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## Assessment of consumer preferences in the context of multiple labels: the case of fishery and aquaculture products

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### Abstract :

Labels are currently numerous and diverse in the fishery and aquaculture products (FAPs) market, providing consumers with information about the different attributes of FAPs. This extensive development implies that consumers have to face trade-off situations. This paper aims (1) to identify which labels are most valued by consumers when they face a trade-off situation, (2) to study the consumption profiles behind these preferences and (3) to suggest ways of improving the efficiency of labelling policies. Based on a survey conducted in 2021 ( $n = 1\,427$ ), this article describes FAPs consumers' preferences for labelled FAPs. To do so, each consumer was asked to rank their favourite scheme from a pool of nine hypothetical labels related to specific FAPs characteristics. Then, we used a mixed multinomial logit model (MMLM) with marginal effects to analyse consumption profiles. Our results show heterogeneity among consumers regarding labelled FAPs. Overall, labels that ensure intrinsic qualities remain preferred to labels linked to ethical considerations. Moreover, while preferences for domestic productions are prominent, there is a very wide gap with real purchasing behaviour. Furthermore, this study shows that personal motivation, age, gender, knowledge or place of residence influence the preferences expressed. Labels are a policy tool used to reform the FAPs value chain. Nevertheless, they are struggling to achieve their objectives. Our results can be useful for better targeting the messages to be implemented, improving the efficiency of labelling policies and helping consumers to make informed and sustainable choices.

**Keywords :** Multiple choices, Labelling schemes, Consumers' preferences, Seafood, France, Multinomial mixed logit model



## 1. Introduction

Our food systems are facing multiple challenges that question their ability to provide healthy and sustainable food for a growing world population. As a result, significant efforts are underway to reform our modes of production and consumption of food products. While public policies have initially focused on the productive sphere, consumers are now recognised as a driving force that is able to transform our food value chains (Brunin et al., 2022). Over the last few years, the concept of “sustainable consumption” has become widely disseminated (Santeramo et al., 2018). It lies at the heart of the United Nation’s sustainable development programme via goal 12: “Ensure sustainable consumption and production patterns”<sup>1</sup>. At the EU scale, the “From Farm to Fork” strategy also promotes this policy goal. In order to guide consumers towards sustainable consumption choices, policymakers promote, among other things, new information tools such as labelling schemes. To make our food systems more sustainable, it is therefore essential to understand how consumers position themselves concerning these labelling initiatives.

These labels can take varied forms, as shown by the definition adopted by the Food and Agriculture Organization (FAO):” A food label is any tag, brand, mark, pictorial or other descriptive matter, written, printed, stencilled, marked, embossed or impressed on, or attached to, a container of food or food product”. Labels are currently highly developed in the food market (Caswell & Mojduszka, 1996). A study launched in 2013 by the EU Commission already counted over 900 food labels<sup>2</sup> in the EU, where producers are key actors in this expansion. In a globalized food market, labels are a means of differentiating products from competition. Unfortunately, this may lead to dubious labels with varying expectations and constraints, allowing for artificial changes in the perceived value. Consequently, this potential information asymmetry could lead to increasing distrust among consumers.

The global expression "label jungle" (Isabel Sonntag et al., 2023) captures the negative sides of this label expansion. This includes a loss of meaning of labels, growing confusion, overlap risks and even difficult trade-off situations for consumers. Indeed, labels can cover a wide range of product attributes (Gracia & De-Magistris, 2016) through different certification methods, criteria, etc. From a theoretical point of view, labels transform credence attributes (Nelson, 1970; Darby & Karni, 1973) into search attributes for consumers (Roe & Sheldon, 2007) and reduce asymmetric information between producers and consumers. Credence attributes are attributes (Lancaster, 1966) for which the marginal cost of seeking information exceeds the associated marginal benefit, both before and after consumption. In other words, their presence in the product is difficult for the consumer to assess, even after consumption. Labels, therefore, remain the only source of information that allows consumers to consider this dimension in their consumption preferences. However, labels typically focus on a single product attribute, such as environmental impact, health or animal welfare. When making consumption choices, consumers will thus encounter some trade-off situations

The FAPs (Fisheries and Aquaculture Products) market is a highly “label-dependent” market (Washington, 2008; Fonner & Sylvia, 2015). This dependence is explained by the presence of credence attributes in FAPs (Sogn-Grundvag et al., 2014), notably valued by consumers in the context of responsible consumption. Today, different

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<sup>1</sup> More information on this sustainable development goal can be found at <https://sdgs.un.org/goals/goal12>

<sup>2</sup> Survey IPSOS: Consumer market Study on the functioning of voluntary food labelling schemes for consumers in the European Union EAHC/ FWC/2012 86 04

59 labels coexist in this market to inform consumers about these attributes. It includes labels related to FAPs  
60 production methods, FAPs quality, FAPs origin, FAPs welfare, etc. Interestingly, trade-off consuming situations  
61 described earlier are thus prevalent (Isabel Sonntag et al., 2023).

62 While the sustainability of the FAPs sector is a major challenge (Tigchelaar et al., 2022), it is essential to  
63 understand how consumers position themselves regarding these multiple labelling schemes and possible trade-off  
64 situations. This is of interest to public decision-makers or even to the industry. Although the existing literature  
65 often focuses on understanding the preferences for a single label (Johnston et al., 2001; Brécard et al., 2009;  
66 Salladarré et al., 2010; Uchida et al., 2014; Weitzman & Bailey, 2018), or a limited number of labels (Brécard et  
67 al., 2012; Banovic et al., 2019), to our knowledge, available research has rarely investigated these expressed  
68 preferences for a large pool of alternatives. However, Fonner and Sylvia (2015), Gracia and De-Magistris (2016),  
69 and Maesano et al. (2019) pointed out that there is a need to understand better how consumers interact with these  
70 multiple choices inside the food market. This article seeks to fill this gap. It proposes to refine the knowledge on  
71 consumers' preferences for labelled FAPs *via* a choice situation towards ten hypothetical alternatives (see Section  
72 2). This approach tries to bring consumers closer to their current trade-off situations. The aim of this article is to:

- 73 • Study the most preferred labelling schemes by FAPs consumers in a framework close to real choice  
74 by allowing preferences to vary across ten alternatives ;
- 75 • Study the consumption profiles behind these expressed preferences ;
- 76 • Propose public policy recommendations regarding FAPs to orient the sector towards greater  
77 sustainability.

