



***The World's Largest Open Access Agricultural & Applied Economics Digital Library***

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search  
<http://ageconsearch.umn.edu>  
[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from AgEcon Search may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

*No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.*

## Intention to Purchase Sustainable Wood Products: An Empirical Analysis of the Determinants

Teresa Panico, Tiziana Pagnani, and Francesco Caracciolo

*Department of Agricultural Sciences, University of Napoli Federico II, 80055 Portici (NA), Italy  
tpanico@unina.it; francesco.caracciolo@unina.it*

*Received August 2017, accepted May 2018, available online August 2018*

---

### ABSTRACT

Although Forest Principles promoting responsible forest management were formally adopted in 1992, the sustainability of forests is still undermined by harmful practices. In this regard, voluntary forest certification may represent an effective way to lessen the negative impacts of timber and forestry products upon the environment and upon the living conditions of local populations. This work aims to investigate the role of socio-demographic characteristics, knowledge of the forestry certification schemes and attitudinal factors on the purchasing intention of certified wood-derived products in Italy. A convenience sample of 371 consumers were interviewed through an online-administered questionnaire, and data collected were analysed by means of an ordered probit model. The results show that income and age, together with knowledge of the main certification labels and the attitudes towards certifications, have a positive and statistically significant effect on intentions to purchase certified wood products

**Keywords:** wood products; attitude; intentions; preferences; certifications

---

## 1 Introduction

Consumer interest in sustainable production processes, especially in the agri-food and forestry supply chains, has steadily increased over time (O'Brien and Teisl, 2004). This trend can be attributed to the growing general recognition of the importance of environmental conservation for the wellbeing of rural societies especially in developing countries (Bellon et al., 2015). Moreover, one of the main strategies for effective natural resources management is to define appropriate instruments for dealing with the environmental externalities of human activities (Caracciolo and Lombardi, 2012). Although there are several policy instruments to manage the environmental impact of production processes, they require government interventions of countries that are generally unresponsive to environmental issues, especially in less developed regions. That said, there is growing evidence for the spread of non-state governance systems (Cashore et al., 2007). One such system comprises voluntary certification related to the sustainable use of natural resources present in several sectors, including forestry. Voluntary third-party forest certification began in the 1990s in response to the concerns of the consumer about forest management and illegal logging, especially in developing countries. However, still today, forest resources are exploited in such a way as to compromise their conservation and the wellbeing of local communities (Smith, 2004; Cashore et al., 2007). Current agroforestry chains face many sustainability challenges in terms of the environmental, social and economic aspects of production and consumption.

In this context, the main objective of wood certification is to limit the negative impacts of forest exploitation and use of timber products on the environment and on the living conditions of local populations (Bartley, 2003). Following the Statement of Forest Principles contained in Agenda 21, the main document approved in 1992 during the Earth Summit of Rio de Janeiro, several certification schemes have spread internationally. Moreover, the technical literature has recently started to investigate consumer choices and behaviour *vis-à-vis* wood products from sustainable forest management, identifying key determinants of willingness to pay for certification and suggesting marketing strategies to enhance consumer awareness of related environmental issues (Cai & Aguilar, 2013; Hansmann et al., 2006; Gulbrandsen, 2004).

The current study builds on these research contributions to explicitly investigate the individual motivational system which underlies the purchasing choice of certified wood products from sustainable forest management. The precise objective is to ascertain the main motivational purchasing drivers for these products in Italy. Although the determinants of consumer attitudes to sustainable production techniques have been extensively investigated (Coppola et al., 2017; Panico et al., 2015; Panico et al., 2017; Verneau et al., 2016) the determinants of sustainable consumption of wood products is still quite unexplored, especially in Italy (FSC, 2015; Pajari et al., 1999). For this purpose, a convenience sample of Italian consumers was interviewed through an online-administered questionnaire and the data collected were analysed econometrically to identify the role of some key variables in explaining purchasing intentions for certified wood products. The variables in the analysis concern the classic socio-demographic characteristics of respondents, the level of consumer knowledge of certified wood labels, and some attitudinal measures of the respondents, especially the sustainability orientation of consumers developed by Hansmann et al. (2006), and the Certification Attitudes and Preferences (CAP) scale previously implemented by Ozanne & Vlosky (2003).

The remainder of the paper is organised as follows: the next section presents an overview of the main sustainable wood certifications available. Section 3 reviews the research investigating sustainable patterns of consumption and attitudes, especially towards sustainable forest certification; section 4 describes the empirical methodology and data, while section 5 discusses the results; Finally, the last section concludes the paper with some suggestions for further research.

