



the **food** institute

OF THE UNIVERSITY OF GUELPH

# Food Price Report 2016

UNIVERSITY OF GUELPH ECONOMIC BRIEF

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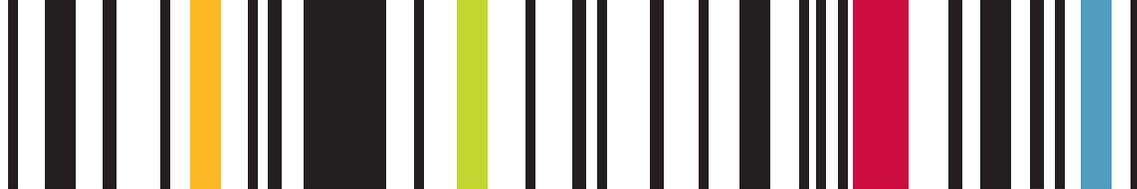
## The Food Institute of the University of Guelph

Building on more than 150 years of tradition, the Food Institute of the University of Guelph connects food research and expertise across all fields of study with Canadian and global partners to support sustainability, economic growth, and security in the food supply chain from fork to field.

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# Abstract

In 2014, the Food Institute of the University of Guelph predicted that overall food prices in 2015 would rise by up to 3.0%. As stated in our revised report in February 2015, this prediction was based on a much stronger Canadian dollar versus the American currency. For 2015, overall food price inflationary patterns were consistent with our predictions. However, fruit, nut and vegetable price inflation rates rose at a much higher rate than expected due to a much weaker Canadian dollar. Some products embedded in other food categories like pasta in grains and other processed foods also pushed prices higher than anticipated. For 2016, the Food Institute is forecasting food inflation rates across the country to be anywhere between 2.0% to 4.0%.

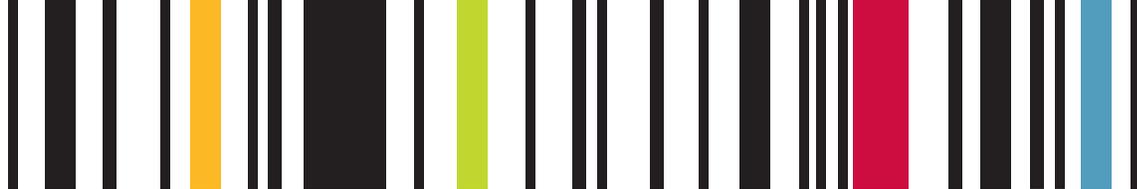
Categories	Expected Price Increases
Meats	2.5% to 4.5%
Fish and Seafood	1.0% to 3.0%
Dairy and Eggs	0.0% to 2.0%
Grains	0.0% to 2.0%
Fruits and Nuts	2.5% to 4.5%
Vegetables	2.0% to 4.0%
Food from Restaurants	1.5% to 3.5%
<b>Overall Food Expenditures</b>	<b>+ 2.0% to + 4.0%</b>

Once again, we expect food inflation in 2016 to exceed the general inflation rate. In dollar terms, we can anticipate based on historical data, the average Canadian household will spend \$8,631 on food, of which \$2,416 will be outside the household (restaurants). This means our forecast predicts the average household could spend up to **\$345 more on food** in 2016.

This report employs seasonal auto-regressive integrated moving average (SARIMA) models with exogenous regressors, supplemented by the authors' expert opinions to determine forecasts for the seven commodities. Significant factors considered for 2016 were El Nino's impact on the **climate**, the lowering **Canadian dollar**, and important consumer trends. The three major **consumer trends** we expect in 2016 are supply chain transparency and animal welfare, gut health, and vegetable proteins. Given that 2016 will be the International of the Pulses, more emphasis will be put on protein alternatives for this coming year.

This year, for the first time, we also present results from a consumer survey the Food Institute recently conducted on higher beef prices and their impact on consumers. An abstract of the study is presented at the end of the report.

Une version française de ce document est disponible en visitant le site du Food Institute au [www.uoguelph.ca/foodinstitute](http://www.uoguelph.ca/foodinstitute).



# 2015: A year marked by a lowering Canadian dollar

Food prices in stores rose by 4.1% this year, which was significantly above inflation. This means the average Canadian household likely paid about \$325 more for food in 2015. Canada experienced a tremendous shift in its economic landscape in 2015. Lower crude oil prices and lower interest rates have pushed the Canadian currency to unprecedented levels in recent years. The Canadian dollar lost almost 10% of its value in only one-month in early 2015. We did not anticipate such a significant drop. For the first time, in February, the Food Institute revised its forecast for two categories: vegetables, and fruits and nuts. These categories are known to be highly vulnerable to currency fluctuations as 81% of all vegetables and fruits consumed in Canada are imported.

Procurement for these categories was clearly a challenge early on in the year for Canadian food importers. Drought in the U.S. compelled many to look for new suppliers, which garnered some level of success. Due to the droughts, particularly in California, we did notice that price points for organic vegetables and fruits remained at a fairly high level throughout the year.

