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Does the Sustainability of Food Products Influence Consumer Choices? The Case of Italy.

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ABSTRACT

In this paper we analyse if there is a diffused interest among consumers about the environmental impacts of their food choices, and try to capture the different types of attitudes of Italian consumers with respect to environmental sustainability of food products. The analysis builds on a survey based on vis-a-vis interviews with 240 consumers in Milan, and on a cluster analysis. The results highlight a high level of stated concern about environmental issues and about possible impacts of personal food consumption choices on the environment. Nevertheless, when investigating their actions during everyday shopping we have identified four groups of consumers: (1) those who take into consideration the environmental information on labels and do not require additional information; (2) those for which environmental information on labels does not have a great effect on purchase, but would like to receive more information; (3) those for which the presence of environmental information directs product selection and would also like to receive more; (4) those that do not take into account environmental issues when purchasing and are not interested in receiving more information about the impacts of the products.

Keywords: Consumer choices, environmental sustainability, food labelling

JEL codes: D12, Q13, Q56

1 Introduction

The newly emerging demand for food-product attributes that relate to environmental sustainability expresses the interest of consumers for environmental issues and, at the same time, could represent an opportunity for producers. In this direction, product differentiation may constitute a valuable strategy to consolidate or enhance a firm's position in a market with continuously increasing competition, such as that for food products. Indeed, in addition to regulation, market forces have a fundamental role in directing the changes in supply chains (Grunert, 2011). This is because consumers through their choices are able to influence production and the environmental standards applied along the supply chain.

At the same time, some topical environmental problems whose concern is spreading among citizens - like for example climate change - increasingly require the active participation of consumers to be tackled effectively (Chakravarty et al., 2009).

Presently, we are often surrounded by discussions and information regarding environmental sustainability, both from the private and the public sector. Indeed, more and more adverts on different types of goods highlight the environmental friendliness of their product-range or brand.

What we are interested in evaluating in this study is if there is an interest among consumers about the environmental impacts of their food choices that may lead to a change of purchasing behaviour. In this context, this work aims at evaluating the different types of attitudes of Italian consumers with respect to

environmental sustainability of food products. Considering the limited number of empirical analysis evaluating consumer attitudes towards environmental sustainability attributes in general terms, this analysis can help to get a better understanding of this topic.

The analysis builds on a survey based on vis-a-vis interviews conducted between December 2011 and January 2012 in Milan, a city of Northern Italy. The sample is composed by 240 consumers. To classify the different consumers in groups on the basis of their sustainability attitudes, we perform a cluster analysis.

The paper is organised as follows: Section 2 deals with the economic issues; Section 3 depicts the methodology used in the analysis; Section 4 presents the results, while in Section 5 we set down the concluding remarks.

2 Economic issues

2.1 Economic framework

The main focus of the paper is to identify if, among Italian consumers, there is concern for environmental issues and analyse if this concern affects food choices. Many studies about consumer preferences regarding food products are available in the literature, though these mainly focus on nutritional aspects, food safety attributes and quality features, see for example Nayga (1996), Drichoutis et al. (2005), Drichoutis et al. (2008).

Concerning environmental sustainability attributes, in the recent economic literature, quite a good number of papers is available on two 'traditional' themes, analysing them separately: consumer preferences regarding organic products, or consumer attitudes with respect to genetically modified organisms.

More recently, new concepts connected to environmental issues have been also studied. Topics range from food miles (Kemp et al., 2010), carbon foot-print (Gedema and Oglethorpe, 2011), and water footprint to packaging (van Birgelen et al., 2009), animal and forest protection (Jaffry et al., 2004), and animal breeding (de Boer et al., 2009).

Our perspective is not referred at evaluating consumer interest in a specific environmental attribute, but instead we try to understand the general interest for environmental sustainability issues in the choice of food products.

To do so, we focus on three main levels:

- first, general concern towards environmental issues;
- second, interest for environmental-sustainability labelled information;
- third, interest for additional environmental sustainability information.

