



Consumer willingness to pay for cheese with a social sustainability attribute

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ABSTRACT: *The social dimension of sustainability is becoming very relevant on the consumer purchasing decision, especially in the food sector. This research analyzed the willingness to pay (WTP) of Chilean consumers for cheese with a social sustainability attribute using a double-bounded dichotomous choice format. Results showed that the WTP for a price premium depends on three variables: age, income and previous knowledge regarding social sustainability. The mean WTP is 7.5% over the average price of cheese; although, combining relevant variables and changing values over their range shows that firms can obtain up to a 12.9% price premium if they focus on younger and high income consumers that have a previous good knowledge about social sustainability practices. Additionally, this study presented a novel market oriented methodological approach for identifying and quantifying specific niche markets based on the WTP.*

Key words: consumers, willingness to pay, social sustainability, attribute, cheese.

Disposição do consumidor de pagar pelo queijo com um atributo de sustentabilidade social

RESUMO: *A dimensão social da sustentabilidade está se tornando muito relevante na decisão de compra do consumidor, principalmente no setor alimentício. Esta pesquisa analisa a disposição a pagar (DAP) dos consumidores chilenos por queijo com um atributo de sustentabilidade social usando um formato de escolha dicotômica de duplo limite. Os resultados mostram que a DDP por um prêmio de preço depende de três variáveis: idade, renda e conhecimento prévio sobre sustentabilidade social. A DDP média é de 7,5% sobre o preço médio do queijo, embora a combinação de variáveis relevantes, e valores variáveis em sua faixa, mostre que as empresas podem obter um prêmio de preço de até 12,9% se se concentrarem em consumidores mais jovens e de alta renda que tenham um bom conhecimento prévio sobre práticas de sustentabilidade social. Além disso, este estudo apresenta uma nova abordagem metodológica orientada para o mercado a fim de identificar e quantificar nichos de mercado específicos com base na WTP.*

Palavras-chave: consumidores, disposição a pagar, sustentabilidade social, atributo, queijo.

INTRODUCTION

Food purchasing decisions have become a highly complex and elaborate process. Apart from the vast diversity of products available in the market, this is also a result of the many variables involved, wherein sustainability has been increasingly used as an attribute to attract consumers and influence their final purchase decision (GRUNERT et al., 2014). Although, the environmental dimension of sustainability has concentrated the attention of the food industry and researchers for a long time, in recent years the social side has received special interest because of the positive perception of the concept and the new concerns of society related to products,

the production processes and the interest of firms' stakeholders (BANGSA & SCHLEGELMILCH, 2020; WAHEED et al., 2020).

Social sustainability (SS) is a broad concept, and many researchers treat social responsibility or corporate social responsibility practices as part of SS (BANGSA & SCHLEGELMILCH, 2020; TOUSSAINT et al., 2020). From the firm viewpoint, SS includes practices such as having good working conditions, avoiding child labor, keeping wages that goes beyond the industry average, and taking care of animal welfare, among others (MUELLER LOOSE et al., 2013; DE MAGISTRIS et al., 2015; MILLER et al., 2017; WEI et al., 2018). From the consumer's perspective, social sustainability can be categorized

as an ethical consumption, which is defined as “the act of purchasing products that have additional attributes (e.g., social, environmental, political, health, etc.) in addition to their immediate use-value, to signify commitment to their values and/or to support changes to unjust market practices” (LONG & MURRAY, 2013). Thus, customer values and actions influence firms’ decisions. In the case of food production, consumers’ collective choice of specific goods or services regarding ecological and social sustainability issues have been proven to impact market orientation (SACCHI, 2018).

The solution to coordinate the interest of firms (to convey the SS attributes of their products), and consumers (to express their purchase intention), is achieved mainly through the use of labels in food products (TOBI et al., 2019). Thus, there is a wide variety of labels in the market applied to distinguish social attributes, such as those related to local production aspects, Fair Trade and other credence attributes (GHVANIDZE et al., 2017; TAIT et al., 2019). Moreover, consumers not only prefer foods with an SS attribute, but most of them would be willing to pay a price premium (TULLY & WINER, 2014; MILLER et al., 2017).