Meat prices rose 5% in 2015, as expected. Price inflation for meat products was more modest than last year. Given meat prices increases in recent years, the Food Institute conducted an exploratory study on determinants of consumers purchase decisions for beef. Results suggest that a high proportion of consumers have changed their beef consumption behavior due to increase in meat prices (Charlebois and McCormick, 2015). Canadian consumers are more likely to search for new protein alternatives, which may cause lower demand for meat and higher demand for vegetables and grains in future. More details of the survey can be found at the end of this report.

Fish and seafood prices rose by 2.4%, which is slightly lower than forecasted. Canada being a large exporter of fish and seafood, this result was not surprising. Grain products like bread and bakery rose by 2.9% which was higher than forecasted. This is justified by the fact that some products such as pasta (10.2%), crackers (4.0%), cookies (3.8%), and rice (3.0%) pushed food inflation for grains upwards.

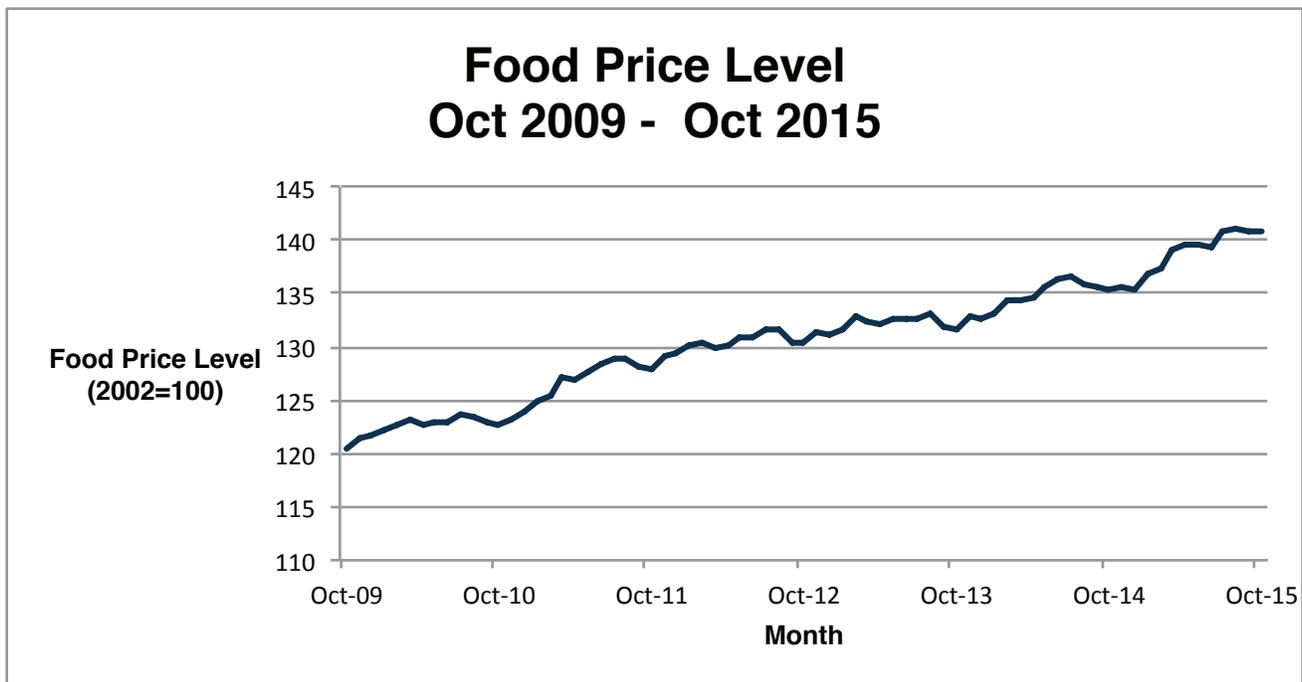
As we expected, inflation for dairy products and eggs remained relatively stable. This category is subject to the effects of supply management, a quota-based production system coupled with high tariffs on imports, which make Canada a closed-in economy. Food prices in restaurants rose by 2.7%, which is below the overall food inflation of 4.6%. Competition for both full-service and fast food industries has increased which brings prices lower. Full-service restaurants are offering smaller portion sizes and healthier food options. More waste-reduction measures are implemented, eventually reducing costs.

For the first time, we may see Canadian sales from the fast food industry exceed those of the full-service industry in 2016. Offerings in fast food generally have enhanced and many chains offer natural, antibiotic-free meat products. Animal welfare has also been recognized as a driver in fast

food, more so this year than ever before. McDonald's Canada decision to procure only cage-free eggs by 2025 is just one of many examples.

