Corporate Social Responsibility certifications influence consumer preferences and the seafood market price

Abstract

This study analyzes consumer preferences toward Corporate Social Responsibility (CSR) aspects of canned tuna fish in relation to environmental and social responsibility. The analysis investigates the different existing labeled standards on canned tuna fish, evaluating the effects of such CSR-labeled information on market price and consumer choice. Data collection was carried out at a retail store and respondents were interviewed only after they had put a tin of canned tuna fish, chosen from among those available in the real choice set, in their shopping basket. Data were analyzed using two different, but complementary, methods: hedonic pricing and random utility models. Results show that consumers are in search of environmental and social sustainability attributes for canned tuna fish. Indeed, especially concerning the environmental dimension, consumers prefer green products more than their ordinary counterparts. The findings indicate that products with environmental certifications are priced higher than regular non-certified products, while those with social certifications are priced similarly to regular products. With regards to consumer choice, canned tuna with environmental or social certifications is preferred as opposed to the non-certified product, with both types of certifications showing a similar willingness to pay. The willingness to pay for such products seems to increase, *ceteris paribus*, with income and decrease with age. By combining the experimental findings of the two models adopted, managerial and policy implications are drawn.

Keywords: CSR, consumer, canned tuna, revealed preferences

1.   Introduction

In recent decades, a noticeable amount of public concern about environmental and social aspects of food production, including fishery management and utilization, has arisen (Uchida et al., 2014). The whole food sector has experienced a growth in the number of initiatives related to the practice of Corporate Social Responsibility (CSR) (Freeman et al., 2010). According to the European Commission, CSR is "a concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis" (European Commission, 2001). Thus, CSR may be identified by two main key dimensions: social and environmental responsibility (Luhmann et al., 2016). Environmental responsibility mainly relates to corporate activities protecting the natural environment, whereas social responsibility refers

to initiatives that protect the social welfare of key stakeholders (Lockett et al., 2006). The result of this concern is that nowadays most food producers and processors are engaged in some forms of CSR, communicating their activities through different media platforms and also via product labeling (Romani et al., 2016).

Moving more specifically to the fishery industry and seafood production, literature highlights an increasing need for a wider system approach to seafood certification (Alfnes, 2017). The greater institutional attention in Western European countries toward the protection of a wide range of sustainability aspects of fishery is also related to the growing consumer preference toward the different sustainability-related aspects of seafood products (Maroušek et al., 2015). Important social and environmental issues related to fishery are at stake (Banterle et al., n.d.). Seafood consumers in developed countries are increasingly sensitive to more articulated credence attributes that include a wide range of intangible and interconnected characteristics, such as environmental and ecosystem conservation, product origin, creation of employment, support for small-scale enterprises, preservation of local rural communities, and workers' rights (Brécard et al., 2009).

To date, it is possible to observe, on the one side, a proliferation of different certifications aimed at managing and conserving marine resources and, on the other, at safeguarding small local communities (Parkes et al., 2010). Such schemes may differ in relation to the ownership of the standard and/or to the type of CSR-related certified attributes. With regard to the scheme ownership, it is possible to distinguish: (i) third party certification schemes; (ii) internationally accepted protocols provided by NGOs (e.g., FAO guidelines); (iii) private labeling schemes imposing the adoption of rules for sustainable fishery (mostly rules and protocols set up by the main retailers); and (iv) certifications approved by national governments mostly oriented to the preservation of local marine biodiversity (e.g., Scottish salmon, Queensland catch, Responsible Alaska seafood, North Carolina's local catch) (McClenachan et al., 2016). Regarding the type of CSR-related certified attributes, it is possible to distinguish between certifications aimed at preserving both the environmental and social aspects of fish production (i.e., Best Aquaculture practices certified, Aquaculture Stewardship Council certification, and FAO guidelines for aquaculture certification), and schemes that focus on a specific dimension of corporate responsibility. For example, the

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standards Dolphin safe, Friend of the Sea, and Marine Stewardship Council certified impose rules mostly related to the environmental sustainability of production. Specific social regulation for seafood does not exist yet. The lack of appropriate legislation on ethical issues, related to the production side, leads to a risk of unethical behavior by food manufacturers (Maroušek et al., 2016). As a response to such normative context, voluntary standards have begun to emerge. Indeed, all certifications, aiming specifically at safeguarding the social attribute of fish products, are provided by private certification initiatives (mostly by retailers with their own private labels) or by the Social Accountability standard–SA8000, which guarantees firm efforts in managing corporate activities in an ethical manner (Gutierrez et al., 2016).

