

Foreign Geographical Indications, Consumer Preferences, and the Domestic Market for Cheese*

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Abstract

The protection of geographical indications (GIs) is an important feature of modern trade agreements. In the Canada-European Union Comprehensive Economic and Trade Agreement (CETA), Canada agreed to stronger protections for GIs of European cheeses and other food products. Under this agreement, new Canadian producers can no longer label cheese as “feta” but instead must refer to it as “imitation feta,” “feta style,” or “feta type.” We use a choice experiment to determine the effect of this agreement on Canadian cheese producers. We find that the effect of GI recognition varies depending on the terms used to label Canadian cheese and the information given to consumers.

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Introduction

The protection of geographical indications (GIs) is an important feature of modern trade agreements. As their name suggests, GIs are symbols or labels that indicate a product has a relationship to a particular geographic region. This relationship can reflect a method of production used in that region or the natural characteristics of the region. For example, “Champagne” is recognized as a GI in Europe because it corresponds to the sparkling wine produced in the French region of Champagne. Similarly, “Roquefort” identifies cheese made using milk from a specific breed of sheep and aged in the natural caves of Roquefort-sur-Soulzon in France. Most GI products are known by their geographic location, which appears in their name. As such, “prosciutto” is not a GI but “prosciutto di Parma” is, because it refers to a type of prosciutto made in Parma, Italy following traditional methods. However, there are a small number of products that enjoy GI recognition in Europe even though the product name does not refer to a specific location of production; examples include asiago, feta, fontina, gorgonzola, and munster.¹

The EU has continually advocated for stricter protections of GIs, both at the World Trade Organization (WTO) (Goldberg, 2001; Addor and Grazioli, 2002) and in bilateral and plurilateral trade agreements (Engelhardt, 2015). One demonstration of the EU’s success in obtaining stronger GI protections is the recently signed Comprehensive Economic and Trade Agreement (CETA) between Canada and the EU. As part of this agreement, Canada agreed to recognize 171 GIs on European products.²

The majority of GIs recognized under CETA are compound phrases that include the name of the region of production, as well as the name of the product itself. Few, if any, Canadian

¹While there is the Asiago Plateau and the towns of Gorgonzola and Muenster, the GI label is applied to products made outside of these locations. As such, asiago, gorgonzola, and munster do not refer to a product from that location in the way that Champagne or Roquefort do.

²The EU likewise agreed to recognize GIs of Canadian products. However, in the text of the agreement the table that lists the GIs originating in Canada contains zero entries (CETA, 2017).

products are impacted by the recognition of these phrases. Companies can continue to market cheese as “mozzarella” because the GI protects the term “Mozzarella di Bufala Campana.” For GIs that are simply the name of the region, Canadian producers must change the name of the product. Canadian companies can no longer label sparkling wine as Champagne nor can they label blue cheese as Roquefort. For GIs that do not refer to a specific region, the agreement specifies a middle-ground. New Canadian producers of asiago, feta, fontina, gorgonzola, and munster can use these GIs on their product labels if they are modified by terms such as “imitation,” “style,” or “type,” while existing Canadian producers can continue using the terms without any modification. For example, a new Canadian cheese producer could market “feta type” or “imitation feta” cheese, but not simply “feta” cheeses.

To date, there is little economic research on the effect that stronger protections of foreign GIs have on domestic consumers and producers. In this paper, we examine the impact of recognizing foreign GIs using a hypothetical choice experiment that elicits consumer preferences for three different specialty cheeses: asiago, feta, and gorgonzola. We simulate the effect of CETA by labelling cheese produced outside the EU with the modifiers “imitation”, “style”, and “type”.

In our experiment, consumers demonstrate a high willingness-to-pay (WTP) for both European and locally produced cheeses (relative to cheeses that are made in the USA). The effect of GI recognition depends on the terminology used and the information provided to consumers. Consumers place a large discount on cheese that is labeled as “imitation,” but a small, statistically insignificant, discount on cheese with the label “type.” Interestingly, providing consumers with information about GIs increased their WTP for all cheese regardless of its place of origin. We also find that consumer preferences for GIs and place of origin labels are heterogeneous, and some of this heterogeneity is explained by product characteristics, socio-demographics, and the food values of consumers.

We use our estimates of consumer preferences to simulate market shares under various

pricing and policy scenarios. Notably, when imports are restricted (as they are under CETA) and information is provided to consumers, the protection of GIs benefits both Canadian and European producers. In sum, our results demonstrate that stronger protections for GIs can negatively impact domestic producers, but this impact can be moderated, and even reversed, through information, marketing, and policy decisions.

The protection of GIs is a contentious policy issue,³ and has caused significant hand-wringing among Canadian dairy producers (Dairy Farmers of Canada, 2017). This consternation is shared by producers in other countries, namely the US, who believe that stronger recognition of GIs will limit their ability to market their products (Goldberg, 2001). These concerns are underscored by the voluminous literature documenting the importance of food labels in consumer decision making. Previous papers have found that consumers are willing to pay more for food products labeled as “natural” (Syrengelas et al., 2017), “traditional” (Balogh et al., 2016), or “organic” (Batte et al., 2007; Urena, Bernebeu, and Olmeda, 2008). One may presume that a label with an inauthentic connotation – such as “imitation,” “style,” or “type,” – would have the opposite effect on consumers’ WTP. However, there is little in the existing literature that directly speaks to the concerns domestic producers have about the recognition of GIs.

The few existing papers that examine the impact of GIs on WTP, have focused on the effect of GIs on European products. For example, Menapace et al. (2011) find that a GI label increases Canadian consumers’ WTP for European olive oil. However, they do not examine how Canadian producers would be impacted by GI recognition. This is not surprising given that Canadian olive production is, to a first approximation, zero. Aprile, Caputo, and Nayga (2012) also examine the effect of labeling European olive oil with a GI, finding that American consumers have a positive WTP for the designation. However, the GI label was less salient

³From the popular press, see Jeffries (2015), Behsudi (2015), and New (2015). For opposing policy positions regarding US recognition of GIs, see Baldwin et al. (2015) and Watson (2016).

than other product characteristics such as organic labels, quality cues, and country of origin labels. In this study, we add to the literature on consumer preferences for GIs by considering the effect of GI recognition on domestic producers.

We also contribute to the burgeoning literature examining consumers' WTP for place of origin labels (Loureiro and Hine, 2002; Alfnes and Richertsen, 2003; Gracia, de Magistris, and Nayga, 2012; Lim et al., 2013). In this issue, Norris and Cranfield (2019) find that Canadian consumers are willing to pay considerably more for dairy products (gouda, cheddar, ice cream, and yogurt) that are made in Canada, compared to products made in Europe, the USA, or Australia/New Zealand. Similarly, consumers are willing to pay more for Canadian cheese relative to American cheese, though, unlike in Norris and Cranfield (2019), consumers in our survey are also willing to pay a premium for European cheese. One reason for this discrepancy might be that in our survey European cheese contains a Protected Geographical Indication (PGI) symbol, which denotes that the cheese was made according traditional methods in a particular region. Consumers, therefore, seem to value both locally produced food and food imported from traditional production regions. We also examine how the protection of GIs interacts with place of origin labels. Specifically, we are curious if domestic producers can offset some of the negative effects of GI labels by using labels that highlight the local nature of the product. However, the effect of GI labels is the same for local and non-local food.

Our results inform the ongoing discussion about the recognition of GIs in future trade agreements. It is well-known that the EU would like to write stricter protections for GIs into future trade agreements. The language in CETA may form a template for these future agreements, including those between the EU and the US. It is, therefore, important for policymakers to understand the impact that these regulations will have on markets, especially given that policy details, such as the the language that must be used when labeling products and the information provided to consumers, can significantly moderate the effect of GI

recognition.

Geographical Indications

Geographical identifications have been recognized in international agreements dating back to the Paris Convention for the Protection of Industrial Property of 1883. Currently, a number of international agreements govern GIs. The agreements with the strictest protections of GIs are the Madrid Agreement for the Repression of False or Deceptive Indications of Source on Goods and the Lisbon Agreement for the Protection of Appellations of Origin and their International Registration. The strictness of these agreements may explain their small number of signatories – just 34 and 28 for the Madrid and Lisbon Agreements, respectively. The absence of broad international agreements on GIs has led to large discrepancies in the treatment of GIs across countries.

In the EU, symbols and labels connecting a product to a specific place are protected through two different labels: *Protected Designation of Origin* (PDO) and *Protected Geographical Indication* (PGI). Producers outside the region associated with a PGI or PDO are precluded from using the protected symbol or label even if it is employed in conjunction with terms such as “style” or “type.”