Agri-food firms are recognizing the importance of including SS aspects in their products and processes. For instance, the Dairy Sustainability Framework has established sustainability guidelines for the dairy industry that member countries must adhere to and implement (DAIRY SUSTAINABILITY FRAMEWORK, 2020). Chile is a member country, and in this context has developed a sustainability framework to which most dairy producers across the whole industry have subscribed. The social dimension of this framework considers actions to improved labor conditions (CHILEAN COMMITTEE OF THE INTERNATIONAL DAIRY FEDERATION, 2018). However, despite the importance that the Chilean dairy sector has given to SS, there is no information regarding the impact that these actions will have on consumers. In this line, the hypothesis stated in this study is that consumers in a developing country are willing to pay a price premium for social sustainability attributes in dairy products.

Thus, the objective of this research was to elicit the WTP for cheese with a social sustainability attribute in Chile, an emerging market. Studies conducted in developing countries are scarce by comparison with those performed in developed countries (BANGSA & SCHLEGELMILCH, 2020) and, to our best knowledge, there are no studies that have explored this issue previously in this nation.

Furthermore, this research provided a novel way to analyze WTP because provides WTP values for specific niche markets, which should be of special interest for agri-food firms focused in marketing their products based on distinctive attributes.

MATERIALS AND METHODS

In the Chilean market there is no cheese that displays an SS attribute in the label, so there is neither a price for this attribute nor explicit information regarding how much consumers would pay for it. Therefore, a contingent valuation method (CVM) is the way to approach this situation and the double-bounded dichotomous choice format (DBDC) is recommended because it provided more efficient and consistent estimates than other methods (HANEMANN et al., 1991). In this format each participant i is asked twice to answer if he/she would be willing to pay for a certain amount or bid, t . The individual can answer yes or no to a first bid, t^1 , and then, contingent upon the first bid, he/she is asked to respond yes or no to a second bid, t^2 . Thus, the probabilities for the four potential answers A of an individual i are $Pr(A^{first}, A^{second}|x)_i$, where x is a set of covariates that affect the consumer preferences. The WTP can be expressed as $WTP_i = x_i'\beta + \varepsilon_i$, where β is a vector of parameters, and $\varepsilon_i \sim N(0, \sigma^2)$. Parameters β and σ can be estimated using maximum likelihood estimation. Finally, the average WTP can be calculated as $WTP = \bar{x}'\hat{\beta}$, where \bar{x} is the average of the explanatory variables and $\hat{\beta}$ their estimated coefficients. The previous formulations can be estimated by a modified ordered probit model (LOPEZ-FELDMAN, 2012).

Among Chilean dairy products, cheese and yogurt occupy by far the highest volume of production (OFICINA DE ESTUDIOS Y POLÍTICAS AGRARIAS, 2018). However, unlike yogurt, cheese is produced not only by big and medium companies, but by many small producers that are constantly looking for attributes to create a differentiation strategy (FUNDACIÓN PARA LA INNOVACIÓN AGRARIA, 2009). It is estimated that about 87% of the Chilean population consumes cheese on a monthly basis and around 69% of them consider aspects such as the brand to make their purchase decision (VARGAS-BELLO-PÉREZ et al., 2014), where the Gouda type is the highest consumed cheese (SERVICIO NACIONAL DEL CONSUMIDOR, 2015). Therefore, Gouda cheese was the product selected for eliciting the consumers WTP.

