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Consumer preferences and willingness-to-pay for integrated production label on common beans

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Summary

Integrated Production has been applied in Brazil since 1998/99 aiming to mitigate the negative environmental impacts of intensive production areas, and to improve the quality of beans produced. Economic and market analysis is fundamental in providing adequate and better understanding of the likely response of potential buyers regarding this kind of product, especially when a premium price is feasible. The objective of this study was to analyse consumer perception of beans with a hypothetical integrated production label and estimate consumer willingness-to-pay for labelled beans. Data were collected from a sample of 160 consumers living in Goiânia, Brazil, using a questionnaire survey based on a discrete choice approach. The attributes (and levels) used in the choice experiment were label (IP labeled *vs*. conventional), price (3 levels), and brand (preferred *vs*. fictitious). Multinomial logit and mixed logit models were used to analyze data. The findings indicate that consumers are sensitive to the presence of the hypothetical label and are willing to pay more for IP certified beans. Thus, there could be an unmet demand for safe and sustainable food products because consumers apparently prefer the certified alternative, even when brand is known and price is higher.

Keywords: consumer behaviour, stated preferences, certification, labelling, credence attributes.

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Introduction

In many countries, consumers have perceived health-related attributes as the most significant reasons to buy sustainable and safe foods. They are willing to pay higher prices to minimize the perceived direct and societal risks associated with pesticide residues in food, generally linked to conventional food production. However, in many cases, consumers must consider product attributes that are difficult for them to evaluate at any stage of purchase, sometimes even after consumption of the food. Because of that, goods with credence attributes require a judgment or certification by an authority figure, such as a government agency or private certification body, that consumers (Akerlof, 1970; Caswell, 1998) or practitioners (Wongprawmas et al., 2015) consider credible and trustworthy to lend information on credence attributes.

In order to respond to this consumer attitude, private industries have invested more in branding programs, while national governments and other organizations have developed and coordinated public certification schemes with the scope of addressing the problem of asymmetric information in the consumer agro-products market, and/or communicating and promoting sustainable and safe food characteristics.

There are many types of standards and certification schemes in the agribusiness sector, with different interests. Depending on the type of certification scheme (B2B, business-to-business, or B2C, business-to-consumer), the target public changes. B2B normally is focused on the production sphere, or on the relationship between supplier and client with the objective of minimizing the quality uncertainties within the supply chain; B2C is addressed to the final consumer, and represents the majority of certification schemes in Europe (Gawron & Theuvsen, 2009).

In this study, we focus on the standard for Integrated Production (IP) system that is a concept of sustainable agriculture that integrates natural resources and regulation mechanisms into farming activities to replace the greatest number of polluting sources in agronomic practices, taking into account the protection of health of farmers, consumers, and the environment (IOBC, 2004). It covers ecological, ethical, and social aspects of agriculture production as well as those aspects related to food quality and safety. IP certified produce is not only perceived by some as safer for consumption, but as also reducing the impact on the environment, protecting biodiversity and/or reducing greenhouse gas emissions.

In Brazil, IP has been applied since 1998/99 as a voluntary standard. The first application was on fruits, specifically apple crops (Andrigueto et al., 2009). The Normative

Instruction IN/MAPA N. 20/2001 represents its legal framework for fruits. Later, in 2010, the new IN/MAPA n. 27/2010 extended the legal framework for other crops as well as animal production (BRASIL, 2015).The IP label is called "*Brasil Certificado – Agricultura de Qualidade*". In Europe, after many years of experience as a voluntary standard, IP has become compulsory in 2014 (European Parliament, 2009).

In beans production in Brazil, IP allows reducing the negative impacts of the intensive production of beans in the irrigated areas of the Brazilian central region, and to improve the quality of beans produced (Barbosa et al., 2009). Instead, on the consumer side, IP can improve food quality and safety by guaranteeing compliance with minimum standards of production (BRASIL, 2015).

The IP standard for common beans was established during the winter harvest of 2008/09, but until Nov. 2016, the norms were not available for growers and the crop cannot be certified, yet. Because of that, certified beans are not available for sale in supermarkets, thus the present study considered IP certified beans as a hypothetical product.

Before government and producer's organizations move with great force to invest and promote food safety protocols and policies, it is important to study consumer perceptions of such labeled products, as well as the probable return from these investments (Tonsor & Shupp, 2009). We cannot be sure that consumers will automatically view the IP produce as a win-win option just because farmers gain environmental and financial benefits.

