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Label information and consumer behaviour: evidence on drinking milk sector



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Abstract

The purpose of the research is to evaluate the impact of different kinds of information disclosures of milk labels, investigating the interest among consumers based on their consumption behaviours and characteristics. In this research, all the actions which lead to a healthiness, become expressions of a production process, among which consumers' food choices, purchase, preparation, and also self-production. Therefore, in the "health creation" production process, information and knowledge about food become "investments". In this context, label disclosures become a tangible expression of this kind of "investment". The research question is: what impact do purchase preferences and consumers' characteristics have on their interest towards the label information provided? Several information disclosures, both mandatory and voluntary, are investigated. Therefore, some choice attributes will be analysed as indicators of the consumer's behaviour in relation to his investment in food information. The methodology used for the analysis is an Ordered Logit. The analysis of the consumer's behaviour has been performed by transposing Ménard's analysis of firm corporate governance (Ménard, *Agribus*. 34: 142–160, 2018) to the consumer as producer of welfare equity. The reduction of information asymmetry is a cost for the producer, and this research may be able to measure how much it would be convenient to invest in this reduction, based on the analysis of the consumer's behaviour toward his personal investment in food information acquisition.

Keywords: Quality disclosure, Labelling, Information, Ordered logit

Introduction

The information asymmetry between producer and consumer is a very important strategic element, which the seller can use either to his advantage or to conceal a flaw (Akerlof 1970; Hobbs and Kerr 2006). In modern society, the consumer is ever more curious and conscious, especially about the agri-food sector, and the provided information plays a key role in his choices; it is important to find the right balance between economic interests and marketing, profit and transparency.

The Italian drinking milk market is currently experiencing a crisis, with a constriction in sales of 1.8% between 2015 and 2017, and 2.5% in consumption (Assolatte 2017). In this market, there is in fact a great concern about domestic food safety issues, and there are a lot of new food-tendencies, which promote consumption of alternative

products (for example vegetable drinks). Therefore, it could be very useful to study the consumers' interest towards the information disclosures related to their consumption behaviours and characteristics. First of all, new laws and decrees are mandatorily required (Bai et al. 2013). By analysing the present milk offer, it is clear that the information provided through the label is divided between "mandatory" and "non-mandatory", as with most products. Indeed, through these two types of information, labelling can be used as a means of obtaining the consumer's informed consent, and consequently mitigating outraging factors (Zepeda et al. 2003). Some consumers may consider sufficient this kind of information, because they trust the production system and national law system, and not needing any further information or participation to the production process. Otherwise, they might acquire a high perception of risk, which could lead to the need for a new personal system of rules (Babutsidze 2007). This can be considered a consumer's centralisation of decision rights about information, and so greater knowledge, and more participation to the production process.

Many companies use the new information provided through the label as a tool to differentiate the offer or as a product enhancement, trying to place themselves ahead of tendencies and future market requirements, to ensure a competitive edge over competitors. As a result, the label becomes an element of differentiation from the competitors, making the product stand out. There are many studies that correlate and show that there is interest in regard to some information that determines a plus of the product and therefore its distinctiveness with respect to others (Scarpa et al. 2009).

The aim of the research is to understand which kind of disclosures has the most impact among consumers in relation to their concerns as buyers, to their lifestyle, and to their background. The research aims to investigate what impact the components of different choices have on the interest towards these two kinds of disclosures. It also investigates how the consumer's interest is an indicator of his willingness to invest in food information. This should clarify if the reduction of the information asymmetry conveyed through the "non-mandatory" disclosure, is more impactful than the one conveyed through "mandatory" disclosure, and which one is better for the producer and the consumer. The questionnaire takes into consideration the Italian law for milk and dairy products, which establishes that in Italy it is mandatory to declare the origin of milk (decree 9 December 2016) the stabilization treatment, and the nutritional information. The new laws and decrees have been established to assure the consumer about the quality, safety, and origin of this product, in order to satisfy his need for more information, and his growing concern about the quality of milk. Such is the case of the declaration of origin of milk, which became mandatory through the decree of 9/12/2016, implementing Regulation (EU) n° 1169/2011. Other mandatory information, which was not considered for the study, is the expiration date, the presence of technological adjuvants, allergens, conditions of conservation, and name and address of the responsible for the label declaration. Other disclosures can be included in order to enhance the product, and overall be beneficial to the reputation of the producer and his territory of production. In our research, the "non-mandatory" disclosures considered are local origin, cattle feed, and environmental sustainability. The interest in each of these is given by the sum of all the aspects of the consumers' characteristics and behaviours, the attitude towards the purchase, habits, profile as consumers, and social-demographic characteristics, which can lead to specific purchase choices, with the

mediation of the information (Cowan et al. 1997). The paper is structured as follows: in the “Conceptual framework” section, the main literature about label disclosures will be illustrated, and a new model for consumer behaviour through neo institutional approach will be introduced. In the “Methodology” section, the research, together with data and methodology, will be presented. In the “Results and discussion” section, the results and their discussion will be illustrated. Conclusions, political implications, and limits of the research will be in the “Conclusions” section.

Conceptual framework

Literature review

In order to reduce the informational gap between buyer and seller for credence goods, some institutional signals are set up. Through them, potential consumers are able to discern the high-quality products from the lowest ones. For this reason, in order to face this problematic condition, businesses use quality signals strategically, which provides multiples benefits (competitiveness in the markets, coordination of operations, quality assurance to consumers). The goal of quality strategy is to identify and organize distinctive quality signs (Ippolito and Mathios 1991; Jin and Leslie 2003), in order to reduce the information asymmetry between producer and consumer and provide credible information about the superior attributes of the product, if necessary, through a labelling strategy (Crespi and Marette 2005).

There are several mechanisms used to disclose these efforts. One of the most common ways to solve quality information asymmetry is represented by the signals transmitted by the producer, the informed part about the quality of products, about his own inner information, through investments in certification and labelling strategy. A labelling strategy determines a product differentiation (Grunert 2005), in order to meet the consumers’ needs and preferences. The aim is to communicate, in a credible way, this “difference” and to produce additional value for the product. This may allow consumers to rank the alternatives.

The issue concerning the labelling of agri-food products has been the subject of discussion and analysis for many years and from different points of view, giving rise to a wide range of studies and research both at Italian and international level. Numerous authors have undertaken research on the importance of labelling related to information asymmetry, focusing on particular sectors such as wine (Loureiro and Hine 2004; Stasi et al. 2008), fish (D’Amico et al. 2017), oil (Marchini and Riganelli 2015), and beer (Farace 2017).

Particular attention was given to the consequences on consumer behaviour (Drichoutis et al. 2006; Hieke and Taylor 2012). As a matter of fact, the food selection is a complex process, which is generally not based on tangible elements (Lien and Døving 1996). Usually the consumer takes into consideration strictly personal parameters and characteristics, which are difficult to identify from an external point of view (Wandel 1997). In consideration of this, the main contributors of choice in dairy products are hedonistic characteristics, affordability, health perception, and nutritional qualities (Grunert et al. 2000).

During the last decades, there were a lot of studies devoted to understanding and estimating the consumers’ values about products’ attributes (Lusk and Briggeman 2009;

Dagevos and van Ophem 2013; DuPuis 2000; Furst et al. 1996) and their link with the purchasing choices (Vermeir and Verbeke 2006; Sheth et al. 1991; Connors et al. 2001; Riganelli et al. 2018), helping firms to better direct R&D (Research and Development) activity and product differentiation strategies. Considering the pattern of consumers' values, several studies attempted to analyse how and whether consumer perceived quality attributes and how much these perceptions influence purchasing decisions (Grunert 2005; Grunert and Wills 2007).

The growing interest in food safety as well as ethical and environmental issues, both by public opinion and institutions, has encouraged some researchers to conduct studies on the behaviour of consumers. The main goal of agri-food firms is to respond to consumers' demand in terms of safety, quality, and environmental attributes, and to adopt a labelling strategy that can help to better communicate these attributes. Health and environmental concerns have grown among consumers (Cavaliere et al. 2015; Banterle and Cavaliere 2014; Krystallis and Ness 2005), and there were huge efforts in order to communicate these attributes (highly correlated) through marks and claim on the product packaging (Cavaliere et al. 2014).