In contrast to the EU, the US and Canada (prior to CETA), have significantly weaker protections for GIs. Neither of these countries have extended GI protections beyond the mandate of the WTO agreement on Trade Related Aspects of International Property Rights (TRIPS). The recognition of GIs has been a key issue in the US-EU trade negotiations between the EU and US (Johnson, 2017). Throughout these negotiations, the US has argued that their current laws governing patents and trademarks (15 U.S.C. §§1114, 1125) are sufficient to protect agricultural products with a credible claim to a GI designation (Babcock, 2015). Meanwhile, the EU has emphasized the relatively small number (five percent) of EU

GIs that are problematic under current US law (Serra, 2015). The treatment of GIs in CETA could be viewed as a middle ground between these positions and might serve as a template for US-EU negotiations.⁴

There are two primary economic arguments in favor of protecting GIs. The first argument is that GIs correct asymmetric information (Josling, 2006). According to this argument, if consumers expect feta cheese to be Greek, then policymakers ought to ensure that only Greek cheese is labeled as such. However, one can question the validity of this argument, in the Canadian context. Currently, 90% of feta cheese consumed in Canada is of Canadian origin.⁵ It is, therefore, unlikely that the average Canadian consumer associates the term “feta” with cheese that is produced in Greece. Instead, they likely think of feta as the generic name for a crumbly, white, brined cheese, regardless of its origin. It is not uncommon for consumers to use GIs, such as port and champagne, or trademarks, such as Kleenex and Band-Aid, as generic terms for a class of products. Forcing Canadian producers to use a modifier (such as “style” or “type”) when marketing what would have previously been labeled as feta cheese, will likely confuse consumers more than inform them. It seems probable that consumers would logically think that “imitation feta” is something other than the domestically produced feta cheese they have purchased in the past, or, perhaps, not even cheese at all.

The second economic argument in favor of GIs centers on product quality. Moschini, Menapace, and Pick (2008) show in a theoretical model that producers in a protected region have an incentive to enact quality standards in order to differentiate their product. These higher standards not only improve quality, but also welfare. Again, this argument does not appear to apply to the protections of GIs in CETA. Prior to CETA, Canadian consumers could clearly differentiate Greek feta cheese and Canadian feta cheese through country of ori-

⁴A comprehensive discussion of GIs can be found in Goldberg (2001) and Josling (2006). These overviews outline some of the complications in the recognition of GIs, such as the conflict between GIs and registered trademarks, the treatment of homonymous terms, and policy enforcement.

⁵In 2017, Canada produced 7,927 tonnes of feta cheese and imported 807 tons (CanadaDairy, nd).

gin labels. These country of origin labels provide Greek producers the ability to differentiate their product without restricting the use of the term “feta.”

The economic argument against protections of GIs is that they provide a monopoly to a geographically limited set of producers, resulting in higher prices and deadweight loss. The value of this monopoly is most visible on the border of the Champagne region in France. Land within the region of Champagne can sell for €1,000,000 per hectare, while similar tracts of land in neighboring regions fetch only €4,000 per hectare (Deconinck and Swinnen, 2014).

In many instances, domestic producers have responded to foreign GIs by re-branding their products using another term. The best-known example would be the re-branding of “champagne” as sparkling wine. Similarly, after the signing of the 2013 Canada-EU Wine and Spirits Agreement, “port” became a protected GI. The Canadian Vintners Association recommended that Canadian wine producers re-label “port” as tawny, ruby, or vintage (Canadian Vintners Association, 2013). Other wine producers rebranded their erstwhile “port” as pipe (Kerr, 2006).

Producers in other countries have also adopted new terminology in reaction to foreign GIs. South African wine producers were forced to discontinue using the term “port” in 2012 because of a trade agreement with the EU. South African port producers had once marketed their port using terms such as Cape vintage port and Cape ruby port. After the agreement with the EU they simply dropped the term “port” from these names, marketing their wine as Cape vintage and Cape ruby (Buzzeo, 2013).

Consumer response to these re-labelling initiatives is unclear and serves as the motivation for our current study. Kerr (2006) is sanguine about the ability of marketers to innovate around GI labels, stating that, “there is no way that a blunt instrument such as a WTO agreement can be used to control efforts of firms to inform consumers that their new products are close substitutes for products associated with geographic indicators” [p.10]. However,

the current fight over GIs implies that, at least some producers, believe that it will not be so easy to mitigate the effects of GIs through product marketing.

Survey and Methodological Background

The data used in this study were obtained through an online survey delivered by the company *Asking Canadians*. The pool of respondents was generated by random-digit dialling and stratified to mimic the age, gender, and geographic distribution of the Canadian census. The survey was offered in both English and French, however, in this paper, we focus only on English language respondents. We drop the French observations because a major focus of our analysis is the terminology used on labels (i.e., “imitation,” “style,” and “type”), and this terminology is not comparable across the two languages.⁶

The survey screened out respondents who did not have the primary or shared responsibility for grocery shopping in their household. After passing the screening questions, respondents completed a hypothetical choice experiment in which they were asked to imagine that they were shopping for a particular type of cheese. Respondents were then queried about their past purchases of cheese, shopping habits, food values (i.e., the importance placed on various characteristics when making food choices), familiarity with trade agreements, and socio-demographic characteristics.

Choice experiment

Each respondent completed five different choice tasks. In each choice task, respondents were told to imagine that they were in a grocery store and were shopping for a particular type of cheese, either asiago, feta, or gorgonzola. Respondents were then shown an image of two blocks of cheese (see figure 1). They could choose to buy one of the two blocks or

⁶We provide results from the French language respondents to the survey in Appendix C.

purchase neither. Both blocks of cheese were 100g, and the two images were nearly, though not perfectly, identical in shape.⁷ The prices of the two blocks of cheese were independently drawn from a uniform distribution between two and six Canadian dollars. Each cheese was labelled with its place of origin; four places of origin were considered (a) Canada, (b) the USA, (c) the respondent’s province of residence, and (d) the catchment area of the geographic indication – Italy for asiago and gorgonzola, and Greece for feta. For simplicity, we shall refer to cheese produced in the catchment area of the GI as being made in the EU. In each choice task, the places of origin of the two blocks of cheese were drawn randomly without replacement.

Our survey had three different treatment levels: a cheese treatment level, a policy treatment level, and a label treatment level (see figure 2). Each respondent was assigned to one, and only one, treatment at each level. At the cheese treatment level, respondents were assigned to one of the three cheese types: asiago, feta, or gorgonzola.

At the policy treatment level, respondents were assigned to one of three policies: no GI, GI, and GI with information. The no GI treatment captures the type of labels that consumers observe prior to the signing of CETA; cheese is simply labeled with the name of the cheese, the region or country of origin, and a PGI for EU cheese. The GI treatment reflects labeling requirements post-CETA; cheese made outside of the catchment area of the GI (i.e., in the US or Canada) is labeled using a language modifier – either imitation, style or type. In the GI with information treatment, the labels are the same as in the GI treatment, but respondents are given information about GIs and CETA before completing the choice tasks. The information stated that if new Canadian producers manufactured a cheese that was covered by a GI, they would be required to modify the language on their label. The information script, along with the entire survey, is contained in Appendix B.

Finally, in the labeling treatment, cheese produced outside the EU is given one of the

⁷Controlling for differences in the shape of the cheese had no impact on the results

three language modifiers: imitation, style, or type. Evidently, the labeling treatment is irrelevant for respondents assigned to the no GI policy treatment.

To recap by example, one particular respondent might be assigned to the asiago cheese treatment, the GI policy treatment, and the “style” language treatment. This respondent would only see asiago cheeses, and all cheese produced outside of Italy would be labeled as “asiago style.”

Descriptive statistics

Descriptive statistics of the main explanatory variables are contained in table 1. The sociodemographic statistics are a reasonable approximation of the Canadian population. The youngest age category is somewhat underrepresented in our sample: in the census, 19% of adults are between 18 and 29, while only 13% of the sample falls into that age group. Conversely, the sample has six percentage points more 30-39 year olds than the census. The shares of all other age categories are within three percentage points of the census. The median income in the census (\$70,336 in 2016) is within the median range in our sample (\$60,000 to \$80,000).

Individuals in our sample are, on average, not very familiar with GIs or CETA: the mean familiarity with CETA is 2.5 on a scale of 1-5, significantly less than the mean familiarity with the North American Free Trade Agreement (NAFTA), which stands at 3.5 on the same scale. As expected, feta cheese is the most familiar of the three types of cheese, while gorgonzola is the least familiar. The differences in familiarity across the three types of cheese are all statistically significant. Finally, the importance that respondents put on the food values is similar to prior studies; respondents place the most importance on food safety, taste, price, and nutrition (Lusk and Briggeman, 2009; Slade, 2018).