Thus, it is critical to provide an adequate and complete economic and market analysis to understand the probable response of potential buyers and competitors of these kinds of differentiated products, principally when a premium price is feasible. Comprehending consumer behaviour, what determines the decision to purchase, and willingness-to-pay (WTP) is vital to the success of the supply chain's agents interested in investing in this kind of products. This information can be very important in estimating the acceptability of the products offered to the market by customers.

Several studies worldwide focused on consumer preferences and their WTP for products labelled with claims such as "produced by sustainable practices," and "pesticides-free," especially with fruits, vegetables, and meat (Cranfield & Magnusson, 2003; McCluskey & Loureiro, 2003; Tonsor & Shupp, 2009). For instance, Wongprawmas & Canavari (2017) have studied safety labels on fresh produce in Thailand with a focus on estimating the value of safety labels perceived by Bangkok consumers. Relatively little economic researches has focused specifically on IP produce (or IPM, ICM, etc.) (Govindasamy et al., 2001; Kuhar & Juvančič, 2010). Eventually, there are WTP studies that use IP products as an alternative to

organic products (e.g., Radić & Canavari, 2014). At the best of our knowledge, no published economic research was conducted in Brazil with a focus on consumer behavior toward IP produce.

Building upon existing work conducted in other countries in evaluating other food attribute labels, we seek to begin addressing this gap and intend to further contribute with more studies in this same field. The objectives of this study were to examine consumer perception of the hypothetical IP label on beans sold at a supermarket in Goiânia, Brazil, and estimate consumer WTP for certified beans. In addition to providing the results of consumer preferences, this study can also help the process of structuring IP adoption at the farm level by providing producers with information about the price level of the certified beans.

1. Material and Methods

We analyze consumer preferences toward the IP label on common beans, using a Choice Experiment (CE) that allows investigating trade-offs between several competing beans' attributes (or factors) at different values (or levels). CE is versatile in its application because it allows a design that estimates a wide range of values from hypothetical choice sets, including credence attributes (Bennett, 2005). This approach was chosen because it permits to study consumer preferences for products and services not traded on market, such as for a new product under development and not yet commercially available (Mangham et al., 2009). It also permits the breakdown of products into attribute levels, each of which receives a part-worth estimate, i.e., the relative contributions of each of the different attribute levels can be determined (Breidert et al., 2006). Its theoretical background is based on Lancaster's new approach to consumer behaviour (Lancaster, 1966), and the Random Utility Theory (RUT), based on Thurstone's hypothesis (1927) on human decision-making (McFadden, 1986).

A Multinomial Logit (MNL) model was used as the basic data analysis tool, because it is the most traditional and widely used econometric model applied in CE, which combines hedonic evaluation of alternatives and random utility maximization (McFadden, 1986). However, MNL models assume consumer homogeneity across preferences that are likely to be unrealistic. In fact, there is a huge amount of variability in the reasoning underlying decisions made by a population of individuals, often referred to as heterogeneity (Hensher et al., 2005).

Therefore, similarly to Sackett et al. (2016) we employ a Random Parameters Logit (RPL) or Mixed Logit model on the same data set to account for possible preference heterogeneity. The maximum likelihood estimation (MLE) technique was applied to estimate the parameters. This is a popular method of model estimation because of its robustness and ability to deal with complex data (Hensher et al., 2005).

The RPL model allows consumer heterogeneity to be continuous across respondents. The heterogeneity can be modeled including some interactions terms of case-specific demographic variables and/or habits of consumers. The notation for the utility of the decision-maker *q* from the alternative *j* in the RPL model is:

$$U_{qj} = \mathbf{x'}_{qj}\boldsymbol{\beta}_q + \varepsilon_{qj}, \quad q=1, 2, \ldots, n; \quad j=1, 2, \ldots, J, \tag{1}$$

$\mathbf{x'}_{qj}$ are observed variables that relate to the alternative *j* and the individual *q*; β_q is a vector of coefficients of the observed variables for the individual *q*, i.e., the individual's tastes; and ε_{qj} is a random term with an independent and identically distributed (IID) extreme value distribution.

