immediately respond to market signals for a single commodity such as beef – resulting in delayed responses to market signals. This delayed response puts beef at a disadvantage to competing proteins due to the longer biological and production cycle.***

Weather events can be devastating at a local and farm level. Producers must be financially prepared to handle these events in the long-term. There are limited options during a drought: reducing livestock numbers and purchasing feed (i.e., leasing forage or increasing supplemental feed).

In areas prone to drought producers can maintain a conservative stocking rate so that destocking is rarely necessary. The cost of this strategy is underutilization of forage, negatively impacting economic viability. The second strategy is variable stocking, where destocking can occur quickly in a drought situation. This has been primarily done with yearling grassers. Yearlings can be sold, conserving forage for the beef cow herd and preventing liquidation of the cow herd. Torell *et al.* (2010) found that a flexible yearling enterprise increased average annual net returns by 14% with conservative stocking and by up to 66% with flexible grazing. While such a strategy supports producer viability it is noted in the Environmental Life Cycle Assessment (Deloitte 2016), that yearlings have a larger environmental impact.

5.1.4. Cost of Production

Profitability is vulnerable to outside market impacts that depress prices (e.g., exchange rate fluctuations, market access, animal health issues). While market prices are outside of the control or influence of the producer, a producer can change the type of product delivered to market (e.g., quality) in response to price signals. The one aspect of profitability within a producer's direct influence is per unit cost of production (COP).

Input costs have fluctuated widely over the last decade. The major costs components for the cow-calf sector (feed and replacement cattle) have increased significantly in recent years. The sharp rally in replacement cattle and land value requires producers entering the beef industry to have access to capital (e.g., loans). Beef production in Canada has a high COP compared to other major exporters, particularly related to land and labour costs.

Producers adapted to a market environment of high feed costs, a par exchange rate, and uncertain market access (due to the BSE in 2003) with: (1) **productivity improvements** through research, technology adoption, innovation; (2) exploring alternative production practices (e.g., adjusting winter feed rations); and (3) adopting improved risk management strategies. They have also responded to changing market conditions by **adapting marketing arrangements** to improve beef quality and supply attributes

demand. As noted by the Western Beef Development Centre (2012) the top 25% of participating producers in the Saskatchewan cow-calf cost of production analysis had breakevens 20.5% lower than the bottom 75%. Research and adoption of existing practices on the bottom 75% of operations are important for the sustainable development of the cattle industry.

5.1.5. Competitiveness

Being able to compete with other commodities for land, labour and capital is necessary for long-term viability. However, small margins, a longer time frame to see a return due to the biology²⁶ of the cow compared to pigs and poultry, and differences in risk management tools available for various commodities within Canada can skew investment decisions in land, labour and capital. This has the potential of impacting both producer expansion plans and access to capital for new entrants due to the current high replacement breeding stock prices and land values.

High prices paid for breeding stock can negatively impact producer viability going forward. As the cattle cycle turns and larger supply results in lower prices, margins will be squeezed as the depreciation paid on these breeding animals remains steady.

In comparison to other major exporters, Canadian finishing feedlots have higher cost for land, labour and capital, but the big differences were due to higher feed costs (productivity) and wages (labour supply). Average daily gain was lower than in the U.S., Brazil and Australia – this is partly impacted by placement weights in each country.

Continued research, innovation and adoption of management practices that decrease per unit cost of production and policy that provide access to competitively priced inputs are necessary for the beef industry.

5.1.6. Succession of Farm Operations

An unprofitable business is unlikely to be handed down to the next generation as parents encourage children to find employment elsewhere. Hence, the first requirement of succession planning is having a profitable business. However, that alone is not enough as an operation that has successfully supported a family for decades may not be large enough to support a second family. Expansion of agricultural operations frequently occurs when the market opportunity is present; therefore timing of succession can impact the longer term success of the second generation.

Unlike other entrepreneurial enterprises, a farm is five times more likely to be passed from one generation to the next than a non-farm business (Laban and Lentz 1983). Family dynamics and perceptions of fairness, particularly when there were siblings who did not stay on the farm, impact succession plans. Clear communication is necessary for successful succession; everyone needs to know where they stand and what the plan is. A financial plan that takes into account legal obligations (i.e., the older generations will, how non-farm siblings are addressed) with the time for everyone to prepare is critical.

Different **management** styles between generations can create conflict if not addressed. Taylor (1998) identified two approaches to farm management (the expander and conservator) that impact farm succession. Each style has different working relationships, succession strategies and areas of potential difficulty. The conservators had a more cautious approach to debt and expansion. They tend to use their own resources to expand, borrowed very little and have a farm that can be passed on with little or no debt. Conservators, with a next generation interested in expansion, focused on diversifying and increasing cash flow and farm holdings in order to create room for the next generation with a large, diversified operation with low debt.

²⁶ This longer timeframe is caused by the time it takes for a heifer to reach maturity for breeding and the longer gestation period.

Financial Considerations - Challenges of transferring assets between generations include capital gains tax. If retirement of the first generation requires selling of land assets (i.e., if their retirement plan is land appreciation), this can create challenges for the second generation if a larger down payment is required. If the second generation inherits upon death, they still need to pay the capital gains tax. There is a \$750,000 capital gains exemption over a lifetime that frequently does not adequately cover all assets, capital gains above this can be addressed in two ways. First, sell off enough assets (e.g., land, equipment, etc.) to pay the tax; however, this could negatively impact the future viability of the operation. If the first generation sells the land prior to death at fair market value, they will be able to cover the taxes – but it will affect old age security for the year the sale is reported to Canada Revenue Agency. If the land title is transferred at cost this will create a larger capital gains problem for the next generation. A second option is to use life insurance equal to the capital gains tax. This can be difficult to estimate, particularly if the operation is continually expanding in order to be viable over time. Asset value can be frozen, creating greater confidence in planning.

Both of these issues are connected with **unpaid labour**. The older generation did not pay themselves, as long as they were able to pay down debt they were building equity. For the incoming generation, unpaid labour means their sweat equity goes unrecognized and they have no way to buy into the operation. If the incoming generation were to be paid, they could re-invest their income into the operation, and build equity. Additionally, paid labour for the older generation would enable them to make independent retirement plans. But if the operation cannot pay for its labour (that is, it is unprofitable), and this makes succession extremely difficult due to a lack of cash flow. This is sometimes dealt with by not actually paying out the labour but shifting ownership of equity on paper over time. But who wants to invest in an unprofitable business?

