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Consumers' willingness to pay for eco-labelled food products

Analysis of influencing factors, price premium, and multi-branding effect on the Swiss population

Deposed by

Quentin Binggeli
B.A. in Management

Date of birth: 23.07.1996
Student number: 15-219-306
Mail address: quentin.binggeli@unifr.ch

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Supervisor

Prof. Dr. Olivier Furrer

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Faculté des sciences économiques et sociales
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Boulevard de Pérolles 90
CH-1700 Fribourg

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Faculté des sciences économiques et sociales
Département de Gestion
Chaire de Marketing
Prof. Dr. Olivier Furrer
Bd. de Pérolles 90
CH-1700 Fribourg

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ABSTRACT

Consumers' willingness to pay for eco-labelled food products is a topic that has been explored in several studies using various methodologies and focusing on different products. This study is based on the Gabor-Granger method and aims at determining and quantifying the willingness to pay of Swiss consumers for three eco-labelled food products. The purpose of this analysis is to establish a direct effect of several factors such as household revenue, label knowledge and recognition, ecological concern, and socio-demographic factors (age, gender, place of residency, and education level) on consumers' willingness to pay. In addition, the multi-branding effect is tested and brings a new contribution to the topic. The results of the online survey (120 valid cases) show that all factors tested, with the exception of knowledge and recognition of the label, influence consumers' willingness to pay for eco-labelled food products. Findings suggest that the multi-branding effect applies to eco-labels and the price premium for a single-labelled product reaches up to 10,32% more compared to an equivalent unlabelled product.

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I. INTRODUCTION

There is a rising awareness among consumers regarding the ecological impact of food choices (Poinski, 2022) and the benefits of healthy nutrition (Portugal-Nunes, 2022). Environmental sustainability labels are one of the tools that provide information on the product and help consumers make sustainable purchase decisions alongside nutrition tables, nutrition scores, mentions, and other digital tools (UFC Que Choisir, 2021).

Created first to fight against fraud and defend traditional know-how, particularly for alcoholic beverages, the role of labels has evolved over the years (Denmat, 2021). Now labels aim at informing and encouraging consumers to move towards more sustainable and healthy consumption behaviors (Denmat, 2021).

These past years, there has been a proliferation of new labels whose purpose is to guarantee different products' attributes such as their origin, quality, and environmental impact (UFC Que Choisir, 2021). However, consumer awareness about these labels remains low (Singh et. al, 2023), and "both the complexity and the proliferation of eco-labels are likely to hamper their efficiency in guiding consumers" (Yokessa & Marette, 2019, p.1).

For producers and retailers, the use of eco-labels aims at differentiating from competitors by signaling quality as well as other environmental attributes and can serve as justification for premium prices (McCluskey & Loureiro, 2003). Recently, there has been a tendency to multiply the number of labels on food products to certify and inform consumers about several attributes (Monier-Dilhan, 2018). However, the effect of this new trend on consumers remains unclear.

Taking into consideration the different elements discussed above, this study aims to respond to these questions:

- What factors influence the willingness to pay for eco-labelled food products?
- How much more are consumers willing to pay for eco-labelled food products?
- Are consumers willing to pay more for multi-eco-labelled products than single eco-labelled products?

This research intends to develop knowledge about customers' willingness to pay for eco-labelled food products. The first objective is to identify the factors influencing consumers' willingness to pay for labelled food products. Different factors are tested to determine their effect on consumers' willingness to pay. In addition, a second objective is to quantify the price premium consumers are willing to pay for specific label attributes and to compare the results between single- and multi-eco-labelled food products.

This study will focus particularly on «type I» eco-labels, whose “aim is to certify both products and production processes according to different criteria that relate to the entire life cycle of the products” (Galarraga Gallastegui, 2002, p.317). The selected eco-labels are used in Switzerland's main food store chains and certify principally process attributes of product quality. They are the following: Bourgeon Bio, Migros Bio, Bio Suisse, Naturaplan, Rainforest Alliance, and Fairtrade Max Havelaar.

Figure 1: Selected eco-labels

The thesis begins with a literature review of the topic. Then, the conceptual framework and the hypotheses of the study are developed. Thereafter, the methodology of the research is described, followed by the results and a discussion of the results. Lastly, a conclusion summarizes the main findings of the thesis and highlights the limitations of the research as well as future research possibilities to deepen the knowledge on this topic.

II. LITERATURE REVIEW

2.1 Eco-labels definitions

Eco-labelling is defined by the Global Ecolabelling Network as a “voluntary method of environmental performance certification and labeling that is practiced around the world. An ecolabel identifies products or services proven to be environmentally preferable within a specific category” (Global Ecolabelling Network, n.d.).

The American Environmental Protection Agency (EPA) highlights different aspects and defines eco-labels as “marks placed on product packaging or in e-catalogs that can help consumers and institutional purchasers quickly and easily identify those products that meet specific environmental performance criteria and are therefore deemed «environmentally preferable»”. Eco-labels can be “owned or managed by government agencies, nonprofit environmental advocacy organizations, or private sector entities.” The organization also differentiates between single-attribute labels which focus on a single lifecycle stage of a product/service or a single environmental issue, and multi-attribute labels which focus on the entire lifecycle of a product/service and address many different environmental issues (US EPA, n.d.).

2.2 Types of eco-labels

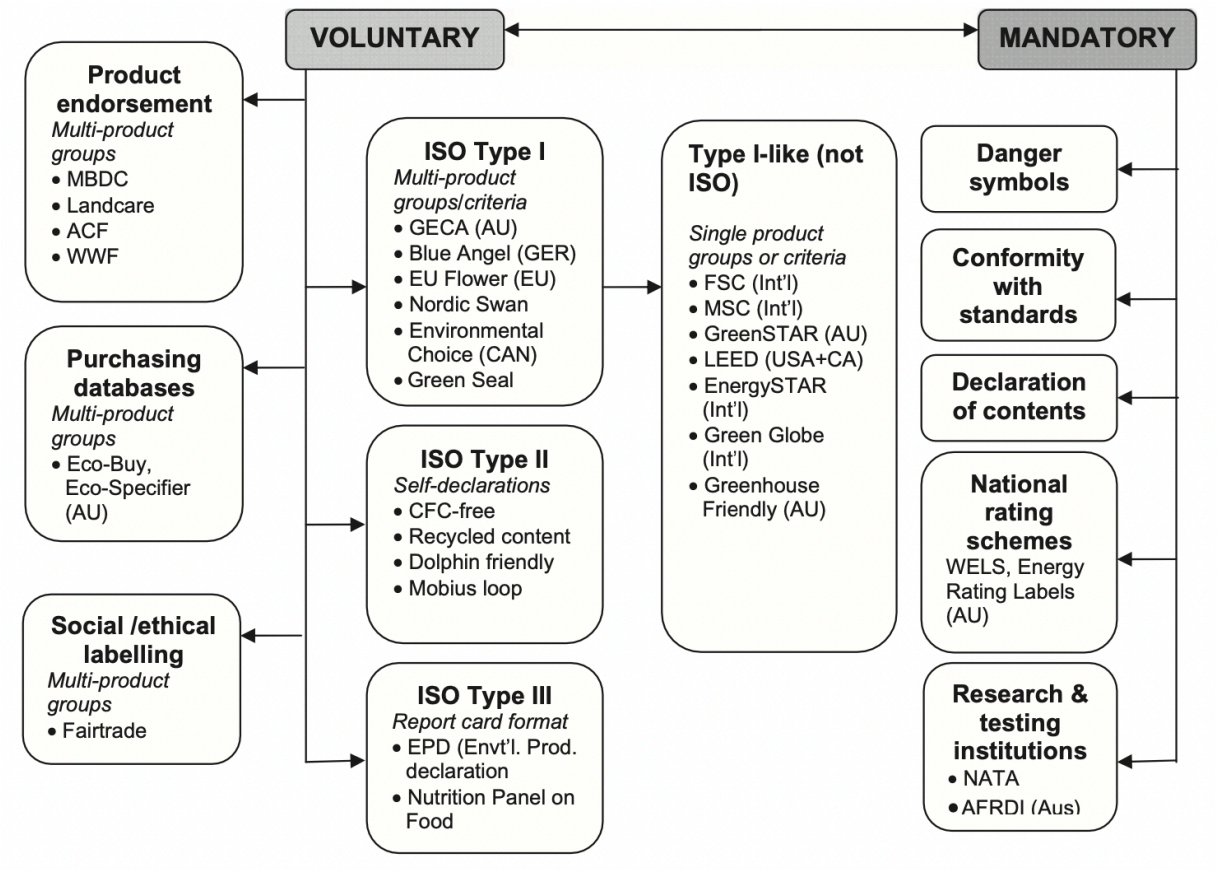
The International Organization for Standardization (ISO) has created environmental management standards (ISO 14000) in which three categories of eco-labels are defined. For each category, the organization establishes principles for developing environmental labelling programs and certification procedures for awarding the label. The main characteristics of each category are the following:

- Type I (ISO 14024): awarded by third-party certification programs, usually supported by governments, based on standardized criteria developed by independent experts, certify both products and production processes (multi-attributes).
- Type II (ISO 14021): self-declared claims made by manufacturers, importers, or distributors, usually single attribute.

- Type III (ISO 14025): environmental declarations based on pre-set indices, give quantified information about products based on independent verification (Galarrage G., 2002).

Horne (2009) developed a more comprehensive representation of product environmental labels and classified them by types (see figure 2). The classification differentiates voluntary and mandatory schemes as main categories. Whereas mandatory labelling is required by law, voluntary labelling depends on manufacturers', importers', distributors', or retailers' decisions (Horne, 2009).

Figure 2: Classification of product environmental labels by type (R. Horne, 2009)



ISO Type I labels are considered the only true «eco-labels» due to their independent verification schemes and comprehensive approach (Horne, 2009). Unlike the other types, strict environmental requirements are guaranteed based on multiple criteria for Type I labels. However, the term «eco-label» is used in this paper in a way that includes all types of environmental certification programs.

2.3 Quality attributes for food products

Product quality can be characterized by different attributes. According to Caswell (1997), the main quality attributes for food products are the following: food safety, nutrition, value, package, and process. Food safety attributes include aspects such as the presence of heavy metals, pesticide residues, foodborne pathogens, and food additives in a product. Nutrition attributes gather product characteristics including fat content, calories, fibers, sodium, vitamins, and minerals. Value attributes consist of notions such as purity, compositional integrity, size, appearance, taste, and convenience of preparation. Package attributes namely cover package materials, labelling, and other information provided on the packaging. Finally, process attributes regroup environmental impact, pesticide use, animal welfare, worker safety, and biotechnology (Caswell, 1997).

All consumers evaluate the quality of a product based on a combination of these attributes. The importance of a certain attribute may differ according to consumer preferences. Labels are a tool to communicate these quality attributes (Caswell, 1997).

Table 1: Main process attributes of selected labels

	Environmental impact	Social responsibility	Pesticide use	Animal welfare	Worker safety	Human rights	Use of biotechnology	Traceability	Certified product origin	Limited product transformation
Bourgeon Bio	×	×	×	×			×	×		×
Migros Bio	×	×	×	×			×	×		×
Bio Suisse	×	×	×	×			×	×	×	×
Naturaplan	×	×	×	×			×	×		×
Rainforest Alliance	×	×			×	×				
FairTrade Max Havelaar	×	×	×		×	×	×	×*		

*Limited traceability for some products.

The labels chosen for this study are all certifying process attributes. Based on information available on the labels' websites, table 1 illustrates in detail the attributes of the different labels.

2.4 Functions of eco-labels

Eco-labels assume different functions depending on the stakeholders' perspective. In the following paragraphs, eco-labels' functions will be described from a consumer perspective, an industry perspective, and a government perspective.

From a consumer's perspective, eco-labels serve as means to guide purchase decisions (Unep, n.d.). Indeed, labelling policies aim at improving the quantity and the nature of information available (Caswell, 1997), giving consumers more transparency. Thus, the information provided by eco-labels allows consumers to consciously make sustainable food choices (Proi et al., 2023). Furthermore, "eco-labels aim to reduce information asymmetry between consumers and producers, providing information related to environmental attributes that consumers otherwise would not be able to observe or test directly" (Proi et al., 2023, p.1). In addition, labelling programs transform a credence attribute into a search attribute (Caswell, 1997), such as the consumer doesn't have to assume certain characteristics of a product but can search for specific characteristics by looking at a product's labels before its purchase. In this way, eco-labels "reduce information search costs for consumers" (Grunert et al., 2007, p.385), increasing the chances consumers use the information provided (Thogersen et al., 2010). However, consumers' level of motivation to use eco-labels is dependent on their consideration and the credibility of the information provided by the labels (Caswell, 1997). Finally eco-labels encourage sustainability without impacting consumers' freedom of choice (Grunert et al., 2007), making it an attractive instrument to guide consumers' purchase decisions.

From an industry perspective, eco-labels "are a means of measuring performance" and "communicating and marketing the environmental credentials of a given product" (Unep, n.d.). Eco-labelling allows firms to differentiate from competitors (Bonroy & Constantatos, 2015), by improving "the environmental attributes of their products" (Yokessa & Marette, 2019, p.7). The strategic decision to use eco-labels is usually motivated by the perspective of improving sales (Galarraga Gallastegui., 2002). In fact, the use of eco-labels "provides incentives to producers to attract consumers with a high willingness to pay" (Yokessa & Marette, 2019, p.2). However, "the link between communication and environmental improvement is sometimes fragile and controversial" (Yokessa & Marette, 2019, p.7), which can be associated with

greenwashing in certain situations. This is the case when the claim is considered more important than the actual effort made to improve the environmental impact of the product or when the credibility of the certification is questioned.

From a government perspective, the role of governments in labelling is to “encourage the behavioral change of producers and consumers towards long-term sustainability” (Unep, n.d.). Governments’ roles englobe different aspects such as defining policies and their format, enforcing labelling regulations, establishing a relationship with private labels and certification programs, and cooperating with related institutions at the international level (Caswell, 1997). It is believed that governments should encourage “quality signaling through product labelling and information disclosure requirements” (Caswell, 1997, p.11; Magat & Viscusi, 1992) instead of restricting or banning products. According to Caswell (1997), “labelling requirements may be attractive for governments because they are believed to be more compatible with consumer and seller incentives than other types of regulations” (p.11).

Caswell & Padberg (1992) also considers the third-party roles of eco-labels and describe them as follows:

1. Product design influence: Labelling regulations influence the formulation of products and even push some manufacturers to reformulate products to avoid some ingredients or reduce their use.

2. Advertising franchise: Labelling programs tend to regulate the eligibility of claims made on advertisements or labels for certain ingredients or products depending on the country’s policies.

3. Public surveillance assurance: Labelling policies generate consumer confidence, by signaling attention from the authorities regarding quality, which is especially important for food products.

4. Public values definition: Regulators’ role of defining the information and format used to signal which product quality attributes are significant, provides a clear and stable base for consumers, distributors, and manufacturers.

5. Public education format: Consumers' education can be supported by labels, especially when education programs are linked to label information. This role is

getting more important if governments rely on consumers to adapt their purchasing decisions.

Despite the diversity of functions assumed, eco-labels face several barriers to fulfilling their roles as well as convincing firms and consumers to use them. The limitations of eco-labels will be presented in the next section.

2.5 Limitations of eco-labels

Based on a classical hierarchy of effects model, Grunert (2011) established a framework describing six possible barriers limiting the impact of eco-labels on consumers' food choices: the absence of consumers' perceptions of the label criteria, the peripheral broadcast of information about the label, the wrong inferences of the label meaning, the trade-off between an eco-label and an alternative label, the lack of awareness and/or credibility, and the lack of motivation at the time of choice.

The perceived quality of eco-labels can decrease for several reasons, which reduces firms' incentives to certify. Three main reasons can explain this phenomenon: the credibility of eco-labels, the complexity and technicality of environmental information, and the proliferation of eco-labels (Yokessa & Marette, 2019).

The credibility of eco-labels is built by the entities that are setting criteria, certifying, and enforcing the labelling policies. Eco-labels' credibility is established when "consumers have faith in the third-party certifying agencies" (Yokessa & Marette, 2019, p.12). Credibility is a very important aspect considering "the increasing knowledge of consumers and their awareness of the choices they perform" (De Chiara, 2016, p.170).

The complexity and technicality of environmental information are "leading to a major difficulty in prioritizing consumption decisions in favor of the environment" (Yokessa & Marette, 2019, p.12). This is due to the multiplicity of different environmental dimensions indicated by eco-labels. Labels are often covering only specific aspects such as air pollution, water pollution, use of pesticides, biodiversity protection…etc. which are difficult to situate in the bigger concept of sustainability (Yokessa & Marette, 2019). It creates a complex environment for consumers and requires considerable technical knowledge to be able to understand the impact of each environmental dimension.

The proliferation of eco-labels leads to consumers' confusion (Gadema & Oglethorpe, 2011). Indeed, "retail shopping occurs in an information-overloaded environment, where consumers make a large number of choices within a relatively short time span" (Grunert, 2011, p.209). Therefore, consumers tend to simplify their decisions, as they cannot understand the environmental information labels provide, which "limits the extent to which such labels help consumers" (Yokessa & Marette, 2019, p.15). In addition, the number of different types of certifications associated with the variety of environmental claims accentuates consumers' confusion (Marette, 2010).

2.6 Willingness to pay for food products

Measuring the willingness to pay aims at determining the maximum price consumers are willing to pay for a product or service (Stobierski, 2020). Understanding consumers' willingness to pay is a key aspect of pricing decisions and new product development as well as other areas of marketing management (Breidert et al., 2006).

Consumers value different attributes when purchasing food products (presented in section 2.3). Among these attributes, Dolgopolova & Teuber (2018) have demonstrated that consumers are willing to pay more for health benefits in food products. According to this study, the claim «lowering cholesterol» has the most significant positive impact on consumers' marginal willingness to pay compared to any other health or nutrition claim.

In the context of eco-labelled foods, multiple studies and experiments have explored consumers' willingness to pay, focusing mostly on specific products. A non-exhaustive list has been established (see appendix 3). For example, Abdu & Mutuku (2021) did a meta-analysis on willingness to pay for socially responsible eco-labelled coffee. Their research shows that "consumer's willingness to pay for a pound of organic, country of origin labelling, and fairtrade coffee is positive and significant" (Abdu & Mutuku, 2021, p.1). However, experiments led on a single product might not be representative of the whole category of this product.

Bastounis et al. (2021) have reviewed a large number of discrete choice experiments on certified environmentally friendly products and have demonstrated that participants are willing to pay more for eco-labelled foods. Results show that the "willingness to pay was higher for organic labels compared to other labels" (Bastounis et al., 2021, p.1).

The motivations behind these consumption decisions are various and challenging to extrapolate. However, Yokessa & Marette (2019) have made four hypotheses regarding the positive impact of eco-labels on consumers' willingness to pay. The motives can be purely altruistic reasons for the environment, to satisfy the consumer's utility or ego, for selfish reasons when a green product has other positive characteristics, or for a positional effect to indicate a high revenue. Influencing factors of consumers' willingness to pay have been previously explored by different authors and findings of previous research will be detailed in the next section.

2.7 Influencing factors of willingness to pay

Although eco-labels are designed to support consumers in their decision-making process (Singh et al., 2023), different factors influence consumers' willingness to pay for certified food products. These factors have been subject to studies to identify them and measure the extent of their influence. Table 2 summarizes the principal findings related to influencing factors of consumers' willingness to pay for eco-labelled food products. Among them, factors such as trust, awareness and recognition of the eco-labels, environmental concern, and sociodemographic factors have been tested. The results of related studies will be presented in the following paragraphs.

