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# Consumers are unaware about European legislation on communication of the health benefits conveyed by claims. An empirical survey

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**Abstract.** This paper investigates how consumers knowledge of the EC list (reg. (EU) 432/2012) can affect their understanding of health claims (HC). Despite the existence of a rigorous regulation on the communication of health benefits attributed to functional foods (reg. (EC) 1924/2006), there are still doubts about the efficacy of legislation. In fact, the information conveyed by HC does not always reach the consumer in a clear and understandable way, making the consumer skeptical. This paper proposes an empirical analysis to verify if this effect could be mitigated in case that the consumer knew the European register of HC. The results show how consumers skepticism is linked to trust and assessment problems that contribute to limit the HC efficacy and provide new elements to improve the health benefits regulation.

**Keywords:** functional food, regulation, health claims, credence goods, food choice.

**JEL codes:** Q01, Q1, M31, D12.

## 1. INTRODUCTION

Nowadays, consumers are increasingly interested in the relationship between consumption and its effect on health. This interest generated the need to respond to a growing demand for information about the health benefits of food products, especially in the case of functional foods. In this context reg. (EC) 1924/2006 was introduced in order to assure consumers that HC posted on the label or used by advertising are correct, understandable and scientifically tested. In fact, one of the specific objectives of reg. (EC) 1924/2006 (art. 13) is that the information conveyed by the HC reaches «well understood by the average consumer» in a clear and understandable way. If the legislation does not achieve this main goal consequently, consumers will remain skeptical towards the purchase and consumption of functional foods and regulation will lose its efficacy.

This paper proposes an empirical analysis to verify if HC legislation helps to alleviate consumers skepticism by providing them with a clear and

intelligible health information. Since it does not always occur, it creates confusion among consumers in the choice of healthy foods (Meijboom, 2007) because they do not seem to understand claims. Concerns about the effects of food on personal health are the reason for a progressive expansion of the functional foods consumption. The estimates of the size of market for functional food are not consistent (Bech-Larsen, Grunert, 2003; van Trijp, van der Lans, 2007; Jago, 2009; Falguera *et al.*, 2012), yet studies agree on rapid growth of the sector in the near future though the regulation does not push innovation in the EU food sector (Khedkar *et al.*, 2017). Regulation and information are key issues that can potentially hinder future growth (Vicentini *et al.*, 2016). Recent studies show that there is a high percentage of consumers who are interested to functional foods consumption for disease prevention (Plasek *et al.*, 2020).

The relevance of the sector has made functional food an interesting research field in the scientific debate. Despite the positive trend registered in health-food consumption (Lau *et al.*, 2013; Grunert, 2017) consumers seem to be skeptical toward the purchase of functional foods (Krystallis, Chrysochou, 2012; Fenko *et al.*, 2016), although the effects on health are based on scientific evidence (reg. (EC) 1924/2006). According to the study provided by Nelson (1970), functional foods are configured as credence goods. This feature as credence good may create, in the absence of public intervention, a market failure deriving from erroneous assessment by consumers of expected health benefits. To mitigate the effects of information asymmetry a European register of health was established (reg. (EU) 432/2012<sup>1</sup>) where each claim specifies the health benefits associated with functional food whereby an authorization to use has been issued. After its adoption, some doubts remain in the literature about the ability of the register to solve the asymmetry in practice (Bech-Larsen, Scholderer, 2007; van Trijp 2009; Walker, 2017).

This paper provides an empirical survey on 202 purchasers of Italian food to evaluate the efficacy of European Commission's list. In fact, the information conveyed by HC seems not to reach always the consumer in a clear and understandable way. This consideration means that European legislation does not always reach its goals. For this reason the paper aims to identify any systematic determinant of trust and assessment problems. Results reveal how the efficacy of the information conveyed by HC is undermined by two factors. The first relates to an erroneous assessment of HC by consumers. The second concerns the rules that producers must comply with in

order to obtain authorization for use of HC. These rules, although rigorous seems to be unknown to consumers.