In MNL, the β_q vector is assumed to be the same for all respondents. In RPL, instead, β_q will vary across individuals in the sample with density $f(\eta_q|z_q,\Omega)$ and a shape of the distribution chosen by the researcher. The RPL model is exploratory in nature and each of the alternatives should be compared with the MNL model to determine the best fit to the data.

Regarding the WTP estimation from the RPL model, if the parameters used in deriving measures of WTP are estimated as non-random parameters (that is, if price coefficients are assumed to be the same across respondents), the method of calculating WTP is the same of the MNL model. That is, the WTP for an attribute is the ratio of that attribute's parameter estimate to the parameter estimate of the price parameter.

The selection of the attributes (label, brand and price), used on the CE, was made taking into account the results from a qualitative research applied in Nov. 2013 with a sample of consumers from a supermarket in Goiânia, GO. We confirmed the relevance of the selected attributes comparing them with some findings from other studies (Wander et al., 2006). Table 1 shows the selected attributes and its respective levels used in the CE.

[Table 1]

The attribute "label" was applied considering only two levels; one for certified beans (IP labeled beans), and another for conventional beans (the *status quo* option). Organic beans were not considered as one of the options of choice since they are still rare in the Brazilian market, especially in big cities as Goiânia, GO. Normally, in Brazil organic beans are marketed in specific channels such as farmers' markets in country towns. The attribute "brand" was included to consider the respondent who preferred a commercial brand of beans (preferred brand) as opposed to another unknown brand for consumers that we called fictitious brand. The range of the attribute "price" was +/-15% around the local average price (R$ 3.25/kg), similarly to other studies with organic products (Anderson et al., 1996; Bonti-Ankomah & Yiridoe, 2006).

Experimental design: The experimental design (ED) was structured using the software Ngene 1.1.1. (Choice Metrics, 2012) from which an MNL efficient or D-optimal design was applied. According to Kerr & Sharp (2009), D-efficient designs have been the most common approach to measure the efficiency of ED. It offers the potential to reduce confidence intervals for parameters of interest in CE, or to reduce required sample sizes; moreover, D-efficient designs minimize the D-error.

Because in stated CE the parameters are unknown, the knowledge of the sign of the parameter is sufficient to design the experiment (Choice Metrics, 2012). Therefore, we have considered the negative sign for price, and positive sign for label and brand parameters attributes. Dummy coding was used in the design. A no-choice alternative was also provided for the respondents to indicate that they would have the possibility not to choose any of the presented product profiles.

The design including nine choice situations with three product alternatives and a no choice option with the lowest D-error (0.2754) was chosen. Table 2 brings an example of a choice set used in the CE.

[Table 2]

We opted to use an unlabeled experiment. According to Hensher et al. (2005), the use of unlabeled experiments does not require title identification, and therefore, it can be used for all alternatives within the universal set of alternatives.

Based on this design, consumers were asked nine times to choose, among three product profiles, with different prices and other product attributes, whether they would purchase the good at that price, with such attributes or not (no-buy option). The choice

questions were presented in randomized order across respondents to reduce questions ordering biases.

Data collection tool: The survey instrument comprised four sections: (1) buying behavior and consumption habits, (2) choice experiment (CE), (3) theory of planned behavior, and (4) socio-demographic characteristics (SDC) data. A "cheap-talk" script was introduced before starting the questionnaire in order to remove hypothetical bias for consumers who were relatively ignorant of the beans that had been evaluated as a good (Lusk, 2003). The "cheap-talk" objectives were: (1) to explain to consumers the meaning of the IP label credence attributes such as "produced by sustainable practices", and "free of pesticide residues"[1]; and (2) to explain to consumers that they should make their selections as though they were actually facing those options in the hypermarket, even though the CE were hypothetical in that they did not include actual pricing or real product.

Before asking respondents what option was preferred in the choice set, we asked them to nominate their preferred brand, and then, we used the nominated brand to apply the CE given the alternative fictitious brand. Additionally, questions on habits of purchasing and consumption from the consumers, and their socio-demographic characteristics were considered as part of the survey instrument because these variables can modify preferences (McFadden, 1986).

Sampling and Data collection procedure: A convenience sample was chosen due to budget and time constraints. Two screening questions were asked before starting the interview to ensure that the respondents were at least 18 years old, and they were regular bean consumers. Data collection was carried out in Nov. 2014. Before that, a previous pilot survey was administered to 30 bean consumers as suggested by Stopher (2012). The final survey was administered face-to-face to 160 bean consumers from a hypermarket located in Goiânia (GO), by trained interviewers, where local bean consumers usually purchase this product (Wander et al., 2007).