**Table 1- Comparison of expected food price change in 2015 with real price change in 2015**

Food Category	Expected Price Increase (December 2014)	Revised Forecast for 2015 (02/15)	Actuals (10/14 to 10/15)
Meat	3.0% to 5.0%	No Change	5.0%
Fish & Seafood	3.0% to 5.0%	No Change	2.4%
Dairy & Eggs	- 1.0% to 1.0%	No Change	1.5%
Grains	0.0% to 2.0%	No Change	2.9%
Fruit & Nuts	1.0% to 3.0%	3.0% to 5.0%	9.1%
Vegetables	3.0% to 5.0%	5.5% to 7.5%	10.1%
Food from Restaurants	1.0% to 3.0%	No Change	2.7%
<b>Overall Food Expenditures</b>	<b>+ 0.3% to + 2.4%</b>	<b>+ 0.7% to + 3.0%</b>	<b>4.1%</b>



# Forecast for 2016

## Factors affecting food retail prices

Every year the Food Institute of the University of Guelph looks at several drivers that could impact food prices in upcoming year. Table 2 outlines the impact, effect, and likelihood for each drivers. Drivers are either macro, sectorial or domestic.

### Macro Drivers

Climate change will remain one of the most significant, unpredictable influences on food prices. El Nino could be a significant factor in 2016, in fact meteorologists predict next year's El Nino to be one of the strongest on record. This may cause more precipitation in southern and western regions in the United States. Although these effects are highly unlikely to redeem the four years of drought experienced in some regions previously, this could influence agricultural productivity for vegetables, fruits and nuts. California and other drought-stricken regions could see more rain which could in fact increase production. Production capacity could be less of a concern and would increase product exports, particularly in Canada. Vegetable and fruit prices could be affected as a result, making procurement easier for importers. Cattle production, which has been affected by droughts, will remain low enough to keep inventories at current low levels. Since rebuilding inventories is a very long process, this could keep beef prices high but not at record levels as we saw in 2015.

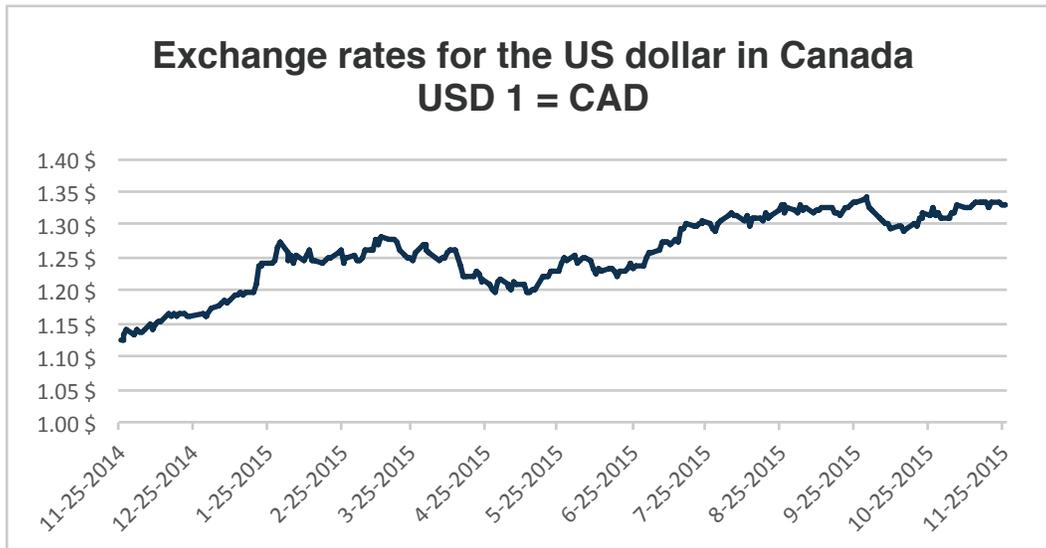
**Table 2- Fundamental drivers of Canadian Retail Food prices (2015)**

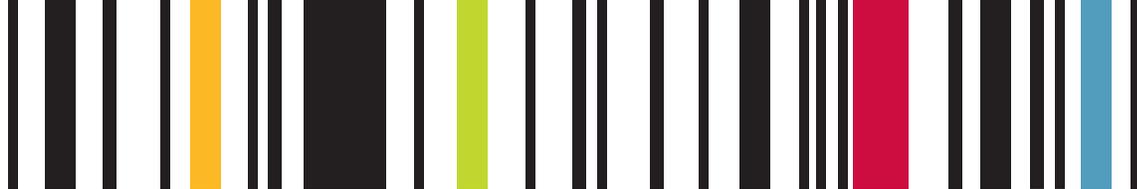
Variables	Categories	Impact	Price Effects	Likelihood
Macro	Climate	Significant	Variable	Very Likely
	Geopolitical Risks	Significant	Upward	Likely
	Input Costs	Moderate	Downward	Likely
	Energy Costs	Moderate	Downward	Very Likely
	Inflation	Minimal	Negligible	Very Likely
	Currencies and Trade Environment	Significant	Upward	Very Likely
Sectorial	Food Retail and Distribution Landscape	Very Significant	Upward	Likely
	Food Processing Industry	Significant	Upward	Very Likely
	Policy Context	Moderate	Negligible	Unlikely
	Consumer Food Awareness and Trends	Significant	Increased Dispersion	Unlikely
Domestic	Consumer Debt and Deleveraging	Significant	Downward	Very Likely
	Consumer Income and Income Distribution	Significant	Downward	Likely

For 2016, geopolitical risks may have an effect on food prices, particularly in Africa and the Middle East. Europe has been severely affected by Russian embargoes on food products, much more so than Canada for beef and pork. Prices for many products in Europe dropped significantly since embargoes were enacted in 2014. However for Canada, risks are minimal at best and thus we do not anticipate a high impact on food prices in 2016.