The efficacy information analysis on the HC was made using different approaches from the experimental to the theoretical-empirical. Currently, in the economic literature, the studies about efficacy of rules are relatively rare and not systematic. This paper intends to contribute on debate to setting an adequate and effective European legislation on HC because functional food is becoming a sector of particular importance that can reduce the risk of disease.

## 2. BACKGROUND

### 2.1. Functional food literature framework

The term «functional food» refers to fresh or processed foods that, if included in a balanced diet, can help to improve the consumer well-being and state of health (eg. Diplock *et al.*, 1999). A scientific consensus was reached on the definition of functional food. Specifically a food can be defined as functional «if a beneficial effect on one or more biological functions of the organism is demonstrated».<sup>2</sup> Subsequently, the scientific literature proposed a classification of functional food (eg. Bigliardi, Galati, 2013). Precisely the topic has been widely covered also in the law literature (eg. Petrelli, 2011; Strambi, 2016). In recent decades, agri-food companies have relied on health features in an attempt to create greater value for the consumer and differentiate their offerings. However, this strategy found a constraint in the credence nature of functional foods health attributes, because not all consumers believe in the health benefits associated with functional foods. Consumers are not able to fully assess the health effects of functional foods. In fact the conditions are created for a possible market failure due to an asymmetry of information. According to a typical Akerlof model (1970), the deviation to the social optimum (perfect information) can emerge for two interrelated reasons. Whilst consumers could exhibit a willingness to pay for functional foods less than that in the case of complete information, producers could act opportunistically and try to induce the consumer to overestimate non-functional foods. In this context, producers do not necessarily have incentives to provide correct information to consumers (eg. Russo, Tufi 2016, unlike Milgrom, Roberts, 1986). Information asymmetry on functional foods, therefore, can distort purchasing behavior and productive allocation to the detriment of consumers and high quality producers.

<sup>1</sup> The list of authorized indications was established by reg. (EC) 432/2012 and subjected to continuous updates.

<sup>2</sup> The European Commission Concerted Action on Functional Food Science in Europe (FUFOSE).

Some studies have identified the imperfect consumer information as a significant determinant of the gap between potential demand and expressed demand for functional foods (Annunziata *et al.*, 2011) despite the legislator prepared a regulatory intervention aimed at encouraging correct information to consumers and the markets efficiency (the reg. (EC) 1924/2006). Information and communication plays an important role in reducing this phenomenon. Often correct labeling of functional foods is identified as a desirable solution for limiting the effects and the presence of asymmetric information (Malla *et al.*, 2005). The regulation does not define the term of «functional food» but regulates nutrition and HC, in particular how companies can convey information to the consumer on the product label or through advertising to prevent the release of false information and prevent market failure. To provide full transparency to consumers and food operators a European public registry contains a list of nutrition and HC to be authorized to use or rejected. The HC is the main tool used by companies to inform consumers of the healthy effects of functional foods, if these are not well known (Annunziata *et al.*, 2012). Some studies suggest that HC are mostly perceived positively by consumers (Van Buul *et al.*, 2015) and allow them to make informed purchase choices (Leathwood *et al.*, 2007).

Empirical studies highlight two problems in reading HC. The first concerns the assessment, or the ability of the consumers to interpret (understand) the claim correctly and to evaluate the effects on health (Tonkin *et al.*, 2016). Secondly it concerns the trust that consumers have in the claims that are correctly understood. Empirical evidences show that skepticism in consumption negatively affects the demand for functional foods (Fenko *et al.*, 2016) especially when consumers perceive functional foods like pharmaceutical food rather than a substitute for the conventional food (Stein, Rodriguez-Carezo, 2008).