Empirical model

We assume that the utility the i^{th} individual obtains from the j^{th} cheese is a function of (a) the price, (b) the type of cheese (asiago, feta, gorgonzola), (c) the place of production (EU, US, Canada, the province of the respondent), (d) the wording on the label (“style,” “type,” or “imitation”), and (e) the information a respondent received:

$$\begin{aligned}
 u_{i,j} = & \beta_{PRI,i}Price_j + \beta_{ASI,i}Asiago_j + \beta_{FET,i}Feta_j + \beta_{GOR,i}Gorgonzola_j + \\
 & \beta_{PROV,i}Made\ in\ province_j + \beta_{CAN,i}Made\ in\ Canada_j + \beta_{EU,i}Made\ in\ EU_j + \\
 & \beta_{IM,i}Imit_j + \beta_{ST,i}Style_j + \beta_{TY,i}Type_j + \\
 & Info_i(\beta_{IM-I,i}Imit_j + \beta_{ST-I,i}Style_j + \beta_{TY-I,i}Type_j + \beta_{EU-I,i}Made\ in\ EU_j) + e_{i,j}.
 \end{aligned} \tag{1}$$

All the variables in equation 1, other than price, are indicator variables. We model the effect of the information treatment (denoted $Info_i$), by interacting it with dummy variables for each of the labelling treatments and a dummy variable for cheese made in the EU.

We estimate preferences using both multinomial logit and mixed-logit models. The mixed-logit model assumes that preferences are heterogeneous, with all coefficients drawn from a normal distribution save for the coefficient on price, which we assume to be negative and log-normally distributed in absolute value. We also tested sign restrictions on other coefficients. In particular, we hypothesized that the variables indicating that a product was labeled with “imitation,” “style,” or “type,” would have negative coefficients. We, therefore, estimated models that assumed the absolute value of these coefficients ($\beta_{IM-N,i}$, $\beta_{ST-N,i}$, $\beta_{TY-N,i}$) was distributed according to either a log-normal distribution or a normal distribution truncated at zero. However, the normal distribution returned a better model fit than either of these alternate specifications.

Willingness-to-pay

We calculate WTP using a simulation method proposed by Hensher and Greene (2003). To illustrate this method, consider WTP for cheese labeled as made in Canada. In a simple multinomial logit model, we could calculate WTP by dividing the coefficient on made in Canada by the coefficient on price,

$$\text{WTP}(\text{made in Canada}) = \frac{\beta_{CAN}}{\beta_{PRI}}. \quad (2)$$

The standard error of WTP can be found using the delta method.

Estimating WTP is somewhat more complex with random parameters. We use the following algorithm to obtain a distribution of both the median and standard deviation of WTP:

1. Draw the means and standard deviations of all parameters from their sampling distribution.
2. Make 1,000 draws from the distributions based on the means and standard deviations drawn in the previous step.
3. For each of the thousand draws calculate WTP according to equation (2).
4. Calculate the median and standard deviation of the 1,000 WTP estimates.
5. Repeat 1,000 times to obtain a sampling distribution for the median and standard deviation of the WTP distribution.

Hensher and Greene (2003) and Armstrong, Garrido, and de Dios Ortúzar (2001) point out that the mean WTP estimates can become skewed when taking the ratio two random parameters, particularly when the denominator is drawn from the log-normal distribution. We, therefore, focus on the median of the distribution, as opposed to the mean.

Results

The results from our base model are presented in table 2. The coefficients on the cheeses (asiago, feta, and gorgonzola) are all positive and significant, which is consistent with individuals generally purchasing cheese. We expected respondents to be most likely to purchase feta, the best-known cheese, and least likely to purchase gorgonzola, the least familiar cheese. However, the differences in these coefficients are not significant in either the multinomial logit or in the mixed logit model.

As expected, consumers prefer cheese that is made either locally, or in Europe, relative to cheese produced in the United States. The difference between the mean values of the place of origin coefficients is statistically significant at the one percent level. This suggests that pre-CETA, when cheese only carried country of origin labels, the average Canadian preferred cheese produced in their province to cheese produced in the EU. This finding provides justification for the EU's push to obtain GI recognition in CETA, as absent such labeling restrictions, Canadians prefer domestic products. It is interesting, however, to note that the standard deviation of the coefficient on made in Europe is larger relative to the two other place of origin coefficients, which implies that there are particular consumers who highly value authentically sourced cheese.

Norris and Cranfield (2019) also find that Canadian consumers derive utility from place of origin labels. In their survey, Canadian consumers were willing to pay considerably more for Canadian dairy products, relative to products produced in other countries. However, our studies diverge in how consumers view European products. In Norris and Cranfield (2019), consumers were willing to pay the same amount for American and British cheddar, and close to the same amount for American and Italian gouda. This begs the question of why consumers in our survey valued European cheese more than they did in Norris and Cranfield (2019), even in the absence of GI labels. We think the difference may lie in the presentation

of our choice tasks. Norris and Cranfield (2019) use text in their choice tasks, whereas we use pictures. Further, in our pictures of European cheese, we include a symbol denoting that the cheese has a Protected Geographical Indication, which may connote authenticity to consumers.

Our results could also be seen as implying an anti-American bias among Canadian consumers, or simply a belief that American goods are of inferior quality. Certainly, Canadians have taken a more disapproving view of their southern neighbour in recent years,⁸ however, there is little evidence that this has translated into decreased demand for American products.⁹ Given that Norris and Cranfield (2019) do not find that American products are discounted vis-à-vis European or Australian products, we think it is more likely that the coefficients on place of origin labels reflect consumers preference for products that are produced locally, or in a traditional production region, rather than a dislike of American products.

The impact of stronger protections for GIs (that is requiring domestic producers to label their products with “style,” “type,” or “imitation”), depends on the terminology used on the label and the information given to consumers. When no information on GIs is given, consumers significantly discount cheese that is labeled as “imitation.” They apply a more modest discount to cheese labeled as “style,” while cheese labeled as “type” is not discounted at all. This suggests Canadian cheese makers can mitigate the effect of GI recognition through product marketing. It also underscores the importance of providing latitude to food marketers when recognizing GIs. For example, the EU could increase the strictness of GI protection by forcing more salient terms (such as “imitation”) to be used on packaging.

The provision of information on GIs has two effects on consumer preferences. First, it

⁸In a 2018 survey of 2,000 Canadians, Environics Institute (2018) found that 57% held an unfavourable view of the United States, while only 37% held a favourable view. By comparison, in 2012, just 29% of respondents held an unfavourable view, while 68% held a favourable view.

⁹According to Statistics Canada, imports to Canada from the USA are up 4.6% over the past two years (measured in dollar value and adjusted for inflation). The share of imports from the United States is down 1.3 percentage points in the last two years, which reflects a general decline in the share of US imports over the past 20 years.

increases WTP for all cheeses, both those produced outside of the EU and those produced in the EU. It may be the case that the information provided in the survey has an “advertising” effect; respondents may value the fact that cheese has a special history tied to a particular region, even if it is not currently produced in that region. Second, information mediates the negative impact of the label “imitation” and “style” labels. When information is provided to individuals, the utility they receive from cheeses labelled as “imitation” or “style” increases in relation to the utility they receive from cheese made in the EU.

Product and market characteristics

In this section, we analyze whether characteristics of the product or the market moderate the impact of GI recognition. To do so interact the GI-related terms (“style,” “type,” and “imitation”) and the place of origin (EU, Canada, and province) with each other, and with indicator variables for the type of cheese (asiago, feta, and gorgonzola) and the familiarity individuals have with GIs and CETA. We treat the coefficients on these interaction terms as fixed in the mixed-logit model.

The full results of the model are contained in Appendix A (table A1). Overall, the interaction terms add little explanatory power to the model. We do find that consumers pre-existing familiarity with GIs is correlated with stronger preferences for place of origin labels. Suggesting that consumers who value place of origin are more likely to be informed about labels that speak to a product’s origin.

We also find that familiarity with both GIs and CETA influence the effect of the information treatments. Recall that the information treatment generally increased consumers’ utility for cheese regardless of its place of origin. For consumers with more pre-existing information about GIs, the effect of information is generally weaker (i.e., the interaction terms involving information are generally negative, save for the interaction with “style”). Conversely, the effect of information was stronger for respondents who had greater pre-existing information

about CETA.

Sociodemographic characteristics

To determine how sociodemographics moderate place of origin and GI labels, we interact these variables with the individual’s age, gender, education, and income, as well as a variable that captures how often an individual has traveled to Europe. The full results of this model are contained in Appendix A (table A2).