The cow-calf operation typically has a large land base to transfer; however this does not mean there is greater asset value to transfer as feedlots have a significant amount of specialized equipment²⁷. The main difference may come from unpaid labour. One could say that while feedlots tend to operate as a business, cow-calf operations do not always have that same focus. In fact, many cow-calf operations that focus on the business aspects have addressed many of the issues raised here.

5.1.7. Packers

Packer profitability was unavailable for this study. However, utilization rates are a major contributor to per unit cost of production, and low utilization may result in a plant closure. Western Canada is home to two large packing plants, meaning the industry may be vulnerable to further declines in cattle numbers that may lead to a plant closure.

New entrants in this sector are rare, but there is potential for a small- or medium-sized packer that has the flexibility to do custom work for branded programs, adding to the competitive environment and responding to consumer demands for niche products. The viability of these operations is challenged by higher fixed costs per animal that must be absorbed by the consumer (e.g., premium prices) or taken out of the producer price – impacting both producer viability and the consumer market.

²⁷ In fact, feedlots probably have a greater dollar value to transfer depending on their size.

5.2. Consumer Resilience

Strong domestic and international demand for Canadian beef has supported cattle prices and overall industry stability. With beef demand at the highest level since 1990, it is not expected to grow sufficiently to offset the increase in cattle supplies; hence, cattle prices are expected to decline moving forward. In recent years when beef supplies have been small, demand has been strong. This amplifies the price signal received by producers, creating greater volatility, and potentially signally over-production in the future.

Assessing the source of the recent increase in beef demand will inform industry on how to proceed. But we already know a number of things. First, attracting new consumers to the market who demand Canadian beef is one of the most effective and rapid ways to build overall demand. This has primarily been done by assessing international demand prospects and identifying target countries and regions. Second, the domestic market is the largest and most stable market for Canadian beef. Understanding the implication of changes in the composition of domestic households over the next 50 years (e.g., population growth, proportion of the population over 65 years, part of a minority group or foreign-born) will help the industry be proactive to these changes rather than reactive. Given the longer time lag for the beef industry to respond, being proactive is necessary to staying competitive with alternative protein sources.

5.2.1. Domestic Demand

A sustainable and viable cattle industry has to evolve with the consumer market and respond to changes in consumer preferences. Industry has responded to changing consumer preferences with product innovation, convenience, smaller serving sizes, nutrition information and cooking videos online. Failure to respond to changing consumer preferences and ignoring fads even when they become trends can result in lost market share. Continued investment in beef quality, food safety and effective communication of beef's nutritional properties and health information will support future beef demand.

Over the short term, as supplies are smaller and prices are at a record high, competition from competing proteins (e.g., poultry, pork, and alternative protein options such as pulses and dairy products) that are more budget friendly provide an incentive for consumers to substitute beef. Therefore, product differentiation and development (e.g., additional processing and value-added meal options) are necessary if the beef category is to remain a competitive protein source. The beef industry has been successful with this in the past, but tends to lag behind pork and poultry in innovation, which has contributed to a loss of market share (based on volume). Still, consumers in Canada are willing to pay the most for beef, as compared to pork and poultry protein substitutes, with the largest share of the dollar at retail.

The changing population and wealth demographics will continue to impact meat consumption patterns with a growing demand for convenient, diversified, and high-quality products. While consumers in the domestic market appear to be resilient to higher beef prices, quality, safety and healthfulness have become the top demand shifters for domestic beef products and will continue to drive beef demand. Consumer information will be an important tool to support beef demand, particularly in marketing to the millennial generation.

5.2.2. International Demand

With a growing population and increasing middle class, the international market represents an opportunity for the industry to expand. International demand has been supported through market access and trade agreements that reduce tariff levels. However, there are an increasing number of non-tariff trade barriers (e.g., labelling regulations such as COOL, product use bans, etc.) that have impacted trade flows in recent years. Trade policies that help to prevent export interruption are essential for the viability of a strong Canadian cattle industry. Uncertainty over market access can deter investment into the industry. Efforts by beef industry organizations to encourage stronger international rules to reduce the risk from non-tariff trade barriers are important to stabilize markets.

In order for Canada to take full advantage of the international opportunities there must be **market access**, Canadian beef must be **cost competitive** with other high quality grain-fed beef exporters, and there must be **sufficient production** to meet export demand.

5.2.3. Supplying Niche Markets

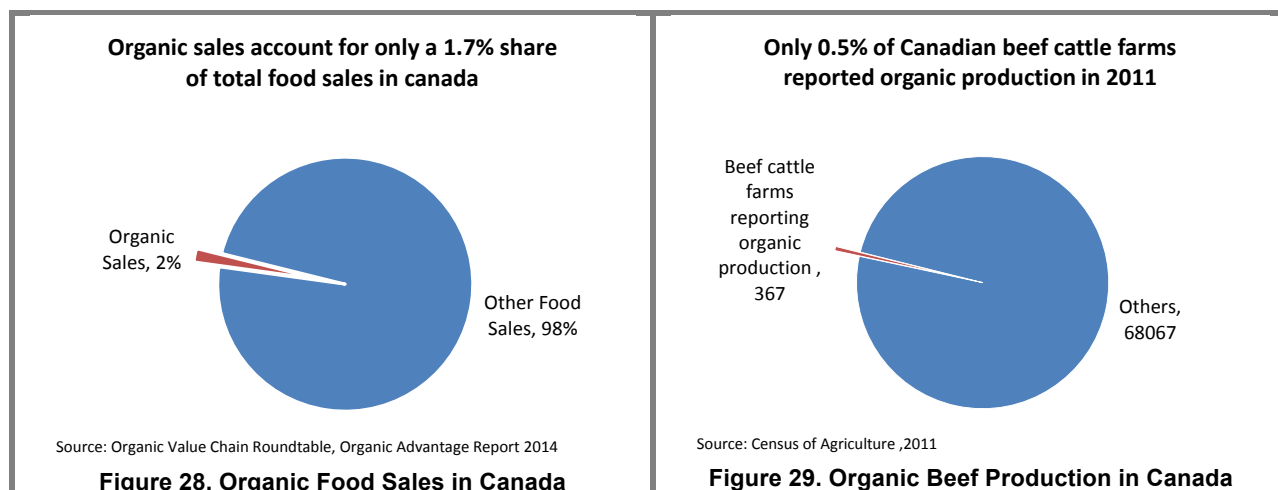
There is growing consumer interest in transparency, on where food comes from and how it is produced (e.g., organic, natural, verified sustainable, hormone-free, and certified animal welfare). There are also costs associated with providing a verified, certified or audited product.; these costs, which are incurred throughout the supply chain, demanding a premium even with no change in production practices. However, if production practices must change to supply the niche market, there will be an impact on the economic viability, which may have a greater impact on the sector where the production change occurs. These changes may take longer if occurring at the cow-calf where there are more numbers and greater diversity than at the feedlot sector which is relatively consolidated.