Other empirical studies on functional foods demand have jointly analyzed the issues of trust and assessment, trying to estimate a synthetic indicator of consumer attitude: his willingness to pay (WTP) that depends on both trust and understanding of the claims. In particular, the literature investigated the factors influencing the WTP for functional foods and, consequently, influencing consumption decisions (Vecchio *et al.*, 2016; Pappalardo *et al.*, 2016; Annunziata *et al.*, 2016, Wongprawmas *et al.*, 2015). Although consumers are willing to allocate part of their income to purchase food products with health benefits (Larue *et al.*, 2004), the sector's profit margins depend on the producers' ability to identify the right consumers target for each specific product (Bonanno, 2012).

In general, studies agree on a strictly positive WTP of consumers, who recognize that functional foods, consumed in a balanced lifestyle, offer potential for improving health (Van Trijp *et al.*, 2007; Krystallis *et al.*, 2008; Goetzke *et al.*, 2014). However, many research studies highlight confusion in consumers perceptions and assessments (eg. Williams *et al.*, 2005).

Despite of the existing regulation, empirical studies confirm assessment problems and, to a lesser extent, trust problems. These results gave rise to a literature aimed at understanding the motivational aspects of functional foods consumption and to assess the communication efficacy (Verbeke, 2008; Tudoran *et al.*, 2009; Visschers *et al.*, 2010; Grunert, *et al.*, 2011; Dean *et al.*, 2012; Wills *et al.*, 2012; Nocella *et al.*, 2012; Chan *et al.*, 2013; Lähteenmäki, 2013, Hung *et al.*, 2017). The answer to this growing demand for correct information translates into the proposal by some authors to make changes to the rules relating to claims (Chan *et al.*, 2005) and in the use of a qualitative-quantitative approach that shows how an acceptable number of consumers can understand nutrition and health information (Leathwood *et al.*, 2007).

Our paper contributes to this literature to evaluate the problems of trust and assessment in functional foods demand, and to identify any systematic components and regulatory proposals able to mitigate the information problem.

### 3. METHODOLOGY, SURVEY PROCEDURES AND MATERIALS.

This paper reports the results of an empirical survey on consumers of Italian food products – testing for the existence of trust and assessment problems and to identify any exogenous factor systematically associated with them. The qualitative data used in this research were obtained through questionnaires, conducted online. Cross-sectional data were collected from 202 Italian consumers. The self-administered questionnaire contained questions with closed-ended response alternatives and used samples and standardized questions in order to carry out a structured interview.

The content validity of the questionnaire was ascertained with a pre-test and from a pilot survey. Subsequently, a database was developed to support the processing in order to systematize the collected data into STATA and SPAD dataset.

Compared to the existing literature, it does not pursue exact quantification of consumer's WTP and does not provide quantitative estimates of the distortion in

the evaluation. The choice is driven by the purpose of obtaining an assessment that is robust with respect to the assumptions informing quantitative estimates of WTP.

Methodological approach relies on consolidated data reduction techniques. The advantage of this approach is the ability to analyze separately the two issues. The survey also captured the demographic profile of the respondents. Table 1 describes the characteristics of the participants by gender, age, education. Generally, respondents are female and the age classes are not homogeneous distribution. With regard to the educational level, mostly consumers had a high school diploma (38.61%) and graduation degree (33.66%).

The questionnaire was designed to analyze three areas of priority: i) knowledge of the legislation and the validation process of claims by third parties (European Commission registry); ii) the ability to discriminate true claims from false ones iii) the ability to understand the meaning and implications of the claim. Our goal is to test empirically the hypothesis that European Commission registry really affects the understanding of the HC.

Questionnaire was divided into three sections. The first section collects general information of interviewee and verifies consumers' knowledge of functional foods and HC, the frequency and motivation to purchase, the

identification of communication tools that influence the foods purchasing process, functional and correct assessment of HC. The second section analyzes the influence of HC regulation during the process of purchasing functional foods. The questions were structured in order to investigate consumer awareness about the existence of the European register of HC and its main function, aimed at preventing the circulation on the market of claims not approved. The respondent was asked to indicate according to his knowledge, if HC authorized by EU register and attributed to some Italian «private label» of famous functional foods, were true, false, or confirm the hypothesis of a lack of information with a «do not know». In particular, the merchandise categories are milk/dairy products and cereal food products where have been considered as functional ingredients plant sterols/probiotics and dietary fiber. In addition, according to the answers given participants were asked to indicate their motivation through the proposed structured alternatives (Tab. 2).