78 Our case study will be the French FAPs market, a market particularly dependent on labelling schemes  
79 (FranceAgrimer, 2019). Indeed, labels have quickly expanded in the last decades (Organic, Protected Geographical  
80 Indication, *Label Rouge*, etc.) and cover a wide range of FAPs' attributes (production methods, origin, quality,  
81 animal welfare, etc.). The different features of this market may explain this noteworthy development. First,  
82 regarding consumption habits, it seems French consumers purchase more and more processed FAPs  
83 (FranceAgriMer, 2021a). These products are described as low quality (Ahern et al., 2021), whose consumption  
84 can impact consumers' health. This may therefore motivate a demand for information regarding FAP's quality,  
85 health or even nutritional aspects. Second, a large share of domestic catches and supplies originate from production  
86 methods with high environmental impacts (trawling, intensive aquaculture, etc.) (STECF, 2020). This may explain  
87 the emergence of an ethical demand and associated ecolabels in the French FAPs market (Lucas et al., 2021).  
88 Furthermore, this market is highly dependent on imports. In 2018, France imported 2,078 thousand tons of FAPs  
89 (FranceAgriMer, 2021b), i.e., more than 2/3 of French consumption. While French consumers are increasingly  
90 concerned about the origin of their food, traceability in the FAPs sector is highly problematic (Crona et al., 2016;  
91 Lewis & Boyle, 2017), leading to the development of geographical origin labels. Finally, the "Fair Trade" trend is  
92 growing in importance for food demand (Rousseau, 2015; Clark et al., 2017). As a credence attribute, consumers  
93 would value further information, creating a possible demand for related labels in the FAPs sector.

94 The paper is structured as follows. Section 2 will introduce the database and the methodology used to analyse  
95 the stated preferences. Section 3 will present results regarding the preferences of French consumers for labelled

96 FAPs. Section 4 will discuss our results, provide recommendations regarding public policies and suggest further  
 97 research.

## 98 2. Materials and methods

### 99 2.1 Data

100 The database used in this article stems from a FAPs consumer survey carried out between April and May  
 101 2021 on the French market (noted COPECO-Covid-Norway database) in the framework of two research  
 102 programmes: a French research programme, COPECO<sup>3</sup>, and a Norwegian research programme, COVID-  
 103 NORWAY<sup>4</sup>. This survey had two objectives: 1) to measure the impact of the COVID crisis on FAP consumption  
 104 and 2) to study the preferences of French consumers concerning labelled FAPs. The survey was performed online  
 105 and administered by KantarWorldPanel to 1,504 FAPs consumers. The quotas method was applied to obtain a  
 106 representative sample of the French population regarding age and gender. After processing and analysing  
 107 responses, we selected a sample of 1,427 individuals. Table 1 presents the socio-demographic characteristics of  
 108 this sample.

109 **Table 1.** Characteristics of the sample – 1,427 obs (Source: COPECO-Covid-Norway database - 2021)

Gender (%)	Sample		France <sup>1</sup>	
	Male	Female	Male	Female
	48.8	51.2	48.3	51.7
<b>Socio-Professional Category (%)</b>				
Farmers		0.2		0.8
Artisans, retailers and business owners		2.9		3.5
Managers and higher intellectual professions		11.6		9.5
Intermediate professions		13.9		14.1
Employees		26.9		16.1
Workers		4.6		12.1
Retirees		28.3		26.9
Other non-working people		11.6		17.0
<b>Age categories (%)</b>				
[18-34]		23.9		22.6
[35-49]		25.1		24.9
[50-64]		25.8		25.2
[65+]		25.2		27.2

<sup>1</sup>Source: INSEE, data from 2021

Note: As we included only FAPs consumers, the under-representation of the socio-professional category “Farmers and Workers” can be explained by the negative correlation between the level of education and FAPs consumption (Hicks et al., 2008).

110 This survey is broken down into five sections for a total of 57 questions: 1) food consumption habits  
 111 (including during the COVID crisis); 2) FAPs consumption and purchasing behaviour; 3) consumer preferences  
 112 for FAPs; 4) motivations, knowledge and implications of FAP consumers; and, lastly, 5) socio-demographic  
 113 characteristics. In this article, we focus on questions relating to consumption habits (Section 2), preferences

<sup>3</sup>For more information on this research programme: [https://www.umr-amure.fr/projets-scientifiques/projet\\_copeco/](https://www.umr-amure.fr/projets-scientifiques/projet_copeco/)

<sup>4</sup> For more information on this research programme: <https://www.forskningsradet.no/en/>

114 expressed regarding labelled FAPs (section 3), Schwartz values (Schwartz, 1992; Schwartz, 2012) (Section 4) and  
 115 the socio-demographic section (Section 5).

116 To study consumers' preferences for labelled FAPs, we asked the respondents to rank their three favourite  
 117 labels from a choice of ten hypothetical alternatives (section 3). Here, we decided to focus solely on the first  
 118 expressed preference, as it represents the label consumers prioritise. Moreover, we have deliberately chosen to  
 119 work on hypothetical schemes, not existing ones. Therefore, each label in our survey was presented to consumers  
 120 by a specific definition, not by an existing brand. The purpose was to avoid "anchoring bias" related to brand  
 121 recognition. This allows us to study preferences for the attribute labelled rather than a preference for the label  
 122 itself. Indeed, according to the results of the FranceAgriMer survey (2019), it seems that this anchoring bias is  
 123 apparent in the French FAP market. The selected labels may already exist on the French FAPs market (ecolabels,  
 124 origin labels, animal-welfare labels, nutrition claims and quality labels) or may respond to global food market  
 125 trends (the Fair-Trade label is not currently available for FAPs, and the health claim remains fictional<sup>5</sup>). This  
 126 choice brings consumers closer to a real trade-off situation (*ceteris paribus*). These labels and their definitions are

Labels	Definition
Animal Welfare	Identify FAPs that respect animal welfare throughout the production process
Ecolabel	Identify FAPs that respect the environment and resources
Fair-Trade	Identify FAPs that guarantee a minimum income for producers and good working conditions
Local origin	Identify FAPs produced in your region
France origin	Identify FAPs produced in France (except your region)
EU origin	Identify FAPs from European fisheries and aquaculture (except France)
Health	Identify FAPs that do not contain toxic substances
Nutrition	Identify the nutritional content of FAPs (less salt, rich in omega 3, etc.)
Quality	Identify FAPs with a higher quality level than other products in the category

127 presented in Table 2.

128 **Table 2.** Definition of the labels used (Source: COPECO-Covid-Norway survey - 2021)

129

## 130 2.2 Method

### 131 2.2.1 Variance and Mean Comparison Tests

132 We wanted to test whether the preferences declared for one label are statistically lower or higher than those  
 133 declared for another. Two statistical tests were performed. First, an F-test to measure the equality of variances  
 134 between the means. If the equality of variances of the means is not rejected, a Student t-test is used. Otherwise,  
 135 the Welch t-test should provide more accurate results (Overall et al., 1995).

<sup>5</sup> Despite their absence in the FAPs market, more and more initiatives are being developed in the food industry concerning health information.