We find that age and gender moderate consumer preferences for place of origin. Younger people have a stronger preference for cheese that is made in the EU, while older respondents have a stronger preference for cheese that is made in Canada. Previous research has also found that age increases preferences for local food (Feldmann and Hamm, 2015; Stanton, Wiley, and Wirth, 2012). The finding that age is negatively associated with utility from EU cheese, comports with past research showing that younger people are more interested in authenticity (Danshekhu, 2018) and more comfortable with foreign products and foods (FoodInsight, 2015). There is a similar preference difference in terms of gender; women have stronger preferences for locally produced food more than men, while men have stronger preferences for cheese made in the EU. However, these coefficients are not statistically significant.

The interactions between age and GI related labels are all negative and jointly significant at the ten percent level, which suggests that older consumers find these labels more off-putting. Intriguingly, women are also more affected by inauthentic labels when they are not provided any information – the coefficients on the interaction of gender and GI labels are negative (except for the coefficient on “style”, which is close to zero) and jointly significant at the five percent level. This finding is consistent past research showing that women have stronger preferences for other food labels such as local (Feldmann and Hamm, 2015; Loureiro and Umberger, 2003), organic (Hughner et al., 2007), and GM-free (Burton et al., 2001). Conversely, women are less affected by labels when they are provided with information,

though these variables were not jointly statistically significant.

The education and income of participants appear do not appear to moderate preferences for country of origin or GI related labels. Not surprisingly, the frequency of travel to Europe increases the utility individuals receive from for cheese made in the EU, though it does not moderate any other variable.

Food values

Finally, we interact place of origin and labeling variables with consumers food values (i.e., the importance that respondents place on certain food attributes). In our survey, we asked respondents about the importance they place on the list of food attributes contained in Lusk and Briggeman (2009) (we made one minor modification to this list, replacing “tradition” with “authenticity”). However, we hypothesized that some of these values (i.e., fairness, animal welfare, novelty, and convenience) are orthogonal to preferences for place of origin and GI related labels. Indeed, models without these food values are preferred by both the Akaike and Bayesian information criteria.

The results of the food values model are, again, in Appendix A (table A3). Food values play a large role in shaping consumer preferences for place of origin labels. Not surprisingly, respondents who value price have a lower WTP for place of origin labels, conversely, taste has a positive effect on preferences for cheese produced in the EU and to a lesser extent in Canada, suggesting that “foodies” value both food that is authentically sourced and produced locally.

Those who value the environment are more likely to prefer locally sourced food, which is consistent with the narrative of local food having fewer “food miles” or a lower environmental impact (Brown, Dury, and Holdsworth, 2009; Stanton, Wiley, and Wirth, 2012). Finally, there is an interesting interplay between the “authenticity” and “origin” food values. Consumers who value authenticity are more likely to prefer EU cheese (the authenticity

coefficients are jointly, though not individually significant), while those who value origin are more likely to prefer locally produced cheese. Evidently, when respondents say they value origin, what they really mean is they prefer local food.

Food values explain little of the heterogeneity in consumer preferences for GI related labels. As we suspected, consumers who value the origin of their food are generally more affected by GI labels. The three-way interactions between GI labels, information, and the importance consumers place on food origin are also jointly significant, though we did not have an *ex ante* hypothesis relating to these variables.

Market implications

Ultimately, farmers, food marketers, and policymakers are concerned with the impact that stronger recognition of GIs will have on markets. We consider the impact of stronger GI recognitions in two different ways. First, we estimate how these policies will impact WTP. Second, we examine how these policies impact the market share of cheese produced in different countries under a variety of scenarios.

Willingness to pay

Table 3 reports the effect of product of origin and GI labeling on consumers' WTP for cheese based on the multinomial logit regression coefficients reported in table 2. The table contains consumers WTP for cheese based on its place of origin, labeling treatment, and the information treatment (relative to cheese that is made in the US and has no GI related labels). The implications are, of course, similar to table 2. Given that the typical price for 100g of feta cheese in a Canadian grocery store is around \$4.00, the WTP for place of origin labels and to avoid cheese with the modifiers "imitation" and "style," appears to be economically significant.

Market share

WTP estimates do not provide a complete picture of how domestic producers would be impacted by stronger protections for GIs. For example, certain labeling and information treatments raise WTP for both Canadian and European cheese. If the market shares of Canadian and European cheeses were held constant, then the Canadian cheese industry might benefit as they could charge more for their product. However, if WTP for European cheese increased more than WTP for Canadian cheese, then Canadian cheese might be harmed by a loss of market share. In this section, we simulate the market shares for cheeses made in Canada, the US, and the EU under a variety of pricing assumptions (we do not consider cheese that is made in a respondent's province).

To understand how market shares might be affected by GI recognition, it is necessary to have some understanding of Canadian dairy policy. The Canadian dairy market is rationalized by a system of supply management, which gives producer groups the right to restrict milk production and thereby achieve a higher price. Imports to Canada are constrained through tariff rate quotas (TRQs). Under these TRQs, a small percentage of dairy products are allowed into the country under nominal tariffs, while additional imports over the quota limit are charged a prohibitively high tariff, in excess of 200% for most product lines (Schmitz, Furtan, and Baylis, 2002, Ch. 10). Under CETA, Canada agreed to import 18,500 tons of European cheeses annually by the sixth year of the deal. While this represents only about 2% of domestic cheese production, it is likely that imports of specialty cheeses will be significantly greater in percentage terms. Over 75% of the Canadian cheese market is cheddar, cream cheese, and mozzarella (CanadaDairy, nd) – these low-priced cheeses are unlikely to see significant imports from the EU. Instead, the bulk of EU cheese imports will likely be in the form of higher value cheeses, such as asiago, feta, or gorgonzola.

We simulate market shares using estimates from the mixed-logit model in table 2. We denote the market share of a country, as the proportion of consumers who would purchase

cheese that is produced in that county. One drawback of this approach is that some consumers will shop for cheese more frequently than others, and it could be the case that frequent cheese buyers have stronger or weaker preferences for foods with certain place of origin or GI related labels. Nonetheless, this exercise provides some insight into the market shares that could be expected under various labelling treatments.

We consider market shares under three different scenarios. Across all scenarios we assume the price of Canadian cheese is fixed at \$4 per 100g. We expect the price of Canadian cheese is independent of the quantity of production. This is because there is free entry into cheese processing in Canada, and the price of raw milk is unlikely to be affected by changes in the consumption of asiago, feta and gorgonzola cheese (which account for a small fraction of Canadian milk production).

Table 4 presents the predicted market shares for feta cheese. The results for asiago and gorgonzola are quite similar and are contained in Appendix D. In the first scenario, we assume that EU cheese is priced at \$4 per 100g and there are no constraints on imports. In this scenario, Canadian cheese captures 43% of the market when there is no GI labeling. However, when the “imitation” label is used, the Canadian market share is cut to about one-third of its previous level. Most of this market share moves to Greek cheese, though there is also an increase in the proportion of consumers who do not purchase any cheese. When the “type” label is used, the Canadian market share falls by three percentage points, and the loss in market share is further moderated when information is provided.

In the second scenario, the price of EU cheese is increased to \$5 per 100g. As one would expect, this increases the market share of Canadian cheese and the fraction of consumers who do not purchase the product (especially when Canadian cheese is labelled as “imitation”).

These two scenarios may be somewhat unrealistic as TRQs limit the amount of cheese that is imported into Canada. Currently, imports account for about nine percent of Canadian feta consumption. This percentage will likely rise under CETA, as European cheese imports

are slated to increase by 237% (Dairy Farmers of Canada, 2017). In the third scenario, we assume that imports of feta cheese are capped at 20% of the potential market for cheese (in the base scenario only 85% of consumers actually purchase feta cheese, hence the actual market share of EU cheese is 23.5%, two and a half times the current level of imports.) We assume that the price of EU cheese is set to maximize revenue, while the price of Canadian cheese remains at \$4 per 100g.

In the third scenario, when there is no GI labelling Canadian cheese captures 57% of the potential market. The share of Greek cheese is fixed at 20% and the revenue-maximizing price of Greek cheese is \$5.25. When the imitation label is used, significantly fewer consumers purchase Canadian and American cheese. The revenue-maximizing price of Greek cheese is predicted to be \$11.02. This result should be treated with some skepticism as it requires an out of sample prediction – in our experiment the maximum cheese price was \$6. Nonetheless, it does demonstrate that, under certain labelling treatments, the recognition of GIs transfers significant rents to foreign producers. In contrast, when the type label is used the market share of Canadian cheese is virtually the same as when there are no GI protections. Although the revenue-maximizing price of Greek cheese is somewhat higher – \$5.84. Finally, when the type label is used and information is provided to respondents, both domestic and foreign producers benefit relative to when there was no GI recognition. Canadian cheese gains an extra 5% of the potential market, and the revenue maximizing price of Greek cheese increases to \$6.20.