The first level regards the general concern of consumers towards environmental issues such as climate change and resource wastefulness, and the perception of the possible impact of own choices and behaviours on these issues. Indeed, we try to assess if there is concern regarding such topics, and to capture if there is a diffused sense of powerlessness, that is often associated to lack of action.

The second level regards the environmental sustainability information that consumers can find on front labels of food products. Indeed, labelling represents a tool to communicate to consumers the attributes of the products, including also environmental sustainability features (Banterle et al., 2013). Though, the amount of information that can be labelled is limited for space constraints, and for the overloading information problem that has been shown to negatively affect the effectiveness of communication (Wansink et al., 2004). Nevertheless, consumer trust for sustainability information can be low, as it refers to characteristics connected to the production process and the supply-chain that are difficult to verify by the consumer. Therefore, consumer trust is conditioned by possible opportunistic behaviour of food firms, as sustainability indications are credence attributes (Grolleau and Caswell, 2006). Certification may address these problems by means of a third party guarantee on the truthfulness of the claims, that switches a credence attribute in a search attribute (Caswell et al., 2002; Grolleau and Caswell, 2006). Moreover, the logos of the certifications are able to convey this certified message in an immediate and concise way.

An open problem in the case of credence attributes is the possible mismatch between consumer interest towards sustainability attributes and the actual choices among food products. This problem affects

particularly analyses where preferences are stated (as in our study) and not revealed. As it is well-known, the choice of a product depends on a number of intrinsic and extrinsic attributes, among which price. The mismatch between consumer interest and actual choices can happen when the consumer gives more importance to other types of attributes, such as for example price, compared to those for which an interest was declared. Moreover, even if the price between two products is the same, the labelled message related to a specific attribute can turn out to be not effective for various reasons, such as, for example, the fact that exposure to information does not necessarily lead to its perception or - even if perceived - to its correct interpretation (Grunert, 2011).

Concerning the third level, consumer interest for environmental sustainability issues can go beyond the search of information on labels. Therefore, a "sustainable consumer" may also be keen to achieve more extensive information from a variety of sources. These go from internet to newspapers, educational TV programs or advertising. Nevertheless, in addition to the interest in the topic itself, the willingness to search additional information is related to three main drivers: time availability, preferences in terms of allocation of non-working time among different activities, and personal knowledge about environmental problems. The choice among the various sources is related also to personal preferences and skills in accessing different channels of communication.

2.2 Variable description

In this context, the variables that we used in our empirical analysis are related to the three levels described in the previous section and are reported in Table 1 with scale, median and inter-quantile range.

Table 1.
Attitude variables

Short name	Description	Scale	Median	IQR
1	level of concern about climate change and resource wastefulness	1-5	5	4;5
2	perception on level of impact of own food consumption choices	1-5	5	5;5
3	level of importance of environmental certification labels/logos for product choice	1-5	4	2;5
4	level of importance of organic agriculture claims for product choice	1-5	3	2;5
5	level of importance of indications on type of animal breeding for product choice	1-5	4	2;5
6	level of interest in additional information about the environmental impact of the product and its packaging	1-5	4	1;5
7	level of interest in additional information about organic agriculture	1-5	3	2;5
8	level of interest in additional information about animal breeding	1-5	3	1;5

Notes: IQR stands for inter-quantile range.

To evaluate the general consumer concern about environmental issues (first level), we took into consideration two variables related to: level of concern about climate change and resource wastefulness, and perception on the level of impact of own food consumption choices.

To investigate the role of environmental labelling (second level), we designed three variables with which we try to assess the effect on consumer choices of the presence of environmental labelled claims/certifications. In this way, even if we are dealing with stated preferences, we try to capture the effect of claims/certifications in directing choices among otherwise-similar products. The variables we chose relate to: environmental certification labels/logos; organic agriculture certification; indications on

the type of animal breeding.

We address the third level with three variables concerning the level of interest in additional information on: environmental impact of the product and of its packaging; organic agriculture; type of animal breeding.