Health and environmental attributes became key policy tools which aim to guarantee safety and consumers' protection (Teisl and Roe 1998; Stranieri et al. 2010; Nilsson et al. 2004; Caswell and Mojduzka 1996). In particular, a product label policy is the main way through which a transmission of information to consumers can be set, generating social welfare (Teisl and Roe 1998).

For some years now, the subject of what is to be included in the labels and how this can determine clarification in the consumer's mind and perception has been studied with further depth: in this sense, there has been a heated debate over time with regard to the two types of information, the mandatory and the voluntary (Segerson 1999) and how these can result in changes to the market trend (Caswell and Mojduzka 1996). The agri-food sector has several ways to show its products' characteristics. The regulations, both mandatory and voluntary, and the pressure from consumers in terms of quality have pushed producers to organize their activities (Ménard 2004).

Particularly interesting is the literature about voluntary disclosure through a certification and labelling strategy. As a matter of fact, the establishment of mandatory disclosure does not necessarily solve the problem of asymmetric information between producer and consumer, because of collective knowledge, reputation, and trust in the producer's voluntary label disclosure (Grossman 1981; Shavell 1994; Khanna 2001). On the contrary, voluntary certification is a tool that offers subsidies to firms, highlight the firm's efforts and its attempts to offer advantages to social welfare (Lyon and Maxwell 2003, 2007; Wernstedt et al. 2013; Lutz et al. 2000), but it entails the risk to fall in a form of greenwashing (Kim and Lyon 2011). Firms in lemons markets may voluntarily disclose quality as a way to prevent the adverse selection phenomenon (Cutler and Zechhauser 1998). Several motivations lead producers and consumers to respond to this consumers' demand for quality standards although there are differences in terms of reactions. The effects of these different actions lead to several consequences, both in terms of consumer reaction and firm performance.

Many researchers begin by assuming that labelling is one of the fundamental elements that push the consumer to choose a particular product and its subsequent repurchase, compared to another, thus determining a loyalty that leads to a competitive

advantage for companies (Aprile and Annunziata 2006; Ilbery et al. 2005; Mancini et al. 2017). It is also certain that the correct production of a label allows a correct marketing of the product inside a country but also in relation to exports (Jansen and Lince de Faria 2002). Label information can also influence consumers' preferences, behaviours, and willingness to pay towards food products, especially if this information is provided through a certification (Slade et al. 2019; Rihn et al. 2019; Choi et al. 2018; Scozzafava et al. 2020). In particular, the origin of the product, which is usually considered an indicator of quality (Dekhili and d'Hauteville 2009; Di Vita et al. 2013), is important for consumers (Perito et al. 2019; Fraser and Balcombe 2018; Yin et al. 2018; Grebitus et al. 2018). Nowadays, the information and the format of the label are very important, by becoming a tool which can affect the consumers' food choices (Rihn et al. 2019; Thiene et al. 2018). The characteristics and behaviours of the consumers are also important, affecting their preferences and concerns towards the information provided (Yin et al. 2018; Thiene et al. 2018). Nowadays, producers should also provide detailed information about the corporate equity, the environmental sustainability of their production process, and ingredients (if they are particular or if the product is "free-from"), which are increasingly important for the consumers (Lerro et al. 2018; Grebitus et al. 2018; Mcfadden and Lusk 2018). In fact, the sustainability issue (environmental, social, and economic) has become very important among the consumers, and so label disclosures focused on it can be an important strategic element (Boncinelli et al. 2018; Risius and Hamm 2018; Wägeli et al. 2016). In fact, if the consumers understand the real cost of food-production, and appreciate the producers' work, may be more inclined to pay a premium price (Schneider and Francis 2005; Loureiro and Hine 2002; Darby et al. 2008).

By taking its own place in this debate, the research aims to analyse the factors that influence the consumers' interest towards different kinds of label information, both mandatory and voluntary, referring to the milk segment. The milk attributes that the research aims to investigate are related both to the health and environmental aspects, considering the multidimensional nature of the quality concept. In particular, there are some important aspects to investigate, which can be translated into one research question: what is the impact of the purchase choices on the consumers' interest towards the information provided? These purchase attributes are being investigated, in order to have a comparison between mandatory and voluntary quality disclosure in terms of consumers' perception. Therefore, the purchase choices, which lead to an interest towards each label disclosure, are analysed as indicators of consumer's behaviour about his investment in food information.

Modelling the consumer behaviour through neo institutional approach

In contemporary society, food has become a polyhedral good or, better, *n-hedron*. Food is an asset with *n* characteristics: organoleptic, technological, and nutritional, but also with the characteristics of availability, convenience, safety, and sustainability, both of the product and of the process (Brunori et al. 2013; Galli et al. 2018), which are due to change and increase. Therefore, food as nourishment is a merchant "private asset", but it maintains a lot of characteristics of collective nature (ethical, justice, health, and environmental issues); in fact, it can be defined as a "mixed asset" (Casini and Scozzafava 2013). This complexity is also part of the definition of interpretative models of food

production and consumption. The evolutionary approach to consumption stems from that of companies, along with their industries and institutions. Several models have studied how the choices of individual agents result in a coherent structure, especially with regard to the distribution of technologies and standardization process (Arthur 1989; Cowan 1991; David 1985; Farrell and Saloner 1985). The institutional change is constrained by the state of the institution itself, and the world with which it is linked (Cowan et al. 1997; David 1994). Indeed, these changes are carried out also by the evolution of the consumers' demand, because it leads to economies of scale in consumption (Farrell and Saloner 1985). Thus, the consumers' behaviour can be seen, from an evolutionary point of view, as an "institution" (Keilbach 1995; Feichtinger et al. 1995; Weise 1992) which can be the determinant of the change on the supply side, in a co-evolution of industries, technological innovations and users (Malerba et al. 2007; Safarzyńska and van den Bergh 2010). However, while changes in the production side can be treated as exogenous variables, changes on the demand side are more complicated. Consumers' behaviour in literature (Larrick 1993) is explained by two theories: one it is the cardinal utility theory and prospect theory (Bernoulli 2011; Kahneman and Tversky 1989), which explain the consumers' behaviour with universal behavioural laws. The other group of theories is mostly based on expected utility theory (Friedman and Savage 1948) related to the risk associated.

Whereas the changes on the consumption side are mostly seen as random factors, influenced by advertising and promotional activities (Galbraith 1998), these can also be considered as the result of an individual's own consumption behaviour, in relation with that of other people (Cowan et al. 1997). In fact, consumers' behaviour is strictly tied to the social dimension. When there are social interactions, the patterns of demand change, and consumers' preferences are influenced by the consumption behaviour of others (Cowan et al. 1997). Cowan et al. working on the Filser's theories (1987), grouped the factors which influence demand into four groups: (a) product's attributes; (b) consumer's socio-economic attributes; (c) consumer's own past consumption history (attitude toward consumption); (d) consumption patterns of the consumer's peer group and rivals, etc. (social dimension of consumption).

Consumers' preferences are usually endogenous, the marginal utility of consumption is not always decreasing (learning by consuming), and consumers' decisions as well are not always independent, but driven by patterns in peer group and rivals, bounded with their social dimension. Veblen (1899) was one of the first to develop a theory in which consumption is an activity with which to create an impression (Veblen effect), imitate someone (bandwagon effect on "free from" and "less is more"), or differentiate themselves (snob effect) (Leibenstein 1950; Bagwell and Bernheim 1996; Rengs and Scholz-Wäckerle 2019). Thus, the complexity of food production and consumption does not allow the economic interpretation of the exchange as a microeconomic expression of price system.