136 
$$t_{Student} = \frac{\bar{X}_1 - \bar{X}_2}{s_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \text{ with } s_p = \sqrt{\frac{(n_1-1)s_{X_1}^2 + (n_2-1)s_{X_2}^2}{n_1+n_2-2}} \quad (1)$$

137 
$$t_{Welch} = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{s_1^2}{N_1} + \frac{s_2^2}{N_2}}} \text{ with } s_{\bar{X}_1} = \frac{s_1}{\sqrt{n_1}} \text{ and } s_{\bar{X}_2} = \frac{s_2}{\sqrt{n_2}} \quad (2)$$

138 With  $\bar{X}_n$  the mean to compare,  $s_n$  the sample means' standard deviations and  $n_n$  the sample sizes.

139 For these two tests, if the null hypothesis (H0) is not rejected, we should conclude to an equality of means. If not,  
140 the means are statistically different.

141 *2.2.2 Mixed Multinomial Logit (MMNL) Model*

142 The model used is based on Lancaster's theory (Lancaster, 1966) and the random utility theory  
143 (McFadden, 1974). Consumers are assumed to compare alternatives and choose the alternative with the highest  
144 level of utility. The utility  $U$  of alternative  $a$  obtained in a choice situation  $t$  by consumers  $i$  is therefore given by:

145 
$$U_{ait} = V_{ait} + \varepsilon_{ait} \quad (3)$$

146 We used a Mixed Multinomial Logit (MMNL) model to analyse consumer preferences for labelled FAPs.  
147 As McFadden and Train (2000) discussed, this model efficiently represents an economic discrete choice. The  
148 MMNL is an extension of the Multinomial Logit Model (MLM). Compared to a conventional MLM, the MMNL  
149 model relaxes the independence of the irrelevant alternatives assumption (IAA) (McFadden & Train, 2000). The  
150 MMNL fits with choice data in which individuals make choices across unordered options and includes attributes  
151 that vary between individuals (such as income, age, etc.). It uses random coefficients to model the correlation of  
152 choices across alternatives. The mixed logit models are commonly used in choice literature (Bhat & Gossen, 2004),  
153 including for labelling schemes (Bonnet & Simioni, 2001; Gracia & De Magistris, 2016).

154 In our case, consumers select the label with the highest perceived utility. For the mixed logit model, a  
155 standard representation of the utility that individual  $i$  receives from alternatives  $a$ ,  $a = 1, 2, \dots, 10$  denoted by  $U_{ia}$   
156 is:

157 
$$U_{ia} = x_{ia}\beta_i + \omega_{ia}\alpha + z_i\delta_a + \epsilon_{ia} \quad (4)$$

158  $\beta_i$  are random coefficients that vary across individuals in our sample, and  $x_{ia}$  is a vector of case-specific variables.  
159  $\alpha$  is a fixed coefficient from  $\omega_{ia}$  a vector of alternative-specific variables.  $\delta_a$  are fixed alternative-specific  
160 coefficients, and  $z_i$  is a vector of case-specific variables.  $\epsilon_{ia}$  is a random term. Our model does not include  
161 alternative-specific variables. The probability that case  $i$  chooses alternative  $a$  regarding the random parameter  $\beta_i$   
162 is:

163 
$$Y = P_{ia}(\beta) = \frac{e^{x_{ia}\beta_i + \omega_{ia}\alpha + z_i\delta_a}}{\sum_{a=1}^A e^{x_{ia}\beta_i + \omega_{ia}\alpha + z_i\delta_a}} \quad (5)$$

164 We end up with a variable to be explained  $Y = 1$  if the individual has ranked the label concerned at first in his/her  
165 preference. Otherwise,  $Y = 0$ .

### 2.2.3 Explanatory variables included in our model

The existing literature focusing on FAPs consumers' preferences for labelling schemes (Wessells et al., 1999; Johnston et al., 2001; Jaffry et al., 2004; Brécard et al., 2012; Salladarré et al., 2010; Weitzman & Bailey, 2018; Zander & Feucht, 2018; Maesano et al., 2019; Maesano et al., 2020; Zander et al., 2022) was consulted to identify variables to be included in our model. However, some explanatory variables used can differ among articles, and several models could have been estimated in our framework. To compare these different models, measure their performances, and select the most pertinent regarding our dataset and research objectives, we referred to the Akaike criteria (AIC) and Schwarz's Bayesian information criteria (BIC).

Finally, eleven explanatory variables (detailed hereafter) were selected. We included sociodemographic variables related to age (grouped into four age classes, with four modalities) [*18-34; 35-49; 50-64; over 65 years old*], gender (with two modalities) [*female, male*], department of residence [*coastal department*] and the presence of children in the household [*children*]. These variables often influence the stated preferences for labelled FAPs (Brécard et al., 2009; Salladarré et al., 2010; Bronnmann et al., 2021; Maesano et al., 2019; Zander et al., 2022).

Since price is an important factor of FAPs consumption (Claret et al., 2012; Menozzi et al., 2023), and the price premium associated with labelled products is often perceived as a barrier to their consumption (Roheim et al., 2011), we incorporated a variable related to consumers' price importance when buying FAPs [*price*]. Our consumers were asked to answer the question: "Would you say that price is your first choice criterion when buying fish at home?" by positioning themselves on a Likert scale from 0 (Totally disagree) to 10 (Totally agree).

As consumers' motivations are a significant predictor of behaviour regarding ethical consumption (Brécard et al., 2012; Reinstein & Song, 2012; Zander & Feucht, 2018), we integrated three motivation variables into our model. These variables were constructed by factorisation. The first factorial analysis was performed on Schwartz's values-related questions (Schwartz, 1992; Schwartz, 2012) and identified two motivational variables: [*Universalism*] and [*Tradition*]. A series of eight questions (see Table 3) were presented to consumers, who were then asked to indicate their level of agreement with each statement on a Likert scale from 0 (Not at all like me) to 7 (Totally like me). Two factors have been retained (Table 3). The first factor encompasses three statements (*Take care of nature; Combat threats against nature; Protect the environment*) and measures individuals' degree of universalism, as defined by Schwartz (1992), hereafter referred to as "*Universalism*". The second factor stems from the same factorisation and groups three other statements (*Uphold beliefs in traditional values, Follow traditions, Value traditional practices*). It reflects the attachment to the "*Tradition*" motivation defined by Schwartz (1992). We performed a second factorial analysis on consumer preferences concerning FAPs attributes (Table 3), which allowed us to identify one other motivation variable [*Origin*]. The factor identifies consumers' interest in the geographical origin of the product they consume. It encompasses three preferences linked to the origin of FAPs (*fish of local origin; fish of France origin; fish of EU origin*). We identify it as "*Origin*" motivation in our model.

Our model also includes a variable related to consumers' assessment of the ability of individual consumers to influence environmental issues, measured by Perceived Consumer Effectiveness (PCE). Indeed, according to Verbeke et al. (2007), the PCE influences consumers' choices regarding green consumption. We performed a third factorial analysis on questions related to consumers' perception of the consequences of their consumption choices on the marine environment. Consumers had to position themselves regarding five statements (see Table 4) on a



205 Likert scale from 0 (I totally disagree) to 7 (I totally agree). We named the factor identified as [*PCE*]. Table 4  
206 presents the factorisation results.