The Canadian currency was the big story of 2015 (See Figure 2). For 2016, we expect the Canadian dollar to devalue further against the American dollar. Some analysts suggest that the dollar could go as low as \$0.70, if not more. For every cent drop in the dollar over a short period of time, currency-exposed food categories like vegetables, fruits and nuts are likely to increase by more than 1%. The drop of the Loonie in early 2015 was so sudden that it was almost impossible for any food importers to hedge against our currency. Many vegetables, fruits, processed and grocery products are likely to continue to increase in 2016. Unlike meats, it is more challenging to find substitutes for these products, so consumers cope with higher prices.

On trades, 2015 was marked by the signing of the 12-member state trade deal called the Trans-Pacific Partnership (TPP). Our highly protectionist supply management system is seemingly under threat by the Trans-Pacific Partnership talks. As mentioned earlier, supply management in Canada is currently supported by a quota system, a price fixing mechanism, and high tariffs on imports. As a result, anyone beyond our borders who wishes to sell dairy products to Canadians is subject to high tariffs. However, effects on prices due to TPP are unlikely to be felt in Canada until after ratification by member nations occurs. Rumours persist that more dried dairy protein is coming into Canada from the United States. These imports are likely initiated by processors to keep input costs down. This increases the likelihood of seeing dairy product prices remain a current levels, as we saw in 2015.





## Sectorial Drivers

In 2015, with the departure of Target and the closure of many food retail stores, food retailers faced lower competition and generated higher profit margins. The sector was able to successfully transfer topline gains into bottom-line increases. It appears that there is considerable market discipline as food retailers continue to protect margins. Other than Sobey's acquisition of Co-op Atlantic, and Metro with Moisson Montréal, no major deals were reported in 2015, however more consolidation is expected in the future, perhaps in 2016. The German group Aldi has already shown an interest in the Canadian market, but any acquisitions in 2016 will have no effects on food prices that year.

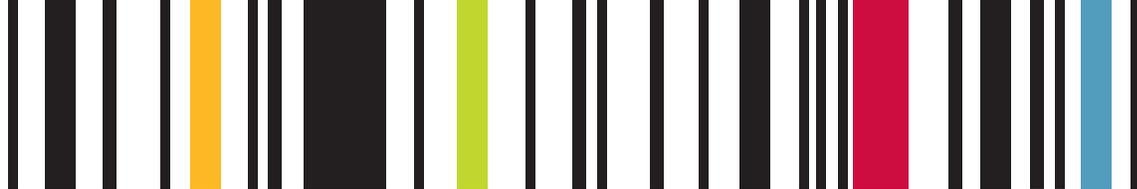
Consumer trends also influences prices. The three major consumer trends we expect in 2016 are supply chain transparency and animal welfare, gut health and vegetable proteins (relevant to ethnicity). All these trends have the potential to increase retail prices over the long term. Transparency will be key for reasons explained previously.

“ The three major consumer trends we expect in 2016 are supply chain transparency and animal welfare, gut health and vegetable proteins”

Supply chain transparency will continue to be a focus in 2016. Many decisions in 2015 by major players show the industry is being shaken by external powers, resulting in an ingredient revolution of sorts. PepsiCo is removing aspartame from Diet Pepsi, and Kraft is revising its famous Kraft Dinner mac and cheese powder recipe to include natural ingredients. Food businesses are revisiting their procurement strategies and ingredient lists as more and more consumers want to know where their foods come from, how they was made and under what conditions. The good news is that the industry is showing signs of its will to adapt. The not-so-good news for food corporations is that the revolution has only begun, and it will become more complicated.

Food ingredients are increasingly being scrutinized by consumers. Since food is in the public eye, the curiosity of consumers has now moved up the food chain of the industry, probing into the practices of processing plants and farms. The adage suggesting that consumers believe food just shows up on store shelves is passé. This collective awakening of the foodie within us is compelling industry to address consumers' concerns. It is interesting to understand why companies like PepsiCo, Kraft and McDonalds would change something so significant to their product when for years, nothing seemed to have bothered them.

Some may think that this ingredient-centric concern is all about product labels and consumers trying to understand what is in their products. Yet, according to a study from NPD Group, consumers are actually reading food labels less frequently than 10 or 15 years ago. Time-pressured consumers may be visiting food stores more than twice a week, but they spend just a little over 20 minutes per visit. It is unlikely that consumers review the labels of products they have been buying for



years. Labels and packaging may have little to do with this revolution; rather, it is the growing influence of corporation-consumer interaction, plus the increasing number of influencing sources, that makes the organizational role of consumer relations so influential. Product innovation is not so much about reassuring the public; it is about responding to public opinions on food issues and changing the DNA of the product itself, no matter which side the science is on. The “Farm to Fork” paradigm is slowly shifting towards a market-based “Fork to Farm” emphasis. Social media, not labels, has changed the power relations among the corporation, stakeholders, and consumers when it comes to ingredients.

