



The influence of education on sustainable purchasing decisions of  
European citizens

*Lorenzo Zambellini Artini*

*468471*

**Supervisor:** *Brigitte Hoogendoorn*

**Second Assessor:** *Eric Slob*

Master Thesis

Industrial Dynamics and Strategy

MSc. Economics and Business

## Abstract

---

Nowadays, the discussion about issues related to the environment has steadily increased. Media, economic and political powers argue about global warming and climate change. Parliamentary assemblies and world conferences try to promote manoeuvres pro-environment and to delineate guide lines to decrease pollution. Nevertheless, in the majority of cases, it is difficult to implement a common agreement, due to different interests and economic situations of countries. Therefore, the role associated to single individuals assumes great importance. If every consumer engages itself in achieving a sustainable behaviour, for instance, by recycling, by avoiding wastes, by purchasing sustainable products and so on, it can provide its contribute to the environmental preservation. This study wants to identify the role of consumers in the sustainable development by analysing their purchasing decisions. Specifically, the main relationship of the analysis refers to the influence of education on purchasing decisions of sustainable products. Past literature reveals that this demographic has an influence on the buying decisions of consumers. This analysis, through the study of the Flash Eurobarometer Survey No. 256 released in 2009, wants to demonstrate the relation between level of education and purchasing decisions and to provide an additional contribute to the literature by exploring whether the influence of education differs across different types of sustainable products. Specifically, the relationship between education and the purchasing decision of general sustainable products is firstly studied. Then, the influence of education on eco-labelled and energy efficient products is analysed, by providing assumptions that the effect of education is expected to be stronger for energy efficient products than eco-labelling.

---

**Keywords:** Sustainable development – Consumer’s behaviours – Purchasing decisions – Sustainable products – Global warming – Education – Eco-labelling – Energy efficiency;

## 1. Introduction

Over the last years, the debate regarding environmental development has steadily increased. In particular, the topic of sustainability has been highlighted as a fundamental contributor to environmental development (Lele, 1991). It is well known that pollution, production, waste of natural resources and consumption attitudes, as well as other factors have all drastically contributed to issues related to the environment, such as climate change. Individual attitudes and behaviours are both key players in affecting environmental development. Whereby, the decisions and habits of one impact the environment improving or worsening environmental sustainability. Therefore, in order to preserve the environment and all living species, humanity needs to take considerable action to change current efforts, both collectively and individualistically. An example of how to tackle the current challenges is to focus on sustainable consumption. The Organization for Economic Co-operation and Development defines sustainable consumption as: "The use of goods and services that respond to basic needs and bring a better quality of life, while minimizing the use of natural resources, toxic materials and emissions of waste and pollutants over the life cycle, so as not to jeopardize the needs of future generations." (Ofstad et al., 1994). Therefore, adopting sustainable consumption behaviours is crucial. Undeniably, consumers, through their consumption behaviours, play an essential role in the achievement of sustainable development. McGougall (1993) conveys that the 30% - 40% of environmental degradation has been caused by household consumption activities. Household sustainable consumption can be obtained for instance, by recycling, relying more on renewable resources or avoiding unnecessary waste. Moreover, consumers have great market power by shaping market demand. Thus, their attitudes have the potential to influence companies to produce more sustainable products (Nittala, 2014). Consequently, these attitudes collectively allow for preservation of natural resources and the preservation of environmental detriment.

Regarding the theoretical framework of the research, education seems to be a significant demographic factor. Several literatures depict that education may influence the purchasing decisions of consumers (Nittala, 2014; Meyer, 2015; Jain and Kaur, 2008). The research question that is addressed in this paper is: What is the role of education on purchasing decisions about sustainable products?

The main relationships within this paper have been conducted by analysing the purchasing decisions of three product types across 28 European countries. Firstly, general sustainable products are considered. Secondly, different sustainable products are subdivided into: eco-labelled and energy efficient products. Eco-labelling refers to all products certificated as sustainable. Whereas energy efficient products are products which require lower amounts of energy to function.

