

RISK PERCEPTION AT DIFFERENT SELLING POINT OF BEEF: A BEST-WORST DISCRETE CHOICE EXPERIMENT APPROACH¹

Etiénne Groot²

ABSTRACT: *The work aimed to study the preferences toward attributes associated with risk perception of beef consumption and regarding different selling points. It was carried out 166 face-to-face interviews, between July and August 2017. The interviews were conducted with the help of a questionnaire with a Best-Worst Discrete Choice Experiment. The results show that consumers prefer to buy rump in neighborhood butcher shops rather than supermarket butcher. The attribute linked to the risk perception of food that weighed most on consumers' choices was the selling point's reputation. In neighborhood butchers there is a preference for Brazilian rump rather than Uruguayan or Australian meat and people are indifferent tracked meat. The main conclusion of the work is that retailers should focus on building and maintaining a good reputation with their customers, regardless of sales point type*

Key-words: *best-worst discrete choice experiment, selling point reputation, traceability, inspection of quality, country-of-origin labeling.*

A PERCEPÇÃO DE RISCO NOS DIFERENTES PONTOS DE VENDA DE CARNE BOVINA: UMA ABORDAGEM COM O EXPERIMENTO DE ESCOLHA DISCRETA DE MELHOR-PIOR

RESUMO: *O trabalho objetivou estudar as preferências por atributos associados à percepção de risco de consumo de carne bovina e por diferentes pontos de venda, em Dracena. Foram realizadas 166 entrevistas presenciais, entre julho e agosto de 2017. As entrevistas foram conduzidas com o auxílio de um questionário com um Experimento de Escolha Discreta de Melhor-Pior. Os resultados mostram que os consumidores preferem comprar a alcatra em açougues de bairros ao invés de açougues de supermercados. O atributo ligado à percepção de risco alimentar que mais pesou nas escolhas dos consumidores foi a reputação dos pontos de venda. Nos açougues de bairros, há uma preferência por alcatra brasileira ao invés da carne uruguaia ou australiana e uma indiferença quanto à rastreabilidade. A principal conclusão do trabalho é que: o varejo deve focar na construção e manutenção de uma boa reputação junto aos seus clientes, independentemente do formato de sua venda.*

Palavras-chave: *experimento de escolha discreta de melhor-pior, reputação ponto de venda, rastreabilidade, inspeção de qualidade, país de origem.*

JEL classification: *Q13, M31, C51.*

1 - INTRODUCTION

Bovine farming has great relevance in Brazil. According to the Brazilian Beef Exporting Association (ABIEC, 2023), in 2022, Brazil had second largest herd of cattle and buffaloes in the world, with 202.8 million head. In the same period, 44.31 million heads

were slaughtered, obtaining 10.79 million tec (tons equivalent carcasses), in which domestic market consumed 71.48%. The livestock Gross Domestic Product (GDP) was estimated in US\$ 198,12 billion, corresponded to 10.0% of the national GDP. Taxes and social contributions by this sector totaled US\$ 30.85 billion, while external wages - generated by external ef-

¹Registrado no CCTC, REA-05/2022. O autor agradece à Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP), por ter financiado a pesquisa (processo n° 2015/25797-4).

²Engenheiro Agrônomo, Doutor, Unesp *campus* de Dracena, Dracena, SP (e-mail: etienne.groot@unesp.br).

fects, were calculated in US\$ 6.86 billion. In addition to the socioeconomic importance, the sector has met the population's food demand.

In recent decade, beef consumption has decreased. According to ABIEC (2022, 2023), in 2013, the Brazilian beef consumption was 39.0 kg per person and this value decreased to 36.7 kg in 2022 (5.9% reduction in 10 years). The main factor responsible for the reduction in meat consumption was price. In May 2013, the price of beef was R\$ 168.42/@ and this value became 271.83/@ in May 2022 (prices corrected by IPCA for May 2024), an increase of 61.4% (Agrolink, 2024).

The beef market is dynamic and competitive. The local retail has adapted to meet the new consumption patterns. According to the Brazilian Supermarket Association (ABRAS, 2012), in the 1970s and 1980s, the market share of small neighborhood butchers was 70% and was reduced to 30% in the 1990s, due to the entry of large multinational self-service retailers in the Brazilian market. Under these circumstances the neighborhood butcher shops reacted and their market share became 40% in 2012. One of the adopted strategies was to transform the traditional shops into boutiques or gourmet spaces.

According to The Brazilian Service of Support for Micro and Small Enterprises (SEBRAE, 2017), compared to the traditional butcher shop, boutiques take more care with establishment's hygiene and appearance. In addition, they offer differentiated products and services - focused on different market segments, with higher quality and personalized service.

The self-service retail has bet on other strategy to compete in the market. Packaged meat is an example because it presents multidimensional convenience. In this sense, the packaging adds practicality, since the product can be sold ready for preparation (roasting, frying, etc.) and, at gondolas, it eliminates the time spent with the endless lines of butchers. This attribute ends up weighing heavily on consumers' decisions, given the lack of time to shop. The market share of meat on gondolas has increased in some Brazilian cities.

According to the Brazilian Slaughterhouse Association (ABRAFRIGO, 2018), in Porto Alegre, the

packaged beef sold in portioned or vacuum trays, on gondolas in self-service establishments, corresponded to less than 10% of total beef sales in 2008. Ten years later, this market increased to 70%. Even having positive aspects, the packaged meat sale, in gondolas, presents some challenges.

Since meat is a highly perishable product, the temperature in the gondola must be adequate. In order to draw a panorama of the cold chain in Brazil, Dalcorte, Dalcanton and Costella (2018) carried out a wide bibliographic review and found that all papers reported equipment (such as gondolas) with temperatures outside the standard required by law. The authors estimated that non-conformity was present in three out of four of evaluated supermarkets. They concluded that the situation of food conservation ends up putting consumers' health at risk.