2.7.1 Trust

Trust is defined by Doney and Cannon (1997) as "the perceived credibility and benevolence of a target of trust" (p.36). Thereby, "the development of trust relies on the formation of a trustor's expectations about the motives and behaviors of a trustee" (Doney and Cannon, 1997, p.37). The relationship marketing theory stipulates that trust increases the value of a relationship between two actors which leads to commitment and a desire to maintain a valued relationship that ultimately results in positive behavioral outcomes (Hunt et al., 2006). Two mechanisms are responsible for the creation of trust: personal experience and trust transference. The first mechanism depends on "repeated interactions and positive assessments of past behavior" (Gorton et al., 2021, p.2) whereas the second mechanism identifies that "trust can be transferred from a trusted proof to another" (Gorton et al., 2021, p.2). In the context of eco-labels and certification programs, trust transference can apply in two different ways. It can be "a cognitive process of association of a label with a trusted, related institution and a communication of knowledge process whereby a third-party exerts a

direct influence" (Gorton et al., 2021, p.2). Therefore, trust can apply either to the eco-labels directly or to the related institutions, particularly when a label is associated with a governmental entity. Gorton et al. (2021) have demonstrated that institutional trust affects trust in an organic label related to that institution, which ultimately affects the consumer's use of the label. Also, trust in the eco-label has a direct effect on the use of the label. Hence, trust contributes to the success of eco-labels (Gorton et al., 2021). Lui et al. (2023) also demonstrated that a higher level of trust in eco-labels contributes to a preference for eco-labelled products. While these studies highlight the importance of trust in consumers' purchasing decisions, they didn't establish a direct relationship between trust in eco-labels and consumers' willingness to pay for eco-labels.

2.7.2 Belief in eco-labels

Singh et al. (2023) have a different interpretation of eco-label trust. In their perspective, it is more relevant to test the level of belief in the claim and information provided through eco-labels rather than the trust in eco-labels or the trust in the institutions. Therefore, they measured trust as "consumers' belief in environmental ability of eco-labels which captures whether consumers trust the environmental claims" (Singh et al., 2023, p.4) of the labels. In their opinion, "believing in the claims of eco-labels is what provides them (consumers) with assurance about the credibility of the claims made, which allows consumers to make a conscious decision to pay more for eco-labelled products" (Singh et al., 2023, p.4). The results of this study show that consumers' level of belief in the environmental ability of eco-label positively impacts their willingness to pay more for eco-labelled food products. Furthermore, the belief in eco-labels acts as a mediator between consumers' environmental concern and their willingness to pay, as well as between consumers' awareness of eco-labels and their willingness to pay for eco-labelled food products (Singh et al., 2023).

2.7.3 Eco-labels awareness and knowledge

Different studies have integrated variables such as eco-label awareness and knowledge to test their influence on consumers' willingness to pay for eco-labelled products. A study conducted by Zainalabidin et al. (2014) showed that "consumers' knowledge of whether they can distinguish the eco-label from other labels on food products is an important factor that influences their willingness to pay more toward eco-labelled food products" (p.72). Additionally, "consumers who look for eco-label while purchasing food products are 2.201 times more willing to pay for eco-labelled food

products" (Zainalabidin et al., 2014, p.72). Lui et al. (2023) have investigated the consumers' willingness to pay for eco-labelled eggs. According to their findings, consumers' level of knowledge of eco-labels positively influences the willingness to pay for eco-labelled eggs. Finally, Singh et al. (2023) have demonstrated that "consumers who are aware of eco-labels are willing to pay more for eco-labelled food products" (p.10).

2.7.4 Past experience

In their study based on the theory of planned behavior (TPB), Zainalabidin et al. (2014) have integrated past experience as a variable in their experiment. They measured if consumers who have bought eco-labelled food products in the past have a different willingness to pay than those who have not. The results show that "consumers who have bought eco-labelled food products in the past have 1.514 times higher intention and willingness to pay for them" (Zainalabidin et al., 2014, p.72). According to this study, past experience has an influence on consumers' willingness to pay for food products.

2.7.5 Environmental concern

Environmental concern refers to the extent to which consumers are aware of environmental issues and worry about their consequences (Singh et al., 2023). Different studies show that environmentally concerned consumers are adapting their buying behavior by looking for products that have a smaller environmental impact (Cerri et. al., 2018; Testa et al., 2020; de Canio et al., 2021; Sadiq et al., 2021). Eco-labels provide information regarding the environmental impacts of products and therefore influence consumers' purchasing decisions (Singh et al., 2023). According to Singh et al. (2023), "consumers with higher environmental concern are willing to pay more for eco-labelled food products" (p.10).

2.7.6 Socio-demographic factors

Socio-demographic factors influence consumers' willingness to pay for eco-labelled food products. Several factors have been tested in previous experiments. Among them are gender, age, education level, income level, the presence of children or a pregnant woman in the family, marital status, and household size.

Gender

The literature is diverging regarding the influence of gender on consumers' willingness to pay for eco-labelled food products. For some authors, it plays a significant role, and for others, it has no influence. For example, Bastounis et al. (2021) have identified that women have a higher willingness to pay than men. However, the results of other studies show that gender doesn't influence customers' willingness to pay for eco-labelled food products (Lui et al., 2023; Zainalabidin et al., 2014).

Age

Findings regarding the influence of age on consumers' willingness to pay differs from a study to another. According to Zainalabidin et al. (2014), older generations are more willing to pay for eco-labelled food products than the younger generation. However, for Liu et al. (2023), age has no significant influence.

Education level

The influence of education level on consumers' willingness to pay is unclear. While some authors affirm that lower levels of education expressed a higher willingness to pay (Bastounis et al., 2021), others have concluded the opposite. Indeed, according to Zainalabidin et al. (2014), consumers with higher education levels are more willing to pay for eco-labelled food products. Finally, a study from Lui et al. (2023) has demonstrated that educational level has no significant influence.

Income level/per capita income

In contrast with previous factors, the effect of income on willingness to pay for eco-labelled food products is undisputed. Consumers with higher income levels are willing to pay more than lower income levels (Liu et al.,2023; Zainalabidin et al.,2014).

Presence of children/pregnant woman

Previous studies have demonstrated that the presence of children or a pregnant woman in a family is a factor that positively influences consumers' willingness to pay for eco-labelled food products. In fact, one of the studies states that "the presence of children moderates the relationship between the belief in the environmental ability of eco-labels and the willingness to pay for eco-labelled food products, such that the effect is stronger for consumers who have children living with them" (Singh et al., 2023, p.10). Another study by Liu et al. (2023) indicates that families with pregnant women

or children are willing to pay more for eco-labelled food products than families without pregnant women or children.

Marital status

According to Zainalabidin et al. (2014), the marital status of consumers has an influence on their willingness to pay. The findings of the research show that single consumers are more willing to pay for eco-labelled food products than married consumers.

Household size

The household size has also an influence on consumers' willingness to pay. Indeed, consumers with smaller household sizes are willing to pay more for eco-labelled food products (Zainalabidin et al., 2014).

2.8 Estimation of the price premium

Different studies have estimated the price premium consumers are willing to pay for eco-labelled food products. A study by Lui et al. (2023), which focuses on eco-labelled eggs, shows that consumers are willing to pay a premium that ranges between 73.3% and 190.4% depending on the certification (pollution-free, green label, organic label, free-range husbandry, or nutrition enriched). The study from Zainalabidin et al. (2014), suggests that consumers are willing to pay on average 3.995% more than the market price for eco-labelled food products.

Bastounis et al. (2021) have reviewed an important amount of discrete choice experiments on the topic. The authors converted the price premium in Purchasing Power Parity dollars per kilogram (PPP$/kg) adjusted with the inflation. The result of the study shows an important variation in consumers' willingness to pay depending on the products, labels, and countries. However, they concluded that consumers are willing to pay on average a premium of 3.79 PPP$/kg for environmentally sustainable products (Bastounis et al., 2021).

Table 2: Summary of previous studies on the topic

Authors	Variables	Key Findings
Singh, P., Sahadev, S., Wei, X., & Henninger, C.E. (2023). Country: UK Eco-labels: -	- Environmental concern - Awareness of eco-label - Level of belief in the environmental ability of the eco-label - Presence of children in the family - -Willingness to pay	The impact of consumers' environmental concerns and eco-label awareness on their willingness to pay for eco-labelled food products is partially mediated by consumers' belief in the environmental ability of these eco-labels. The relationship is further moderated by the presence of children living in the household.
Zainalabidin, M., Phuah, K.T., Golnaz, R., & Juwaidah S. (2014). Country: Malaysia Eco-labels: -	- Attitude: look for eco-label while purchasing food products - Perceived behavioral control: Income - Past experience: bought eco-labeled food products in the past - Knowledge: distinguish eco-label from other labels - Intention: willingness to pay - Socio-demographic variables	Education level, income, age, marital status, household size, attitude, past experience, and knowledge significantly influence consumers' willingness to pay for eco-labelled food products.
Liu, C., Liu, X., Yao, L. & Liu, J. (2023). Country: China Eco-labels: green certification, Free-range	- Gender - Age - Education level - Per capita income - Children/pregnant women - Level of trust in eco-labels - Knowledge of eco-labels	The empirical results show that individual heterogeneous preference and attributes of eco-labelled eggs significantly influence consumer choices. More specifically, higher per capita income, families with pregnant women or children, higher level of trust in and knowledge of eco-labels contribute positively to choosing eco-labelled eggs.
Gorton, M., Tocco, B., Yeh, C.-H. & Hartmann, M. (2021). Countries: France, Germany and Serbia Eco-labels: Green Leaf EU, AB France, Bio-siegel Germany, Organic product Serbia	- Recognition of the label - Use of the eco-label when shopping - Trust in the eco-label - Institutional trust - Knowledge of 3rd party certification	Trust in an eco-label positively affects use of that eco-label. Knowledge of third-party certification positively affects trust in, and use of, an eco-label.

2.9 Critics of the literature

By reviewing the existing literature on the topic, it seems like multiple variables are influencing consumers' willingness to pay for eco-labelled food products. The results of the experiments mentioned previously show some divergence in the influencing factors and in the way they are influencing consumers' willingness to pay. Each consumer evaluates each product or label with different criteria and weights making it difficult to generalize for a whole population.

Numerous methods are used to determine consumers' willingness to pay, among them hypothetical choice experiments (HCE), real choice experiments (RCE), stated preference in lab experiments (SPLE), contingent valuations (CV)…etc. However, most of the studies appear to be experimental studies. The diversity in studies and experiments setup is problematic for comparing the results of the different research led on the topic. Moreover, most of the experiments focus only on one product or one label which is not representative of the whole basket of goods purchased by consumers (Yokessa & Marette, 2019).

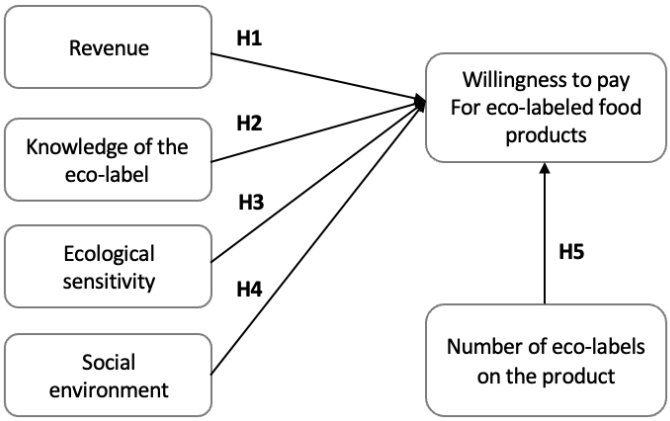
Additionally, there hasn't been any specific study on the willingness to pay for eco-labelled food products in Switzerland. Therefore, it can be interesting to find out if the Swiss population is willing to pay more for eco-labelled food products and is influenced by the same factors.

III. CONCEPTUAL FRAMEWORK

3.1 Conceptual model

The conceptual model illustrates the framework of the study, which will be developed in the next sections. The direct relationship between the five independent variables (revenue, knowledge and recognition of the eco-labels, ecological sensitivity, social environment, and number of eco-labels) and the dependent variable (willingness to pay for eco-labelled food products) will be analyzed.

Figure 3: Conceptual model



3.2 Revenue

Revenue influences consumers' purchasing behavior and it directly affects the willingness to pay for eco-labelled food products. (Zainalabidin et al., 2014). According to previous studies, consumers with higher income levels tend to maximize their utility and are willing to pay more for eco-labelled food products (Liu et al., 2023). The level of income in Switzerland is specific in comparison to other countries. For this reason, it seems important to re-test this factor on the Swiss population. However, household revenue seems to be a more appropriate variable to measure rather than individual revenue. In fact, by measuring the household revenue eventual bias related to different household setups are prevented. Therefore, the following hypothesis will be tested:

H1: Consumers with higher household revenue are willing to pay more for eco-labelled food products.

3.3 Label knowledge and recognition

Label knowledge and recognition stand for consumers' "ability to recognize a label and understand its meaning" (Liu et al., 2023, p.1687). Consumers' knowledge of a label is an important variable that determines their willingness to pay for eco-labelled food products (Zainalabidin et al., 2014; Liu et al., 2023). Previous studies stated that label knowledge positively affects consumers' willingness to pay. As each country/region uses different labels, the level of label knowledge can be influenced. For this reason, it seems relevant to test this aspect specifically for the Swiss population. Therefore, the influence of label knowledge on consumers' willingness to pay will be tested with the second hypothesis:

> **H2: Consumers with a higher level of label knowledge and recognition are willing to pay more for eco-labelled food products.**

3.4 Ecological sensitivity

"Extant research shows that environmentally concerned consumers try to adapt their buying behavior, seek products which have a lesser impact on the environment and are willing to pay for such products" (Singh et al., 2023, p.4). Eco-labels' role is to signal environmentally preferable products to customers, therefore consumers with an ecological sensitivity should be willing to pay more for eco-labelled food products. This leads to the third hypothesis:

> **H3: Consumers with higher ecological sensitivity are willing to pay more for eco-labelled food products.**

3.5 Socio-demographic factors

Previous studies have proved the relationship between the presence of children and/or a pregnant woman in the family with a higher willingness to pay for eco-labelled food products (Singh et al. 2023; Liu et al. 2023). There shouldn't be any significant difference between the Swiss population and other countries regarding this aspect. Therefore, the influence of other socio-demographic factors should be considered such as gender, age, education level, and place of residence (rural/urban).

3.5.1 Gender

Traditionally, women have been more involved in the household than men. Despite the evolution of society, women are still more subject to taking care of tasks related to food shopping and cooking than men. Therefore, there is a great chance that they attribute more value to eco-labels.

H4a: Women are willing to pay more for eco-labelled food products than men.

3.5.2 Age

Younger generations have been informed and educated about the impact of their consumption behavior and should attribute more value to eco-labels than older generations.

H4b: Younger consumers are willing to pay more for eco-labelled food products than older consumers.

3.5.3 Education level

Education has an influence on purchasing behavior. Consumers with a higher level of education tend to search for more information about products and will tend to choose products that are less harmful for themselves and the environment. Therefore, eco-labelled products are likely to be more valued by consumers with a higher education level.

H4c: Consumers with a higher education level are willing to pay more for eco-labelled food products than consumers with a lower education level.

3.5.4 Place of residence

The place of residence might influence the willingness to pay for eco-labelled food products. Assuming that people living in rural areas are probably more familiar to agricultural processes, they might value eco-labelled products more than people living in urban areas.

H4d: People living in rural areas are willing to pay more for eco-labelled food products than people living in urban areas.

3.6 Multi-branding effect

Wilson & Lusk (2020) have conducted a study on consumers' willingness to pay for redundant food labels. However, there haven't been any studies considering the multi-branding effect on consumers' willingness to pay for eco-labelled food products. It is assumed that the number of labels on a product plays an important role in the willingness to pay. Therefore, the following hypothesis will test the direct effect of single versus multiple eco-labels on consumers' willingness to pay for eco-labelled food products:

H5: Consumers' willingness to pay is higher for food products with multiple eco-labels than for those with a single eco-label.

IV. METHODOLOGY

The analysis aims at obtaining empirical evidence for the different hypotheses tested. Therefore, a questionnaire was created to collect quantitative data to confirm or reject the different hypotheses.

As underlined in the literature review, experiments led on a single product might not be representative, therefore three commonly purchased products were selected for this study: bananas, nature yogourt, and chocolate cereal bars. These products were declined in four different variants: without an eco-label, with a single eco-label (two different labels for each product), and with two eco-labels. The labels selected for the study were distributed within the three products according to the table below.

Table 3: Overview of the selected eco-labels

	Product 1: banana (1kg)	**Product 2: nature yogourt (500g)**	**Product 3: chocolate cereal bars (box of 9)**
Variants	Without eco-labels	Without eco-labels	Without eco-labels
	FairTrade	Naturaplan	Migros Bio
	Bourgeon Bio	Bio Suisse	Rainforest Alliance
	FairTrade + Bourgeon Bio	Naturaplan + Bio Suisse	Migros Bio + Rainforest Alliance

Participants were asked to indicate their purchase intention on a Likert scale (1=will never buy; 5=will certainly buy) for the same product at five different price levels according to the following table. The price levels were established based on the real price of products available on the market. The scales were established in a way that the reference prices are located approximatively in the middle of the scales.

Table 4: Overview of the products' price scales

	Product 1: banana (1kg)	**Product 2: nature yogurt (500g)**	**Product 3: chocolate cereal bars (box of 9)**
Price levels	1.00 CHF	0.50 CHF	2.50 CHF
	2.00 CHF	1.00 CHF	3.50 CHF
	3.00 CHF	1.50 CHF	4.50 CHF
	4.00 CHF	2.00 CHF	5.50 CHF
	5.00 CHF	2.50 CHF	6.50 CHF

Each participant was asked to answer only one alternative per product. Four questionnaires were created to distribute the different product alternatives. The different product alternatives were distributed according to the following table.

Table 5: Distribution of the product alternatives

	Questionnaire 1	**Questionnaire 2**	**Questionnaire 3**	**Questionnaire 4**
Banana	Without eco-labels	FairTrade	Bourgeon Bio	FairTrade + Bourgeon Bio
Nature yogourt	Bio Suisse	Naturaplan + Bio Suisse	Without eco-labels	Naturaplan
Chocolate cereal bars	Migros Bio + Rainforest Alliance	Without eco-labels	Migros Bio	Rainforest Alliance

For H1, the household revenue was measured using a single item. Multiple items were used for H2, H3, and H4 to determine respectively the eco-label knowledge and recognition, the ecological sensitivity, and the socio-demographics of the respondents. These four hypotheses were tested on products with a single eco-label by combining the two variants of single label for each product. To test the fifth hypothesis (H5) and determine if a multi-branding effect exists, the willingness to pay between products with one eco-label and products with two eco-labels were compared. Finally, the willingness to pay for products without eco-labels serves as a reference to determine the premium customers are willing to pay for eco-labelled food products.

The willingness to pay was measured using the Gabor-Granger method which is a variation of the sequential monadic approach. The particularity of this approach is that purchase intentions are transformed into purchase probabilities. In this study, a purchase intention of 5 was interpreted as a probability of purchase of 50% and a purchase intention of 4 as a probability of purchase of 20%. Purchase intentions equal to 3 and lower were interpreted as probabilities of purchase of 0%.

Based on the average purchase intention at each price point a calibrated percentage of purchase at the different price points was determined by using the following logit model:

$$prob. = max/(1 + \exp(-\beta 0 + \beta 1 \times price))$$

$\beta 0 = intercept$
$\beta 1 = slope$

The function “Solver” on Microsoft Excel was used to minimize the sum of the squared error between the average purchase intention and the calibrated percentage of purchase, with $\beta 0$ and $\beta 1$ as variables.

The participants of the study were Swiss residents, that are shopping regularly for food in grocery stores. In this way, they should be familiar with the different labels, and they should have had the opportunity to see these labels at least once in the past to have a chance to know the labels and their meaning.

The data were collected through an online survey using the platform “SoSci-survey”. The survey was in French, therefore native French speakers were targeted to take part in the study. The distribution took place via email, private messages, and social media by using a QR code and a link which redirected the participants randomly on one of the four questionnaires. A total of 152 questionnaires were collected, of which 32 were deleted due to incoherent purchasing behaviors. The minimum of 30 respondents per survey was reached, which represents a total of 120 valid cases. The data analysis was conducted on IBM SPSS Statistics and on Microsoft Excel.

V. RESULTS

5.1 Descriptive statistics of the sample

Using the following variables, the sample was categorized into different groups to carry on the analysis of the different hypotheses. The sample's characteristics are represented in the next table.