The decision for a company to implement CSR is voluntary, but not exempt from adoption costs (Stranieri et al., 2017a). These costs, however, are likely to be different depending on the type of certification adopted, and it is unclear as to what extent these costs are directly transferred to final consumers via market price. On the demand side, whether consumers are able to value this specific firm effort through a price premium is also still uncertain. Indeed, studies on consumer preferences on CSR aspects, particularly concerning the fishery sector, are still scarce (Hartmann, 2011). Moreover, the mechanism by which consumers recognize the value of CSR-related attributes is complex since it is related to several behavioral factors (Lombardi et al., 2015). For instance, consumer trust in the stakeholders operating in the food supply chain plays an important role in the effective market recognition of "responsible" product attributes, especially if products are produced in foreign countries (Vlachos et al., 2009).

Based on such considerations, the current study addresses the following two research questions.

i) What is the impact of social and environmental CSR-related certifications on the market price formation process of canned tuna fish?

ii) What are the effects of CSR-related labels on consumer choices of canned tuna fish and on their relative willingness to pay (WTP)?

To obtain answers to both of the questions above, two revealed preference (RP) analyses

were conducted examining actual market transaction data[1] (prices and purchases) of the canned tuna fish available on the shelves of a large grocery retailer in Italy. The choice of the specific product is related to the fact that canned tuna is one of the most common fish commodities globally and that its sustainability represents an important issue for producers, sellers, and consumers (Leadbitter and Benguerel, 2014). FAO (2016) estimates that almost 25% of processed tuna is sold in preserved form. Europe is the world's largest canned tuna market, and Italy represents one of the main markets for tuna consumption, with 2.33 kg/year/inhabitant of canned tuna (Fattore et al., 2015).

The current study contributes to the specific literature in the following ways. Most of the existing studies on canned tuna fish have focused only on safety aspects (Lim et al., 2009) and environmental impact (Hospido et al., 2006). Only a few studies have analyzed canned tuna fish from a consumer perspective (De Magistris, et al., 2015), and many of these have focused on health-related information (Roosen et al., 2007). This current study, instead, focuses both on environmental and social quality attributes of such a product.

Thus, both the analysis of the market price formation process and the assessment of consumer preferences and WTP toward CSR-related labels give new insights on this topic. Moreover, the methods adopted in this study integrate two RP tools analyzing actual market transaction data (prices and choices). Such methods are useful to analyze the so-called "CSR-paradox" (Öberseder et al., 2011), namely, the social desirability bias that characterizes consumer evaluation of CSR aspects (Smith and Langford, 2009). Thus, the present study is innovative both for the topic under analysis as well as for the methodology adopted for eliciting consumer preferences. Indeed, most of the existing literature has been carried out using stated rather than RP surveys (Stefani et al., 2012).

The remainder of the paper is organized as follows. Section 2 discusses the research hypotheses of the study. Section 3 describes the methodology and data collection. Section 4 presents the results. In Section 5, a discussion of the results is provided. Finally, the paper ends with some concluding remarks.

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[1] The main advantage of the RP methods is the use of real market data. However, RP analyses are largely limited to analyzing current market situations and they are not useful for measuring (or predicting) preferences for attributes (or their combinations) that are not currently observed.