As previously said, consumers are interdependent in the consumption process (David 1985; Arthur 1989) and part of a large network of users, which leads to economies of scale in consumption (Cowan et al. 1997; Katz and Shapiro 1985; Gaertner 1974). In fact, consumer behaviour studied on a disaggregated level can be carefully aggregated due to the relations among consumers (Babutsidze 2007).

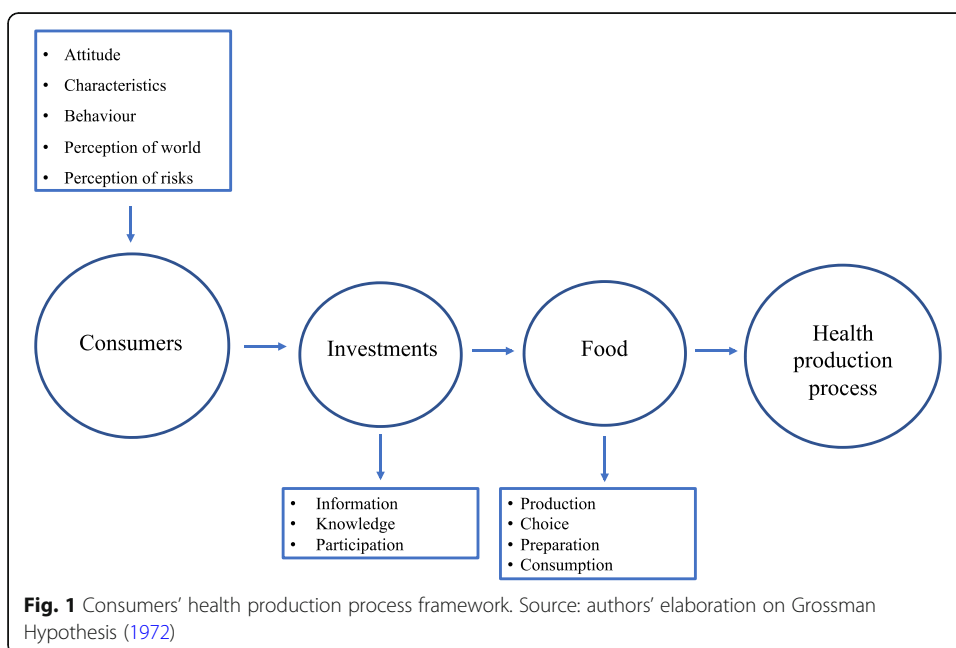
This research takes into account the Grossman hypothesis (Grossman 1972), for which the concept of health is, from an economic point of view, the result of a production process. Several factors determine health production: the contribution of doctors and the medical system, individual choices, and public interventions, which lead to a maximization of individual welfare. Diet and consumption choices contribute to the health equity production, and ultimately to the welfare equity.

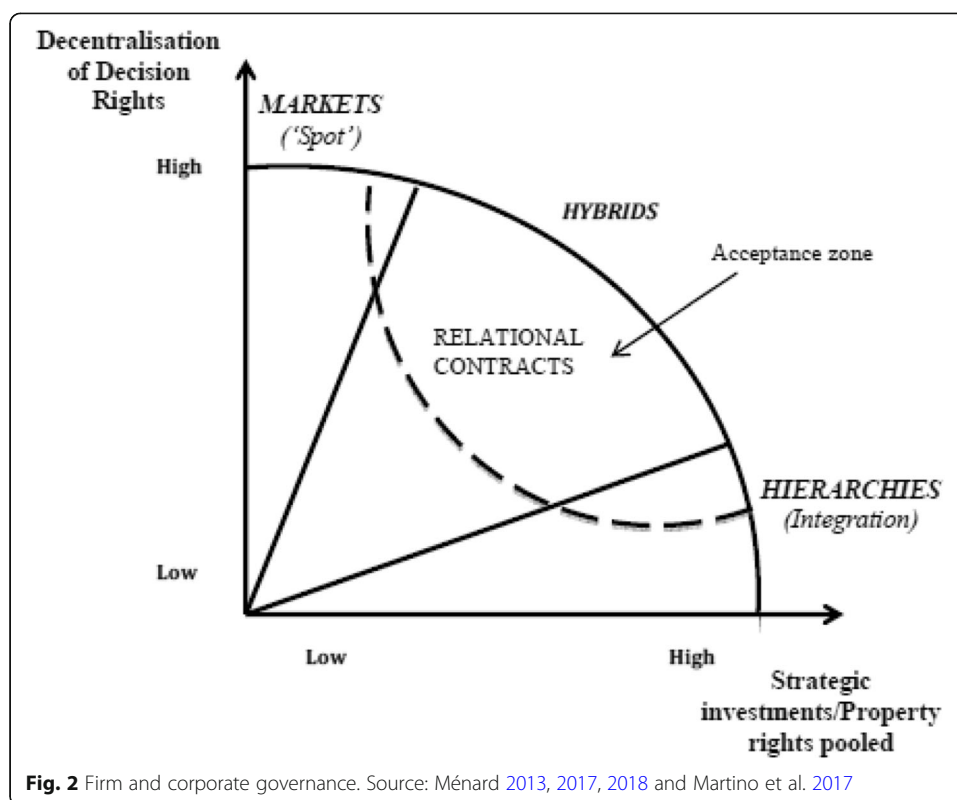
The consumers’ choice process is often determined also by the perception of risk (Bauer 1960; Jacoby et al. 1994), and their perception of the world driven by their own reality and beliefs (Wright and Lynch Jr 1994). In this research, the consumers’ food choices, purchase, preparation, and also self-production, become expressions of a production process. The consumers’ behaviour and choices, in this context, can be interpreted by changing the interpretative systems of transaction costs theory. Therefore, in the “health creation” production process, information and knowledge about food are “investment”. Consumers’ choices are linked to what they need and what they want (Witt 2001), but the information needed (i.e. investment) is linked to their perception of risks and perception of their environment. Therefore, their characteristics and behaviours determine which kind, and which level of information and knowledge they could reach, and so the interest for a certain kind of label disclosure (i.e. “investment”, see Fig. 1) (Yin et al. 2018; Thiene et al. 2018).

With reference to the agri-food business, Claude Ménard (Ménard 2013, 2017, 2018) and Martino et al. (2017) highlight the existence of different organizational forms, with new hybrid forms of production process emerging between market and hierarchies (Fig. 2).

Transposing their analysis to the consumer as producer of healthiness, it is possible to identify the consumer’s behaviour in analogy with the forms of corporate governance (Fig. 3).

On the basis of the consumer’s behaviour there are, in addition to the level and quality of information, the experience of consumption and the consumer’s changing beliefs,





depending on cultural backgrounds. In fact, the level of decentralisation of this investment depends on the perception of risks, of asymmetries, which mostly rely upon the characteristics of the consumers. In fact, it is subject to transactional costs, mostly because of information asymmetries. Thus, a high perception of risk can lead to a centralisation of decision rights about information, which could not only mean a greater knowledge, but also more participation to the production process. The consumer, as an individual or in associated form, could assume an organizational model, which minimizes transaction costs, swinging between spot trades (in the food market), and self-production, preferring a hierarchical organization for production and consumption process. Consumers, who are not so deeply concerned about the food production process and characteristics, probably have a lower perception of risk. This can lead to a decentralisation of decision rights about the information provided, and so the standard information provided (mostly mandatory) is sufficient.

By trying to explore this dimension of the analysis, a survey about milk consumption was organized, with the aim of investigating the interest of the consumer in response to the mandatory or voluntary label disclosures at the moment of purchase. For each information, the link between the main product attributes, consumers' characteristics, and behaviour was analysed. In the analysis, three consumers' attributes were introduced and used as proxies of the link with the production environment, and therefore expressions of cultural background, able to influence the purchase choices and the perception of food risks.