## 2 Sustainable wood certification schemes

The most widely adopted sustainable wood certification schemes are those of the Forest Stewardship Council (FSC), the Program for the Endorsement of Forest Certification (PEFC) and the Sustainable Forestry Initiative (SFI) (Fig.1). FSC was officially created in 1994. It is a non-governmental and non-profit organisation that includes environmental movements (e.g. Greenpeace, WWF and, in Italy, Legambiente), indigenous communities, forestry owners, woodworking and paper industries, large retailers (e.g. Ikea and Castorama) and researchers working together to promote responsible forest management. More than 190 million hectares of forest are FSC-certified in over 80 countries. FSC has defined a voluntary and independent certification system. Within FSC there are two possible types of certification which are complementary: certification of good forest management (FM), for forest owners, and certification of the

chain of custody (CoC), for processing companies. To obtain the certification ten Principles and 56 Good Forest Management Criteria must be respected. Both principles and criteria are broadly defined, ensuring the necessary flexibility for being adapted to local conditions. FSC labels should provide an assurance that the product is made from wood from responsible sources. They can be found on various product types, from toilet rolls to books and product packaging. The chain of custody (CoC) certification guarantees that processing companies source materials from FSC-certified forests and follow FSC-defined best practice throughout the production process and supply chain. In 2017, in Italy almost 65,188 hectares were FSC-certified while 2,154 processing companies had been awarded CoC certification (FSC, 2017; FSC, 2015).



Figure 1. Certification marks of responsible forestry

PEFC is an international non-profit and non-governmental organisation created in Europe in 1998 under the initiative of forest owners and wood industries. It has recently embraced activities in non-European countries such as Australia, Brazil, Canada, Chile and the U.S. (PEFC, 2015). PEFC is the world's largest forest certification system with 300 million hectares of forest certified worldwide. As in the case of FSC, there are two types of PEFC certification: PEFC Sustainable Forest Management and the Chain of Custody certification. In Italy 811,040 hectares of forest and 24,022 forest owners are PEFC-certified while 962 processing companies have CoC certification (PEFC, 2017). Certifications issued by PEFC are specific for forest, wood and paper and cannot be adopted by companies belonging to other economic sectors. Finally, the Sustainable Forestry Initiative (SFI) is an independent, non-profit organisation, launched in 1994 and currently the major certifier in North America (Wallinger, 2003). The SFI programme has two on-product labels, SFI-Certified Sourcing labels and SFI Chain-of-Custody labels (Sustainable Forestry Initiative, 2017).

### 3 Literature review on sustainable wood certification

Since the late 1980s, consumers have been increasingly concerned about the sustainability of human activities, including those related to food production and consumption. Thanks to the activism of consumer and environmental organisations, consumers have become increasingly aware of their ability to minimise the negative consequences of their choices by consuming environment- and animal-friendly products, and fair-trade goods, including legally logged wood products. The wide variety of observable consumer behaviours for different types of products has stimulated research interest in different fields, aiming to interpret this emerging phenomenon and identify its main determinants. Indeed, consumption choices are far from determined only by strictly economic variables. They are rather the result of psychological, social and cultural drivers, which play an increasingly important role, especially in affluent societies.

Among the various "sustainable" consumption patterns, so-called *ethical consumption* is currently emerging as well. According to several authors (Ozcaclar-Toulouse et al., 2006; Newholm and Shaw, 2007), ethical consumption is not a homogeneous pattern of behaviour, but rather extremely heterogeneous. In this context, it is important to distinguish between ecological and social motives. For instance, Newholm and Shaw (2007) highlight the importance of considering the existence of different interlinked aspects of consumer behaviour emerging in the context of ethical consumption. Hustvedt and Bernard (2010) confirmed that social responsibility and environmental concerns explain the different aspects of the issue. This is widely reflected by the large number of definitions of ethical consumption found in the literature, often overlapping because of the difficulty of establishing clear boundaries among the different consumption behaviours. In this regard, the expression 'green consumer' appeared in market research in 1994 (MORI, 1994) but was expanded to 'ethical consumer' when Mintel (1994) published "The Green Consumer: Green Today, Ethical Tomorrow". In the latter work, a wide range of ethical issues influencing buying patterns was reported, including oppressive regimes, human rights,