The DBDC considers the application of a questionnaire to a set of consumers. An initial draft, i.e., a pretest, was applied to a random group of adults for question improvement as well as to set the initial bids to be used in the DBDC format (using open ended questions). Based on that information, a final questionnaire with three sections was constructed. The first section aimed to identify the previous knowledge of consumers regarding SS. Then, independent of how much interviewee knew about SS, a brief explanation of social sustainability was read to each participant. This was explained in a simple way, so every person could understand it easily: "social sustainability is the sum of those actions that allow a more equitable society, where every person can benefit from the economic growth in a context that goes beyond respect for labor laws, such as having good working conditions, avoiding child labor, keeping wages that go beyond the industry average and no gender discrimination, in such a way that meeting the needs of the present does not compromise the ability of future generations to meet their needs". Thus, the social sustainability concept was standardized. In the second section the DBDC method was conducted. This included a description of a hypothetical situation that was read to each interviewee: "*A company has arrived to the city and will produce and sell Gouda type cheese under social sustainability procedures, which will be advertised and also printed in the label of the cheese. Considering this, how much would you willing to pay for 1 Kg of this cheese?*". The 1 Kg unit was chosen because by law all Chilean supermarkets must exhibit the food prices by kilogram to help consumers to make informed food choices. It was assumed that interviewees associated the production with sustainable procedures as stated in the previously provided SS concept. Subsequently, consumers were asked to answer "yes" or "no" to different bid price premium alternatives (2 bids, 2 answers, where the first bid was selected randomly) that they would be willing to pay over the average price (note that WTP is for the price premium, the extra price, not for the price of the product). The third and last section of the questionnaire asked for socio-economic aspects of individuals (gender, age, occupation, household income, and educational level). The study was conducted using Chilean pesos, CLP, but results were presented in US dollars (at prices of December 31, 2017: USD 1 = CLP 615.4).

The pretest showed that most people were willing to pay 5% more for 1 Kg of cheese (\$0.51) with the social sustainability attribute. Based on this information, four initial bids were specified taking

as a reference the average price of cheese (Gouda) sold in supermarkets: \$10.31 per kilogram. Thus, for 2.5%, 5%, 7.5% and 10% the bid sets were \$[0.24, 0.12, 0.48], \$[0.48, 0.24, 0.73], \$[0.73, 0.48, 0.97] and \$[0.97, 0.73, 1.46], respectively. The first number corresponds to the initial bid; the second number is the bid when the answer to the initial bid is "no"; and the third number is the bid when the answer to the initial bid is "yes". Questionnaires were applied during second semester of 2017, to a representative sample of 260 adults (older than 18 years old) that regularly shop in the main supermarkets of the city of Valdivia.

To face the hypothetical bias, this study employed a follow-up certainty question, where respondents answered on a scale (adapted to the Chilean grading system) ranging from 1 to 7 how certain were their WTP answers (1 "very uncertain"; 7 "very certain") (CHAMP et al., 1997). Answers receiving a score of 4 or lesser were recoded "no" for the first and second bid. To address the starting point bias the first bids were divided in well-balanced segments of \$0.24 and randomly applied to interviewees (VERONESI et al., 2011).

RESULTS AND DISCUSSION

After filtering data and eliminating observations with errors and missing data (interviewees did not provide complete information in some questions, mostly for the income variable), a total sample of 212 individuals was used. Table 1 shows the sample's main statistics. The variable "Knowledge" has a mean of 4.1 in a 7-point Likert scale, which shows that people generally have a medium knowledge about the social sustainability concept, with 32.6% below and 45.3% above the average. It is important to note that 16% of interviewees stated that they did not know anything about social sustainability (Table 2). The variable "Age" has a mean of 36.5 years old with a minimum value of 18 (no minors were interviewed) and a maximum of 80. The variable "Gender" showed that females predominate at 60.8%, which is not representative as women are regularly 50% of the population. This difference can be explained because in Chile women make most supermarket purchases. The variable "Education" showed that the high school level is most frequent (53.8%), followed by the university level (21.2%). The variable "Income", specifically the household income, presents 7 ordered segments with a mean of 3.14 (corresponding to the segment of \$812 - \$1,218), which is consistent with the information provided by the Chilean National

Table 1 - Descriptive statistics of the sample (n = 212).