2. Research hypotheses

This study aims at gaining better insight into the role that social and environmental CSR-related standards play on the market price formation process of canned tuna fish. Besides the societal benefits, CSR implementation may potentially provide benefits to the company, in terms of reputation, attractiveness, performance, and access to markets, as well as explicit costs (Weber, 2008). For instance, Merli et al. (2015) identified certification costs as one of the main barriers to implementing SA8000 for small and micro companies. For CSR implementation to be sustained over time, costs incurred by firms need to be counterbalanced by a premium price for "responsible" products (Maloni and Brown, 2006), otherwise if these costs exceed their benefits, a market failure is likely to arise (Kitzmueller and Shimshack, 2012). Analysis of the price formation process provides direct information on the market equilibrium between production costs related to the CSR implementation and the corresponding price premium. Indeed, a better understanding of the price formation process could help companies that are aware of their own costs of production to understand if the market price can effectively reward their efforts (Caracciolo et al., 2016). While a large component of the literature has carried out price formation analysis focusing on a wide range of food attributes (Costanigro and McCluskey, 2011), the impact of CSR-related certifications has never been explicitly addressed. Existing scientific knowledge mostly focused on ecolabeling schemes (Roheim et al., 2011) without focusing on "social" aspects of responsibility. Accordingly, the first research hypothesis is the following.

H1: CSR-related certifications positively contribute (although with varying degrees) to the market price of canned tuna.

The effects of CSR-related labels on consumer choices of canned tuna fish, and their relative WTP, are also investigated. Most of the existing consumer-related studies have focused on sustainable seafood consumption (Fabinyi, 2016) or on just a few quality-related product attributes, namely country of origin, production methods (wild/farmed), and price (Carlucci et al., 2015). For instance, a positive relationship between CSR activities

and purchase intention was identified in studies like Becker-Olsen et al. (2006), Mohr and Webb (2005), and Pracejus and Olsen (2004). Only a limited number of studies have explored consumer choices and WTP for certification labels on fish and seafood products. Regarding sustainability seafood labels, Jaffry et al. (2016) highlighted a positive consumer attitude toward sustainably managed fisheries. Brécard et al. (2009) investigated European consumer preferences with regard to the introduction of a specific eco-labeling policy for seafood products finding a positive attitude. Jaffry et al. (2004) also reached similar results for UK consumers. Furthermore, Mauracher et al. (2013) and Stefani et al. (2012) investigated the WTP for organic fish, showing positive WTPs for the organic attribute. To the best of our knowledge, no study has yet investigated the role of CSR-labeled information on consumer preferences for seafood products, considering both environmentally friendly and ethical labels at the same time. Accordingly, the second research hypothesis is the following.

H2: CSR-related certifications positively influence consumer choices and WTP for canned tuna.

3.   Methodology and data

3.1   Data collection

Data collection was carried out in three subsequent steps. First, all the options of canned tuna fish available at the retail store were recorded. Second, consumers choosing among canned tuna fish products were observed and their choice was registered. Third, respondents were approached right after they had put in their shopping basket a tin of canned tuna fish. A short interview followed. Indeed, the respondents were recruited in a real-life situation in which they spontaneously chose to buy canned tuna fish and they freely selected which specific product to buy—among the full set of options available on the shelf—before knowing that they were going to be interviewed.

Respondents were interviewed in a large grocery retailer in Naples (Italy) and the final sample consisted of 150 consumers. The choice of sampling at a supermarket relates to the

type of consumer targeted by our analysis. Indeed, consumers that shop at a supermarket are generally characterized as having time constraints and are more prone to buying convenience foods, such as canned tuna fish (Stranieri et al., 2017b).

The set of canned tuna alternatives available on the shelves was 41 products. To illustrate, the attributes available were related to: price; brand (the first three market leaders were identified); fish species (if "Yellow fin" or not); type of packaging (packaging material); type of oil (i.e., olive oil, extra virgin olive oil, preserving liquid); presence of nutrition claims (fat free); and presence of handmade label; and presence of certifications. Studying the choice set allowed us to identify the available indications and/or certifications that could fall in the realm of CSR. The different CSR certifications were then aggregated in two different categories based on their key focus on the social or environmental aspects of CSR. The social-certification category (SC) includes "*SA 8000*", while the environmental-certification category (EC) includes "*Dolphin safe*" and "*Friend of the sea*" certifications. Other CSR labels, like those related to *Best Aquaculture practices* certified or *Aquaculture Stewardship Counci*l (ASC) certifications, were not considered because they were not present on the packaging of canned tuna fish during data collection.

