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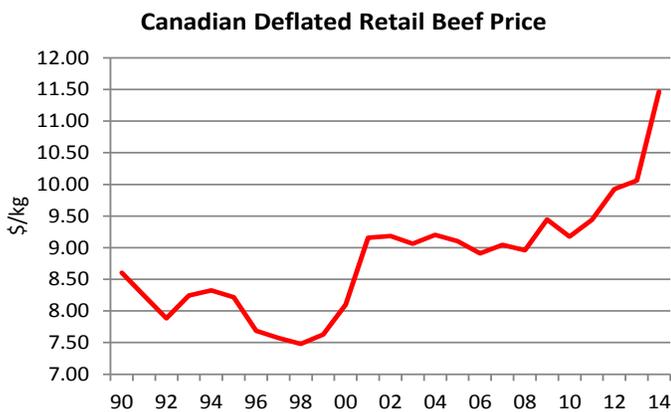
A Division of the Canadian Cattlemen's Association

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Consumer Demand

Beef supplies are tight, across North America and globally, and are supporting beef prices at record high levels. Deflated retail beef prices were relatively flat from 2001 to 2011 before spiking sharply higher over the last three years. Deflated retail beef prices in 2014 averaged 21% higher than 2011.



Herd expansion is underway in the US and Canadian cow and heifer marketings are down about 24% and 12% in the first quarter of 2015. As the industry moves into the next expansion phase, beef supplies will tighten even further as heifers are retained for breeding. Therefore, retail prices can be anticipated to remain strong over the next 2-3 years until larger production is available or there is a change in consumer demand.

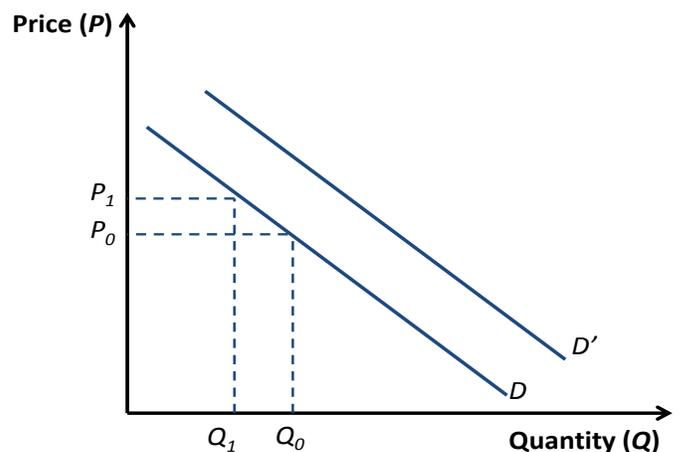
How consumer demand holds up, both domestically and internationally, in the face of higher prices will determine the magnitude of the coming expansion phase. While beef demand has been strong in recent years, there is increasing uncertainty moving forward. *Will beef prices hit resistance at retail? Will consumers switch to cheaper competing meats as pork and poultry production increase? Will*

consumers switch back to cheaper beef cuts, like they did after the global financial recession?

This uncertainty has made producers cautious about the next expansion phase. Current prices can only be maintained if demand stays strong. This fact sheet reviews the major factors influencing beef demand, both domestically and globally, examining both overriding long term trends and short term market impacts.

WHAT IS DEMAND?

Demand is a buyer's willingness to pay for a specific quantity of good or service. It refers to how much (quantity) of a product or service is desired at various prices. The demand curve for a normal good is downward sloping. 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; but the demand curve remains unchanged. Demand could remain constant throughout a cattle cycle with only price and quantity changing.