Variable	Mean	Std. Dev.	Min	Max
Knowledge (Likert scale, 1-7; 1= badly informed, 7=well-informed)	4.1	1.9	1	7
Age (years)	36.5	13.6	18	80
-----Gender-----				
Male	39.2%			
Female	60.8%			
-----Education-----				
Elementary and middle	19.8%			
High school	53.8%			
Technical	5.2%			
University	21.2%			
-----Income (household)-----				
<\$406	10.9%			
\$407-\$812	34.0%			
\$813-\$1,218	18.4%			
\$1,219-\$1,625	16.0%			
\$1,626-\$3,249	10.4%			
\$3,250-\$4,875	9.0%			
>\$4,875	1.3%			
Low-income, < \$812	44.8%			
High-income, ≥ \$813	55.2%			
-----Occupation-----				
Housewife	6.6%			
Worker	63.7%			
Other Occupations	29.7%			

Institute of Statistics (INSTITUTO NACIONAL DE ESTADÍSTICAS, 2018){Instituto Nacional de Estadísticas INE, 2018 #812}, which indicated that the median household income in 2017 was \$1,039. To conduct the regression analysis, this variable was regrouped in two segments: a group that includes the first 3 segments (less than \$1,218) which was named “Low-Income”, and another one that represents a higher family income, called “High-Income”. Regrouping this variable was necessary to avoid multicollinearity problems in the regression. Other regrouping options (for example, grouping into low, medium and high income) did not show statistically significant results. The variable occupation was represented through three categories (each as a dummy variable): “Housewife”, “Worker” and

“Other Occupations” (retires, employees, students), where most people declared themselves to be workers (63.7%).

Results from the modified ordered probit model are presented in table 2. A likelihood ratio test showed that the proposed model fits better than an unrestricted model (Chi-square of 24.63 with 7 degrees of freedom). The variables Low-Income and Other Occupations were not included in the regression model to avoid the variable dummy trap. The results showed that the only statistically significant variables were Knowledge, Age and High-Income: younger consumers belonging to high-income families with previous knowledge regarding social sustainability are willing to pay more for a product that has a socially sustainable attribute.

Table 2 - Results from the modified ordered probit model.

Variable	---Coefficient---	---Std. Dev.---
Knowledge	0.10 **	0.03
Age	-0.01 *	0.00
Gender	-0.15	0.11
Educational level	-0.05	0.06
High-income	0.27 **	0.11
Housewife	0.17	0.24
Worker	-0.03	0.13
Constant	0.85 **	0.33

*, ** significant at 5% and 1%, respectively.

The negative relationship between age and a price premium for socially sustainable food has been reported by other authors (MAHÉ, 2010; DEL GIUDICE et al., 2018). It seems that a higher exposure to sustainability information that children have during their school experiences and later as students of higher-education institutions, as well as the information provided by media is creating a greater consciousness regarding social sustainability (YU et al., 2014; AZZURRA et al., 2019). Although, all participants received a definition of SS during the interview, those who had previous knowledge regarding SS practices were willing to pay more for cheese with this attribute, which reveals that consumers need a good and thoughtful understanding of SS to modify their purchase decision, which is consistent with the findings of FIGUEROA-GARCIA et al. (2018) and LERRO et al. (2018). Lastly, the positive effect of income on WTP for SS foods has been reported by DEL GIUDICE et al. (2018) and MAHÉ (2010), while MOHR and SCHLICH (2016) reported that income is not a predictor of sustainable meat consumption (including the social aspect).

