Methodological Assessment

of Documentation Provided by FSIS

in support of the

FSIS 'Product of USA' Proposed Rule

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Prepared for Canada Beef
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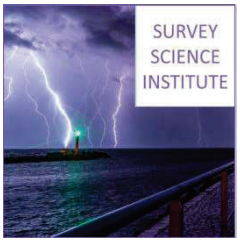

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Summary of Findings

FSIS reviewed a wide range of information in coming to its recommendation that the Product of USA claim rule be modified to require that the animal to be born, raised, slaughtered, and processed in the USA. From the *USA-Origin Labeling Notice*, however, it appears that FSIS relied heavily on data and analyses that are flawed, questionable or incomplete.

1. **Validity of core RTI Survey findings is undermined by methodological issues.**

   Example: Due to the implied importance of fat content to consumers revealed in the Canada Beef survey discussed below, and the inverse relationship between fat content and price of ground beef, MWTP estimates in the RTI Survey and Canada Beef study can only be generalized to consumers who typically purchase 85% lean/15% fat ground beef (approximately 28% of all ground beef consumers).

2. **Validity of the FSIS Pricing Study marginal willingness to pay findings is undermined by methodological issues.**

   Example: FSIS assigned 15% fat content to ground beef UPCs that have no fat content displayed, which introduced errors into the dataset and in doing so, introduced bias in FSIS MTWP estimates, the direction and size of which are unmeasurable.

   Example: The FSIS data source covered only about 55% of all ground beef products sold, and also excluded private/store brands. This incompleteness of the data may produce systematic bias in the data and the findings.

3. **Implementation of a new Product of USA definition will not resolve consumer confusion.**

   Currently, 47% of consumers believe the Product of USA definition to mean that the animals are born, raised, slaughtered, and processed in the USA (RTI Survey), which is the proposed definition. Hence, if the proposed definition were implemented now, 47% of consumers would know the correct definition and the majority of consumers (53%) would not.

4. **The Product of USA label appears to be of little interest and little importance to most consumers.**

   In each unaided question (RTI Survey), a small proportion of respondents (9%-31%) recalled the Product of USA label on the package of ground beef they viewed—even though they were given *20 seconds* to look at just one image, and even when "Product of USA" was next to an American flag on the package. This suggests a lack of noticeability and importance of the Product of USA label. The RTI Survey also directly asked consumers how often they look for a Product of USA label when shopping for ground beef; only 42% said always or almost always. Another RTI survey question asked respondents to select the most important feature of ground beef when deciding what to buy: grass-fed, free from antibiotics, or Product of USA; only 27% said Product of USA.

5. **Impact of higher Product of USA prices on lower income households needs greater consideration.**

In the RTI survey, differences between lower Income and higher income households were not statistically significant due to small sample sizes and the use of binary household income categories. The Canada Beef survey discussed below found that poverty income households are twice as likely as higher income households to "always" purchase ground beef on sale or at a discounted price (26% vs. 13%), which suggests the need for greater investigation into the potential impact on lower income households of higher Product of USA ground beef prices under a new definition.

6. **Although recommending a new Product of USA definition, FSIS is missing critical information that is required to fully assess the benefits and drawbacks to consumers and American beef producers.**
   - Consumer confusion with the current Product of USA definition has been considered, but consumer confusion with the proposed Product of USA definition has not.
   - There is no evaluation on potential changes in the volume of ground beef purchased by consumers as a result of a higher price for Product of USA ground beef under the proposed Product of USA definition.
   - There is no consideration of potential economic harm to U.S. family farmers and independent ranchers if consumers purchase less Product of USA ground beef under the proposed USA-only label.
   - Marginal willingness to pay for *specific* countries of origin, like Canada, has not been tested, which has resulted in an overestimation of the MWTP for ground beef with a Product of USA label.
   - There is no apparent consideration of the impact of the expected Product of USA ground beef price increase for consumers who believe the current definition is the proposed definition.
   - Insufficient consideration has been given to the impact of higher Product of USA ground beef prices on lower income households.
   - Consumer purchase behaviour when faced with qualified claims instead of Product of USA labels has not been explored.

A. Methodological Assessment Report Context

Background

On March 13, 2023, the Food Safety and Inspection Service (FSIS) of the U.S. Department of Agriculture issued a *USA-Origin Labeling Notice* document[1], which outlines the rationale and evidence for modifying the "Product of USA" definition rule for single ingredient meat, poultry, and egg products. Currently, the Product of USA label may be used in the United States on products that are derived from animals that may have been born, raised, and slaughtered in another country, but are processed in the United States, even if minimally. The FSIS proposed rule would require the Product of USA label to be used only on meat products that are "derived from animals born, raised, slaughtered, and processed in the United States."[2]

Re-consideration of the existing Product of USA label was prompted by petitions from a variety of key stakeholders (e.g., Organization for Competitive Markets, American Grassfed Association, and United States Cattlemen's Association), who requested that FSIS amend its regulation for the use of a US-origin label claim on meat, poultry and egg products. The stakeholders' core contention was that under current FSIS regulations the US-origin claim misleads consumers as the claim only requires a product to be processed in the USA[3], while the animal may be born, raised and slaughtered in another country.

As part of its formal response to these petitions, FSIS undertook a cost-benefit pricing analysis in 2021 to determine the premium paid for one pound of ground beef with a US-origin label ("FSIS Pricing Study").[4] The following year, FSIS commissioned Research Triangle Institute International to undertake a consumer research survey ("RTI Survey")[5] to assess whether consumers notice the Product of USA label, to determine consumer understanding of the current Product of USA label claim, and to estimate consumer marginal willingness to pay for one pound of ground beef with a US-origin label under the proposed definition. FSIS contributed to the RTI methodology,[6] the FSIS Technical Review Team helped develop the RTI Survey questionnaire, and the study was approved by the U.S. Office of Management and Budget.[7] The RTI Survey report and FSIS Pricing Analysis were issued by FSIS alongside its *USA-Origin Labeling Notice* document.

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[1] United States Federal Register. "Voluntary Labeling of FSIS-Regulated Products with U.S.-Origin Claims." Federal Register Vol. 88, No. 48 pp. 15290-15306 (March 13, 2023). RIN 0583–AD87.
Found at: https://www.federalregister.gov/documents/2023/03/13/2023-04815/voluntary-labeling-of-fsis-regulated-products-with-us-origin-claims#open-comment

[2] Ibid.

[3] RTI Survey, p.1-1.

[4] U.S. Department of Agriculture, Food Safety and Inspection Service. "Appendix to the Preliminary Cost-Benefit Analysis: The Implicit Price Premiums of U.S.-Origin Labeling Claims on Ground Beef Products." Found at: https://www.fsis.usda.gov/sites/default/files/media_file/documents/Product_of_USA_Appendix.pdf

[5] Cates, S.C., et al. *Analyzing Consumers' Value of 'Product of USA' Labeling Claims*. RTI International (November 30, 2022). Found at: https://www.fsis.usda.gov/sites/default/files/media_file/documents/Product_of_USA_Consumer_Survey_Final_Report.pdf

[6] RTI Survey, p.2-2.

[7] RTI Survey, p.2-11

The FSIS *USA-Origin Labeling Notice* makes two key arguments. First, it argues that a change in the Product of USA definition is necessary in order "to resolve consumer confusion" around the current definition of Product of USA. Second, it argues that consumers have a higher willingness to pay for meat products with the proposed Product of USA claim definition than for meat product with the existing Product of USA claim definition.[8]

FSIS has invited interested parties to submit comments on the proposed Product of USA definition for single ingredient meat, poultry, and egg products.

In this context, Canada Beef engaged a leading survey scientist, Dr. Glenys A. Babcock, and a prominent statistical data scientist, Prof. David Draper, to assess the validity of the FSIS arguments. Specifically, Canada Beef sought to better understand the methodologies, analyses, and accuracy of findings of the RTI Survey and FSIS Pricing Study, and of the arguments made by FSIS in the *USA-Origin Labeling Notice*. As part of this methodological assessment, Canada Beef undertook a consumer survey of Americans. While the proposed change in the Product of USA label claim would apply to all single ingredient meat, poultry, and egg products, Canada Beef directed the consultants to focus on ground beef products.

Purpose

This Report provides methodological and analytic assessment of the accuracy of the RTI Survey report and of the arguments put forward in the FSIS *USA-Origin Labeling*. Specifically, this Report contains:

1. A methodological and analytic review of the RTI Survey;
2. An evaluation of the fairness (scientific neutrality) of the utilization of the studies' findings by FSIS in the *USA-Origin Labeling Notice*; and
3. Additional survey-based information to verify the FSIS and RTI findings, studies, to fill in gaps in the information, and to inform the FSIS proposed rule decision.

Core Documents / Datasets

The analysis for this Project focuses on the following documents and datasets:

1. **USA-Origin Labeling Notice**. United States Federal Register: Voluntary Labeling of FSIS-Regulated Products with U.S.-Origin Claims. Vol. 88, No. 48 (March 13, 2023). RIN 0583–AD87. Found at: https://www.federalregister.gov/documents/2023/03/13/2023-04815/voluntary-labeling-of-fsis-regulated-products-with-us-origin-claims#open-comment

2. **RTI Survey**. Cates, S.C., et al. *Analyzing Consumers' Value of 'Product of USA' Labeling Claims*. RTI International (November 30, 2022). Found at: https://www.fsis.usda.gov/sites/default/files/media_file/documents/Product_of_USA_Consumer_Survey_Final_Report.pdf

[8] Ibid., p.15290 col. 1.

3. **RTI Survey Dataset made available by FSIS on May 19, 2023**. Found at: https://www.regulations.gov/document/FSIS-2022-0015-1272; https://www.regulations.gov/document/FSIS-2022-0015-1274; and https://www.regulations.gov/document/FSIS-2022-0015-1270

4. **Canada Beef US Consumer Survey**. This survey was conducted in April / May 2023 and is proprietary.