At this point, the respondent is asked to indicate which of some proposed solutions could be more effective to increase confidence in the information conveyed by the HC. Among the solutions, the interviewees proposes by the establishment of a European public register just to confirm or not that they are knowledge about. The third and final section aims to test whether consum-

**Tab. 1.** Respondents' distribution by socio-demographic profiles (n=202).

	Freq.	Percent	Cum.
<b>Age</b>			
15-24	11	5.45	5.45
25-34	69	34.16	39.60
35-44	55	27.23	66.83
45-54	38	18.81	85.64
55-64	21	10.40	96.04
65-74	8	3.96	100.00
Total age	202	100.00	
<b>Gender</b>			
Female	120	59.41	59.41
Male	80	39.60	99.01
Missing Value	2	0.99	100.00
Total gender	202	100.00	
<b>Education</b>			
Graduation	68	33.66	33.66
High school diploma	78	38.61	72.28
Middle school diploma	11	5.45	77.72
Phd/Master/Specialization	30	14.85	92.57
Professional qualification	15	7.43	100.00
Total education	202	100.00	

**Tab. 2.** Items defining about the understanding and trust in the health claim.

Health claim	Knowledge degree	Motivation
A. Bifidobacterium BB12 (or bifidus) promotes the balance of intestinal flora.	True	1. I know it because seen/ heard through Tv/ Radio/ Web. (T1) 2. I trust of the information in health claims. (T2) 3. Usually, I use products that have this health claim. (T3)
B. Beta-glucans that help maintain normal blood cholesterol levels.	False	1. False I know the properties of the health component (F1). 2. False I feel that is misleading (F2). 3. False I don't trust the content of health claims (F3).
C. Vitamin K, zinc and manganese that help maintain bone health.		1. From the health claim I do not understand the health benefits. (NK1)
D. Plant sterols that help reduce blood cholesterol.	I do not know	2. I can not associate the active ingredient of the health claim with health benefits mentioned. (NK2)
E. Zinc and folic acid that help the immune system function.		3. I know other foods that provide the same healthy benefits. (NK3)

ers are aware of the existence of an institution responsible for ensuring that the benefits conveyed by the HC is substantiated by scientific evidence.

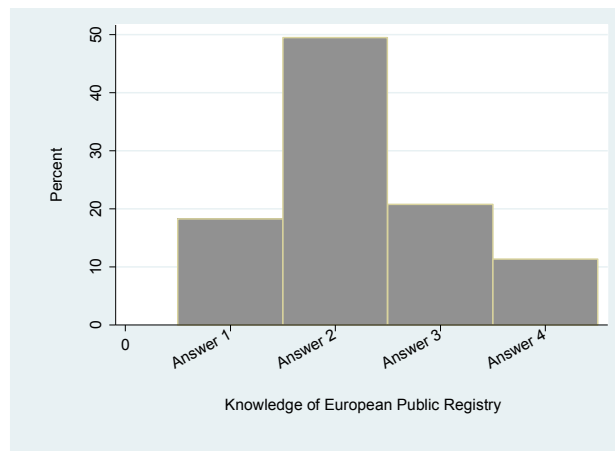
#### 4. RESULTS AND DISCUSSIONS.

The results reveal how the information efficacy conveyed by HC is undermined by two factors, based on information asymmetries in the market. The first, relates to an erroneous assessment of HC by consumers. The second concerns the rules that producers must comply in order to obtain authorization for use of HC. These rules, although stringent, seem to be unknown to consumers. In fact, consumers do not seem to know the regulation establishing a European register of HC. Consumers have been asked indirectly to express their opinion about the knowledge of the EC registry or rather to answer the question on the possible solutions to be adopted to increase belief in the information conveyed by HC (Fig. 1).