The neglect of establishments and the lack of supervision create an environment conducive to poor management of food cold chain, as well as bad hygiene conditions. On the other hand, strict management, based on the Brazilian Good Practices Norms (RDC n° 216), improves food security and impacts on the establishment's reputation and credibility with suppliers and consumers (Perete, 2007).

Consumer market worries purchasing safe food. Consumption patterns changed with the appearance of outbreaks, such as Bovine Spongiform Encephalopathy (BSE) and Foot-and-Mouth Disease. The market started to demand products elaborated with greater technical rigor in production, distribution and commercialization. Traceability, which is a set of actions that allows one to know when and where the beef was produced by whom (from pasture to dish), which improves food quality and safety. The tracked beef receives a seal from a certifier, accredited by the Traceability Service of the Bovine and Bubaline Production Chain (SISBOV), linked to the Ministry of Agriculture, Livestock and Food Supply - MAPA (Brasil, 2018b).

The MAPA, through the Department of Inspection of Animal Products - DIPOA, seeks to ensure the beef quality and safety by the Federal Inspection Service, known as SIF. All inspected meat that fit for

consumption receives the SIF seal. In principle, the SIF seal should ensure that the animal has not been slaughtered in a clandestine manner. Nevertheless, Mathias (2008) states that clandestine slaughter takes place inside establishments even under the supervision of the SIF. The Operation Weak Meat (OWM), launched by the Federal Police on March 17, 2017, investigated a supposed fraud scheme involving MAPA inspectors and irregularities committed by large slaughterhouses (Guimarães; Palau; Senesi, 2018). The scandal caused cancellations of contracts and putted SIF's credibility and Brazil's image in evidence.

The Country-of-Origin Labeling (COOL) affects purchasing decisions since it is associated with the beef quality perception. The perceived quality of beef will be higher when consumers have a good opinion about the rigor of a given country's production process (Olmedo *et al.*, 2017). Therefore, health problems, such as BSE disease - in England, radiation contamination due to the nuclear catastrophe of Fukushima - in Japan (Reiher, 2016), can generate distrust among consumers about food quality. Although there is a tendency for consumers to prefer beef from their own country (Umberger *et al.*, 2003), this study considered the possibility of product devaluation due to OWM.

In summary, several studies have been carried out to assess consumer preferences in relation to traceability (Abicht, 2009), inspection (Santos *et al.*, 2012) and Country of Origin Labeling (Magalhães *et al.*, 2016; Lopes *et al.*, 2017). In the same way, opinion polls were performed comparing the meat sale in butchers and supermarkets (Brisola; Castro, 2005) or stating the importance of butchers on purchase decision (Zamberlan *et al.*, 2008). Despite this, it is important to highlight the lack of research that considers that the supermarket competes with the neighborhood butcher shop and that the supermarket offers beef in two points: butcher and gondolas. Therefore, there are practically no studies that estimate the weight of the sale point reputation on beef buying decisions.

This study aims to analyze the consumers' preferences, in the city of Dracena (São Paulo State, Brazil), in relation to three types of beef sales outlets:

neighborhood butcher shop and butcher and gondola in supermarket, evaluating the influence of the sale point reputation, as well as the beef's attributes, such as: traceability, inspection, Country of Origin Labeling on beef (rump) purchase decisions. Responses allowed also calculate the influence of sociodemographic characteristics on the choices of sale points. Preferences were evaluated through a Best-Worst Discrete Choice Experiment.

2 - METHODOLOGY

The research was carried out in two stages: one qualitative and other quantitative. The qualitative corresponded to the bibliographic study on the addressed issue and, due to the lack of specific prior information about the Dracena market, a focus group was held with local consumers. Based on the results of this previous stage, a pilot questionnaire was developed for the quantitative study. The pilot questionnaire was used in interviews with people from the College of Agricultural and Technological Sciences (FCAT / Unesp). Once adjustments were made, it was used to assess the consumers' preferences in the city of Dracena.

2.1 - Best-Worst Discrete Choice Experiment (Bwdce)

The consumers' preferences were evaluated using the Best-Worst Discrete Choice Experiment (BWDCE). This experiment was developed by Finn & Louviere (1992). In this experiment, the respondents need to choose the best and the worst options among a set of available alternatives. There are three types of BWDCE: Case 1, Case 2 and Case 3. The research adopted the Case 3 or Multi-profile Case, in which each alternative represents a product profile, defined by the combination of different attributes' levels (Marley; Pihlens, 2012). Therefore, consumers indicated the best beef rump steak in the right column (+ sign) and the worst beef rump steak in the left column (- sign) (Figure 1).







| - | Purchase situation 1 | + |
|---|---|---|
| | <p>Neighborhood butcher shop</p>   <p>Inspected</p> <p>35 RS/kg</p> | |
| | <p>Butcher shop in the supermarket</p>   <p>35 RS/kg</p> | |
| | <p>Gondola in the Supermarket</p>   <p>Tracked</p> <p>15 RS/kg</p> | |

Figure 1 - Purchase situation 1, adopted in the study.
Source: Research result.

The BWDCE has aroused the interest of researchers from different areas. Each type of BWDCE has its advantages over other methods. When compared to traditional choice experiments - where it is indicated only one alternative per choice set, the advantage of the BWDCE of case 3 is obtaining additional information per choice situation without an expressive extra cognitive effort of respondents (Cheung *et al.*, 2016).

2.2 - Selection of Attributes and Attributes' Levels

As pointed earlier, the selection of attributes and their respective levels was the result of the qualitative research. In total, the survey assesses the importance of four attributes, with three levels each, in the purchase situations of the beef rump steak (Table 1).