207 Finally, subjective [*Subj. Knowl*] and objective [*Obj. Knowl*] knowledge variables were considered. As  
208 Pieniak et al. (2013), Almeida et al. (2015), and Menozzi et al. (2023) discussed, consumer knowledge is an  
209 essential factor in consumer decision-making, notably regarding FAPs. Our subjective knowledge variable is  
210 constructed on an average score obtained regarding four statements, following Zander and Feucht's (2018) article.  
211 Consumers were asked to position themselves on a Likert scale from 0 (Totally disagree) to 7 (Totally agree). Our  
212 objective knowledge variable is based on the number of correct answers obtained from four "Yes/No" statements.  
213 All these statements are detailed in Table 6.

214 Table 7 summarises all the variables included in our model with their mean values.

**Table 3.** Factoring method and associated test results (Source: COPECO-Covid-Norway survey - 2021)

Question used	Most significant variables	Constructed variables	Cronbac's alpha statistic	Barlett test	KMO
<b>Factor analysis #1</b>					
"I kike ..."					
(1) to take care of nature					
(2) to fight against threats to nature	+(1) (2) (3)	<i>Universalism</i>	0.89	p-value = 0.00	0.821
(3) to protect the environment					
(4) to help people I care about					
(5) to take care of people close to me					
(6) to maintain traditional beliefs and values	+(6) (7) (8)	<i>Tradition</i>	0.85		
(7) to follow traditions					
(8) to value traditional practices					
<b>Factor analysis #2</b>					
"I prefer ..."					
(1) fresh fish					
(2) wild fish					
(3) local fish					
(4) environmentally friendly production	+(3) (5) (8)	<i>Origin</i>	0.83	p-value = 0.00	0.88
(5) French fish					
(6) raised fish					
(7) fish that do not present a health risk					
(8) European fish					

Note: To determine the internal consistency of items, we used Cronbach's alpha statistic. A score of 0.7 is an acceptably reliable coefficient, but lower thresholds are sometimes used in the literature (see Nunnaly. C, 1978). Factors with an eigenvalue over one are retained. The Bartlett test is Bartlett's test of sphericity, and KMO is the Kaiser-Meyer-Olkin measure.

Number of Observations: 1,427.

**Table 4.** Factoring method and associated test results (Source: COPECO-Covid-Norway survey - 2021)

Question used	Most significant variables	Constructed variables	Cronbac's alpha statistic	Barlett test	KMO
<b>Factor analysis #3</b>					
(1) By buying sustainable FAPs, I can help limit the environmental impact of fishing and aquaculture	+ (1) (2) (5)	<i>PCE</i>	0.65	p-value = 0.00	0.72
(2) Whenever I can, I choose sustainable FAPs					
(3) I can do nothing more about the depletion of fish stocks	- (3) (4)				
(4) My FAPs choices do not influence the sustainability of fisheries					
(5) Labels are an effective information tool for the consumer					

Note: To determine the internal consistency of items, we used Cronbach's alpha statistic. A score of 0.7 is an acceptably reliable coefficient, but lower thresholds are sometimes used in the literature (see Nunnaly. C, 1978). Factors with an eigenvalue over one are retained. The Bartlett test is Bartlett's test of sphericity, and KMO is the Kaiser-Meyer-Olkin measure.

Number of Observations: 1,427.

215

### 3. Results

216

#### 3.1. The most valued labels on the French market

217

Figure 1 gives the first picture of the relative importance of French consumers' preferences regarding labelled FAPs in a trade-off situation. Before interpreting this chart, we performed the F-test and T-test. These tests revealed no statistical difference between the preferences expressed for the quality labels and the "France Origin" labels. In addition, they revealed no statistical difference between the preferences expressed for the ecolabels, the health claims and the "Local Origin" labels. Otherwise, all the other preferences were statistically differentiated. Table 8 summarises the results of all the tests performed.

223

According to these results, the two most valued labels are the quality labels, with 17.80 % of the sample ranking it, and the "France Origin" labels, with 17.17 % of the stated preferences. Then comes a group composed of three labels: the ecolabels (11.35 %), the health allegations (11.14 %), and the "Local Origin" labels (10.72 %), followed by the animal welfare schemes (9.39 %). Finally, three schemes are statistically less preferred by consumers: the Fair-Trade labels, the "Nutrition" claims, and the "EU origin" labels ranked by 6.38 %, 5.26 % and 2.52 % of consumers. Interestingly, 8.27 % of our consumers prefer FAPs without labels. Thus, in a multiple-choice situation, French consumers' preferences for labelled FAPs products are highly heterogeneous. However, this heterogeneity is not uniformly distributed, and some initiatives remain more valued by consumers.

224

225

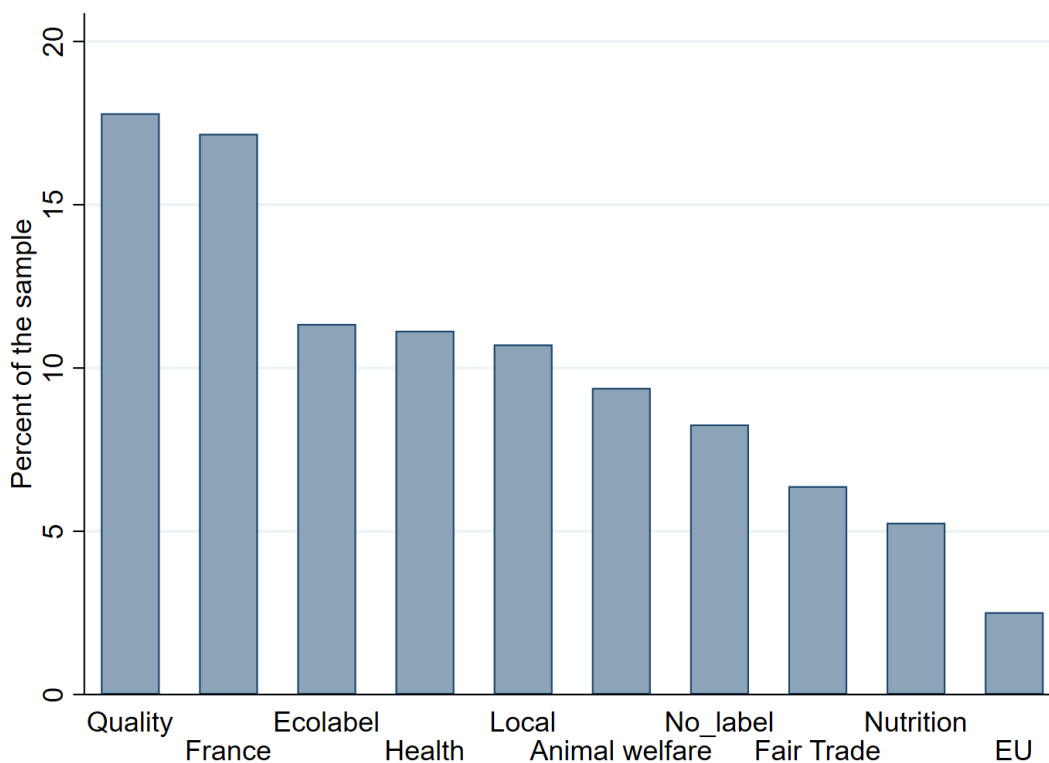
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**Figure 1.** Expressed preferences of French consumers according to the ten alternatives tested - 1 427 obs. (Source: COPECO- Covid-Norway database – 2021)