labour relations, land rights, the environment, irresponsible marketing, fair trade, nuclear power, animal testing, factory farming and political donations. The term 'Green' generally continues to refer to consumers with environmental concerns (Diamantopoulos et al., 2003) but is separated from a wider range of social concerns, such that ethical consumption generally covers two distinct aspects: i) ecologically friendly and ii) socially conscious consumption patterns. Preferences for environmentally friendly products do not automatically entail preferences for socially conscious products. Empirical research about ethical consumption has investigated mainly food consumption in order to highlight the importance of product attributes and antecedents of consumption behaviour (Verain et al., 2015; Verain et al., 2012; Doran, 2009). Moreover, consumers' willingness to pay (WTP) a premium for different attributes of sustainable products and for eco-labelled products, e.g. environmentally friendly, organic and legally logged wood products, has been extensively investigated. In this context, forest certification, like other voluntary certifications, is conceived as a tool to influence markets, given the concern of consumers about the impacts of forest management and the translation of this concern into purchasing preferences for certified wood products (Bigsby & Ozanne, 2002; O'Brien & Teisl, 2004). Several studies have been conducted both in the USA and European countries, aimed at assessing the role of certification on preferences and attitudes of consumers and on WTP for certified wood products. Hansmann et al. (2006) implemented a survey in Switzerland to analyse the relationship between individual sustainability orientation, the knowledge of sustainability labels, and the preferences and attention devoted to labelled wood products. Their results showed that people emphasizing social and ecological aspects of forests over economic values give more attention to wood labels and are more willing to pay a premium for labelled products. Aguilar and Cai (2010) conducted a survey among UK and US consumers to assess the importance of the disclosure of information on consumer preferences. They found that products originating from tropical forests were less preferred than products sourced from temperate forests or without information and concluded that disclosure of this information can significantly reduce market shares of tropical wood products both among US and UK consumers. These findings, which are particularly important to reduce illegal logging in tropical countries, are congruent with those of other authors. Kozak et al. (2004) found a different perception of the need for environmental certification for temperate and tropical forests in different countries, while Rametsteiner (1999) indicated that consumers in the UK, Germany, France and Italy were concerned about the forests both in their home countries and tropical areas. Considering the willingness to pay a premium for certified wood products, Cai & Aguilar (2013) implemented a meta-analysis on 19 different studies conducted worldwide, to determine the influence of some key factors on WTP a premium for environmentally certified wood products. The results showed that, among product characteristics, base price was negatively associated with consumers' WTP while purchasing frequency was positively correlated. The results suggested that a product with a higher price had a lower premium price while higher purchasing frequency leads to higher WTP (Cai & Aguilar, 2013). Teisl et al. (2002) found certification labels have more influence on frequently purchased items probably because consumers believe that more frequently used wood products have a greater impact on the environment. Indeed, from research conducted in 2000 in the USA, Ozanne & Vlosky (2003) concluded that product type is one of the most important characteristics influencing consumer WTP. WTP decreases from a certified chair to a certified wood dining room set and, finally, to a kitchen. Pajari et al. (1999) found that consumers in Germany, France, Italy, the UK and Austria revealed different mean WTP price premiums for wooden furniture from sustainably managed forests ranging from 1.4% for France to 4.9% for Austria. Aguilar & Cai (2010) found that US and UK consumers had a mean WTP premium of 20.7% and 39.3% respectively for a certified wooden night table with a base price of \$100 and £100. Regarding the role of label-issuing organisations, Rametsteiner et al. (1998) and Ozanne & Vlosky (2003) reported that, among the certifying bodies, environmental non-government organisations (NGOs) are the most trusted; O'Brien and Teisl (2004) found no statistically significant differences between preferences for government- and NGO-issued labels; finally, Aguilar and Cai (2010) showed that both labels would have a positive effect on consumer preferences.

## 4 Data and Methods

### 4.1 The determinants

This section presents the determinants of intention to purchase sustainable wood products being analysed in this study: individual attitudes to environmental certification, knowledge of forestry certification schemes and socio-demographic characteristics. The functional relations analysed in this study are shown in Fig. 3. It is hypothesised that the consumer's purchasing intention could be influenced not only by socio-demographic characteristics but also by knowledge of the FSC and PEFC labels, and by specific attitudes to sustainable wood products. In this regard, the literature provides evidence of the

importance of individual orientation towards sustainability (Hansmann et al., 2006) and of the Certification Attitudes and Preferences (CAP) scale previously used by Ozanne & Vlosky (1997; 2003). The following sections will illustrate in detail all the tested determinants.