The average price premium found for cheese, \$0.77, is equivalent to 7.5%. Although, there is no previous research that explores WTP on cheese with SS attributes, some studies reported a wide range for other food products (TULLY & WINER, 2014; MILLER et al., 2017; LERRO et al., 2018). Despite the importance of the average WTP, the marginal effects provide more precise values of the price premiums. Table 3 shows the marginal and discrete changes of the relevant variables (maintaining all other variables at their mean). The marginal effect is for each unit of the variable (dy/dx) and the discrete change is calculated from the minimum to the

maximum value ($\Delta \text{ min/max}$), i.e., age is evaluated at the values 18 and 80, and knowledge at the values 1 and 7. The variable knowledge reveals a marginal effect, i.e., the change of a given level to the next one, of \$0.10. In terms of discrete change, this variable has a change of \$0.61 from a badly-informed person to a well-informed person. The variable age showed a negative marginal effect of -\$0.01, i.e., for each year older a consumer decreases his/her WTP in this amount. In terms of discrete shift, the WTP change between a young person of 18 years and an old person of 80 years is \$0.51. Lastly, the variable High-Income has a marginal and discrete change of \$0.27.

The average WTP and the marginal effects are only referential, so any decision based on these values could lead to wrong decisions, especially for those decision makers inserted in a market context. An alternative form of analyzing WTP is from a more realistic market standpoint. In practice, sellers are interested in specific niche markets and how much they are willing to pay. A good approach for examining this is to consider the joint effect of the relevant variables changing values across their range. Figure 1 shows the WTP of combined values of variables age, knowledge and high-income.

As age increases, lower values of WTP are obtained, and the minimum value of high-income is low-income. Given that knowledge has 7 levels in the Likert scale, for graphical purposes the variable age was also divided by taking 7 arbitrary ages (18, 25, 35, 45, 55, 65 and 75 years old). Thereby, 7 combinations are presented: in an extreme, the lowest value of knowledge ($K=1$) and the highest value of age ($A=75$); and in the other extreme, the highest value of knowledge ($K=7$) and the lowest value of age ($A=18$). The combination of low-income/age=75/knowledge=1 (low-income, old and badly informed consumers) results in a mean WTP of \$0, i.e., 0% over the average price of cheese (this value is actually negative, -\$0.01, but from a market point of view the consumers' WTP would be zero). Conversely, the combined effect high-income/age=18/knowledge=7 (high-income, young and well-informed people) provides a mean WTP of \$1.33, which represents a 12.9% over the average price of cheese, with an upper band of \$1.61 or a 15.6% over the average price. The combination of the three relevant variables showed that agri-food firms interested in maximizing their sales should focus on high income young adults. Moreover, higher price premiums are related to the previous knowledge about SS, i.e., it is a concern of a company and/or the food industry as a whole rather than a product specific issue (LERRO et al., 2018).

Table 3 - Marginal effects of relevant variables on WTP.

Variable	Marginal effect	Discrete change		
	(dy/dx)	Minimum	Maximum	Absolute change (Δ min/max)
Knowledge	0.10 ** (0.03)	0.45 ** (0.10)	1.06 ** (0.10)	0.61
Age	-0.01 * (0.0)	0.92 ** (0.09)	0.41 ** (0.18)	0.51
High-income	0.27 ** (0.11)	0.62 ** (0.08)	0.89 ** (0.07)	0.27

*, ** significant at 5% and 1%, respectively.
Numbers in parentheses are standard errors.

CONCLUSION

This study has tested and accepted the hypothesis that in a developing country (Chile), consumers are willing to pay a price premium for a food product (cheese) with an SS attribute. The mean WTP is 7.5% over the average price of cheese; although, combining relevant variables and changing values over their range showed that firms

can obtain up to a 12.9% price premium. Besides, results indicated that age, previous knowledge about SS practices and income are the only variables that influence the WTP for an SS attribute. It is important to note that firms must be aware that these results cannot be extrapolated to other foods because WTP is specific for each product. Therefore, any attempt to use these results in other products, especially if they are included as part of a commercial strategy, could