Consultant Bios

Prof. David Draper

David Draper is a Professor of Statistics in the Department of Statistics at the University of California, Santa Cruz, and the CEO of Uncertainty Quantification LLC, a data science consulting firm.

He is a Fellow of the American Association for the Advancement of Science, the American Statistical Association, the Institute of Mathematical Statistics, the International Society for Bayesian Analysis (ISBA), and the Royal Statistical Society; from 2001 to 2003 he served as the President-Elect, President, and Past President of ISBA.

Prof. Draper is the author or co-author of more than 225 contributions to the methodological and applied statistical literature, including articles in the Journal of the Royal Statistical Society (Series A, B and C), the Journal of the American Statistical Association, the Annals of Applied Statistics, Bayesian Analysis, Statistical Science, the New England Journal of Medicine, and the Journal of the American Medical Association; his 1995 JRSS-B article on assessment and propagation of model uncertainty has been cited more than 2,200 times; together his research contributions have been cited about 19,800 times.

His research is mainly in the areas of best-practice statistical data science (he has worked on applied consulting projects for 45 years), Bayesian inference and prediction, model uncertainty and empirical model-building, hierarchical modeling, Markov Chain Monte Carlo methods, survey sampling design and analysis, and Bayesian non-parametric methods, with applications mainly in medicine, health policy, economics, education, and environmental risk assessment.

His short course at the Anaheim Joint Statistical Meetings received the 1998 ASA Excellence in Continuing Education Award, and his short course on intermediate and advanced-level topics in Bayesian hierarchical modeling at the San Francisco JSM received the 2004 ASA Excellence in Continuing Education Award. He has won or been nominated for major teaching awards everywhere he has taught: University of Chicago; RAND Graduate School of Public Policy Studies; University of California, Los Angeles; University of Bath (UK); and University of California, Santa Cruz.

He has a particular interest (a) in the exposition of complex statistical methods and ideas in the context of real-world applications and (b) in developing socially responsible and reproducible statistical data science methods.

Dr. Glenys A. Babcock

Dr. Babcock is an accomplished applied researcher and leading survey scientist, with particular expertise in complex sampling. For more than 30 years, she has directed complex qualitative and quantitative research projects for diverse clients including: The World Bank; Governments of the USA, Canada, and Russia; Microsoft and other Fortune 500 companies; and dozens of not-for-profit organizations. She has served as a consultant to the RAND Corporation, Director of the Titan Group for Public Policy Analysis, Vice President with Ipsos Public Affairs, and most recently, Research and Methodology Lead at the University of Toronto. Dr. Babcock is currently the Principal of the Survey Science Institute/Survey Science Services.

Declarations of Impartiality

In taking on this assignment, Dr. Babcock and Prof. Draper each explicitly provided a Declaration of Impartiality. They acknowledge the strong interests of Canada Beef and the Canadian beef industry, and at the same time, commit to providing impartial and scientifically sound findings, whether these findings support the interests of Canada Beef and its stakeholders.

Organization of the Report

This Report evaluates the RTI Survey methodology and analyses, then assesses the evidence provided in the *USA-Origin Labeling Notice to* support FSIS' recommended new Product of USA claim definition. The Report then discusses some core elements of enquiry that are absent from these three documents, before providing additional information from the Canada Beef Survey that fills in some evidentiary gaps.

B. RTI Consumer Survey

Description

The RTI Survey had three objectives: to understand whether consumers notice the Product of USA labeling claim; to determine consumers' understanding of the Product of USA label; and to estimate consumers' marginal willingness to pay (MWTP) for one pound of ground beef with a Product of USA label under the proposed definition. To address these objectives, RTI International commissioned Ipsos USA to undertake an online consumer survey.

To estimate the marginal willingness to pay (MWTP) for one pound of ground beef with a US-origin label, RTI included two Discrete Choice Experiments (DCE 1 and DCE 2) in the survey, and then used a statistical technique called a mixed logit model to analyze the data. Theoretically, this is a credible methodology for estimating marginal willingness to pay.

Issue 1. Inaccurate interpretation of consumer recall of P-USA label

One goal of the RTI Survey was to assess whether consumers notice the Product of USA labeling claim. To make this determination, each respondent in the RTI Survey was shown one of four

images of a package of ground beef (Figure 1 below). Respondents were shown the image on screen for 20 seconds, known as a limited time exposure task. RTI International provides no rationale for the choice of 20 seconds, which is a long time to view one simple image on screen.

After looking at the image, respondents were asked to write down everything they remembered seeing on the food package, including words, pictures, and symbols. RTI International found that 9% of respondents recalled, unprompted, seeing the minimalist Product of USA label, 17% saw the medium-sized Product of USA label, and 25% saw the larger Product of USA label with the US flag. With less restrictive coding of responses the unaided recall of the Product of USA label was 14%-31%.[9] Next, respondents were asked directly whether they had seen the Product of USA label. When prompted, 70%-80% said yes, they had seen the Product of USA claim. Among those who looked at a package with no Product of USA label (control sample), 15% said, when prompted, that they had seen a Product of USA label on the package.

RTI International summarizes the limited time exposure findings as "consumers do notice the 'Product of USA' claim'.[10] This statement is clearly at odds with the findings in their survey. Unaided, only 9%-31% of respondents mentioned the Product of USA label after viewing the ground beef package for 20 seconds. Even when aided, only 70%-80% said they had noticed the Product of USA claim, and based on the control sample, better estimates would likely be 55%-65%, 15 percentage points lower.

Figure 1. Four Ground Beef Package Images

It is difficult to extract a meaning from this limited time experiment to the issue of changing the Product of USA label. The limited time experiment is very much survey-specific, and distant from the experiences and behaviours of consumers when purchasing ground beef. Further, the FSIS Pricing Study found that 58% of the volume of ground beef sold has a US-origin label only on the *back* of the package.[11] This adds another element distancing the RTI Limited Time Exposure experiment from real life ground beef considerations and choices. In a store or online setting, how long does a consumer typically look at a package of ground beef before making a purchase decision? How many different packages of ground beef do they look at before choosing one? If the Product of USA label is on the back of the ground beef package, do consumers turn the package over to find it? In a real world store or online setting, what proportion of consumers know whether the ground beef they just purchased has a Product of USA label on it?

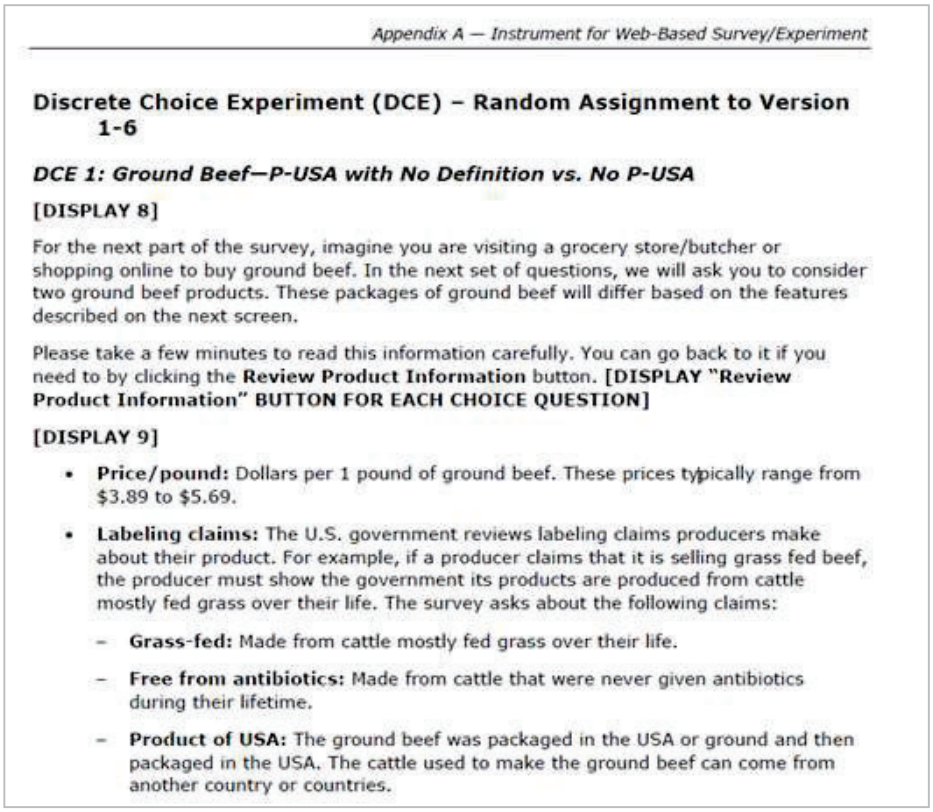
[9] RTI Survey, Table 3.3. p. 3-6.
[10] RTI Survey, pp. ES-2, 3-6, and 4-1.
[11] FSIS Pricing Study, pp. 12-13.

From the RTI Survey, it is impossible to estimate the proportion of consumers who 'notice' a Product of USA when they are actually purchasing ground beef in store or online, let alone to impute importance or any other meaning to noticing a Product of USA label.

Issue 2. Contradictory information provided regarding DCE 1

The RTI Survey report describes DCE 1 as a comparison of the MWTP for "P-USA with No Definition vs. No P-USA". The assertion that DCE 1 provided no definition for the Product of USA claim is repeated in the Executive Summary description of the discrete choice experiment, in the description of MWTP findings, and in the presentation of findings in Table ES.1, and the description of those findings. The "no definition" is then repeated in the in-depth discussion of DCE 1 methodology, in the findings and in the conclusion sections of the report. [12]

Figure 2. Survey Questionnaire Providing Definition of P-USA



Appendix A — Instrument for Web-Based Survey/Experiment

Discrete Choice Experiment (DCE) – Random Assignment to Version 1-6

DCE 1: Ground Beef—P-USA with No Definition vs. No P-USA

[DISPLAY 8]

For the next part of the survey, imagine you are visiting a grocery store/butcher or shopping online to buy ground beef. In the next set of questions, we will ask you to consider two ground beef products. These packages of ground beef will differ based on the features described on the next screen.