**Figure 2.** The relations analysed

#### 4.1.1 Knowledge

In order to ascertain the knowledge of sustainable forest management certification labels the knowledge index suggested by Hansmann et al. (2006) was adopted<sup>1</sup>. This index is based on five questions whose answers count 0 if incorrect and 0.20 if correct. Thus, the index value can range from 0 = no knowledge, to 1 = maximum knowledge. After showing respondents FSC and PEFC labels, they were asked:

1. *Were you aware of the products made from certified wood?*
2. *Have you ever heard of the FSC or/and PEFC labels?*

*In your opinion, which of the following three statements are correct?*

3. *The FSC and PEFC labels guarantee environmentally appropriate production.*
4. *The FSC and PEFC labels refer exclusively to wood from tropical forests.*
5. *Products with FSC and PEFC labels are particularly cheap.*

The set of correct answers for the items from 1 to 5 is yes, yes, correct, incorrect, incorrect.

#### 4.1.2 Individual sustainability orientation

To assess individual sustainability orientation concerning forests we followed the approach suggested by Hansmann et al. (2006) which includes all three dimensions of sustainability: ecological, social, and economic.

<sup>1</sup> The index was adapted for the use in the Italian context.

**Table 1.**

Individual sustainability orientation - statements addressing ecological, social, and economic aspects of forests.

---

**Are you pleased** (answer from 1=*not at all true*, to 5=*very true*)

Ecology (1) ... if a lot of different species live in the forest?

Social (1) ... if you get into conversation with others in the forest?

Economy (1) ... if wood is used commercially?

**What are your thoughts if an old oak is cut?** (answer from 1=*not at all true*, to 5=*very true*)

Ecology (2) It is a loss for nature.

Social (2) It is a loss for the beauty of the landscape.

Economy (2) There are economic profits from timber sales.

**Forest areas are growing. This is positive because** (answer from 1=*not at all true*, to 5=*very true*)

Ecology (3) Living space of forest animals gets bigger.

Social (3) Space for leisure activities gets bigger.

Economy (3) Timber production can be increased.

**How important do you think it is** ( answer from 1=*not important* to 5=*important*):

Ecology (4) that the forest serves as habitat for animals?

Social (4) that the forest serves as a recreational area?

Economy (4) that the forest allows job creation in the forestry and timber industries?

Ecology (5) that parts of forests are ecologically protected?

Social (5) that the forests are accessible for visitors?

Economy (5) that as much economic profit as possible is made from forests?

Ecology (6) that there is habitat for wildlife in forests?

Social (6) that children can experience encounters with rare animals?

Economy (6) that economic damage through wildlife is minimised?

---

Source: Hansmann et al. (2006:242)

Each dimension consisted of six items and the answers had to be given on a five-point rating scale ranging from 1=*not at all true*, to 5=*very true* and from 1=*not important* to 5=*important* (Table 1).

#### **4.1.3 Certification attitudes and preferences**

Attitude represents the individual's evaluation, in positive or negative terms, of performing a specific behaviour. The more positive the attitude to the specific behaviour, the stronger is the individual's intention to do it. In this research the attitude to certified wood products is formalised through an attitudinal scale consisting of six items, namely Certification Attitudes and Preferences (CAP) (Table 2), previously used by Ozanne & Vlosky (1997; 2003). The response format was from 1 (completely disagree) to 5 (completely agree).

**Table 2.**  
Certification attitudes and preferences

---

1. I understand the concept of environmental certification.
2. I believe certification can reduce tropical deforestation.
3. I have purchased certified wood products in the past year.
4. If available, I would seek out certified wood products.
5. I trust environmental claims made by wood product suppliers.
6. I believe consumers will pay a premium for certified wood products.

---

Source: Ozanne and Vlosky (2003:17)

#### 4.1.4 Socio-demographic characteristics

Socio-demographic characteristics were used to assess the role of gender, age, level of education and income in determining the intention to purchase certified wood products.

#### 4.2 The survey

In order to investigate the above described determinants of intention to purchase sustainable wood products, a web-based survey, conducted through an online questionnaire, was submitted from October 2015 to January 2016 to a snowball convenience sample using social networks. During this period, 371 questionnaires were filled out. The questionnaire was divided into three sections. The first included questions about past purchasing behaviour of wood products and about the knowledge of FSC and PEFC labels; the second section, after some brief information concerning the guarantees provided by such labels, asked about behavioural and attitudinal constructs. Finally, the last section contained questions about the intention to purchase labelled wood products and about socio-demographic characteristics of the respondents such as age, gender, income and level of education.