Very briefly, *Dolphin Safe* is a certification by the Earth Island Institute denoting compliance with policies designed to minimize dolphin by-catch during tuna-fishing. *Friend of the Sea* is an international certification project for products originating from both sustainable fisheries and aquaculture focusing on overexploitation, seabed impacts, and discard rates. *SA 8000* is an international workplace-quality certification based on the concept of social accountability; its major objective is to ensure the application of ethical practices in the hiring and treatment of employees and in the production of goods and services.

The collected data were analyzed using two different, but complementary, methods: (i) a hedonic pricing model to identify the market equilibrium price of the attributes; and (ii) a random utility model to investigate the observed choices of consumers to identify their preferences for each attribute.

3.2 Hedonic pricing

The hedonic pricing method assumes that each good includes a bundle of attributes and that the good is valued on the market by its attribute composition. In other words, the market price reflects the attributes, which, on the contrary, do not have an observable price on the market. However, it is possible to isolate the value associated to the single attributes that compose the final good by analyzing the systematic variation in the price (Rosen, 1974). Hedonic-price studies in the agri-food sector range from wine (Caracciolo et al., 2016), to pasta (Cembalo et al., 2008), to milk (Kolodinsky, 2008), to coffee (Schollenberg, 2012), to oil (Cavallo et al., 2017).

Empirically, the following equation is estimated using *linear* robust regression techniques (Street et al., 1998):

$$P_t = X_t \boldsymbol{\beta} + e_t, \qquad \text{with } t = 1, \dots, T; \qquad (1)$$

where t indexes the 41 canned tuna options observed in the market and (P_t) is the price; X_t is a $1 \times m$ vector of all collected observable attributes that characterize the t-th canned tuna; $\boldsymbol{\beta}$ is an $m \times 1$ parameter vector, measuring the role of these attributes on market price formation process; and e_t is the error component.

Thus, through the estimation of parameter $\boldsymbol{\beta}$ it is possible to understand in which way the different CSR-labeled attributes may affect the canned tuna market price.

3.3   Random utility model

Typically, consumer choices and preferences are analyzed in hypothetical settings that represent a potential source of bias (Hensher, 2010). The approach adopted in this study tries to merge the typical approach of experimental economics with the classical implementation of the choice model, building on the work of Train and Wilson (2008), Cembalo et al. (2008), and Thiene et al. (2013). In this case, respondents are directly sampled at the shelf of a large supermarket after they independently selected to buy the product under examination. Consumers do not choose from a controlled set of hypothetical products but from the full set of available options available on a real retailer shelf. Attribute

combinations are the ones available on the market, at the chosen retailer.

Formally, given a T=41 the number of canned tuna consumption alternatives available on the shelf to the *i*-th consumer, the outcome of the choice experiment, i.e., the purchase decision for the alterative *t* by the *i*-th consumer interviewed, is represented by y_{it}, with $t = 1,..., T$. It indicates that alternative *t* was purchased ($y_{it} = 1$) or not purchased ($y_{it} = 0$) by the *i*-th individual interviewed, with $t \in T$ alternatives.

Each observed purchase decision y_{it} can be considered as the outcome of an income-constrained utility maximization exercise, where U_{it} is the utility associated by the *i*-th individual to the alternative *t*. We assume that $U_{it} \geq U_{ik}$ when $y_{it} > y_{ik}$ for each alternative *t* and *k* in the choice set T, with the utility U_{it} being the sum of an observable component μ_{it} and a stochastic component ε_{it}.