Please take a few minutes to read this information carefully. You can go back to it if you need to by clicking the **Review Product Information** button. **[DISPLAY "Review Product Information" BUTTON FOR EACH CHOICE QUESTION]**

[DISPLAY 9]

- **Price/pound:** Dollars per 1 pound of ground beef. These prices typically range from $3.89 to $5.69.
- **Labeling claims:** The U.S. government reviews labeling claims producers make about their product. For example, if a producer claims that it is selling grass fed beef, the producer must show the government its products are produced from cattle mostly fed grass over their life. The survey asks about the following claims:
  - **Grass-fed:** Made from cattle mostly fed grass over their life.
  - **Free from antibiotics:** Made from cattle that were never given antibiotics during their lifetime.
  - **Product of USA:** The ground beef was packaged in the USA or ground and then packaged in the USA. The cattle used to make the ground beef can come from another country or countries.

In the RTI survey questionnaire in Appendix A, the DCE 1 header also describes a comparison between MWTP for ground beef package with a Product of USA label (no definition given) to a ground beef package with no Product of USA label.[13] Directly below the DCE 1 heading, however, Display 9 indicates that respondents *were* in fact shown the current definition of the "Product of USA" label claim.[14] The current definition of Product of USA is repeated in all of the 'no definition' DCE questions in the questionnaire.

[12] RTI Survey, pp. ES-2, ES-3, ES-3, 2-5, 2-6, 2-16, 4-1, and 4-2.
[13] RTI Survey, p. A-11.
[14] RTI Survey, p. A-11.

RTI International reports a MWTP of $1.69 for one pound of ground beef with a Product of USA label with no definition over one pound of ground beef without a Product of USA label when consumers may have in fact been shown the current Product of USA definition. The $1.69 marginal willingness to pay for one pound of ground beef with a Product of USA label is a core finding of the DCE study, and yet, it is unclear what it means.

Issue 3. A MWTP of $2.84?

If respondents were indeed shown the current definition of the Product of USA label in DCE 1, then the MWTP estimates in DCE 1 and DCE 2 are essentially additive, since the baseline in DCE 2 is ground beef with the current Product of USA label definition. DCE 1 would be saying that consumers are willing to pay $1.69 more for ground beef with the current Product of USA label than for ground beef with no Product of USA label, and DCE 2 tells us that consumers are willing to pay $1.15 more for ground beef with the proposed Product of USA label than for ground beef with the current label. Together, this implies that consumers are willing to pay **$2.84** ($1.69 + $1.15) more for one pound of ground with the proposed Product of USA label than for ground beef with no Product of USA label. This stretches incredulity beyond all reason.

Issue 4. Inaccurate description of mixed logit modeling

To test the hypotheses and estimate the marginal willingness to pay, random utility models along with mixed logit models were employed. The formulae[15] for these are provided in the report; however, there are a number of inaccuracies in the description of this modeling; see Section 1 in the Technical Appendix for details. These inaccuracies undermine confidence in the RTI DCE results.

Issue 5. Unclear basis for exclusion of one-third of DCE 1 respondents from analysis

A total of n=788 respondents were randomly assigned to DCE 1; however, the reported findings say the sample size was n=522. The exclusion of those who did not purchase ground beef in the past 6 months appears to account for only part of the n=266 gap. Who else was removed from the analysis?

Issue 6. Incorrect interpretation of MWTP findings

The RTI Survey reports that on average consumers are willing to pay $1.69 more for one pound of ground beef with a Product of USA claim than for one pound of ground beef with no Product of USA claim (marginal willingness to pay). At the same time, RTI reports that the marginal willingness to pay for one pound of ground beef with a Product of USA claim is $1.69 above the mean price of $4.79 for one pound of ground beef. These findings are contradictory and presented prominently over multiple pages and tables, including in the Executive Summary.[16]

RTI did not design the DCE experiments to measure MTWP over the mean price, but rather, to measure the MWTP over the referent group (e.g., MTWP for ground beef with a Product of USA

[15] RTI Survey, pp. 2-16 to 2-21.
[16] RTI Survey, ES-3, pp. 3-15 to 3-22, and p. 4-2.

claim over ground beef with no Product of USA claim.) It is difficult to understand how such a substantive misunderstanding could be so prevalent in the RTI Survey report.

Issue 7. In DCE 1, 40% of respondents chose the 'neither' option at least once

For each discrete choice experiment in the RTI Survey, respondents were shown 9 pairs of ground beef options (one pair at a time) and asked which one they would buy. Each pair differed by price per pound, grass fed or not, free from antibiotics or not, or Product of USA/Location produced. Respondents could choose Product A, Product B, or neither. In DCE 1, which included 794 participants, the proportions of respondents who chose 'neither' ranged across the 9 questions from 14% to 21%, and (314 / 794) = 40% of the respondents chose 'neither' for one or more of the 9 pairs they were shown.

Presumably, the 4 in 10 respondents in DCE 1 who chose 'neither' product at least once, did so because the options put before them were not ground beef options that they would consider purchasing. That is, the high levels of 'neither' responses documented above are consistent with the possibility that the RTI discrete choice experiment was too far from the respondents' ground beef purchase preferences; for example, they always purchase organic, lean ground beef, or ground beef at a price lower than $3.89 (the lowest price option in DCE 1).

There is a substantive statistical methodology question of how RTI handled the 'neither' responses. The RTI report lists an n of 522 in the DCE 1 MWTP analysis, but (794 - 314) = 480, which differs from 522, so RTI did not simply drop the respondents with one or more 'neither' choices. When 40% of respondents are unable to choose Product A or Product B in the DCE 1 on at least one occasion, the validity of the DCE 1 experiment findings is again drawn into question.

In the DCE methodology literature, permitting survey respondents in discrete choice studies to answer 'neither' is appropriately controversial: What should be done with the data from people who choose 'neither', when those people were offered a choice between two reasonable-to-buy products in a category in which they have already said they make purchases? The data analyst is faced with a number of possible options, none of them entirely satisfactory. RTI does not discuss the 'neither' issue, but how they handled these respondents / responses will have affected the MWTP estimates. How does the published RTI random-utility mixed-logit modeling cope with this issue? A sensitivity analysis documenting the results using all of the reasonable analytic ways to cope with the 'neither' responses is a bare minimum in credible modeling of this type. Campbell and Erdem (2019) go further in concluding that:

> "Overlooking opt-out effects in discrete choice experiments can lead to erroneous policy recommendations. Opt-out effects are context specific and there is a myriad of potential reasons that may explain why participants choose the opt-out alternative, meaning that there is no unique best way to analyze opt-out choices. Practitioners should consider many models and, subsequently, apply a multi-model inference procedure so that the relative support for each model can be assessed."

There is no evidence that RTI International followed this important advice.

Issue 8. Impossible MWTP for other ground beef attributes

In addition to reporting on the MWTP for ground beef based on the presence of a Product of USA label and its definition, RTI International also produced MWTP estimates for 'free from antibiotics'. The findings presented for DCE 1 and DCE 2 about the effect of the 'free from antibiotics' label are in strong statistical contradiction with each other. 'Free from antibiotics' is an independent variable in both DCE models, and is unrelated to the Product of USA label.

DCE 1 produced a MWTP of $1.98 for ground beef with a 'free from antibiotics' label over ground beef with no 'free from antibiotics' label, while DCE 2 produced a corresponding value of $1.16.[17] As demonstrated in the Appendix, the difference ($1.98 - $1.16) = $0.82 between these estimates is highly statistically and practically significant. This inexplicable contradiction in MWTP for another attribute of ground beef alone casts doubt on the validity of the RTI findings.

Issue 9. MWTP findings are generalizable only to respondents who typically purchase 85%lean/15% fat ground beef

As described below, the Canada Beef findings that specific fat content is an inflexible and important purchase consideration for some consumers, coupled with the inverse relationship between price and fat content, imply that the RTI MWTP findings should be generalized only to consumers who typically purchase 85% lean/15% fat ground beef. In the Canada Beef survey, only 28% of all ground beef consumers typically purchase 85% lean/15% fat ground beef.

Issue 10. Implausible null findings on lower/higher income households

To explore whether MWTP varies by household income, RTI International combined respondent household income and respondent household size variables, and then used the U.S. Department of Health and Human Services poverty guidelines to categorize each respondent as lower income or higher income household (p. 3-18).

RTI International found that the difference in the MWTP between the two groups was not statistically significant. This finding is largely the result of small sub-samples. The DCE 1 experiment included n=522 respondents, but the number of respondents in lower income and higher income households is not provided in the report and is omitted from the publicly available RTI survey dataset. Canada Beef replicated the RTI approach and found that 35% of its survey respondents were in the lower household income category. If this holds true for RTI, RTI's lower income sample comprises only about n=183 respondents. Such small base sizes have large margins of error, which results in the MWTP not being statistically significant. With larger sample sizes, differences between lower and higher income households would be statistically significant.

The RTI Survey report rejects the hypothesis that there is difference in MWTP between lower income and higher income households; however, this finding of no statistically significant difference is, in part, a result of small base sizes for these two household income groups. It does not mean that lower income households have the same price sensitivity as higher income households. Moreover, statistical significance is only one of the two basic types of relevant

[17] RTI Survey. Table 3.7., p.3-15.

significance in inferential studies; there was no discussion whatsoever of *practical* significance of the RTI findings, if any.

See Section 1 in the Technical Appendix for additional details on issues that challenge the validity of the RTI DCE results.