Online consumers have the ability to criticize and damage corporations, even if claims are not always scientifically defensible. Social media has essentially led to a more democratic food system and we expect more of this in 2016. Consumers’ influence is significantly facilitated and amplified by social media and food companies have noticed, so it shouldn’t come as a surprise that companies are changing recipes. As food issues continue to emerge, so too will the number of targeted companies.

Under the same theme of transparency is animal welfare. We have started to see animal welfare as a fundamental driver in 2015 and we expect that focus will be prolonged into 2016. Animal welfare and other ethical issues in agriculture are an ongoing concern for consumers.

For years, many in the food industry believed that the issue of animal welfare would be a short-lived issue, connected primarily to an urban-driven anxiety juxtaposed with the principles of pet ownership. It was assumed that consumers’ desire for convenience and affordability would trump this concern. Consumers continue to express this desire, but the issue is clearly retaining traction in ongoing conversations about agriculture. The industrialization of agriculture has successfully produced a large supply of meat, eggs and dairy products for urban centres, but some argue that this supply comes at significant costs to ethical treatment of animals on farms. Chicken, hogs, cattle, foie gras, and now the dairy industry, have been, at one point or another, the centre of controversy over the last five years in Canada.

Some jurisdictions adopted improved legislation in order to safeguard the health of animals on farms; however, the proper resources to support these laws were not forthcoming. The industry, on the other hand, is not waiting: for example, agribusiness giant Cargill will shift to group housing by the end of this year, moving away from gestation crates for sows that animal welfare groups have opposed. More companies are starting to fund university research to better understand the societal and financial implications of tracing and tracking manifests displaying farm practices on food products. Some Canadian universities have launched programs focusing on animal welfare science.

The agricultural industry is also beginning to use technology to facilitate transparency. An increasing number of facilities are now installing closed-circuit cameras to monitor employees and animals around the clock, which is exactly what a B.C. based dairy producer promised to do hours after a video showing animal welfare concerns at their farm surfaced. in the media A commitment to transparency goes a long way in the age of instant information, especially when the intent is to reduce concerns about the practices of an industry that is remotely located from 98% of the population.



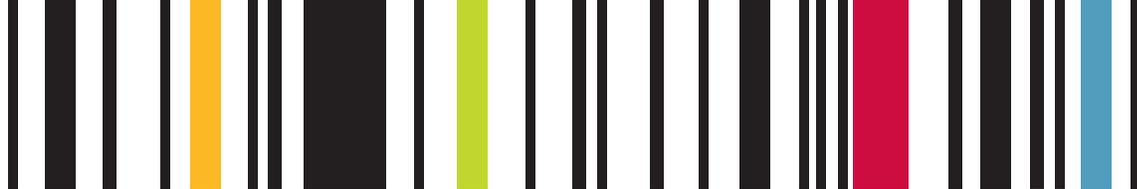
The animal welfare issue is moving down the food chain as restaurants and retail chains are making changes to their procurement strategies. With the price of animal protein currently reaching record levels in food stores, videos revealing irresponsible behavior with livestock provides another reason for consumers to stop purchasing steak and chicken. With the ratification of trade deals looming, in particular CETA, with countries where the rights of farm animals are perceived differently, industry pundits need to demonstrate to the Canadian public that current farming practices are still worthy of their trust, and the trust of potential trading partners.

The second major trend expected in 2016 is the quest by consumers for products providing health benefits for their gut. We expect to see more products focused on the health of consumers, particularly gut health, which has become topical in recent years. The World Health Organization made headlines by declaring that processed meats can cause cancer. We do not believe this decision will alter demand for these products in Canada, at least for the short-term.

The third trend we expect in 2016 is the emergence of vegetable proteins. As consumers look for protein alternatives, they may become more attracted to fish products, or perhaps pulses. The Food and Agriculture Organization of the United Nations (FAO) has declared 2016 the year of pulses and through promotional efforts, demand for pulses such as lentils and chickpeas may rise. Consumers have already shown some interest in ethnic foods, either because they are part of culinary traditions they are accustomed to or they are drawn to these products out of curiosity. Regardless, ethnic foods often use other non-traditional sources of protein for the Canadian diet.

## **Domestic Drivers**

Finally, with domestic drivers, consumer debt is should be watched closely. The U.S. Federal Reserve will likely move forward with a slow, steady increase of their overnight lending rate. This could put pressure on our dollar and which could swing lower. The likelihood of seeing interest rates go higher in Canada are remote. That said, more Canadians are spending their revenues on shelter, which makes it increasingly difficult for these households to spend more on food. Wages are starting to increase in Canada again. In some parts of the country, Canadians are earning more after a few years of stagnation. This may give breathing room for some households which felt under pressure these past few years.