$$U_{it} = \mu_{it} + \varepsilon_{it}. \tag{2}$$

This theoretical framework is based on the classic random utility maximization analysis. McFadden (1974) showed that under the assumption that an unobservable utility component ε_{ij}, or error term, has a type one extreme value distribution, observed discrete choices may be modeled using the conditional logit model consistently with the assumption of utility maximization. Commonly, the observable component μ_{it} is decomposed into a linear function of explicative variables (Cicia et al., 2016); in this specific case we assume the observable component μ_{it} to be a function of *p* specific variables so that x_{it} constitutes a $(1 \times p)$ vector of canned tuna fish attributes, including CSR certifications, that vary only over the *T* alternatives. Therefore, Equation 2 can be rewritten as:

$$U_{it} = x'_{it} \gamma + \varepsilon_{it}, \tag{3}$$

where γ is the conformable $(p \times 1)$ vector of parameters for the alternative specific variables. Moreover, Equation 3 can be augmented including consumers' specific variables as interaction terms, in order to identify the role of different socio-demographic attributes in

influencing consumer preferences for the different attributes. Empirically, the estimates of γ parameters can be obtained using maximum likelihood estimation.

4. Results

4.1 Descriptive statistics

Descriptive analysis of our data revealed that, although the shelf choice set consisted of 41 different types of products, most consumers in our sample focused only on a small set of them. Indeed, 15 products were never selected, while 5 products made up 52% of the choices. Average observed price was equal to 1.32 (€/100gr). The most commonly chosen products were packaged in aluminum cans (85%) and canned in olive oil (59%). 34% of the products were branded by the current Italian market leader (Rio Mare, produced by Bolton Group SPA). Finally, around 20% of the products were either labeled as handmade or their labels reported indications about some health-related characteristic. Table 1 reports the details on the full set of attributes of the choice set and on how they were converted into variables for the analyses.

Tab. 1. Canned tuna attributes, descriptive statistics (sample size n= 41).

Variables	Description	Mean	Standard deviation
Price	Market price in € for 100gr	1.318	0.499
Yellow fin	1 if labelled as yellow fin; 0 otherwise	0.366	N/A
Aluminium Cans	1 if packaged in aluminium cans; 0 otherwise	0.854	N/A
In olive oil	1 if canned in olive oil; 0 otherwise	0.585	N/A
In extra virgin olive oil	1 if canned in extra virgin olive oil; 0 otherwise	0.098	N/A
Brand 1	1 if produced by the market leader; 0 otherwise	0.341	N/A
Brand 2	1 if produced by the second market leader; 0 otherwise	0.073	N/A
Brand 3	1 if produced by the third market leader; 0 otherwise	0.073	N/A
Handmade	1 if labelled as "handmade" tuna; 0 otherwise	0.195	N/A
Health - reduced fat	1 if labelled as fat-reduced or rich in omega 3; 0 otherwise	0.220	N/A
Social cert.	1 certified as socially responsible product; 0 otherwise	0.073	N/A
Environmental cert.	1 certified as environmentally responsible product; 0 otherwise	0.293	N/A

If we consider the labeled information that indicates CSR practices by the firm, our results show that about 29% of the available options had a recognizable environmental attribute on the label, in relation to fishing practices, namely, having either the *Dolphin Safe* or the *Friend of the Sea* logo on the packet. Focusing on actual consumer choices, about 50% of respondents chose a product with such attributes (see Table 2). For the social certification, while only 7% of the available options had a social responsibility attribute—namely, the SA8000 certification—8% of interviewees chose a product with this certification. Moreover, products including the environmental attribute on the label showed a higher market price (1.48 €/100gr) than those including the social responsibility one (1.26 €/100gr) or without any CSR-related attribute (1.25 €/100gr.). None of the available 41 options had both an environmental and a social certification.

Tab. 2. Presence of Social and Environmental certifications, prices and consumers choices.