3 Methodology

3.1 Data collection

We use data collected through vis-à-vis interviews with 240 consumers in charge of their household grocery shopping. These interviews were conducted between December 2011 and January 2012 at 18 retail-stores in the Milan area.

Supermarkets were selected among all superstores in Milan keeping into account geographical distribution. In particular, we used systematic sampling with a random starting point (Dixon and Leach, 1977) over the sequence of super and hyper-markets ordered according to the post-code. The sampling interval was chosen in order to reach 18 retail-stores and one retail-store every 21 was selected, with the first chosen randomly among the first 21. Indeed, the selected retail-stores were the 10th, 31th, …, 387th of our list.

At each retail-store, consumers were approached randomly. Interviews were conducted during different daily time-segments to try to reach different kinds of consumers.

An ad hoc questionnaire was designed to investigate consumer attitudes towards sustainability issues related to food products. The questionnaire was made of questions regarding: the socio-demographic conditions of the respondents (age, gender, education, income), the interest in sustainability issues (variables 1 and 2 in Table 1), the effect of different product attributes on the purchasing decision (variables 3-5), the interest for additional sustainability-related product information (variables 6-9), the use of food labels in general and the sources of information used to choose among products (friends, advertising, newspapers and educational TV programs, labels). Some of these questions, namely those reported in Table 1, were used to identify the different attitudes towards sustainability of food products; the other variables were used to investigate the characteristics of the consumers associated with the various attitudes.

Most questions are closed-answered and arranged in a multiple-choice format, while some are dichotomous. The only continuous variable is age.

3.2 Data analysis

In order to identify if, with respect to environmental sustainability of food products, our sample is a continuum or is divided in groups of people with different attitudes, we performed a cluster analysis on the basis of the variables reported in Table 1.

We performed an agglomerative hierarchical clustering. The idea of this method is to look at the similarities among individuals (or groups of individuals), and to sequentially merge two individuals (or clusters) starting from the situation were all individuals are single clusters moving to the situation were all are in the same unique cluster. The output is a dichotomic tree, i.e., dendrogram, in which the sequences of merging are shown, and in which the length of each branch is equal to the distance of the individuals (or clusters) being merged. For further details see for instance Johnson and Wichern (2007).

In order to proceed with the cluster analysis, we had to define a distance between individuals and between clusters. As distance between individuals we choose the Manhattan distance among the answers to the selected questions (Johnson and Wichern, 2007). That is:

$$d(\mathbf{x},\mathbf{y}) = \sum_{q \in \mathbf{Q}} |x_q - y_q|,$$

if we indicate with x_q (or y_q) the answer of the individual X (or Y) to question q, and $\mathbf{Q}$ the subset of questions used for the clustering. The Manhattan distance considers as distance between individuals the sum of the distances between the answers to all the questions, and the distance between each question is the absolute difference between the levels; this makes this distance more easily interpretable than other ones.

For what concerns the distance between clusters we tested various distances for robustness issues, but

the results presented in the following Section are based on the Ward linkage for which the distance among clusters is related to the gain of within-cluster variability incurred by merging them (Johnson and Wichern, 2007).

4 Results

Figure 1 reports the dendrogram of the clustering aimed at identifying similarities in behaviours or attitudes within our sample.

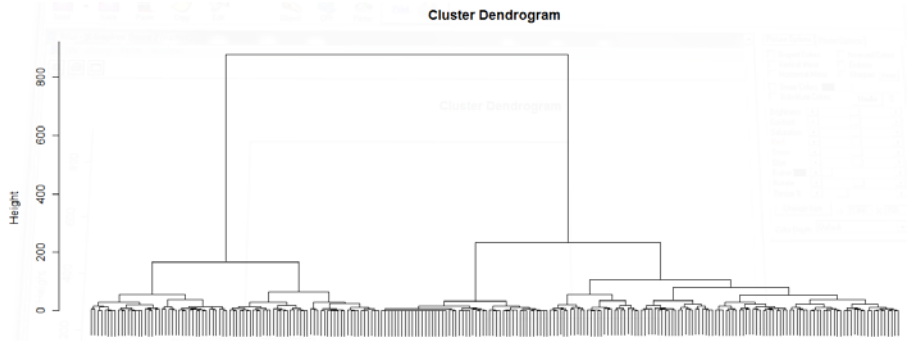


Figure 1. Cluster analysis dendrogram

The figure suggests the presence of four main groups of respondents with different attitudes. Indeed, we cut the dendrogram below the third split as this provides the last large "jump" and obtained four clusters.