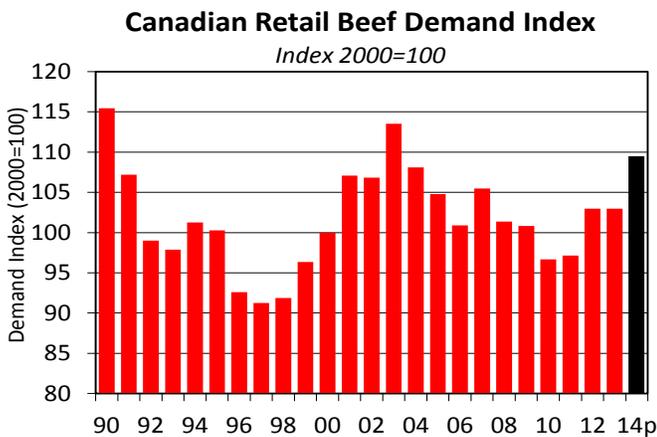


When there is a shift in demand (from D to D'), the entire demand curve shifts up or down. The changes in prices or the quantity of consumption alone do not

cause demand curve to shift. Rather, it is changes in consumer preference, taste and budget constraints that cause shifts in demand.

Domestic Demand

The Canadian Retail Beef Demand Index (2000=100) is calculated based on deflated retail beef prices and per capita consumption. There have been some major trends and turns in the past two decades. Retail demand weakened almost every year from before 1980 through 1997 (except 1985 and 1994). Following this long-term decline, beef demand started to strengthen in the late 1990's. From 1998 through 2003, beef demand increased from a low of 91.26 to a peak of 113.51, before weakening again from 2004 through 2010. Demand bottomed in 2010 and has rebounded to reach 109.5 in 2014.



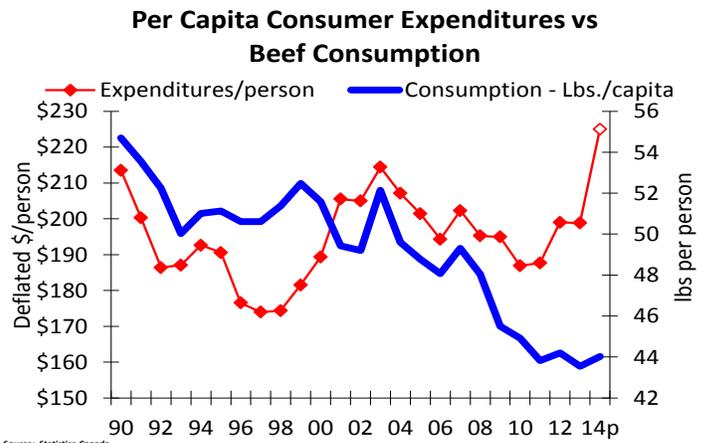
Source: Statistics Canada, CanFax, US Beef Demand Study Group

This is the third strongest annual demand since 1990 with only 1990 and 2003 being higher. If retail beef demand in 2014 had been steady with 2010 levels, deflated beef prices would have been 15% lower than what actually occurred. The improvement in domestic since 2010 has contributed to the price signal producers are currently receiving to expand.

Consumption & Expenditures

Per capita beef consumption has declined over the last three decades. 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 that beef is cheaper not because they 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.



Source: Statistics Canada

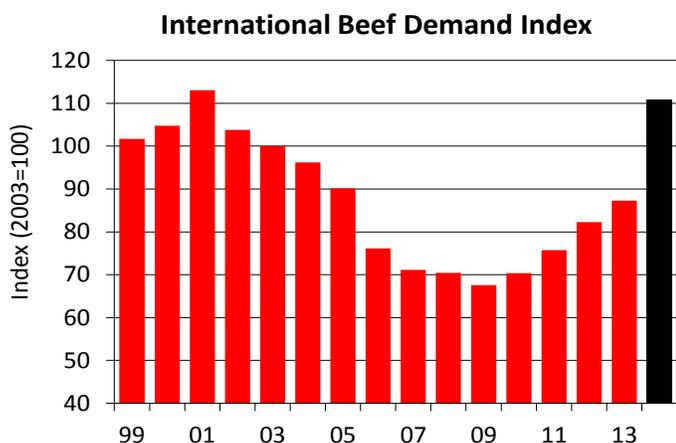
In contrast to consumption, per capita expenditures (quantity x price) on beef is a good proxy for domestic demand and tracks closely with the retail beef demand index.