The main information reported on the label and the attributes sought by the consumer act as drivers of a different behaviour of the consumer with respect to the axis

of decentralisation of decisions, or that of control (aggregate decision rights) and presence of strategic investments defined by Ménard. In our research, the strategic investments are food, process, and nutritional knowledge, up to food self-production. In our context, the presence of standards (certifications, legal obligations, brand reputation, etc.) will be interpreted as drivers that lead to the decentralisation and of the use of the market as an optimal allocator of resources. Conversely, a high perception of risks, and so a high transaction cost in the use of the market, as well as the proximity to the knowledge of agricultural environment (i.e. resource), will be taken as a push towards forms of supply and relationship with food close to the control (and so consciousness) of the entire local production chain.

Methodology

Questionnaire and sample

Data has been gathered in the Umbrian region in April and October 2018, through a structured questionnaire. The sample contains 440 respondents, who were interviewed through an online questionnaire using Google Form, distributed through the main social networks. The database created contains cross-sectional data, in which the statistic units are the respondents and each variable refers to a specific question in the questionnaire.

After a screening question asking about the consumption of milk¹, we then asked the interviewees to express their opinion about the interest towards some label information through a 7-point Likert scale (from 1, not important to 7, very important). Considering the previous researches on quality disclosure and the specificities of the segment object of the analysis, the milk segment, some declarations were chosen to be investigated. Some of them are mandatory for producers, such as the *indication of national origin*, the *nutritional information*, and the *stabilisation treatment* used during the production process. Others are voluntary, such as the *local indication of the origin*, the *cattle feed*, and the *environmental sustainability* of the company. Both mandatory and voluntary declarations are the dependent variables in the analysis. Moreover, we asked the interviewees to express their opinions regarding aspects that they consider important at the time of purchase. This aspect answers to the research question previously formulated and represents the independent variable in the analysis.

Furthermore, we have investigated some variables used as proxy in the analysis. Some of them are related to the consumption frequency of milk and dairy products; others concern the features related to the consumer profile. Finally, some social and demographic characteristics were inquired in order to verify the results about the interest on label information. Considering this last set of variables (Table 1), we have a sample of respondents of 59% female and 41% males, most of them in the group of age 18 to 45 (83%). The 67% of respondents have high education (a degree) and 53% are in a low-income bracket, followed by 32% in the mid-range income bracket. Finally, 28% of respondents have a household size consisting of 2 people, followed by 26% with a household size consisting of 4 people

¹This question is necessary in order to consider only consumers of milk. As a matter of fact, consumers who never drink milk couldn't be answering the questionnaire.

Table 1 Sample description

Variable name	Percentage
Gender	
Male	59%
Female	41%
Age	
Under 30	40%
Between 31 and 45	43%
Over 46	17%
Education	
Middle school diploma	2%
High school diploma	31%
Degree	67%
Household size	
Single	12%
2 people	29%
3 people	20%
4 people	27%
Over 4 people	13%
Household income	
R1: until 36,151.98 euros	54%
R2: from 36,151.98 to 70,000.00 euros	33%
R3: from 70,000.00 to 100,000.00 euros	13%

Ordered Logit model

In order to test the research question, we analysed the data by the following equation, obtained by consumer *i* for each label information *l*:

$$Y_{il} = \sum_k \beta_k \text{CHOICES}_i + \sum_b \gamma_b \text{HABITS}_i + \sum_c \alpha_c \text{PROFILE}_i + \sum_j \theta_j \text{SOC}_i + \varepsilon_i \tag{1}$$

Where Y_{il} denotes the outcome variables: these are ordinal variables, scale 1–7, that show the extent to which consumers are interested towards the different kinds of label information; ε_i is the error term. CHOICES_i represents a set (*k*) of dummy variables that include features through which purchase choices are composed and through which we aim to answer the research question previously formulated, considering their coefficients β_k . In particular, these are the *loyalty* to the brand, the degree of *nearness* to the consumers, the *cheapness*, the *packaging* and the *labelling*, the product *safety*, and the *organoleptic* features.

HABITS_i are two dummy variables indicating if the respondent is a habitual consumer of two products (*b*): milk and/or dairy products, evaluating each one through the coefficient γ_b .

PROFILE_i represents a set of dummy variables (*c*) that includes the *role* in the product choice (*responsible of food expenses*), the presence of some *food-related diseases*, the presence of *children* under 12 years in the household, the *ownership of a farm* and,

finally, the interest toward *organic certification*. Each variable is evaluated through its coefficient α_c .

Finally, SOC_i represents a set of socio-demographic characteristics (j) of the sample. The set of variables include *gender* (dummy variable), *age* (scale variable), the *size of household* (scale variable), the level of *education* (scale variable), and of *household income* (scale variable). Each variable is evaluated through its coefficient θ_j . $HABITS_i$ and SOC_i are used in order to control the result of CHOICES variables.

Table 2 shows descriptive statistics of the variables used in the analysis.

Considering the nature of the dependent variables, we estimate an Ordered Logit model (Verbeek 2012; Dobson and Barnett 2008), using STATA 13 software. The model also includes robust estimation of standard error in order to avoid possible serial correlation, and it takes into consideration the violation of normality assumption and the presence of outliers. Furthermore, for every model estimated in the analysis, the indices of fitting are considered: every model has a considerable reliability, because for each one we can reject the null hypothesis of combined variables effect equal to 0². For the interpretation of the result, odds ratio (OR) is shown³.

Results and discussion

Results of the models

To test the research question previously formulated through the Eq. 1, we performed a set of 6 ordered Logit models, one for each label information considered in the dependent variable (Tables 3 and 4).

RQ: What impact do purchase preferences and consumer's characteristics have on its interest regarding the label information?

Considering the national origin information, three choices' attributes show positive and significant impacts: packaging, food safety, and freshness. As we can see from the odds ratio of Table 3, consumers who have positively evaluated packaging, food safety, and freshness have a propensity to be interested in the national origin information (100% Italian) respectively about two, four, and three times higher than consumers that do not consider these three aspects. Furthermore, habitual consumption of milk and organic concern are characteristic of the consumer, and they have a positive and significant impact on the interest in national origin.

Taking into account the nutritional information, there are several choices' attributes that are positive and significant: the proximity to the store, the cattle welfare, the packaging, the food safety, and the taste. Also, the consumer's characteristics "responsible of food expenses", "children", and "organic concern" show a positive and significant impact. Instead, consumer's characteristic "farm ownership" has a negative relation with the interest in this type of disclosure, which means that the propensity to be interested to the nutritional information is lower if the consumer is a farmer.

Among the purchase choices, only the closeness and the food safety attributes, as it can be expected, have a positive impact on the interest about the stabilisation treatment used in the milk production process. Both "milk purchase" and "purchase of dairy

²Wald chi-square statistic.

³Instead of performing the marginal effect, in the paper we have chosen to perform the odds ratio estimation, that give us information about the event probability of the dependent variables in relation with the value assumed by the explanatory variables.