Table 6: Descriptive statistics of sample characteristics

Variables	**Description**	**Statistics**	
Gender	Female = 1 Male = 2	Ratio Ratio	0.433 0.567
Age	Age of the respondents divided into 5 categories Under 20 = 1 20 to 34 = 2 35 to 49 = 3 50 to 65 = 4 Above 65 = 5	Mean Std. dev. Ratio Ratio Ratio Ratio Ratio	3.01 0.983 0.000 0.417 0.217 0.308 0.058
Education level	Education level of the respondents divided into 5 categories Primary school = 1 Secondary school 1 = 2 Secondary school 2 = 3 Bachelor/Federal diploma = 4 Master/PHD = 5	Mean Std. dev. Ratio Ratio Ratio Ratio Ratio	4.23 0.730 0.000 0.017 0.125 0.467 0.392
Place of residence	City or agglomeration (more than 2000 inhabitant) = 1 Rural area (less than 2000 inhabitant) = 2	Ratio Ratio	0.725 0.275
Household revenue	Yearly household revenue of the respondents divided into 5 categories Under 40'000 CHF = 1 40'000 to 60'000 CHF = 2 60'001 to 80'000 CHF = 3 80'001 to 100'000 CHF = 4 Above 100'000 CHF = 5	Mean Std. dev. Ratio Ratio Ratio Ratio Ratio	3.85 1.333 0.100 0.075 0.142 0.242 0.442

The gender was divided into two groups: female and male. Age groups were divided into five groups, but only four groups will be considered for the analysis as there weren't any respondents under 20. Similarly, for the education level, the group "Primary school" wasn't represented, and the number of respondents in the group "Secondary school 1" wasn't sufficient to be representative. So only three categories of education level were

used for the analysis. Regarding the place of residence, two categories were used: city or agglomeration and rural areas. The number of inhabitants was given to specify the choice of the respondents. Finally, the household revenue was divided into 5 categories which were all used to carry out the analysis.

5.2 Household revenue (H1)

To verify the first hypothesis regarding the effect of household revenue on the willingness to pay, the purchase intentions were compared across household revenue categories for the three products. The following graphics and tables illustrate the results of the analysis.

Figure 4: Likelihood of purchase for single-label bananas by household revenue

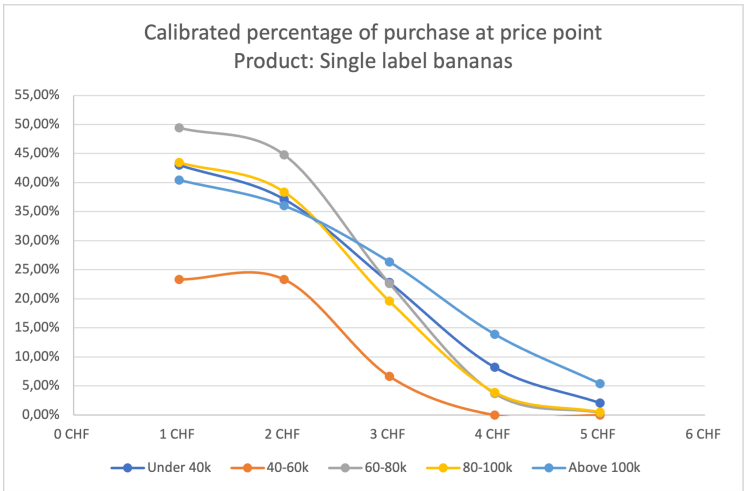


Table 7: Likelihood of purchase for single-label bananas by household revenue

	1 CHF	2 CHF	3 CHF	4 CHF	5 CHF
Under 40k	43,02%	37,13%	22,81%	8,23%	2,09%
40-60k	23,33%	23,33%	6,67%	0,00%	0,00%
60-80k	49,44%	44,78%	22,64%	3,69%	0,38%
80-100k	43,47%	38,38%	19,60%	3,91%	0,52%
Above 100k	40,45%	36,01%	26,35%	13,90%	5,39%

By looking at the graphic and the table above, the following observations can be highlighted. The categories “60-80k” and “80-100k” have the highest likelihood of purchase for the price points 1 CHF and 2 CHF. And the category “above 100k” has the highest likelihood of purchase for the price points 3 CHF, 4 CHF, and 5 CHF, followed by the category “under 40k”. For this product, the category “40-60k” only had three respondents among which one had low purchase intention for all price points. This results in a curve that is significantly lower than the other.

Figure 5: Likelihood of purchase for single-label nature yogourt by household revenue

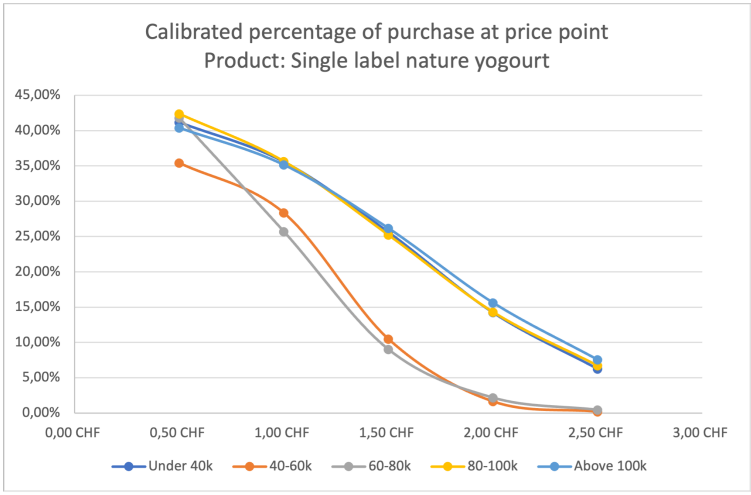


Table 8: Likelihood of purchase for single-label nature yogourt by household revenue

	0,50 CHF	1,00 CHF	1,50 CHF	2,00 CHF	2,50 CHF
Under 40k	41,19%	35,59%	25,63%	14,24%	6,27%
40-60k	35,45%	28,38%	10,50%	1,65%	0,20%
60-80k	41,79%	25,73%	9,03%	2,19%	0,47%
80-100k	42,37%	35,65%	25,22%	14,31%	6,73%
Above 100k	40,42%	35,18%	26,20%	15,64%	7,57%

For the second product, two different patterns are noticeable. The categories “under 40k”, “80-100k”, and “above 100k” follow a similar curve. The likelihood of purchase for these three categories are significantly higher than the two other categories for most of the price points. Similarly, the curves of the categories “40-60k” and “60-80k” follow a close pattern. The category “above 100k” has the highest likelihood of purchase for the price points 1,50 CHF, 2,00 CHF, and 2,50 CHF.

Figure 6: Likelihood of purchase for single-label chocolate cereal bars by household revenue

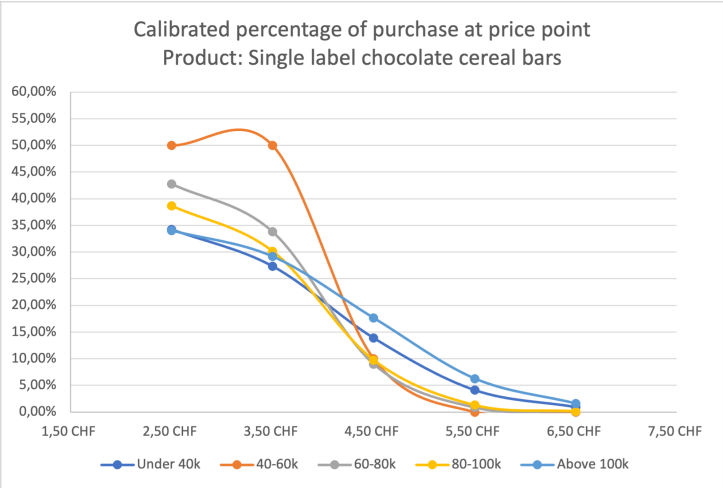


Table 9: Likelihood of purchase for single-label chocolate cereal bars by household revenue

	2,50 CHF	3,50 CHF	4,50 CHF	5,50 CHF	6,50 CHF
Under 40k	34,24%	27,34%	13,89%	4,13%	0,94%
40-60k	50,00%	49,99%	10,01%	0,00%	0,00%
60-80k	42,79%	33,81%	9,01%	0,85%	0,07%
80-100k	38,67%	30,16%	9,76%	1,32%	0,14%
Above 100k	34,05%	29,19%	17,65%	6,28%	1,59%

For the last product, the category “under 40k” has the lowest likelihood of purchase for the price points 2,50 CHF and 3,50 CHF. On the opposite side of the scale, the category “above 100k” has the highest likelihood of purchase for the price points 4,50 CHF, 5,50 CHF, and 6,50 CHF. At the price of 4,50 CHF and above, the likelihood of purchase for all categories of revenue is below 20%.

In summary, independently of the products, the category “above 100k” has the highest likelihood of purchase at the three highest price points. However, the lowest category of household revenue “under 40k” doesn’t have the lowest likelihood of purchase. The likelihood of purchase for categories in between fluctuates depending on the product without following a distinct pattern.

5.3 Label recognition and knowledge (H2)

The second hypothesis focuses on label recognition and knowledge. The next table shows the variables that were used to evaluate the respondents. The 4th variable has been transformed into a new variable by inverting the observations in the following way: 1=5; 2=4; 3=3; 4=2; 5=1. The mean of the 4 variables has been calculated and

the respondents have been categorized into two groups: low label recognition and knowledge (mean below or equal to 3) and high label recognition and knowledge (mean above 3). The categorization process results in the following distribution: 21 respondents in group 1 (low label recognition and knowledge) and 99 respondents in group 2 (high label recognition and knowledge).

To verify this hypothesis, the purchase intentions were compared across the two categories of label recognition and knowledge for the three products. The following graphics and tables illustrate the results of the analysis.

Table 10: Descriptive statistics - Label recognition and knowledge

Variables	**Description**	**Statistics**	
1.I recognized most of the labels on the products.	Not agree at all = 1 Totally agree = 5 1 2 3 4 5	Mean Std. dev. Ratio Ratio Ratio Ratio Ratio	4.09 1.029 0.042 0.033 0.133 0.375 0.417
2.I know the meaning of most of these labels.	Not agree at all = 1 Totally agree = 5 1 2 3 4 5	Mean Std. dev. Ratio Ratio Ratio Ratio Ratio	3.49 1.145 0.075 0.108 0.258 0.367 0.192
3.I can differentiate one label from another.	Not agree at all = 1 Totally agree = 5 1 2 3 4 5	Mean Std. dev. Ratio Ratio Ratio Ratio Ratio	3.31 1.165 0.083 0.150 0.308 0.292 0.167
4.All labels have the same meaning.	Not agree at all = 1 Totally agree = 5 1 2 3 4 5	Mean Std. dev. Ratio Ratio Ratio Ratio Ratio	1.92 1.038 0.408 0.383 0.125 0.042 0.042

Figure 7: Likelihood of purchase for single-label bananas by category of label recognition and knowledge

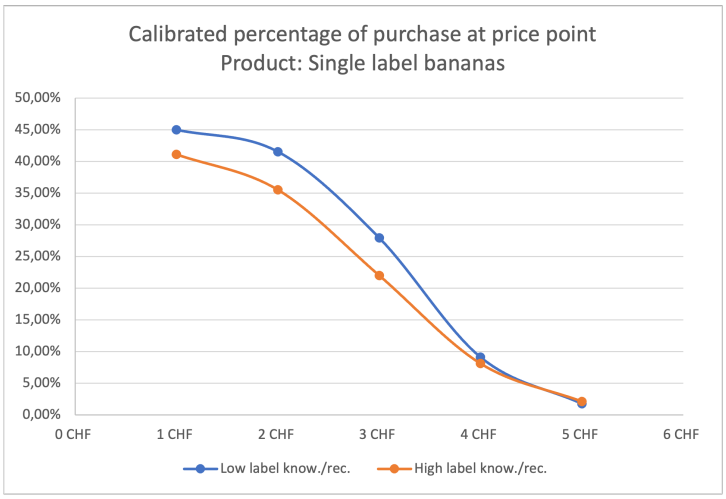


Table 11: Likelihood of purchase for single-label bananas by category of label recognition and knowledge

	1 CHF	2 CHF	3 CHF	4 CHF	5 CHF
Low label know./rec.	45,00%	41,55%	27,95%	9,08%	1,72%
High label know./rec.	41,13%	35,54%	22,02%	8,09%	2,10%

Regarding single-label bananas, the graphic shows that for all price points but 5,00 CHF, respondents with lower levels of label recognition and knowledge have a higher likelihood of purchase than respondents with higher levels of label recognition and knowledge.

Figure 8: Likelihood of purchase for single-label nature yogourt by category of label recognition and knowledge

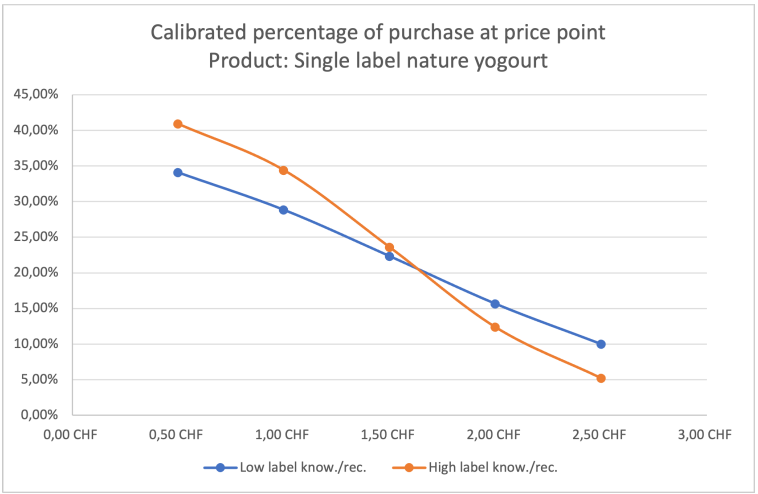


Table 12: Likelihood of purchase for single-label nature yogourt by category of label recognition and knowledge

	0,50 CHF	1,00 CHF	1,50 CHF	2,00 CHF	2,50 CHF
Low label know./rec.	34,11%	28,86%	22,35%	15,67%	10,01%
High label know./rec.	40,92%	34,42%	23,61%	12,38%	5,22%

For the second product, respondents with lower levels of label recognition and knowledge have a higher likelihood of purchase for price points above 1,50 CHF. On the opposite, respondents with higher levels of label recognition and knowledge have a higher likelihood of purchase when the price is equal to 1,50 CHF and lower.

Figure 9: Likelihood of purchase for single-label chocolate cereal bars by category of label recognition and knowledge

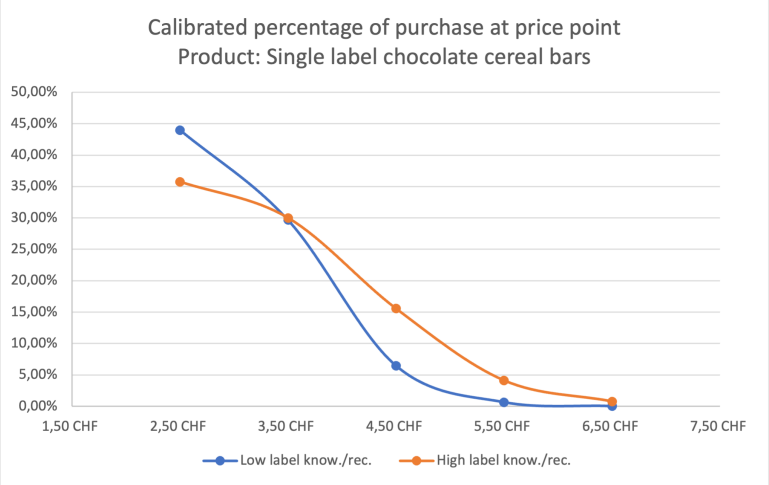


Table 13: Likelihood of purchase for single-label chocolate cereal bars by category of label recognition and knowledge

	2,50 CHF	3,50 CHF	4,50 CHF	5,50 CHF	6,50 CHF
Low label know./rec.	44,02%	29,69%	6,48%	0,68%	0,06%
High label know./rec.	35,80%	30,04%	15,59%	4,13%	0,79%

Finally, for the last product, respondents with higher levels of label recognition and knowledge have a higher likelihood of purchase for price points equal to 3,50 CHF and higher.

In summary, for each product, the two categories of label recognition and knowledge behave differently. On the one hand, respondents with a higher level of label recognition and knowledge have a higher willingness to pay for chocolate cereal bars. On the other hand, respondents with a lower level of label recognition and knowledge have a higher willingness to pay for bananas. And the results are shared for the last product. Overall, the results fluctuate depending on the products.

5.4 Ecological sensitivity (H3)

The third hypothesis focuses on ecological sensitivity. The next table shows the variables that were used to evaluate the respondents' level of ecological sensitivity. The 4th variable has been transformed into a new variable by inverting the observations in the following way: 1=5; 2=4; 3=3; 4=2; 5=1. The mean of the 4 variables has been calculated and the respondents have been categorized into two groups: low ecological sensitivity (mean below or equal to 3) and high ecological sensitivity (mean above 3). The categorization process results in the following distribution: 22 respondents in group 1 (low ecological sensitivity) and 98 respondents in group 2 (high ecological sensitivity).

Table 14: Descriptive statistics - Ecological sensitivity

Variables	**Description**	**Statistics**	
1.I feel concerned by the problems related to ecology and the environment.	Not agree at all = 1 Totally agree = 5 1 2 3 4 5	Mean Std. dev. Ratio Ratio Ratio Ratio Ratio	4.05 0.995 0.025 0.058 0.142 0.392 0.383
2.I think my consumption choices can have an impact on the environment.	Not agree at all = 1 Totally agree = 5 1 2 3 4 5	Mean Std. dev. Ratio Ratio Ratio Ratio Ratio	3.92 1.120 0.033 0.100 0.167 0.317 0.383
3.I prefer to buy products with a low environmental impact.	Not agree at all = 1 Totally agree = 5 1 2 3 4 5	Mean Std. dev. Ratio Ratio Ratio Ratio Ratio	3.72 1.130 0.075 0.100 0.175 0.325 0.325
4.I don't care about environmental issues.	Not agree at all = 1 Totally agree = 5 1 2 3 4 5	Mean Std. dev. Ratio Ratio Ratio Ratio Ratio	1.96 1.118 0.467 0.250 0.175 0.075 0.033

To verify this hypothesis, the purchase intentions were compared across the two categories of ecological sensitivity for the three products. The following graphics and tables illustrate the results of the analysis.

Figure 10: Likelihood of purchase for single-label bananas by category of ecological sensitivity

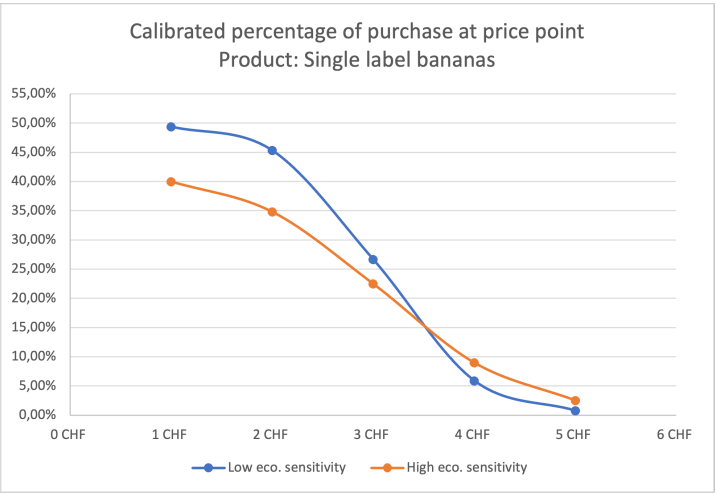


Table 15: Likelihood of purchase for single-label bananas by category of ecological sensitivity

	1 CHF	2 CHF	3 CHF	4 CHF	5 CHF
Low eco. sensitivity	49,41%	45,36%	26,70%	5,93%	0,78%
High eco. sensitivity	40,00%	34,83%	22,51%	9,00%	2,54%

Regarding the first product, for the price points of 4 CHF and 5 CHF, respondents with higher levels of ecological sensitivity have a higher likelihood of purchase. On the opposite, for the price points below 4 CHF, respondents with lower levels of ecological sensitivity have a higher likelihood of purchase.