Section Summary

There are a number of unanswered critical questions about the RTI Survey methodology and analysis pertaining to marginal willingness to pay for one pound of Product of USA ground beef, including whether respondents were shown text with the current Product of USA definition in the DCE 1 'no definition' comparisons. Unless more information is provided, the validity of RTI's core analytics cannot be assessed. Based on analysis of the Canada Beef survey findings below, the RTI marginal willingness to pay estimates for ground beef should only be generalized to consumers who typically purchase 85% lean/15% fat ground beef.

RTI's conclusion that consumers 'notice' the Product of USA label is contrary to RTI's own survey data.

C. FSIS *USA-Origin Labeling Notice* Assessment

Description

The FSIS *USA-Origin Labeling Notice* outlines the impetus, rationale and evidence for possibly modifying the "Product of USA" claim requirements on meat, poultry, and egg products. The analysis relies heavily on the RTI Survey report and the FSIS Pricing Study. This section of the Canada Beef report discusses a number of issues with and questions about the FSIS *USA-Origin Labeling Notice* rationale and evidence.

Issue 11. Changing the Product of USA definition will not resolve consumer confusion.

The primary rationale given by FSIS for changing the current Product of USA label definition from processed in the USA to born, raised, slaughtered and processed in the USA is to "resolve consumer confusion" surrounding the current Product of USA label claim. Changing the definition will not, however, resolve consumer confusion.

FSIS cites RTI Survey data as evidence of consumer confusion over the current meaning of the Product of USA label. The RTI Survey found that 16% of respondents correctly understand the current Product of USA label to mean that the ground beef is processed in the USA, while 63% believe it has a different meaning, and another 21% are not sure what the Product of USA label means. Just under half of consumers (47%) incorrectly believe that the current Product of USA label means ground beef is from cattle born, raised, slaughtered and processed in the USA, the proposed definition.

FSIS interprets the survey findings as follows:

> These findings suggest that the current "Product of USA" label claim is misleading to a majority of consumers. This proposed rule would adopt a requirement for the "Product of USA" claim that would convey more accurate U.S. origin information and thus reduce consumer confusion in the marketplace.[18]

While it is true that the *current* label claim is misleading to a majority of consumers, it is also likely that the *proposed* Product of USA claim will be misleading to a majority of consumers. The exact same evidence that shows consumers are currently confused about the current Product of USA meaning is also evidence that consumers will be confused about the new Product of USA meaning: Simply put, all that will change is that a different set of consumers will be confused. Under the proposed definition, 47% of consumers would know the correct definition, and the majority of consumers (53%) would not. This is an improvement on the current situation, but by no means "resolves consumer confusion."

Issue 12. Inaccurate representation of the RTI Survey findings: Importance of P-USA claims

FSIS states that "The results from the RTI survey also reveal that 'Product of USA' claims are noticeable and important to consumers,"[19] adding that 70%-80% of respondents correctly recalled seeing the Product of USA label on ground beef in the RTI Survey data. FSIS also claims that consumers "frequently notice" the Product of USA label claim.[20]. These statements are not an accurate interpretation of the RTI Survey findings.

As described earlier, RTI respondents were shown one of four images on a package ground beef on screen for 20 seconds and then asked to write down everything they remembered seeing on the package. Only 9% of respondents mentioned, unaided, seeing 'Product of USA' on the ground beef package with a small image, and 25% mentioned 'Product of USA' when exposed to a ground beef package with a larger image that included the US flag. With less restrictive coding of responses, the unaided recall of Product of USA was 14%-31%. It is only when prompted that 70%-80% say they had seen the Product of USA claim. (15% of the control sample said they had seen a Product of USA label on the package after being prompted when there was no such label.)

As noted earlier, the very low unaided recall of the Product of USA label—even after 20 seconds of looking at one simple image—suggests a *lack of* noticeability and lack of importance of the Product of USA label.

The RTI Survey also *directly* asked consumers how often they look for a Product of USA label when shopping for ground beef; only 42% said always or almost always. Another set of survey questions asked respondents to select the most important feature of ground beef when deciding what to buy: grass-fed cattle, free from antibiotics, or Product of USA. Only 27% said Product of USA. These RTI findings are additional evidence supporting the claim made here that the Product of USA label is of limited importance to consumers. The findings of these two questions are not included in the FSIS *USA-Origin Labeling Notice*.

[18] FSIS Proposed Rules, p.15301 col. 3.
[19] FSIS Proposed Rules, p. 15301 col. 1.
[20] FSIS Proposed Rules, p. 15301 cols. 1-2.

Both the RTI Survey and the FSIS Pricing Study indicate that features other than Product of USA are more important to consumers than US-origin when purchasing ground beef. Marginal willingness to pay is a useful proxy for importance; the more a consumer is willing to pay for a particular ground beef attribute, the more important that attribute is to the consumer. The RTI Survey found that the MWTP for ground beef free from antibiotics is $1.98, while the MWTP for ground beef with a Product of USA label is $1.69. The FSIS Pricing Study, based on accurate ground beef sales data, is more compelling. The FSIS Pricing Study found that organic ground beef, grass-fed ground beef, and antibiotics free/hormone free ground beef have much larger impacts on price than the US-origin label.

From the RTI Survey, it is impossible to estimate the proportion of consumers who 'notice' a Product of USA label when they are actually purchasing ground beef, let alone impute the importance to the consumer of noticing a Product of USA label, or the frequency of noticing the label.

Issue 13. Blanket disclaimers for the studies relied upon as evidence

While relying upon the RTI Survey and FSIS Pricing Study as evidence for the need to change the Product of USA label and for the benefits of making this change, FSIS includes blanket disclaimers in its *USA-Origin Labeling Notice*. After presented the findings, FSIS states:

> Consumer WTP estimates, such as those obtained by the RTI survey, rely on stated preferences and may not reflect actual purchasing preferences in real life situations as the survey respondents do not have their own money on the line.[21]

FSIS further cautions:

> The benefits for this proposed rule have not been quantified due to data, including the divergence between estimated values and what would be changed by the proposed rule, and the limitations (some of which are discussed in Appendix A) associated with the associated surveys, LTE experiments, DCEs, and hedonic price modeling.[22]

Despite these disclaimers about the potential benefits of changing the Product of USA definition, FSIS concludes:

> However, if finalized, the proposed changes would allow consumers to make informed purchasing decisions, resulting in an increase in consumer benefit and preventing market distortions. [23]

Even if, hypothetically, consumers understand the new Product of USA label, the benefit to consumers of making an informed choice must be balanced by price considerations. Even if consumers, on average, have a marginal willingness to pay for ground beef under the proposed definition, lower income households may be disproportionately affected by the higher prices, and the overall volume purchased by consumers may be reduced to reflect the higher price.

[21] FSIS Proposed Rules, p. 15302 col. 1.
[22] FSIS Proposed Rules, p. 15302 col. 3.
[23] FSIS Proposed Rules, p. 15302 col. 3.

Other potential drawbacks to the proposed change of Product of USA claim rule include:

- Consumer burden of higher retail price (MWTP) for P-USA ground beef,
- Reduced purchase of P-USA ground beef, which may negatively impact U.S. farmers and independent ranchers,
- New consumer confusion due to the change in Product of USA label rule, and
- Consumer aversion to the word 'slaughtered' on ground beef packages (discussed in Section E below).

Section Summary

Changing the definition of Product of USA to mean born, raised, slaughtered and processed in the USA will likely result in the majority of consumers being confused about the meaning of the Product of USA label. This confusion in the future, as now, may be somewhat intractable as most consumers have a low interest in the Product of USA label on ground beef and the Product of USA label is a low priority for most when selecting ground beef to purchase.

To fully understand the implications of changing the Product of USA label definition, more research is required into some potentially significant downsides for consumers, family farmers, independent ranchers, and other ground beef producers.

D. Canada Beef Consumer Survey Findings

Description

Methodology

In an effort to produce survey results that are comparable to those found in the RTI Survey, Canada Beef sought to replicate the RTI Survey data-collection methodology. While RTI International used the IPSOS Knowledge Panel, which is a gold standard probability panel for online population surveys, if properly executed (which is not the case here). Canada Beef used the Ipsos ISay Panel, a non-probability online panel, but set target quotas and weighted the sample data to match the weighted geo-demographic targets in the RTI Survey.[24] These geo-demographic variables were: age group, education level, gender identity, household income, U.S. Census region, Metropolitan Statistical Area status, race/ethnicity, and survey language (English/Spanish).

Survey Specifications

Target population:	Adults aged 18 and older who had purchased ground beef in the past 6 months and who do the grocery shopping in their household at least half the time.[25]
Questions:	Both close-ended and open-ended questions

[24] RTI Survey, pp. 3-2 and 3-3.
[25] RTI Survey, p. A-2.

Questionnaire length:	Approximately 8 minutes on average
Language:	English and Spanish
Pre-test:	May 8-9, 2023; n=207
Full survey:	May 12-22, 2023; n=1898

Accuracy of Findings

The pre-test with n=207 respondents revealed anomalies in the responses, which resulted in the pre-test data being unusable and substantive changes to the survey questionnaire.

Issues with the pre-test emerged as responses to split-sample scale questions were examined. The survey included a number of questions in which half of the respondents saw a scale in ascending order and half saw a scale in descending order ("split-sample"). While scientific studies have shown that respondents are more inclined to select responses near the top of a scale than to select responses at the bottom of the scale, the difference in responses depending on the scale far exceeded typical scale order variations. For both scales, respondents tended to select a response that was near the top of the scale they were seeing. To address this issue, survey questions were modified to explicitly remind the respondents to read through the entire list of responses before making their selection.

This issue with the split-sample ordered responses led to a deeper examination of response quality.

A second issue that emerged was illogical responses to questions about willingness to pay for a pound of ground beef with varying characteristics. This issue was addressed by: reminding respondents of how much they said they had paid for a pound of ground beef the last time they purchased ground beef; adding caution pop up messages if the dollar amounts provided were illogical; and excluding respondents who gave illogical responses on a second try and/or on a test question. Early in the questionnaire, respondents were asked if they had purchased ground beef in the past 6 months. Those who said yes were later asked a question about when they had most recently purchased ground beef; those who said 7 months or more were excluded from the survey.