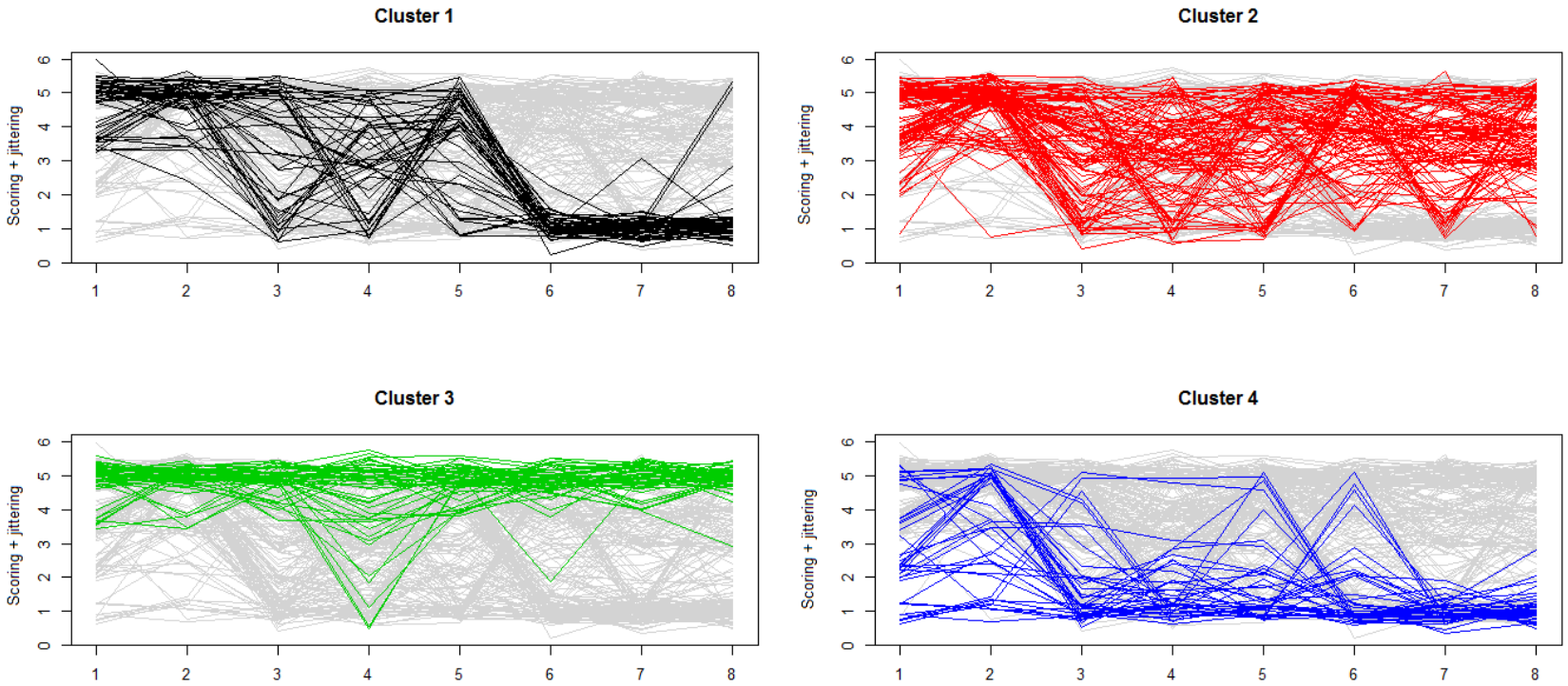
Figure 2 reports, for each cluster, the scoring provided by each respondent for each of the variables used for the classification, allowing to highlight the differences among groups and similarities within[*]. We can identify two main drivers that seem to cluster consumer behaviour with respect to the environmental sustainability of food products: i) the effectiveness of the presence of environmental claims/logos in influencing the choice among products, ii) the interest for additional information on the environmental impact of the products. Note that these drivers correspond to the second and third level of our economic framework.