#### 4.3 The empirical model

The empirical model aims to assess the existence of functional relations of the determinants previously illustrated with the *Purchasing Intention* for wood certified products, which represents the dependent variable (Figure 2). According to the definition proposed by Ajzen & Fishbein (1975), intention expresses the probability of performing a specific behaviour and is the proximal cause of volitional behaviour. In our questionnaire, *Purchasing Intention* was measured through the following question:

*"Are you going to buy wood products labelled as environmental sustainable?"*

The question had to be answered on a five-point rating scale ranging from 1 = "absolutely not" to 5 = "definitely yes". The existence of functional relations was empirically tested by implementing an ordered probit regression.

The ordered probit regression represents a generalization of probit regression specifically applied to analyse ordinal data. Indeed, the *Intention* variable consists of a set (five in our analysis) of cases which can be ordinally measured.

The ordered probit model assumes a latent unobserved continuous process (1):

$$(1) \quad y_i^* = \mathbf{X}_i' \boldsymbol{\beta} + e_i, \quad E[e_i | \mathbf{X}_i] = 0, \quad e_i \text{ i.i.d. } N(0,1) \text{ with } i = 1, \dots, n.$$

It underlies the ordinal observed outcome  $y_i$

$$y_i = \begin{cases} 1 & \text{if } k_0 < y_1^* \leq k_1 \\ 2 & \text{if } k_1 < y_1^* \leq k_2 \\ 3 & \text{if } k_2 < y_1^* \leq k_3 \\ 4 & \text{if } k_3 < y_1^* \leq k_4 \\ 5 & \text{if } k_4 < y_1^* \leq k_5 \end{cases}$$

where  $k_0 = -\infty$  and  $k_5 = \infty$ ; while  $k_1, k_2, k_3$  and  $k_4$  are unknown threshold parameters to be estimated in order to indicate the range of the normal distribution associated with specific values of the stated response variable  $y_i^*$ .  $\mathbf{X}_i$  is a  $1 \times m$  vector of explanatory variables and  $\boldsymbol{\beta}$  is a  $m \times 1$  vector of unknown parameters expressing the existing relationship between the behavioural response of the  $i$ -th consumer and the predictors.

The estimated probability that, for example, the latent value is included within the first interval is equal to:

$$(3) \quad \pi_{i1} = P(y_i = 1 | \mathbf{X}_i) = \Phi(k_1 - \mathbf{X}'_i \boldsymbol{\beta}) - \Phi(k_0 - \mathbf{X}'_i \boldsymbol{\beta})$$

where  $\Phi$  is the distribution function of  $e_i$  which in the ordered probit is assumed, as in equation (1),  $N(0,1)$ .

## 5 Results

As previously stated, our model analysed data collected from a web-based survey including 371 observations. The descriptive statistics of the frequencies of the different levels of variables are shown in Table 3.

**Table 3.**  
Descriptive statistics of the sample

Variable	Classification	Frequency (%)
Age	18-24	25.1
	25-34	46.9
	35-44	8.5
	45-54	11.6
	>54	7.9
Gender	Male	53.1
	Female	46.9
Education level	None	0.5
	Primary	0.5
	Lower Secondary	3.5
	Upper Secondary	49.3
	Higher Degree	46.1
Occupation	Student	41
	Housewife	4
	Employee	22.9
	Retired	1.3
	Trader	5.7
	Temporary employee	12.7
	Self-employed	12.4
Household income	<€1000	17.3
	€1000-2000	47.7
	€2000-3000	20.2
	>€3000	14.8

The descriptive analysis of the data in question highlighted some interesting aspects. In answer to the question "Are you going to buy wood products labelled as environmental sustainable?" used to assess intention to purchase certified wood products, almost 72% of the sample responded "Yes" (5% "No"; 23% "I do not know").

With regard to knowledge of wood certification labels, in accordance with the range of values in the *knowledge index*, 44% of the sample revealed a good level of knowledge (index values higher than 0.8) whereas 14% revealed a low level (index values lower than 0.4). Finally, nearly 38% and 19% of the sample claimed to have seen at least one of the FSC or PEFC labels, respectively, on wood products. Only 12% stated that they had seen both labels. Before proceeding to estimate the econometric model, we assessed