International Demand

Canada exports 46% of beef production (including live slaughter cattle exports), making the international consumer as important as the domestic consumer for producers and the price signal for expansion. These international consumers have their own preferences for products that may be the same or different than domestic consumers. The International Beef Index peaked in 2001 then declined until 2009. It has since rebounded and in 2014 is close to the peak demand seen in 2001.

Once again the distinction needs to be made between consumption and demand. Growing populations in Asia and other markets have resulted in a 31.5% increase in global beef trade between 2009 and 2014. But it is the growing middle class with increasing disposable incomes that are driving global beef demand. Consumers who are willing to pay – in China despite a much lower annual average income the retail price of beef is equivalent to the

US. This has been the main driver behind growing international demand over the last five years. This trend is not going away and, as long as market access remains open, will be supportive to cattle prices.



Source: Cranfield 2012, Canfax Research

KEY FACTORS TO WATCH

Key factors to watch 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 perceptions around the health and nutrition of red meat, beef quality and food safety. The shorter term market impacts of relative protein prices and options.

At this point we need 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. 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.

LONG TERM TRENDS

Population Growth

In global market, population growth and increased urbanization will continue to push beef demand in

the next several decades. By 2050, the world's population is projected to be over 9 billion, including middle class growth of 3 billion. Currently, about 50% of the world's population lives in urban areas and this is projected to increase to 70% by 2050. Increased urbanization will lead to a change of food consumption patterns with less 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 and influence cattle cycles over in the coming decades. However, short term factors may have a greater impact on the current cycle.

Consumer Demographics

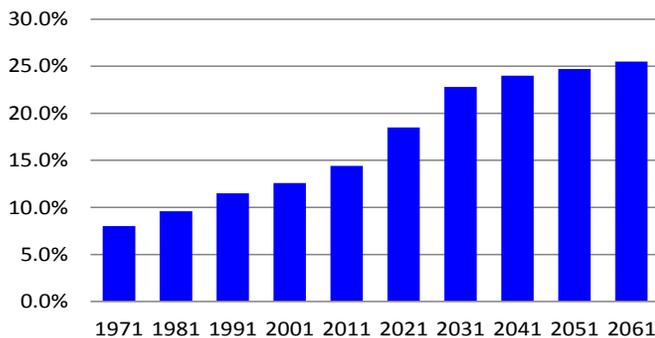
Changes in various demographic characteristics have influences on the change in the demand for meat. Increased **percentage of females in the labor force** is an important factor that changes meat consumption pattern over the past decades. In 2014, women represented 47.3% of the labor force, up from 45.7% in 1999 and 37.1% in 1976. As the percentage of women employed outside of home increases, the time available for food preparation at home declines and the demand for products that are convenient to prepare increases. This trend had a negative impact for beef demand, but a positive effect on poultry demand. Specifically, a study based on US data from 1982 through 1998 found that for each 1% increase in female labor force participation, beef consumption declined by 1.51% whereas poultry consumption increased by 0.46% (Schroeder et al., 2000).

Ethnic diversity is one of the leading demographic trends in Canada and is reshaping 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—the fastest population growth among all groups (Statistics Canada, 2011). The rapidly expanding ethnic population may have a pressure beef demand as many of these ethnic groups have a higher dietary preference to poultry and pork. On the other hand, as each ethnic group has its own culinary culture and preferences for beef cuts, growing ethnic diversity provides a great opportunity for the beef industry to introduce new products and expand the ethnic niche market.