Conclusions and policy implications

In this article, we examine the impact of stronger protections for foreign geographic indications on consumer preferences and domestic producers. In particular, we analyze the labeling policies mandated under the recent trade agreement between Canada and the EU.

This agreement on GIs represents a middle-ground between the strict GI protections advocated by the EU and the lax policies that are favored by other developed countries, such as Canada and the United States. We believe that a similar compromise over the protection of GIs might arise in future trade agreements, such as the agreement currently being discussed between the EU and the US.

We find that consumer preferences can be significantly affected when domestic producers are forced to label their cheese with certain modifiers. However, this effect is moderated, and, indeed, completely eliminated, depending on the terminology used, and the information provided to consumers. In fact, we find that when GI protections are accompanied by information and trade restrictions (such as those included in CETA), both domestic and foreign producers can gain from GI protections. This result arises because information about GIs increase consumers WTP for all cheese, not just those produced in the catchment area of the GI.

Similar to Norris and Cranfield (2019), we find that Canadian consumers are willing to pay more for cheese that is produced locally. However, unlike Norris and Cranfield (2019), we also find that consumers are willing to pay more for cheese that is produced in traditional production regions. We argue that these differences may be due to experimental differences across our two studies. Collectively, both our studies can be taken as evidence that Canadian cheese producers can obtain higher prices by highlighting the place of origin on cheese labels.

We have left aside a number of important questions. We make no effort to calculate welfare measures. In this setting, welfare calculations are fraught with philosophical complications. For example, labeling Canadian cheese as “imitation” reduces the utility consumers receive from that cheese. Under a traditional conception of welfare, this would reduce the consumer surplus from purchasing Canadian cheese. However, advocates for the protection of GIs might counter that this is not actually a reduction in welfare, as consumers were previously being misled about the origin of the product.

We also do not analyze the effect of even stricter GI protections, which would prevent terms like asiago, feta, or gorgonzola from being used at all. Under such a policy Canadian cheese manufacturers would have to label their cheese using some name other than “feta.”

Finally, we have not modelled the grandfathering in of existing cheese producers. Under CETA, existing Canadian cheese producers can continue to market their cheese without using any modifiers. Our assumption is that in the long run there will be turnover in the food processing industry, eliminating the products that were grandfathered in. However, in the short- to medium-term the grandfathering provision in CETA may benefit existing Canadian cheese producers. We also suspect the grandfathering of existing producers will amplify consumer confusion, as some Canadian cheeses will be labeled with modifiers and other Canadian cheeses will not.

Overall, our results suggest that the details are very important when setting GI policies. We find that protecting GIs can generate significant gains for European producers, either through increased market shares or higher prices. However, we also find that domestic cheese producers can partially neutralize the effects of GI protection through the judicious selection of which modifying terms to use on their labels and the information provided to consumers. For policymakers who wish to preserve domestic industries while recognizing foreign GIs, it is therefore important to leave domestic firms with as much latitude as possible when marketing their products. Conversely, countries that want to protect their GIs should try to foreclose these avenues for product marketing.

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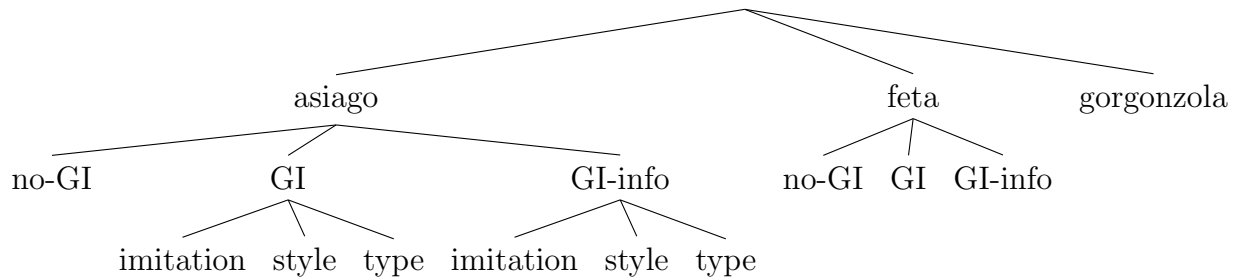
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Figure 1: Sample choice tasks

(a) Feta cheese treatment			(b) Asiago cheese treatment		
Product	Cost	Choice	Product	Cost	Choice
Feta cheese made in Canada 	\$4.00	<input type="radio"/>	Asiago style cheese made in Ontario 	\$3.35	<input type="radio"/>
Feta cheese made in Greece 	\$5.30	<input type="radio"/>	Asiago cheese made in Italy 	\$4.70	<input type="radio"/>
Neither	--	<input type="radio"/>	Neither	--	<input type="radio"/>

Note: Panel (a) presents an indicative example from the “no-GI” policy treatment where feta cheese produced outside of Greece requires no language modifiers, though Greek cheese still bears the PGI symbol. Panel (b) presents an indicative example from both the “GI” and “GI-info” policy treatments where asiago cheese produced outside Italy requires a language modifier.

Figure 2: Assignment to treatments



Note: The game tree provides a suggestive, though incomplete, description of assignment of respondents to treatments. The “No-GI,” “GI,” and “GI-info” treatments exist for all three cheese types. Similarly, the three language treatments exist for each cheese type. However, language treatments exist only for the “GI” and “GI-info” policy treatments, since no language modifiers are required under the “no-GI” treatment.

Table 1: Descriptive statistics

Variable	Mean (St Dev)
Sociodemographics	
Age ^a	3.42 (1.59)
Female	0.531
Education ^b	5.20 (1.33)
Income ^c	4.43 (1.93)
Children in the household	0.400 (0.780)
Frequency of	
Cheese consumption ^d	2.21 (0.995)
Travel to EU ^e	2.64 (1.68)
Familiarity with^f	
NAFTA	3.54 (1.04)
CETA	2.50 (1.13)
Asiago	3.33 (1.23)
Feta	4.08 (0.996)
Gorgonzola	2.89 (1.26)
Geographic indications	3.07 (1.24)
Food values^f	
Price	4.20 (0.881)
Taste	4.49 (0.891)
Nutrition	4.09 (0.929)
Environment	3.56 (0.979)
Authenticity	3.44 (1.02)
Origin	3.70 (0.967)
Appearance	4.03 (0.941)
Fairness	3.59 (0.950)
Naturalness	3.56 (1.05)
Safety	4.60 (0.895)
Animal welfare	3.66 (1.06)
Novelty	2.94 (0.870)
Convenience	3.47 (0.992)
Number of respondents	833

^a1=18-29 years; 2=30-39; 3=40-49; 4=50-59; 5=60-69; 6=70 or older.

^b1=No high school; 2=Some high school; 3=High school; 4=Some post-secondary; 5=College degree; 6=Bachelors; 7=Masters; 8=PhD.

^c1=Less than 25; 2=25-40; 3=40-60; 4=60-80; 5=80-100; 6=100-125; 7=More than 125 (000s).

^d7 point scale: 1=Less than once a year; 7=Daily or more.

^e1=Never; 2=Once; 3=2-3 times; 4=4-5 times; 5=5-10 times; 6=More than 10 times.

^f5-point scale.

Table 2: Multinomial and mixed logit models

	Multinomial logit	Mixed logit	
		Mean	Standard deviation
Price	-0.609 (0.031)***	-1.23 (0.075)***	0.819 (0.100)***
Type of cheese			
Asiago	2.55 (0.228)***	7.79 (1.64)***	4.33 (1.34)***
Feta	2.53 (0.225)***	8.12 (0.785)***	4.15 (0.814)***
Gorgonzola	2.27 (0.242)***	7.42 (0.810)***	4.86 (0.502)***
Place of origin			
Canada	1.33 (0.077)***	1.93 (0.118)***	0.033 (0.193)
Province	1.60 (0.081)***	2.37 (0.134)***	0.868 (0.200)***
Europe	1.22 (0.123)***	1.59 (0.189)***	1.77 (0.202)***
Labels			
Imitation	-1.71 (0.230)***	-5.02 (0.585)***	3.96 (0.419)***
Style	-0.420 (0.217)*	-1.00 (0.406)**	1.01 (0.291)***
Type	-0.068 (0.207)	-0.336 (0.364)	1.26 (0.536)**
Information treatment (interaction terms)			
Imitation	0.873 (0.308)***	3.60 (1.18)***	0.210 (1.27)
Style	1.12 (0.295)***	3.34 (1.02)***	0.195 (0.559)
Type	0.731 (0.283)***	2.45 (1.13)**	0.764 (0.611)
Europe	0.692 (0.198)***	2.46 (1.03)**	0.890 (0.968)
Model information			
Observations	12,495	12,495	–
Log-likelihood	-3,420.15	-2,700.273	–

Standard errors are in parentheses. *, **, *** represent significance at the 10%, 5% and 1% levels.