In Brazil, inspection of all slaughtered meat is mandatory. According to the Ministry of Agriculture, Livestock and Food Supply (Brasil, 2018a), the Federal Inspection Service, which aims to ensure the animal products' quality, operates in more than 5,000 establishments. However, it is estimated that around







40% of beef is slaughtered and traded in a clandestine manner in Brazil (Mathias, 2008). The illegal beef market, in addition to exercising unfair competition with the inspected establishments (they do not pay taxes or social charges), is responsible for meat of dubious quality. It can put the population health at risk (Ximenes, 2018). This is an extremely relevant topic for the livestock sector.

Meat traceability, unlike inspection, is optional. The official traceability system in the beef production chain is the SISBOV (Brasil, 2018b). The beef traceability contributes to obtaining superior quality food, since it promotes better control of the production process, prevents fraud, controls mobility, avoids hiding and collaborates with public policies (Conchon; Lopes, 2012).

In several countries, the Country-of-Origin Labeling of beef is related to the food risk perception. Usually, the consumers' perception is that meat produced in their country is safer. This preference can be explained by several reasons, such as: greater freshness, productive practices, stimulating the national economy, environmental impacts and other credence attributes (Schoeder *et al.*, 2006). In addition to the Brazilian rump, the study considered the product from Uruguay and Australia. These countries are important exporters of beef. According to FAO (2020), Australia is the second largest exporter of beef in the world, second only to Brazil. Uruguay is the third largest beef exporter in South America. In other words, the study considered a neighboring and a distant country.

The sale point can be considered as a beef extrinsic attribute. According to Becker (2000), due to the complexity of evaluating the beef quality at the sale point, the meat's origin and the sale point reputation end up gaining importance in this process. In a study of consumer preferences in Londrina, Maringá and Campo Mourão (all in the State of Paraná), Mottin *et al.* (2019) found that butchery hygiene is one of the main factors that consumers take into account when they purchase beef. In this way, it was evaluated how much the sale point reputation (good, regular and bad) interferes on beef rump steak purchase decision.

Table 1 – Attributes and their respective levels evaluated in the survey

| Attributes | Levels | | |
|----------------------------|--|---|--|
| Price | 15 R\$/kg | 25 R\$/kg | 35 R\$/kg |
| Meat quality control | Tracked | None | Inspected |
| Country of origin labeling | Uruguay  | Brazil  | Australia  |
| Selling point's reputation | Good  | Regular  | Bad  |

Source: Research result.

2.3 – Experimental Design

The experimental design concerns to generate specific combinations of attribute levels for building alternatives within choice situations. As the number of combinations of 4 attributes and 3 levels each is high, the adopted experimental design was the fractional factorial. The experimental design was obtained with the aid of the Ngene software (ChoiceMetrics, 2013). The program performed 1,000 simulations and determined the best experimental design based on the C-efficiency index.

The evaluation of the experimental design efficiency usually uses the following indices: D-efficiency, A - efficiency, B - efficiency, S - efficiency and C-efficiency. The use of these indexes aims to minimize the sample size, increase the estimator's precision and, when considering the balance of utility among alternatives - function available in Ngene - minimizes the presence of dominant and dominated alternatives. Thus, use either index depends on the study's objective (Scarpa; Rose, 2008). As the intention was to calculate the consumers' willingness to pay for the beef attributes, the adopted index was the C-efficiency.

The experimental design was a labeled type, where each alternative represented a sale point:

neighborhood butcher shop, butcher in the supermarket and gondola in the supermarket (Figure 1). With this configuration, the experimental design made it possible to assess consumer preferences of each trade chain.

2.4 – Econometric Model

The BWDCE is based on the random utility theory. It is assumed that respondent maximize utility when he chooses the best alternative and, in the case of BWDCE, and minimize utility when he chooses the worst alternative. Hence, under Thurstone' Random Utility Theory, the utility provided by alternative j to individual i (U_{ij}) is not directly observable and consists of a systematic and observable component (V_i) and another random error term (ϵ_{ij}), as shown in equation 1.

$$U_{ij} = V_{ij} + \epsilon_{ij} \tag{1}$$

The probability of individual i choosing alternative j as the best alternative in a choice set with J alternatives can be represented by equation 2:

$$P_{ij} = (U_{ij} > U_{ik}; \forall j \neq k \in J) = P(\varepsilon_{ij} < \varepsilon_{ik} + V_{ik} - V_{ij}; \forall j \neq k \in J) \quad (2)$$

Considering the Gumbel distribution of the error term, the Multinomial Logit model is obtained. Thus, that equation 2 can be rewritten into equation 3.

$$P_{ij} = \frac{\exp(\mu V_{ij})}{\sum_{j=1}^J \exp(\mu V_{jk})} \quad (3)$$

Where: μ is the scale factor, inversely proportional to the standard deviation. Unit value is assumed for the scale factor. The systematic component can be decomposed into: $V_{ij} = \beta' x_{ij}$, where β is the parameters' vector to be estimated and x_{ij} is the beef rump attribute levels' vector. With the adopted experimental design (labeled), it is possible to estimate a utility function for each alternative, i.e., a utility function for each sale point, like represented by equations 4, 5 and 6. These equations assume that the consumers have the same price sensitivity, however, it regards those other attributes have different impacts on purchase decision for different sale point.