233

234 **3.2. The results of the MMNL**

235 Our Mixed Multinomial Logit Model was estimated using STATA.17. Our base outcome is the “No label”  
236 alternative. The coefficients presented in the remainder of the article are the marginal effects. They allow a more  
237 accurate interpretation of the results compared to the standard coefficient by providing information about the  
238 change in predicted probabilities due to a change in a particular predictor (Wulff, 2015). The results of the MMNL  
239 are displayed in two separate tables (Tables 5 and 9), although all the preferences were conjointly estimated in our  
240 model.

241 Table 5 discusses results for six preferences: “France origin”, “Local origin”, Ecolabel, Animal Welfare,  
242 Health allegation and the “No Label” alternative. As French consumers do not highly value them (Figure 1), the  
243 results for nutrition claims, “EU origin”, and Fair-Trade labels will not be discussed but are presented in Table 9.  
244 As the notion of quality is highly heterogeneous and each consumer may have his or her own perception of quality,  
245 we chose not to discuss the preferences for the quality label. Indeed, interpreting this preference remains highly  
246 complex without a better understanding of these different quality expectations. Moreover, consumers can use this  
247 label as a “safe-haven” option. Results for this label are also presented in Table 9.

248 *3.2.1. Motivations as drivers of preferences*

249 Table 5 highlights the strong link between consumers’ motivations and stated preferences. Universalism  
250 influences the preferences expressed for different schemes. Individuals with a high degree of universalism tend to  
251 prefer ecolabels and animal welfare labels. However, marginal effects show that universalism is more strongly  
252 associated with ecolabels preferences (+6.5 %) than animal welfare (+2.7 %). Conversely, the opposite correlation  
253 is observed for the “France origin” scheme (-3.2%) and the “No label” alternative (-1.8 %). According to our  
254 results, attachment to traditional values also drives consumers’ preferences. The positive correlation between  
255 “tradition” motivation and the “France origin” label (+3.2 %) seems consistent with the underlying idea of cultural  
256 attachment. Nevertheless, finding a negative effect with the “Local origin” label (-1.9 %) is quite surprising. The  
257 results show a stronger negative correlation with stated ecolabel preferences (-2.7 %). Finally, and logically, the  
258 “origin” motivation increases the probability of choosing “France origin” (+8.6 %) and “Local origin” labels (+5.4  
259 %). On the contrary, this motivation reduces the preferences expressed for ecolabels (-3.1 %) and the “No label”  
260 alternatives (-2.1 %).

**Table 5.** Mixed multinomial logit model marginal effects (Source: COPECO-Covid-Norway database - 2021)

	France <sup>a</sup>	Ecolabel <sup>a</sup>	Health <sup>a</sup>	Local <sup>a</sup>	Animal Welfare <sup>a</sup>	No Label
Nb. Individ. (%)	245 (17.17)	162 (11.35)	159 (11.14)	153 (10.72)	134 (9.39)	118 (8.27)
<b>Age (Ref [18–34] years old)</b>						
[35–49]	.012 (.028)	-.052* (.030)	.057* (.021)	-.011 (.022)	.008 (.025)	.020 (.019)
[50–64]	.016 (.028)	-.092*** (.027)	.077*** (.022)	.023 (.024)	-.013 (.023)	.004 (.017)
[65+]	.061* (.032)	-.114*** (.027)	.081*** (.026)	.026 (.026)	-.041* (.022)	.012 (.020)
<b>Female</b>	-.006 (.021)	-.020 (.018)	.050*** (.018)	.001 (.017)	.039** (.016)	-.021 (.014)
<b>Coastal Department</b>	-.055*** (.021)	-.046*** (.018)	-.002 (.017)	.069*** (.016)	-.002 (.016)	.016 (.013)
<b>Children</b>	.004 (.023)	-.026 (.018)	.029* (.019)	.008 (.019)	-.026 (.017)	-.033** (.015)
<b>Price</b>	-.007 (.004)	.001 (.003)	-.001 (.003)	.002 (.003)	-.003 (.003)	.007** (.003)
<b>Motivations</b>						
Universalism	-.032** (.014)	.065*** (.012)	.007 (.011)	-.012 (.011)	.027** (.011)	-.018** (.008)
Tradition	.032** (.013)	-.027*** (.009)	-.002 (.010)	-.019* (.010)	-.001 (.009)	-.011 (.008)
Origin	.086*** (.016)	-.031*** (.010)	-.009 (.012)	.054*** (.013)	-.011 (.010)	-.021*** (.008)
<b>PCE</b>	-.009 (.015)	.033*** (.012)	.021 (.013)	-.013 (.012)	-.004 (.011)	-.077*** (.009)
<b>Subj. Knowl</b>	-.008 (.009)	.003 (.007)	-.016** (.008)	.008 (.008)	-.009 (.007)	-.003 (.006)
<b>Obj. Knowl</b>	.012 (.009)	-.010 (.007)	.003 (.007)	.008 (.007)	.004 (.007)	-.022*** (.006)

<sup>a</sup> Base alternative: No Label

Significance threshold: \*\*\* 0.01; \*\* 0.05; \*0.1. In parentheses: Standard deviation

Number of observations = 1,427

### 3.2.2. *Influence of socio-demographic variables*

Behind motivations, socio-demographic characteristics also influence stated preferences in our model. We first find an age effect. We note, for example, that compared to 18 to 34-year-olds, other individuals in our sample are less likely to prefer ecolabels. We also see *via* our marginal effects that the older the consumers get, the more the preferences for these labels decrease. Indeed, compared to 18-34-year-olds, the probability for consumers between 35 and 49 years old to choose ecolabel decreased by 5.2%, while this probability decreased by -11.4 % for those over 65. The opposite outcome is apparent for health allegations. The older consumers get, the more likely they prefer these alternatives. By comparison, the probability of choosing this label increased by 8.1 % for individuals over 65 and by 5.7 % for people between 35 and 49 years old. The change in probability for people between 50 and 64 years old is 7.7 %. Finally, if we look specifically at consumers over 65, they express a specific interest in the "France origin" labels (+6.1 %) and are less interested in the animal welfare ones (-4.1 %).