the internal consistency of the attitudinal scales, CAP and those regarding individual attitudes to forest sustainability. The results showed that all the scales had a good internal consistency (Cronbach's  $\alpha$  = 0.76 for CAP scale and 0.78, 0.70, 0.62 for ecological, social and economic dimensions of the *Individual Orientation towards Sustainability*). The results of the estimated model (Table 4) indicate that, among socio-demographics, *Income* and *Age* have a positive and statistically significant effect on purchasing intention. As regards the occupation status of respondents, being an employee reduces the probability of purchasing certified wood products. Among the other explanatory factors tested, the attitudinal scale "*Certification Attitudes and Preferences*" and the *Knowledge* of the FSC and PEFC labels have a positive and significant effect on *Purchasing Intention*. As regards the three aspects of the *Individual Orientation towards Sustainability*, only the social dimension seems to effectively influence purchasing intention, while the other two dimensions, economic and ecological, are not statistically significant. Marginal effects of the estimate are reported in table 4, indicating the increase in the probability of observing the maximum level of respondents' purchasing intention of certified wood products due to a marginal increase in the different explanatory variables. People with a full knowledge of the certification schemes are 18% more likely to buy the certified wood products. CAP shows a similar magnitude (15%) in influencing purchasing intention positively, while the social dimension of Individual Orientation towards Sustainability shows a slightly lower impact (7.4%).

**Table 4.**  
The maximum likelihood estimates of the ordered probit model

Independent variable	Coef.	Std. Err.	z	P>z	Marginal effect (dy/dx)*
Age	0.012	0.007	1.85	0.065	0.004
Gender	-0.134	0.118	-1.14	0.254	
Occupation					
Employee	-0.632	0.361	-1.75	0.081	0.196
Retired	-0.774	0.837	-0.92	0.355	
Self-employed	-0.049	0.387	-0.13	0.898	
Trader	-0.301	0.403	-0.75	0.455	
Temporary employee	-0.601	0.372	-1.61	0.107	
Student	-0.172	0.379	-0.45	0.651	
Education level	0.008	0.113	0.07	0.942	
Income	0.132	0.065	2.01	0.045	0.041
CAP	0.491	0.101	4.85	0	0.153
Knowledge index	0.584	0.292	2.00	0.045	0.182
Orientation towards sustainability					
economic	-0.058	0.103	-0.56	0.574	
social	0.237	0.127	1.86	0.063	0.074
ecological	0.052	0.115	0.45	0.65	

Number of obs = 371; LR  $\chi^2(15) = 95.1$ ; Prob > chi2 = 0

Log likelihood = -412.90 Pseudo R<sup>2</sup> = 0.0967

\* marginal effects calculated as Prob(Y = 5);

## 6 Conclusions

This study aimed to offer insights into the role of several factors predicting consumption behaviour *vis-à-vis* certified sustainable wood products in Italy. Based on studies carried out in other countries (Cai & Aguilar, 2013; Hansmann et al., 2006; Ozanne & Vlosky, 2003) an empirical model was developed to evaluate the role of the knowledge of labels, attitudes towards and preferences for forestry certification, individual orientation towards sustainability and socio-demographic characteristics as predictors of consumer intention to purchase certified wood products.

Our empirical findings confirm the results of previous studies conducted in the USA and other European countries (Aguilar & Vlosky, 2007; Hansmann et al., 2006), especially the positive and significant role played by the level of knowledge of sustainable forest management labels and by the attitude to forest certification on the intention to purchase certified wood products.

By contrast, as found by Hansmann et al. (2006) in Switzerland, the *Individual Orientation towards Sustainability* does not appear to fully explain purchasing intention. Indeed, only the social dimension influences purchasing intention while the other two dimensions (economic and ecological) do not. Among the socio-demographic variables, the estimated model reveals that income and age play a significant and positive role while the level of education has no statistically significant effect. These results suggest that older individuals and those with higher levels of income have a stronger preference towards certified wood products. Confirmation of the importance of positive attitudes towards sustainable forest management and of the knowledge of the principles of such management and of the related labels indicates that sustainable forest management can be successfully promoted both on the supply and demand side. As already pointed out elsewhere (De Pelsmacker, 2005; Shaw & Clarke, 1999), credible information about ethical issues can play an important role in determining beliefs, attitudes, intention and consumption behaviour. High-quality information campaigns may reduce confusion in the minds of consumers and improve the consumption of sustainable products (Carrigan & Attalla, 2001). Therefore, it is possible to increase the demand for certified products through marketing strategies, but also through the introduction of innovations in certification processes. Hansmann et al. (2006) suggest that these could include the generation of innovative certification systems in a transdisciplinary and participatory process. Moreover, the spread of positive attitudes to certified wood products and hence the greater intention to buy them, can further leverage the development of sustainable practices on timber production firms.