Third, in the data cleaning stage, 6 respondents who gave illogical responses were eliminated from the data. For example, one individual said they paid $20.00 per pound the last time they purchased ground beef, but when asked to select the features of the ground beef they purchased (e.g., grass-fed, organic, no antibiotics, etc.), not only did they say they had purchased basic ground beef, but that they had selected the ground beef with the cheapest price.

To be sure that unexpected responses made sense, open ended questions were added throughout the questionnaire to ask why respondents gave the responses that they did. These open-ended questions proved highly valuable in confirming the validity of responses.

In reviewing the final survey data, it is clear that the additional quality control measures improved the quality of the responses substantially.

Weighting

The Canada Beef survey resulted in n=1898 responses. Due to the tight timeline for providing comments to FSIS on its *USA-Origin Labeling Notice*, Ipsos was unable to meet some of the target geo-demographic quotas. In order to mirror a representative sample without employing excessive weights, the survey data were weighted down to n=1496. The additional 497 responses are 'oversample'.

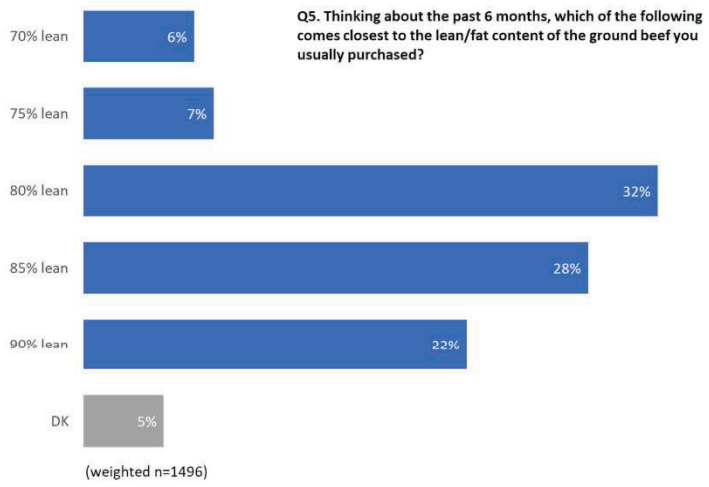
Finding 1. Need to adjust questionnaire to minimize respondent inattention

The Canada Beef survey pre-test revealed an unexpectedly high level of respondent inattention: A large proportion of respondents selected the top items on an ordered scale; many completed the survey in less than 3 minutes; and some gave illogical dollar estimates over the course of the survey. Canada Beef addressed these issues by modifying the questionnaire for the main survey and confirmed the quality of the re-launch data after n=200. The Canada Beef experience indicates a persistent need with panel surveys to rigorously test response validity both qualitatively and quantitatively.

Finding 2. Few ground beef consumers purchase 85% lean/15% fat ground beef

For many consumers, fat content is an important consideration in their choice of what ground beef to purchase. Among ground beef purchasers, 45% typically purchase ground beef with 20% or more fat, 28% typically purchase 85% lean/15% fat ground beef, and 22% purchase lean ground beef with 10% or less fat content.

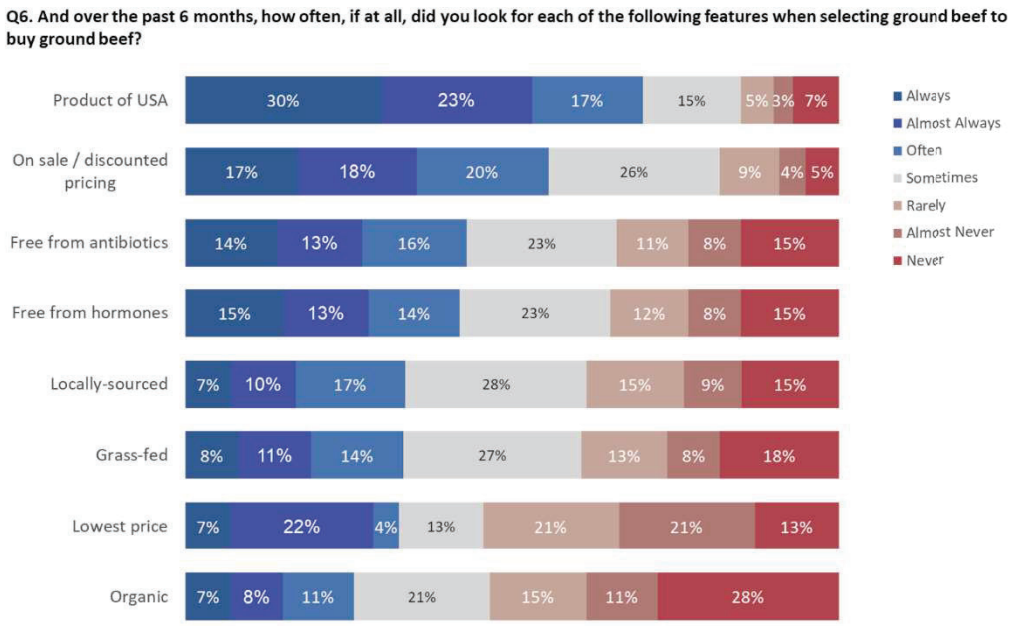
Figure 3. Fat content of ground beef purchased by consumers



Finding 3. Some consumers always purchase ground beef with specific features

As with fat content, there are notable minorities who "always" purchase ground beef with specific features. For example, 17% only buy ground beef on sale, 7% only buy locally sourced, and 7% only buy organic.

Figure 4. Other ground beef features sought by consumers



Finding 3. MTWP findings should only be generalized to consumers who regularly purchase 85% lean/15% fat ground beef.

In one section of the survey, respondents were shown different versions of ground beef packages and asked how much they would pay for each version. The product versions were: No country of origin label ("No Label"), Product of USA label ("P-USA"), USA/Canada country of origin label ("Qualified Canada"), and USA/other unspecified country of origin label ("No COOL). Replicating the RTI approach, respondents were informed that all packages were one pound, USDA-inspected, and 85% lean/15% fat.

Figure 5. Ground beef package images shown to respondents

When asked how much they would pay for each package shown, many respondents said they would not purchase this ground beef at any price, often citing the 85% lean/15% fat content as the reason. Some verbatims are provided below:

- The fat content fat is too low for me to want to buy.

- Fat content is important for flavor!
- THERE IS NOT ENOUGH FAT TO MAKE IT FLAVORFUL. LOW FAT PRODUCTS SUCK!
- 85/15 is too lean
- Too lean. You need some fat for flavor.
- I prefer 80/20 ground beef
- Fat content is important for flavor!

- Too much fat in it.
- I only buy 93% lean ground beef
- I want less fat content and more lean meat.
- Fat percent is too high for me.
- I buy 93% lean, no antibiotics
- Too high a fat content

Although qualitative in nature, these unaided verbatim responses indicate that some proportion of consumers are inflexible in the lean/fat ratio of ground beef they purchase.

Given both the implied importance of fat content and the inverse relationship between price and fat content, Canada Beef MWTP estimates should only be generalized to consumers who typically purchase 85% lean/15% fat ground beef, 28% of all ground beef consumers. It seems likely that the MWTP for ground beef with a Product of USA label would be lower in dollar terms for consumers who purchase higher fat ground beef—either for flavor or for price. More broadly, it seems highly probably that consumer MWTP depends on the price a consumer typically pays for ground beef (which reflects the consumer's holistic preferred ground beef features). As such the Canada Beef MWTP estimates should be generalized, at best, to the 28% of consumers who typically purchase 85% lean/15% fat. This caution is applied equally to the RTI Survey MWTP estimates.

Finding 4. Unexpected respondent aversion to word 'slaughtered' qualified label claims

Unaided, one reason some respondents gave for being unwilling to purchase ground beef with the qualified label on it was that they were put off by the word "slaughtered" on the label. Here is a selection of the feedback:

- The word slaughter turns me off
- I didn't like the word slaughtered. Doesn't sound pleasant and eatable
- I don't like meat from different countries and I don't like the word slaughtered
- Slaughtered is starting to make me feel gross about eating it
- the slaughter part is my exit point
- Don’t like that it used the word slaughtered on package
- I personally would not purchase a product that indicates being slaughtered and processed. If you are purchasing the product to serve to your family, you have children who will view

that statement and will become upset about the reality of their food. Even though you know it occurs, you don't want to view it in black and white.

- the word 'slaughtered' seems to make the meat product unappetizing to me
- I personally do not like the label with the terms slaughtered and processed.

Respondent aversion to the word "slaughtered" is an unexpected finding that may negatively affect ground beef producers who currently use a Product of USA label, but who change to a qualified claim label under the proposed rule. These producers may experience lower sales due to consumer discomfort with the word "slaughtered" on it.

Given this specific finding, consideration should be given to potential unexpected side effects of qualified claims on consumer behavior in a more comprehensive way.

Finding 5. Marginal Willingness to Pay

The Canada Beef survey asked respondents approximately how much they paid per pound the last time they purchased ground beef. Respondents who were not sure were then given a number of price ranges and asked to select the best estimate. The base ground beef purchase price for these respondents was set at the mid-point of the range. Respondents who were unable to estimate the price of ground beef they most recently purchased were excluded from the survey, as were respondents who selected "less than $2.50" or "$15.00 or more" per pound. This allowed a more realistic analysis of marginal willingness to pay based on each consumer's current ground beef purchase price. In the Canada Beef survey, consumers paid, on average, $538 per pound the last time they purchased ground beef.