The questionnaire developed items to collect information about consumers' knowledge and belief regarding specific HC. Then consumer profile by applying clustering techniques to each group of question was built. The interpretation of each cluster provides us a parsimonious representation of individual consumers' beliefs and understanding toward each HC proposed. Table 3 illustrates the four emerging clusters and their interpretation. Also, in Appendix Figure A.1., A.2. and A.3. reports for each cluster socio-demographic aspects. Cluster analysis results show an identification of the elements that affect the trust and assessment of the claim and can be interpreted as consumers' attitude.

$\chi^2$ -test is used to evaluate if there were the conditions to analyze into the clusters and for each claim considered the knowledge of the public registry. It appeared that most respondents, they do not know in the public register even mentioning the most famous claim. All claims

Fig. 1. Consumer knowledge of the European public registry (%).



Answer 1: Organization of public information events; Answer 2: Establishment of a European public register; Answer 4: Increased supply of food with health claims; Answer 5: Increase in purchasing behavior with health reasons.

considered are significantly associated with the lack of information about the public register ( $p < 0,01$ ) (Tab. 4).

A  $\chi^2$  association test allowed to reject the null hypothesis of independence between the HC and the public registry form at 99% confidence level. The test statistic  $\chi^2$ , which is larger than the critical value  $\chi^2(0,01,24) = 42,98$ . The data supports the conclusion of an association between the lack of understanding of the claim and the knowledge of the EC registry.

In particular, results show that consumers have serious difficulties to make a proper assessment of the health benefits provided by the HC (for example, they are unlikely to associate the active ingredient to the HC with the benefit the healthy conveyed). Furthermore, the lack of information of consumers about the regulation that supports the communication of health benefits is manifested in two different aspects. At first,

Tab. 3. Consumers profiling for assessing to health claims in the EC registry.

Emerging consumers profile		Cluster description
Cluster 1/4	Moderately unaware consumers	Consumers who are unable to associate the active ingredient to the healthy effects conveyed by claims. However, they could potentially know the public register.
Cluster 2/4	Aware consumers	Consumers who trust the content of health claims they could potentially know the public register.
Cluster 3/4	Moderately aware consumer	Consumers who trust the content of health claims, because they listen on TV, they could potentially know the public register.
Cluster 4/4	Unaware consumers	Consumers who consider the claims to be misleading or that associate claim with other foods of usual consumption (provide the same health benefit). These consumers say they do not know the public register).

Tab. 4.  $\chi^2$  Pearson-Test for different health claim.

Health Claims	Consumers profile	T1	T2	T3	F1	F2	F3	NK1	NK2	NK3
Bifidobacterium BB12 promotes the balance of intestinal flora.	Moderately unaware consumers	10	6	2	1	0	1	2	19	1
	Aware consumers	2	22	2	0	1	0	0	1	1
	Moderately aware consumers	22	1	0	0	24	20	0	2	0
	Unaware consumers	8	9	28	1	23	4	18	23	11
$\chi^2 (24) = 224.4917 \quad Pr = 0.000$										
Beta-glucans that help maintain normal blood cholesterol levels.	Moderately unaware consumers	1	1	0	0	2	3	1	34	0
	Aware consumers	1	15	0	0	0	0	7	6	0
	Moderately aware consumers	14	0	0	0	2	0	5	2	2
	Unaware consumers	4	3	13	5	24	5	26	9	17
$\chi^2 (24) = 245.0168 \quad Pr = 0.000$										
Vitamin K, zinc and manganese that help maintain bone health.	Moderately unaware consumers	1	2	2	1	3	1	0	32	0
	Aware consumers	1	21	1	1	0	0	1	3	1
	Moderately aware consumers	16	1	3	0	0	0	1	3	1
	Unaware consumers	4	4	13	15	5	5	36	3	21
$\chi^2 (24) = 297.7506 \quad Pr = 0.000$										
Plant sterols that help reduce blood cholesterol.	Moderately unaware consumers	1	5	4	0	0	0	1	30	1
	Aware consumers	3	20	0	0	1	1	0	4	0
	Moderately aware consumers	19	1	1	0	0	0	1	2	1
	Unaware consumers	9	5	13	8	13	6	27	7	18
$\chi^2 (24) = 249.8423 \quad Pr = 0.000$										
Zinc and folic acid that help the immune system function.	Moderately unaware consumers	0	1	3	1	1	0	5	30	1
	Aware consumers	0	18	0	1	2	0	1	4	3
	Moderately aware consumers	10	0	0	1	1	7	7	6	0
	Unaware consumers	2	3	12	13	16	7	25	5	23
$\chi^2 (24) = 243.0051 \quad Pr = 0.000$										