It must be recognized that demand for these attributes may be niche and not necessarily mainstream. Niche marketing has been defined as servicing a unique market, or a unique portion of a common market, that is not already served (Rawls *et al.* 2002). Rawls *et al.* (2002) found that lean, organic and natural are identified as the three key categories in the niche beef market, while a study by Hash *et al.* (2015) shows that nutrition and health, natural and organic as well as social and sustainable are the major trends of the U.S. beef retail and foodservice sector.

The niche beef market has been receiving a lot of attention in recent years with increasing demand for differentiated products and the increasing ability of consumers to pay a premium for value-added attributes. The Power of Meat report (Food Marketing Institute, 2015) shows that 34% of respondents have purchased natural or organic meat/poultry in the past three months, up from 26%. The growth outlook is accelerating, with 38% of current users expecting to increase purchases.

Although the demand for niche beef products are trending upward and the emerging niche market indicates new growth opportunities, the mass market remains price-driven. The International Consumer Attitudes Study (ICAS)²⁸ shows that 95% of consumers are *Food Buyers*. In general, these buyers make purchases based on taste, cost and nutrition (in that order). Only 4% of consumers are *Lifestyle Buyers* who purchase food based largely on lifestyle factors including ethnicity, vegetarian, organic, local, or Fair Trade (Simmons, 2011). The Canadian Consumer Retail Meat Study (ALMA, 2012) also indicates that prices are the most important beef-purchasing factor, followed by product origin, while other factors such as hormone-free, antibiotic-free, certified humane, environmentally sustainable, grass fed, and organic are less important. Organic appears to be the least important of the beef attributes tested in the study.

²⁸ The International Consumer Attitudes Study (ICAS) was the responsibility of two agricultural economists who reviewed more than 70 reports and studies about consumer attitudes and behaviors from around the world.



Only a small number of cattle producers are selling cattle through niche markets like natural, organic or grass-fed, and niche beef products comprise only a small share of total beef sales. Organic sales account for 1.7% share of total food sales in Canada (Figure 28), and only 0.5% of Canadian beef cattle farms reported organic beef production with nearly 90% of these farms having less than 250 head of beef cattle (Figure 29, Census of Agriculture, 2011). In addition, while niche markets represent value-added opportunities for beef and cattle operations, it also typically increases production costs and marketing expenses. This means that producers must derive enough value from their products to cover the extra costs.

5.2.4. Supply Chain Dynamics & Price Transparency

The cow-calf, feedlot and packer sectors tend to have a competitive relationship as one groups' output is the other groups' input. Collaboration has not always been optimal; however, the industry has found ways to build branded programs and improve product quality using price signals.

Prices have been the sole signal from packers to the feedlot and cow-calf producers to expand or liquidate the herd or to incorporate programs focusing on specific attributes. Over the past decade, price signals on fed cattle have improved in terms of providing greater information to both the buyer and seller. Previously, cattle were primarily priced on the average (i.e., cash on a live basis), while now we increasingly see quality and quantity requirements (i.e., contracts with a quality grid on the rail). The ability to provide premiums and discounts for certain attributes communicates to producers what they should produce more of to meet consumer demand. If price signals and attribute premiums are clear throughout the supply chain then producers can more easily adopt practices fit to their unique operations.

Prices send the signal about consumer demand for specific attributes and quality back through the value chain to producers. **Price discovery** provides a clear average price for producers to compare their price received. This allows producers to determine if the premium or discount for the specific quality or attribute justifies a change in production practices. **However, if the average price is unknown due to a lack of price transparency or inadequate data there is a higher risk for a producer to change production practices, as the premium would be unknown.**

5.2.5. Adopting Environmental Production Practices

While there is growing consumer interest in production practices (e.g., organic, natural, verified sustainable, hormone-free and certified animal welfare), there are costs associated with providing a verified, certified or audited product that can make these claims. Which players absorb these costs impacts the viability of the industry.

There are costs to both the farmers and society from the adoption of production practices that increase the price of the product as costs are passed through the supply chain to the consumer. Changing the entire supply chain to have a specific attribute currently demanded by a niche market or group of consumers (e.g., for the majority of Canadian production to be “all-natural”) can result in less choice being available in the market, potentially impacting demand and market development. A down-sloping demand implies that a higher price for this product would have a smaller per capita consumption – even if demand is maintained.

If price signals are clearly given throughout the supply chain on the premium for certain attributes then producers are more likely to adopt new practices as they fit into their individual operations and marketing strategies. It should be noted that with the variety in cost structures in the industry, and particularly at the cow-calf level, it would make sense for some operations to adopt certain practices at lower premium levels and for other operations at higher premiums.

It should be noted that with limited production and sales data for Canada’s niche beef market, information on the premiums available for certain attributes is just as limited for the producer to make these decisions. In addition, there is limited literature on the cost of producing specific attributes. This means we will not be providing detailed qualitative analysis in this economic assessment. This is an area for future research.

5.3. Conclusion

Profitability is not enough. The beef industry must be able to compete with alternative protein options domestically and internationally for resources and market share.

Declining terms of trade, where beef and cattle prices tend to lag behind general inflation and input costs, squeeze producer margins. There are two ways to address this: (1) increase demand; and (2) decrease cost of production through productivity improvements.

Recommendations:

- Increase financial awareness, particularly in the cow-calf sector:
 - Support and encourage producer participation in cost of production monitoring programs (e.g., Alberta Agriculture AgriProfit\$, Western Beef Development Centre CowProfit\$).
 - Maintain a safe level of equity (e.g., 85%)
 - Encourage risk management tools (both financial and diversification) that stabilize production and allow specialization where producers can focus on productivity improvements.
- Continued research, innovation and adoption of management practices that decrease per unit cost of production and policy that provide access to competitively priced inputs are necessary for the beef industry.
- Adjust marketing practices to respond most effectively to quality and attribute signals.
- Support price transparency throughout the supply chain.
- Maintain and enhance market access for Canadian beef.