To determine marginal willingness to pay, respondents were then asked how much they would be willing to pay for each of the four versions of the ground beef package: No country of origin label ("No Label"), Product of USA label ("P-USA"), USA/Canada country of origin label ("Qualified Canada"), and USA/other unspecified country of origin label ("No COOL"). Replicating the RTI Survey approach, respondents were informed that all packages were one pound, USDA-inspected, and 85% lean/15% fat.[26] No definition of "Product of USA" was given. Later, these respondents were asked to suppose that "Product of USA" means that "the product must be made from animals born, raised, and slaughtered, and the meat then processed in the USA" and again asked how much they would be willing to pay for each of the three Product of USA package versions.

The Canada Beef study found that the average MWTP for one pound of 85% lean/15% fat ground beef with a Product of USA label is $0.43 more than the baseline mean price of $5.38 (+8%) when the definition of that label is not provided, and around $0.60 (+11%) when the proposed Product of USA definition is provided.

[26] While Canada Beef analysis strongly indicates that by standardizing ground beef packages with 85% lean/15% fat, the resulting MTWP are generalizable only to consumers who typically purchase ground beef with this fat content, Canada Beef utilized this standardization of ground beef packages in its estimations of MWTP. Our findings are provided for comparison purposes.

The Canada Beef MWTP for one pound of ground beef with a Product of USA not defined is not too dissimilar from the FSIS Pricing Study estimate of $0.25 (4.1%), but contrasts sharply with the corresponding $1.69 MWTP obtained by the RTI survey analysis.

Finding 6. Consumer response to varied *specific* non-USA countries of origin

Just as it is reasonable to assume that consumers may care about what elements of the ground beef production process take place in the United States, it is reasonable to assume that consumers may care about the specific country other than the USA in which elements of the ground beef production process takes place. When shopping in the grocery store/butcher or online, consumers will often have the option to purchase ground beef with specific other countries of origin on the label in addition to or instead of the USA. The FSIS Pricing Study found that 15.5% of ground beef sales by volume have a country of original label other than the USA.[27]

The Canada Beef survey found that the extra marginal willingness to pay is:

- 39 cents (a 7.1% increase from a baseline of $5.64 per pound) for ground beef with an exclusive Product of USA label (no definition),
- 14 cents (+2.6%) for ground beef "slaughtered and processing in the USA, and born and raised in Canada", and
- 3 cents (+0.4%) for ground beef "slaughtered and processing in the USA, and born and raised in another country".

In the final comments of the survey, some respondents noted a preference for products of USA and some noted that it does not matter to them what country their beef comes from. Others commented on their perception of ground beef from Canada:

- Although I prefer purchasing products from America, I would purchase this product from Canada.
- Animals raised and or slaughtered in Canada I would consider equal in quality to USA and would not hesitate to purchase.
- Born and raised in Canada gives me confidence. I believe that Canada is in better overall health than the US and that they probably have more ability to raise cattle outdoors with better environmental conditions. I prefer Canadian meat to US. I would be willing to pay a little more.
- Canada has similar standards to the USA
- Canada and US are pretty close. Perhaps would think differently if another country.
- Do not mind if cattle are from Canada versus US.
- Does not matter if beef was raised in Canada or U.S.
- I would feel totally fine about purchasing meat from cattle raised in Canada
- I would have no issues purchasing Canadian-raised beef that is slaughtered in America. The way the beef is raised and what it is exposed to is more important to me than the product being born, raised, slaughtered, etc [sic] in USA.

[27] FSIS Study, p.15.

- I would not be afraid to but ground beef born and rasied [sic] in Canada.
- I am indifferent if the beef originated in Canada as long as it passes FDA guidelines
- I never thought of Canada as "another country".
- I am 100% confident in products made in Canada, and think any cattle born & raised in Canada are equal to (or can even be better than) cattle born & raised in the USA. But as an American, of course I'd prefer to support our own farm community. Food products I'd be leery of would be anything from China, Brazil, Southeast Asia, etc. I tend to avoid purchasing such products, and fresh meat products are out of the question.
- The reason I would buy Canada because they seem to have the same ideas as USA

While the FSIS Pricing Study grouped together all countries of origin other than the USA in its MWTP analysis, the underlying sales prices in its regression model are based on actual products with specified countries. In contrast, the RTI Survey gave respondents an option of Product of USA and/or "another country or countries" which were unnamed.

By not including a specific other country of origin, the RTI Survey findings exaggerate the value (MWTP) of the proposed Product of USA label claim.

Finding 7. Impact of higher price on volume purchased

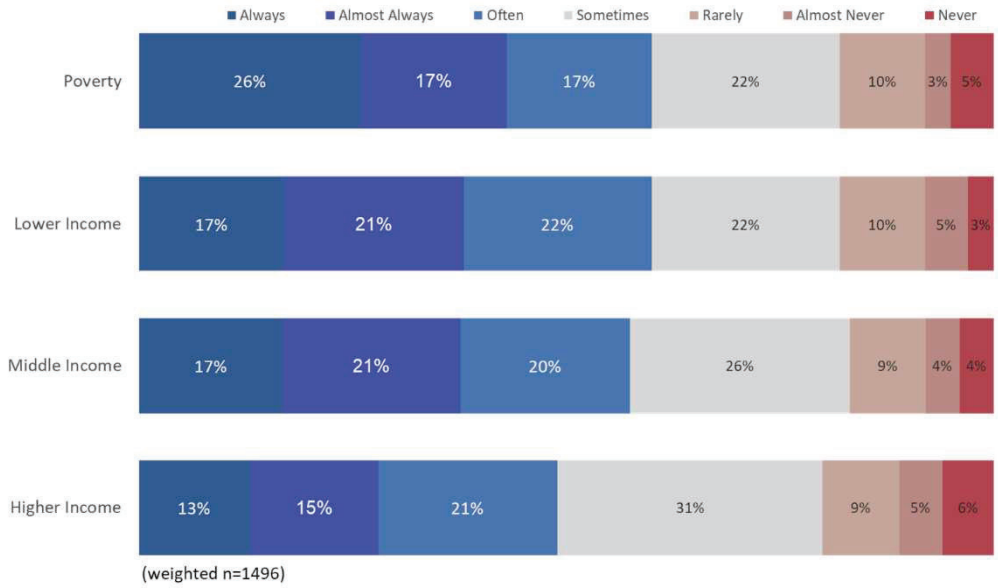
Canada Beef explored the potential for higher priced ground beef to be associated with lower volume purchases by consumers. Survey respondents were asked to assume the Product of USA label means that "the ground beef came from cattle that were born, raised and slaughtered in the USA, and the meat then processed in the USA." They were then asked: "If "Product of USA" ground beef with the definition shown costs [INSERT 90 cents/$1.15/ $1.69] more per pound than the ground beef you typically buy, how often do you think you would purchase ground beef with a "Product of USA" label? Respondents were randomly assigned to see one of three price increases: 90 cents, $1.15, and $1.69. The resulting samples sizes were small (n=152 to n=155). Nonetheless, for each price increase above the current amount consumers pay, between one-quarter and one-third of respondents say they would purchase less ground beef at this price with about 10% saying they would purchase "much less". The impact of any increase in ground beef prices due to a change in the Product of USA claim rule should be evaluated, particularly with respect to low income households.

Finding 8. Household income and MWTP

Replicating the RTI approach, Canada Beef classified respondents as Lower Income if their household income/household size was less than twice the poverty point based on the U.S. Department of Health and Human Services poverty guidelines. Additionally, Canada Beef explored price impacts for respondents in Poverty Income, Middle Income (2-3 times poverty level) and Higher Income (4 times the poverty level or more).

As expected, the Canada Beef survey reveals greater price sensitivity for lower income households than for higher income households. For example, Poverty Income households are twice as likely as Higher Income households to "always" purchase ground beef on sale or at a discounted price (26% vs. 13%).

Figure 6. Frequency of purchasing ground beef on sale, by household income



Section Summary

The Canada Beef survey provides additional information to inform FSIS' deliberation on the implementation of a new Product of USA rule. In particular, it fills in some of the analytics and information gaps in the RTI and FSIS studies.

E. Critical Omissions from FSIS Proposed Rule Analysis

Several important issues related to the proposed change in Product of USA label claim are not addressed in the FSIS *USA-Origin Labeling,* RTI Survey and FSIS Pricing Study. Below are some of these omissions:

1. **No consideration of consumer confusion with the Product of USA definition, if the proposed definition is implemented.**

   The RTI Survey found that 47% believe that the current Product of USA label means ground beef is from cattle born, raised, slaughtered and processed in the USA, which is the proposed definition. This means that when the Product of USA label changes, 47% of consumers will know the (new) correct Product of USA definition, and the majority of consumers, 53%, will not.

2. **No consideration of impact of higher price for Product of USA ground beef on volume purchased.**

   The RTI Survey produced an average MWTP of $1.69 for ground beef with a Product of USA label over ground beef with no Product of USA label. This premium for the proposed Product of USA label may very well affect the amount of ground beef that consumers purchase and may result in

negative economic gains for beef producers if the added revenue per pound is more than reversed by the smaller volume sold. Benefits of the proposed label must take this potential issue into account.

3. **No testing of marginal willingness to pay for specific countries of origin.**

   The Canada Beef survey explored consumers reactions to ground beef labels with Product of USA origin only, Product of USA plus another unspecified country, and Product of USA and Canada. These findings along with unaided verbatim feedback, provide evidence that not naming the other country of origin artificially increases the MWTP for the proposed definition of Product of USA.

4. **No consideration of impact of price increase on Product of USA products for consumers who believe the current definition is the proposed definition.**

   The RTI Survey and FSIS *USA-Origin Labeling Notice* focus on increases in consumer willingness to pay with the proposed Product of USA definition. Negative consequences have not been considered. There are consumers who currently purchase Product of USA ground beef under the belief that Product of USA means the animals are born, raised, slaughtered and process in the USA and who would be required to pay more ($1.15?) for the exact same products under the new Product of USA definition.