Figure 11: Likelihood of purchase for single-label nature yogourt by ecological sensitivity

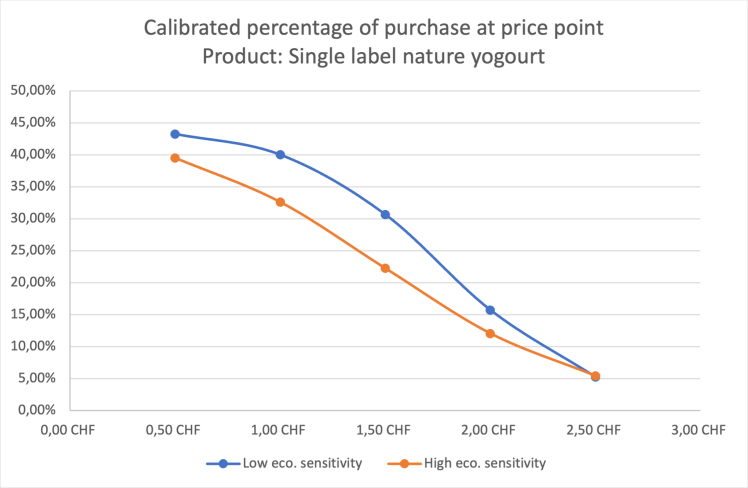


Table 16: Likelihood of purchase for single-label nature yogourt by ecological sensitivity

	0,50 CHF	1,00 CHF	1,50 CHF	2,00 CHF	2,50 CHF
Low eco. sensitivity	43,27%	40,03%	30,69%	15,76%	5,29%
High eco. sensitivity	39,52%	32,62%	22,26%	12,07%	5,44%

Concerning single-label nature yogourt, for all price points but 2,50 CHF, respondents with lower levels of ecological sensitivity have a higher likelihood of purchase. Only for the price of 2,50 CHF, respondents with higher levels of ecological sensitivity have a higher likelihood of purchase.

Figure 12: Likelihood of purchase for single-label chocolate cereal bars by ecological sensitivity

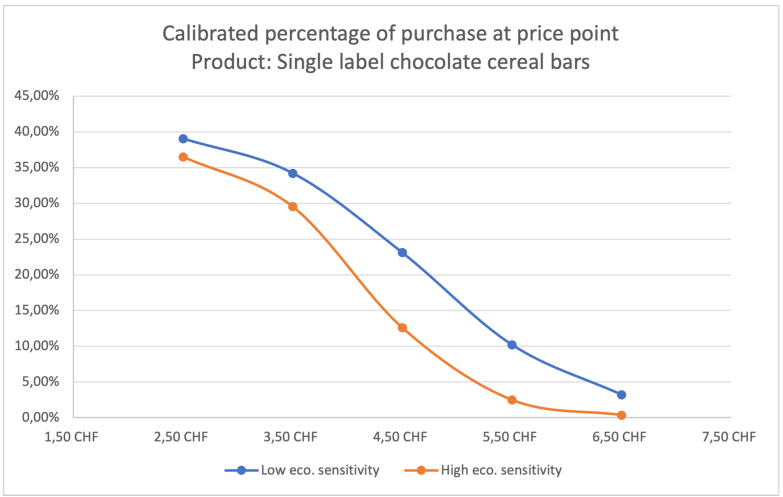


Table 17: Likelihood of purchase for single-label chocolate cereal bars by ecological sensitivity

	2,50 CHF	3,50 CHF	4,50 CHF	5,50 CHF	6,50 CHF
Low eco. sensitivity	39,10%	34,26%	23,13%	10,23%	3,23%
High eco. sensitivity	36,55%	29,58%	12,63%	2,51%	0,38%

For the last product, at all price points, respondents with lower levels of ecological sensitivity have a significantly higher likelihood of purchase.

To summarize the results on the influence of ecological sensitivity, for two out of three products, respondents with lower levels of ecological sensitivity have a higher willingness to pay than respondents with lower levels of ecological sensitivity. For the last product, single-label bananas, it is only true until a certain price point.

5.5 Socio-demographic factors (H4)

This section illustrates the results of the different analyses focusing on the following socio-demographic factors: gender, age, education level, and place of residence. Each factor will be analyzed separately to verify each hypothesis individually.

5.5.1 Gender (H4a)

The purchase intentions were compared across two gender categories for the three products. The following graphics and tables illustrate the results of the analysis.

Figure 13: Likelihood of purchase for single-label bananas by gender

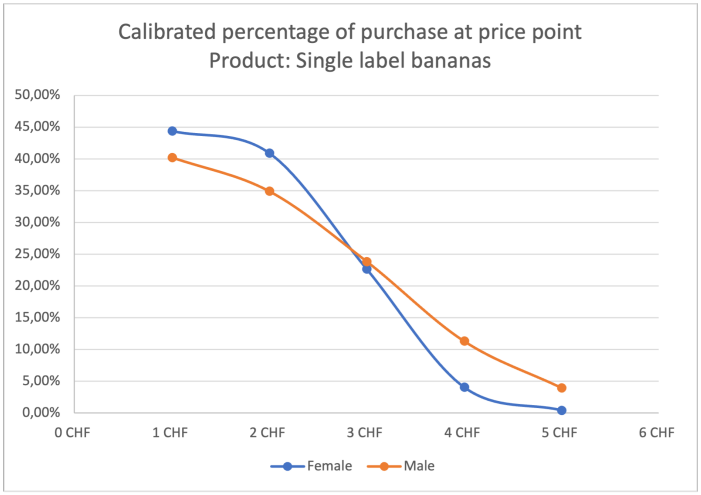


Table 18: Likelihood of purchase for single-label bananas by gender

	1 CHF	2 CHF	3 CHF	4 CHF	5 CHF
Female	44,39%	40,90%	22,66%	4,06%	0,43%
Male	40,24%	34,92%	23,87%	11,33%	3,99%

Concerning bananas, females have a higher likelihood of purchase than males for price points below 3 CHF. However, at 3 CHF and above males have a higher likelihood of purchase than females.

Figure 14: Likelihood of purchase for single-label nature yogourt by gender

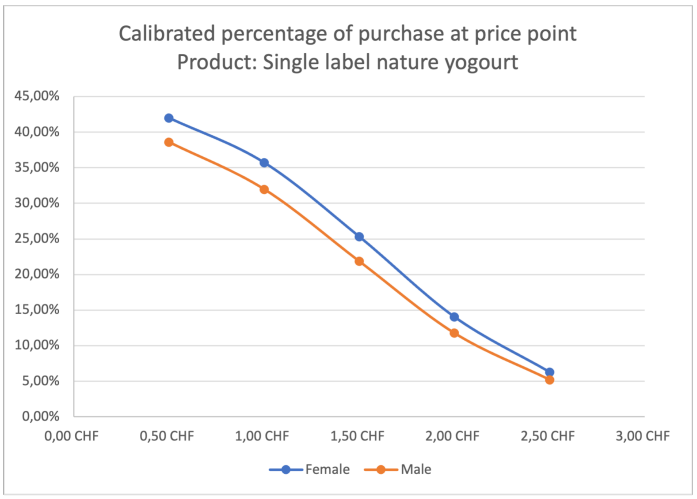


Table 19: Likelihood of purchase for single-label nature yogourt by gender

	0,50 CHF	1,00 CHF	1,50 CHF	2,00 CHF	2,50 CHF
Female	42,00%	35,73%	25,33%	14,05%	6,31%
Male	38,61%	32,00%	21,88%	11,79%	5,25%

Regarding nature yogourt, females have a higher likelihood of purchase than males for all price points. The gap between both curves tends to decrease when the price increases.

Figure 15: Likelihood of purchase for single-label chocolate cereal bars by gender

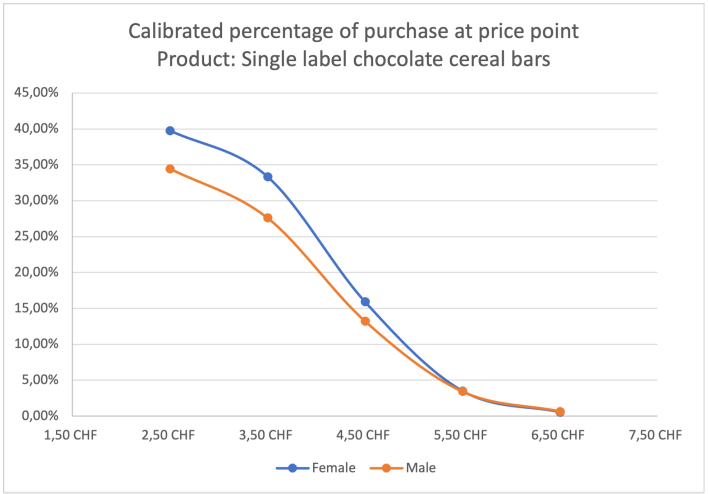


Table 20: Likelihood of purchase for single-label chocolate cereal bars by gender

	2,50 CHF	3,50 CHF	4,50 CHF	5,50 CHF	6,50 CHF
Female	39,79%	33,38%	15,96%	3,52%	0,56%
Male	34,45%	27,62%	13,25%	3,45%	0,68%

For chocolate cereal bars, females have a higher likelihood of purchase than males for all price points but 6,50 CHF. However, at the highest price point, males have slightly higher purchase intentions.

With regard to gender, the analysis shows that females tend to have a higher likelihood of purchase for at list for two of the three products. For bananas, it is only true until a certain price point.

5.5.2 Age (H4b)

To test the hypothesis related to age, the purchase intentions were compared across four age categories for the three products. The following graphics and tables illustrate the results of the analysis.

Figure 16: Likelihood of purchase for single-label bananas by age category

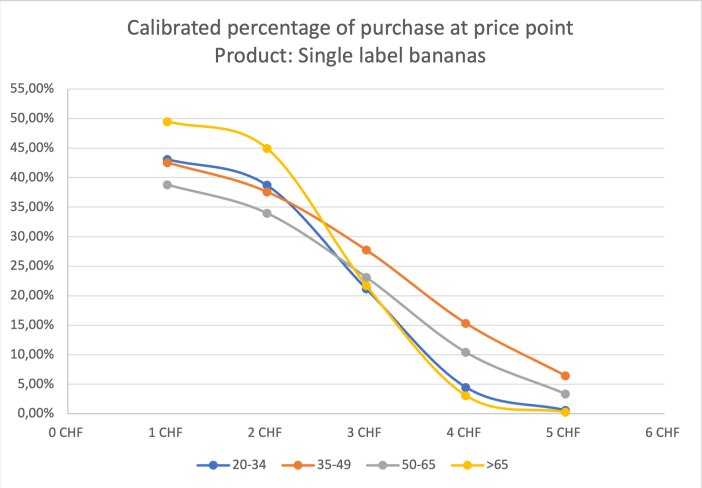


Table 21: Likelihood of purchase for single-label bananas by age category

	1 CHF	2 CHF	3 CHF	4 CHF	5 CHF
20-34	43,12%	38,74%	21,18%	4,50%	0,61%
35-49	42,58%	37,64%	27,75%	15,36%	6,48%
50-65	38,84%	34,02%	23,12%	10,43%	3,38%
>65	49,53%	44,98%	21,74%	3,10%	0,28%

For the first product, the category “above 65” has the highest likelihood of purchase for the price points 1 CHF and 2 CHF. For all other price points, the category “35-49” has the highest likelihood of purchase followed by the category “50-65”.

Figure 17: Likelihood of purchase for single-label nature yogourt by age category

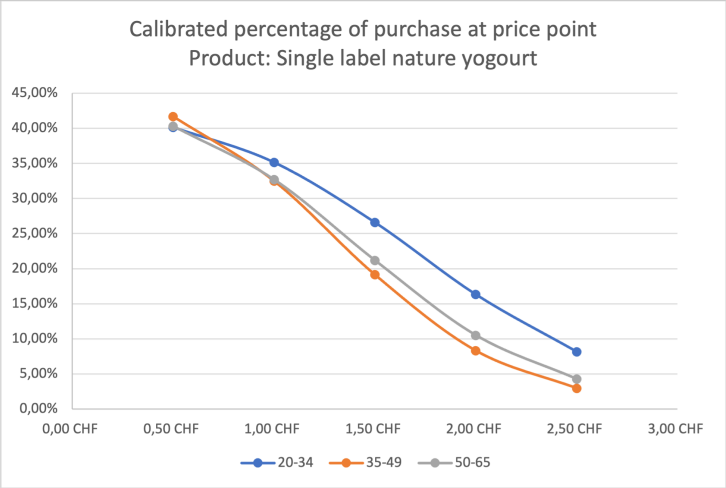


Table 22: Likelihood of purchase for single-label nature yogourt by age category

	0,50 CHF	1,00 CHF	1,50 CHF	2,00 CHF	2,50 CHF
20-34	40,17%	35,17%	26,61%	16,35%	8,19%
35-49	41,71%	32,53%	19,18%	8,36%	3,00%
50-65	40,32%	32,73%	21,21%	10,54%	4,30%

For the second product, the data available for the age category above 65 was insufficient to generate a representative curve. Therefore, only three age categories were considered. The category “20-34” has the highest likelihood of purchase for all price points but 0,50 CHF. And the category “50-65” has a higher likelihood of purchase than the category “35-49” for almost all price points.

Figure 18: Likelihood of purchase for single-label chocolate cereal bars by age category

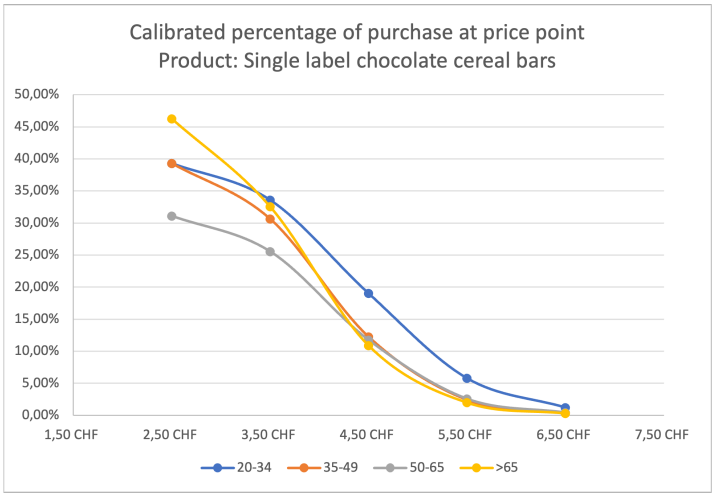


Table 23: Likelihood of purchase for single-label chocolate cereal bars by age category

	2,50 CHF	3,50 CHF	4,50 CHF	5,50 CHF	6,50 CHF
20-34	39,32%	33,60%	19,05%	5,81%	1,25%
35-49	39,32%	30,65%	12,27%	2,42%	0,37%
50-65	31,13%	25,59%	11,76%	2,58%	0,42%
>65	46,30%	32,58%	10,92%	2,00%	0,31%

Regarding chocolate cereal bars, the younger age category (20-34) has the highest likelihood of purchase for all price points but 2,50 CHF. At this price point, the older age category has the highest likelihood of purchase with 46,30%.

In summary, for two of the three products, the age category “20-34” has the highest likelihood of purchase for most of the price points. While the age category “above 65” seems to have the highest likelihood of purchase for low price points. The likelihood of purchase for categories in between fluctuates depending on the product without following a distinct pattern.

5.5.3 Education level (H4c)

To verify the hypothesis concerning education level, the purchase intentions were compared across three education levels for the three products. The following graphics and tables illustrate the results of the analysis.

Figure 19: Likelihood of purchase for single-label bananas by education level

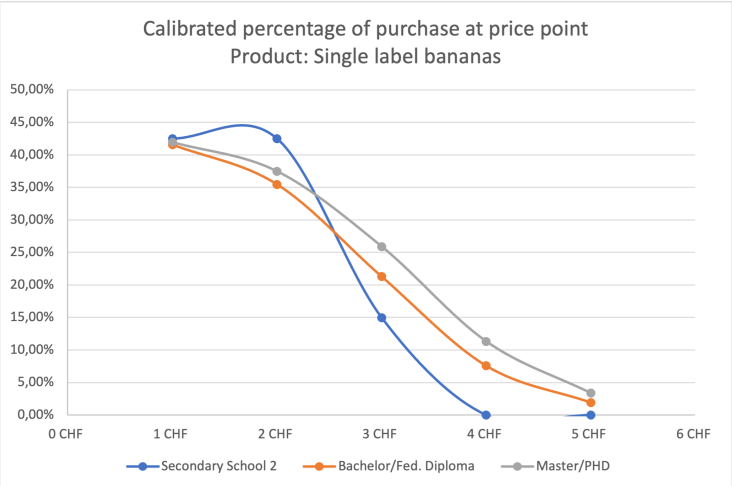


Table 24: Likelihood of purchase for single-label bananas by education level

	1 CHF	2 CHF	3 CHF	4 CHF	5 CHF
Secondary School 2	42,50%	42,50%	15,00%	0,00%	0,00%
Bachelor/Fed. Diploma	41,58%	35,48%	21,32%	7,59%	1,94%
Master/PHD	41,94%	37,47%	25,92%	11,33%	3,38%

For the single-label bananas, the category “Master/PHD” has the highest likelihood of purchase for all price points above 2 CHF, followed by the category “Bachelor/Federal diploma” and the category “Secondary school 2”. While the category “Secondary school” has a high likelihood of purchase for low price points, it decreases drastically above 2 CHF. For this product, above a certain price point, it seems like the higher the level of education is, the higher the likelihood of purchase.

Figure 20: Likelihood of purchase for single-label nature yogourt by education level

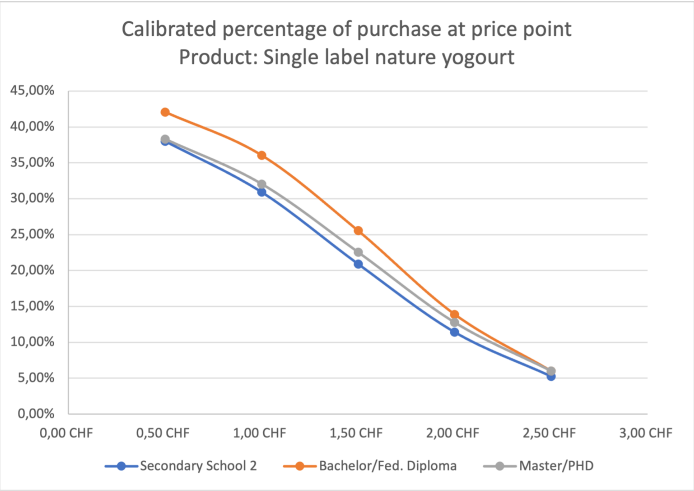


Table 25: Likelihood of purchase for single-label nature yogourt by education level

	0,50 CHF	1,00 CHF	1,50 CHF	2,00 CHF	2,50 CHF
Secondary School 2	38,02%	30,94%	20,94%	11,45%	5,30%
Bachelor/Fed. Diploma	42,09%	36,07%	25,57%	13,92%	6,03%
Master/PHD	38,31%	32,07%	22,58%	12,79%	6,04%

For nature yogourt, the likelihood of purchase is the highest for the category “Bachelor/Federal diploma”, followed by the category “Master/PHD” and finally the category “Secondary school 2”. The gap between the three curves tends to decrease when the price increases.

Figure 21: Likelihood of purchase for single-label chocolate cereal bars by education level

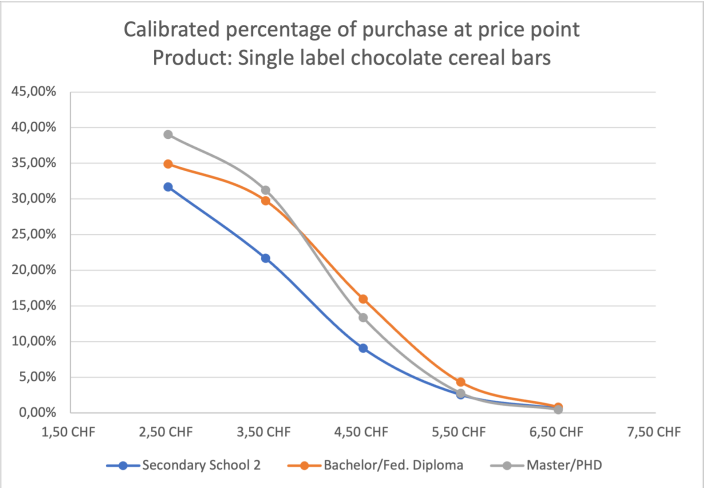


Table 26: Likelihood of purchase for single-label chocolate cereal bars by education level

	2,50 CHF	3,50 CHF	4,50 CHF	5,50 CHF	6,50 CHF
Secondary School 2	31,70%	21,68%	9,06%	2,54%	0,61%
Bachelor/Fed. Diploma	34,92%	29,78%	15,99%	4,31%	0,82%
Master/PHD	39,07%	31,25%	13,35%	2,76%	0,44%

For the last product, the pattern of the curves seems less clear than for nature yogourt. Overall, the category "Secondary school 2" has the lowest likelihood of purchase. And the category "Bachelor/Federal diploma" has the highest likelihood of purchase for the three highest price points.