Producer Viability SWOT

Declining terms of trade, where beef and cattle prices tend to lag behind general inflation and input costs, squeeze producer margins. There are two ways to address this: (1) increase demand; and (2) decrease cost of production through productivity improvements.



Strengths

- Diversity in operational structures provides a level of stability to production.
- Mixed operations stabilize income.
- Productivity improvements and changes in production practices reduce COP.
- Producers adapted marketing arrangements (cash to contract) to improve quality (% AAA).
- More risk management tools are available.



Opportunities

- Continual improvement must not only come from productivity efficiencies but also in marketing to ensure the type of product demanded is the product supplied.
- As demand for branded programs increases, clear price signals are needed, requiring price transparency.
- Access to risk management tools are not available in all provinces and are unequal between commodities.
- Improved profitability has provided an opportunity for producers to rebuild equity.

Key messages

- The beef industry is characterized by small margins and large volumes at every production stage.
- The average cow-calf operation (200 head) relies on other sources of income.
- Unpaid labour in the cow-calf sector provides production stability.
- Profitability is not enough. The beef industry must be able to compete with alternative protein options domestically and internationally for resources and market share.
- Weather events can be devastating at a local and farm level. Producers must be prepared financially to handle these events long term.
- Continual improvement must not only come from productivity efficiencies but also in marketing to ensure the type of product demanded is the product supplied.

Potential Hotspots

- **Thin margins and market volatility** are a threat to producer economic viability.
- External factors such as commodity prices, value of the Canadian dollar, uncertain market access and weather will continue to affect the **stability** of the cattle industry.
- A lack of **price transparency** can limit producer's response to price signals from consumers for certain attributes if premiums are unclear.
- **Low utilization rates** make the industry vulnerable to further decreases in cattle numbers that may lead to a plant closure.

Weaknesses



- Volatile commodity prices and thin margins require producers to use cash reserves, equity, unpaid labour and alternative income sources in periods of negative margins in the cattle cycle.
- Long term margins on the typical 200 head cow/calf operation cannot support a family but require alternative income sources or further consolidation.
- Beef prices tend to lag behind general inflation and changes in input costs creating further challenges for producer margins.

Threats



- Debt has increased with land values and the ability to pay off principle is questionable.
- Higher input prices require productivity improvements to maintain COP.
- Differences between risk management tools available for various commodities within Canada can skew investment in land, labour and capital.
- Higher replacement breeding stock prices will impact future COP as depreciation is carried forward.
- Packer utilization is at the threshold when a plant has closed in the past; the impact of a closure would be that one of the large Alberta plants would be a monopoly buyer in Western Canada.
- If Canada is not competitive domestically and internationally, lost market share would necessitate a smaller industry.

Consumer Resilience SWOT

Declining terms of trade, where beef and cattle prices tend to lag behind general inflation and input costs, squeeze producer margins. There are two ways to address this: (1) increase demand; and (2) decrease cost of production through productivity improvements.



Strengths

- Current strong domestic and international demand for Canadian beef is supporting cattle prices.
- Industry has responded to changing consumer preferences with quality improvements, product innovation, convenience, smaller serving sizes, nutrition information and cooking videos online.
- International demand has been supported through market access and trade agreements which reduce tariff levels.



Opportunities

- Continued innovation of product to meet consumers' changing preferences for beef products and attributes.
- Branded Programs
- Growing international demand for high quality grain-fed beef with growing populations with larger disposable incomes.

Key messages

- There are many protein alternatives available to consumers today.
- Current strong domestic and international demand for Canadian beef is supporting cattle prices.
- Strong international demand represents an opportunity for the Canadian beef industry in the global market.
- In order to take advantage of this Canada must have reliable market access and the ability to compete with other grain-fed beef producers.

Potential Hotspots

- In recent years when beef supplies are small, demand has been strong. This amplifies the price signal received by producers and potentially can result in over supply in the future as producers respond.
- The industry must continue to adapt and respond to consumers' changing preferences for beef products and attributes.
- Product differentiation and development (e.g., additional processing and value-added options) are necessary in the beef category in order to remain a competitive protein source.

Weaknesses



- Consumer demand is currently strong, amplifying the price impact of tight cattle supplies at the bottom of the cattle cycle. A larger price signal could result in over production if demand falls at the same time supplies increase.

Threats



- Failure to respond to changing consumer preferences, ignoring fads even when they become trends.
- Product differentiation and development are necessary in the beef category in order to remain a competitive meat-based source of nutrition and protein.

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Appendix

A. Critical Review Panel feedback and responses

The following table summarizes questions and comments raised by reviewers and Canfax Research Services (CRS) responses.