Table 2 Definition of variables, means, frequencies, and standard deviations

Variable name	Description	Obs	Mean	SD
Dependent variables				
100 % Italian	Scale 1–7, respondents interested toward national origin information	438	6.09	1.35
Nutritional information	Scale 1–7, respondents interested toward nutritional information	440	5.22	1.59
Stabilisation treatment	Scale 1–7, respondents interested toward stabilisation treatment used	440	5.52	1.40
Local origin	Scale 1–7, respondents interested toward regional origin	440	5.58	1.65
Cattle feed	Scale 1–7, respondents interested toward cattle feeding	440	5.38	1.69
Environmental sustainability	Scale 1–7, respondents interested toward environmental sustainability	440	5.48	1.61
Independent variables				
Loyalty	Dummy, respondents interested to loyalty feature = 1; otherwise = 0	440	0.56	0.50
Proximity to the store	Dummy, respondents interested to nearness feature = 1; otherwise = 0	440	0.46	0.50
Price	Dummy, respondents interested to price feature = 1; otherwise = 0	440	0.50	0.50
Cattle welfare	Dummy, respondents interested to animal welfare feature = 1; otherwise = 0	440	0.64	0.48
Packaging	Dummy, respondents interested to packaging and label feature = 1; otherwise = 0	440	0.71	0.45
Food safety	Dummy, respondents interested to safety feature = 1; otherwise = 0	438	0.88	0.33
Freshness	Dummy, respondents interested to freshness feature = 1; otherwise = 0	440	0.91	0.29
Taste	Dummy, respondents interested to taste feature = 1; otherwise = 0	440	0.91	0.29
Habits—purchase of milk	Dummy, respondents consumers of milk = 1; otherwise = 0	440	0.49	0.50
Habits—purchase of dairy products	Dummy, respondents consumers of dairy products = 1; otherwise = 0	440	0.61	0.49
SOC—responsible of food expenses	Dummy, respondents responsible for food shop = 1; otherwise = 0	440	0.75	0.44
SOC—food-related disease	Dummy, respondents suffering of specific diseases = 1; otherwise = 0	440	0.19	0.39
SOC—children	Dummy, respondents who have children under 12 years = 1; otherwise = 0	440	0.25	0.44
SOC—farm ownership	Dummy, respondents who have a farm = 1; otherwise = 0	440	0.05	0.22
SOC—organic concern	Dummy, respondents interested in organic agriculture = 1; otherwise = 0	440	0.73	0.45
SOC—woman	Dummy, respondents are woman = 1; otherwise = 0	440	0.59	0.49
SOC—age	Scale 1–3, age of respondents	440	2.77	0.72
SOC—household size	Scale 1–5, household size	438	3.01	1.25
SOC—education	Scale 1–3, level of education of respondents	440	4.65	0.52
SOC—household income	Scale 1–3, level of household income of respondents	430	1.59	0.70

products” have significant impacts, respectively positive and negative. Finally, “responsible of food expenses” shows propensity to be interested in the stabilization treatment.

Considering the voluntary declaration about the local origin, the choice attributes having a positive and significant impact are loyalty and packaging. Furthermore, those

Table 3 Model estimation: beta coefficients and odds ratio for mandatory label disclosure

Variables	(Model 1)		(Model 2)		(Model 3)	
	100% Italian		Nutritional information		Stabilisation treatment	
	β	Odds ratio	β	Odds ratio	β	Odds ratio
Loyalty	0.29 [0.30]	1.34 [0.40]	− 0.05 [0.22]	0.95 [0.21]	0.10 [0.23]	1.10 [0.25]
Proximity to the store	− 0.04 [0.23]	0.96 [0.22]	0.54** [0.22]	1.72** [0.38]	0.53** [0.21]	1.70** [0.35]
Price	− 0.09 [0.25]	0.91 [0.22]	0.05 [0.22]	1.05 [0.23]	− 0.26 [0.22]	0.77 [0.17]
Cattle welfare	− 0.07 [0.29]	0.93 [0.27]	0.76*** [0.24]	2.13***[0.52]	0.37 [0.24]	1.45 [0.35]
Packaging	0.58** [0.29]	1.79** [0.52]	0.58** [0.30]	1.79** [0.53]	0.14 [0.28]	1.15 [0.32]
Food safety	1.42*** [0.32]	4.12*** [1.32]	0.57* [0.33]	1.76* [0.58]	1.09*** [0.32]	2.97*** [0.95]
Freshness	1.16*** [0.37]	3.20*** [1.20]	− 0.21 [0.57]	0.81 [0.46]	0.18 [0.47]	1.19 [0.56]
Taste	0.40 [0.40]	1.49 [0.60]	2.34*** [0.48]	10.39*** [4.94]	− 0.06 [0.48]	0.94 [0.45]
Habits—purchase of milk	0.69*** [0.26]	2.00*** [0.52]	0.07 [0.21]	1.07 [0.22]	0.52** [0.21]	1.68** [0.35]
habits—purchase of dairy products	0.28 [0.24]	1.32 [0.31]	− 0.27 [0.21]	0.76 [0.16]	− 0.39* [0.22]	0.68* [0.15]
Responsible of food expenses	0.37 [0.29]	1.45 [0.42]	0.98*** [0.32]	2.66*** [0.85]	1.00*** [0.30]	2.71*** [0.82]
Food-related disease	− 0.34 [0.34]	0.71 [0.24]	0.13 [0.31]	1.14 [0.35]	− 0.04 [0.29]	0.96 [0.27]
Children	0.00 [0.35]	1.00 [0.35]	0.67** [0.28]	1.96** [0.54]	− 0.10 [0.26]	0.90 [0.23]
Farm ownership	− 0.27 [0.76]	0.76 [0.58]	− 1.21** [0.52]	0.30** [0.16]	− 1.02 [0.65]	0.36 [0.23]
Organic concern	0.61** [0.26]	1.84** [0.47]	0.99*** [0.25]	2.69*** [0.67]	0.01 [0.22]	1.01 [0.22]
SOC—woman	0.06 [0.29]	1.07 [0.31]	− 0.45** [0.22]	0.64** [0.14]	− 0.35 [0.21]	0.70 [0.15]
SOC—age: 31–45	0.54* [0.31]	1.71* [0.53]	− 0.15 [0.30]	0.86 [0.26]	− 0.19 [0.26]	0.82 [0.22]
SOC—age: > 46	1.67*** [0.34]	5.30*** [1.83]	0.34 [0.31]	1.41 [0.44]	0.50 [0.34]	1.66 [0.56]
SOC—household size: 2 members	− 0.76* [0.43]	0.47* [0.20]	0.38 [0.44]	1.47 [0.64]	0.17 [0.37]	1.18 [0.43]
SOC—household size: 3 members	− 0.53 [0.46]	0.59 [0.27]	− 0.45 [0.46]	0.64 [0.29]	0.32 [0.39]	1.38 [0.54]
SOC—household size: 4 members	− 0.65 [0.49]	0.52 [0.25]	0.58 [0.46]	1.79 [0.82]	0.20 [0.38]	1.22 [0.47]
SOC—household size: > 4 members	− 1.27** [0.59]	0.28** [0.17]	− 0.42 [0.50]	0.66 [0.33]	− 0.05 [0.48]	0.96 [0.46]
SOC—education: high school	− 1.26** [0.49]	0.28** [0.14]	− 1.22* [0.70]	0.30* [0.21]	− 0.46 [0.34]	0.63 [0.22]
SOC—education: degree	− 1.22** [0.50]	0.29** [0.15]	− 1.18* [0.69]	0.31* [0.21]	− 0.69** [0.34]	0.50** [0.17]
SOC—household income: from 36,151.98 to 70,000.00€	0.02 [0.23]	1.01 [0.24]	− 0.81*** [0.24]	0.45*** [0.11]	− 0.21 [0.21]	0.81 [0.18]

Table 3 Model estimation: beta coefficients and odds ratio for mandatory label disclosure (Continued)

Variables	(Model 1)		(Model 2)		(Model 3)	
	100% Italian		Nutritional information		Stabilisation treatment	
	β	Odds ratio	β	Odds ratio	β	Odds ratio
SOC—household income: from 70,000.00 to 100,000.00€	- 0.29 [0.36]	0.75 [0.27]	- 0.57** [0.28]	0.56** [0.16]	- 0.08 [0.33]	0.92 [0.30]
Cut 1	- 2.15 [0.74]		- 1.26 [0.98]		- 2.87 [0.73]	
Cut 2	- 1.38 [0.71]		- 0.21 [0.96]		- 2.14 [0.69]	
Cut 3	- 0.94[0.74]		0.99 [0.97]		- 1.05 [0.66]	
Cut 4	0.13 [0.72]		2.38 [1.00]		0.05 [0.66]	
Cut 5	1.43 [0.71]		3.36 [1.01]		1.02 [0.66]	
Cut 6	2.71 [0.72]		4.94 [1.03]		2.73 [0.67]	
Obs	424		426		426	
Pseudo R2	0.1568		0.1516		0.0723	

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. There are robust standard errors in brackets

who are habitual consumers of dairy products have a lower propensity to be interested in local origin in comparison with the non-habitual consumers.

The consumer’s characteristic “organic concern” shows a positive and significant impact, and the presence of “food-related diseases”, instead, shows a negative coefficient, so the respondents with this attribute have a low propensity to be interested in the local origin label information.