The structure of the paper is shortly discussed hereafter. Firstly, the theoretical framework, literature review and hypotheses are discussed next in detail. Following this, the main concepts and literature are described and the theory this paper builds upon is explained. Subsequently, four main hypotheses are derived. Succeeding this, in the data and methodology section, the data and variables are described, and the methodology is explained. I will conclude with concisely describing the results and the conclusion and discussion, where the main findings are summarized and evaluated. The research question is answered and limitations, follow-up research and implications are unfolded. It should be noted that along the paper terms sustainable and pro-environment are interchangeable and used as synonymous to render the reading more pleasant.

## **2. Theory and Hypotheses**

The analysis of the effect of education on sustainable behaviours is an important and novel research area (Patel et al., 2017). In the following, relevant definitions are made, and concepts are explained in order to shape the field of research for the relationship between education and pro-environmental purchasing decisions.

### **2.1 Main Concepts**

In this analysis, the sustainable consumption among European citizens is studied by analysing their purchasing decisions regarding sustainable products. In this section, different concepts are explained and located in the in the specific context of purchasing decisions. Additionally, definitions of sustainable products, eco-labelling and energy efficient products will also be provided.

Firstly, pro-environmental behaviour is defined as an action that aims to minimize the negative impact of an action on the natural and built world (Kollmuss and Agyeman, 2002). In the

context of a purchasing process, this behaviour is associated with buying sustainable products. Due to the broad scope of sustainable behaviour, in this analysis, sustainable behaviour will be defined as the decision process of consumers which results in the purchase of sustainable products.

Secondly, sustainable products are defined as goods and services that have a minimal negative impact on the environment (Datta, 2011). Consequently, these products are considered as environmentally-friendly, environmentally superior and ecologically safe; allowing the protection and preservation of the natural environment, with primary aim of achieving sustainable development (D'Souza et al., 2007).

Thirdly, eco-labelling is a voluntary method of environmental performance certification and provides information about the level of environmental impact of products and services (GEN, 2004). Eco-labelling allows consumers to recognize sustainable products. Due to the complexity of the life cycle of pro-environmental products, the identification of sustainable products by eco-labels facilitates the recognition of sustainable products by consumers. In 1978, the first eco-labelling programme was introduced in Germany (Dosi and Moretto, 2001); however, in order to clarify the sustainable impact of a certain product the Council of European Communities implemented an eco-label award scheme in 1992. Besides the impact eco-labels have on consumer choices, eco-labelling also generates positive externalities along product production, creating competition between firms encouraging sustainable innovation, for instance, changing their productive process to favour sustainability (Dosi and Moretto, 2001).

Finally, it has been found that energy conservation behaviour covers an important role for the environment preservation (Bhatt and Sharma, 2012). Such behaviour can be achieved by purchasing energy efficient products. An energy efficient product is something that can perform the same task as another by using less energy (Morrison and Beer, 2017). These products contribute to the reduction of climate change by decreasing energy waste and consumption and thus, greenhouse gas emissions. Concerning this, the Integrated Pollution Prevention and Control reports that energy efficiency plays the second largest role in the achieving climate stabilization, emphasising the importance of energy conservation as a pro-environmental behaviour (IPCC, 2014).

## 2.2 Literature review

Besides the general concepts mentioned in the prior section, in this paragraph some relevant insights based on previous literature relating to the main association of the analysis between education and sustainable purchasing decisions are provided.

The relationship between education and sustainable purchasing decisions has been subject of academic discussion over the years. The literature reports ambiguous results regarding the association of these two factors and debate about this topic is still open.

On the one hand, the majority of the studies find a positive and significant relationship between education and sustainable behaviours. The literature reveals that education is an important demographic factor that mostly influences purchasing decisions of consumers (Nittala, 2014). Highly educated consumers exhibit greater social responsibility (Diamantopoulos et al., 2003) and to be sensible to environmental development (Jain and Kaur, 2008). School provides a strong background and skills that allow to better understand topics and scientific terms inherent in sustainability literature. Through education, individuals gain knowledge about environmental issues and thus, they are expected to have a pro-environmental attitude (Chen et al., 2011). Whereas existing literature typically provides information solely about the descriptive relationship between education and sustainable behaviour, Meyer (2015) investigated whether education increases pro-environmental behaviour of European individuals, by considering the causal effect between these two variables. By doing so, Mayer aimed to control all omitted characteristics that could bias the estimated relationship between these variables. The causal model with education, as explanatory variable, reveals a positive and statistically significant association between education and pro-environmental behaviours. Specifically, Meyer explores the association between education and several sustainable behaviours such as environmental friendly travel, separate waste, reduce disposables, reduce water consumption, reduce energy consumption, purchase labelled products, purchase local items, reduce car usage, by finding a positive and statistically significant relationship with all these pro-environmental behaviours.