5. **Potential economic harm to U.S. family farmers and independent ranchers.**

   If consumers react to a price increase for ground beef with the new Product of USA label by purchasing less Product of USA ground beef, the total volume purchased from family farmers and independent ranchers may be reduced, resulting in an economic loss.

6. **Insufficient attention to the impact of higher Product of USA ground beef prices on low income households.**

   Due to small sample sizes and the use of a binary household income variable, the RTI Survey did not find statistically significant differences in MWTP for Lower Income and Higher Income households. The Canada Beef survey, on the other hand, found that Poverty Income households are twice as likely as Higher Income households to "always" purchase ground beef on sale or at a discounted price (26% vs. 13%).

7. **No consideration of consumer purchase behavior in response to qualified claims.**

   The Canada Beef survey found a consumer aversion to the word "slaughtered", which may affect consumer purchase of ground beef products with qualified claims. Other implications of the qualified claim language should be explored for unexpected consumer reactions that affect purchase behavior.

Section Summary

Inclusion of critical missing information could substantially alter the evaluation of benefits/drawbacks to consumers and beef producers arising from a new Product of USA label. As it stands, these omissions undermine the current rationale for FSIS' proposal to change the Product of USA claim definition.

F. Conclusions

FSIS does not have the necessary information to make a sound evidence-based decision on whether to implement the proposed Product of USA definition. The *USA-Origin Labeling Notice* is missing examination of key issues that would inform the cost-benefit analysis for consumers and beef producers, including family farmers and independent ranchers.

The RTI Survey, FSIS Pricing Study and Canada Beef survey produced different marginal willingness to pay figures related to the Product of USA label. Taken together, these three studies lead to the conclusion that the benefits and drawbacks of changing the Product of USA label MWTP cannot be determined without undertaking a new research approach, which has both qualitative and quantitative components. Qualitative research methods are needed in order to gain a substantive and nuanced understanding of how consumers purchase ground beef, and to incorporate into the subsequent quantitative research design, thus avoiding the limitations of the existing studies.

Technical Appendix

1 Critique of RTI DCE Ground Beef Analysis

> ***The mixed logit model is considered to be the most promising state of the art discrete choice model currently available. Increasingly researchers and practitioners are estimating mixed logit models of various degrees of sophistication with mixtures of revealed preference and stated choice data. It is timely to review progress in model estimation since the learning curve is steep and the unwary are likely to fall into a chasm if not careful. These chasms are very deep indeed given the complexity of the mixed logit model. Although the theory is relatively clear, estimation and data issues are far from clear. Indeed there is a great deal of potential mis-inference consequent on trying to extract increased behavioural realism from data that are often not able to comply with the demands of mixed logit models.*** (Henscher and Greene, 2002)

- Page 2–10, DCE Questionnaire: Permitting survey respondents in discrete choice studies to answer **Neither** is appropriately controversial in the DCE literature: what should be done with the data from people who choose **Neither**, when those people were offered a choice between two reasonable-to-buy products in a category in which they have already said they make purchases? The data analyst is faced with a number of possible options, none of them entirely satisfactory.

- The RTI survey analysis began with $n = 4{,}834$ respondents, who were randomly assigned to one of 6 DCE experimental groups (Figure 2.1, page 2–5); $\frac{4834}{6} \doteq 806$, so that each group had about 806 people in it (e.g., DCE group 1 had 794 respondents). Yet (Table E–1, page E–2) the two DCE ground beef groups (1 and 2) had sample sizes of only 522 and 527 in the mixed logit results (about 65% of the average group size). What happened to the other 35% of the respondents? It is customary in studies of this type to include, in the analysis report, a flowchart of the form (e.g., for DCE group 1)

  > ***Box at top ($n = 794$) → Split into 2 separate flows based on answer to yes/no question … → (Left flow) $n_1 = xxx$ omitted from analysis because … → (Left flow) $n_2 = xxx$ omitted from analysis because … (Right flow) $n_1 = xxx$ omitted from analysis because … → …***

  No such diagram (or equivalent detailed information about exclusion criteria) is evident in the RTI report, which makes it difficult to assess the internal validity of the DCE analyses.

- Pages 2–16 through 2–21:

  - As the quotation from Henscher and Greene (2002) with which we began this Section highlights, random-utility mixed-logit econometric models are extremely complicated,

with many different sets of possible assumptions leading to potentially different results. In commercial software for fitting such models (e.g., `Stata` or `NLOGIT`), this phenomenon manifests itself in a bewildering array of options with which the model is fit. (1) Which precise set of assumptions were used in the RTI analyses, (2) why were those choices made, and (3) did RTI perform sensitivity analyses across plausible assumption sets to investigate the stability of their findings? The report is silent about this crucial issue; confidence in the results would have been increased if more implementation details had been given.

– Equation (2.1): Consider one of the 2 ground beef experimental groups, say DCE 1. The unit of analysis in the relevant data set is respondents, which could be indexed by i (say): there's one row in that data set for each person who participated in DCE 1. But the only index in Equation (2.1) (j) is across the 3 possible options {(Utility for Hypothetical Product A), (Utility for Hypothetical Product B), (Utility for Neither A nor B)}; there is no index for the individual in this equation! Perhaps what RTI meant was

$$u_{ij} = v_j + \epsilon_{ij} \,, \tag{1}$$

although a clear explanation of what (from the frequentist point of view) is fixed and what is random is missing even after making this correction. This same comment applies *mutatis mutandis* to all of equations (2.1), (2.2), (2.3), (2.4), (2.9), (2.10), and (2.14); confidence in the RTI use of a "mixed logit" modeling strategy is shaken by this elementary error.

– A more accurate re-write of Equation (2.2) would be of the following form, in which j and k index across the 3 options mentioned above:

$$p_{ijk} \triangleq P(u_{ij} > u_{ik}) = P(v_j + \epsilon_{ij} > v_k + \epsilon_{ik}) = P(\epsilon_{ik} - \epsilon_{ij} < v_j - v_k) \,. \tag{2}$$

The fact that the probability p_{ijk} is triply-indexed in (i, j, k) means that strong additional assumptions, unstated in the RTI report, are necessary to describe how p_{ijk} and $p_{i'jk}$ are related across individuals i and i', and also highlights the need to make yet additional assumptions about whether the unexplained-variation terms ϵ_{ik} and ϵ_{ij} are correlated within individual.

– Continued confusion is evident in Equation (2.3) and the discussion surrounding it, in which, e.g., the i index in Equation (2.3) represents variation across the 3 product options but the sentence immediately below that Equation states that "$Price_i$ is a continuous variable for the price of meat product j"! Similarly, *PUSA* is indexed by j in Equation (2.3) but described below that Equation as $PUSA_i$. Many basic errors of this type pervade pages 2–16 through 2–21.

– As noted in Table 2.2, the DCE 1 and 2 models offered respondents a price range for 1 pound of 15%–fat ground beef from \$3.89 to \$5.69, when much higher prices are prevalent in the marketplace for grass-fed and free-from-antibiotics ground beef. It is virtually certain than different **MWTP** values would have been found for such higher-priced products, and by no means certain that such values were obtainable by linear extrapolation (which is what main-effects-only modeling relies upon). (For

example, RTI estimates the **MWTP** from the effect of the free-from-antibiotics labeling to be $1.98 (!).) ***This means that interactions between price and the indicators for grass-fed and free-from-antibiotics variables should have been included in the DCE models; without such interactions the RTI MWTP estimates do not correctly reflect differences as a function of package labeling.***

- As we note in the main body of the report, in addition to reporting on the MWTP for ground beef based on the presence of a **Product of USA** label and its definition, RTI International also produced MWTP estimates for *free from antibiotics*. The findings presented for DCE 1 and DCE 2 about the effect of the *free from antibiotics* label are in strong statistical contradiction with each other. *Free from antibiotics* is an independent variable in both DCE models, and is unrelated to the **Product of USA** label.

  DCE 1 produced a MWTP of $1.98 for ground beef with a 'free from antibiotics' label over ground beef with no 'free from antibiotics' label, with an implied standard error (from the published 95% confidence interval (CI) that accompanies the $1.98 estimate (RTI International (2022, Table 3.7, p. 3–15)) of $0.18. In parallel with this, and based on a different sample of respondents, DCE 2 produced a corresponding estimate of $1.16, with an implied standard error of $0.11. The difference ($1.98 - $1.16) = $0.82 between these estimates then has a standard error of $0.21, leading to a 99.9% CI of ($0.13, $1.51); in other words, the difference between the DCE 1 and DCE 2 results regarding the effect of a 'free from antibiotics' label is highly significantly different from 0 in both statistical and practical terms. This inexplicable contradiction in MWTP for another attribute of ground beef alone casts further doubt on the validity of the RTI findings.

2 Canada Beef Survey: Ground Beef Inferential Analysis

2.1 Methods

- The population $\mathcal{P}$ of people to which the **RTI Survey (RTIS)**, described elsewhere in this document, attempted to generalize inferentially was defined (page ES–1 of RTI International (2022)) as follows:

  > $\mathcal{P}$ = [American] adults who do at least half of the grocery shopping for their household and have purchased beef ... products within the past 6 months.

- The **Canada Beef Survey (CBS)**, also described elsewhere in this document, gathered data on a sample of $n^* = 1{,}894$ Americans 18+ years of age who matched the characteristics defined by $\mathcal{P}$; the **CBS** was intended to replicate the sampling frame in the **RTIS**.

- Quota sampling and weighting targets used in the **CBS** matched the corresponding **RTI** specifications to promote comparability; the relevant geo-demographic variables defining the stratification grid included age, education level, gender identity, household income,

Metropolitan Statistical Area status, race/ethnicity, U.S. Census region, and survey language.

- To support statistical inference outward from the **CBS** to $\mathcal{P}$, it's necessary to make the assumption that the **CBS** respondents with a given geo-demographic profile are like the people in $\mathcal{P}$ with the same profile as far as ground beef purchasing is concerned. We make that assumption in what follows, noting that a similar assumption is necessary to support the validity of any **RTIS** inferential findings.