Types of certification	Average Price	Freq. sample (%)	Freq. choice (%)	Freq. choice / Freq. sample
Environmental cert.	1.48	29.3	50	1.7
Social cert.	1.26	7.3	8	1.1
Environmental & Social cert.	N.A	0	N.A	N.A
Not certified	1.25	63.4	42	0.66
Total	1.32	100	100	1

4.2 Hedonic pricing

Table 3 demonstrates the estimated coefficient of the Hedonic price model. A log-linear specification of Equation 1 was adopted following Box-Cox transformation results. Furthermore, a regression method robust to outliers was implemented (Street et al., 1988). Estimated coefficients can be interpreted as the percentage of change on the tuna market price due to a unit change of the corresponding variable. Only statistically significant attributes ($p \leq .10$) were included in the model.[2] Results indicate that the attributes showing an impact on canned tuna market price were: type of packaging, preservative used, brand,

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[2] The following variables do not have a significant effect on canned tuna market price: "Yellow fin", "Brand 2", and "Social certification".

being handmade, reduced fat, and environmental certifications. To illustrate, in line with the results of Loose and Szolnoki (2012) and Delgado et al. (2013) indicating the importance of packaging in affecting food market price, canned tuna in aluminum cans has a lower price than those in glass.

Tab. 3. Hedonic Price Model - Dep var = ln (price €/100gr) (robust regression)

	β parameters	std-dev	z-stat	p-value	$\Delta p\%$
Aluminium Cans	-0.575	0.11	-5.2	<0.001	-57.5
In olive oil	0.118	0.05	2.49	0.018	11.8
In extra virgin olive oil	0.211	0.08	2.8	0.009	21.1
Brand 1	0.427	0.05	8.5	<0.001	42.7
Brand 3	0.386	0.09	4.41	<0.001	38.6
Handmade	0.418	0.10	4.2	<0.001	41.8
Health - reduced fat	0.237	0.05	4.39	<0.001	23.7
Environmental cert.	0.192	0.05	3.57	0.001	19.2
Social cert.					
Cons	0.259	0.12	2.1	0.044	

Sample size = 41 R^2 = 0.81 // // F = 50.61 // Skewness test of residuals p = 0.682 (H_0: normality)

Moreover, the "canned in olive oil" attribute shows a positive and significant implicit price of about +12%, confirming positive consumer attitudes toward olive oil (Santosa et al., 2013). The implicit price goes up by +21% if the tuna is canned in extra virgin olive oil. Two brands over three are also found to add to the sale price, attesting their importance as value creators (McWilliams and Siegel, 2001). Similarly, the attributes being handmade or with reduced fat content positively influence the market price. As concerns the latter, this finding is in line with Edenbrandt et al. (2017), who underlined the significant role of nutrition information on the market price for different food products, and with Carrol et al. (2001) who showed that fresh Bluefin tuna price is influenced by different quality attributes, including fat content.

With regard to the first research issue, the contribution of social and environmental CSR-related certifications to the market price formation process of canned tuna fish, H1 hypothesis (*CSR-related certifications positively contribute (although with varying*

degrees) to the market price of canned tuna.) is only partially confirmed by the empirical analysis. Hedonic price results indicate a positive implicit market price only for those products with an environmental certification. The presence of an environmental certification significantly influences market price, increasing it by about +19%. For social certifications, instead there is no statistical evidence of a positive implicit market price. This could indicate that implementing the SA8000 standard may not affect price equilibrium, in terms of both production costs and consumers preferences (Miles and Munilla, 2004). On the other side, previous literature highlights how environmentally friendly practices often imply higher costs and/or lower productivity for the company (Maloni and Brown, 2006). Such findings add to Roheim et al. (2011) who investigated the actual premium being paid by consumers for ecolabeled processed Alaska pollock, finding a price premium of +14%. Analogous results were obtained by Ankamah-Yeboah et al. (2016) identifying a price premium of +20% for organic salmon. As concerns the presence of certification for social aspects of food production, while no other studies exist on the role of such certification on the seafood market price, our results are not in line with the findings of Schollenberg (2012), who found a premium of +38% for Fair Trade labeled coffee in Sweden.