$$V^{NB} = \beta_0 + \beta_1 Price^{NB} + \beta_2 Good\ Reputation^{NB} + \beta_3 Bad\ Reputation^{NB} + \beta_4 Australian\ Origem^{NB} + \beta_5 Uruguayan\ Origem^{NB} + \beta_6 Tracked^{NB} + \beta_7 Inspected^{NB} \quad (4)$$

$$V^{BS} = \beta_8 + \beta_1 Price^{BS} + \beta_9 Good\ Reputation^{BS} + \beta_{10} Bad\ Reputation^{BS} + \beta_{11} Australian\ Origem^{BS} + \beta_{12} Uruguayan\ Origem^{BS} + \beta_{13} Tracked^{BS} + \beta_{14} Inspected^{BS} \quad (5)$$

$$V^{GS} = 0 + \beta_1 Price^{GS} + \beta_{15} Good\ Reputation^{GS} + \beta_{16} Bad\ Reputation^{GS} + \beta_{17} Australian\ Origem^{GS} + \beta_{17} Uruguayan\ Origem^{GS} + \beta_{19} Tracked^{GS} + \beta_{20} Inspected^{GS} \quad (6)$$

The heterogeneities of preferences toward sale points were assessed using the Cointegration Model, equation 7. Where: Sociodemographic variables were taken as dummy variables.

$$U_i = \beta_i + \sum_{n=1}^N \beta_n X_n + \sum_{m=1}^M \beta_m Y_m Z_m + \varepsilon_i \quad (7)$$

The descriptive analysis was performed using the SPSS software, while the analysis of the BWDCE data was performed with the Biogeme program, version 1.7 (Bierlaire, 2008).

2.5 – Survey and Sampling

Personal interviews took place with the help of a structured questionnaire, between the end of July and mid-August 2017. In order to motivate the consumer participation and not be too exhaustive, the questionnaire was developed in such a way that there were no doubts and quick questions and answers. The questionnaire asked about the consumers' socio-demographic characteristics, beef consumption habits and the BWDCE of Case 3.

The interviews were conducted in public places in Dracena, by trained people from an outsourced company. People were invited to participate in the survey completely randomly (the only criterion was that they were over 18 years old) and took 20 to 30 minutes. In total, 166 consumers participated in the survey. The sampling error was calculated at 7.6%, with a 95% confidence interval. To estimate the sampling error, it was taking into account the guidelines provided by Trespalacios, Vázquez and Bello (2005).

3 - RESULTS AND DISCUSSION

3.1 - Respondents' Profile

Table 2 shows the sociodemographic characteristics of the consumers that participated in this study, as well as the sociodemographic profile of the Dracena's population. It turns out that the sample has a higher percentage of women (59%). This characteristic of the sample is desirable since women are usually responsible for making decisions when purchasing food for their families.

Respondents were younger than the average population. Consumers aged 18 to 24 years represented 29% of sample. This figure for the population was 18%. Thus, it is very likely that consumers participating in the survey would seek, to a lesser extent, information through traditional communication channels, such as: TV and radio, and give more priority to the internet. According to Nielsen (2015), age makes people more attentive to spending, and, there-

fore, the expectation is that the surveyed consumers do not limit their purchases as much as the population average.

The interviewed consumers presented a higher level of studies than the population of Dracena. On average, 34% of the population had few studies - elementary education, complete or incomplete, while only 7% of respondents had this level of studies. As a result, respondents can be considered more prepared to seek and interpret information than the population average.

The social class, which is related to income, of the interviewed consumers is higher than the average of the studied population. According to the Brazilian National Institute of Geography and Statistics (IBGE, 2018), only 7% of Dracena's population are from social classes A or B, i.e., with a higher family income than 5 minimum wages per month. Among respondents, 25% considered themselves to be from social classes A or B. In this sense, respondents have a greater purchasing capacity than the general population.

Table 2 - Sociodemographic characteristics of the sample and the population of Dracena, State of São Paulo

| Sociodemographic characteristics | | Sample | | Population | |
|----------------------------------|---|------------|-------------|---------------|-------------|
| | | Number | % | Number | % |
| <i>Gender</i> | Male | 68 | 41% | 17,609 | 49% |
| | Female | 98 | 59% | 18,198 | 51% |
| <i>Age classes</i> | From 18 to 24 years old | 48 | 29% | 6,615 | 18% |
| | From 25 to 44 years old | 81 | 49% | 13,444 | 38% |
| | From 45 to 64 years old | 29 | 17% | 10,56 | 30% |
| | Over 64 years old | 8 | 5% | 5,146 | 14% |
| <i>Level of studies</i> | Elementary, complete or incomplete | 12 | 7% | 7,156 | 34% |
| | High school, complete or incomplete | 100 | 60% | 9,188 | 43% |
| | Higher, complete or incomplete | 54 | 33% | 4,934 | 23% |
| <i>Social class / Income</i> | Class AB / More than 5 minimum wages / month ³ | 41 | 25% | 2,504 | 7% |
| | Class C / From 3 to 5 minimum wages / month ³ | 80 | 48% | 2,773 | 10% |
| | Class DE / Less than 3 minimum wages / month ³ | 45 | 27% | 22,957 | 83% |
| Total | | 166 | 100% | 42,048 | 100% |

Source: Research result and IBGE (2018).

3.2 – Consumers' Preferences

The estimated model in table 1 presents the consumers' preferences toward the sale points and for attribute levels related to quality perception of rump. The estimated model of table 4 weights of model in table 3 and, in addition, it measures how much the sociodemographic characteristics influenced the choices of sale point.

Consumers from Dracena prefer to buy the rump at neighborhood butcher shops rather than supermarket butcher shops. The alternative specific constant for neighborhood butcher shop is positive (0.167) and statistically significant, which indicates that this sale point provided a higher utility level than the supermarket butcher. At first, this result was not expected. Since, motivated by convenience, around 90% of consumers from Dracena purchase beef mainly in supermarkets (Henrique, 2018). Something similar happens in Europe. The EU Custom Research and Coordination Center (GFK EU3C, 2012) reports that even 39% of Europeans prefer to buy meat at butcher shop, they purchase meat at supermarket. It happens because in the preferred buying place prices are too high or it is too far from their usual routes (they want to minimize their trips to the establish-

ments). In Dracena the explanation must be similar.