Changing **age structure** of the Canadian population also affects beef demand and preference to beef products. Seniors make up the fastest-growing age group in Canada, and this trend is expected to accelerate in the next decade due to the aging of the **Baby Boomer generation** (born from 1946 to 1965). Elderly consumers are likely to be more health conscious, which could dampen the demand for meat, especially red meat. They also tend to cook and eat smaller portions.

Percentage of Population 65 years and over
Historical and Projected



Source: Statistics Canada

The **millennial generation** (born between 1980 and 2000) is becoming a major consumer group in the market. According to a study by Oklahoma State University beef consumption of consumers between 18 to 34 years old is higher than those over 35. However, US surveys also show that millennial parents consider chicken to be easier to prepare and more kid-friendly. They also perceive other meats as more heart-healthy than red meat. The millennials have less knowledge about different beef cuts and

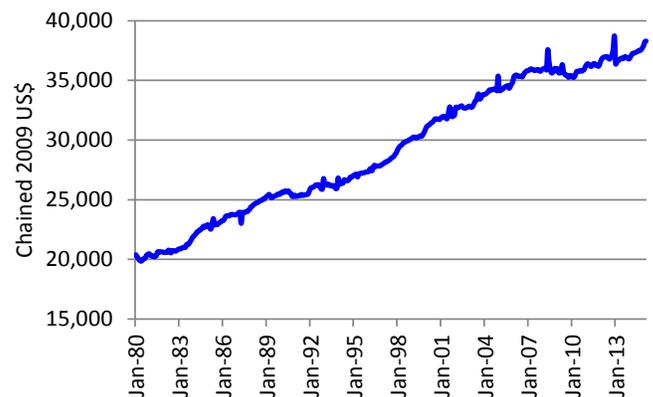
experience in preparing beef dishes compared to the Baby Boomer generation. They tend to buy the same cuts rather than diversify their choices, but many are very open to learning and indicated that they would buy more beef if they knew more about the different cuts.

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 household disposable income and beef demand, the responsiveness of beef demand to increased income is greater in developing countries than higher income nations.

In Canada, expenditures on food only 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), and the differences may relate to the data and methodology being used. 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 economic recovery in North America.

US Real Disposable Income



Source: US, Bureau of Economic Analysis

Canadian beef demand tends to be more responsive to the changes in disposable income (income elasticity ~ 0.54) than competing meat prices (cross-price elasticity $\sim 0.27-0.35$). 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. While higher income level is expected to benefit beef demand in a longer term. It is worth noting that in a mature market like Canada or the US, the growth in income is likely to have a larger impact on demand for quality 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, and most of their food spending goes 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, China's the income elasticity of beef demand is estimated at 0.68 up to 1.56 (Tadayoshi *et al.* 2010) and some West African countries' is at 1.2 (ILRI, 2000). With strong income growth and large population, developing countries are expected to represent the strongest increase in beef demand in the next decade. The relatively long production cycle of the cattle industry means that domestic production will have a hard time catching up with the demand growth and import demand will rise, providing robust opportunities for Canada to expand its export market.

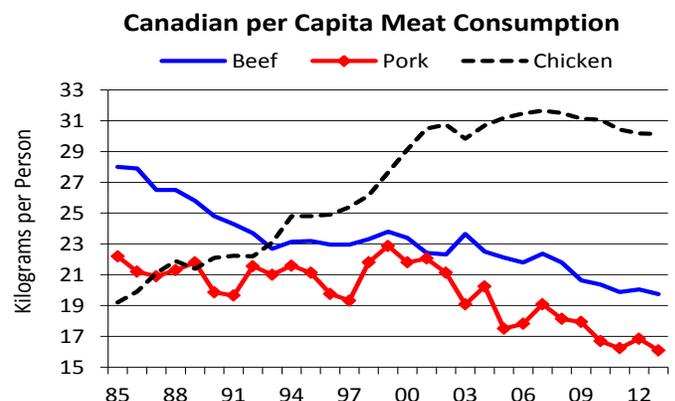
MEDIUM TERM PERCEPTIONS

Higher levels of education results in a more aware and demanding consumer. Surveys have found that the vast majority of Canadians read nutritional labels when making purchasing decisions (Conference Board of Canada, 2011). Food awareness extends to food safety and the environmental impact of food production. However, even seemingly strong environmental attitudes, like support for organic farming, can be interpreted as being concern for food quality.