Considering information about cattle feeding, the attributes with a positive and significant impact are cattle welfare and packaging. So, these two features are strictly correlated with the interest toward the cattle feed, as well as the consumer’s characteristic “organic concern”.

Finally, considering the voluntary declaration about the environmental sustainability, the choice attributes having a positive and significant impact are closeness, cattle welfare, and taste. Considering the reduction in the carbon emission and the close link between cattle and environmental welfare, this result is quite understandable. The consumer’s characteristic “farm ownership”, instead, shows negative impacts on environmental sustainability. On the contrary, the presence of “food-related disease” and “organic concern” show positive and significant impacts.

The socio-demographic variables vary across the models. The gender variable shows a significant impact only as regards to mandatory nutritional information: women consumers have lower propensity to be interested to nutritional information with respect to male consumers. Considering the age variable, consumers over 46 years old have, with respect to young consumers, a higher propensity to be interested in all the voluntary label disclosures and in the mandatory indication “100% Italian”. The education variable shows significant and negative impact in all the mandatory label disclosures, considering both the “high school” and the “degree” with respect to the middle school: the respondents who have a high education have a low propensity to be interested in the mandatory information. On the contrary, the education variable shows a significant and positive impact, with respect to a low education, on the voluntary information related to local origin. Finally, even a middle-high household income has a significant

Table 4 Model estimation: beta coefficients and odds ratio for voluntary label disclosure

Variables	(Model 4)		(Model 5)		(Model 6)	
	Local origin		Cattle feed		Environmental sustainability	
	β	Odds ratio	β	Odds ratio	β	Odds ratio
Loyalty	1.15*** [0.25]	3.15*** [0.78]	- 0.11 [0.25]	1.12 [0.27]	- 0.34 [0.21]	0.71 [0.15]
Proximity to the store	- 0.83 [0.23]	0.92 [0.21]	0.15 [0.24]	1.16 [0.27]	0.44** [0.22]	1.56** [0.35]
Price	- 0.19 [0.23]	0.82 [0.19]	- 0.27 [0.23]	0.76 [0.18]	0.08 [0.21]	1.08 [0.23]
Cattle welfare	0.35 [0.24]	1.42 [0.34]	1.40*** [0.29]	4.06*** [1.20]	2.08*** [0.31]	7.98*** [2.44]
Packaging	1.05*** [0.30]	2.86*** [0.86]	0.71** [0.28]	2.04** [0.57]	0.42 [0.26]	1.52 [0.39]
Food safety	0.24 [0.31]	1.27 [0.39]	0.37 [0.38]	1.44 [0.54]	- 0.01 [0.40]	0.99 [0.39]
Freshness	0.67 [0.48]	1.95 [0.93]	0.49 [0.37]	1.63 [0.59]	- 0.27 [0.42]	0.76 [0.32]
Taste	- 0.41 [0.45]	0.66 [0.30]	0.04 [0.33]	1.04 [0.35]	0.61* [0.36]	1.84* [0.66]
Habits—purchase of milk	0.06 [0.24]	1.06 [0.26]	- 0.23 [0.23]	0.79 [0.18]	0.21 [0.24]	1.24 [0.30]
Habits—purchase of dairy products	- 0.40* [0.21]	0.67* [0.14]	- 0.09 [0.23]	1.10 [0.25]	- 0.08 [0.22]	0.92 [0.20]
Responsible of food expenses	0.37 [0.30]	1.44 [0.43]	0.13 [0.29]	1.14 [0.34]	0.08 [0.28]	1.08 [0.30]
Food-related disease	- 0.88*** [0.28]	0.42*** [0.12]	0.43 [0.28]	1.54 [0.42]	0.60* [0.32]	1.82* [0.59]
Children	- 0.11 [0.35]	0.89 [0.31]	- 0.25 [0.30]	0.78 [0.23]	- 0.09 [0.27]	0.92 [0.24]
Farm ownership	0.50 [0.49]	1.64 [0.80]	- 0.07 [0.47]	0.93 [0.44]	- 0.99* [0.51]	0.37* [0.19]
Organic concern	0.96*** [0.23]	2.60*** [0.61]	1.10*** [0.26]	3.00*** [0.77]	1.05*** [0.24]	2.86*** [0.68]
SOC—woman	0.34 [0.24]	1.40 [0.34]	0.08 [0.22]	1.09 [0.24]	- 0.30 [0.21]	0.74 [0.16]
SOC—age: 31–45	0.28 [0.29]	1.32 [0.39]	0.84*** [0.29]	2.31*** [0.66]	0.16 [0.30]	1.17 [0.35]
SOC—age: > 46	1.26*** [0.35]	3.51*** [1.23]	1.75*** [0.35]	5.74*** [2.00]	0.83** [0.34]	2.30** [0.79]
SOC—household size: 2 members	- 0.72** [0.37]	0.48** [0.18]	0.12 [0.39]	1.13 [0.45]	- 0.56 [0.39]	0.57 [0.22]
SOC—household size: 3 members	- 0.29 [0.44]	0.75 [0.33]	- 0.10 [0.50]	0.91 [0.45]	- 0.52 [0.52]	0.60 [0.31]
SOC—household size: 4 members	- 0.34 [0.43]	0.71 [0.31]	0.42 [0.48]	1.52 [0.72]	- 0.83* [0.49]	0.44* [0.22]
SOC—household size: > 4 members	- 0.75 [0.51]	0.47 [0.24]	- 0.15 [0.54]	0.86 [0.46]	- 0.84 [0.54]	0.43 [0.23]
SOC—education: high school	2.19*** [0.56]	8.96*** [5.04]	0.94 [1.43]	2.55 [3.64]	0.19 [0.49]	1.21 [0.59]
SOC—education: degree	2.24*** [0.56]	9.41*** [5.25]	0.66 [1.44]	1.94 [2.79]	0.02 [0.49]	1.02 [0.50]
SOC—household income: from 36,151.98 to 70,000.00€	0.50** [0.23]	1.64** [0.38]	- 0.58** [0.25]	0.56** [0.14]	- 0.05 [0.23]	0.96 [0.22]

Table 4 Model estimation: beta coefficients and odds ratio for voluntary label disclosure (Continued)

Variables	(Model 4)		(Model 5)		(Model 6)	
	Local origin		Cattle feed		Environmental sustainability	
	β	Odds ratio	β	Odds ratio	β	Odds ratio
SOC—household income: from 70,000.00 to 100,000.00€	0.52 [0.35]	1.68 [0.59]	− 0.59* [0.32]	0.55* [0.18]	− 0.06 [0.36]	0.94 [0.34]
Cut 1	1.23 [0.86]		0.21 [1.59]		− 2.16 [0.87]	
Cut 2	1.65 [0.85]		1.05 [1.59]		− 1.09 [0.84]	
Cut 3	2.47 [0.85]		2.07 [1.59]		− 0.02 [0.81]	
Cut 4	3.26 [0.84]		2.90 [1.60]		0.81 [0.81]	
Cut 5	4.30 [0.85]		4.03 [1.59]		1.84 [0.81]	
Cut 6	5.75 [0.85]		5.37 [1.59]		3.52 [0.82]	
Obs	426		426		426	
Pseudo R2	0.1366		0.1427		0.1400	

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. There are robust standard errors in brackets

and positive impact on voluntary information about local origin. On the contrary, significant and negative impacts are found on mandatory nutritional information and voluntary cattle feed disclosure.

Placement of information on the diagram

The following step is to evaluate where the consumer's interest for a certain disclosure on the label is located on the diagram, i.e. how much he could delegate his decisional rights about the information on milk, without having to invest on his personal information. As previously said in the literature review, the information acquired through the label is an investment which is affected by the consumers' perception of risk, derived by the asymmetries in food market. In fact, the label is an important instrument to reduce the risks (Crespi and Marette 2005) affecting the quality perception and the willingness to pay (Perito et al. 2019; Dekhili and d'Hauteville 2009; Di Vita et al. 2013). However, the level of decentralisation of this investment also depends on consumers' characteristics and behaviour (Cowan et al. 1997).