# Food Price Report 2016 Predictions

## Method

As we did last year, this report employs seasonal auto-regressive integrated moving average (SARIMA) models with exogenous regressors, supplemented by the authors' expert opinions to determine forecasts for the seven commodities. SARIMA models tend to render favorable forecasts in this context due to their validity in short-term forecasting, and they are the preferred model among many researchers when forecasting price inflation. The Box-and-Jenkins approach is used for model identification, using subjective assessments of autocorrelogram and partial autocorrelogram plots for the series. Box-Jenkins is supplemented with the Akaike and Bayesian information criteria to determine in-sample model fit, and by indicators such as the MAE and RMFSE to determine out-of-sample forecasting ability for past years. Exogenous regressors included in the model are USD/CAD exchange rate, and the prices of key production inputs including feed, livestock, seed, and fertilizers.

## Forecast

We expect food inflation to be between 2.0% to 4.0% in 2016, which will be significantly higher than inflation (See Table 3).

Table 3- Food Price Forecasts for 2016	
Categories	Expected Price Increases
Meats	2.5% to 4.5%
Fish and Seafood	1.0% to 3.0%
Dairy and Eggs	0.0% to 2.0%
Grains	0.0% to 2.0%
Fruits et Nuts	2.5% to 4.5%
Vegetables	2.0% to 4.0%
Food from Restaurants	1.5% to 3.5%
Overall Food Expenditures	+ 2.0% to + 4.0%



Meat prices are expected to increase from 2.5 to 4.5% in 2016. Beef and pork will drive increases mainly, but increases are expected to be more modest than in 2014 and 2015 when some meat products increased by almost 30%. Chicken is expected to experience modest increases. We expect consumers to seek protein alternatives like fish, lentils or chickpeas. This may result in changing demand for this category for the longer term. Beef demand per capita will likely continue to fall, as pork and chicken may show more resilience. Because of higher price points, consumers with more means may opt for better cuts, or even different specialty meats.

“ Following 2015, price increases for these categories should be more modest, but high levels of inflation remain troublesome for many vulnerable regions, most importantly, for Northern communities.”

Vegetables, and fruits and nuts inflations are expected to be higher than the general inflation. Inflation should be anywhere between 2.5% to 4.5% for fruits 2016. Inflation rates between 2.0% to 4.0% are expected next year for vegetables. Following 2015, price increases for these categories should be more modest, but high levels of inflation remain troublesome for many vulnerable regions, most importantly, for Northern communities. Unlike meat, vegetables and fruits have few or no substitutes so increases will impact Canadians. Since we expect the Canadian dollar to decline even further in 2016, this will put more pressure on vegetable and fruit prices at retail. Effects of El Nino could play a role in 2016 and may offset the effects of our currency on vegetable and fruit prices next year.

“ Effects of El Nino could play a role in 2016 and may offset the effects of our currency on vegetable and fruit prices next year.”

The Food institute expects prices in other food categories to be relatively stable. Specifically, fish and seafood prices are expected to increase by 1.0% to 3.0%. Canada is a fish-secure country and is reaping the benefits of aquaculture, therefore we do not expect major shifts in the price of fish and seafood in 2016. As in 2015, prices for dairy products and eggs are expected to remain stable as well. Food inflation should not exceed 2.0% for this category. Inflation for grain products will also remain stable. Even if this category is not immune to the Canadian dollar, we do not expect food inflation to exceed 2% next year.

Given the restaurant landscape, increases should be modest with restaurants. Due to menu changes, wage increases and procurement strategy shifts due to animal welfare issues, margins will be reduced or prices may increase. The marketplace remains competitive which may deter many chains and restaurant owners from increasing prices. We expect the food prices in restaurants to go up by 1.5% to 3.5% in 2016.



# Report on 2015 Study on Beef Consumption (Abstract version)

## Objectives

The aim of this exploratory study is to evaluate if sudden retail price increases for beef products have affected consumers' purchasing behaviors. Little research has been conducted that integrates retail price volatility with subdued food consumption motivations. Prior research about consumers' meat-purchasing habits and systemic concerns linked to sustainability and animal welfare is limited or de-contextualized. This study also attempts to assess if retail price increases have triggered a change in perception of the meat industry, by looking at specific values related to animal protein production and consumption.

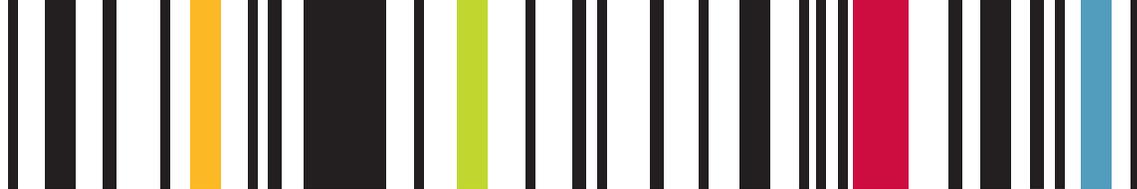
The present study is based upon the answers to the following research questions: Is the practice of meat reduction in a diet increasing due to higher prices? Do factors such as education, age and gender play significant roles in meat avoidance and reduction when meat retail prices change rapidly? Do meat price increases trigger motivations that may not be factored under normal circumstances (e.g. self-oriented and altruistic factors determinants)? What forms of latent motivations, self-oriented or altruistic, lie behind choices when meat retail prices fluctuate rapidly? And finally, does meat retail price volatility enable reduction and/or avoidance? An attempt is made to interpret the findings of the study within the broader context of long-term shifts in attitudes towards beef consumption in general.

