Consumer preferences and labelling: an empirical analysis of the beef sector in Italy

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Abstract - Within the framework of European food safety measures, Reg. 1760/2000 and 1825/2000 have introduced mandatory traceability and relevant labelling into the beef sector. The paper analyses whether information on meat labels can be considered a useful instrument for consumers, facilitating the verification of quality. The purpose of the paper is, first, to evaluate if meat information is used during food purchase. Second, focussing on specific meat information, we assess the interest of consumer for some mandatory and voluntary information cues and identify the determinants affecting the use of them. Data were collected by a survey conducted in the Lombardy, region of northern Italy, and employed a telephone questionnaire. The sample is composed by 1,025 consumers. We estimate 4 models based on the literature and for all the equations we used a binary logit model. The analyses revealed that meat label is widely used by Italian consumers in the formulation of their purchasing preferences. The use of the meat label is also positively connected to consumer attention towards quality signalling such as certification, expiry date and so on. The origin is confirmed to be an important information for a large part of interviewed. Among the voluntary information the system of cattle breeding is related to a consumer who pays particular attention in general to quality indicators whereas the cattle feeding seems to interest young consumers with high level of education.

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Keywords **-** traceability, meat, consumer preferences, logit

I. INTRODUCTION

As a part of European food safety measures, mandatory traceability and relevant labelling have been introduced into the beef sector by Reg. 1760/2000 and 1825/2000. Mandatory labelling concerns information like a traceability code, the country of animal origin and the country in which the slaughterhouse and cutting hall are located. The EU regulations also allow the single member states to introduce additional voluntary information on labels. In Italy, this labelled voluntary information concerns the characteristics of the animal (date of birth, gender and cattle breed), its breeding (the kind of breeding and feeding e.g. GMO-free, no antibiotics and so on), and details of the firms along the meat chain.

The information reported on labels can be considered an instrument that improves consumer perception of meat quality, and makes it easier for consumers to choose products based on preferences (Bredhal, 2004; Banterle and Stranieri, 2008). Quality signalling can transform credence attributes into search attributes and strengthen consumer trust, allowing the reduction of consumer perceived risk towards food quality and safety, and of information asymmetry between consumers and producers (Mojduszka and Caswell, 2000; Banterle *et al*., 2008). Empirical evidence has revealed no clear framework for the conceptualisation of the information required by consumers. Bernués et al. (2003) found that the most important information for the European meat consumer was the origin and expiry date of the meat, while other important elements concern nutritional features, type of cut, traceability and quality controls. Hobbs et al. (2005) suggest that consumers consider traceability to be an important system to guarantee food safety, especially if associated with other quality assurances, but results show that traceability does not reduce the information asymmetry between producers and consumers with respect to quality attributes. Moreover, Verbeke and Ward (2006) stress the difference between the importance consumers give to the information on labelled meat and the effective use of such information. Probit analysis shows consumer

interest to be low for traceability, but higher for origin and meat quality indications. The paper analyses whether voluntary and mandatory information on meat labels can be considered a useful instrument for consumers, facilitating the verification of quality. The purpose of the paper is first to evaluate whether, during the purchase of meat, the labelled information is used, analysing the variables that can influence consumers in their use of the meat label, and secondly, to focus attention on specific meat information. In this latter, we assess consumer interest in some of the mandatory and voluntary information cues, and identify the determinants affecting their use.

II. METHODOLOGICAL ISSUES

Data were collected by a survey, employing a telephone questionnaire, conducted in the Lombardy region of northern Italy. The sample consisted of 1,025 consumers, and these were divided by the variables of gender, age, and residence of the interviewees. Answers to the questions were arranged in a multiple-choice format with rating scales, and were processed by means of four binary logistic regressions.

In accordance with recent economic literature concerning consumers and food labelled information (Drichoutis, Lazaridis and Nayaga, 2005; Nayaga, 1996), we can assume the following functional relationship among groups of variables:

$$MI_j = f\,(IC, PBF, HLA, NKS, FSA) \qquad [I]$$

MI_j-Meat Information is represented by 4 dependent variables: MI_1-Meat label use; MI_2-Mandatory information concerning country of animal origin; MI_3-Voluntary information concerning the system of cattle breeding; MI_4-Voluntary information concerning cattle feeding.

IC-Socio-demographic and individual characteristics of consumer include variables such as age, gender, income, education, BMI and being shopper; PBF-Factors that affect purchasing behaviour towards food products include variables like price, origin of products, traceability, quality certification, product freshness, nutritional properties, ingredients, expiry date; HLA-Healthy life attitude represents variables such as dietary habits, sports habits, smoking status; NKS-Nutrition Knowledge and source of information represents variables such as the level of food knowledge and information sources; FSA-Food safety attitude represents variables such as attention to food safety issues, the level of food safety perceived by consumers, and meat consumption variation after the BSE crisis.