Some attributes, which are taken in great consideration by the consumer during the purchase, have a significant impact on the interest for a certain declaration. Therefore, the purchase choices, which lead to an interest towards each label disclosure ("national origin", "nutritional information", "stabilisation treatment", "local origin", "cattle feed", and "environmental sustainability") are analysed as indicators of the consumer's behaviour about his investment in food information, which can lead to a "standard choice" or a "conscious choice". In particular, if the interest in a declaration is driven by attributes that are indicators of a "standard choice", the consumer prefers to rely on the information provided by the producer/retailer, minimizing his personal investment on the acquisition of knowledge. This type of consumer has more trust in the producer and the legal system; therefore, the perception of risk is quite low. Maybe for him the information asymmetries are not so high, and the provided mandatory information is sufficient (decentralisation of the "investments" decision rights) to reduce consumers' perception

of risk and asymmetry (Teisl and Roe 1998; Stranieri et al. 2010; Nilsson et al. 2004; Caswell and Mojduzka 1996). On the contrary, the interest for a declaration driven by attributes that are indicators of a “conscious choice”, indicates that the consumer’s investment in the acquisition of information is higher, and does not decentralise his decisional rights. This type of consumer has a high perception of risk, and often does not trust the standard mandatory information, which leads to a desire for deeper information. This can be provided through the label (Cavaliere et al. 2015; Banterle and Cavaliere 2014; Krystallis and Ness 2005; Brunori et al. 2013), and/or with an approximation to the food production system (Brunori 2007). This may increase the costs of his “investment”, both in terms of price and effort. Therefore, these consumers need to assume an organisational model which can reduce costs; therefore, the options reported in the right side of the graph in Fig. 3 are preferred.

The position was determined based on the significance of the attributes for each declaration. The placement on the graph was determined using the odds ratio of the significant attributes for each declaration. To determine the magnitude of the attributes, first of all the level of significance of the attributes’ probabilities was taken in consideration, and then the odds ratio among them. This can be considered as an approximation of the level of decision rights decentralisation, where the “investment” is food knowledge and information, and label disclosure an expression of it. The attributes chosen as indicators of “standard choices” are loyalty to a brand, packaging, food safety, and proximity to the store, because these can be considered more “tangible” aspects, and the information can be provided through mandatory label disclosure. Cattle welfare, freshness, and taste are chosen as indicators of “conscious choice”, because less tangible and more centred on the product’s quality. In particular, cattle welfare can characterise the product, enhancing the closeness between the production system and the consumer, but it also highlights the equity of the producer (Risius and Hamm 2018;

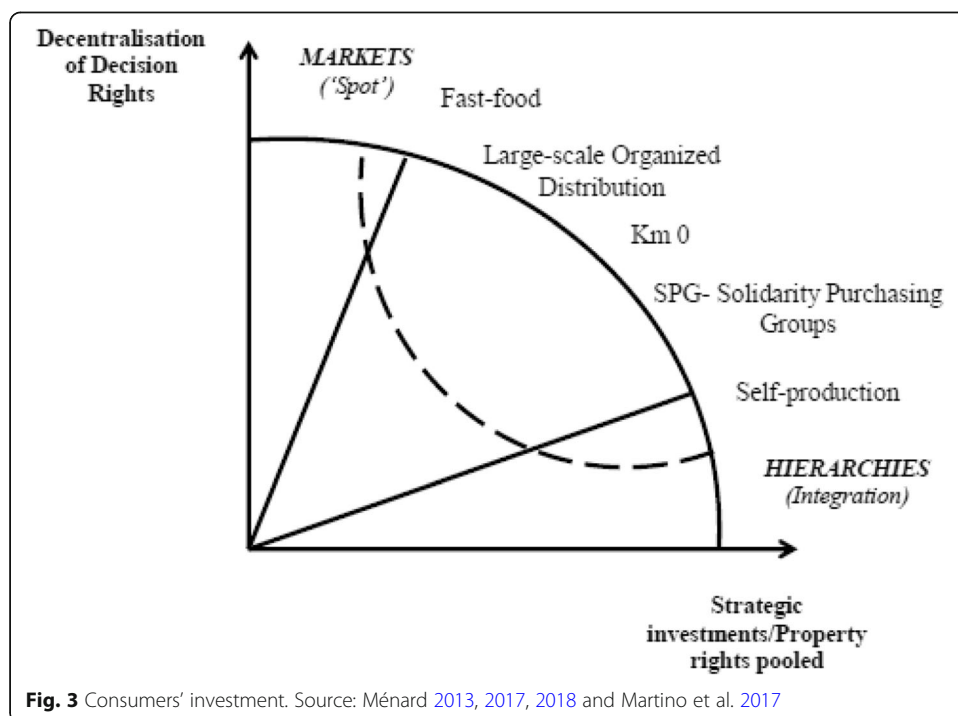


Fig. 3 Consumers’ investment. Source: Ménard 2013, 2017, 2018 and Martino et al. 2017

Profeta and Hamm 2019; Wägeli et al. 2016). All the attributes have a significant impact on consumer interest in the information provided on the label, so they are indicators of his behaviour with respect to this information.

Some characteristics of the consumers (i.e. farm ownership, organic concern, and food-related diseases) are used as proxies for the link with the world of production and therefore an expression of a cultural context, capable of influencing their behaviour. Food-related diseases usually lead to a “standard choice” as these types of problem usually limit the choice to standard and certified products (Yin et al. 2018). On the other hand, farm ownership and organic concern usually lead to a “conscious choice”, due to respectively the cultural background, and the personal sensitiveness to the environmental and health issue (Scozzafava et al. 2020).

Following, we will discuss the position of each information disclosure analysed (Fig. 4) based on the attributes just seen.

Interest for the national origin of the milk

This information is usually important for the consumer (Perito et al. 2019; Fraser and Balcombe 2018) because usually synonymous of “quality”. Freshness, food safety, and packaging are choices’ attributes that have shown a significant impact on this type of information, particularly the first two. Food safety and packaging are two indicators of a “standard choice”, which means that the consumer’s interest in the national origin of the milk is more inclined towards standard information provided by the producer/retailer; in fact, this information is mandatory since 2016. However, the consumer’s characteristic “organic concern” has shown a positive significance, leading to a “conscious choice”. Therefore, the tendency of consumers to centralise their personal investment in this information is rather average.

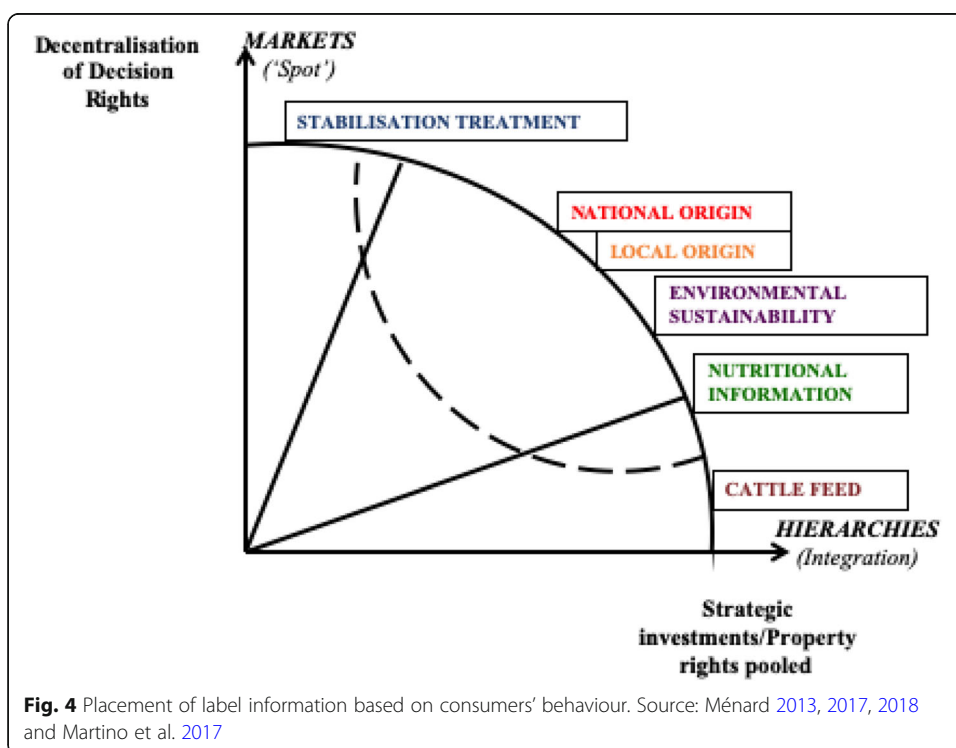


Fig. 4 Placement of label information based on consumers’ behaviour. Source: Ménard 2013, 2017, 2018 and Martino et al. 2017