## Methodology

For convenience and validity, all respondents had to be living in Canada for twelve months, and were at least eighteen years old. The choice of country is not trivial. First, access to data was convenient for this study. Second, and most importantly, Canada has supply managed commodities that include poultry and chicken. In effect, Canada produces the amount of chicken it needs. Beef production is vulnerable to market volatility. As a result, demand-focused market conditions for one often influence conditions for the other.

This methodological approach is consistent with similar studies on food consumption and meat avoidance. The survey was posted online, and invitations were widely distributed across the country to several regions and socio-economic groups. Invitations were also posted on social media outlets. The survey was in both French and English. Geographical locations for the survey were chosen with the aim of achieving the maximum geographical and socioeconomic scattering of consumers' characteristics as possible.

The survey instrument came in three parts. In the first part, general nominal questions were posed; questions were mainly about gender, age, education and frequency of beef consumption, and on whether respondents changed consumption habits in relation to beef products. The second part assessed altruistic characteristics, while the third section was more related to personal benefits and self-oriented characteristics. The survey instrument can be found in Appendix A of this manuscript.



The data collection was conducted over a four-day period. In order to obtain an effective measuring tool, we conducted a pretest before handing out the official questionnaire, in order to make necessary revisions. Some modifications were required as a result of the pretest, as all questions needed to be perceived clearly. All questions also had to be translated into French, and meaning and tone for all questions needed to be adjusted and verified. Since it is an exploratory study, a sample size of 504 was thought to be adequate. Each respondent took on average of four minutes to fill out the survey. The completion for the survey was 95%, which was acceptable.

## Findings

For our survey, the gender distribution was consistent with other surveys of the same type. Of our sample, 53.7% were female. As for age, the sample was evenly distributed across all categories. Of those surveyed, 39.6% were 46 years old or older, and 37.9% were between the ages of 21-35. We believe, then, that the sample is a fair representation of the Canadian population. Education-wise, our results indicate that our sample may have been more educated than average. Almost 50% (49.7%) had a university degree, which is above average. The fact that the survey was conducted by a university may have discouraged some to fill out the survey. We also wanted to assess whether respondents did eat beef products. Almost 5% (4.9%) surveyed mentioned they did not eat beef at all. Interestingly, many surveys suggest 5% to 9% of Canadians are vegetarians. Our results are below that threshold. We suspect that some who do not consume beef may have not felt compelled to fill out the survey, just by seeing the subject matter of the study. We also evaluated the frequency of consumption. The majority of respondents (83.4%) consume beef at least once a week. Of our sample, 36.8% eat beef once a week, while 36.2% of our sample eat beef twice a week.

**Table 1: In the last 12 months, have you reduced or stopped consuming beef?**

Answer	%
I was not eating beef 12 months ago	3.8%
Yes	37.9%
No	58.2%
Total	100.0%

The next portion of the question assessed how respondents have changed their perception and/or habits over the last twelve months. More than 37% (37.9%) of respondents reported to have reduced or stopped consuming beef during that time (See Table 1). This percentage seems much higher than expected. When asked as to why they have reduced or stopped consuming beef products, price seem to have had a significant impact on purchase intentions, but so did health and food safety.



Of the people surveyed, 62.1% stated financial reasons as a reason to have reduced or stopped consuming beef.”



Of the people surveyed, 62.1% stated financial reasons as a reason to have reduced or stopped, whereas 43.1% have identified health and food safety (See Table 2).

**Table 2: Why have you reduced or stopped your beef consumption in the last 12 months?**

Answer	%
For health and food safety reasons	43.1%
For ethical reasons	22.4%
For environmental reasons	24.1%
For religious reasons	0.0%
For financial reasons	62.1%
I have not reduced my consumption of beef in the last 12 months	0.0%

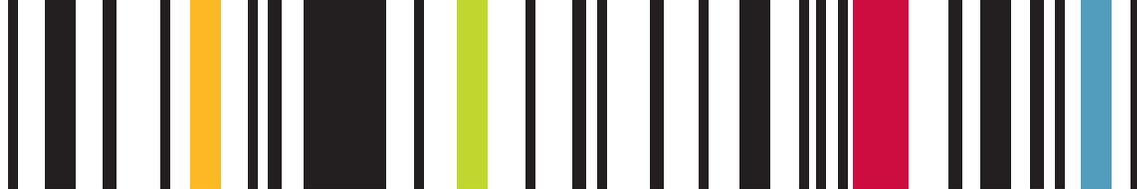
“Altruistic” determinants, on the other hand, scored much lower. Animal welfare and environment reasons were not as significant. No one stated religion as a reason to reduce or stop the consumption of beef products.

“More than 37% (37.9%) of respondents reported to have reduced or stopped consuming beef during that time.”