- All respondents were asked in an open-ended question (*Q7*) to estimate the cost (in US dollars and cents) of ground beef on the last occasion on which they purchased that product; respondents who could not remember were asked (*Q8*) to identify that cost by choosing a category defined by the cutpoints {\$2.50–\$2.99, \$3.00–\$3.99, and so on in \$1 categories up to \$13.00–\$14.99}; respondents who could not specify recent cost in either of those two ways, or who responded with a value below \$2.50 or \$15.00 or above, were excluded from the survey. A single cost variable (*Q7Q8*) was created by appropriately merging (*Q7*) and (*Q8*).

- Marginal willingness to pay (**MWTP**) for ground beef as a function of labeling was assessed by randomly assigning half of the respondents to answer seven direct questions (*Q12, Q13, Q14, Q15, Q23, Q24, Q25*) about **MWTP**; this yielded a total of $n = 550$ respondents who experienced this direct-questioning approach and who answered the recent-cost question and all seven direct **MWTP** questions.

2.2 Findings

- Table 1 presents numerical summaries of the eight relevant **MWTP** price variables. The sample mean prices ranged from a baseline value of about \$5.60 per pound up to \$6.17 for packages with a **Product of USA** label when the respondents were told explicitly what that label means (the cattle were born, raised, and slaughtered in the USA and the meat then processed in the USA). With the observed standard deviations (SDs) and sample size, sample means as estimates of their corresponding population means have a give-or-take (standard error) of about 11 cents; the resulting 99.9% confidence intervals would start at the sample means and go about $\$(3.3) \cdot (0.11) \doteq \$0.36$ either way.

- The simplest econometric model of consumer price behavior that is consistent with the context of this problem posits an additive (shift) effect of new information on **MWTP**:

$$(\textbf{MWTP} \text{ with new information})_i = (\textbf{MWTP} \text{ without new information})_i + \Delta + \text{noise}_i\,, \tag{3}$$

in which i indexes consumer. Under this model it is meaningful to look at pairwise correlations among the relevant variables. Table 2 gives the correlation matrix for the same eight **MWTP** price variables as in Table 1 . The correlations are all moderately to strongly positive, ranging from +0.64 to +0.91; this offers a strong indication of internal validity of the respondents' data.

Table 1: *Numerical summaries of the recently-paid question (Q7Q8) and the seven direct* ***MWTP*** *questions; see Notes below Table for details.*

	Price (US$)							
	Recently Paid	No Label	P-USA Label (No E)	Q No COO Label	QC Label	P-USA Label (E)	QC Label (E)	Q No COO Label (E)
	Q7Q8	Q13	Q12	Q15	Q14	Q23	Q24	Q25
n	1894	728	853	697	752	871	745	689
Mean	5.38	5.49	5.80	5.60	5.64	5.97	5.61	5.64
SD	2.32	2.50	2.50	2.65	2.64	2.63	2.55	2.78
SE	0.05	0.09	0.09	0.10	0.10	0.09	0.09	0.11

Notes: (1) Sample sizes n record the numbers of non-missing data values for each question. (2) SD = standard deviation of the variable. (3) SE = standard error of the mean estimate. (4) (No E) = meaning of label not explained; (E) = meaning of label explained. (5) (Q No COO) = Qualified No Country Of Origin: the respondents knew that the ground beef was slaughtered and processed in the USA from cattle born and raised in another (unnamed) country. (6) (QC) = Qualified Canada: the respondents knew that the ground beef was slaughtered and processed in the USA from cattle born and raised in Canada.

Table 2: *Correlation matrix for the eight relevant* ***MWTP*** *variables; the meanings of the variable names are given in Table 1. Each correlation is based on all complete cases for the two variables in question.*

	Q13	Q12	Q15	Q14	Q23	Q24	Q25
Q7Q8	0.707	0.703	0.655	0.652	0.705	0.638	0.621
Q13		0.873	0.802	0.805	0.773	0.765	0.778
Q12			0.813	0.837	0.832	0.789	0.770
Q15				0.905	0.838	0.877	0.885
Q14					0.852	0.885	0.874
Q23						0.883	0.845
Q24							0.909

- We performed a variety of sensitivity analyses to assess the stability of the inferential findings, including examining the price data on both the raw and log scales and using different subsets of pairwise-complete cases for each pairwise comparison. The findings presented here exhibited broad stability across these analytic variations.
- Tables 3 and 4 present inferential information on the most important paired comparisons.

Table 3: *Pairwise comparisons between **MWTP** estimates as a function of ground beef product labeling; see Notes below Table for details.*

X / $(\bar{Y} - \bar{X})$	Y: Price (USD) No Label (Q13) ($5.49)	Y: P–USA Label No Explanation (Q12) ($5.80)	Y: No COO Label (Q15) ($5.60)	Y: QC Label (Q14) ($5.64)
Recently Paid (Q7Q8) ($5.38)	Not PS, not SS (+$0.11; +2.0%) (−$0.12, +$0.34)	**PS, SS** **(+$0.43; +8.0%)** **(+$0.22, +$0.64)**	Not PS, Not SS (+$0.24; +4.4%) (−$0.03, +$0.50)	**PS, SS** **(+$0.27; +5.0%)** **(+$0.02, +$0.52)**
No Label (Q13) ($5.49)	—	**PS, SS** **(+$0.31; +5.8%)** **(+$0.16, +$0.47)**	Not PS, Not SS (+$0.13; +2.3%) (−$0.09, +$0.34)	Not PS, Not SS (+$0.16; +2.9%) (−$0.05, +$0.36)
P–USA Label No Explanation (Q12) ($5.80)	—	—	Not PS, Not SS −$0.19; −3.3%) (−$0.39, $0.01)	Not PS, Not SS (−$0.16; −2.8%) (−$0.34, $+0.01)
No COO Label (Q15) ($5.60)	—	—	—	Not PS, Not SS (+$0.03; +0.5%) (−$0.12, +$0.18)

Notes: (1) All entries involve comparisons of the form $(\bar{Y} - \bar{X})$, in which $\bar{Y}$ and $\bar{X}$ denote cell means defined by column (Y) and row (X) product labeling, respectively. (2) The $\bar{X}$ and $\bar{Y}$ values are given in the row and column headings, respectively; for example, the mean price that respondents recently paid for one pound of ground beef was $5.38. (3) PS = practically significant; SS = statistically significant. (4) All cell entries $(\bar{Y} - \bar{X})$ are in US$ except the percentage differences, which are calculated as $100\,(\bar{Y} - \bar{X})/\bar{X}$. (5) The first row in each cell summarizes the significance of the comparison; the second row is of the form (mean difference, percentage difference); and the third row gives the 99.9% confidence interval for the mean difference.

2.3 Conclusions

We draw the following conclusions from the Canada Beef Survey data:

- (Table 3) Off of a base (recently paid) price of $5.38, the **P–USA** label increased the **MWTP** by an average of $0.43 (8.0%) [this difference is both statistically significant (**SS**) at the 99.9% level and practically significant (**PS**)].
- (Table 3) When the base is (No label) ($5.49), the **P–USA** label increased the **MWTP** by an average of $0.31 (5.8%) (**SS**, **PS**).
- (Table 4) The **P–USA** label with explanation increased the **MWTP** price by an average of $0.48 (9.0%) (**SS**, **PS**) when compared with (No Label).
- (Table 4) The **P–USA** label with explanation increased the **MWTP** price by an average of $0.17 (3.0%) (**SS**, **PS**) when compared with **P–USA** label with no explanation.

Table 4: *Additional pairwise comparisons between **MWTP** estimates as a function of ground beef product labeling; see Notes below Table for details. Numbers differ slightly from those in the previous Tables because of different group sample sizes as a function of missingness.*

X	Y	(*): mean(Y) - mean(X)	99.9% CI for (*)	100 * (mean(Y) - mean(X)) / mean(X)
Q7Q8	Q23	+$0.60	(+$0.39, +$0.82) SS	11.2% PS
Q12	Q23	+$0.17	(+$0.01, +$0.34) SS	3.0% PS
Q13	Q23	+$0.48	(+$0.29, +$0.68) SS	9.0% PS
Q14	Q24	-$0.03	(-$0.18, +$0.12) NSS	-0.1% NPS

Notes: (1) Q7Q8 = (recently paid). (2) Q12 = (P-USA label with no explanation of label meaning). (3) Q23 = (P-USA label with explanation of label meaning). (4) Q24 = (Qualified Canada label with explanation of label meaning). (5) SS = (statistically significant, NSS = not statistically significant). (6) PS = (practically significant, NPS = not practically significant).

- (Table 3) The **P–USA** label increased the **MWTP** price by an average of $0.29 (5.0%) (**SS**, **PS**) when compared with the QC (Qualified Canada) label.
- (Table 3) The QC (Qualified Canada) label increased the **MWTP** price by an average of $0.27 (5.0%) (**SS**, **PS**) when compared with the (Recently Paid Price).
- (Table 4) The **P–USA** label with explanation of the meaning of the label increased the average **MWTP** price over the baseline (recently paid) by $0.60 (11.2%) (**SS**, **PS**).
- All of the (not–SS, not–PS) results in Tables 3 and 4 accord with common sense; for example, there was essentially no difference between the **MWTP** prices between (recently paid) and (No Label). This further strengthens the internal validity of the results.
- (overall) ***The estimate obtained from the Canada Beef survey of the average MWTP price that consumers are willing to pay for the P–USA label — around $0.43 from a baseline price of about $5.38 (+7%) when the meaning of that label is not defined, and around $0.60 (+11%) when explained — is in the general vicinity of the FSIS estimate of 2.5–4.1% but contrasts sharply with the corresponding $1.69 increase claimed by the RTI survey analysis. In our view the CBS results have dramatically stronger face validity than the RTI findings.***

References

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