A gender effect also appears in Table 5. Women seem to value health allegations and animal welfare labels more than men. This effect is more pronounced for health claims, with a marginal effect of 5 %, higher than for animal welfare schemes (+3.9 %). Interestingly, the presence of children in the household influences only the preferences for the "health claim" (+2.9 %) and the "No label" option (-3.3 %). Our results also reveal a coastal effect. Indeed, living close to the coast positively influences the preference for a "Local origin" label (+6.9 %). Conversely, it reduces preferences for ecolabels and "France origin" labels. This effect is more significant for the "France origin" label (-5.5 %) than for the ecolabel (-4.6 %).

Finally, variables linked to consumers' knowledge and PCE marginally influence the stated preferences. Indeed, objective knowledge influences only the expressed preferences for the "No label" alternative (-2.2 %). Although we find an effect of subjective knowledge on preferences regarding health claims (-1.6 %), no other relationship is highlighted in our results. The PCE variable influences only the preferences for ecolabels (+3.3 %) and the "No label" (-7.7 %). Attention paid to price during FAPs purchasing acts influences only the preferences for the "No label" alternative (+0.7 %).

## 4. Discussion

As outlined above, labels are highly developed in the French FAPs sector. However, until now, we had limited information on how consumers' preferences for these schemes were structured. In limited-choice studies, each label under consideration seems to be essential without considering the possible interactions with other initiatives. Indeed, although the literature on consumer preferences is abundant (Wessells et al., 1999; Jaffry et al., 2004; Pieniak et al., 2010; Claret et al., 2012; Brécard et al., 2012; Uchida et al., 2014; Weitzman & Bailey, 2018; Zander & Feucht, 2018; Zander et al., 2022), it was difficult to estimate the relative place of specific preference in the global demand. However, as Lucas et al. (2019) discussed, "*it is essential to study consumer preferences in a multiple-label framework to determine realistic preferences*". Our multiple-choice approach fills this gap. It better captures the trade-offs encountered during consumer purchasing acts and better reveals relative preferences. It allows the identification of the labels most valued within the market and those that are least researched. We even have information on the share of consumers not interested in labelled FAPs. Finally, this approach makes comparing the different consumption profiles corresponding to the expressed preferences easier. These profiles are essential for policymakers and industry to adapt their labelling strategies. More generally, this approach

298 provides genuine contributions compared to constrained choice approaches, *ceteris paribus*. This conclusion is in  
299 line with Fok et al. (2012), Nguyen et al. (2015) and Wulff (2015) on the contribution of multiple-choice methods.

300 Our results underline the substantial heterogeneity of French consumer preferences relating to FAPs labelling  
301 issues. This heterogeneity was expected with respect to existing works (Johnston et al., 2001; Teratanavat &  
302 Hooker, 2006; Hasselbach & Roosen, 2015; Bronnmann et al., 2021). Nevertheless, it is now possible to identify  
303 how this heterogeneity is structured. As in other food markets, Figure 1 confirms the relative importance of  
304 domestic production for French FAP consumers, where 17.17 % preferred the “France origin” label, and 11.72 %  
305 the “Local origin” label. These results are consistent with the existing literature (Uchida et al., 2014; Feldmann &  
306 Hamm, 2015; Banovic et al., 2019). Conversely, the “EU origin” label is often overlooked when consumers have  
307 the opportunity to select “domestic” alternatives. This result underlines the preference for the closest productions,  
308 as demonstrated by Uchida et al. (2014) and Picha et al. (2017), when consumers have the choice. However, this  
309 result could have been modified with a different geographical scope (for example, “EU origin” *versus* “Worldwide  
310 origin”). Regarding the policy side, promoting French FAPs represents a promising lever with various advantages.  
311 First, promoting national FAPs ensures economic support for the national value chain in response to this weakened  
312 sector (Brexit, the energy crisis, closure of fishing areas, etc). Second, it also addresses food sovereignty issues, a  
313 debate that has been back on the agenda since the COVID crisis. Third, promoting domestic production is relevant  
314 from an environmental perspective. On the one hand, consumers are provided with resources managed under the  
315 Common Fisheries Policy<sup>6</sup> (CFP). On the other hand, it can reduce fishing pressure on certain exploited stocks  
316 and minimise emissions caused by transporting these imported species.

317 Several works have discussed growing ethical demand in the food sector (Grunert et al., 2014; Bratanova et  
318 al., 2015; Tomsa et al., 2021). However, Isabel Sonntag et al. (2023) show that consumers’ egoistic interests are  
319 stronger than altruistic ones in a trade-off situation. Our results tend to confirm this finding. Indeed, in a multiple-  
320 choice situation, quality and “France origin” labels are significantly preferred to ethical labels (ecolabel, animal  
321 welfare, fair-trade). We also find that health allegations are significantly more researched than animal welfare and  
322 Fair-Trade labels. In summary, our results show that ethical preferences remain secondary compared to “self-  
323 oriented” ones (related to Quality, France origin labels or Health allegations) when it comes to labelled FAPs  
324 consumption.

325 The third position of ecolabels in the stated preferences leads to discussion. Indeed, when we consider the  
326 numerous literature that focuses solely on ecolabels (Wessells et al., 1999; Jaffry et al., 2004; Brécard et al., 2009;  
327 Brécard et al., 2012; Salladarré et al., 2010; Lucas et al., 2018; Banovic et al., 2019; Lucas et al., 2021), we tend  
328 to overestimate the importance of this demand in the FAPs sector. However, as discussed, consumers prefer other  
329 labels such as quality or “France origin”. Ecolabels are, however, part of national and European strategies for  
330 resource conservation. Fostering this green demand is essential to achieve this objective. In this line, several levers  
331 are discussed in the literature. According to Giacomarra et al. (2021), consumer information on ecolabels is  
332 essential, particularly in this global context of mistrust. In our survey, 40% of individuals still doubt that buying

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<sup>6</sup> The Common Fisheries Policy is a European sector-specific policy. Formulated in 1983, one of its main functions is the preservation of exploited stocks.



333 sustainable FAPs can help to protect the ocean<sup>7</sup>. This perception is even more pronounced among older generations.  
334 Considering the influence of behavioural insights for reinforcing “*existing instruments and help achieve policy*  
335 *objectives*” could be relevant (Grolleau et al., 2016). These behavioural-based instruments can address some of  
336 the limitations of approaches based on the market.

337 These suggestions for policy improvement are all the more important to consider as our results suggest that  
338 green demand could grow in the future. Indeed, our model highlights that the young generation particularly values  
339 ecolabels. Moreover, this generation is deeply committed to the responsible consumption trend (Ivanova et al.,  
340 2019). We can thus assume that green demand will increase in the coming years, confirming an ongoing trend in  
341 the FAPs market (Lucas et al., 2021; European Commission 2016, 2018, 2021). The same assumption can also be  
342 made regarding the animal welfare label. Currently, this scheme is valued by 9.39 % of individuals in our sample,  
343 ranking it the fifth most popular label. However, our results show that older consumers are less interested in this  
344 label. More generally, these two results support the idea of a growing “ethical demand”, consistent with the  
345 findings of Zander & Feucht (2018) and Maesano et al. (2020) findings.