This study poses some limitations: it reports only preliminary results on Italian consumers' behaviour *vis-à-vis* products with sustainable forest management certification and it was based on a survey conducted on a snowball convenience sample. However, the results shed light on an almost unexplored subject in Italy. Yet the segment of sustainable consumption is growing steadily nationwide, as is the spread of retailers focusing on such products. Further research is therefore needed on a more probabilistic sample, given that purchasing intention does not automatically imply actual purchase. In addition, the role of other predictive factors on the willingness of Italian consumers to pay a premium for certified wood products should be explored. For example, product type could play a significant role in affecting WTP price premiums, and the assessment of this aspect could provide interesting insights into consumer attitudes to sustainable wood products.

## References

Ajzen, I., Fishbein, M. (1975). Belief, attitude, intention and behavior: An introduction to theory and research. Massachusetts: Addison-Wesley.

Aguilar, F. X., Cai, Z. (2010). Conjoint effect of environmental labeling, disclosure of forest of origin and price on consumer preferences for wood products in the US and UK. *Ecological Economics* 70(2): 308-316. doi: 10.1016/j.ecolecon.2010.09.002.

Aguilar, F. X., Vlosky, R. P. (2007). Consumer willingness to pay price premiums for environmentally certified wood products in the US. *Forest Policy and Economics* 9(8): 1100-1112. doi: 10.1016/j.forepol.2006.12.001.

Bartley, T. (2003). Certifying forests and factories: States, social movements, and the rise of private regulation in the apparel and forest products fields. *Politics & Society* 31(3): 433-464. doi: 10.1177/0032329203254863.

Bellon, M., Gotor, E., and Caracciolo F. (2015). Conserving landraces and improving livelihoods: how to assess the success of on-farm conservation projects? *International journal of Agricultural Sustainability* **13**(2): 167–182.

Bigsby, H., Ozanne, L. K. (2002). The purchase decision: Consumers and environmentally certified wood products. *Forest Products Journal* **52**(7/8): 100.

Cai, Z., Aguilar, F. X. (2013). Meta-analysis of consumer's willingness-to-pay premiums for certified wood products. *Journal of Forest Economics* **19**(1): 15-31. doi: 10.1016/j.jfe.2012.06.007.

Caracciolo F., Lombardi, P.(2012). A new-institutional framework to explore the trade-off between Agriculture, Environment and Landscape, *Economics and Policy of Energy and the Environment* **3**: 135-154.

Carrigan, M., Attalla, A. (2001). The myth of the ethical consumer—do ethics matter in purchase behaviour? *Journal of consumer marketing* **18**(7): 560-578. doi: 10.1108/07363760110410263.

Cashore, B., Auld, G., Bernstein, S., and McDermott, C. (2007). Can non-state governance 'ratchet up' global environmental standards? lessons from the forest sector. *Review of European, Comparative & International Environmental Law* **16**(2): 158-172.

Coppola, A., Verneau, F., Caracciolo, F., and Panico, T. (2017). Personal values and pro-social behaviour: The role of socio-economic context in fair trade consumption. *British Food Journal* **119**(9): 1969-1982.

De Pelsmacker, P., Driesen, L., and Rayp, G. (2005). Do consumers care about ethics? Willingness to pay for fair-trade coffee. *Journal of consumer affairs* **39**(2): 363-385. doi: 10.1111/j.1745-6606.2005.00019.x.

Diamantopoulos, A., Schlegelmilch, B. B., Sinkovics, R. R., and Bohlen, G. M. (2003). Can socio-demographics still play a role in profiling green consumers? A review of the evidence and an empirical investigation. *Journal of Business research* **56**(6): 465-480. doi: 10.1016/s0148-2963(01)00241-7.

Doran, C. J. (2009). The role of personal values in fair trade consumption. *Journal of Business Ethics* **84**(4): 549-563. doi: 10.1007/s10551-008-9724-1.

FSC (2015), <https://it.fsc.org/preview.cspsc-italia-presenta-i-risultati-della-ricerca-condotta-da-nielsen-sulla-riconoscibilità-del-marchio.a-336.pdf> (Accessed July 10, 2016).

FSC Italia (2015), La certificazione delle foreste e del legno secondo il Forest Stewardship Council,

FSC (2017) <https://ic.fsc.org/file-download.facts-figures-july-2017.a-2020.pdf> (Accessed October 9th, 2017).

Gulbrandsen, L. H. (2004). Overlapping public and private governance: Can forest certification fill the gaps in the global forest regime?. *Global Environmental Politics* **4**(2): 75-99. doi: 10.1162/152638004323074200.

Hansmann, R., Koellner, T., and Scholz, R. W. (2006). Influence of consumers' socioecological and economic orientations on preferences for wood products with sustainability labels. *Forest Policy and Economics* **8**(3): 239-250. doi: 10.1016/j.forpol.2004.06.005.