A similar analysis that considers the causal relationship between education and sustainable behaviour has been developed by Chankrajang and Muttarak (2017), but in this case data refers to Thai population. This investigation aimed to identify if education encourages pro-environmental behaviours. The results from the IV model demonstrate a statistically significant relation between

these factors. Fundamentally, an additional year of education increases the probability of regular use of cloth bags, energy saving light bulbs and energy efficiency appliances. Furthermore, De Silva and Pownall (2004) find that consumers, with at least a college education, are more likely to reduce their standard of life in favour of the environmental maintenance for future generations. Additionally, it has been also found that higher educated people are more likely to recycle (Callan and Thomas, 2006), further support these findings.

On the other hand, other studies do not find statistically supportive evidence to explain the relation between education and sustainable behaviours. For example, a study developed on the consumer profile in Greece reveals no relationship or no statistically relevant results between education and sustainable purchasing decisions (Abeliotis et al., 2010). While other studies even find a negative association between education and pro-environmental attitudes. For example, Thompson and Kidwell (1998) find that having a college degree does not produce a statistically effect on the purchasing of organic products and that people with a graduate or professional degree are less likely to choose organic products. However, it is difficult to understand whether these results are cohesive with previous analysis (Huang, 1996) as authors consider education as categorical variable while continuous measures would be more preferable (Thompson and Kidwell, 1998). Despite some studies depict a negative or inconsistent relation between education and pro-environmental behaviour, the majority of previous literature reports a positive and significant association (Patel et al., 2017).

### 2.3 Hypotheses

The following section will provide an empirical background regarding the association between the dependent variables and education in order to create a solid support to derive hypotheses for the analysis. Initially, some empirical concepts are reported to delineate the nature of the role of education in the scope of sustainable purchasing decisions. Subsequently, the relation between education and sustainable products is analysed and, on this base, a main hypothesis that considers sustainable products in general is created. Consequently, eco-labelled products and energy efficient products are considered, with the aim to generate further two hypotheses examining the relation between education and these two different types of sustainable product.

Finally, this leads to the creation of a last hypothesis that explores how the influence of education varies amongst different sustainable products, such as eco-labelling and energy efficient products.

Firstly, an interesting study is considered to provide relevant support to the potential role played by education in the scope of sustainable purchasing decisions (Estrin et al., 2016). Specifically, this paper explores the difference between social and commercial entrepreneurship and how human capital influences these aspects. Although the study does not explicitly refer to consumer attitudes and behaviours and is more focused on entrepreneurial aspects, it provides a solid empirical base to understand how education might affect sustainable purchasing decisions. Social entrepreneurship is associated to a social wealth creation rather than profit maximization and the typical activities executed by social entrepreneurship generate positive externalities that benefit the society (Santos, 2012). Amongst these externalities, it is also possible to include those related to the preservation of the environment such as relying on green energy to avoid pollution. Concerning this, education plays an important social role. Higher education stimulates pro-social actions with the final aim of reaching a social welfare maximisation. Findings from this study reveal that education has a stronger positive effect on starting a social compared to commercial entrepreneurial activity (Estrin et al., 2016). This paper argues and provides empirical evidence that education increases pro-social motivation and serves as an indicator for a positive relationship between education and sustainable purchasing decisions.

Secondly, another relevant consideration that proves the important role of education in the scope of purchasing decisions concerns its interaction with income. The relationship between education and income is found to be strong (Wolla and Sullivan, 2017). Education is an investment in human capital improving socio-economic status as it usually increments alongside earnings (Chankrajang and Muttarak, 2017). Several researches and statistics demonstrate that more educated people earn higher incomes (Boshara Emmons and Noeth, 2015). Additionally, education provides skills that allow to be more employable achieving prestigious and profitable job positions. Regarding sustainable purchasing decisions, this privileged economic status increments the probability to buy sustainable products that, in most cases, are classified as premium products and therefore, are more expensive compared to non-sustainable substitutes. Therefore, the income effect provides support to prove the relationship between education and purchasing decision of sustainable products and allows to examine whether the effect of education differs amongst sustainable products.