Health Information

Health information is ranked the third most important determinant in the US Beef Demand Determinant study (2013). 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 per capita beef consumption was exceeded by chicken for the first time in 1993. In the late 1990s and early 2000s, beef demand responded positively to the promotion of the Atkins diet with high protein and low carbohydrates. 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.



Source: Statistics Canada

The new edition of Dietary Guidelines for Americans scheduled to publish fall 2015 may lead to changes on consumer's perception of cholesterol and positively impact beef demand. The Scientific Report to the 2015 Dietary Guidelines Advisory Committee (DGAC) states *previous recommendations that cholesterol intake be limited 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.*

As consumers are becoming more health conscious, effectively communicating beef's nutritional properties and health information will be important in supporting beef demand.

Food Safety

According to the Beef Demand Determinant study, Food Safety and Product Quality are consistently the top two demand shifters for both ground beef and steak with Health ranking third among demand shifters for both products (Schroeder *et al.* 2013).

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 Food's 2012), and the 2008 Listeria recall in Canada. 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. On the average, consumers 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 lead to a 2.26 million kilogram reduction in beef demand. In value terms, this is equivalent to about \$26 million at the retail level, or about 1% of Canadian beef expenditures.

Food safety also impact 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 brought home 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

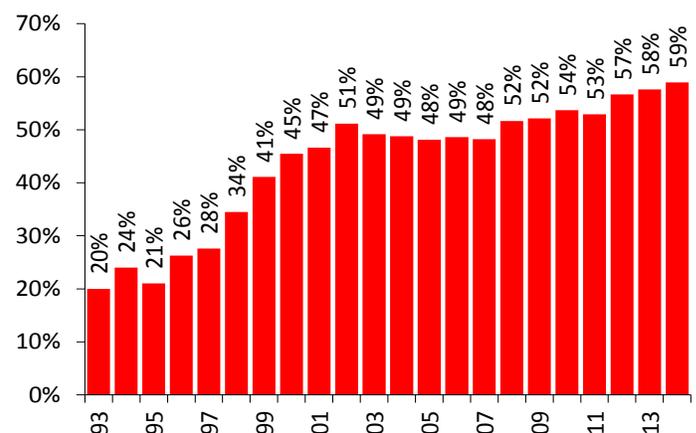
products known for their high food safety standards. On the other hand, it also means that ensuring the safety of Canadian beef has become increasingly important as any food safety recalls can dampen international demand.

Beef Quality

Consumers desire consistent high quality products with excellent flavor, color, tenderness, juiciness, and freshness. However, when consumers buy a better quality cut of beef, they could be buying less quantity. Such quality-quantity trade-off (i.e. a higher unit price for a better cut of beef leads to consuming less beef) is consistent with the expenditure data shown earlier where dollars spent remain constant while per capita consumption drops. 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.

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 be feasibly influenced through research and technology innovation. Increasing overall beef demand requires increasing the total value of cuts from the entire carcass. Predictable, consistent eating quality in middle meats (loin and ribeye) are very important, but beef quality research that leads to increased consumer satisfaction with and consumption of end cuts (rounds and chucks) is equally important to support demand.

Cdn AAA + Prime as a % of all A Grades



Source: CBGA

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; but these tend to be short term impacts. Leaving the underlying consumer tastes and preferences unchanged.