When comparing the results of the three products, the likelihood of purchase of respondents having completed an education program at the tertiary level (bachelor degree, federal diploma, master degree, and PHD) seems to be higher than those who completed their education at the secondary level.

5.5.4 Place of residence (H4c)

To confirm the hypothesis concerning the place of residence, the purchase intentions were compared across two categories of place of residence for the three products. The following graphics and tables illustrate the results of the analysis.

Figure 22: Likelihood of purchase for single-label bananas by place of residence

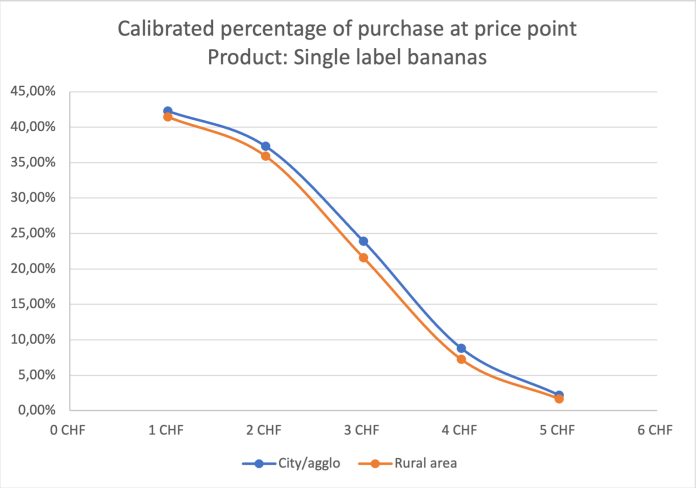


Table 27: Likelihood of purchase for single-label bananas by place of residence

	1 CHF	2 CHF	3 CHF	4 CHF	5 CHF
City/agglo	42,31%	37,34%	23,93%	8,83%	2,20%
Rural area	41,45%	35,91%	21,61%	7,27%	1,69%

For single-label bananas, the respondents living in rural areas have lower likelihood of purchase for all price points compared to respondents living in urban areas.

Figure 23: Likelihood of purchase for single-label nature yogourt by place of residence

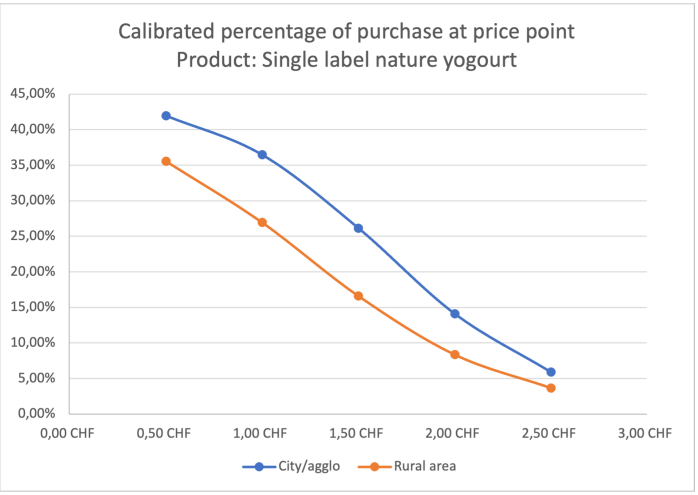


Table 28: Likelihood of purchase for single-label nature yogourt by place of residence

	0,50 CHF	1,00 CHF	1,50 CHF	2,00 CHF	2,50 CHF
City/agglo	41,96%	36,47%	26,17%	14,14%	5,93%
Rural area	35,57%	26,95%	16,63%	8,38%	3,69%

For the second product, the results are the same as for single-label bananas, respondents living in cities have a higher likelihood of purchase for all price points. The gap between both curves is even more accentuated.

Figure 24: Likelihood of purchase for single-label chocolate cereal bars by place of residence

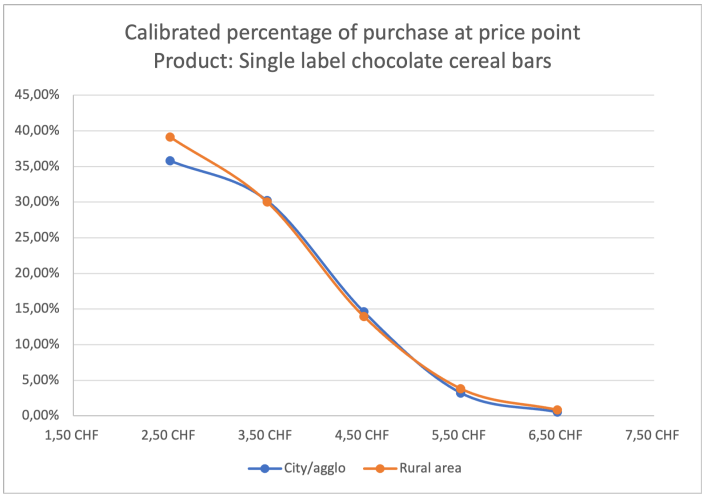


Table 29: Likelihood of purchase for single-label chocolate cereal bars by place of residence

	2,50 CHF	3,50 CHF	4,50 CHF	5,50 CHF	6,50 CHF
City/agglo	35,81%	30,22%	14,60%	3,21%	0,51%
Rural area	39,11%	30,02%	13,96%	3,82%	0,83%

Finally, for the last product, the difference between both curves is marginal, making it difficult to observe significant differences.

In summary, for two of the three products, respondents living in urban areas have a higher likelihood of purchase compared to respondents living in rural areas.

5.6 Multi-branding effect (H5) and price premium

This next section will show the results of the analysis focusing on the multi-branding effect and price premium. Purchase intentions for single-label products are compared with purchase intentions for multi-label products to determine if there is a multi-branding effect. To estimate the price premium the purchase intentions for products without labels are compared with purchase intentions for single-label products.

Figure 25: Likelihood of purchase for bananas by number of labels and price premium

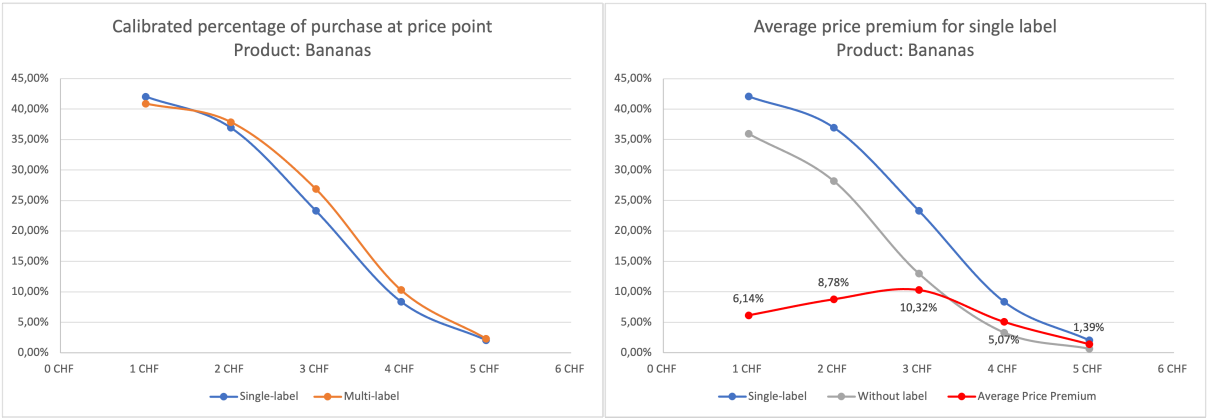


Table 30: Likelihood of purchase for bananas by number of labels and price premium

	1 CHF	2 CHF	3 CHF	4 CHF	5 CHF
Single-label	42,09%	36,98%	23,32%	8,38%	2,05%
Multi-label	40,93%	37,91%	26,90%	10,32%	2,34%
Without label	35,95%	28,20%	13,00%	3,31%	0,66%
Average Price Premium	6,14%	8,78%	10,32%	5,07%	1,39%

For the first product, the likelihood of purchase for multi-label bananas is higher than for single-label bananas for all price points but 1 CHF. Regarding the price premium, the likelihood of purchase for single-label bananas is between 1,39% and 10,32% higher than the likelihood of purchase for bananas without labels.

Figure 26: Likelihood of purchase for nature yogourt by number of labels and price premium

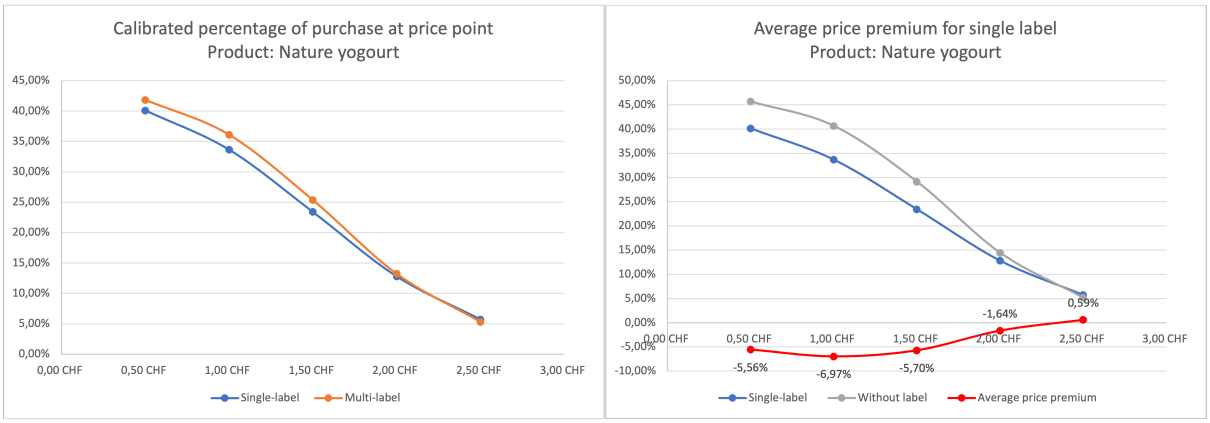


Table 31: Likelihood of purchase for nature yogourt by number of labels and price premium

	0,50 CHF	1,00 CHF	1,50 CHF	2,00 CHF	2,50 CHF
Single-label	40,14%	33,68%	23,43%	12,82%	5,74%
Multi-label	41,88%	36,14%	25,41%	13,26%	5,36%
Without label	45,70%	40,65%	29,13%	14,46%	5,15%
Average Price Premium	-5,56%	-6,97%	-5,70%	-1,64%	0,59%

For the second product, the likelihood of purchase for multi-label nature yogourt is higher than for single-label nature yogourt for all price points but 2,50 CHF. Concerning the price premium, the likelihood of purchase for nature yogourt without labels is higher than the likelihood of purchase for single-label nature yogourt for all price points but 2,50 CHF. Respondents are the most likely to purchase nature yogourt without labels than nature yogourt with one or more labels.

Figure 27: Likelihood of purchase for chocolate cereal bars by number of labels and price premium

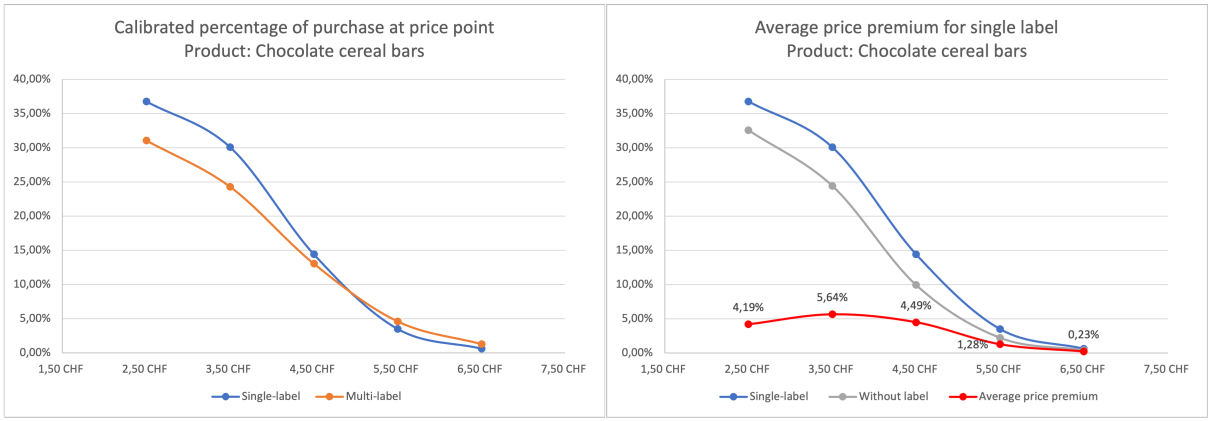


Table 32: Likelihood of purchase for chocolate cereal bars by number of labels and price premium

	2,50 CHF	3,50 CHF	4,50 CHF	5,50 CHF	6,50 CHF
Single-label	36,78%	30,10%	14,42%	3,51%	0,63%
Multi-label	31,10%	24,32%	13,06%	4,61%	1,29%
Without label	32,60%	24,45%	9,94%	2,22%	0,40%
Average Price Premium	4,19%	5,64%	4,49%	1,28%	0,23%

For the last product, the likelihood of purchase is higher for multi-label chocolate cereal bars compared to single-label chocolate cereal bars only for the two last price points (5,50 CHF and 6,50 CHF). Regarding price premium, the likelihood of purchase for single-label chocolate cereal bars is between 0,23% and 5,64% higher than the likelihood of purchase for the same product without labels.

To summarize the results, for two of the three products, there is a higher likelihood of purchasing when there are multiple labels rather than a single label. For the third product, it's only partially true. As for the price premium, two of the three products have a positive price premium at all price points. For these two products, the respondents are more likely to purchase the product when there is a single label rather than if the product isn't labelled.

5.7 Label preferences

The data collected allowed the respondents' preferences between the two labels tested to be analyzed for each of the three products. In total, six different labels have been used for this study. The following figures and tables illustrate the purchase intentions by label for each product.

Figure 28: Likelihood of purchase for single-label bananas by label

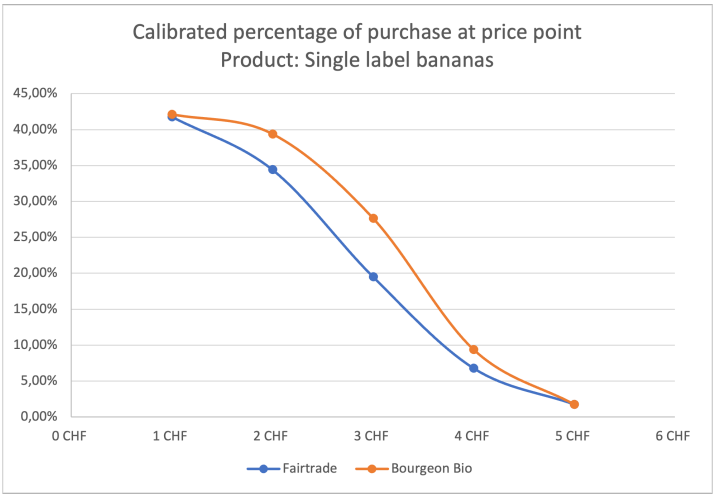


Table 33: Likelihood of purchase for single-label bananas by label

	1 CHF	2 CHF	3 CHF	4 CHF	5 CHF
Fairtrade	41,79%	34,43%	19,53%	6,80%	1,78%
Bourgeon Bio	42,13%	39,40%	27,67%	9,39%	1,77%

The two labels tested on bananas were "Fairtrade Max Havelaar" and "Bourgeon Bio". The results show that the likelihood of purchase is higher for the label "Bourgeon Bio" than for the label "Fairtrade Max Havelaar".

Figure 29: Likelihood of purchase for single-label nature yogourt by label

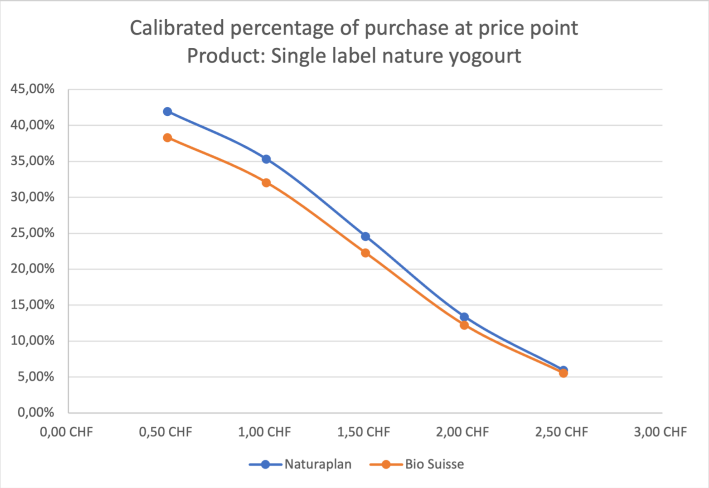


Table 34: Likelihood of purchase for single-label nature yogourt by label

	0,50 CHF	1,00 CHF	1,50 CHF	2,00 CHF	2,50 CHF
Naturaplan	41,97%	35,33%	24,60%	13,39%	5,94%
Bio Suisse	38,31%	32,04%	22,27%	12,24%	5,54%

For the second product, the two labels used were “Naturaplan” and “Bio Suisse”. The likelihood of purchase is higher for the label “Naturaplan” than for the label “Bio Suisse”.

Figure 30: Likelihood of purchase for single-label chocolate cereal bars by label

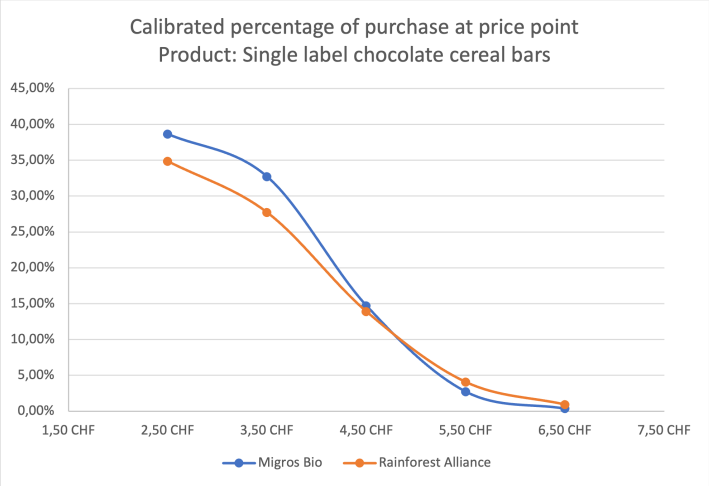


Figure 31: Likelihood of purchase for single-label chocolate cereal bars by label

	2,50 CHF	3,50 CHF	4,50 CHF	5,50 CHF	6,50 CHF
Migros Bio	38,63%	32,70%	14,72%	2,74%	0,37%
Rainforest Alliance	34,84%	27,71%	13,88%	4,05%	0,91%

Finally, for chocolate cereal bars, the two labels “Migros Bio” and “Rainforest Alliance” were represented. The likelihood of purchase is higher for the label “Migros Bio” for the

price points equal to 4,50 CHF and below. Above 4,50 CHF the likelihood of purchase is higher for the label “Rainforest Alliance”.

To summarize the results regarding label preferences, for two of the three products tested, a clear preference can be observed. Whereas for the last product, only a partial preference can be observed.

VI. DISCUSSION

6.1 Summary of the study

The Gabor-Granger method was used in this study to investigate consumers' willingness to pay for eco-labelled food products. The purchase intentions were converted into probabilities of purchase with a maximum of 50% (corresponding to 5 on the Likert scale). Therefore, a likelihood of purchase of 40-45% in the study can be considered high.

Based on the results of the analysis of the curves, the following table summarizes the outcomes of the different hypotheses tested.

Table 35: Summary of the hypotheses' outcomes

H1	Consumers with higher household revenue are willing to pay more for eco-labelled food products.	Supported
H2	Consumers with a higher level of label knowledge and recognition are willing to pay more for eco-labelled food products.	Rejected
H3	Consumers with higher ecological sensitivity are willing to pay more for eco-labelled food products.	Rejected (alternative hypothesis is partially supported)
H4	Socio-demographic factors	
H4a	Women are willing to pay more for eco-labelled food products than men.	Partially supported
H4b	Younger consumers are willing to pay more for eco-labelled food products than older consumers.	Partially supported
H4c	Consumers with a higher education level are willing to pay more for eco-labelled food products than consumers with a lower education level.	Partially supported
H4d	People living in rural areas are willing to pay more for eco-labelled food products than people living in urban areas.	Rejected (alternative hypothesis is partially supported
H5	Consumers' willingness to pay is higher for food products with multiple eco-labels than those with a single eco-label.	Partially supported

A hypothesis is considered “supported” when the results are similar for the three products tested. It is “partially supported” when two out of the three products tested show similar results. A hypothesis is “rejected” when the observations do not show clear evidence to support the hypothesis tested. While a hypothesis is rejected, the alternative hypothesis can be supported if the observations show evidence to prove the hypothesis in the opposite way.