Besides the theoretical concepts of pro-social motivation enhancing effect of education and income effect, the hypotheses of the analysis are derived. Initially, the specific scope of sustainable products is analysed and the literature that provides an association between education and the choice of purchasing sustainable products is reported. During the last years, attention regarding the exhaustion of natural resources and the development of sustainable products and services has steadily increased. It has been found that environmental issues are intrinsically associated to human behaviours (Vlek and Steg, 2007). Individuals must respect the ecosystem by giving importance to the environmental impact of products they buy and use. Sustainable products are defined as those products that prevent environmental detriment in favour of the preservation of natural and scarce resources (D'Souza et al., 2007) and thus, several types of product can be associated to this definition. In relation to the association amongst education and the choice of buying sustainable products, the majority of literature finds a positive relation. Higher educated persons are more likely to reduce the use of cars (Ortega-Egea et al., 2014) and buy fuel-efficient or alternative fuel vehicles (Mannberg et al., 2014; Potoglou and Kanaroglou, 2007). Rowlands et al., (2002) finds that education has a positive effect in the choice of relying on green electricity, for example, by installing photovoltaic solar panels (Zarnikau, 2003). Furthermore, it has been found that education is correlated with food choices that could influence the environment. For instance, being educated stimulates people to reduce the consumption of disposable items and buy seasonal, local (Ortega-Egea et al., 2014), organic (Ngobo, 2011) and eco-labelled food products (Blend and Van Ravenswaay, 1999). On the base of the positive association between education and the purchasing choice of several sustainable products found in the literature, a first hypothesis is generated:

*H1: "Education is positively associated with the importance of products with a low environmental impact during a purchasing decisional process".*

Furthermore, Blend and Van Ravenswaay are the first to study consumer intentions to purchase an eco-labelled product with their analysis called "Measuring Consumer Demand for Ecolabeled Apples" (1999). In order to so, this study collects data from household surveys to insight into the intentions of purchasing eco-labelled apples. Subsequently, data was analysed to identify which factors were the most influential for the purchasing behaviours of eco-labelled apples. This type of fruit seems to be a good baseline product for this study. Indeed, apples are bought by over 90% of households and a complementary product to apples does not exist, which could conditionate

the price, the market demand and thus, bias the data (Blend and Van Ravenswaay, 1999). Several explanatory variables are considered, and results show that the purchasing probability for eco-labelled apples is significantly and positively affected by education. Specifically, marginal effects of the probit model show that, on average, one additional year of education increases the probability of buying eco-labelled apples by 0,026 percentage points, *ceteris paribus*. Furthermore, a more recent analysis developed in China explores consumers' willingness to pay for green and eco-labelled seafood (Xu et al., 2012). This analysis is based on a three-stage purchase framework model that analyses whether consumers have heard about eco-labelled seafood products (stage I), intend to purchase the labelled seafood (stage II) and the consumer's willingness to pay a price premium (stage III). Results show that people with higher level of education are 3% more likely to pay a price premium for eco-labelled products. On this basis, the second hypothesis of the analysis is derived:

*H2: "Education is positively associated with the importance of eco-labelled products during a purchasing decisional process"*

Thirdly, Urge-Vorsatz and Hauff (2001) develop an analysis with the aim of studying the market transformation in Hungary due to the rise of compact fluorescent lighting (CFL), a new and more sustainable technology. Specifically, they study the consumption attitudes, behavioural patterns, and awareness of household related to compact fluorescent lighting. Vorsatz (1996) defines CFL as a good indicator of energy saving behaviours; indeed, compact fluorescent lightings provide an alternative to general service incandescent lamps (GSL) while providing an energy saving potential close to 80% and maintaining the same amount of energy service as GSL. Concerning the relation between education and decision to adopt this energy efficient product, data shows that educated people are more likely to opt for compact fluorescent lighting. Specifically, 6% of people with do not complete primary school education choose CFL. Contrastingly, 44% of those who receive higher education (college or university) adopt CFL. Therefore, it is plausible to assume a positive association between the level of education and CFL ownership exists. Thus, the higher level of education an individual receives increases the likelihood of buying an energy efficient product. Additionally, Poortinga et al. (2004) refer to household energy use for activities such as home heating, lighting, and the use of household appliances. Results of their analysis show that higher levels of education are related with lower home energy use. Therefore, educated individuals tend to save energy and rely more on energy efficient household appliances than their counterparts that received lower level of education. Specifically, one additional year of education decreases home

energy use by 0.11 points. Based on the literature, exploring factors that influence environmental behaviour regarding household energy use supports a positive relationship between the level of education and the probability to purchase of energy efficient products and therefore, it is possible to state:

*H3: "Education is positively associated with the importance of energy efficiency products during a purchasing decisional process"*

Finally, an ultimate hypothesis is created on the base of the effect of education on different products. Indeed, by comparing the two different sustainable products considered in the analysis, it is possible to predict that the effect of education will be stronger for energy efficient products than eco-labelled. Energy efficient products are usually long-term products such as renewable energy sources or electrical cars (Ma et al. 2013) and thus, are expected to be more expensive. Black et.al. (1985) states that household income plays the greatest role in energy consumption. On this basis, a stronger effect of education on buying decisions of energy efficient products, due to income effect, is expected. Although limitedness of the literature about the relationship between income and the purchasing decision of sustainable products, this assumption leads to derive a fourth hypothesis:

*H4: "Education is expected to have a stronger effect on purchasing decision of energy efficient products than eco-labelling"*

Exploring the literature regarding the analysis on the relationship between education and sustainable behaviours indicates a significant influence of level of education on the purchasing decisions of sustainable products. Particularly, literature that analyses this association leads to the creation of three hypotheses that expect a positive relation of education and sustainable purchasing decisions. Finally, by considering different sustainable products such as eco-labelled and energy efficient products, how the influence of education changes amongst different products can be studied, leading to the creation of a fourth hypothesis.

### 3. Data & Methodology

#### 3.1 Data

The analysis is based on dataset The Flash Eurobarometer 256 called: “Europeans attitudes towards the issue of sustainable consumption and production”, which was conducted in Europe in 2009. Flash Eurobarometers are telematic telephone interviews conducted as service for European Commission since 1973. These surveys address several topics regarding the European Union by collecting data of member states. In this context, the survey was conducted by the Gallup Organization under request of the European Commission Directorate General Environment coordinated by EC Directorate General Communication (Morrison and Beer, 2017). The Gallup Organization is an American research-based, global performance-management consulting company that provides analytics and advices to solve main problems that companies can face. The survey collects data from 28 countries and reports a sample of over 25,000 consumers. It was conducted by telephone in each European country except Bulgaria, Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Romania and Slovakia where both telephone and face-to-face interviews were made. The target sample size was almost 1000 respondents for each country except Malta, Cyprus and Luxemburg where 500 interviews were made. The database is constructed using a questionnaire that explores the sustainable consumption of individuals. Each question can be answered with a multiple choice to provide a degree of importance regarding several topics and thus, they are represented by ordinal categorical variables in the dataset.

#### 3.2 Variables

##### 3.2.1 *Dependent Variables*

Firstly, as indicators of sustainable purchasing decisions, three questions are selected. These variables include a category referring to a nonresponse (“[DK/NA]”) that has been dropped out of the sample because it is not indicative for the analysis. Table 1 provides an explanation of those questions that are used as dependent variables with the possible answers, after having dropped out from the sample observations of those individuals that refused to answer. Moreover, it reports frequencies, percentage, mean and deviation standard. The first dependent variable, called in the database *q2.a*, refers to general sustainable products and explains whether consumers consider the importance of product’s impact on the environment during the purchasing process and thus, it is

renamed *sustainable\_product*. Consumers are asked to explain the importance of product's impact on environment during a purchasing process by providing 4 degrees of importance: very important, rather important, rather not important, not at all important. Frequencies show that 46% of European citizens (12,313 observations) considers rather important the product's impact on the environment in the purchasing process. For the 36% (9,709) of the sample this consideration is very important, while rather not important for 12% (3,070) and not all-important for 4% (1,044) of consumers. Finally, 506 individuals do not provide an answer at all are excluded from the sample. As these represent just 2% of the sample, omitting these observations does not seem to bias the remaining sample.