Price

Research conducted in Canada and America show that price is one of the most important determinants in consumer's purchasing decision (ALMA, 2012 and Schroeder *et al.* 2013). At the same time, 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 US where beef own-price elasticity is estimated at around -0.62 (USDA, 2012). This inelastic relationship between price and quantity can partly explain why the 21% increase in deflated beef prices from 2011 to 2014 did not cause a sharper fall in consumption.

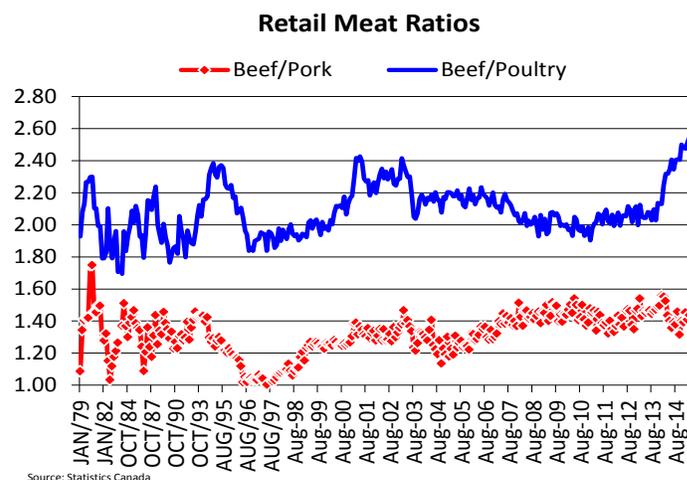
Competing Meat Prices

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. In 2014, the relative price of poultry has fallen sharply with the beef/poultry ratio reaching a high of 2.54 in

March 2015, up 10% from last year to be the highest on record.

Wholesale pork prices have dropped sharply as production in North America jumps sharply higher with the decline in Porcine Epidemic Diarrhea virus (PEDV) cases. Retail pork prices, however, have remained sticky as retailers gain margin they lost last year when wholesale prices jumped. Consequently, instead of pulling beef prices down, high beef prices have provided support for competing meats. In the first quarter of 2015, the beef/pork ratio remained in line with historical levels. But retail prices tend to lag wholesale prices by three to six months. Pork prices at retail should moderate somewhat through the rest of 2015 as pork supplies increase.



Although the 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 over the short term.

Looking back in the 1980's and 1990's, one would notice that any dramatic change in the price relationship is usually followed by a sharp correction in the next few years (e.g. Beef/Poultry in 1990-1996 and Beef/Pork in 1993-1999). The implication is that the negative impact of cheaper competing meat prices on beef consumption will be a short-term effect. As long as consumer preferences remain the same, once beef production has responded this will eventually bring the price relationship back in line.

Switching between Cuts

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 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 45% over the same period.



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, 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 in the current high-price, tight-supply situation.

CONCLUSION

As the cattle industry starts to move into the expansion phase, consumer demand will be a critical driver for beef and cattle prices and determine the magnitude of the expansion.

Canadian consumers have shown strong resilience to high beef prices in recent years and this is expected to continue as beef demand has proven to be inelastic to the changes in beef prices. The dramatic shift in relative prices compared to competing meats,

is expected to dampen beef demand over the short term. But increasing disposable income levels in North America and many developing countries will be supportive of beef demand domestically and internationally over the long term. Specifically, developing countries are expected to represent the strongest increase in beef demand in the next decade. Solid international demand will be a supportive factor for the upcoming expansion even if domestic demand softens.

Quality, safety and healthfulness are the top demand shifters for beef products and will continue to drive beef demand in the long term. Consumers are becoming more flexible to switch between meats choice to fit their budget and preference in terms of quality and quantity, and increasingly aware of food safety and health information. Continue investment on quality improvement and food safety and effective communication beef's nutritional properties and health information will be important in supporting beef demand.

The changing demographics of the population will continue to affect meat consumption pattern with a growing demand for convenient, diversified and high-quality products. Consumer education will be an important tool to support beef demand especially in marketing to the millennial generation.

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