Instead, the variables regarding the general concern of consumers towards environmental issues (first level) is not very influent in clustering respondents, as all seem to show a high degree of concern. Indeed, 85% of the sample is ‹‹fairly›› or ‹‹very›› preoccupied for climate change and resource wastefulness. Moreover, 76% of respondents reckons that consumers with their everyday food purchases can have an effect on such issues.

When we look at how this concern translates into action - in terms of food product choices - we can identify different attitudes on the basis of the two main drivers emerged. More in detail, we can outline the four clusters as grouping consumers with the following features (Figure 2):

1. those who take into consideration the environmental information on labels and are satisfied with it (do not require additional information) (20% of the sample);
2. those for which environmental information on labels does not have a great effect on purchase, but would like to receive more information (43%);
3. those for which the presence of environmental information directs product selection and would also like to receive more (21%);

[*] In order to better visualize the different lines corresponding to the different respondents we have added some gittering to the curves.



Notes: the use of gittering for a better visualization of the cluster densities implies that the scale of the Y axis goes above 5 and below 1, even if the real scale goes from 1 to 5.

Figure 2. Scoring patterns of the individuals grouped in each cluster

4. those that do not take into account environmental issues when purchasing and are not interested in receiving more information about the impacts of the products (16%).

Note that all clusters include consumers that gave quite high scorings to variables 1 and 2, connected to level 1. Nevertheless, cluster 4 includes most of the respondents that do not show concern about the environment, while cluster 3 has none.

Moreover, cluster 2 groups people that seem quite concerned about the environment, quite interested in additional information, but with very diverse levels of effect of environmental labelled information on the purchasing decisions.

Another thing that can be noticed is a slightly less diffused interest in labelled information about organic products shown in cluster 3. This could be due to the fact that such products require quite a high premium price.

Given the classification of our respondents in these four clusters, we now evaluate if there are differences related to other types of consumer characteristics.

Firstly, we focus on the socio-demographic characteristics; median values for the four clusters are reported in Table 2. We performed four analysis of variance (p-value computed by means of permutational tests) to assess if the means of the socio-demographic variables (age, gender, education and income) of the four groups are statistically different.

Table 2.
Median or percentage values of socio-demographic variables in the four clusters

Cluster	Age	Gender	Education class	Income class
1	47	64%	3	3
2	52	46%	3	3
3	45	60%	3	3
4	51	77%	3	3

Notes: in the column gender we report the % of females in the *i−th* cluster; Class 3 of education corresponds to high-school diploma; Class 3 of income corresponds to households with a monthly income between 1500-3000 €.

The results of the tests, reported in Table 3, show no significant differences among the clusters, thus indicating that, within our sample, age, gender, education and income do not drive the identified attitudes with respect to environmental sustainability of food products. This result leads us to think that these attitudes are distributed across the segmentation of the population based on age, gender, education, and income.

Table 3.
Test for socio-demographic variables

Variable	p-value	R^2
Age	0.2212	0.0085
Gender	0.1248	0.0233
Education	0.6761	0.0029
Income	0.5889	0.0161

Another set of variables that can help to understand the profile of consumers grouped in the different clusters is related to the use of food labels in general. In particular, a variable concerning the frequency of the use of labels highlights the highest scores for the consumers included in cluster 3, followed by those in cluster 2. This result underlines two aspects: a strong attitude for environmental sustainability is connected to a general attention towards food information through labels; on the other side, consumers that are not strongly influenced by environmental attributes, but that are interested in looking for

additional information again show a high use of labels.