We estimated 4 models based on [1] and, for all the equations, we used a binary logit model as the dependent variable is expressed in a dichotomic way. This model takes the form (Bohrnstedt and Knoke, 1994)

$$logit(p_i) = \ln\left(\frac{p_i}{1-p_i}\right) = \alpha + \sum_j \beta_j X_{ji} \qquad [II]$$

where

i =1,....1025; corresponding to number of consumers interviewed

p_i = probability of the dependent variable taking a value of 1

j = 1,....24; corresponding to the number of independent variables

X_{ji} = independent variables

α = constant

β_j = regression coefficients

III. RESULTS

Equation [2] was estimated using the maximum likelihood estimation method, and the results are shown in table 1. Pearson's Chi-Square Statistics confirms that all the models with the independent variables included are significantly better than those models with just intercepts, and Nagelkerke's R^2 indicates an adequate goodness of fit.

Most consumers believe labelled information to be very important when purchasing meat: 69% of the sample read the meat label. Model MI_1 shows that some socio-demographic variables (IC), like age, gender and income, significantly affect the dependent variable "meat label use". The analysis highlights that young people, females, and consumers without a high income are more likely to use the meat label. According to other empirical studies (Drichoutis *et al*., 2005) the negative sign of income can be connected to

Table 1 –Estimates of the 4 models

	Meat label use (MI_1)		**Country of origin (MI_2)**		**System of cattle-breeding (MI_3)**		**Cattle-feeding (MI_4)**	
	β	Sig.	β	Sig.	β	Sig.	β	Sig.
α	-3,508	*0,005*	-4,280	*0,004*	-3,171	*0,019*	-2,737	*0,030*
Socio-demographic and individual characteristics (IC)								
age	**-0,154**	*0,008*	-0,109	*0,135*	-0,079	*0,224*	**-0,168**	*0,007*
gender (1)	**0,314**	*0,072*	**0,749**	*0,001*	**0,493**	*0,013*	**0,311**	*0,094*
income	**-0,138**	*0,087*	-0,020	*0,843*	-0,035	*0,702*	-0,028	*0,742*
education	0,032	*0,740*	0,111	*0,365*	0,020	*0,853*	**0,196**	*0,059*
shopper	-0,099	*0,596*	-0,283	*0,236*	-0,041	*0,847*	0,050	*0,804*
BMI	0,073	*0,523*	**0,247**	*0,093*	**0,556**	*0,000*	**0,450**	*0,000*
Factors affecting purchasing behaviour of food products (PBF)								
price	0,050	*0,493*	0,053	*0,559*	0,005	*0,951*	0,033	*0,665*
origin	-0,044	*0,586*	0,125	*0,199*	-0,029	*0,740*	0,110	*0,180*
traceability	**0,156**	*0,073*	0,098	*0,339*	**0,246**	*0,008*	0,104	*0,243*
certifications	**0,153**	*0,067*	**0,422**	*0,000*	**0,226**	*0,012*	**0,282**	*0,001*
freshness	**0,632**	*0,089*	-0,318	*0,488*	**0,626**	*0,093*	0,283	*0,446*
nutritional properties	-0,108	*0,253*	-0,122	*0,302*	0,074	*0,461*	-0,012	*0,905*
ingredients	**-0,669**	*0,000*	-0,323	*0,137*	**-0,421**	*0,027*	**-0,531**	*0,003*
expiry date	**2,335**	*0,000*	**1,268**	*0,007*	**0,702**	*0,097*	0,583	*0,158*
Healthy life attitudes (HLA)								
special diet	0,281	*0,128*	0,221	*0,342*	0,137	*0,517*	0,184	*0,349*
sport habits	0,220	*0,169*	**0,404**	*0,048*	-0,030	*0,866*	-0,244	*0,147*
smoke	-0,047	*0,347*	**-0,118**	*0,059*	-0,088	*0,118*	-0,038	*0,478*
Nutritional knowledge and sorce of information (NKS)								
infomedia	**0,296**	*0,062*	0,197	*0,326*	0,277	*0,121*	0,108	*0,524*
infoexpert	0,245	*0,148*	0,332	*0,134*	0,261	*0,177*	0,155	*0,393*
infofriends	-0,035	*0,831*	0,021	*0,921*	-0,122	*0,506*	0,175	*0,319*
food knowledge	0,087	*0,291*	**0,359**	*0,001*	0,039	*0,676*	0,072	*0,413*
Food safety attitude (FSA)								
Attention to food safety issue	0,042	*0,692*	0,095	*0,451*	0,115	*0,315*	0,123	*0,261*
Level food safety perceived	0,089	*0,322*	-0,103	*0,363*	**-0,250**	*0,015*	-0,086	*0,366*
Bse effect	**0,221**	*0,056*	**0,276**	*0,069*	**0,241**	*0,066*	0,058	*0,625*
Chi-Square (Sig. 0,000)	130,43		102,14		106,38		99,41	
Nagelkerke R Square	0,18		0,18		0,17		0,15	

the time pressure of high revenue consumers. Healthy life attitude (HLA) does not affect the dependent variable whereas, among the factors affecting the purchasing behaviour of food products (PBF), traceability, certification, product freshness, ingredients and expiry date play an important role in the model. Regarding food safety attitude (FSA), the variable connected to the decrease in meat consumption after the Bse crisis is positive and statistically significant. Moreover, those respondents who obtained food information by media (NKS) were more likely to use the meat label.