4.3   Random utility model

The random utility model (RUM) measures consumer preferences toward the different attributes of canned tuna fish. In detail, the impact of certain product attributes—such as environmental or social certifications acquired through indications on the label or packaging—on consumer choices were explicitly assessed. Table 4 shows the point estimates of the attributes and the odds ratios. As in the previous model, only statistically significant variables ($p \leq .10$) were kept in the model.[3]

Model results show quite clearly that the tuna species "Yellow fin" impacts positively on consumer preference, even if consumers usually are not aware of the differences among fish species, as stated by Burger and Gochfeld (2009) and Gaviglio et al. (2014). Moreover,

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[3]"Aluminium cans", "Handmade", and "Health-reduced fat" do not have a significant influence on consumer preference.

findings show that the type of preservative used for canned tuna, both "canned in olive oil and "canned in extra virgin olive oil", impact positively on the probability of choosing such a product, as well as brands, confirming the important role of such attributes on consumer quality perceptions (Vitale et al., 2017). Consumer aversion to higher prices, which is corroborated by our results, seems to be related to the age of the consumers (the older the consumer, the higher the aversion).

Table 4. RUM model - Fixed effect logit - Dep var = choice

	γ **parameters**	std-dev	z-stat	p-value
Price				
× age	-0.025	0.01	-3.2	0.001
Yellow fin	0.559	0.21	2.72	0.006
In olive oil	0.871	0.53	1.64	0.1
In extra virgin olive oil	0.937	0.22	4.2	0
Brand 1	0.375	0.22	1.65	0.1
Brand 2	2.678	0.29	9.34	0
Brand 3	1.145	0.53	2.14	0.032
Environmental cert.				
× income classes	0.643	0.13	5.09	0
Social cert.				
× income classes	0.542	0.22	2.43	0.015

Pseudo R-squared= 0.1084// sample size = 6,150 // Chi2 = 120.77

Regarding the effects of CSR-related labels on consumer choices of canned tuna fish, H2 hypothesis (*CSR-related certifications positively influence consumers choices and WTP of canned tuna.*) is confirmed by our results for both social and environmental certifications. Canned tuna products with either environmental or social certifications are associated with a higher probability to be effectively purchased by the consumers. However, we may acknowledge, by means of a Wald test on the coefficient estimates, that both certifications benefit equally from the same magnitude of the effect. Even if we are not explicitly assessing consumer knowledge of each of the different CSR-related certifications included in the model, we can interpret such results as an indirect clue that consumers might not

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attribute so much importance to the specific quality signal. Put differently, consumers seem to prefer a certified product to one without any warranty, but might not pay great attention to the type and the specific content of the standard, thus showing a lack of perceived differentiation between the various certifications. On the basis of the RUM results, it is possible to provide estimates on consumer WTP for the two categories of certifications. Table 5 provides WTP estimates for different types of consumers.

Table 5. Estimated WTP (€/100gr)

	Age		
Environmental cert.	30	45	60
low income	0.45	0.30	0.22
middle income	0.89	0.60	0.45
high income	1.79	1.19	0.89
Social cert.			
low income	0.38	0.25	0.19
middle income	0.75	0.50	0.38
high income	1.50	1.00	0.75

Large heterogeneity in consumer preference for the different CSR certifications exists. WTPs for environmental certification range from 0.22€/100gr (consumers with an age greater than 60 and with a low income) to 1.79 €/100gr (consumers with age lower than 30 and a high income), while WTPs for social certification are slightly lower (ranging from 0.19–1.50 €/100gr).

What emerges is that WTP for both CSR-related certifications seems to increase with income[4] and to decrease with age. This confirms literature results that highlight a positive association between income and WTP for sustainable products (Vecchio and Annunziata, 2015). Results confirm previous findings on other products by Maroušek (2013) that highlight that younger consumers are more sensitive to environmental and social issues. The higher propensity of young people to choose CSR-labeled products could be due to the massive information available about the environmental and social impacts associated with

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[4] Income was included in the model by grouping respondents' household incomes into three categories: low (less than €10,000–€29,999 annually), middle (less than €30,000–€49,999 annually), and high (greater than €50,000).

everyday choices, something that in the last few years has been provided by a diverse set of sources. The fact that young people (keeping the income class constant) show a higher propensity toward environmentally responsible products may be related to the fact that the issues related to environmental degradation and resource depletion related to the production of goods and services are starting to be taught in schools and are becoming common knowledge especially for young and digitalized consumers (Maloni and Brown, 2006).