If we analyse further the sources of information used by the members of the four clusters for the choice among food products, with regards to information coming from newspapers and educational TV programs, the highest median is in correspondence to cluster 2, whereas cluster 4 shows the lowest score, and cluster 1 and 3 reveal an intermediate score. Therefore, this confirms that cluster 4 is made of people that do not care much about information on food products. On the opposite, members of cluster 2, even if their choices are not clearly influenced by environmental logos, are interested in improving their level of information. Cluster 1 and 3 - where consumers are influenced by environmental logos - do not show such a high use of information coming from this source. In both these cases this is related to the fact that the main source of information declared by this kind of consumers is represented by labels (Table 5). Moreover, labels constitute the primary source of information also for consumers that do not use such indications in the product selection process and do not care to have additional information (cluster 4).

Table 4.
Median values of frequency of use of different sources of information to choose among food products, in the four clusters

Cluster	Friends	Advertising	Newspapers and TV programs	Labels
1	2	1	2	3
2	2	2	3	3
3	1	1	2	3
4	2	1	1	3

Notes: 1 corresponds to 'never', 2 to 'rarely', 3 to 'sometimes', 4 to 'often', 5 to 'always'.

Table 5.
Main source of information used by the four clusters to choose among food products

Cluster	Main source of information
1	labels
2	newspapers and TV programs + labels
3	labels
4	labels

Notes: the ranking is based on the median values of the clusters.

5 Conclusions

This paper aims at evaluating if there is a diffused interest for environmental sustainability of food products among Italian consumers, and at identifying a set of common attitudes. The analysis is based on 240 vis-a-vis interviews of consumers at retail-stores during food shopping.

Our results indicate a high level of concern about environmental issues and about possible impacts of personal food consumption choices on the environment.

Nevertheless, when investigating the respondent actions during everyday shopping the behaviours are not so consistent. Indeed, we have identified four clusters of consumers: the first one groups consumers who care about environmental labelled information and do not demand other additional information; the second includes consumers that give different levels of importance to environmental labels, but require more information; the third comprises consumers that are sensitive to the presence of environmental labels and that, at the same time, are interested in further information; the fourth groups consumers less interested in environmental labels and in additional information.

We find that socio-demographic characteristics - such as age, gender, education and income - do not seem to have an effect on the four identified attitudes. On the contrary, other characteristics that can profile the consumer suggest that some differences may exist. More in detail, we find that the consumers interested in additional information on environmental sustainability issues are also those who more often read food labels in general (cluster 2 and 3). Newspapers and educational TV programs seem to be the most important sources of information for consumers that are interested in additional information on sustainability but that do not clearly take into account these issues in the choice among food products

(cluster 2); while labels are the most relevant source of information for consumers who declare that environmental sustainability certifications and logos affect their purchases (cluster 1 and 3).

As the identified attitudes towards the environmental sustainability of food products seem to be related to personal inclinations and not to socio-demographic conditions, one managerial implication of our results is that marketing initiatives need not to be segmented on the basis of the latter characteristics.

Moreover, we highlight how a large share of the consumers that choose environmentally sustainable products (cluster 1 and 3) are driven by information on labels, confirming the importance of labels as a mean to communicate food attributes to consumers, overcoming information asymmetry between producers and consumers. Those consumers that still need more information to decide to take a clear standpoint (cluster 2) give a high importance also to newspapers and educational TV programs. Maybe such consumers are in need of more trust for certifications.

The importance of labels is confirmed also by the fact that they result to be the main source of information even for those consumers that are not currently taking into account sustainability in their choices and do not look for additional information otherwise (cluster 4).

The main limit of our analysis is the fact that we use stated preference data and a geographically defined sample. Nevertheless, future work will try to deepen the analysis of the characteristics of the consumers having different attitudes with respect to the environmental sustainability of food products by including in the analysis also other purchasing characteristics and stated interests.

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