Table 3: Willingness-to-pay for cheese labels

	No information		Information	
	Mean	St dev	Mean	St dev
No additional label				
Made in Canada	1.88 (0.134)***	1.53 (0.258)***	–	–
Made in Province	2.20 (0.165)***	2.24 (0.345)***	–	–
Made in EU	1.31 (0.203)***	6.96 (1.02)***	–	–
Made in USA	Base case		–	–
Imitation label				
Made in Canada	-2.60 (0.506)***	6.12 (0.948)***	0.457 (1.02)	5.86 (0.791)***
Made in Province	-2.22 (0.489)***	6.12 (0.926)***	0.823 (1.06)	6.01 (0.769)***
Made in EU	1.31 (0.203)***	6.96 (1.02)***	4.11 (1.02)***	8.08 (1.07)***
Made in USA	-4.39 (0.548)***	6.86 (1.09)***	-1.20 (1.02)	5.95 (0.852)***
Style label				
Made in Canada	0.812 (0.374)**	1.66 (0.490)***	4.02 (1.03)***	3.74 (0.861)***
Made in Province	1.19 (0.381)***	2.22 (0.461)***	4.40 (1.04)***	4.23 (0.884)***
Made in EU	1.31 (0.203)***	6.96 (1.02)***	4.11 (1.02)***	8.08 (1.07)***
Made in USA	-0.878 (0.378)**	1.69 (0.413)***	2.16 (0.964)**	2.52 (0.711)***
Type label				
Made in Canada	1.40 (0.355)***	2.21 (0.672)***	3.71 (1.20)***	3.94 (0.942)***
Made in Province	1.78 (0.363)***	2.74 (0.593)***	4.10 (1.21)***	4.40 (0.945)***
Made in EU	1.31 (0.203)***	6.96 (1.02)***	4.11 (1.02)***	8.08 (1.07)***
Made in USA	-0.285 (0.319)	1.81 (0.688)***	1.91 (1.10)*	2.93 (0.790)***

Willingness-to-pay measures are relative to cheese that is made in the USA without any additional labels.

Table 4: Predicted market share of feta cheese

	Greece	Canada	USA	No purchase
Greek feta at \$4				
No GI protection	0.37	0.43	0.06	0.14
Imitation label	0.68	0.12	0.02	0.18
Type label	0.41	0.39	0.06	0.14
Type label with information	0.45	0.42	0.06	0.07
Greek feta at \$5				
No GI protection	0.23	0.54	0.08	0.15
Imitation label	0.58	0.16	0.02	0.23
Type label	0.28	0.49	0.07	0.16
Type label with information	0.31	0.53	0.08	0.09
Greek feta at 20% share of potential market				
No GI protection	0.20	0.56	0.08	0.16
Imitation label	0.20	0.34	0.05	0.40
Type label	0.20	0.55	0.08	0.17
Type label with information	0.20	0.62	0.09	0.09

**Online-Only Appendix to “Foreign Geographical
Indications, Consumer Preferences, and the Domestic
Market for Cheese”**

A Additional results

Tables A1 - A3 contain the results of models containing interaction terms that are referenced in sections 5.1-5.3 of the paper. The estimates in the table reflect coefficients on the interaction of the variable in the column header and the variable in the row header.

Table A1: Mixed logit model including product and market characteristics

	Mean	St dev	Asiago	Feta	Canada	Province	Fam. GI	Fam. CETA
Place of origin								
Canada	0.658 (0.370)*	0.245 (0.146)*	-0.059 (0.262)	0.038 (0.280)	–	–	0.274 (0.086)***	0.182 (0.103)*
Province	1.29 (0.388)***	0.839 (0.167)***	0.091 (0.290)	-0.309 (0.289)	–	–	0.308 (0.098)***	0.106 (0.112)
Europe	0.436 (0.558)	1.82 (0.237)***	0.348 (0.486)	-0.662 (0.450)	–	–	0.426 (0.169)**	-0.005 (0.166)
<i>F</i> -test ^a	–	–	0.760	0.158	–	–	0.005***	0.289
Labels								
Imitation	-5.32 (1.36)***	5.61 (0.709)***	1.99 (1.11)*	-1.76 (0.935)*	-0.165 (0.414)	-0.173 (0.472)	-0.099 (0.271)	-0.023 (0.309)
Style	-0.772 (1.08)	1.16 (0.431)***	0.660 (0.946)	-0.225 (0.744)	0.157 (0.401)	-0.156 (0.429)	-0.013 (0.328)	0.140 (0.386)
Type	-1.31 (1.06)	0.899 (0.480)*	-0.606 (0.994)	-0.743 (0.877)	-0.319 (0.354)	-0.283 (0.360)	0.330 (0.279)	-0.052 (0.333)
<i>F</i> -test ^a	–	–	0.230	0.300	0.731	0.880	0.620	0.979
Information treatment (interaction terms)								
Imitation	7.82 (2.00)***	2.30 (0.555)***	-3.43 (1.42)**	0.443 (1.55)	0.607 (0.599)	0.551 (0.621)	-1.69 (0.616)***	0.819 (0.596)
Style	2.10 (2.24)	0.076 (0.313)	-1.17 (1.58)	-0.230 (1.20)	-0.006 (0.440)	0.317 (0.499)	0.269 (0.479)	-0.167 (0.898)
Type	0.409 (1.67)	0.375 (0.469)	0.562 (1.46)	0.066 (1.48)	0.518 (0.404)	0.593 (0.446)	-0.383 (0.391)	1.11 (0.511)**
Europe	0.365 (1.57)	1.14 (0.386)***	0.154 (1.22)	0.525 (1.13)	–	–	-0.177 (0.352)	0.708 (0.570)
<i>F</i> -test ^a	–	–	0.137	0.941	0.449	0.404	0.045**	0.038**

Standard errors are in parentheses. *, **, *** denote significance at the 10%, 5% and 1% levels.

The model also includes covariates capturing the effect of the type of cheese and the price. These means of these coefficients are: Asiago 9.14 (1.02)***, Feta 8.37 (0.993)***, Gorgonzola 7.76 (0.829)***, Price -1.31 (0.10); and the standard deviations are: Asiago 5.02 (0.608)***, Feta 4.19 (1.22)***, Gorgonzola 4.83 (0.446)***, Price 0.85 (0.12).

Number of observations=3,365. Log-likelihood=-2,664.

^aP-value from a test of the joint significance of the interactions between the covariate in the column header and the covariates within the particular subtable (place of origin, labels, or information treatment).

Table A2: Mixed logit model including sociodemographics

	Mean	St dev	Age	Female	Education	Income	Travel to EU
Place of origin							
Canada	0.340 (0.810)	0.285 (0.829)	0.161 (0.078)**	0.337 (0.359)	0.029 (0.129)	0.094 (0.076)	0.119 (0.113)
Province	0.546 (0.918)	0.862 (0.258)***	0.335 (0.085)***	0.472 (0.448)	0.003 (0.135)	0.092 (0.081)	0.027 (0.095)
Europe	0.740 (3.29)	1.79 (0.441)***	-0.094 (0.257)	-0.269 (1.10)	0.087 (0.440)	0.007 (0.225)	0.403 (0.205)**
<i>F</i> -test ^a	–	–	0.000***	0.204	0.986	0.514	0.165
Labels							
Imitation	-1.82 (5.62)	4.36 (0.755)***	-1.01 (0.378)***	-1.94 (0.991)**	-0.081 (0.491)	0.417 (0.334)	-0.038 (0.765)
Style	-0.737 (2.74)	0.773 (0.362)**	-0.221 (0.285)	0.367 (1.72)	0.245 (0.397)	-0.129 (0.307)	0.028 (0.214)
Type	0.563 (8.10)	0.363 (2.68)	-0.370 (1.63)	-1.27 (1.91)	-0.078 (0.698)	0.255 (0.807)	0.030 (1.05)
<i>F</i> -test ^a	–	–	0.052*	0.047**	0.840	0.558	0.999
Information treatment (interaction terms)							
Imitation	1.49 (8.29)	1.55 (1.66)	-0.101 (0.636)	3.62 (1.75)**	0.575 (1.17)	0.160 (0.499)	-1.32 (1.01)
Style	3.35 (4.86)	1.24 (0.534)**	-0.212 (0.518)	0.478 (2.81)	-0.361 (0.678)	0.443 (0.402)	-0.161 (0.504)
Type	1.08 (10.4)	1.42 (0.553)**	-0.010 (1.15)	1.77 (2.47)	0.193 (1.23)	0.253 (0.946)	-0.639 (0.480)
Europe	2.46 (4.97)	0.847 (0.442)*	-0.705 (0.531)	1.47 (1.83)	0.079 (0.645)	0.506 (0.317)	-0.639 (0.525)
<i>F</i> -test ^a	–	–	0.364	0.140	0.690	0.339	0.153

Standard errors are in parentheses. *, **, *** denote significance at the 10%, 5% and 1% levels.