Interest in nutritional information disclosure

As the results show, the interest in this kind of disclosure is linked with the consumer's choice attributes cattle welfare and taste, which lead to a "conscious choice". These two attributes have a strong and positive significance, especially the taste. The proximity, packaging, and the food safety have also shown a positive and significant impact on the interest in this type of information, but lower than the first two. The consumer characteristic "farm ownership" has shown a negative relation with the interest in nutritional information disclosure, which lead the consumer's behaviour to a "standard choice". However, its effect is more than compensated for by the "organic concern" which has shown a strong and positive significance, and it is related to the consumers' concern for the use of technology in the production process (Mcfadden and Lusk 2018), leading them to the "conscious" side of the graph. All considered, we might say that these consumers tend to centralise the investment on this information, reaching so a deeper knowledge ("conscious choice").

Interest for stabilisation treatment disclosure

The attributes that have shown a strong and positive impact on the interest in this type of information are the food safety and the proximity to the store, which lead to a "standard choice". This result is expected because an important aspect for milk safety is its stabilisation treatment, and a standard and industrial product may guarantee greater safety. The consumer trusts the given information, because the law provides sufficient assurance about this aspect (Teisl and Roe 1998). Therefore, this consumer orients his behaviour in regard to this information to a "standard choice", and so what occurs is a decentralisation of decision rights about this investment.

Interest in local origin disclosure for milk

The local origin of milk, in Italy, is usually synonymous of "local dairies", which have an important value for Italians because of their sense of belonging (Galli and Brunori 2013; Brunori 2007; Massaglia et al. 2019; Di Vita et al. 2013) although in general local milk products are synonymous of quality for the consumer (Yang and Leung 2019; Ilbery et al. 2005). The attributes that have shown an impact on the interest in this type of information are the loyalty to a brand and the packaging, which lead to a "standard choice". However, the consumer's characteristic "organic concern" has shown a strong and positive impact on this disclosure, and the "food-related disease" has a negative correlation. This is important information, because the organic concern contributes in slightly shifting the consumer's behaviour towards a "conscious choice", as does the negative correlation with food-related disease. In fact, the "organic" declaration, especially for milk, is an important attribute for the consumer, which is usually considered synonymous of "naturalness" and "proximity" (Merlino et al. 2019).

Therefore, the interest in the "local origin" of milk, like the interest in "national origin", is quite central.

Interest in cattle feed disclosure

The attributes that have shown a positive and significant impact on this information are packaging and cattle welfare, but the latter has a higher significance. However, the

cattle feed declaration is mostly related to the origin and the quality of feed, while cattle welfare is related to the ethics of the farm breeding (Profeta and Hamm 2019; Risius and Hamm 2018; Wägeli et al. 2016), where more information can increase the number of consumers who may consume ethically produced animal products (Risius and Hamm 2018). Moreover, the “organic concern” has shown a strong and positive significance too, which means that the interest in cattle feed disclosure tends to the “conscious choice” (as expected, due to the particularity of the information).

Interest in the environmental sustainability declaration

As expected, the attribute “cattle welfare” has shown a positive and strong impact on this type of information, in addition to “organic concern”, while the impact of taste is slightly significant. In fact, consumers with these characteristics are usually aware of the environment, and of the sustainability issue, and can be more inclined to pay a premium price (Schneider and Francis 2005; Loureiro and Hine 2002; Darby et al. 2008). However, there is a significant impact of the “proximity to the store” and the characteristic “food-related disease”, although lower than the first two. The attribute “farm ownership” has shown a negative impact on this information, which leads the consumers’ behaviour to a “standard choice”. Nevertheless, the significance of the “conscious choice” attributes are higher and stronger; therefore, the consumers’ behaviour in relation to the interest in the declaration of “environmental sustainability” is rather central, with a tendency to a centralisation of the investment, and so towards a “conscious choice”.

From the data results, we can conclude that the consumers’ behaviour towards the label disclosure, except two “extreme cases” (“stabilization treatment”, and “cattle feed”) tends to the centre, between standard and conscious choice, with a partial decentralisation of decisional rights about the information on the product consumed, the “acceptance zone” in Ménard’s model.

Conclusions

This research attempts to introduce empirical evidences about quality attribute disclosures, both mandatory and voluntary, by exploring consumers’ behaviour with regard to information provided through labelling strategies. The main implication for the Italian milk market is the possibility of measuring how much it is convenient to invest in a reduction of information asymmetry. This reduction has a positive implication for the market, because the precise information on a product that has only one ingredient, such as milk, implies the reduction of several frauds (such as the “Italian sounding effect”). But reducing information asymmetry through voluntary disclosure is a cost for the producer, so it should be done if the consumer invests in his health through the food information. On the other hand, mandatory information is an inevitable cost and, if it is sufficient for the consumer, it is not convenient to invest in voluntary information. In fact, the mandatory information is related to the safety and health of the consumer, and this type of disclosure is a security for him.

This research can be useful in order to assess when the provided information is sufficient, and when not. This difference is not just related to the consumer, but to the product too. Milk is a “standard” product, not so customisable, therefore it should

distinguish itself with voluntary information which can enhance the quality of the product (as any commodities). Therefore, in this process, the tendency of consumers to centralise the investment in information can be used by the producers, especially if their product is a specialty. In fact, they can use the right information, and the right sales channel, to enhance their product and earn a premium price, rather than a smaller one from big producers.

Consumers who habitually buy milk and pay particular attention to tangible aspects such as food safety, freshness, packaging, taste, although there is also interest in organic food products, take mandatory information into consideration. This kind of consumer is also quite interested in "standard information" obligatorily provided by the producer, and usually does not want to invest in his acquisition of information about products. The only exception is "nutritional information", which is a type of disclosure taken into account by a more aware and conscious consumer, who could invest a little bit more in his information acquisition.

Consumers who are more sensitive to animal welfare and environmental issues place greater emphasis on specific information, usually voluntarily provided by the producer in order to enhance his products. This type of consumer invests in his personal information acquisition, because he invests in his health through diet; therefore, he does a "conscious choice". This is important in order to direct the right kind of information towards the right kind of consumer, and it can be useful especially for small-medium producers.

The research has two limits. One of the biggest limitations is that it was conducted in Italy, where there are specific laws and peculiar behaviours, which can limit the range of its applicability. The second limitation is related to the sampling, which has had as participants mainly young people within a medium-high range of education. Extending the research to a more varied population could lead to more reliable results.

On the other hand, this research could be used as a base for future studies in different European states, in order to observe the differences between them. Eventually, it can be conducted even in the European Community, to collect valuable data throughout the entire Community.

Abbreviations

EU: European Union; R&D: Research and Development

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Authors' contributions

AM designed the work, and substantively revised it, designed, and wrote paragraph 2.2. CR designed the methodology, analysed data, and wrote the literature review. FD participated in drafting the literature review. BP built the questionnaire, performed the interpretation of data, and wrote the discussion and conclusions. All authors read and approved the final manuscript.

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Availability of data and materials

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Competing interests

The authors declare that they have no competing interests.

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