Issue Raised	CRS Response
Supply chain considerations: A 'whole supply chain' view of economic sustainability within the beef sector suggests that consideration of how the supply chain as a whole functions is pertinent. There is virtually no mention of the beef packing sector in the report. A key element in the economic sustainability of the beef cattle industry is the state of play within the Canadian beef packing sector. Considerations include: packing capacity, consolidation within the packing sector (or new entrants) and implications for cattle producers. Also, implications of the regulatory environment for competitiveness of Canadian packers viz-a-viz US packers (e.g. Specified Risk Materials regulations).	See revised introduction to Producer Viability See added Packer Section
International market access: while the report mentions access to international markets, it could be given more emphasis, given the importance of exports to the Canadian beef sector. I have three suggestions (i) the International Demand Index provides a measure of the growth in demand for beef internationally but does not really capture the extent to which that growth has or will translate into a growth in Canadian beef exports. In addition to this measure, some consideration of <u>the trend in Canadian beef exports (volume, value, markets)</u> would be relevant. (ii) <u>Is Canada cost-competitive with other major exporters viz-a-viz the opportunities in developing country markets that are discussed in the report?</u> This is touched on in earlier sections with respect to the cow-calf and feedlot sector (though not the packing sector). Some discussion of relative competitiveness under the "international demand" section would be useful.	See revised International Demand section
(iii) While the report mentions the potential for trade agreements to reduce tariff levels for beef, there is no mention of the effect of <u>Non-Tariff Barriers (NTBs), such as Sanitary and Phyto Sanitary (SPS) measures related to animal disease or food safety, or technical barriers to trade such as labelling regulations (COOL, for example).</u> NTBs create uncertainty for exporters. Consideration of the potential for trade agreements to reduce these NTBs (or the failure to do so, as with CETA and the retention of the EU 'beef hormone ban') merits note, e.g. in the SWOT analysis. The Trans-Pacific Partnership (TPP) negotiations have the potential to provide new market opportunities for the Canadian beef sector, while also potentially exposing Canadian beef exports to stronger competition from exporters in the Pacific Rim region (e.g. Australia) in the US beef market, where the sector currently has access advantages under NAFTA. This is difficult to measure with a simple 'indicator' for the purposes of this report, nevertheless, it would be worth noting these potential effects on the economic sustainability of the sector, and the need to assess them on an ongoing basis.	See revised International Demand section NOTE: we have not included potential or pending trade agreements (e.g. CETA and TPP) as they are not part of the current baseline. They will be taken into account in future studies as progress is monitored and it can be seen how these have benefited the industry.
Domestic Demand: The report identifies a number of important factors that have affected beef demand over time (health information, consumer incomes, demographics), as well as the effect of prices on beef consumption. An additional factor that we would expect to affect beef demand over time, is the state of play with competitor meat products, particularly chicken and pork. Two issues are relevant here. First, the retail price of these substitutes. Some of the shifts in beef demand over time may be related to changes in the prices of key substitutes. Second, <u>product differentiation and value-added activities within the chicken and pork sector create additional competition for the beef sector.</u> This speaks to the importance of continued product development activities within the beef sector.	See revised Consumer Demand section
Definition of Sustainability – early in the introduction the following question is asked "First, how do you define and measure economic sustainability at the industry level?"	Added in the Introduction

Yet I do not see a clear definition given. How can we assess whether or not the beef industry is economically sustainable if the concept is not defined?	
Discussion in Isolation – I recognize that this report is not intended to examine social or environmental sustainability. However, I don't see how economic sustainability can be discussed in isolation of those other areas. There are obvious linkages that should not be ignored. For example, if there is pressure from society to mitigate negative impacts that may lead to beef producers being required to change production practices which in turn will affect economic viability. There is virtually no mention of the environmental or social aspects in this report and I think that is a shortcoming.	See Discussion section
Ignoring linkages within the sector – The report deals with the primary components of the beef industry (cow/calf and feedlot). While this is appropriate, there is not attention given to the connection between the two pieces. In particular, the sectors are linked by the feeder price. This has implications for both sectors. What are the implications of this?	See revised introduction to Producer Viability
Lack of Consideration of the Processing Sector – The processing sector is not the focus of this report. However, it represents the direct “consumer” of fed cattle and so would be an important consideration for the cattle industry. Does the structure and health of the domestic processing industry have implication for economic sustainability of primary beef production?	See Packer Section
Balance between Producers and Consumers – It is obvious that the focus of this report is on primary production and indicators of economic viability as measured by profitability and competitiveness (COP). There is much less attention on the demand side. The discussion of retail consumer demand is rudimentary.	See added discussion on demand drivers
Bottom line? There are “Key findings” provided in the Executive Summary. However, the report ends with no summary/conclusions section. So what is the overall assessment in terms of economic sustainability? Is the industry in good shape? Is it at risk and if so from what sources? Something beyond the SWOT in the executive summary is warranted.	See revised Executive Summary and Discussion section Note: a SWOT summary is at the end of the Discussion section.
Executive Summary should be tighter, clearly provide KPI's and baseline results. Move SWOT to discussion section.	See revised Executive Summary Note: a SWOT summary is at the end of the Discussion section.
<p>Is the balance of indicators correct?</p> <p>The authors of the paper clearly enunciate the need to limit the number of economic indicators to just a few. Use of many indicators can distract from what is important and inevitably leads to confusion as conflicting information is presented. The use of just a few indicators, however, makes it even more important that the indicators be carefully selected to convey a comprehensive and accurate picture of the industry. It is also useful to have a mix of leading indicators as well as those that simply reflect the current state of the industry.</p> <p>Selecting a limited number of indicators is almost an impossible task – invariably compromises are made. However, given a limit of six indicators an obvious question is: are these the most revealing and critical six indicators that can be constructed? An observation is that of the six indicators, four relate to measures beyond the farm gate.</p> <p>Two, in particular, are questionable – the contribution to GDP and employment. The percentage contribution of the Canadian cattle industry to the Canadian economy (at 0.29% of GDP) is even less than the contribution of the Australian cattle industry to the Australian economy (at about 0.5%). The contribution is swamped by what is happening to the economy generally and, particularly, to large volatile industries such as the mining industry. In any case economic contribution is a reflection of the size of other indicators such as profitability. This is not to say contribution to GDP is unimportant. Contribution to GDP is undoubtedly a useful measure to use in some circumstances. It is, however, raising the question of whether it should be one of the six indicators.</p> <p>Similarly, use of Employment as an economic indicator might also be questioned. It employment trends down, as it has in the Australian industry over a long period of time (and, I suspect, the same holds true for the Canadian cattle industry), how is this to be interpreted? Is it a sign of bad health of the industry or, simply, that improvements are occurring in the efficiency with which the industry is applying labour?</p>	Contribution to GDP and Employment are removed as indicators and discussion moved to context in the Introduction.
What is lacking with the existing indicators?	Serval of the leading indicators