The model also includes covariates capturing the effect of the type of cheese and the price. These means of these coefficients are: Asiago 7.25 (0.716)***, Feta 8.37 (6.31), Gorgonzola 7.18 (1.15)***, Price -1.12 (0.10); and the standard deviations are: St devs: Asiago 3.67 (0.754)***, Feta 4.86 (3.87), Gorgonzola 5.23 (1.05)***, Price 0.45 (0.15).

Number of observations=3,365. Log-likelihood=-2,105.

^aP-value from a test of the joint significance of the interactions between the covariate in the column header and the covariates within the particular subtable (place of origin, labels, or information treatment).

Table A3: Mixed logit model including food values

	Mean	St dev	Price	Taste	Environment	Authenticity	Origin
Place of origin							
Canada	0.822 (0.629)	0.045 (0.193)	-0.646 (0.148)***	0.243 (0.133)*	0.403 (0.122)***	-0.092 (0.124)	0.487 (0.139)***
Province	0.174 (0.719)	0.811 (0.165)***	-0.635 (0.178)***	0.332 (0.163)**	0.443 (0.149)***	0.069 (0.129)	0.464 (0.159)***
Europe	-1.39 (1.57)	2.00 (0.257)***	-0.474 (0.345)	0.907 (0.336)***	-0.216 (0.326)	0.400 (0.271)	0.118 (0.286)
<i>F</i> -test ^a	–	–	0.000***	0.019**	0.002***	0.099*	0.004***
Labels							
Imitation	2.26 (3.95)	4.45 (0.878)***	1.06 (0.731)	-1.56 (0.756)**	0.916 (0.699)	0.075 (0.785)	-2.35 (0.971)**
Style	-2.86 (2.50)	0.712 (0.383)*	0.374 (0.460)	-0.170 (0.533)	-0.641 (0.526)	0.284 (0.437)	0.629 (0.648)
Type	-1.23 (2.21)	0.310 (0.893)	-0.326 (0.495)	0.693 (1.05)	-0.207 (0.438)	0.379 (0.516)	-0.398 (0.624)
<i>F</i> -test ^a	–	–	0.386	0.115	0.336	0.847	0.098*
Information treatment (interaction terms)							
Imitation	2.53 (3.49)	1.04 (0.960)	1.92 (1.23)	-0.486 (0.724)	-1.58 (1.19)	-1.65 (1.36)	1.85 (0.871)**
Style	5.19 (4.28)	1.10 (0.466)**	0.138 (1.02)	0.382 (0.613)	1.24 (0.574)**	-0.874 (0.621)	-1.60 (1.03)
Type	0.161 (5.74)	1.25 (0.968)	2.01 (1.20)*	-0.425 (1.14)	0.222 (0.816)	-0.923 (0.658)	-0.661 (0.957)
Europe	1.82 (4.40)	0.000 (0.523)	0.966 (1.25)	0.187 (0.642)	0.762 (0.761)	-0.659 (0.417)	-1.35 (0.728)*
<i>F</i> -test ^a	–	–	0.114	0.848	0.026**	0.146	0.054*

Standard errors are in parentheses. *, **, *** denote significance at the 10%, 5% and 1% levels.

The model also includes covariates capturing the effect of the type of cheese and the price. These means of these coefficients are: Asiago 0.108 (0.070), Feta 0.045 (0.193), Gorgonzola 0.811 (0.165)***, Price -1.34 (0.10); and the standard deviations are: St devs: Asiago 5.41 (1.04)***, Feta 4.89 (2.60)*, Gorgonzola 4.77 (0.482)***, Price 0.88 (0.20).

Number of observations=4,165. Log-likelihood=-2,595.

^aP-value from a test of the joint significance of the interactions between the covariate in the column header and the covariates within the particular subtable (place of origin, labels, or information treatment).

B Survey

Below is an off-line text version of the HTML survey that was delivered by *Asking Canadians*.

Screening questions

S1. Do you wish to proceed in English or in French?

- English
- French

S2. Are you responsible for grocery shopping in your household?

- Yes, I am the sole grocery shopper in my household
- Yes, I share grocery shopping responsibilities in my household
- No, I never or rarely buy groceries for my household

S3. When was the last time you ate any type of cheese?

- Within the past week
- Within the past month
- Within the past two months
- More than two months ago

S4. Please select the province in which you reside

- Alberta
- British Columbia
- Manitoba
- New Brunswick
- Newfoundland and Labrador
- Nova Scotia
- Ontario
- Prince Edward Island
- Quebec
- Saskatchewan

Information Script

Markets no-GI and GI

The first five questions of this survey will ask you to imagine that you are shopping for [CHEESE] cheese. You will be given the option of purchasing one of two different products, each product is 100g. You will also have the option of purchase neither product.

During this task, please imagine that you are making real purchases with real money. Please keep in mind a reasonable price that you would consider paying for [CHEESE].

Market GI-info (two screens)

In 2017 Canada and the European Union signed a trade and economic cooperation agreement. As part of this agreement certain types of cheese, such as [CHEESE], are protected by *geographical indication*. This means that new Canadian-made cheeses can no longer simply be called “[CHEESE],” but must instead be referred to using expressions such as “kind,” “type,” “style,” or “imitation.” For example, new Canadian-made cheese could be called [CHEESE] style, [CHEESE] type, or imitation [CHEESE].

I have read and understand this information

The first five questions of this survey will ask you to imagine that you are shopping for [CHEESE] cheese. You will be given the option of purchasing one of two different products, each product is 100g. You will also have the option of purchase neither product.

During this task, please imagine that you are making real purchases with real money. Please keep in mind what you typically pay for [CHEESE] cheese.

I have read and understand the instructions

Sample Choice Problem

Imagine that you are in the grocery store and you wish to purchase 100g of asiago cheese. Which of the following products presented below, at their given price, do you prefer? Please keep in mind a reasonable price that you would consider paying for asiago.

Product	Cost	Choice
<p data-bbox="391 464 799 491">Asiago style cheese made in Ontario</p> 	<p data-bbox="951 737 1016 764">\$3.35</p>	<input data-bbox="1187 743 1203 764" type="radio"/>
<p data-bbox="440 1043 753 1071">Asiago cheese made in Italy</p> 	<p data-bbox="951 1316 1016 1344">\$4.70</p>	<input data-bbox="1187 1323 1203 1344" type="radio"/>
<p data-bbox="553 1623 639 1650">Neither</p>	<p data-bbox="976 1623 992 1650">--</p>	<input data-bbox="1187 1623 1203 1644" type="radio"/>

Preference Questions

B1. How often do you typically eat cheese products of any kind?

- At least once a day
- More than twice a week but less than everyday
- Once or twice a week
- At least once a month, but less than once a week
- Less than once a month

B2. How often do you typically eat [CHEESE]?

- At least once a day
- More than twice a week but less than everyday
- Once or twice a week
- At least once a month, but less than once a week
- Less than once a month, but more than once every three months
- Less than once every three months, but more than once a year
- Less than once a year

B3. On a scale of 1-5 from very unfamiliar to very familiar, how familiar are you with:

- a) The North American Free Trade Agreement (NAFTA)
- b) The Canada-European Union Free Trade Agreement, also called the Comprehensive Economic Trade Agreement (CETA)
- c) Feta cheese
- d) Asiago cheese
- e) Gorgonzola cheese
- f) Geographical indication

B4. Please rank the following cheeses from your most preferred to your least preferred:

- a) Cheddar
- b) Feta
- c) Asiago
- d) Gorgonzola
- e) Brie
- f) Edam
- g) Monterrey Jack

B5. How many times have you travelled to Europe?

- Never
- Once
- 2–3 times
- 4–5 times
- 5–10 times
- More than 10 times

B6. How many times have you travelled outside Canada and the United States?

- Never
- Once
- 2–3 times
- 4–5 times
- 5–10 times
- More than 10 times

B7. How often do you shop at your local farmers market?

- Once a week or more
- At least once a month, but less than once a week
- Less than once a month, but more than once every three months
- Less than once every three months, but more than once a year
- Less than once a year

B8. How often do you shop at each of these types of stores?