The next section of the survey assessed relative changes to perceived characteristics in our model. For self-oriented elements, the first element was health. In the last twelve months, 21.7% of respondents have changed their opinion on the consumption of beef as a healthy choice. For this period, this shift would be considered significant. Keep in mind that the question did not assess whether respondents perceived beef as a better or worse healthy choice; the survey assessed perceptual changes only.

Altruistic aspects were also measured. In terms of animal welfare, a lower percentage was gathered compared to other categories. Indeed, more respondents strongly disagreed with this statement. A total of 21.1% of respondents agree or strongly agree with the statement on ethics and animal welfare. The environmental issue of cattle production appears to be a larger concern for our sample, which would contradict results from the question about reasons why consumers reduced or stopped consumption. A total of 28.8% of respondents agree or strongly agree with the question on sustainability. Again, for a twelve-month period such a shift is significant when compared with health and ethics.

The last portion of the survey looked at behavior as a result of higher prices. We asked if habits have changed as a result of higher beef prices. This question garnered interesting results. Of the people surveyed, 43.4% of respondents agreed or strongly agreed that prices have had an impact on their



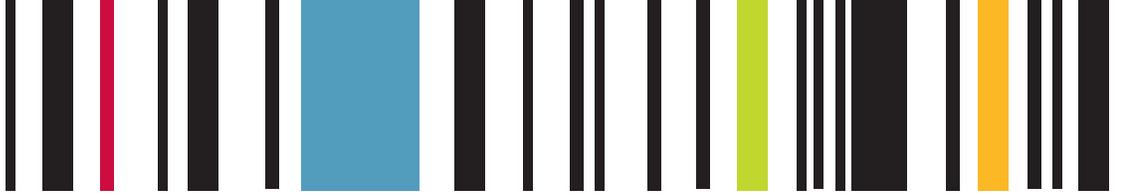
beef consumption habits. The results were much higher than expected. Again, it doesn't mean that respondents are buying less or more beef. It means that the habits for a significant portion of our sample, have changed. The survey also asked if consumers looked at alternatives. According to our survey, 36.3% of respondents are now looking for alternative sources of protein, which is arguably high, and considered as a large group (See Table 3). The last question was related to commitment. According to our survey, 10.9% have considered stopping eating beef in the last twelve months as a result of higher prices. The survey only assessed intent, not behaviour. To a certain degree, then, Canadians remain committed to beef (81%), but that commitment for a small group of consumers is slowly eroding due to higher prices.

“ According to our survey, 36.3% of respondents are now looking for alternative sources of protein, which is arguably high, and considered as a large group.”

With cross-tabulations, some results were not overly surprising. First, men are more likely to eat beef than women. Our findings suggest that there are no significant socio-demographic trends related to consumption of beef related to gender, age and education, except for one. The more educated the respondent, the more likely they would have changed their opinion on the production and consumption of beef as environmentally sustainable (p-value: 0.05).

<b>Table 3: In the last 12 months, higher beef prices have forced me to look for alternative sources of protein</b>	
Answer	%
Strongly Disagree	19.3%
Disagree	27.5%
Neither Agree nor Disagree	17.0%
Agree	27.5%
Strongly Agree	8.8%
Total	100.0%

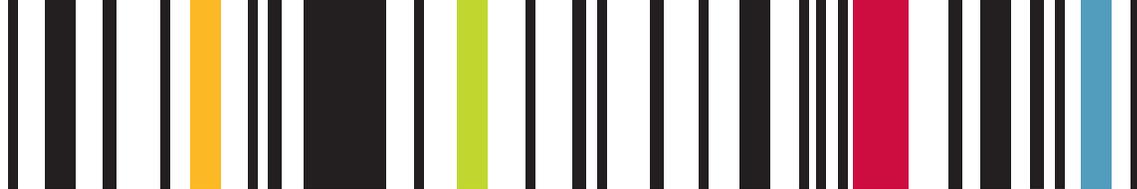
Some results related to frequency of beef consumption are noteworthy. Survey results suggest that the less frequent a respondent consumed beef, the more likely they would have reduced or stopped consuming beef in the last twelve months (p-value: 0,05). In addition, modest beef consumers are more likely to have changed their opinion on the consumption of beef as a healthy choice (p-value: 0,01). Regarding animal welfare, modest beef consumers are more likely to have changed their opinion on the ethical acceptability of the production and consumption of beef in the same period (p-value: 0,00).



Interestingly, our results show that the same group of consumers have acknowledged that higher beef prices have forced respondents to look for alternative sources of protein in the last twelve months (p-value: 0,05), demonstrating a statistical significance between frequency of consumption and intent to stop eating beef products. Respondents who eat less beef were more likely to stop eating beef all together (p-value: 0,00).

One last cross-tabulation that demonstrated statistical significance was between consumers who have stated to have stopped or reduced their consumption of beef, and the search for alternatives. Survey results suggest that if a respondent has reduced or stopped his/her consumption of beef, the more likely he/she would have looked for an alternative source of protein in the last twelve months (p-value: 0,05).

For more information about the beef consumption survey, please consult the Food Institute website at [www.uoguelph.ca/foodinstitute](http://www.uoguelph.ca/foodinstitute).



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