<p>If some of the existing six indicators are to be replaced, what should they be replaced with?</p> <p>Two areas are obviously lacking with the existing indicators (but as noted above is impossible in a set of six indicators to be all-inclusive).</p> <p>One is a lack of “leading” indicators or risk indicators. On the supply side such indicators might include debt levels, reliance on off farm income, etc. On the demand side they might include measures of attitudes to the product such as health perceptions, social license issues, etc (perhaps these are being covered elsewhere with the sustainability work).</p> <p>The other area of deficient coverage in the indicators is the lack of any form of disaggregation below the total industry level. Is our only concern the sustainability/health of the total industry or it is with large segments within this industry – e.g. family farms, mid level operators, etc?</p>	<p>mentioned here have been added throughout the document and highlighted in the Discussion</p>
<p>Everything is relative</p> <p>Also missing from the indicators themselves is any measurement of how the Canadian industry is travelling relative to competitor industries (although it is recognised that the paper contains discussion of Agribenchmark data on international comparisons). If all the economic indicators for the Canadian cattle industry are all positive, but are even more positive for the US industry and the Oceanic industries, what does that say about the long term sustainability of the Canadian industry? This is not to argue against having indicators specific to the Canadian industry, but it does highlight that they are most useful and revealing when used in conjunction with similar indicators for competitors.</p> <p>The authors of the paper emphasize on a number of occasions that:</p> <p><i>“A sustainable cattle industry has to evolve with the consumer market and respond to changes in consumer preferences. Failure to do so leaves an industry without a market and without a market an industry will die.”</i></p> <p>Similar sentiments apply if an industry persistently lags behind competitors.</p>	<p>The Competitiveness sections for feedlots and cow/calf have had additional context on the importance of this issue added.</p>
<p>Is it worthwhile including a discussions of the types of measures that could be introduced to address sustainability</p> <p>Sustainability indicators are useful in themselves, but far more important is how to improve the sustainability of the industry. On this matter the paper is silent, perhaps deliberately so.</p> <p>There are many initiatives that must be followed to improve sustainability related to continuing improvements in productivity and maintaining or improving demand.</p> <p>A worrying sign is that Government support for agricultural research and development in developed nations is in decline – whereas the opposite is occurring in developing nations. This is likely to have a long term detrimental impact on sustainability.</p> <p>Another relevant observation is that supply chain integration, not in terms of ownership (the paper refers to the chicken industry in this regard), but in terms of information sharing and guidance is much weaker in the cattle industry than a number of other agricultural industries, such as dairy. The paper raises the issue of lack of price transparency in the cattle industry and the “spotty” use and prevalence of risk management tools. Those down the supply chain (including large end uses and processors represented on the Canadian Roundtable for Sustainable Beef) could play an important role in encouraging improvements in these areas.</p> <p>There are enormous productivity and quality gains to be made in the cattle industry through improved information sharing. It is noted that the paper refers to the increase in selling over processor grids in Canada. If grids in Canada, however, are similar to those in Australia, they are often rudimentary and only loosely related to the value of meat sold (including the amount of lean meat yield). Also to be of maximum value this information not only has to be available to the final seller of the cattle (the feedlotter) but shared with the backgrounder, cow/calf operator and seedstock operator.</p> <p>Information sharing not only potentially leads to improvements in productivity, but also adds to certainly – and both contribute to the long term sustainability of an industry.</p> <p>What is being suggested here is that members of the Canadian Roundtable for Sustainable Beef could play an important role in contributing to the economic sustainability of the industry through the types of initiatives referenced above. It is recognised that such discussions may be outside the scope of the current paper, but</p>	<p>See enhanced Discussion section</p>

are important in the broader context within which this paper has been prepared.																										
<p>Support for cost of production indicator</p> <p>Finally, a word of support for use the long term cost of production indicator.</p> <p>Evidence from Australia (e.g. McLean et al 2014) is that the cost of production of top operators is lower, not so much because the total costs are lower, but because top operators use resources more efficiently – driving down cost of production per kg of beef produced. Note from the table below that top operators have lower costs of production because they use their land more efficiently to produce more beef from it, have higher reproductive rates and lower mortality rates – this not only results in economic sustainability, but also environmental sustainability.</p> <table border="1"> <thead> <tr> <th>Measure</th><th>Average</th><th>Top 25%</th></tr> </thead> <tbody> <tr> <td>Prices received (\$/kg LW)</td><td>\$1.77</td><td>\$1.78</td></tr> <tr> <td>Cost of production (\$/kg LW)</td><td>\$1.41</td><td>\$1.06</td></tr> <tr> <td>Operating margin (\$/kg LW)</td><td>\$0.36</td><td>\$0.72</td></tr> <tr> <td>Kg Beef/AE*</td><td>110.0</td><td>127.1</td></tr> <tr> <td>Sale weight (kg/hd)</td><td>472</td><td>493</td></tr> <tr> <td>Reproductive rate %</td><td>65.2%</td><td>70.4%</td></tr> <tr> <td>Mortality rate</td><td>2.0%</td><td>1.3%</td></tr> </tbody> </table> <p>* AE is the intake of an adult dry cow consuming enough feed to maintain a constant body weight of 420 kg from one year to the next</p> <p>McLean I, Holmes P and Counsell D, 2014 <i>The Northern beef report: 2013 Northern beef situation analysis</i>, Prepared for Meat and Livestock Australia Report B.COM.0348, April 2014.</p>		Measure	Average	Top 25%	Prices received (\$/kg LW)	\$1.77	\$1.78	Cost of production (\$/kg LW)	\$1.41	\$1.06	Operating margin (\$/kg LW)	\$0.36	\$0.72	Kg Beef/AE*	110.0	127.1	Sale weight (kg/hd)	472	493	Reproductive rate %	65.2%	70.4%	Mortality rate	2.0%	1.3%	Thank-you
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B. Indicator Review

Study	Objectives	Scope	Time Horizon	Approach
Spangenberg (1998)	To present a draft system of "inter-linkage indicators" for the macro level, and a set of business sustainability indicators on the micro level.	National & Organizational	Current	Performance Indicators
Global Reporting Initiative Guidelines (2002)	To assist reporting organizations and their stakeholders in articulating and understanding contributions of the reporting organizations to sustainable development.	Firm (General)	Current	Performance Indicators
Tallis et al. (2002)	To measure the sustainability performance of an operating unit.	Firm (Processing Industry)	Current	Performance Indicators
United Nations Commission on Sustainable Development Framework (2007)	To evaluate governmental progress towards sustainable development goals.	National	Current	Performance Indicators
FAO Sustainable Forest Management	To define, guide, monitor and assess progress towards sustainable forest management in a given context	Global, Regional, National and Local (Forest)	Current	Criteria and Indicators
P.E.Hardisty (2010)	To quantify sustainability and improve environmental decision making.	Not Stated	Future/ Decision Making	Environmental and Economic sustainability assessment (EESA) (combines elements of several well-known systems)
Sustainable Agriculture Initiative Platform (2013)	To provide a set of Principles for Sustainable Beef Farming that applies to mainstream producers in all areas in the world.	Industry & Firm (Beef Farming)	Current	Performance Indicators
BASF (Andrade, J. <i>et al.</i> 2013)	To benchmark the eco-efficiency of the US beef industry and to analyze the positive and negative trends associated with the changes in practices over time.	Industry (Beef)	Current	Eco-Efficiency Analysis (EEA)/ Life Cycle Cost Analysis
Santoyo-Castelazo <i>et al.</i> (2014)	To assess and identify the most sustainable energy options.	Industry (Energy)	Future/ Decision Making	Life Cycle Costing & Multi-criteria analysis