In the supermarket, consumers prefer to buy meat in gondolas than in butcher. The gondola's alternative specific constant is statistically different from zero and positive (0.151), which suggests that gondola provides higher utility than butcher in the supermarket. Buying meat in gondolas is more convenient because demand less time buying and packaged rump is better protected against quality deterioration.

Establishment reputation is the important rump's attribute because its estimated parameters are the highest. In relation to neighborhood butcher shop and gondola in the supermarket reputation, the higher it is the more likely you are to buy at that establishment. All estimated parameter of these two purchase places is statistically different from zero and the good reputations' parameters are positive, while those of bad reputation are negative. However, in butcher in the supermarket only bad reputation negatively interferes on purchasing decisions. This is highlighted by the negative and significant (- 0.740) bad reputation parameter. Consumers are indifferent between a butcher in the supermarket with regular or good reputation. The estimated parameter of good reputation is positive (0.322), but statistically equal to zero.

Table 3 – Consumers' preferences for the rump characteristics and sale point

| Variables | Neighborhood butcher shop | Butcher in the supermarket | Gondola in the supermarket |
|-----------------------------------|---------------------------|----------------------------|----------------------------|
| Price | -0.054*** | | |
| Alternative specific constant | 0.167*** | | 0.151*** |
| Good reputation | 1.370*** | 0.322 ^{ns} | 1.490*** |
| Bad reputation | -1.240*** | -0.740*** | -1.080*** |
| Australian origin | -0.516*** | -0.033 ^{ns} | -0.704** |
| Uruguayan origin | -0.236* | -0.069 ^{ns} | 0.162 ^{ns} |
| Tracked | -0.187 ^{ns} | 0.370* | -0.367** |
| Inspected | 0.375 ^{ns} | 0.056* | 0.616* |
| Number of parameters estimated | 21 | | |
| Number of observations | 3,983 | | |
| Maximum Likelihood function value | -3,391 | | |
| R ² adjusted | 22% | | |

Note: (***) and (**) and (*) indicate statistical significance at the 1 per cent, 5 per cent and 10 per cent levels, respectively, and (ns) denotes values that are statistically insignificant.

Source: Research result.

There is different preference toward country-of-origin labeling depending on the sale point. When shopping at neighborhood butcher shops, consumers prefer Brazilian rump over other origins due to both, the Australian and Uruguayan origin, parameters are negative and statistically significant. Hence, imported rump provides less utility than Brazilian beef. On the other hand, when shopping at a supermarket butcher, the country-of-origin labeling does not matter. Although Australian and Uruguayan origin's parameters are negative, they do not show statistical significance. In this case, the imported rump provides the same utility level as Brazilian rump. In gondolas, consumers are indifferent between the Uruguayan and Brazilian rump, but they dislike Australia's rump.

Preferences for meat quality control change depending on the point of sale. In the choices of neighborhood butcher shop, consumers were indifferent regarding having or not inspection and meat traceability, since the estimated parameters of tracked and inspected beef are statistically equal to zero. At butcher in the supermarket, tracked rump is preferable to a no tracked meat because tracked rump's parameter was estimated at 0.37 (statistically different from zero). At this place, consumers are indifferent between an inspected and a no inspected rump, since inspection's parameter was calculated at 0.056 (without statistical significance). On gondolas, traceability has a negative effect on consumer choices, while inspection positively influenced choices. This result does not converge to those found by Abicht (2009). In Rio Grande do Sul state, he observed a favorable attitude into traced meat sold in supermarket gondola.

The rump price has a negative influence on purchase, which is in accordance with economic theory and previous studies. According to the theory, *Ceteris paribus*, a rational consumer prefers the product with the lowest price because it provides higher utility levels. Price sensitivity converges with that observed by Pes, Figueiredo and Figueiredo (2012). Based on a monthly time series between January 2000 and December 2010, they estimated the price elasticity of demand for beef in Brazil at -0.97, i.e., the 1% increase in the beef price reduces the demanded

quantity in 0.97%. In the USA, the product is taken as more essential, since the price elasticity of demand estimated by Okrent and Alston (2012) is -0.7.

As mentioned earlier, model 2 (Table 4) was estimated to detect if there are relation between consumers' sociodemographic characteristics and sale point preference. There are no differences among preferences for beef sales points of different genders, ages, education and social classes. All sociodemographic variables were not statistically significant. These results differ from those obtained by Moura, Silva and Batalha (2006). They observed that women, consumers with higher education level and income prefer to shop beef in supermarkets, while other kind of consumers prefer traditional butcher stores.

4 - FINAL REMARKS

Livestock has great socioeconomic importance. In the 1990's, the entry of large multinational retail enterprises had a negative impact on traditional establishments' market share, such as neighborhood butchers. The market lost caused a reaction in all sectors. In the next decades butchers adapted to the new market demands. They adopted the concept of meat boutiques, in which they work much more on the appearance and cleanness of sale point. Professionalization, especially regarding consumer service and meat origin, can improve the establishment's reputation and, consequently, improve sales.

In Dracena, even though consumers buy more often in supermarkets, they prefer neighborhood butcher shop over the supermarket butcher shop. The explanation of the apparently contradictory behavior is based on the greater convenience of shopping at self-service retailers. Inside the supermarket, consumers continue to prefer the fastest selling option: on gondolas. The introduction of innovations, such as the use of packaging, which makes it possible to sell meat on gondolas, may represent a comparative advantage to the butcher. The perception of food security can be greater since meat handling is minimal.