Data analysis: The IBM SPSS Statistics software (SPSS Inc., 2013) was used to analyze the SDC in order to characterize the sample. The choice experiment analysis and WTP estimates were made using the software NLOGIT v.4.0 (Greene, 2012).

[1]Special care was taken to avoid confounding with organic products that refer to a different standard, do not allow the use of synthetic chemicals, and evocate several other peculiar quality characteristics.

The best empirical model comprises the three main attributes selected for the CE, i.e., price, label, and brand, as well as the interaction label/brand (R2-Adj = 0.4263). The respective parameter attributes were estimated in an MNL model. In this framework, the left-hand side variable represents choices and is coded as a dummy variable, taking the value of 1 when the product was chosen and 0 otherwise. The right-hand side is represented by the attribute levels of each product or the explanatory variables. The variable price was coded as a continuous variable. Therefore, the basic logistic regression estimated for each alternative j was as follows:

$$V_{ij} = \beta_{price}.Price_{ij} + \beta_{label}.Label_{ij} + \beta_{brand}.Brand_{ij} + \beta_{lbxbr}.LbxBr_{ij} + \varepsilon_i \qquad (2)$$

where *i*= 1, 2, …, *N*, is the number of respondents; *j* is the number of alternatives given the choice set. V_{ij} indicates the respondent's utility, individually; $Price_{ij}$ is the price applied to a package of 1Kg of dried beans for the alternative *j*; $Label_{ij}$ indicates the presence or not of the IP label indicating that the product is certified or conventional; $Brand_{ij}$ indicates the beans' commercial brand (preferred by consumer *vs*. fictitious); and, $LbxBr_{ij}$ the interaction between label and commercial brand.

The RPL model was used to account for heterogeneity across respondents. The parameters of the attributes β*label*, β*brand*, and the interaction term β*lbxbr* were modeled as random with a normal distribution. The model was applied using 400 Halton draws. This number of draws seems to be reasonable to secure a stable set of parameters estimates for the present model (Hensher et al., 2005). Several interactions were tested in the data analysis in order to identify further sources of the heterogeneity in the preferences. The interaction label *vs*. brand (*lbxbr*) was statistically significant and then included in the model.

To measure how well the model fits the data, the usual goodness-of-fit statistics based on the log-likelihood function are used. McFadden's Pseudo R-squared statistic is the most used in the literature on CE. Although this statistic is very different from the R-squared in linear regression, interpretation is similar. As a rule of thumb, when the McFadden's pseudo R-squared values are in the range of 0.3 and 0.4, they are equivalent to values between 0.6 and 0.8 for the R-squared for linear models (Vojáček & Pecáková, 2010).

WTP estimations: The estimates of the parameters can also be used to derive willingness-to-pay (WTP). Since part-worths for different prices are estimated, a change in price can be expressed in terms of change in utility and exchange rate between utility and price can be calculated. Given this exchange rate, the WTP for any product profile relative to the most preferred choice in an individual's evoked set can be calculated. In discrete choice modeling the preference structure is estimated at the aggregate level since it is not possible to directly estimate part-worths at the individual level because of the limited data for each respondent (Breidert et al., 2006).

The average WTP for the label and brand, *ceteris paribus*, was estimated using the relationship between label and price, and brand and price, respectively. In the present case, the WTP for IP label also indicates the price premium for certified beans, relative to conventional ones. The WTP for the brand, instead, gives us the value that consumers assign to the preferred brand. Thus, it is foreseen that the price variable will have negative coefficient estimates because a higher price should provide disutility to the consumer, all the other conditions being equal.

2. Results

The majority of the respondents (63%) are female and married (71.3%) with family size up to 5 people (86.9%). Almost 65% of them reported having children up to 12 years at home. The respondents' age ranges from 36-50 years. However, the age group that appears most often (mode) is that between 56-65 years. Wander et al. (2006, 2007) reported very similar consumers' profile for the same locality. In terms of the level of education, the largest group represents the respondents that reported have a secondary degree (36.3%) followed by the high school group (33.8%). Literate people were only 1.3% of the respondents.