consumers do not know the legal existence of the system that imposes strict requirements that manufacturers must meet to obtain approval of a *HC*. On the other hand, consumers are completely unaware of the existence of the European public *HC* register and of the body responsible for certifying the scientific proof of the health benefits communicated by them, prior to issuing the authorization for use. The information conveyed by *HC* does not always reach the consumer in a clear and understandable way. This effect could be mitigated if the consumer knew the European register of *HC*.

## 5. SUMMARY AND CONCLUSIONS.

Consumers have serious difficulties to make a proper assessment of the health benefits provided by the *HC* (for example, they are unlikely to associate the active ingredient to the *HC* with the benefit the healthy conveyed). This lack of information about regulation could

be due in part to the omission by producers and/or large buyers (in the case of a functional private label foods) of a normative reference on the package which relates to the European registry of *HC*. This confusion could be fueled by the existence under a private label itself of products aimed at improving the wellbeing and health, they both functional and nutritional, whose information is transmitted respectively by the *HC* and nutrition claims. Both products prelude to obtain beneficial effects on health by feeding the consumer a wrong perception of the health consumer. A clear distinction between a health food and a nutritional food would mean directing health-conscious consumers exclusively towards the purchase of functional foods to detriment of nutritional foods demand, tracing a clear line between the two demand segments (e.g sodium-free foods would end up being purchased exclusively by those requiring a low-salt diet). This deviation in health aspect perception induces the consumer to buy the food product regardless of the type of claim declared. These considerations contribute

to the current challenge pursued by European policy to stimulate better communication of the benefits offered by functional foods to ensure a better understanding of the information from legal sources, which we assume that they have greater reliability.

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APPENDIX

Fig. A.1. Gender distribution in consumer profiles (%).

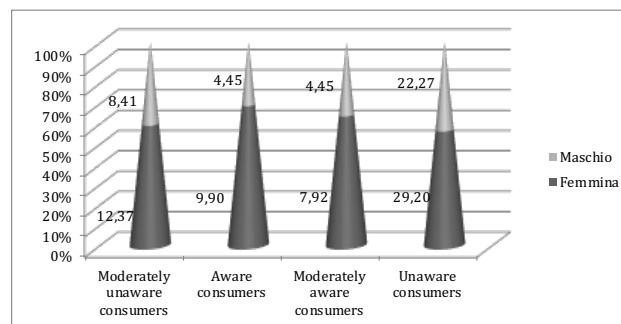


Fig. A.2. Age classes distribution in consumer profiles (average values).

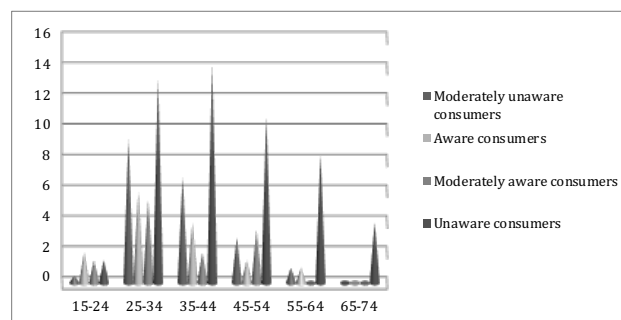


Fig. A.3. Education distribution in consumer profiles (average values).