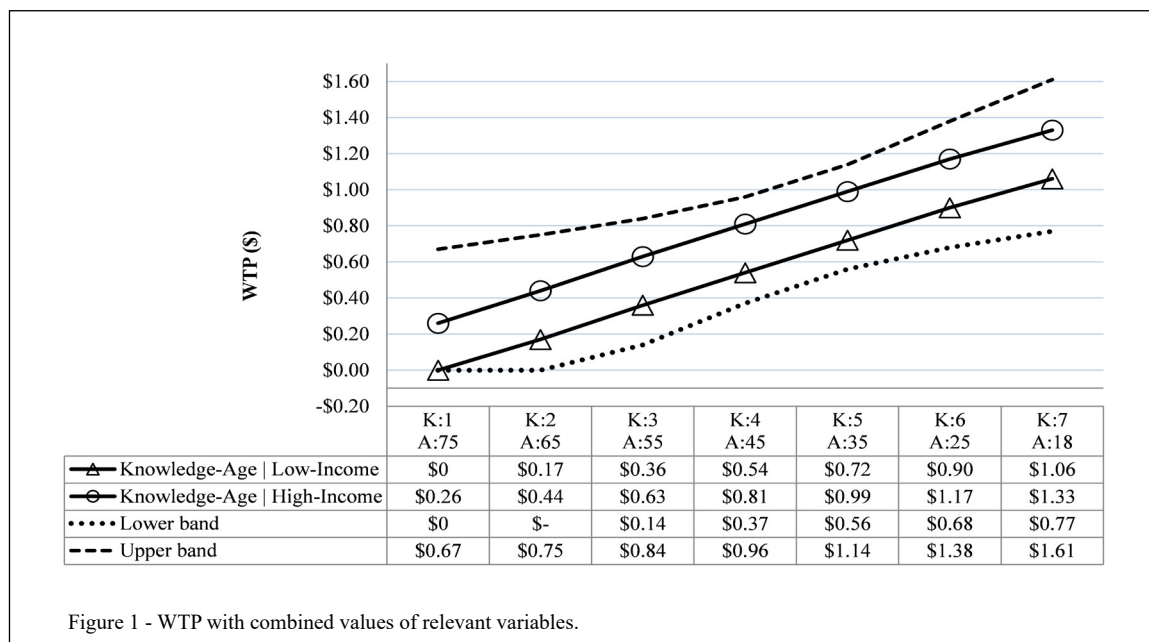


Figure 1 - WTP with combined values of relevant variables.

lead to wrong results. This paper has contributed to the understanding of social sustainability in the food industry of developing countries, providing relevant information about consumers' willingness to pay for cheese. However, companies must be aware that these results cannot be extrapolated to other foods because WTP is specific for each product. Therefore, any attempt to use these results in other products, especially if they are included as part of a commercial strategy, could lead to wrong results. In this line, further research should be conducted in other products and markets including other variables that might be of interest for firms, so that new niche markets can be identified. A final suggestion is that future research in the sustainability area should continue to analyze the WTP of food products with more detail, obtaining more information about its determinants and their impact, so firms can use the results to benefit themselves and simultaneously promote a more sustainable world.

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BIOETHICS AND BIOSSECURITY COMMITTEE APPROVAL

We authors of the article entitled "Consumer willingness to pay for cheese with a social sustainability attribute" declared, for all due purposes, the project that gave rise to the present data of the same has not been submitted for evaluation to the Ethics Committee of the Universidad Austral de Chile, but we are aware of the contents of Resolution No. 466, of December 12, 2012 of the Brazilian National Health Council <<http://conselho.saude.gov.br/resolucoes/2012/Reso466.pdf>> if it involves human>.

Thus, the authors assume full responsibility for the presented data and are available for possible questions, should they be required by the competent authorities.

DECLARATION OF CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHORS' CONTRIBUTIONS

All authors contributed equally for the conception and writing of the manuscript. All authors critically revised the manuscript and approved the final version.

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