Employed people are also the majority (46.2%), followed by those who are retired (18.7%), and those who are household workers (14.4%). Two important groups in terms of the power of purchase, i.e., the autonomous and professional workers (represented by doctors, dentists, lawyers, etc.) represent 15.6%. Students (up 18 years of age) comprised 3.1% and 1.4% were unemployed people. The household income range between 3–6 salaries (R$2.173,00 – R$4.334,00/monthly), equivalent to social classes "B2" and "C", according to the Brazilian Research Company Association cited by Moura et al. (2006). The respondents that did not report their income were 23.1%.

Regarding purchasing and consumption habits, 83% of the respondents self-declared as being responsible for the household's food shopping. Beans are purchased almost 1-2 times/month by 80% of the respondents, generally in hypermarkets and supermarkets. In terms of bean consumption, 91% of the respondents reported daily consumption of beans; this result confirms the importance of beans in the Brazilian diet. We also asked consumers on whether they trust all of the bean label information. Only 43% of consumers believe that information on bean labels is reliable.

Eight in ten consumers consider price and brand as the most important attributes to be included on bean packaging, followed by expiration date (best before). Results are in accordance with other authors who highlight the importance that consumers from Goiânia give to bean brand. Certification labels, place of origin, nutritional information, and cooking tips were the attributes with the least importance to the group of consumers we interviewed. Besides that, the attribute certification of quality ranks as fifth most important. This relatively little importance could be justified by the fact that the IP label is a new sign of quality for consumers and therefore is not well known by those potential future customers.

Almost 80% of the respondents considered important including additional information on bean packaging regarding some credence attributes such as environmental responsibility, pesticide residues, and the health benefits of beans, and the system of production, such as the IP. Information about social responsibility appears in the last position. I would say that local consumers are not familiar with these kinds of quality attributes, i.e., credence attributes. This positive reaction could be explained by the novelty of encountering these kinds of labeled attributes. In terms of CE analysis, the estimates for both the MNL and RPL models are reported in Table 3. Note that the no-choice option is not included because although the option was available in the choice tasks, none of the interviewed consumers chose this possibility. This is consistent with the fact that a staple food was chosen for the analysis and it confirms the importance of beans in the locals' diet.

[Table 3]

β coefficients refer to parameters that weight bean attributes in determining consumer utility. Note that the outcome of the model estimation is "choice probabilities", not choices *per se*. Both the MNL and RPL models exhibit a decent fit as they reach an adjusted McFadden's Pseudo R^2 greater than 0.3. The RPL model fit is statistically better than the

MNL model, showing that probably heterogeneity of preferences is an important issue in this case.

The results of the MNL estimates show expected signs for each parameter and are all highly significant. This means that the null hypothesis, in which all coefficients are zero, was rejected. It means that all the attributes used in the CE are significant from the consumer point of view. The MNL estimates suggest that the provided information had an effect on the respondent choice made in the hypothetical CE across labeled vs. conventional product, indicating that consumers are sensitive to the presence of a label. In magnitude, the utility estimated for the attribute IP label is higher than the utility associated with the preferred brand, probably because of the novelty effect related to certified products.

The negative parameter on price (β_{price}) indicates the marginal disutility associated with a change in price due to the added-value of certified beans; this means that increments on price decrease the associated utility level provided by the choice (dislike).

In contrast, the positive parameter on a label (β_{label}) indicates the marginal utility gained from the IP labeling claim; similarly, the parameter 'β_{brand}' indicates the marginal utility linked to a preferred brand from the viewpoint of the consumer. In our study, we find out that brand is an important attribute for decision-makers when purchasing beans. This is in contrast with Moser et al. (2011), who found that branding seems to be moderately important in determining consumers purchasing decisions.

The negative parameter (β_{lbxbr}) on LBxBR needs a careful interpretation. It means that a preferred brand associated with the IP label has a utility that is less than the sum of utilities from the preferred brand and IP label separately, thus the presence of the brand moderates the effect of the label on the overall utility. This joint effect makes sense since both the label and the brand should address the trust of consumers about product quality.

All the parameters of the RPL model are significant at the 1% level and have the expected signs. Table 3 shows the estimates for the RPL model indicating the random and non-random parameters, and the derived standard deviations of parameters distributions. The estimated parameters differ a little from the MNL model estimates. As depicted in the same table, 'β_{label}', 'β_{brand}' and β_{lbxbr} are random parameters indicating that they vary across decision-makers following a normal distribution. However, it is important to consider that all these parameters were estimated as random and their standard deviations are significant at the 1% level.