Hustvedt, G., Bernard, J. C. (2010). Effects of social responsibility labelling and brand on willingness to pay for apparel. *International Journal of Consumer Studies* **34**(6): 61.

Kozak, R. A., Cohen, D. H., Lerner, J., and Bull, G. Q. (2004). Western Canadian consumer attitudes towards certified value-added wood products: an exploratory assessment. *Forest Products Journal* **54**(9): 21.

McFadden, D. (2001). Economic choices. *The American Economic Review* **91**(3): 351-378. doi: 10.1257/aer.91.3.351.

Mintel (1994). *The Green Consumer*. Mintel Research: London.

MORI. (1994). *The Green Consumer: Consumer Attitudes to Green Issues*. MORI: London.

Newholm, T., Shaw, D. (2007). Studying the ethical consumer: A review of research. *Journal of Consumer Behaviour* **6**(5): 253-270.

O'Brien, K. A., Teisl, M. F. (2004). Eco-information and its effect on consumer values for environmentally certified forest products. *Journal of Forest Economics* **10**(2): 75-96. doi: 10.1016/j.jfe.2004.05.001.

Ozanne, L. K., Vlosky, R. P. (1997). Willingness to pay for environmentally certified wood products: A consumer perspective. *Forest products journal* **47**(6): 39.

Ozanne, L. K., Vlosky, R. P. (2003). Certification from the US consumer perspective: A comparison from 1995 and 2000. *Forest products journal* **53**(3): 13.

Ozçaglar-Toulouse, N., Shiu, E., and Shaw, D. (2006). In search of fair trade: ethical consumer decision making in France. *International journal of consumer studies* **30**(5): 502-514. doi: 10.1111/j.1470-6431.2006.00532.x.

Pajari, B., Peck, T., Rametsteiner, E., 1999. (1999). *Potential markets for certified forest products in Europe*. European Forest Institute. Available online at: <http://www.efi.int/files/attachments/publications/proc25net.pdf>.

PEFC (2015). PEFC Members and Schemes. [www.pefc.org/internet/html/members\\_schemes-%204\\_1120\\_59.htm](http://www.pefc.org/internet/html/members_schemes-%204_1120_59.htm). (Accessed December 10, 2015).

PEFC (2017). <https://www.pefc.it/> (Accessed May 2, 2017).

Panico, T., Menna, C., and Lombardi, P. (2015). Fair Trade consumer behavior in Italy: main differences between northern and southern regions. *Quality - Access to Success* **16**(S1): 349-356.

Panico, T., Verneau, F., Capone, V., La Barbera, F., and Del Giudice, T. (2017). Antecedents of Intention and Behavior Towards Fair Trade Products: A Study on Values and Attitudes in Italy. *International Journal on Food System Dynamics* **8**(2): 96-105.

Rametsteiner, E. (1999). The attitude of European consumers towards forests and forestry. *UNASYLVA-FAO*: 42-47.

Shaw, D., Clarke, I. (1999). Belief formation in ethical consumer groups: an exploratory study. *Marketing Intelligence & Planning* **17**(2): 109-120. doi: 10.1108/02634509910260968.

Sustainable Forestry Initiative (2016) <http://www.sfiprogram.org/> (Accessed April 3, 2016).

Smith, W. (2004). Undercutting sustainability: the global problem of illegal logging and trade. *Journal of Sustainable Forestry* **19**(1-3): 7-30.

Teisl, M. F., Peavey, S., Newman, F., Buono, J., and Hermann, M. (2002). Consumer reactions to environmental labels for forest products: A preliminary look. *Forest Products Journal* **52**(1): 44.

Verain, M. C., Bartels, J., Dagevos, H., Sijtsema, S. J., Onwezen, M. C., and Antonides, G. (2012). Segments of sustainable food consumers: a literature review. *International Journal of Consumer Studies* **36**(2): 123-132. doi: 10.1111/j.1470-6431.2011.01082.x.

Verain, M. C., Dagevos, H., and Antonides, G. (2015). Sustainable food consumption. Product choice or curtailment?. *Appetite* **91**: 375-384. doi: 10.1016/j.appet.2015.04.055.

Verneau, F., Del Giudice, T., Panico, T., and Caracciolo, F. (2016). Fair Trade Food Products: Insights about Motivations for Consumption Behaviour in Italy. *Quality - Access to Success* **17**(155): 99-105.

Wallinger, R. S. (2003). SFI: Sustainable forestry initiative program. *Journal of Forestry* **101**(8): 9.