Table 4 – Different type of consumers' preferences for the rump characteristics and sale point

| Variables | Neighborhood butcher shop | Butcher in the supermarket | Gondola in the supermarket |
|-----------------------------------|---------------------------|----------------------------|----------------------------|
| Price | -0.054 ^{***} | | |
| Alternative specific constant | 0.196 ^{**} | | 0.120 ^{***} |
| Good reputation | 1.370 ^{***} | 0.320 ^{ns} | 1.490 ^{***} |
| Bad reputation | -1.240 ^{***} | -0.739 ^{***} | -1.080 ^{***} |
| Australian origin | -0.517 ^{***} | -0.032 ^{ns} | -0.706 ^{**} |
| Uruguayan origin | -0.236 [*] | -0.070 ^{ns} | 0.162 ^{ns} |
| Tracked | -0.187 ^{ns} | 0.372 [*] | -0.369 ^{**} |
| Inspected | 0.373 ^{ns} | 0.055 ^{ns} | 0.619 [*] |
| Woman | 0.014 ^{ns} | | 0.105 ^{ns} |
| Young | -0.089 ^{ns} | | -0.082 ^{ns} |
| University | -0.017 ^{ns} | | 0.052 ^{ns} |
| Social class AB | -0.026 ^{ns} | | -0.099 ^{ns} |
| Number of parameters estimated | 29 | | |
| Number of observations | 3,983 | | |
| Maximum Likelihood function value | -3,389 | | |
| R ² adjusted | 22% | | |

Note: (***) , (**) and (*) indicate statistical significance at the 1 per cent, 5 per cent and 10 per cent levels, respectively, and (ns) denotes values that are statistically insignificant.

Source: Research result.

The meat outlets reputation is the attribute that weighed most in consumers' choices. Building a good reputation spend time and effort. Thus, establishment must offer products with good origin because illegal meat, common in the Brazilian market, can cause damage to health. The meat retail must also adopt a transparent policy, explaining possible changes in prices or products. A transparent posture favors the consumers, who feel more valued and respected.

Despite the Operation Meat Weak scandal, which involved MAPA employees, inspected meat positively influenced consumer choices when shopping on gondolas. At other sale point, inspection did not influence on consumer purchases decisions. This situation shows two things: the first, that shortly after the outbreak of Operation Weak Meat, the inspected beef certification (SIF) was not negatively affecting meat purchase in Dracena. The second is the importance of the butcher in the buying process. The trust placed in this professional can come close to the trust that consumer has in the establishment. Thus,

as he is a key element in the beef sale, butcher must be trained and constantly updated to meet consumers' expectations.

The beef traceability interference consumer choices according to the specific type of sale point. In the neighborhood butcher shop, it did not affect the choices, while in the supermarket butcher shop the influence was positive. Several articles suggest that tracked meat should be sold in supermarket shelves. However, in short term, this strategy is not indicated in Dracena, as tracked rump had a negative effect on purchases. In the long term, it is necessary to provide more information about traceability impacts on meat quality to consumers. More aware about the benefits – remembering that in Brazil a significant part of beef market is clandestine, consumers would attribute greater value to the tracked beef.

Consumers prefer Brazilian meat when it is sold in a neighborhood butcher shop and in a supermarket gondola. However, consumers are indifferent among Australian, Uruguayan and Brazilian rump

when they buy at supermarket butcher shops. The non-aversion to the national product, at any sale point, is yet another evidence that market quickly overcome the negative impacts of Operation Meat Weak scandals. The preferences also suggest that Country of Origin Labeling can serve as an efficient market protections strategy against imported meat in Brazil.

4.1 - Limitations and Future Research

In general, consumer sociodemographic characteristic is not related to preferences toward sale point. However, future research should analyze the preference heterogeneity with other analytical approaches, such as: Random Parameters Models, Latent Class Regression or Hierarchical Bayes.

The geographical delimitation of the study, city of Dracena, in part, is a limiting factor of this research. To minimize this limitation, it is suggested that the study could be expanded to other cities. At first it could be cities close to Dracena and, later, larger cities, with a larger consumer market, such as the city Presidente Prudente and São Paulo.

Although they are less expressive to sale meat, future research could be developed in order to study consumer preferences for other types of beef sales points, such as: open markets. In these future surveys, the reputation could be broken down into its various dimensions (hygiene, care, etc.) to determine which is the most important from the consumers' point of view.