6.2 Interpretation of the results and comparison with the literature

The findings of this study have indicated that all the factors tested, with the exception of the label knowledge and recognition, influence consumers’ willingness to pay for eco-labelled food products. However, some factors are influencing consumers’ willingness to pay oppositely than it was formulated in the hypothesis.

Household revenue

The results show that, independently of the product, consumers with yearly household revenues above 100’000 CHF have the highest willingness to pay, especially at higher price points. Therefore, the hypothesis that consumers with higher household revenue are willing to pay more for eco-labelled food products is supported. This confirms that household revenue has a direct influence on consumers’ willingness to pay for eco-labelled food products. However, the outcome of the analysis demonstrated that the effect differs for lower categories of household revenue. The results of this study are aligned with existing literature where individual income levels were measured.

Label knowledge and recognition

According to the data collected, the level of label knowledge and recognition has a different effect on each product. Consequently, the hypothesis that consumers with a higher level of label knowledge and recognition are willing to pay more for eco-labelled food products cannot be supported. The effect can be true for some products, but it does not apply to all products.

Hence, it means that recognizing and knowing a label does not necessarily result in a higher willingness to pay. Different hypotheses could explain this outcome. Firstly, consumers that know and recognize labels might not want to pay for certain labels. Secondly, consumers who don’t know and recognize labels might overestimate the value of labels.

While previous research has proved the positive influence of label knowledge and eco-label awareness on consumers' willingness to pay for eco-labelled food products, the results of this study are more mitigated.

Ecological sensitivity

The level of ecological sensitivity has a similar effect on consumers' willingness to pay for most of the products. However, the results show the opposite effect compared to the hypothesis formulated. Consumers with lower levels of ecological sensitivity have a higher willingness to pay for eco-labelled food products compared to consumers with high ecological sensitivity.

As a consequence, consumers with high ecological sensitivity tend to attribute less value to eco-labelled food products. Different reasons can explain this result. Consumers with lower levels of ecological sensitivity might overestimate the value of labels. In addition, consumers with high ecological sensitivity could prefer different types of purchases such as local farms and markets, which are not using labels. Therefore, their perception of labels could be impacted, leading to a lower willingness to pay for eco-labelled products.

The findings of this study are contradictory to the research done by Singh et al. (2023) which concluded that higher environmental concern leads to higher willingness to pay for eco-labelled food products.

Gender

The data collected confirms the influence of gender on consumers' willingness to pay for eco-labelled food products. Females had a higher willingness to pay than men for most of the products. Therefore, the hypothesis that women are willing to pay more for eco-labelled food products than men is partially supported.

The results are similar to the research done by Bastounis et al. (2021). However, it is opposed to the findings of Lui et al. (2023) and Zainalabidin et al. (2014) where gender was not influencing consumers' willingness to pay for eco-labelled food products.

Age

The conclusion of the analysis related to age shows that the younger age category has the highest likelihood of purchase for most of the products compared to the other age categories. Therefore, the hypothesis that younger consumers are willing to pay more

for eco-labelled food products is partially supported. This confirms the influence of age on consumers' willingness to pay for eco-labelled food products. However, the outcome of the analysis demonstrated that the influence differs for other categories of age. The relationship between age and willingness to pay is not linear.

The findings of this study differ from the literature. Indeed, the research done by Zainalabidin et al. (2014) shows that older generations are more willing to pay for eco-labelled food products than the younger generation. In addition, the research done by Liu et al. (2023) found no significant influence of age on consumers' willingness to pay for eco-labelled food products.

Education level

The analysis shows a higher willingness to pay, at almost all price points for all products, for consumers who completed education programs at the tertiary level compared to the secondary level. Therefore, the hypothesis tested is partially supported. This demonstrates the influence of education level on consumers' willingness to pay for eco-labelled food products.

Multiple previous studies have tested this factor and the results were divergent. The findings of this study are aligned with the research done by Zainalabidin et al. (2014), which concluded that consumers with higher education levels are more willing to pay for eco-labelled food products.

Place of residence

The results show that consumers living in urban areas have a higher willingness to pay than consumers living in rural areas for most of the products. Therefore, it confirms the fact that the place of residence is an influencing factor in consumers' willingness to pay for eco-labelled food products. Nevertheless, this outcome is opposed to the hypothesis tested.

This factor was not tested in previous research and cannot be compared with existing literature. However, there is a possible correlation between household revenue and people living in urban areas which could explain this outcome.

Multi-branding effect and price premium

The results indicate that for most of the products tested, there is a higher willingness to pay when multiple labels are present on a product. Therefore, the hypothesis that

consumers' willingness to pay is higher for food products with multiple eco-labels than those with a single eco-label is partially supported. The number of labels on a product has a direct effect on consumers' willingness to pay for this product. This proves that a multi-branding effect applies to eco-labels on food products.

In addition, a higher willingness to pay is observed for most of the products when there is a single label rather than if the product isn't labelled. The premium reached up to 10,32% for a single labelled product. It means that for the same price, up to 10,32% more consumers are willing to purchase the labelled version of a product. The results are difficult to compare with the literature as the price premium is determined with different unities of measure.

Label preferences

Differences in willingness to pay between labels indicate a preference for certain labels. For bananas, a preference is toward the organic label rather than the fairtrade label. This shows that consumers value the organic aspect more than the social characteristics associated with the process of this product. The results are similar to the research done by Bastounis et al. (2021) where consumers' willingness to pay was higher for organic labels compared to other labels.

For the nature yogourt, the main difference between the labels is that "Naturaplan" is a private label, and "Bio Suisse" is an independent certification program. The results show a slight preference for the private label.

6.4 Managerial and theoretical contributions

The findings of this study are beneficial to all stakeholders of the food industry in different ways.

They are encouraging manufacturers to match the labels' standards to be certified, as well as to produce innovative products to satisfy environmental and health criteria. The certifying process is costly and time-consuming. Therefore, selecting the most appropriate label to certify their products is a necessity for producers. This study provides clues regarding the elements to consider when choosing the label.

Retailers have a direct touchpoint with consumers and can have an influence on consumers' consumption choices with their product offerings. Retailers' strategies

have conducted most of them to create their private labels. The results of this study legitimize such a strategy to the extent that consumers seem to prefer private labels over independent certification programs at least for some products.

Governments and policymakers should support consumers' education and promote eco-labels to consumers and companies. The data collected reveal a lack of knowledge regarding eco-labels for a part of the population. A chapter of this research develops the different roles related to governments and policymakers, which includes improving public awareness about eco-labels.

Finally, the results of this study show that consumers perceive the added value of eco-labels and are willing to pay for the benefits associated with them. A large part of the respondents cares about the environmental impact of the products they purchase. This study illustrates the factors influencing consumers' willingness to pay and quantifies the price premium consumers are willing to pay for eco-labelled food products.

From a theoretical perspective, this study demonstrates the application of the multi-branding effect, which was never tested on eco-labels previously. It also highlights the differences and similarities of the Swiss population regarding factors influencing consumers' willingness to pay compared to previous studies.

However, the diversity of methods used to measure the willingness to pay and the price premium shows the lack of continuity between experiments on this topic. Using similar methods could allow comparisons between research and build up on existing knowledge on the topic.

VII. CONCLUSION

7.1 Limitations of the study

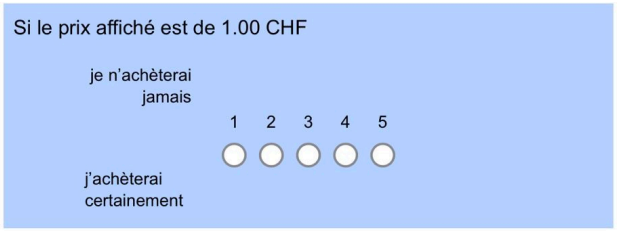
Sample size and distribution

Some limitations of this study should be highlighted. First, the way the sample was distributed didn't allow to have enough respondents for variables such as revenue and age. With a larger sample, some categories would have been covered with enough respondents to have sufficient data for the analysis.

Questionnaire and layout

The layout of the questionnaire was optimized for computer displays and not mobile displays. Most of the respondents used a mobile phone to answer the survey and, on some displays, the labels at the extremity of the scale for the willingness to pay weren't optimally placed.

Figure 32: Scale layout issue on some mobile devices



The consequences were relatively limited as a simple rotation of the mobile phone allowed seeing the scale as it was supposed to be. Also, potential anomalies in the collected data were screened and deleted, which removed any bias.

Irrational purchasing behaviors

In addition to layout issues, irrational purchasing behaviors from respondents were detected before the data analysis. Indeed, the purchasing intention is supposed to decrease as the price increases when the price is the only changing variable and all other characteristics of the products remain the same. But for some respondents, their purchase intention didn't follow a decreasing pattern. Irrational purchase intentions, which represented 32 respondents, were deleted to avoid influencing the results.

Differences in the context/environment

Due to the amount of information consumers are exposed to when in-store shopping, the label's visibility in a supermarket might be different and thus influence the consumers' decisions. In addition, when shopping in real life, consumers are usually time pressured which implies making multiple decisions quickly (Yokessa & Marette, 2019). Unfortunately, reproducing such an environment on a survey seems to be difficult.

7.2 Future research

For future research, setting in-store studies to understand which factors are influencing consumers in their purchase decisions in a real-life environment seems to be necessary. The result of this study and previous experiments suggests that consumer's willingness to pay differs between food product categories. Focusing on the differences in willingness to pay between different food product categories (fruit, vegetables, transformed products, snacks, drinks…etc.) would bring a new contribution to the topic. Comparing eco-label types and formats could also be a direction to take for further research.

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APPENDIX

1. Questionnaire

1.1 Introduction

Introduction

Bienvenue sur ce questionnaire qui s'intéresse à la volonté de payer des consommateurs pour les produits alimentaires labélisés. Cette étude est menée dans le cadre de mon Master en Marketing à l'Université de Fribourg.

Participer à l'étude vous prendra environ 5-10 minutes. Les données sont collectées de manière anonyme et seront utilisées uniquement dans le cadre de mon travail de Master. Les labels mentionnés dans cette étude sont donnés à titre d'exemple et aucune collaboration n'a été établie avec ceux-ci.

La participation à cette étude est volontaire et vous pouvez choisir à n'importe quel moment de renoncer à y participer, sans mentionner de raison. Si vous décider de renoncer, les données ne seront pas sauvegardées.

Si vous avez des questions à propos de cette étude ou des données collectées, merci de me contacter à l'adresse suivante : quentin.binggeli@unifr.ch

Je vous remercie d'avance pour votre participation.

Quentin Binggeli

Confirmation

☐ Je confirme avoir reçu les informations sur cette étude et je souhaite participer à ce questionnaire.

1.2 Qualifying question

Faites-vous des achats au moins une fois par semaine dans un magasin d'alimentation en Suisse ?

Si votre réponse est non, vous n'êtes pas éligible pour répondre à la suite du questionnaire. Vos données ne pourront pas être utilisées. Merci de ne pas répondre à la suite du questionnaire.

☐ Oui

☐ Non

1.3. Purchase intention

Veuillez lire attentivement les questions suivantes et répondre de manière spontanée et sincère. Il n'y a pas de bonnes ou de mauvaises réponses. Pour mon analyse de données, il est important que le questionnaire soit entièrement rempli.

Trois produits vont être représentés par une image. Pour chacun de ces produits, cinq prix différents seront affichés. Pour chacun d'eux, vous devrez indiquer votre intention d'achat sur une échelle de 1 à 5 (1=je n'achèterais jamais : 5=j'achèterais certainement)

Le fait que vous consommiez ou pas ces produits n'a pas d'importance et ne doit pas influencer vos réponses.

1.4 Products pictures

1.5 Scales

Bananes (1 kg)

Veuillez regarder attentivement l'image représentant le produit et répondre aux questions ci-dessous:

		1	2	3	4	5	
Si le prix affiché est de 1.00 CHF	je n'achèterai jamais	○	○	○	○	○	j'achèterai certainement
Si le prix affiché est de 2.00 CHF	je n'achèterai jamais	○	○	○	○	○	j'achèterai certainement
Si le prix affiché est de 3.00 CHF	je n'achèterai jamais	○	○	○	○	○	j'achèterai certainement
Si le prix affiché est de 4.00 CHF	je n'achèterai jamais	○	○	○	○	○	j'achèterai certainement
Si le prix affiché est de 5.00 CHF	je n'achèterai jamais	○	○	○	○	○	j'achèterai certainement

Yogourt nature (500 g)

Veuillez regarder attentivement l'image représentant le produit et répondre aux questions ci-dessous:

		1	2	3	4	5	
Si le prix affiché est de 0.50 CHF	je n'achèterai jamais	○	○	○	○	○	j'achèterai certainement
Si le prix affiché est de 1.00 CHF	je n'achèterai jamais	○	○	○	○	○	j'achèterai certainement
Si le prix affiché est de 1.50 CHF	je n'achèterai jamais	○	○	○	○	○	j'achèterai certainement
Si le prix affiché est de 2.00 CHF	je n'achèterai jamais	○	○	○	○	○	j'achèterai certainement
Si le prix affiché est de 2.50 CHF	je n'achèterai jamais	○	○	○	○	○	j'achèterai certainement

Barres de céréales au chocolat (boîte de 9 pièces)

Veuillez regarder attentivement l'image représentant le produit et répondre aux questions ci-dessous:

		1	2	3	4	5	
Si le prix affiché est de 2.50 CHF	je n'achèterai jamais	○	○	○	○	○	j'achèterai certainement
Si le prix affiché est de 3.50 CHF	je n'achèterai jamais	○	○	○	○	○	j'achèterai certainement
Si le prix affiché est de 4.50 CHF	je n'achèterai jamais	○	○	○	○	○	j'achèterai certainement
Si le prix affiché est de 5.50 CHF	je n'achèterai jamais	○	○	○	○	○	j'achèterai certainement
Si le prix affiché est de 6.50 CHF	je n'achèterai jamais	○	○	○	○	○	j'achèterai certainement

1.6 Label knowledge and recognition questions

Sur les produits précédents, différents labels étaient présents...

J'ai reconnu la plupart des labels présents sur les produits.	pas du tout d'accord	○	○	○	○	○	tout à fait d'accord
Je connais la signification de la plupart de ces labels.	pas du tout d'accord	○	○	○	○	○	tout à fait d'accord
J'arrive à différencier un label par rapport à un autre.	pas du tout d'accord	○	○	○	○	○	tout à fait d'accord
Tous les labels ont la même signification.	pas du tout d'accord	○	○	○	○	○	tout à fait d'accord

1.7 Environmental concern questions

De manière générale...

Je me sens concerné par les problèmes liés à l'écologie et à l'environnement.	pas du tout d'accord	○	○	○	○	○	tout à fait d'accord
Je pense que mes choix de consommation peuvent avoir un impact sur l'environnement.	pas du tout d'accord	○	○	○	○	○	tout à fait d'accord
Je préfère acheter des produits avec un faible impact environnemental.	pas du tout d'accord	○	○	○	○	○	tout à fait d'accord
Je ne me préoccupe pas des problèmes liés à l'environnement.	pas du tout d'accord	○	○	○	○	○	tout à fait d'accord

1.8 Socio-demographic questions

Quel est votre genre ?

- ○ Femme
- ○ Homme

Dans quelle catégorie d'âge vous trouvez-vous ?

- ○ Moins de 20 ans
- ○ 20 – 34 ans
- ○ 35 – 49 ans
- ○ 50 – 65 ans
- ○ Plus de 65 ans

Quel est le niveau d'étude le plus élevé que vous avez achevé ?

- ○ Niveau primaire
- ○ Niveau secondaire 1 (cycle d'orientation)
- ○ Niveau secondaire 2 (maturité gymnasiale, professionnelle ou spécialisée)
- ○ Niveau tertiaire (Bachelor/licence, brevet/diplôme fédéral)
- ○ Niveau tertiaire (Master, Doctorat)

Où se situe votre lieu de résidence ?

- ○ Ville ou agglomération (commune de plus de 2'000 habitants)
- ○ Campagne (commune de moins de 2'000 habitants)

Quel est le revenu annuel de votre foyer?

- ○ Moins de 40'000 CHF
- ○ 40'000 – 60'000 CHF
- ○ 60'001 – 80'000 CHF
- ○ 80'001 – 100'000 CHF
- ○ Plus de 100'000 CHF

1.9 Validation and closing

Merci beaucoup pour votre participation!

Vos réponses ont été transmises, vous pouvez maintenant fermer la fenêtre ou l'onglet de votre navigateur.

Quentin Binggeli

Université de Fribourg

2. Statistics

2.1 Descriptive statistics

Statistiques

		QUESTNNR	Genre	Catégorie d'âge	Niveau d'étude	Résidence	Revenu
N	Valide	120	120	120	120	120	120
	Manquant	0	0	0	0	0	0

2.1.1 Questionnaires distribution

QUESTNNR

		Fréquence	Pourcentage	Pourcentage valide	Pourcentage cumulé
Valide	Q1	30	25.0	25.0	25.0
	Q2	30	25.0	25.0	50.0
	Q3	30	25.0	25.0	75.0
	Q4	30	25.0	25.0	100.0
	Total	120	100.0	100.0	

2.1.2 Gender distribution

Genre

		Fréquence	Pourcentage	Pourcentage valide	Pourcentage cumulé
Valide	Femme	52	43.3	43.3	43.3
	Homme	68	56.7	56.7	100.0
	Total	120	100.0	100.0	

2.1.3 Age distribution

Catégorie d'âge

		Fréquence	Pourcentage	Pourcentage valide	Pourcentage cumulé
Valide	20-34 ans	50	41.7	41.7	41.7
	35-49 ans	26	21.7	21.7	63.3
	50-65 ans	37	30.8	30.8	94.2
	Plus de 65 ans	7	5.8	5.8	100.0
	Total	120	100.0	100.0	

2.1.4 Education level distribution

Niveau d'étude

		Fréquence	Pourcentage	Pourcentage valide	Pourcentage cumulé
Valide	Niveau secondaire 1	2	1.7	1.7	1.7
	Niveau secondaire 2	15	12.5	12.5	14.2
	Niveau tertiaire 1	56	46.7	46.7	60.8
	Niveau tertiaire 2	47	39.2	39.2	100.0
	Total	120	100.0	100.0	

2.1.5 Residence distribution

Résidence

		Fréquence	Pourcentage	Pourcentage valide	Pourcentage cumulé
Valide	Ville ou agglomérations (+2000 hab.)	87	72.5	72.5	72.5
	Campagne (-2000 hab.)	33	27.5	27.5	100.0
	Total	120	100.0	100.0	

2.1.6 Household revenue distribution

Revenu

		Fréquence	Pourcentage	Pourcentage valide	Pourcentage cumulé
Valide	Moins de 40'000 CHF	12	10.0	10.0	10.0
	40'000 - 60'000 CHF	9	7.5	7.5	17.5
	60'001 - 80'000 CHF	17	14.2	14.2	31.7
	80'001 - 100'000 CHF	29	24.2	24.2	55.8
	Plus de 100'000 CHF	53	44.2	44.2	100.0
	Total	120	100.0	100.0	

2.1.7 Label recognition and knowledge

Statistiques descriptives

	N	Minimum	Maximum	Moyenne	Ecart type
Label recognition/knowledge: J'ai reconnu la plupart des labels présents sur les produits.	120	1	5	4.09	1.029
Label recognition/knowledge: Je connais la signification de la plupart de ces labels.	120	1	5	3.49	1.145
Label recognition/knowledge: J'arrive à différencier un label par rapport à un autre.	120	1	5	3.31	1.165
Label recognition/knowledge: Tous les labels ont la même signification.	120	1	5	1.92	1.038
N valide (liste)	120				

Label recognition/knowledge: J'ai reconnu la plupart des labels présents sur les produits.