Study	Economic Indicators
Sustainability Reporting Guidelines (Global Reporting Initiative, 2002)	<p>Economic Performance</p> <ul style="list-style-type: none"> - Direct economic value generated and distributed; - Financial implications and other risks and opportunities for the organization's activities due to climate change - Coverage of the organization's defined benefit plan obligations - Significant financial assistance received from government <p>Market Presence</p> <ul style="list-style-type: none"> - Range of ratios of standard entry level wage by gender compared to local minimum wage at significant locations of operation - Policy, practices, and proportion of spending on locally-based suppliers at significant locations of operation - Procedures for local hiring and proportion of senior management hired from the local community at significant locations of operation <p>Indirect Economic Impacts</p> <ul style="list-style-type: none"> - Development and impact of infrastructure investments and services provided primarily for public benefit through commercial, in-kind, or pro bono engagement - Understanding and describing significant indirect economic impacts, including the extent of impacts
Indicators of Sustainable Development: Guidelines and Methodologies (United Nations, 2001)	<p>Economic structure</p> <ul style="list-style-type: none"> - Economic performance - Trade - Financial Status <p>Consumption and Production Patterns</p> <ul style="list-style-type: none"> - Material Consumption - Energy Use - Waste Generation and Management - Transportation
Principles for Sustainable Beef Farming (Sustainable Agriculture Initiative Platform, 2013)	<p>Long Term Economic Viability</p> <ul style="list-style-type: none"> - The efficiency of the enterprise is continually improved, with key performance metrics regularly benchmarked against the rest of the industry to monitor progress. - Market requirements and desirable specifications for animals are taken into account - Costs of production are known and managed, whilst also ensuring the remaining Principles of Sustainable Beef are not compromised <p>Short and Long Term Business Planning</p> <ul style="list-style-type: none"> - Business planning objectives take into account current and future needs
Assessing the Sustainability Performances of Industries (Labuschagne <i>et al.</i> 2005)	<p>Financial Health (91% rated high relevance), Economic Performance (73.91%), Potential Financial Benefits (26.09%), Trading Opportunities (43.48%) (survey South African process Industry)</p>
Hotspot Analysis, U.S. beef industry (BASF, 2013)	<p>Compliance with law (high relevance), Market Concentration and pricing (Medium relevance), Rural economies (High relevance), Traceability (high relevance), Efficiency (medium relevance), Product quality (medium relevance), Trade (medium relevance)</p>
Identifying Sustainability Issues for Soymeal and Beef Production Chains (Karmali, 2014)	<p>Investment, Vulnerability, Product safety and quality, Local economy (addressed by reviewed literature)</p> <p>Long run profit prospect, Adding value to local economy; Adding value to local economy (Business Stakeholder survey in Latin America and EU)</p> <p>National and local economy (Consumer survey)</p> <p>Profitability, Local economy and National economy (Other Stakeholder survey)</p>

C. Sensitivity of Economic Indicators

Based on the economic indicators presented in the previous sections, an analysis was conducted on the benchmark year (2013) relative to historic performance to see how responsive they were to changes from year to year. Figure 31 shows that in 2006 at the top of the cattle cycle, profitability is below 5 as expected; while in 2014 record large margins are made.

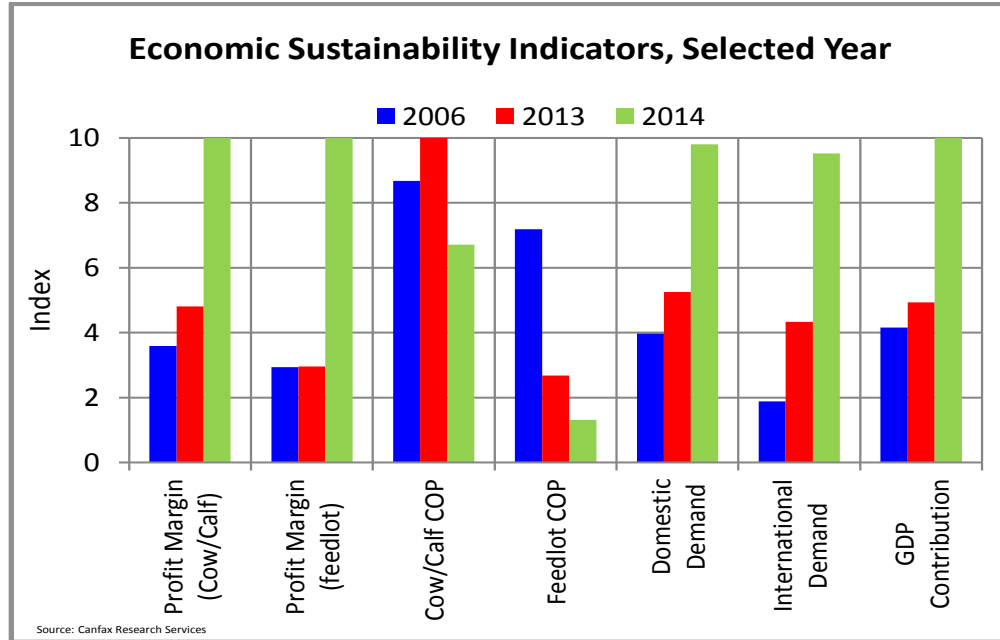


Figure 30. Economic Indicators for Select Years

Data Normalization

Indicators used in this economic assessment as well as the social and environmental LCA are expressed in a variety of statistical units. In order to compare the industry's performance in different areas, the historical annual data for 1990-2014 used in the previous section are normalized to a 10-point rating scale (continuous from 0 to 10) using the min-max normalization method. The min-max normalization performs a linear transformation on the original data based on the following calculations:

For profit margin, domestic and international demand index, GDP contributions and employment creation indicators:

$$A' = \left(\frac{A - \text{minimum value of } A}{(\text{maximum value of } A - \text{minimum value of } A)} \right) \times 10$$

For cow-calf and feedlot production cost indicators:

$$A' = 10 - \left(\frac{A - \text{minimum value of } A}{(\text{maximum value of } A - \text{minimum value of } A)} \right) \times 10$$

where A is the original data and A' is the normalized data transformed to a 10-point scale.