REFERENCES

- ABICHT, A. M. **Percepção dos consumidores locais sobre a carne bovina certificada e rastreada**. 2009. Dissertação (Mestrado) – Centro de Estudos e Pesquisas em Agronegócio, Universidade Federal do Rio Grande do Sul, Porto Alegre, 2009.
- ABIEC. Associação Brasileira das Indústrias Exportadoras de Carne. **Beef Report 2022**: perfil da pecuária no Brasil. Brasília: [s. n.], 2022. Disponível em: https://www.abiec.com.br/wp-content/uploads/Beef-Report-2022_atualizado_jun2022.pdf. Acesso em: 15 jun. 2024.
- ABIEC. Associação Brasileira das Indústrias Exportadoras de Carne. **Beef Report 2023**: perfil da pecuária no Brasil. Brasília: [s. n.], 2023. Disponível em: <https://www.abiec.com.br/wp-content/uploads/Final-Beef-Report-2023-Completo-Versao-web.pdf>. Acesso em: 15 jun. 2024.
- ABRAFRIGO. Associação Brasileira de Frigoríficos. **Do açougue às prateleiras**: carne bovina em porções ganha espaço nos supermercados. [S. l.]: Abrafrigo News, 2018. Disponível em: <https://www.abrafrigo.com.br/index.php/2018/07/03/clipping-da-abrafrigo-no-785-de-03-de-julho-de-2018/>. Acesso em: 20 abr. 2020.
- ABRAS. Associação Brasileira de Supermercados. **Varejo disputa vendas de carnes**. [S. l.]: Notícias ABRAS, 2012. Disponível em: <https://www.abras.com.br/clipping.php?area=20&clipping=28476>. Acesso em: 22 abr. 2020.
- AGROLINK. **Histórico**: boi gordo 15kg. [S. l.]: Agrolink, 2024. Disponível em: <https://www.agrolink.com.br/cotacoes/historico/sc/boi-gordo-15kg>. Acesso em: 16 jun. 2024.
- BECKER, T. Consumer perception of fresh meat quality: a framework for analysis. **British Food Journal**, v. 102, n. 3, p. 158-176, 2000.
- BIERLAIRE, M. **Estimation of discrete Choice models with BIOGEME 1.7**. [S. l.: s. n.], 2008. Disponível em: <http://biogeme.epfl.ch/>. Acesso: 30 jan. 2019.
- BRASIL. Ministério da Agricultura, Pecuária e Abastecimento. **Rastreabilidade Animal**. Brasília: MAPA, 2018b. Disponível em: <http://www.agricultura.gov.br/assuntos/saude-animal-e-vegetal/saude-animal/rastreabilidade-animal>. Acesso em: 14 jan. 2019.
- BRASIL. Ministério da Agricultura, Pecuária e Abastecimento. **SIF**. Brasília: MAPA, 2018a. Disponível em: <http://www.agricultura.gov.br/assuntos/inspecao/produtos-animal/sif>. Acesso em: 16 jan. 2020.
- BRISOLA, M. V.; CASTRO, A. M. G de. Preferências do consumidor de carne bovina do Distrito Federal pelo ponto de compra e pelo produto adquirido. **Caderno de Pesquisas em Administração**, v. 12, n. 1, p. 81-99, 2005.

CHEUNG, K. L.; WIJNEN, B. F. M.; HOLLIN, I. L.; JANSSEN, E. M.; BRIDGES, J. F.; EVERS, S. M. A. A.; HILIGSMANN, M. Using Best-Worst Scaling to investigate preferences in health care. *PharmacoEconomics*, n. 34, p. 1195-1209, 2016.

CHOICEMETRICS. **Ngene**: the most comprehensive software for designing choice experiments. [S. l.]: St. Leonards, 2013. Disponível em: <http://www.choice-metrics.com/index.html>. Acesso em: 10 out. 2020.

CONCHON, F. L.; LOPES, M. A. Rastreabilidade e segurança alimentar. *Boletim Técnico da Universidade Federal de Lavras*, Lavras, v. 91, p. 1-25, 2012.

DALLACORTE, C.; DALCANTON, F.; COSTELLA, M. F. Análise da variação de temperatura de alimentos na cadeia de distribuição: uma revisão sistemática de literatura. *Revista Mundi Meio Ambiente e Agrárias*, v. 3, n. 1, p. 35-62, 2018.

FAO. Food and Agriculture Organization. **FAOSTAT**. [S. l.: s. n.], 2020. Disponível em: <http://www.fao.org/faostat/es/#data>. Acesso em: 15 jul. 2020.

FINN, A.; LOUVIERE, J. J. Determining the appropriate response to evidence of public concern: the case of food safety. *Journal of Public Policy and Marketing*, v. 11, p. 12-25, 1992.

GFK EU3C. EU Custom Research and Coordination Centre. **Final report**: consumer market study on the functioning of the meat market for consumers in the European Union SANCO/2009/B1/010. [S. l.: s. n.], 2012. Disponível em: https://ec.europa.eu/info/sites/info/files/meat-market-study-final-report_en_0.pdf. Acesso em: 14 jun. 2020.

GUIMARÃES, G.; PALAU, H.; SENESI, S. A. Comunicação sobre a Carne Fraca e o impacto do marketing da carne bovina. *Boletim MARKESALQ*, v. 6, n. 27, p. 1-4, 2018.

HENRIQUE, R. L. P. **Importância dos atributos da carne bovina para os consumidores de Dracena/SP**, 2018. Monografia (TCC) - Faculdade de Ciências Agrárias e Tecnológicas, Universidade Estadual Paulista "Júlio de Mesquita Filho", Dracena, 2018.

IBGE. Instituto Brasileiro de Geografia e Estatística. **Cidade**. Rio de Janeiro: IBGE, 2018. Disponível em: <https://cidades.ibge.gov.br/brasil/sp/dracena/panorama>. Acesso em: 10 jan. 2020.

LOPES, M. A.; MAGALHÃES, D. R.; FARIA, P. B.; BRUHN, F. R. P.; PEREIRA, S. M.; DEMEUI, F. A. Fatores associados a disposição de consumidores em adquirir carne bovina com certificação de origem na cidade do Rio de Janeiro, Brasil. *Brazilian Journal of Veterinary Medicine*, v. 39, n. 2, p. 100-110, 2017.

MAGALHÃES, D. R.; LOPES, M. A.; DA ROCHA, C. M. B. M.; BRUHN, F. R. P.; BORGES, J. C.; DA CUNHA, C. F. Fatores socioeconômicos que influenciam na disposição de consumidores em adquirir carne bovina com certificação de origem em Belo Horizonte, Minas Gerais, Brasil. *Arquivos do Instituto Biológico*, v. 83, p. 1-8, 2016.

MARLEY, A. A. J.; PIHLENS, D. Models of best-worst choice and ranking among multiattribute options (profiles). *Journal of Mathematical Psychology*, v. 56, n. 1, p. 24-34, 2012.

MATHIAS, J. F. C. M. A clandestinidade na produção de carne bovina no Brasil. *Revista de Política Agrícola*, v. 17, n. 1, p. 63-73, 2008.