		Fréquence	Pourcentage	Pourcentage valide	Pourcentage cumulé
Valide	Pas du tout d'accord	5	4.2	4.2	4.2
	2	4	3.3	3.3	7.5
	3	16	13.3	13.3	20.8
	4	45	37.5	37.5	58.3
	Tout à fait d'accord	50	41.7	41.7	100.0
	Total	120	100.0	100.0	

Label recognition/knowledge: Je connais la signification de la plupart de ces labels.

		Fréquence	Pourcentage	Pourcentage valide	Pourcentage cumulé
Valide	Pas du tout d'accord	9	7.5	7.5	7.5
	2	13	10.8	10.8	18.3
	3	31	25.8	25.8	44.2
	4	44	36.7	36.7	80.8
	Tout à fait d'accord	23	19.2	19.2	100.0
	Total	120	100.0	100.0	

Label recognition/knowledge: J'arrive à différencier un label par rapport à un autre.

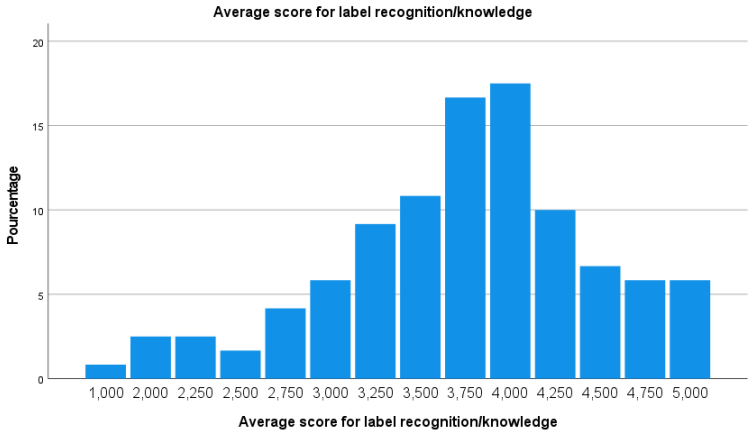
		Fréquence	Pourcentage	Pourcentage valide	Pourcentage cumulé
Valide	Pas du tout d'accord	10	8.3	8.3	8.3
	2	18	15.0	15.0	23.3
	3	37	30.8	30.8	54.2
	4	35	29.2	29.2	83.3
	Tout à fait d'accord	20	16.7	16.7	100.0
	Total	120	100.0	100.0	

Label recognition/knowledge: Tous les labels ont la même signification.

		Fréquence	Pourcentage	Pourcentage valide	Pourcentage cumulé
Valide	Pas du tout d'accord	49	40.8	40.8	40.8
	2	46	38.3	38.3	79.2
	3	15	12.5	12.5	91.7
	4	5	4.2	4.2	95.8
	Tout à fait d'accord	5	4.2	4.2	100.0
	Total	120	100.0	100.0	

Average score for label recognition/knowledge

		Fréquence	Pourcentage	Pourcentage valide	Pourcentage cumulé
Valide	1.000	1	.8	.8	.8
	2.000	3	2.5	2.5	3.3
	2.250	3	2.5	2.5	5.8
	2.500	2	1.7	1.7	7.5
	2.750	5	4.2	4.2	11.7
	3.000	7	5.8	5.8	17.5
	3.250	11	9.2	9.2	26.7
	3.500	13	10.8	10.8	37.5
	3.750	20	16.7	16.7	54.2
	4.000	21	17.5	17.5	71.7
	4.250	12	10.0	10.0	81.7
	4.500	8	6.7	6.7	88.3
	4.750	7	5.8	5.8	94.2
	5.000	7	5.8	5.8	100.0
	Total	120	100.0	100.0	



Categorized variable for average label knowledge/recognition

		Fréquence	Pourcentage	Pourcentage valide	Pourcentage cumulé
Valide	1	21	17.5	17.5	17.5
	2	99	82.5	82.5	100.0
	Total	120	100.0	100.0	

2.1.8 Ecological sensitivity

Statistiques descriptives

	N	Minimum	Maximum	Moyenne	Ecart type
Ecological sensitivity: Je me sens concerné par les problèmes liés à l'écologie et à l'environnement.	120	1	5	4.05	.995
Ecological sensitivity: Je pense que mes choix de consommation peuvent avoir un impact sur l'environnement.	120	1	5	3.92	1.120
Ecological sensitivity: Je préfère acheter des produits avec un faible impact environnemental.	120	1	5	3.72	1.230
Ecological sensitivity: Je ne me préoccupe pas des problèmes liés à l'environnement.	120	1	5	1.96	1.118
N valide (liste)	120				

Ecological sensitivity: Je me sens concerné par les problèmes liés à l'écologie et à l'environnement.

		Fréquence	Pourcentage	Pourcentage valide	Pourcentage cumulé
Valide	Pas du tout d'accord	3	2.5	2.5	2.5
	2	7	5.8	5.8	8.3
	3	17	14.2	14.2	22.5
	4	47	39.2	39.2	61.7
	Tout à fait d'accord	46	38.3	38.3	100.0
	Total	120	100.0	100.0	

Ecological sensitivity: Je pense que mes choix de consommation peuvent avoir un impact sur l'environnement.

		Fréquence	Pourcentage	Pourcentage valide	Pourcentage cumulé
Valide	Pas du tout d'accord	4	3.3	3.3	3.3
	2	12	10.0	10.0	13.3
	3	20	16.7	16.7	30.0
	4	38	31.7	31.7	61.7
	Tout à fait d'accord	46	38.3	38.3	100.0
	Total	120	100.0	100.0	

Ecological sensitivity: Je préfère acheter des produits avec un faible impact environnemental.

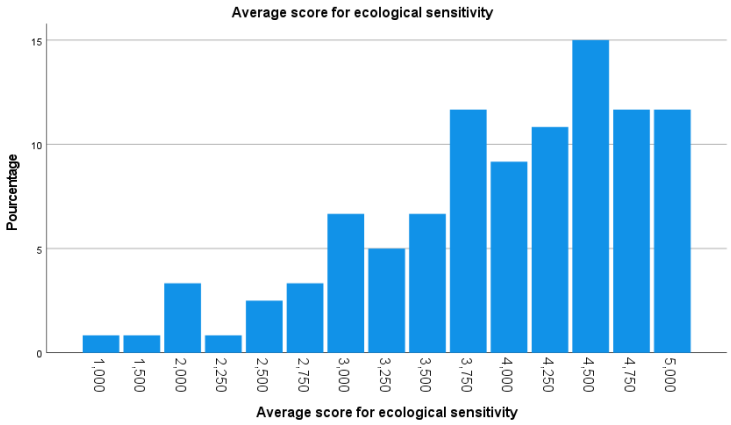
		Fréquence	Pourcentage	Pourcentage valide	Pourcentage cumulé
Valide	Pas du tout d'accord	9	7.5	7.5	7.5
	2	12	10.0	10.0	17.5
	3	21	17.5	17.5	35.0
	4	39	32.5	32.5	67.5
	Tout à fait d'accord	39	32.5	32.5	100.0
	Total	120	100.0	100.0	

Ecological sensitivity: Je ne me préoccupe pas des problèmes liés à l'environnement.

		Fréquence	Pourcentage	Pourcentage valide	Pourcentage cumulé
Valide	Pas du tout d'accord	56	46.7	46.7	46.7
	2	30	25.0	25.0	71.7
	3	21	17.5	17.5	89.2
	4	9	7.5	7.5	96.7
	Tout à fait d'accord	4	3.3	3.3	100.0
	Total	120	100.0	100.0	

Average score for ecological sensitivity

		Fréquence	Pourcentage	Pourcentage valide	Pourcentage cumulé
Valide	1.000	1	.8	.8	.8
	1.500	1	.8	.8	1.7
	2.000	4	3.3	3.3	5.0
	2.250	1	.8	.8	5.8
	2.500	3	2.5	2.5	8.3
	2.750	4	3.3	3.3	11.7
	3.000	8	6.7	6.7	18.3
	3.250	6	5.0	5.0	23.3
	3.500	8	6.7	6.7	30.0
	3.750	14	11.7	11.7	41.7
	4.000	11	9.2	9.2	50.8
	4.250	13	10.8	10.8	61.7
	4.500	18	15.0	15.0	76.7
	4.750	14	11.7	11.7	88.3
	5.000	14	11.7	11.7	100.0
	Total	120	100.0	100.0	



Categorized variable for average ecological sensitivity

		Fréquence	Pourcentage	Pourcentage valide	Pourcentage cumulé
Valide	1	22	18.3	18.3	18.3
	2	98	81.7	81.7	100.0
	Total	120	100.0	100.0	

2.2 Results

2.2.1 Revenue

Single-label bananas

Revenue category 1	**45,00%**	**31,67%**	**28,33%**	**3,33%**	**3,33%**
Calibrated logit model	43,02%	37,13%	22,81%	8,23%	2,09%
Intercept (B0)	4,60075606				
Slope (B1)	-1,5244784				
Sum squared error	0,00898574				
Revenue category 2	**23,33%**	**23,33%**	**6,67%**	**0,00%**	**0,00%**
Calibrated logit model	23,33%	23,33%	6,67%	0,00%	0,00%
Intercept (B0)	42,5343576				
Slope (B1)	-14,48355				
Sum squared error	1,0799E-13				
Revenue category 3	**50,00%**	**44,55%**	**22,73%**	**3,64%**	**0,00%**
Calibrated logit model	49,44%	44,78%	22,64%	3,69%	0,38%
Intercept (B0)	6,82715554				
Slope (B1)	-2,3389508				
Sum squared error	5,212E-05				
Revenue category 4	**44,29%**	**38,57%**	**19,29%**	**4,29%**	**1,43%**
Calibrated logit model	43,47%	38,38%	19,60%	3,91%	0,52%
Intercept (B0)	6,07896916				
Slope (B1)	-2,1032843				
Sum squared error	0,00017677				
Revenue category 5	**42,69%**	**34,23%**	**26,92%**	**13,85%**	**5,38%**
Calibrated logit model	40,45%	36,01%	26,35%	13,90%	5,39%
Intercept (B0)	4,09803347				
Slope (B1)	-1,2066591				
Sum squared error	0,00085396				

Single-label nature yogourt

Revenue category 1	**45,00%**	**31,67%**	**28,33%**	**11,67%**	**8,33%**
Calibrated logit model	41,19%	35,59%	25,63%	14,24%	6,27%
Intercept (B0)	3,43249487				
Slope (B1)	-2,1015751				
Sum squared error	0,00480855				
Revenue category 2	**36,67%**	**28,33%**	**10,00%**	**3,33%**	**0,00%**
Calibrated logit model	35,45%	28,38%	10,50%	1,65%	0,20%
Intercept (B0)	5,51739313				
Slope (B1)	-4,2868762				
Sum squared error	0,00046091				
Revenue category 3	**50,00%**	**18,33%**	**11,67%**	**8,33%**	**8,33%**
Calibrated logit model	41,79%	25,73%	9,03%	2,19%	0,47%
Intercept (B0)	3,19763903				
Slope (B1)	-3,1395361				
Sum squared error	0,02283974				
Revenue category 4	**48,00%**	**33,33%**	**23,33%**	**14,00%**	**10,00%**
Calibrated logit model	42,37%	35,65%	25,22%	14,31%	6,73%
Intercept (B0)	2,97600309				
Slope (B1)	-1,9161314				
Sum squared error	0,00514562				
Revenue category 5	**44,44%**	**34,44%**	**24,07%**	**15,93%**	**9,26%**
Calibrated logit model	40,42%	35,18%	26,20%	15,64%	7,57%
Intercept (B0)	3,27891409				
Slope (B1)	-1,94478				
Sum squared error	0,00241891				

Single-label chocolate cereal bars

Revenue category 1	**36,67%**	**23,33%**	**18,33%**	**0,00%**	**0,00%**
Calibrated logit model	34,24%	27,34%	13,89%	4,13%	0,94%
Intercept (B0)	6,57137368				
Slope (B1)	-1,5702217				
Sum squared error	0,00596305				
Revenue category 2	**50,00%**	**50,00%**	**10,00%**	**0,00%**	**0,00%**
Calibrated logit model	50,00%	49,99%	10,01%	0,00%	0,00%
Intercept (B0)	45,3532223				
Slope (B1)	-10,386312				
Sum squared error	1,1735E-08				
Revenue category 3	**43,75%**	**33,75%**	**8,75%**	**2,50%**	**0,00%**
Calibrated logit model	42,79%	33,81%	9,01%	0,85%	0,07%
Intercept (B0)	10,2321916				
Slope (B1)	-2,5738389				
Sum squared error	0,00037234				
Revenue category 4	**40,00%**	**30,00%**	**9,38%**	**3,13%**	**0,00%**
Calibrated logit model	38,67%	30,16%	9,76%	1,32%	0,14%
Intercept (B0)	8,99642537				
Slope (B1)	-2,2505421				
Sum squared error	0,00052362				
Revenue category 5	**35,71%**	**27,86%**	**18,21%**	**6,43%**	**0,71%**
Calibrated logit model	34,05%	29,19%	17,65%	6,28%	1,59%
Intercept (B0)	6,82656886				
Slope (B1)	-1,5221733				
Sum squared error	0,00056466				

2.2.2 Label recognition and knowledge

Single-label bananas

Category 1 (Low)	**45,71%**	**41,43%**	**27,86%**	**9,29%**	**1,43%**
Calibrated logit model	45,00%	41,55%	27,95%	9,08%	1,72%
Intercept (B0)	5,99715664				
Slope (B1)	-1,8479363				
Sum squared error	6,5414E-05				
Category 2 (High)	**43,04%**	**34,78%**	**22,17%**	**7,61%**	**3,48%**
Calibrated logit model	41,13%	35,54%	22,02%	8,09%	2,10%
Intercept (B0)	4,57442131				
Slope (B1)	-1,5092962				
Sum squared error	0,00064271				

Single-label nature yogourt

Category 1 (Low)	**42,86%**	**21,43%**	**21,43%**	**14,29%**	**14,29%**
Calibrated logit model	34,11%	28,86%	22,35%	15,67%	10,01%
Intercept (B0)	1,99775047				
Slope (B1)	-1,2742729				
Sum squared error	0,01527868				
Category 2 (High)	**45,47%**	**33,02%**	**21,70%**	**12,83%**	**7,55%**
Calibrated logit model	40,92%	34,42%	23,61%	12,38%	5,22%
Intercept (B0)	3,25584089				
Slope (B1)	-2,1193801				
Sum squared error	0,00319528				

Single-label chocolate cereal bars

Category 1 (Low)	**46,25%**	**28,75%**	**7,50%**	**0,00%**	**0,00%**
Calibrated logit model	44,02%	29,69%	6,48%	0,68%	0,06%
Intercept (B0)	8,97353765				
Slope (B1)	-2,3971508				
Sum squared error	0,00073619				
Category 2 (High)	**37,31%**	**29,62%**	**15,38%**	**4,81%**	**0,38%**
Calibrated logit model	35,80%	30,04%	15,59%	4,13%	0,79%
Intercept (B0)	7,5474778				
Slope (B1)	-1,7509339				
Sum squared error	0,00031022				

2.2.3 Ecological sensitivity

Single-label bananas

Category 1 (Low)	**50,00%**	**43,85%**	**27,69%**	**4,62%**	**1,54%**
Calibrated logit model	49,41%	45,36%	26,70%	5,93%	0,78%
Intercept (B0)	6,56636083				
Slope (B1)	-2,1432504				
Sum squared error	0,00059145				
Category 2 (High)	**41,91%**	**34,26%**	**22,34%**	**8,94%**	**3,40%**
Calibrated logit model	40,00%	34,83%	22,51%	9,00%	2,54%
Intercept (B0)	4,48112139				
Slope (B1)	-1,4443572				
Sum squared error	0,00047911				

Single-label nature yogourt

Category 1 (Low)	**44,44%**	**41,11%**	**32,22%**	**11,11%**	**11,11%**
Calibrated logit model	43,27%	40,03%	30,69%	15,76%	5,29%
Intercept (B0)	5,0088852				
Slope (B1)	-2,8039245				
Sum squared error	0,00603288				
Category 2 (High)	**45,29%**	**30,00%**	**19,80%**	**13,33%**	**7,84%**
Calibrated logit model	39,52%	32,62%	22,26%	12,07%	5,44%
Intercept (B0)	2,90310207				
Slope (B1)	-1,957912				
Sum squared error	0,00535902				

Single-label chocolate cereal bars

Category 1 (Low)	**41,11%**	**32,22%**	**23,33%**	**12,22%**	**0,00%**
Calibrated logit model	39,10%	34,26%	23,13%	10,23%	3,23%
Intercept (B0)	6,35828008				
Slope (B1)	-1,3569749				
Sum squared error	0,00226423				
Category 2 (High)	**38,04%**	**29,02%**	**12,75%**	**2,75%**	**0,39%**
Calibrated logit model	36,55%	29,58%	12,63%	2,51%	0,38%
Intercept (B0)	8,08051872				
Slope (B1)	-1,9511013				
Sum squared error	0,00025906				

2.2.4 Gender

Single-label bananas

Genre 1 (Female)	**44,80%**	**40,00%**	**23,20%**	**3,20%**	**0,80%**
Calibrated logit model	44,39%	40,90%	22,66%	4,06%	0,43%
Intercept (B0)	7,00705637				
Slope (B1)	-2,3280289				
Sum squared error	0,00021616				
Genre 2 (Male)	**42,86%**	**33,71%**	**23,71%**	**11,43%**	**4,57%**
Calibrated logit model	40,24%	34,92%	23,87%	11,33%	3,99%
Intercept (B0)	3,98591311				
Slope (B1)	-1,252464				
Sum squared error	0,00086585				

Single-label nature yogourt

Genre 1 (Female)	**46,67%**	**34,44%**	**23,33%**	**14,07%**	**8,89%**
Calibrated logit model	42,00%	35,73%	25,33%	14,05%	6,31%
Intercept (B0)	3,21102984				
Slope (B1)	-2,0265642				
Sum squared error	0,00340364				
Genre 2 (Male)	**43,94%**	**29,39%**	**20,30%**	**12,12%**	**7,88%**
Calibrated logit model	38,61%	32,00%	21,88%	11,79%	5,25%
Intercept (B0)	2,9756184				
Slope (B1)	-1,9894357				
Sum squared error	0,00446862				

Single-label chocolate cereal bars

Genre 1 (Female)	**41,15%**	**33,08%**	**15,77%**	**4,23%**	**0,00%**
Calibrated logit model	39,79%	33,38%	15,96%	3,52%	0,56%
Intercept (B0)	8,15708698				
Slope (B1)	-1,9141327				
Sum squared error	0,00028191				
Genre 2 (Male)	**36,47%**	**26,76%**	**13,24%**	**4,12%**	**0,59%**
Calibrated logit model	34,45%	27,62%	13,25%	3,45%	0,68%
Intercept (B0)	7,08420429				
Slope (B1)	-1,6988834				
Sum squared error	0,0005267				

2.2.5 Age

Single-label bananas

Age category 2	**43,81%**	**37,14%**	**22,38%**	**2,86%**	**0,95%**
Calibrated logit model	43,12%	38,74%	21,18%	4,50%	0,61%
Intercept (B0)	6,23544083				
Slope (B1)	-2,1005544				
Sum squared error	0,00073075				
Age category 3	**45,45%**	**35,45%**	**29,09%**	**13,64%**	**8,18%**
Calibrated logit model	42,58%	37,64%	27,75%	15,36%	6,48%
Intercept (B0)	3,8162068				
Slope (B1)	-1,1221582				
Sum squared error	0,00207249				
Age category 4	**40,91%**	**33,64%**	**22,27%**	**11,36%**	**3,18%**
Calibrated logit model	38,84%	34,02%	23,12%	10,43%	3,38%
Intercept (B0)	4,26448734				
Slope (B1)	-1,3341287				
Sum squared error	0,00060663				
Age category 5	**50,00%**	**45,00%**	**21,67%**	**3,33%**	**0,00%**
Calibrated logit model	49,53%	44,98%	21,74%	3,10%	0,28%
Intercept (B0)	7,10391448				
Slope (B1)	-2,4553771				
Sum squared error	3,6594E-05				

Single-label nature yogourt

Age category 2	**44,14%**	**34,83%**	**24,14%**	**16,55%**	**10,00%**
Calibrated logit model	40,17%	35,17%	26,61%	16,35%	8,19%
Intercept (B0)	3,26262803				
Slope (B1)	-1,8967294				
Sum squared error	0,00253091				
Age category 3	**48,00%**	**28,67%**	**18,00%**	**10,00%**	**6,00%**
Calibrated logit model	41,71%	32,53%	19,18%	8,36%	3,00%
Intercept (B0)	3,0423048				
Slope (B1)	-2,2994397				
Sum squared error	0,00674684				
Age category 4	**46,00%**	**29,33%**	**20,67%**	**10,00%**	**8,00%**
Calibrated logit model	40,32%	32,73%	21,21%	10,54%	4,30%
Intercept (B0)	3,01830362				
Slope (B1)	-2,1158955				
Sum squared error	0,00580164				
Age category 5	**20,00%**	**20,00%**	**20,00%**	**0,00%**	**0,00%**
Calibrated logit model	20,00%	20,00%	20,00%	#NOMBRE!	#NOMBRE!
Intercept (B0)	44710066,9				
Slope (B1)	-25103982				
Sum squared error	#NOMBRE!				