With regard to mandatory meat labelling, according to some empirical studies, the most important information was considered to be the country in which the animals were born (84%) (figure 1). Model MI_2 shows a significant relation to those variables connected with sports habits and smoking, and a positive link with the level of consumer food knowledge, suggesting that those who have good food knowledge and who pay particular attention to having a healthy life care about having information concerning the origin of the animals.

Also some voluntary information such as the system of cattle-breeding (79%), cattle-feeding (76%) and the date of slaughtering (82%) are considered important factors by consumers. Model MI_3 concerning cattle breeding gives a profile of the consumer who pays particular attention to the quality attributes of products but has a low perception of food safety standards. Finally, model MI_4 concerning cattle feeding points to age, education and certification variables as significant factors, indicating that young consumers with a high level of education pay particular attention to this kind of voluntary information.

The analyses reveal that Italian consumers make wide use of the meat label in the formulation of their purchasing preferences. In fact, the meat label appears to be a tool that reinforces consumer trust towards meat safety after the Bse crisis. Furthermore, the use of a label is also positively connected to consumer attention towards quality signalling such as certification, expiry date and so on. The vast majority of those interviewed confirmed meat origin to be important information. With regard to voluntary information, the system of cattle breeding was related to consumers who, in general, pay particular attention to quality indicators, whereas the cattle feeding seems to interest young consumers with a high standard of education

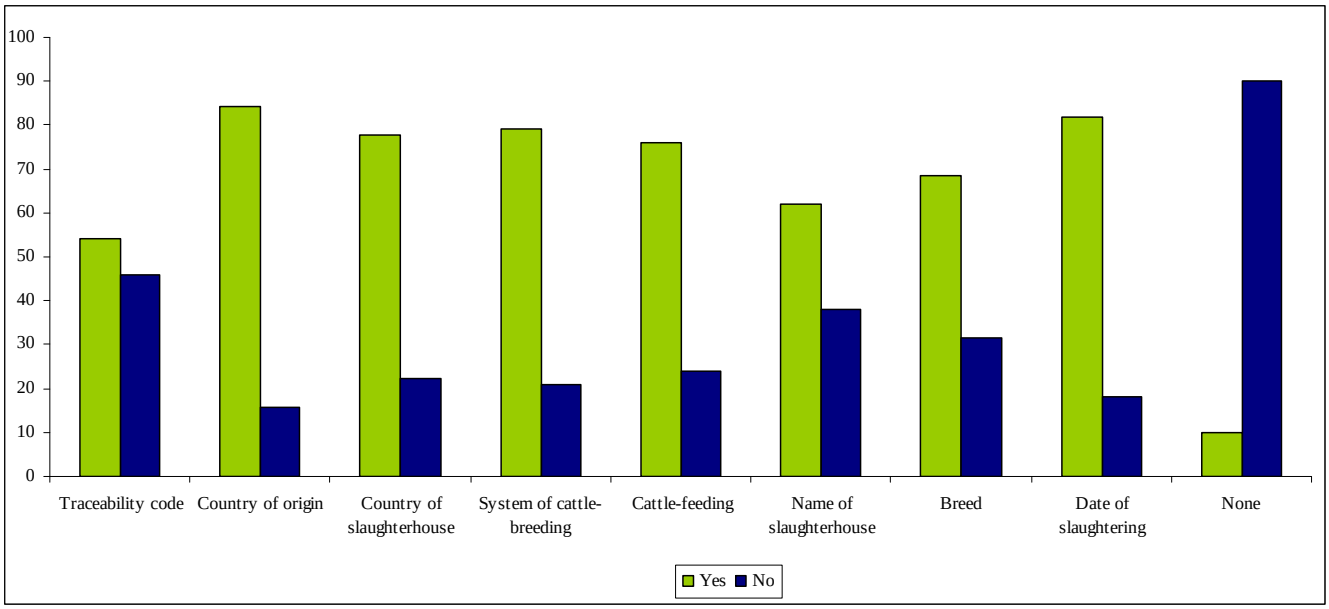

Figure 1: The importance of information labelled on fresh meat (%)

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