346 Nevertheless, these results should be considered carefully as we work on stated preferences. Indeed, there is  
347 often a behavioural gap (Young et al., 2010) between expressed preferences and real purchasing acts. Firstly,  
348 regarding preferences for domestic production. As discussed before, French FAPs consumption greatly depends  
349 on importation. For an annual consumption of 33.5 kg FAPs per person, six species (tuna, salmon, cod, mussels,  
350 Alaska pollock and shrimps) represent 47% of consumption, and these species are mostly imported  
351 (FranceAgriMer, 2021a). Recent consumption even tends to show an increase in the consumption of imported  
352 salmon and shrimp. Although French consumers declare preferences for domestic FAPs, their daily consumption  
353 shows a very different reality. Consuming French products, therefore, implies a profound change in their eating  
354 habits. However, this change seems challenging, especially over the short term. Long-term policies must be  
355 implemented to initiate structural changes, notably by educating young consumers. Secondly, this behavioural gap  
356 may also challenge the apparent growing ethical demand. This phenomenon is particularly well-known regarding  
357 sustainable goods (Padel & Foster, 2005; Lombardot & Mugel, 2017). Indeed, when discussing sustainable  
358 consumption, consumers often declare that they pay attention to it (to conform to “societal expectations”).  
359 Nevertheless, real purchasing behaviours are often not consistent with this positioning. Again, there are several  
360 ways to limit this behavioural gap, including informing and educating consumers.

361 For the first time, we obtained direct information on consumers who do not value labelled FAPs. These  
362 profiles are often poorly studied in the literature. As expected, price can be a barrier to preferences for labelling  
363 schemes. We show that price-conscious consumers tend to prefer unlabelled FAPs. As labels are associated with  
364 a price premium (Roheim et al., 2011), these consumers tend to prioritise unlabelled FAPs. On the contrary, we  
365 find that households with children are less interested in unlabelled FAPs. One possible explanation is that labels  
366 are often associated with products of higher quality. Parents will tend to prioritise differentiated products to ensure  
367 their children’s well-being. Unsurprisingly, we also find that consumers’ knowledge influences the rejection of  
368 unlabelled FAPs. Our results show that people who are aware of the sector (and related issues) and who believe  
369 that their consumption choices can influence the environment’s future reduce their preferences for non-labelled

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<sup>7</sup> We asked consumers to position themselves on a 0 to 7 scale regarding the question: “By buying sustainable seafood, I can help limit the environmental impact of fishing and aquaculture”.

370 products. This aligns with the literature, often revealing that consumer involvement drives expressed preferences  
371 for labels (Olsen, 2003; Pieniak et al., 2010; Zander et al., 2022). Finally, the “*Universalism*” and “*Origin*”  
372 motivations also reduce the expressed preferences for unlabelled FAPs. As existing literature shows that  
373 motivations are essential drivers of consumer preferences for labelled products, it is not surprising that consumers  
374 who express one of these two motivations tend to have a lower preference for non-labelled FAPs.

375 According to FranceStratégie (2021), French food policies fail to encourage FAPs consumption, despite their  
376 recognised health benefits. One explanation is that these policies tend to be rigid and poorly adaptive. A tailored  
377 communication that better accounts for the heterogeneity of consumption profiles could be critical to making them  
378 more efficient. Our article provides interesting insights on this point. Age is, for instance, a factor to consider in  
379 policy implementation. To encourage young people to eat FAPs guarantees related to the environmental attributes  
380 of FAPs can be promising. On the contrary, older people are more interested in the health aspect of FAPs, as they  
381 are more directly involved in these issues (Pieniak et al., 2010; Carlucci et al., 2015). Our model also highlights  
382 that coastal households have differentiated expectations compared to non-coastal ones. Indeed, they are  
383 particularly looking for locally labelled FAPs. According to the existing literature (Feldmann & Hamm, 2015;  
384 Picha et al., 2017; Zander et al., 2022), local food is associated with a high-quality product, a product with low  
385 environmental impacts or a product that supports the local economy. Coastal consumers, therefore, use the “Local  
386 origin” labels as a proxy for these product attributes. This perceived premium quality of local products may also  
387 explain the rejection of products labelled “France origin” in these areas. Indeed, the closer the production is to the  
388 consumer, the higher the perceived quality (Picha et al., 2017). Conversely, living in a coastal area reduces  
389 preferences for ecolabels. According to Salladarré et al. (2010), ecolabels can be perceived as a barrier to local  
390 fisheries and activities endemic to the territory. Globally, place of residence may also be a relevant characteristic  
391 for implementing efficient policies. Other variables, such as gender or the presence of children in the household,  
392 can also be interesting to consider in policy implementation according to our model.

393 This work has certain limitations. First, preferences are studied “all things being equal”, and characteristics  
394 such as the price of a product, its mode of presentation, its species, the certifying organisation, the level of  
395 transparency, and the formulation and control of standards defined are not considered. However, these factors are  
396 essential in choosing labelled FAPs (Wessells et al., 1999; Jaffry et al., 2004; Brunsø et al., 2009; Menozzi et al.,  
397 2020; Bronnmann et al., 2021). Second, the well-documented gap between data on declared behaviours and real  
398 purchases (Ankamah-Yeboah et al., 2020) also requires treating the results of this survey with caution when  
399 focusing on the real purchasing behaviour of households. Finally, this work focuses on the French market only.  
400 Therefore, our results must be generalised to other consumption markets to compare our results and provide more  
401 general recommendations.

## 402 **5. Conclusion**

403 Labels are developing and diversifying in the FAPs sector. They are used to guide consumers toward more  
404 sustainable choices. Consequently, understanding how consumer preferences are structured regarding these  
405 different schemes has become essential, particularly in the context of the FAPs production system transition. By  
406 quantifying the demand for labelled FAPs on the French market and studying preferences for them in a multiple

407 choices situation, this article identified paths of reflection that can help public decision-makers to orient their future  
408 choices regarding public policies.

409 First, our results identified substantial heterogeneity regarding the preferences expressed. French  
410 consumers highly valued quality and “France origin” schemes. In a global manner, French consumers remain  
411 highly “self-oriented” in their preferences. Nevertheless, although secondary, ethical demand (ecolabel and animal  
412 welfare) could become dominant in the years to come, supported by the expectations of the young generation. To  
413 support this growing demand and reach global objectives of sustainable consumption, policymakers need to inform  
414 consumers and adapt their existing policies approach.

415 Despite diverse expectations, existing policies are often rigid and fail to reach their objectives. Our results  
416 provide interesting insights regarding consumption profiles between stated preferences. They show the strong  
417 influence of motivations in the preference expressed regarding labelled FAPs. It seems that consumers’ degree of  
418 universalism and interest in the origin of FAPs are significant drivers of preferences. Moreover, socio-demographic  
419 variables such as age, gender, and even living area influence the choices expressed. To implement more adaptive  
420 and effective policies, better considering this diversity of consumption profiles is critical. The introduction of  
421 systematic surveys regarding FAPs consumption expectations could be an interesting tool to implement. As food  
422 markets are changing quickly (and so are consumer expectations), monitoring these expectations more regularly  
423 could enable policymakers to anticipate changes in demand more accurately.