MOTTIN, C.; EIRAS, C. E.; CHEFER, D. M.; BARCELOS, V. da C.; RAMOS, T. R.; PRADO, I. N. do. Influencing factors of consumer willingness to buy cattle meat: an analysis of survey data from three Brazilian cities. *Acta Scientiarum. Animal Science*, v. 41, 2019.

MOURA, T. L. de; SILVA, A. L. da; BATALHA, M. O. Perfil dos consumidores que frequentam os formatos de varejo de alimentos no Brasil. *In: ENCONTRO DA ASSOCIAÇÃO NACIONAL DE PÓS-GRADUAÇÃO E PESQUISA EM ADMINISTRAÇÃO*, 30., 2006, Salvador. *Anais eletrônicos* [...]. Salvador: ANPAD, 2006.

NIelsen. **Geração global estilos de vida**: como vivemos, comemos, nos divertimos, trabalhamos e economizamos para o nosso futuro. Cotia: [s. n.], 2015. Disponível em: <https://www.nielsen.com/wp-content/uploads/sites/3/2019/04/EstudoGlobal-EstiloDeVida-nov2015.pdf>. Acesso em: 28 fev. 2020.

OKRENT, A. M.; ALSTON, J. M. **The demand for disaggregated food-away-from-home and food at home products in the United States**. USA: USDA Economic Research Service, 2012. (Economic Research Report, 139). Disponível em: https://www.ers.usda.gov/webdocs/publications/45003/30438_err139.pdf?v=0. Acesso em: 15 mar. 2020.

OLMEDO, S. V. S.; MALAFAIA, G. C.; SOUZA, C. C. de; REIS NETO, J. F. dos. Atributos que afetam a decisão de compra de carne bovina in natura: evidências dos consumidores de Ponta Porã, MS. *In: CONGRESSO DA*

SOCIEDADE BRASILEIRA DE ECONOMIA, ADMINISTRAÇÃO E SOCIOLOGIA RURAL, 55., 2017, Santa Maria. **Anais eletrônicos** [...]. Santa Maria: SOBER, 2017.

PERETE, J. **Varejo no Brasil: gestão estratégica**. São Paulo: Atlas, 2007.

PES, D. A.; FIGUEIREDO, M. G. de; FIGUEIREDO, A. M. R. Análise econométrica da oferta e demanda de carne bovina no Brasil, no período de 2000 a 2010. **Revista Eletrônica da Universidade Estadual de Goiás**, v. 8, n. 1, p. 54-73, 2012.

REIHER, C. Food safety and consumer trust in post-Fukushima Japan. **Journal Japan Forum**, v. 29, n. 1, p. 53-76, 2016.

SANTOS, J. C. dos; OLIVEIRA, L. C. de; CARVALHO, J. O. B. de; SANTOS, R. Percepção dos consumidores quanto à segurança e comercialização de carne bovina em um bairro de Salvador (BA). In: CONGRESSO NORTE NORDESTE DE PESQUISA E INOVAÇÃO, 7., 2012, Palmas. **Anais eletrônicos** [...]. Palmas: CONNEPI, 2012.

SCARPA, R.; ROSE, J. M. Design efficiency for non-market valuation with choice modelling: how to measure it, what to report and why. **The Australian Journal of Agricultural and Resource Economics**, v. 52, p. 253-282, 2008.

SCHOEDER, T.; TONSOR, G.; MINTERT, J.; PENNING, J. M. E. **Consumer risk perceptions and attitudes about**

beef food safety: Implications for improving supply chain management. [S. l.: s. n.], 2006. Disponível em: <https://bookstore.ksre.ksu.edu/pubs/MF2793.pdf>. Acesso em: 14 abr. 2020.

SEBRAE. Serviço de Apoio às Micro e Pequenas Empresas da Bahia. **Comércio e serviços: varejo de alimentos açougues**. Salvador: [s. n.], 2017. Disponível em: <https://m.sebrae.com.br/Sebrae/Portal%20Sebrae/UFs/BA/Anexos/Varejo%20de%20alimentos%20-%20a%C3%A7ougues%20na%20Bahia.pdf>. Acesso em: 11 jan. 2020.

TRESPALACIOS, J. A.; VÁZQUEZ, R.; BELLO, L. **Investigación de mercados**. Madrid: Thomson, 2005.

UMBERGER, W. J.; FEUZ, D. M.; CALKINS, C. R.; SITZ, B. M. Country-of-origin labeling of beef products: US consumers' preference. **Journal of Food Distribution Research**, v. 34, n. 3, p. 103-116, 2003.

XIMENES, L. J. F. Segmento de carnes: não basta ser líder em volume, tem que faturar. **Caderno Setorial ETENE**, v. 3, n. 28, p. 1-11, 2018.

ZAMBERLAN, L.; SPAREMBERG, A.; BÜTTENBENDER, P. L.; WAGNER, A.; ZAMIN, M. As atitudes do consumidor de carne: um estudo exploratório das percepções e o papel da cultura no consumo. In: ENCONTRO DA ASSOCIAÇÃO NACIONAL DE PÓS-GRADUAÇÃO E PESQUISA EM ADMINISTRAÇÃO, 32., 2008, Rio de Janeiro. **Anais eletrônicos** [...]. Rio de Janeiro: ANPAD, 2008.

Recebido em: 19/07/2022. Liberado para publicação em 22/07/2024.

COMO CITAR

GROOT, E. Risk Perception at Different Selling Point of Beef: a best-worst discrete choice experiment approach. **Revista de Economia Agrícola**, São Paulo, v. 71, 1-13, 2024. DOI: <https://doi.org/10.56468/1983-7747.erea052022.2024>