Single-label chocolate cereal bars

Age category 2	**40,95%**	**33,33%**	**18,57%**	**6,67%**	**0,95%**
Calibrated logit model	39,32%	33,60%	19,05%	5,81%	1,25%
Intercept (B0)	7,32721047				
Slope (B1)	-1,659324				
Sum squared error	0,00037932				
Age category 3	**41,33%**	**29,33%**	**13,33%**	**1,33%**	**0,00%**
Calibrated logit model	39,32%	30,65%	12,27%	2,42%	0,37%
Intercept (B0)	7,7640457				
Slope (B1)	-1,9170383				
Sum squared error	0,00082471				
Age category 4	**32,38%**	**25,71%**	**10,95%**	**4,29%**	**0,00%**
Calibrated logit model	31,13%	25,59%	11,76%	2,58%	0,42%
Intercept (B0)	7,93011426				
Slope (B1)	-1,8869345				
Sum squared error	0,00053395				
Age category 5	**50,00%**	**30,00%**	**13,33%**	**0,00%**	**0,00%**
Calibrated logit model	46,30%	32,58%	10,92%	2,00%	0,31%
Intercept (B0)	7,28281665				
Slope (B1)	-1,9018301				
Sum squared error	0,00302723				

2.2.6 Education level

Single-label bananas

Education level 3	**42,50%**	**42,50%**	**15,00%**	**0,00%**	**0,00%**
Calibrated logit model	42,50%	42,50%	15,00%	0,00%	0,00%
Intercept (B0)	48,3751782				
Slope (B1)	-16,327105				
Sum squared error	8,7311E-15				
Education level 4	**43,70%**	**32,59%**	**23,33%**	**7,04%**	**0,00%**
Calibrated logit model	41,58%	35,48%	21,32%	7,59%	1,94%
Intercept (B0)	4,48304094				
Slope (B1)	-1,5106863				
Sum squared error	0,00209853				
Education level 5	**43,57%**	**38,57%**	**25,00%**	**10,36%**	**6,43%**
Calibrated logit model	41,94%	37,47%	25,92%	11,33%	3,38%
Intercept (B0)	4,67730601				
Slope (B1)	-1,4308861				
Sum squared error	0,00149844				

Single-label nature yogourt

Education level 3	**44,55%**	**25,45%**	**20,91%**	**12,73%**	**6,36%**
Calibrated logit model	38,02%	30,94%	20,94%	11,45%	5,30%
Intercept (B0)	2,70419577				
Slope (B1)	-1,8827546				
Sum squared error	0,00753944				
Education level 4	**46,21%**	**35,52%**	**23,79%**	**13,10%**	**9,31%**
Calibrated logit model	42,09%	36,07%	25,57%	13,92%	6,03%
Intercept (B0)	3,38065092				
Slope (B1)	-2,110949				
Sum squared error	0,00318314				
Education level 5	**43,68%**	**30,00%**	**20,00%**	**13,68%**	**8,42%**
Calibrated logit model	38,31%	32,07%	22,58%	12,79%	6,04%
Intercept (B0)	2,91404467				
Slope (B1)	-1,8979035				
Sum squared error	0,00462564				

Single-label chocolate cereal bars

Education level 3	**36,67%**	**18,33%**	**8,33%**	**8,33%**	**0,00%**
Calibrated logit model	31,70%	21,68%	9,06%	2,54%	0,61%
Intercept (B0)	5,56259957				
Slope (B1)	-1,4836698				
Sum squared error	0,00703604				
Education level 4	**36,21%**	**30,00%**	**15,17%**	**5,52%**	**0,69%**
Calibrated logit model	34,92%	29,78%	15,99%	4,31%	0,82%
Intercept (B0)	7,71813614				
Slope (B1)	-1,7673276				
Sum squared error	0,0003853				
Education level 5	**40,87%**	**30,00%**	**14,35%**	**1,74%**	**0,00%**
Calibrated logit model	39,07%	31,25%	13,35%	2,76%	0,44%
Intercept (B0)	7,83202207				
Slope (B1)	-1,9010966				
Sum squared error	0,00070189				

2.2.7 Place of residence

Single-label bananas

Residence 1 (City/agglo)	**43,86%**	**37,05%**	**23,86%**	**8,41%**	**3,64%**
Calibrated logit model	42,31%	37,34%	23,93%	8,83%	2,20%
Intercept (B0)	4,86627076				
Slope (B1)	-1,5611259				
Sum squared error	0,00047288				
Residence 2 (Rural area)	**43,13%**	**34,38%**	**22,50%**	**6,88%**	**1,25%**
Calibrated logit model	41,45%	35,91%	21,61%	7,27%	1,69%
Intercept (B0)	4,80653611				
Slope (B1)	-1,6007313				
Sum squared error	0,00063245				

Single-label nature yogourt

Residence 1 (City/agglo)	**45,35%**	**36,74%**	**23,95%**	**14,19%**	**8,14%**
Calibrated logit model	41,96%	36,47%	26,17%	14,14%	5,93%
Intercept (B0)	3,61742091				
Slope (B1)	-2,2047065				
Sum squared error	0,00213629				
Residence 2 (Rural area)	**44,71%**	**18,82%**	**15,88%**	**10,00%**	**8,82%**
Calibrated logit model	35,57%	26,95%	16,63%	8,38%	3,69%
Intercept (B0)	2,30127048				
Slope (B1)	-1,8836283				
Sum squared error	0,01790429				

Single-label chocolate cereal bars

Residence 1 (City/agglo)	**36,98%**	**30,00%**	**14,42%**	**3,72%**	**0,47%**
Calibrated logit model	35,81%	30,22%	14,60%	3,21%	0,51%
Intercept (B0)	8,23374386				
Slope (B1)	-1,9246506				
Sum squared error	0,00017045				
Residence 2 (Rural area)	**42,35%**	**28,24%**	**14,12%**	**5,29%**	**0,00%**
Calibrated logit model	39,11%	30,02%	13,96%	3,82%	0,83%
Intercept (B0)	6,49137636				
Slope (B1)	-1,6003547				
Sum squared error	0,00165901				

2.2.8 Multi-branding effect and price premium

Bananas

Single-label	**43,67%**	**36,33%**	**23,50%**	**8,00%**	**3,00%**
Calibrated logit model	42,09%	36,98%	23,32%	8,38%	2,05%
Intercept (B0)	4,85778891				
Slope (B1)	-1,5738529				
Sum squared error	0,00039886				

Multi-label	**41,67%**	**39,00%**	**26,33%**	**10,00%**	**4,00%**
Calibrated logit model	40,93%	37,91%	26,90%	10,32%	2,34%
Intercept (B0)	5,73093591				
Slope (B1)	-1,7103346				
Sum squared error	0,00049148				

Without label	**38,33%**	**28,00%**	**11,67%**	**5,33%**	**3,00%**
Calibrated logit model	35,95%	28,20%	13,00%	3,31%	0,66%
Intercept (B0)	4,40529112				
Slope (B1)	-1,6908425				
Sum squared error	0,00170591				

Nature yogourt

Single-label	**45,17%**	**31,67%**	**21,67%**	**13,00%**	**8,33%**
Calibrated logit model	40,14%	33,68%	23,43%	12,82%	5,74%
Intercept (B0)	3,07814423				
Slope (B1)	-2,002052				
Sum squared error	0,00392269				

Multi-label	**45,33%**	**35,33%**	**24,33%**	**13,00%**	**7,33%**
Calibrated logit model	41,88%	36,14%	25,41%	13,26%	5,36%
Intercept (B0)	3,62038376				
Slope (B1)	-2,2516529				
Sum squared error	0,0017699				

Without label	**48,00%**	**40,67%**	**28,00%**	**15,00%**	**5,67%**
Calibrated logit model	45,70%	40,65%	29,13%	14,46%	5,15%
Intercept (B0)	4,26313322				
Slope (B1)	-2,5523862				
Sum squared error	0,00071566				

Chocolate cereal bars

Single-label	**38,50%**	**29,50%**	**14,33%**	**4,17%**	**0,33%**
Calibrated logit model	36,78%	30,10%	14,42%	3,51%	0,63%
Intercept (B0)	7,53380514				
Slope (B1)	-1,7880276				
Sum squared error	0,00038417				

Multi-label	**34,33%**	**22,00%**	**13,67%**	**5,00%**	**1,67%**
Calibrated logit model	31,10%	24,32%	13,06%	4,61%	1,29%
Intercept (B0)	5,70306643				
Slope (B1)	-1,3759069				
Sum squared error	0,00165123				

Without label	**35,00%**	**23,33%**	**10,00%**	**3,33%**	**0,67%**
Calibrated logit model	32,60%	24,45%	9,94%	2,22%	0,40%
Intercept (B0)	7,02159149				
Slope (B1)	-1,7659253				
Sum squared error	0,00083427				

2.2.9 Labels

Bananas

Fairtrade MaxHavelaar	**44,67%**	**33,33%**	**19,33%**	**6,67%**	**4,00%**
Calibrated logit model	41,79%	34,43%	19,53%	6,80%	1,78%
Intercept (B0)	4,14219931				
Slope (B1)	-1,4649155				
Sum squared error	0,00144352				

Bourgeon Bio	**42,67%**	**39,33%**	**27,67%**	**9,33%**	**2,00%**
Calibrated logit model	42,13%	39,40%	27,67%	9,39%	1,77%
Intercept (B0)	6,24527458				
Slope (B1)	-1,8775448				
Sum squared error	3,4819E-05				

Natura yogourt

Naturaplan	**47,00%**	**33,33%**	**23,00%**	**13,33%**	**8,67%**
Calibrated logit model	41,97%	35,33%	24,60%	13,39%	5,94%
Intercept (B0)	3,13453736				
Slope (B1)	-2,0273407				
Sum squared error	0,00393058				

Bio Suisse	**43,33%**	**30,00%**	**20,33%**	**12,67%**	**8,00%**
Calibrated logit model	38,31%	32,04%	22,27%	12,24%	5,54%
Intercept (B0)	3,01938035				
Slope (B1)	-1,9760356				
Sum squared error	0,00394114				

Chocolate cereal bars

Migros Bio	**39,67%**	**33,00%**	**14,00%**	**4,33%**	**0,00%**
Calibrated logit model	38,63%	32,70%	14,72%	2,74%	0,37%
Intercept (B0)	8,80474645				
Slope (B1)	-2,0737843				
Sum squared error	0,00043546				

Rainforest Alliance	**37,33%**	**26,00%**	**14,67%**	**4,00%**	**0,67%**
Calibrated logit model	34,84%	27,71%	13,88%	4,05%	0,91%
Intercept (B0)	6,59217277				
Slope (B1)	-1,5813941				
Sum squared error	0,00097911				

3. Studies and experiments on eco-labels

Authors	Products	Countries	Eco-labels/ Attributes of eco-labels	Methods
Aizaki (2013)	Milk	Japan	GAP	Discrete choice experiment
Akaichi (2016)	Bananas	Scotland, France, Netherlands	Soil association	Discrete choice experiment
Aknakamah-Yeboa (2018)	Trout	Germany	Organic EU, ASC	Discrete choice experiment
Aprile et al. (2012)	Olive oil	Italy	PDO, PGI, Organic Farming	HCE
Banovic (2019)	Aquaculture product	France, Germany, Italy, Spain, UK	ASC	Discrete choice experiment
Basu et al. (2016)	Coffee	Germany	not reported	CE
Bienenfeld (2014)	Cereal	USA	USDA	Discrete choice experiment
Bougherara & Combris (2009)	Orange Juice	France	ATCEP	BDM
Bronnmann & Hoffmann (2018)	Turbot	Germany	Production methods, sustainable certification, processing	CE (RPL)
Bronnmann et al. (2017)	Turbot, salmon	Germany	MSC, ASC	Discrete choice experiment
Cailled & Casteran (2008)	Coffee	France	not reported	CV
Caputo (2018)	Chicken breast	Belgium	Organic EU, local private label	Discrete choice experiment
Caputo et al. (2014)	Tomatoes	US	USDA Organic, Nkm, CO2 emission	HCE
Carlsson et al. (2010)	Coffee	Sweden	not reported	CE
Carlucci (2017)	Oysters	Italy	Organic	Discrete choice experiment
Catturani et al. (2008)	Coffee	Italy	not reported	CE
Chen (2015)	Cod, salmon, monkfish, pangasius	France	Agriculture Biologique, MSC	Discrete choice experiment
Cosmina et al. (2016)	Coffee	Italy	not reported	CE
Cranfield et al. (2010)	Coffee	Canada	not reported	CE
Dahlhausen et al. (2018)	Pork, eggs, pasta	Germany	Product origin, organic labels, animal welfare, antibiotics	CE (RPL)
De Pelsmacker et al. (2005)	Coffee	Belgium	not reported	CE
De-Magistris (2016)	Almonds	Spain	Organic EU	Discrete choice experiment

Disdier & Marette (2012)	Shrimp	France	Eco-friendly	SPLE
Fernandez-Polanco (2013)	Seabream	Spain	Sustainable	Discrete choice experiment
Fonner (2015)	Salmon, crab	USA	Sustainable	Discrete choice experiment
Fuller & Grebitus (2019)	Coffee	USA	not reported	CE
Gerini et al. (2016)	Eggs	Norway	Production methods	CE (RPL)
Gerrard (2013)	Apples, eggs	UK	Organic EU, Soil Association, OF&G	Discrete choice experiment
Gianni et al. (2010)	Coffee	Italy	not reported	CUB
Gorton et al. (2021)	Organic food	EU	Eco-labels	MMA
Grebitus (2016)	Ground beef, yogourt, potatoes	Canada, Germany	CO2 impact, water usage	Discrete choice experiment
Grebitus et al. (2009)	Coffee	Germany	not reported	Experimental auction
Grüney & Giraldo (2019)	Eggs	Turkey	Production methods, brand	CE (OP & RPL)
Hearne (2002)	Vegetables	Costa Rica	Sustainable organic local labels	Discrete choice experiment
Heng (2016)	Eggs	USA	USDA	Discrete choice experiment
James (2009)	Applesauce	USA	USDA	Discrete choice experiment
Khai (2015)	Rice	Vietnam	Sustainable, organic	Discrete choice experiment
Kim & Lee (2018)	Seafood	Korea	Species, product origin	OP
Lappeman et al. (2019)	Coffee	South Africa	not reported	CV
Li et al. (2015)	Tomato	China	Organic label	CE (ML)
Lim (2018)	Canned tuna	USA	MSC	Discrete choice experiment
Liu et al. (2015)	Pork	China	Traceable label	CVM (BL)
Liu et al. (2017)	Rice	China	Product origin, eco-labels, brand	CE (RPL)
Liu et al. (2019)	Coffee	Taiwan	not reported	CE
Lombardi (2017)	Milk	Italy	Organic EU	Discrete choice experiment
Loureiro & Lotade (2005)	Coffee	Italy	not reported	CV
Loureiro & Lotade (2005)	Coffee	USA	not reported	CE
Lucia & Romeo (2011)	Coffee	Italy	not reported	Conjoint analysis
Lusk et al. (2007)	Pork	US	EC, AWB, Free of Antibiotic	HCE
Maaya et al. (2018)	Coffee	Belgium	not reported	CE

Maietta (2005)	Coffee	Italy	not reported	Hedonic pricing
Mamouni Limnio (2016)	Apples	Australia	Sustainable, organic	Discrete choice experiment
Marchi et al. (2016)	Yogurt	US	USDA Organic, Carbon Trust	HCE
Michaud et al. (2013)	Roses	France	FFFP, Carbon Footprint	RCE
Mondelaers (2009)	Carrots	Belgium	Sustainable, organic	Discrete choice experiment
Nkana & Gao (2010)	Coffee	Malawi	not reported	CE
Olesen (2012)	Salmon	Norway	Organic	Discrete choice experiment
Olesen et al. (2010)	Salmon	Norway	Freedom Food, Organic	RCE
Pimsiri & Yingyot (2011)	Coffee	Thailand	not reported	Experimental auction
Rahmani et al. (2019)	Eggs	Spain	Production methods	CE (RPL)
Risius (2017)	Beef	Germany	Organic EU	Discrete choice experiment
Rousseau (2013)	Apples	Belgium	Organic	Discrete choice experiment
Rousseau (2015)	Chocolate	Belgium	Organic EU	Discrete choice experiment
Sackett (2016)	Apples, steaks	USA	USDA, private sustainable label	Discrete choice experiment
Sakagami (2006)	Spinach	Japan	Organic	Discrete choice experiment
Scarp et al. (2008)	Carrots	Italy	Organic, BD, IPM	HCE
Schmit et al. (2013)	Wine	US	Shoot Thinning, Leaf Removal, STLR	HCE
Sörqvist et al. (2013)	Coffee	Sweden	Eco-friendly	SPLE
Tait (2016)	Fruits	Japan, UK	CO2 impact, water usage	Discrete choice experiment
Tait (2016)	Lamb	China, India, UK	CO2 impact, water usage	Discrete choice experiment
Tranter et al. (2009)	Carrots & Chicken	EU	CG, Organic	CV
Uchida et al. (2014)	Seafood	Japan	Production methods, product origin, eco-label	CE (RPL)
Van Loo (2011)	Chicken breast	USA	USDA	Discrete choice experiment
Van Loo et al. (2014)	Chicken	Belgium	EU organic, Belgium Organic, EU AW, CF-20%, CF-30%, Free range claim	HCE
Van Loo et al. (2015)	Coffee	US	USDA Organic, Rainforest, Fair Trade, Carbon Footprint	HCE
Van Loo et al. (2020)	Beef	US	Production methods	CE (RPL)

Van Osch (2017)	Salmon	Ireland	Sustainable	Discrete choice experiment
Verteramo et al. (2014))	Coffee	USA	not reported	Conjoint analysis
Verteramo et al. (2016)	Coffee	USA	not reported	Experimental auction
Vitale et al. (2020)	Anchoy	Italy	Eco-labels	Probit regression model
Wakamatsu (2017)	Cod	Japan	MEL, MSC	Discrete choice experiment
Wang (2018)	Pork	China	Organic	Discrete choice experiment
Witkin (2015)	Fishes	USA	Sustainable	Discrete choice experiment
Wongprawmas & Canavari (2017)	Chinese cabbage	Thailand	Freshness, brand and health claims	CE (RPL)
Wu (2014)	Milk	China	Organic	Discrete choice experiment
Xie (2016)	Broccoli	USA	Organic	Discrete choice experiment
Xu et al. (2012)	Seafood	China	Eco-label, green label	CV
Yeh et al. (2020)	Eggs	Hungary & Italy	Organic labels, nutrition and health claims	CE (RPL)
Yin (2018)	Tomatoes	China	Organic	Discrete choice experiment
Yue (2015)	Milk	China	Organic	Discrete choice experiment
Zakowska-Biemans & Tekien (2017)	Eggs	Poland	Production methods, nutrition claims	CE (HB)
Zanoli (2012)	Beef steaks	Italy	Organic	Discrete choice experiment
Zhang et al. (2013)	Pork	China	Brand, certification, security claims	CV (RPL & LCM)
Zhou (2017)	Rice	China	Organic	Discrete choice experiment

Notes: CE: choice experiment; CV: contingent valuation; HCE: hypothetical choice experiment; RCE: real choice experiment; SPLE: stated preference in lab experiment; BDM: Becker-DeGroot-Marschak mechanism; CUB: combination of a discrete uniform and a shifted binomial distribution; RPL: random parameter logit; LCM: latent class model; HB: hypothetical bias; ML: machine learning; BL: bid level; MMA: multi-model analysis.

Data collected from:

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