For the 10-point scale, a higher number represents stronger performance (e.g., higher profit margin, lower production cost, higher demand index and larger contribution to the national GDP) while a lower number represents weaker performance. The highest number (10) represents the strongest performance in the 1990-2014 period, while the lowest number (0) represents the weakest. It should be noted that the mid-point (5.5) of the scale does not represent the long-term average but the median of the data series. The scale is color coded with red presenting the weakest (highest COP and lowest profitability) and green the strongest (lowest COP and highest profitability).



Since the indicators for GDP contribution and employment creation are both calculated based on annual farm cash receipts (FCR) and a constant multiplier coefficient, the normalized data of the two indicators are identical. Therefore, the employment indicator is excluded in the tables and charts in this section to prevent redundancy.

An alternative to using historical annual data is to use a 10-year rolling average to capture the long-term trend throughout the cattle cycle. A sensitivity analysis was conducted to compare the results of using annual data versus the 10-year rolling average. While the 10-year rolling average reduces the volatility of the profit data, it fails to capture the short-term economic and environmental shocks to production cost and has significant lag in showing changes in consumer demand. For these reasons, the annual data are used to construct the 10-point rating scale.

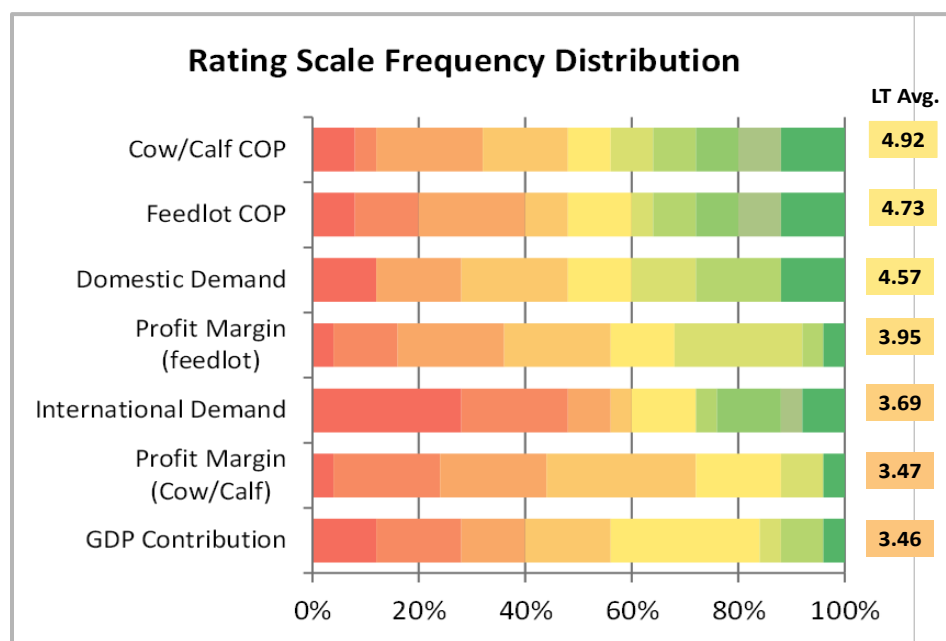


Figure 31. Normalized Indicators

Results

Cow-calf COP has the highest long-term average indicator at 4.92 with 11 out of the 25 years (9%) rated above 5. In 2013, deflated per unit COP (\$/cwt) reached the second lowest level in the 1990-2014 timeframe, coinciding with weaker grain prices, before rebounding in 2014 with significantly higher herd replacement cost (Table 13).

Cow-calf profit margins in 2013 were at the strongest level since 2000 with lower COP and higher cattle prices. But *cow-calf profit margins* had the lowest long-term average of all the indicators at 3.47. COP and profit margins in the cow-calf sector are affected by both internal factors (e.g., improved productivity) and external factors (e.g., commodity prices, environmental conditions). While the industry has no control over external factors, improvement in productivity has contributed to the lower deflated COP over the years.

Table 11. Rating Scale Summary

	Profit Margin (cow/calf)	Profit Margin (feedlot)	COP (cow/calf)	COP (feedlot)	Domestic Demand	International Demand	GDP Contribution
2013	4.81	2.96	10.00	2.68	5.25	4.33	4.94
04-13 avg	3.01	3.79	7.77	7.29	4.53	2.44	3.96
90-14 Avg.	3.47	3.95	4.92	4.73	4.57	3.69	3.46

Feedlot COP has the second strongest performance with a long-term average at 4.73 and with 10 out of the 25 years (8%) rated above 5. In 2013, *feedlot COP* was impacted by high grain prices most of the year.

Feedlot profit margins were negative until fed cattle prices picked up in late 2013, with a long-term average of 3.95. Despite the weakness in the feedlot sector in 2013, the industry started 2014 in great shape with lower feed costs, high fed cattle prices and positive margins. The lowest feedlot margin occurred in 2003 when the industry was hit by BSE, while the lowest cow-calf margin occurred in 1996. In 2014, profit margins are at the record high levels with cow-calf profits (\$0.98/cwt) up 139% from the previous high in 2000 (in deflated dollars) and feedlot profits (\$20/cwt) up 127% (in deflated dollars) from the previous high in 1993.

Before seeing positive margins in 2013, cow-calf and feedlot producers experienced prolonged losses. Despite the decline in deflated per unit COP, production costs in nominal terms have been increasing squeezing margins. Currently at the bottom of the cattle cycle, improved profitability in 2013 and 2014 has provided an opportunity for producers to rebuild equity.

Domestic demand has a long-term average of 4.57. Consumer demand has been steadily improving since 2010 and reached an 11-year high in 2014. However, this remains softer than the levels seen in 2003 and 1990. *International demand* saw significant improvement in 2014 with strong global demand and reached the second strongest demand after 2001. However, the long-term average is relatively low at 3.69 due to the soft demand from 1990-1997 and 2006-2012. Improvements in domestic beef demand highlight the industry's ability to adapt and respond to changing consumer preferences. Increased income levels and changing meat consumption patterns in developing countries are driving international demand.

The long term average of *GDP contribution* is 3.46 with a general uptrend from 1990 to 2014. Gains have come from higher cattle prices as volumes have been declining. Both employment and GDP contribution could be increased by a larger proportion of cattle being slaughtered domestically with value-added jobs being captured in Canada versus being generated internationally.