From the RPL estimates, both values for the derived standard deviations of parameter distribution $Ns\beta_{label}$, $Ns\beta_{brand}$ and $N\beta_{lbxbr}$ are statistically significant at the level of 1%, except

the latter with 5% of significance level, indicating that there is heterogeneity in the parameter estimates across the sample population. In other words, this means that individual preference differs among different individuals, as well as from the mean estimate for the sample population.

The WTP_{MNL} estimates for the IP label attribute is R$ 2.08/Kg, i.e., this is the maximum amount of money the average consumer is willing to pay more for certified (labelled) beans, holding all else constant and considering no uncertainty regarding choice. The MNL framework used in this analysis assumed homogeneous preferences, and thus the WTP estimates can only be interpreted for the average consumer. The WTP_{MNL} estimate for brand attribute is R$ 1.48/Kg. Finally, the WTP_{MNL} estimate for the interaction label*x*brand is R$ 0.61/Kg, highlighting the fact that the effect of commercial brand and IP certification are not completely independent, thus when both attributes are present the increase in utility is lower than the sum of the two separate effects. This is reasonable because brands and labels both work as trust signals for the consumer.

From the RPL model, WTP_{RPL} for the IP label is R$ 1.83/Kg, and for the attribute brand is R$ 1.25/Kg. Additionaly, the WTP_{RPL} estimate for the interaction label*x*brand is R$ 0.38/Kg. The results are similar to those from the MNL model. Interaction variables such as frequency of purchasing and demographics were not significant in the model applied in this study.

The RPL model allows explaining the heterogeneity in consumers' preferences. Bazzani et al. (2017) applied similar strategy, however, evidencing the individuals' personality as an important factor to explain how individuals' personalities affect consumers' valuation of products.

An interesting analysis that can be performed from the MNL results (table 3) are "what-if" scenarios to establish a simulation of how changes in attributes impact upon the choice probabilities for each of the alternatives with a focus on the IP label. To calculate the probability *Prob(i|j)* that an individual will choose alternative *i* among the set of available alternatives, *ceteris paribus*, the utility function V_i for the alternative chosen is treated as the numerator in the equation (3), and V_j is the utility function for all other available alternatives; the *V*'s were calculated using the estimated parameters from the MNL model.

$$\text{Prob}(i|j) = exp(V_i)/\sum_{j=1}^{J} exp\, V_j, \quad j = 1, ..., i, ..., J \quad i=j \tag{3}$$

To simulate the selected scenario, we assumed that there are only three different types of beans available in the market, each at a different price level, as follows: (1) a certified bean from a fictitious brand (on sale at varying prices on the horizontal axis); (2) a conventional bean from a preferred brand on sale at R$ 3.25/Kg (fixed price); and (3) a conventional bean from a fictitious brand on sale at R$ 2.76/Kg (fixed price). Figure 1 illustrates the choice probabilities for each of the alternatives. The no-choice option does not appear in the market simulation in figure 1 since none of the interviewed consumers did consider this option as a more desirable choice.

[Figure 1]

As shown in Figure 1, consumers are willing to purchase certified beans instead of conventional beans up to a maximum price of approximately R$ 3.80/kg, even if the brand is unknown to them. Above that price, consumers will change their preferences and will buy conventional beans from their preferred commercial brand. This scenario indicates that the consumers who were interviewed probably understood the message of the IP label. One can conclude that when the price of the preferred brand is R$ 3.25/Kg, consumers are more likely to buy IP labelled beans up to a price of R$3.80/Kg. If both alternatives, certified + fictitious brand and conventional + preferred brand, were sold at the same price, i.e., R$ 3.25/Kg, the probability of purchasing the first option would be higher than 60%. In this scenario, the alternative "conventional beans from a fictitious brand at R$ 2.76/Kg" would be the less preferred alternative, with the lowest probability of purchase up to the price of R$ 4.90/Kg of the IP labelled beans.

This tendency of paying more for IP certified products was verified in Italy (Canali, 2011) where the integrated production is wide diffused; the author verified that the average price of IP certified products is almost 3-7% higher than those of conventional products.