5. Implications and conclusions

This paper aims at evaluating the impact of social and environmental CSR-related certifications on the market price formation process of canned tuna fish providing insights into the analysis of consumer preferences with regards to CSR aspects. Previous research on such aspects of the food sector is still scarce and shows contrasting results (Hartmann, 2011). The product considered in this study is canned tuna fish, an item regularly purchased worldwide (Marette et al., 2008). Results indicate a positive impact of the presence of CSR certifications related to environmental responsibility on market price. Instead, the presence of social responsibility certifications does not seem to affect the market equilibrium. Moreover, results confirm that consumers are in search of environmental and social sustainability attributes in seafood products. Indeed, especially for what concerns the environmental dimension, consumers choose "responsible" products more than their ordinary counterparts. Moreover, younger consumers seem to be willing to pay more for products with such attributes. The innovativeness of our results relates to different aspects. This study is one of the first attempts to measure consumer preferences for canned tuna fish with regards to CSR-related product information. It also provides insights from both the demand and supply side. Moreover, our analysis showed the degree of consumer preferences toward social and environmental certifications of fish products using revealed preference techniques. Such experimental results allow a real choice scenario to be captured and reduce both the hypothetical and social desirability biases related to CSR-related activities. Thus, the present findings may be considered as supportive information for both research and operational management purposes.

From a managerial perspective, both model findings give interesting insights for successful marketing strategies of product differentiation. The significant implicit prices related to the type of packaging, preservative used, brand, processing method, presence of a nutrition claim, and environmental certifications give canned tuna producers the possibility of isolating the premiums for different product quality attributes. This information allows companies that are aware of their own production costs to evaluate the effective cost-benefit margin of each attribute. From a policy perspective, a hedonic price result stresses the importance of a proper regulation for those certifications that have high implicit prices, such as the environmentally friendly one, for preventing unfair practices of producers, guaranteeing, at the same time, truthfulness of such information to consumers. Also, results of the RUM model have both managerial and policy implications. From a managerial perspective, the empirical analysis confirms consumer preferences toward certain kinds of product attributes, which were revealed also by the hedonic price model. Moreover, it also highlights positive consumer preferences for other canned tuna quality attributes, namely, the fish species and the social certification. These product attributes could be considered by producers for the implementation of alternative marketing strategies on product differentiation and for the implementation of effective pricing policies for all the attributes that reveal market recognition.[5] From a policy perspective, the statistically significant role of social certification for the choice of canned tuna confirms the importance of policy interventions not only to guarantee the environmentally friendly certifications but also the truthfulness of social-related labeled product information. Furthermore, results stress the importance of supporting policy measures to overcome issues of possible confusion among certifications through interventions aimed at increasing consumer understanding of the CSR-related certifications.

The analysis suffers from some limitations. The main limitation of the study relates to the size and geographical scope of the sample. Moreover, although the use of the existing

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[5] Indeed, CSR initiatives have become one of the main strategic tools for firms to gain consumer trust and influence their consumption choices (Romani et al., 2016). Moreover, the multitude of social and environmental aspects which are directly or indirectly connected to food production, represents a real opportunity for diversification and for increasing competitiveness of the firms involved, also in the case of the fishery industry and seafood production (Vanhonacker and Verbeke, 2014).

choice set has allowed us to collect data that does not suffer from hypothetical bias, it has not allowed us to establish a value for all the different CSR-related certifications on canned tuna, but only those available in the choice set. For example, the choice set does not allow to make any inference on possible additive effects given by having the simultaneous presence of different product labeled information (Uchida et al., 2014).

Future studies may look for the confirmation of the present findings in a wider international sample. Furthermore, further analysis may concentrate on consumer preferences toward environmentally friendly and social certifications when both information is provided at the same time to deepen the understanding of the real market value ascribed by consumers to CSR-related labeled information.

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