424 Applying this approach to multi-labelled FAPs could be a relevant extension to this study. In the context  
425 of strong market competition and heterogeneous consumer preferences, the food sector increasingly uses the  
426 “multi-labellisation” process. However, we still have limited knowledge of how consumers perceive and value  
427 these new products, especially in the FAPs sector. New insights on this issue, such as the most valued label  
428 combinations, the role played by motivations interactions, etc., could pave the way towards greater sustainability.

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## APPENDIX

**Table 6.** Questions used to build the objective and subjective knowledge variables. (Source: COPECO-Covid-Norway survey- 2021)

Questions	Answers
<b>Subjective knowledge</b>	
Compared to the average person, I know a lot about fish	
I don't know much about how to assess the quality of fish*	Likert scale from 0 (I totally disagree) to 7 (I totally agree)
People who know me regard me as an expert on fish.	
I don't know much about preparing fish*	
<b>Objective knowledge</b>	
Farmed products and aquaculture products mean the same thing	TRUE
The production method (wild or farmed) is not compulsory information on seafood sold fresh in the French market	FALSE
Oils and meal from wild fish are used as feed for farmed fish	TRUE
The majority of FAPs marketed in France are landed by small coastal vessels	FALSE

\* The results of these questions have been reversed for the analysis.

**Table 7.** Detailed of the eleven variables included in the MMNL

<b>Variables</b>	<b>Modality</b>	<b>Signification</b>	<b>Variable construction</b>	<b>Mean</b>
Age (Class reference ([18-34])	<i>[18-34]</i>	The individual is between 18 and 34 years old	Coded 1 if [18-34]	0.24
	<i>[35-49]</i>	The individual is between 35 and 49 years old	Coded 1 if [35-49]	0.25
	<i>[50-64]</i>	The individual is between 50 and 64 years old	Coded 1 if [50-64]	0.26
	<i>[65+]</i>	The individual is over 65 years old	Coded 1 if [65+]	0.25
Gender	<i>Female</i>	The individual is a female	Coded 1 if female, 0 if man	0.51
	<i>Male</i>	The individual is a male	Coded 1 if male, 0 if female	0.49
Children	<i>Children</i>	There is at least one child under 18 in the household	Coded 1 if children are present	0.44
Coastal department	<i>Coastal Department</i>	The individual lives in a coastal department	Coded 1 for people living in a coastal department	0.36
Price	<i>Price</i>	The consumer considers that price is her/his primary purchasing criterion when buying FAPs	Likert scale from 0 to 10	5.91
Universalism	<i>Universalism</i>	The individual shows a high degree of universalism	Factorisation of Schwartz value questions. Likert scale from 0 to 6	-9.65e-11
Tradition	<i>Tradition</i>	The individual is attached to traditional values	Factorisation of Schwartz value questions. Likert scale from 0 to 6	- 2.52e-09
Origin	<i>Origin</i>	The individual express interest in the origin of FAPs	Factorisation of consumers' preference questions. Likert scale from 0 to 6	-4.03e-10
Perceived consumer effectiveness	<i>PCE</i>	Individual's estimate of his or her ability to contribute to specific sustainable development-related outcomes through specific behaviors.	Factorisation of questions on consumer perceptions	-1.19e09
Subjective knowledge	<i>Subj. Know</i>	The individual considers himself/herself as an expert of the sector	Average score on multiples questions Likert scale from 0 to 7	3.28
Objective knowledge	<i>Obj. Know</i>	The individual is an expert of the sector	Average score on multiples questions	1.66

**Table 8.** Detailed results of the t-test. (Source: COPECO-Covid-Norway database - 2021)

Labels 1	Quality	France origin	Ecolabel	Health allegation	Local origin	Animal Welfare	No Label	Fair-Trade	Nutrition	EU origin
Label 2										
Quality	X	<b>H0</b>	.	.	.	.	.	.	.	.
France origin	<b>H0</b>	X	.	.	.	.	.	.	.	.
Ecolabel	.	.	X	<b>H0</b>	<b>H0</b>	.	.	.	.	.
Health allegation	.	.	<b>H0</b>	X	<b>H0</b>	.	.	.	.	.
Local origin	.	.	<b>H0</b>	<b>H0</b>	X	.	.	.	.	.
Animal Welfare	.	.	.	.	.	X	.	.	.	.
No Label	.	.	.	.	.	.	X	.	.	.
Fair-Trade	.	.	.	.	.	.	.	X	.	.
Nutrition	.	.	.	.	.	.	.	.	X	.
EU origin	.	.	.	.	.	.	.	.	.	X

Null Hypothesis (H0): means are equal. Alternative hypothesis (.): means are statistically different.

**Table 9.** Mixed multinomial logit model marginal effects (Source: COPECO-Covid-Norway database - 2021)

	Quality <sup>a</sup>	Fair-Trade <sup>a</sup>	Nutrition <sup>a</sup>	EU <sup>a</sup>
Nb. Individ. (%)	254 (17.80)	91 (6.36)	75 (5.26)	36 (2.52)
<b>Age (Ref [18-34])</b>				
[35-49]	-.014 (.029)	.010 (0.21)	-.022 (.015)	-.008 (.015)
[50-64]	-.015 (.030)	.012 (.020)	.011 (.019)	-.025* (.013)
[65+]	.001 (.020)	-.008 (.019)	.001 (.020)	-.018 (.015)
<b>Female</b>	-.026 (.022)	-.021 (.014)	.008 (.013)	-.004 (.009)
<b>Coastal Department</b>	.024 (.020)	-.004 (.013)	.008 (.012)	-.007 (.009)
<b>Children</b>	.043* (.023)	-.017 (.015)	.013 (.013)	.005 (.009)
<b>Price</b>	-.001 (.004)	-.003 (.003)	.001 (.003)	.003* (.002)
<b>Motivations</b>				
Universalism	-.040*** (.013)	.001 (.009)	-.002 (.007)	.006 (.009)
Tradition	.013 (.013)	.007 (.008)	.006 (.007)	.003 (.005)
Origin	-.030** (.014)	-.012 (.009)	-.029*** (.007)	.002 (.006)
<b>PCE</b>	-.003 (.015)	.036 ***(.011)	.009 (.008)	.008 (.007)
<b>Subj. Knowl</b>	.028*** (.010)	-.003 (.006)	-.001 (.006)	.004 (.004)
<b>Obj. Knowl</b>	.002 (.009)	-.002 (.006)	.003 (.005)	.002 (.004)

<sup>a</sup> Base alternative: No Label

Significance threshold: \*\*\* 0.01; \*\* 0.05; \*0.1. In parentheses : Standard deviation

Number of observations = 1.427