3. Concluding Remarks

The present study was very useful for concluding some important points regarding consumer preferences for sustainable food attributes in Brazil, even if we cannot make inference for the Brazilian consumers overall. Although other studies highlight that bean consumers from Goiânia city have more preferences for visual attributes, especially for bean colour and

appearance, our findings suggest that they are also concerned about pesticide residue in beans, as well as the sustainable practices applied by growers. The findings of the CE suggest that consumers are label-sensitive, which means that ceteris paribus they value IP certified beans more than non-certified ones. However, it must be pointed out that this attribute was considered the important only by 43% of respondents when consumers were directly asked about their preference.

The average consumer is prepared to find labelled products from IP, i.e., products with sustainable and food safety claims. However, we acknowledge that consumers are likely to have heterogeneous preferences over bean value attributes, such as certification labeling and commercial brand.

Although IP certification is a kind of business-to-business scheme to guarantee minimum quality patterns of a product within the supply chain, it could also be considered a business-to-consumer scheme in the market where the research was conducted. One explanation could be the novelty effect and the latent demand for certified products that offer less risk for health and are more sustainable.

Overall, our findings suggest that profitable market opportunities may exist for operators interested in trading IP certified beans. However, considerable effort needs to be put into leveling information asymmetries about bean quality on sustainable and food safety label claims to be differentiated from more recognizable competing products.

Thus, making relevant information available at the point of purchase can further help to educate consumers about the benefits of choosing IP produce, with an accuracy of communication. Misleading or imprecise environmental or health claims can have a detrimental effect on how consumers perceive the supply chain's operators in general.

Consumer confidence in this kind of label will depend on how companies will provide information about the certified product and which organization will be behind the seal. This is particularly important because the results indicate that interviewed consumers do not trust completely on beans' label information (conventional beans) motivated by recent episodes of frauds such as divergences in beans' quality specification. The IP label could be an important instrument to change positively the level of consumers trust on label information.

Our analysis demonstrates that positive willingness-to-pay can be captured by sustainably produced and healthy labeling claims such as with the IP label, relative to similar unlabeled or conventionally produced beans. The WTP calculated in our model for both IP label and preferred commercial brand reveal that there is a positive trade-off in utility between conventional and sustainably labeled food products, and fictitious and preferred brands.

However, for preferred brands associated with the IP label the increase in perceived value would be lower.

We are convinced that our findings can provide more insights for both policy makers and supply chain actors into the Brazilian consumer's perception and preferences for quality attributes inherent in the IP system. Our results indicate that the government investments in IP can be effective in the long-term because consumers need to be familiarized with labeling schemes. Moreover, the positive WTP values and positive consumer stated behavior toward certified beans could positively influence bean growers to adopt IP to offer certified beans as an alternative to conventional beans. They probably could sell certified beans at a higher price. WTP results may look quite high in absolute terms. WTP could be overestimated for two main reasons: 1) the hypothetical nature of our survey 2) a design that used relatively small price gaps, with respondents who might have paid less attention to price increases. However, since the price attribute has a large negative coefficient (showing a strong price-sensitivity) we consider the latter potential problem as less relevant.

As a recommendation, future research in this same field could explore in depth the possible factors that contribute to the heterogeneity of consumer preferences such as individuals' personality (Grebitus & Dumortier, 2016; Bazzani et al., 2017); it could be useful for developing marketing strategies to better position IP certified products. More information about consumer perception toward food attributes with environmental, social, and health claims would also be important.

A limitation of this study is the relatively small sample size, which is sufficient to detect consumer preferences for the product attributes, but it does not allow extending the results to the whole population in a reliable way. On this respect, replications of this study in Goiânia and in others Brazilian capitals using large stochastic samples would be advisable to map Brazilian consumer's preferences.

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Table 1.CE - attributes and levels

Attributes	Levels
Price(R$/Kg)	P0 = 2,76
	P1 = 3,25
	P2 = 3,75
Label	(0) conventional beans
	(1) IP labeled beans
Brand	(0) fictitious brand
	(1) preferred brand

(Currency ref. in Nov. 2014: € 1,00 ≈ R$ 3,14)

Source: Author's elaboration.

Table 2. Choice set example.

Attributes	Option A	Option B	Option C	Option D
Price (R$/Kg)	3,25	3,73	3,25	Neither A or B or C is preferred
Label	Conventional	IP Label	IP Label	
Brand	Preferred	Fictitious	Preferred	

Source: Author's elaboration.