	Once a week or more	More than once a month but less than once a week	Less than once a month or never
Large chain grocery store			
Discount grocery store			
Independent grocery store			
Department store (e.g. Walmart)			
Specialty food store			
Ethnic grocery store			
Wholesale club store (e.g. Costco)			
Other (please specify):			

B9. Please rank how important each of the following attributes are in your food purchase decisions. (*Check one per row*)

	Very unimportant	Unimportant	Neither Important nor Unimportant	Important	Very Important
Price (price you pay)					
Taste (the flavour of the food)					
Nutrition (amount and type of fat, vitamins, etc.)					
Environmental impact (effects of production on environment)					
Authenticity (whether food is produced according to traditional methods)					
Origin (whether the food is grown locally or overseas)					
Appearance (whether the food looks appealing)					
Fairness (farmers, processors, retailers and consumers equally benefit)					
Naturalness (made without modern food technologies)					
Safety (eating the food will not make you sick)					
Animal welfare (well-being of farm animals used in production)					
Novelty (the food is something you haven't tried)					
Convenience (how easy and fast the food is to cook)					

Control Questions

C1. Select your age category? (*Please select one only*)

- 18–29 years
- 30–39 years
- 40–49 years
- 50–59 years
- 60–69 years
- 70 years or older
- Prefer not to say

C2. Which gender do you prefer to identify with? (*Please select one only*)

- Male
- Female
- Other
- Prefer not to say

C3. How many adults live in your household (including yourself)?

C4. How many children live in your household?

C5. What is the highest level of education that you have completed? (*Please select one only*)

- Elementary or junior high school
- Some high school
- Completed high school
- Some post-secondary (i.e. college or University)
- Completed college or technical institute
- Completed Bachelors degree
- Completed Masters degree
- Completed PhD degree
- Prefer not to say

C6. What was your total annual household income in 2017 before tax? (*Please select one only*)

- Under \$25,000
- \$25,000–\$39,999
- \$40,000–\$59,999
- \$60,000–\$79,999
- \$80,000–\$99,999
- \$100,000–\$125,000
- More than \$125,000
- Prefer not to say

C7. Please enter the first three digits of your postal code:

End of Survey Message

You have now completed the questionnaire!

We sincerely thank you and appreciate your time, dedication, and participation in our online survey. Your responses will be used to understand the impact of trade agreements on food purchases. If you would like to request a copy of a summary of research results or if you have any questions, you can email the researcher below:

C French results

Traits of French-speaking survey respondents are statistically different from results for English-speaking survey respondents. As per table C1, French-speaking respondents tend to be older and more female. Additionally, French speaking respondents are statistically less likely to be familiar with NAFTA, feta cheese, and with geographical indications, though they are more likely to be familiar with CETA, asiago, and gorgonzola.

Estimates from our base model using data from the french-speaking respondents are provided in table C2. The coefficients on price, type of cheese, and place of origin are similar to those in table 2 in the main body of the paper (which used data from English speakers). In the French version of the survey we used only one GI related label – “style”. The coefficient on this was statistically insignificant, as was the effect of information.

D Market shares for asiago and gorgonzola cheese

Tables [D1](#) and [D2](#) contain the predicted market shares for asiago and gorgonzola cheese under a variety of labelling environments. The two tables are analogs of table [4](#), which holds the results for feta cheese).

Table C1: Descriptive statistics (English and French respondents)

Variable	English	French
Sociodemographics		
Age ^a	3.42 (1.59)	3.70 (1.56)**
Female	0.531 (0.499)	0.416 (0.494)***
Education ^b	5.20 (1.33)	5.15 (1.35)
Income ^c	4.43 (1.93)	4.20 (1.87)
Children in the household	0.400 (0.780)	0.429 (0.833)
Frequency of		
Cheese consumption ^d	2.21 (0.995)	2.20 (1.16)
Travel to EU ^e	2.64 (1.68)	2.73 (1.89)
Familiarity with^f		
NAFTA	3.54 (1.04)	2.75 (1.04)***
CETA	2.50 (1.13)	3.41 (1.06)***
Asiago	3.33 (1.23)	3.53 (1.26)**
Feta	4.08 (0.996)	1.98 (0.951)***
Gorgonzola	2.89 (1.26)	3.08 (1.30)*
Geographic indications	3.07 (1.24)	2.36 (1.19)***
Food values^f		
Price	4.20 (0.881)	3.96 (1.00)***
Taste	4.49 (0.891)	4.32 (1.07)**
Nutrition	4.09 (0.929)	3.85 (0.995)***
Environment	3.56 (0.979)	3.42 (1.04)*
Authenticity	3.44 (1.02)	3.45 (0.973)
Origin	3.70 (0.967)	3.72 (0.950)
Appearance	4.03 (0.941)	3.76 (0.956)***
Fairness	3.59 (0.950)	3.37 (1.01)***
Naturalness	3.56 (1.05)	3.33 (1.04)***
Safety	4.60 (0.895)	4.42 (1.01)**
Animal welfare	3.66 (1.06)	3.39 (1.14)***
Novelty	2.94 (0.870)	2.96 (0.939)
Convenience	3.47 (0.992)	3.36 (1.01)
Number of respondents	833	233

Standard deviations are in parentheses. *, **, *** represent significance of a *t*-test for mean differences between the two languages at the 10%, 5% and 1% levels.

^a1=18-29 years; 2=30-39; 3=40-49; 4=50-59; 5=60-69; 6=70 or older.

^b1=No high school; 2=Some high school; 3=High school; 4=Some post-secondary; 5=College degree; 6=Bachelors; 7=Masters; 8=PhD.

^c1=Less than 25; 2=25-40; 3=40-60; 4=60-80; 5=80-100; 6=100-125; 7=More than 125 (in 000s).

^d7 point scale: 1=Less than once a year; 7=Daily or more.

^e1=Never; 2=Once; 3=2-3 times; 4=4-5 times; 5=5-10 times; 6=More than 10 times.

^f5-point scale.

Table C2: Multinomial and mixed logit models (French data)

	Multinomial logit	Mixed logit	
		Mean	Standard deviation
Price	-0.582 (0.057)***	-1.30 (0.171)***	1.17 (0.263)***
Type of cheese			
Asiago	2.11 (0.433)***	6.98 (1.28)***	3.07 (0.634)***
Feta	1.88 (0.406)***	7.58 (2.54)***	5.00 (1.49)***
Gorgonzola	1.82 (0.416)***	8.53 (1.61)***	8.16 (1.43)***
Place of origin			
Canada	1.64 (0.154)***	2.37 (0.249)***	0.581 (0.511)
Province	2.02 (0.164)***	3.10 (0.314)***	0.726 (0.571)
Europe	1.21 (0.220)***	1.70 (0.321)***	1.37 (0.308)***
Labels			
Style	-0.296 (0.285)	-0.564 (0.395)	0.029 (0.277)
Information treatment (interaction terms)			
Style	0.217 (0.364)	0.738 (0.941)	0.955 (0.586)
Europe	-0.100 (0.367)	-0.183 (0.992)	1.74 (0.480)***
Model information			
Observations	1,165	1,165	–
Log-likelihood	-990.759	-739.1562	–

Standard errors are in parentheses. *, **, *** represent significance at the 10%, 5% and 1% levels.

Table D1: Predicted market share of asiago cheese

	Italy	Canada	USA	No purchase
Italian asiago at \$4				
No GI protection	0.37	0.43	0.06	0.14
Imitation label	0.68	0.13	0.02	0.18
Type label	0.42	0.39	0.06	0.14
Type label with information	0.40	0.46	0.07	0.07
Italian asiago at \$5				
No GI protection	0.24	0.54	0.08	0.15
Imitation label	0.58	0.16	0.02	0.23
Type label	0.28	0.49	0.07	0.16
Type label with information	0.26	0.57	0.08	0.08
Italian asiago at 20% share of potential market				
No GI protection	0.20	0.56	0.08	0.16
Imitation label	0.29	0.30	0.04	0.37
Type label	0.20	0.55	0.08	0.17
Type label with information	0.20	0.62	0.09	0.08

Table D2: Predicted market share of gorgonzola cheese

	Italy	Canada	USA	No purchase
Italian gorgonzola at \$4				
No GI protection	0.35	0.41	0.06	0.18
Imitation label	0.64	0.12	0.02	0.22
Type label	0.40	0.37	0.05	0.18
Type label with information	0.39	0.45	0.06	0.10
Italian gorgonzola at \$5				
No GI protection	0.23	0.51	0.07	0.19
Imitation label	0.55	0.15	0.02	0.27
Type label	0.27	0.46	0.07	0.20
Type label with information	0.26	0.55	0.08	0.11
Italian gorgonzola at 20% share of potential market				
No GI protection	0.15	0.57	0.08	0.20
Imitation label	0.15	0.35	0.05	0.45
Type label	0.15	0.55	0.08	0.22
Type label with information	0.15	0.64	0.10	0.11