The second dependent variable is *q3* and is renamed *ecolabelling*. It refers to the consideration of consumers regarding the importance of eco-labelled products during the purchasing process. Almost 50% (12,912 observations) of European citizens states that eco-labelling plays an important part in purchasing decisions. The remaining 50% is divided by people for whom eco-labelling does not play an important part in the purchasing decisional process (6,328) and people that never have read any labels (6,990). While 412 observations (1.6%) have no answers and thus, are excluded from the sample.

Finally, the last dependent variable *q12* is retitled *energy\_efficiency* and refers to energy efficient products. Consumers are asked to answer whether they take into account the energy efficiency of products, such as TVs, computers, boilers and cars, they buy and use. The 42,3% (11,256) of the sample always considers energy efficiency in the decision making, 36% (9,567) most of the time, 11,5% rarely (3,053), while just the 8,4% (2,227) almost never consider this aspect. The sample reports 539 observations without answer that are dropped. Even in this case they represent a minimal part of the dataset and thus, do not bias data. Table 2 reports relevant information about dependent variables of the analysis.

Table 1: Illustration of dependent variables reporting: Frequencies, Percentage, Mean, Deviation Standard

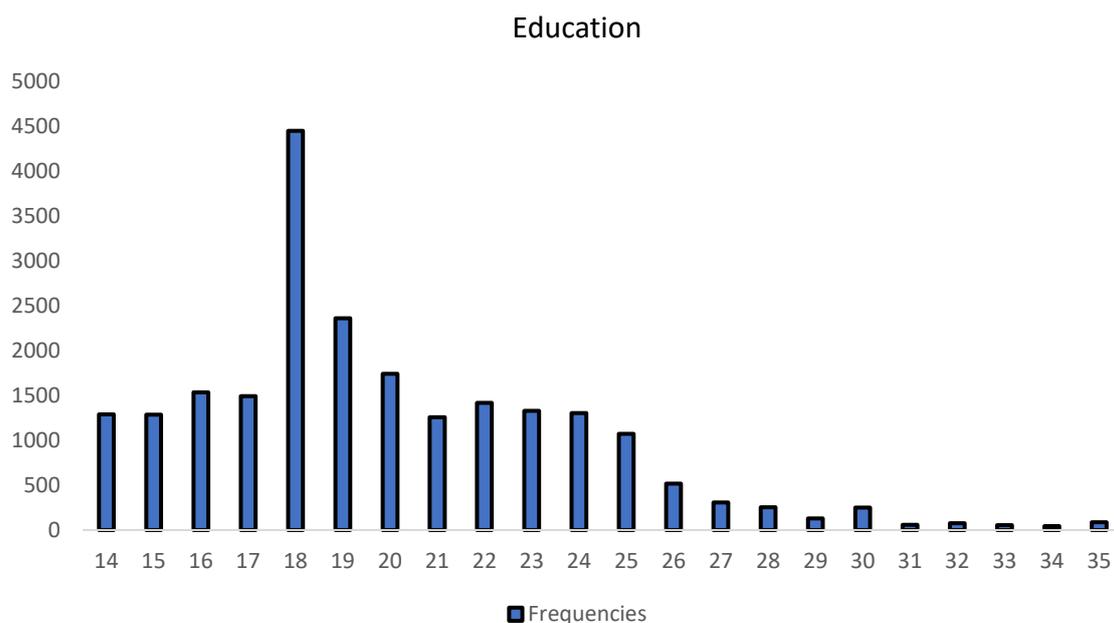
Questions	Answers	Frequencies	Percentage	Mean	Dev. Standard
(Q2.a) How important is the product's impact on the environment when making a decision on what products to buy?	(1) Not at all important	1,044	3.99	3.174128	0.7864002
	(2) Rather not important	3,070	11.75		
	(3) Rather important	12,313	47.11		
	(4) Very important	9,709	37.15		
(Q3) Some products have an ecolabel which certificates that they are environmentally-friendly. Which statement characterised you the best?	(1) Ecolabelling plays an important part in my purchasing decisions	12,912	49.23	1.774228	0.8413106
	(2) Ecolabelling Does not play an important part in my purchasing decision	6,328	24.13		
	(3) I never read any Labels	6,990	26.65		
(Q12) When buying products that use electricity do you take into account how energy efficient they are?	(1) Almost never	2,227	8.53	3.143623	0.9321178
	(2) Rarely	3,053	11.70		
	(3) Most of the time	9,567	36.65		
	(4) Very important	11,256	43.12		