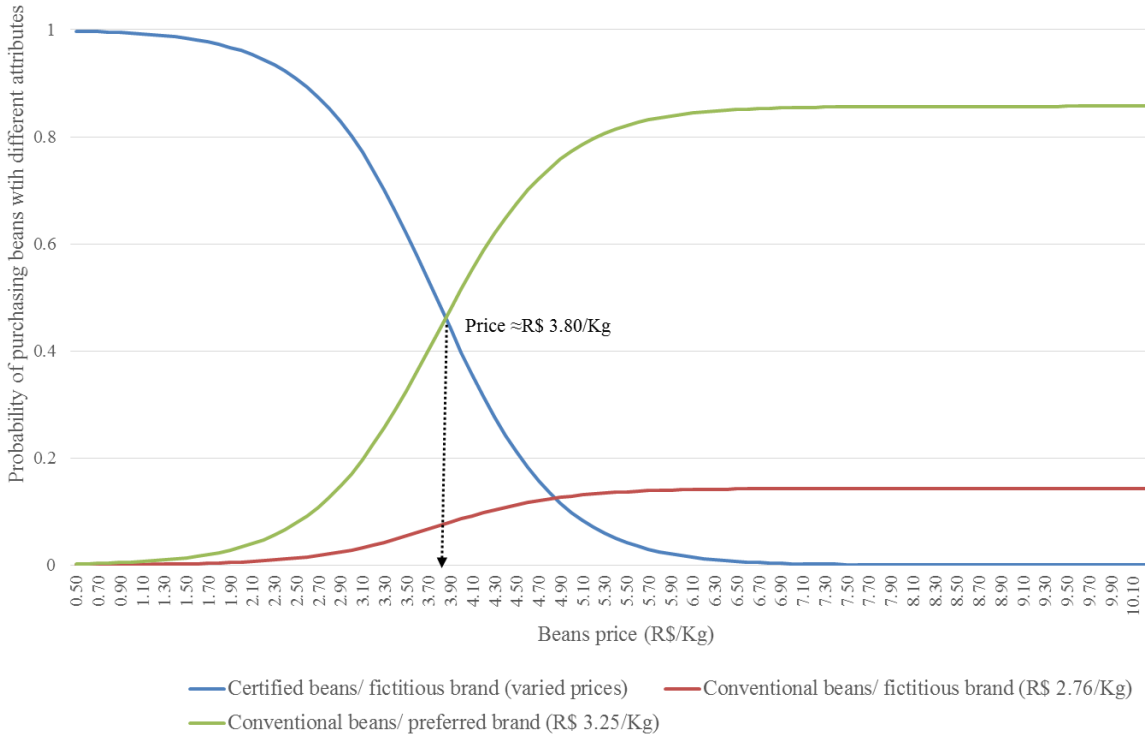
Table 3.MNL and RPL estimates.

	MNL Model			RPL Model			MNL, RPL
Choice	Estimates	Std. Error	z	Estimates	Std. Error	z	Prob. z>|Z|
				Random parameters			
βprice	-1.807***	.13371	-13.52	-	-	-	.0000
βlabel	3.770***	.21291	17.71	4.403***	.26945	16.34	.0000
βbrand	2.675***	.19740	13.55	2.947***	.23819	12.37	.0000
βlbxbr	-1.111***	.21415	-5.19				.0000
				Non-random parameters			
βprice	-	-	-	-2.372***	.17680	-13.42	.0000
βlbxbr	-	-	-	-1.031***	.22967	-4.49	.0000
				Derived Std. Devs. of parameters distributions			

Nsβlabel	-	-	-	1.299***	.17897	7.26	.0000
Nsβbrand	-	-	-	1.324***	.17497	7.57	.0000
Log likelihood	-905.134	-	-	-838.451	-	-	-
Adjusted R^2	.426	-	-	.468	-	-	-
Chi-squared		-	-	1487.099	-	-	-
Observations	1440	-	-	1440	-	-	-
Note: ***, significant at 1% level.				RPL, 100 Halton draws.			

Source: Author's elaboration.

Figure 1.Choice probabilities for 3 alternativesof dry beans on sale by different price levels (certified beans + fictitious brand *vs*. conventional beans + fictitious brand *vs*. conventional beans + preferred brand)



Source: Author's elaboration.