### 3.2.2 Explanatory Variable

Education is the independent variable of the analysis. This demographic has been found to be a relevant factor in the sustainable consumption behaviour (Nittala, 2014). In the dataset, the variable *education* is continuous and reports the age in which consumers stopped full-time education. This provides a proxy for the level education of consumers because the observation of the age in which individuals finished the full education provides a measure their effective level of education. Therefore, higher age when full time education is stopped suggests higher levels of education. The mean of the variable is 19,6, indeed, frequencies show that the highest distribution of the sample is between 14 and 25 years old. Concerning this, 4,443 individuals stopped education

at 18 years old. While 2,356 at age 19 and 1,738 at age 20. Furthermore, the range of this variable is between 2 and 78 years old and thus, some of these observations, considered as not relevant for the analysis, have been dropped from the sample. Firstly, individuals that stopped full education before the age of 14 years old have been dropped out from the sample, because generally in Europe is unlikely that someone stops education before being 14 years old. Indeed, usually everyone has the possibility to be educated until high school. By doing this, 1,063 observations are deleted. Secondly, people that stopped full-time education after 35 years old are excluded from the sample. Concerning this decision, 35 years old can be seen as a hypothetical maximum age in which an individual may finish full time education, considering Masters, MBAs or PhDs. This cleaning action excludes 445 observations. Moreover, 415 individuals have never been in full-time education, while 1,976 (7,4%) individuals are still enrolled in full-time education programs. Even these observations are not indicative to measure the level of education and thus, are dropped out from the sample. Finally, 466 individuals did not provide an answer and thus, also these observations are excluded from the sample. This explanatory variable provides a measure of individuals' level of education and allows to understand how education could affect buying decisions of consumers. Graph 1 shows the distribution of education after having cleaned the variable.

Graph 1: *Distribution of the explanatory variable education*



### 3.2.3 Control Variables

Subsequently, control variables likely to be correlated with education and purchasing behaviours and thus, with the independent and dependent variable are included. Control variables used in the analysis are *age*, *gender*, *employment status* and *country*. These variables seem to be associated with sustainable purchasing decisions. Past literature points out that these demographics influence environmental awareness and, consequently, consumer behaviours (Straughan and Roberts, 1999). All the variables are briefly described and supported by explanative tables to show frequencies and percentages after they have been cleaned.

#### *Age*

Several literatures state that age is likely to be correlated with sustainable behaviours (Morrison and Beer, 2017). On the one hand, some studies find that sustainable consumers are older (Gilg et al., 2005). On the other hand, others find that younger consumers tend to behave in a sustainable way. (Diamantopoulos et., al., 2003). On the base of these contradictory findings, a nonlinear relationship with the dependents is assumed and thus, age and age squared are included in the models. In the sample, *age* is a continuous variable that explains the age of respondents. This variable has been cleaned by dropping from the sample 253 observations of those people that refused to answer. To simplify, Table 2 reports total observations, mean, standard deviation and the range after having cleaned the variable.

Table 2: Illustration of variable *Age* reporting: number of observations, Mean, Standard Deviation, Min and Max

<b>Variable</b>	<b>Observations</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
Age	26,389	50.05188	17.32962	15	99

#### *Gender*

Literature finds a significant relationship between gender and sustainable consumption behaviours (Pinto et., al., 2014). Gender has a relevant impact on how consumers think and behave (Putrevu, 2001). For instance, females tend to be more attached to social values and environment protection. While males are usually more focused on self-enhancement values, searching for success and ambition. In the analysis, *gender* is a binary variable that explains the sex of individuals and it assumes value 0 when refers to male and the value 1 for female. It is noticeable that number

of observations for females are significantly higher than males, with 16.702 observations (62,7%) compared to 9,940 (37,3%). Table 3 shows data inherent this variable.

Table 3: *Illustration of variable Gender reporting: Frequencies, Percentage, Mean, Standard Deviation*

<b>Gender</b>	<b>Frequencies</b>	<b>Percentage</b>	<b>Mean</b>	<b>Std. Dev.</b>
Male	9,940	37.31	1.626905	0.4836362
Female	16,702	62.69		
Total	26,642	100.00		

#### *Employment status*

Past literature states that people with a more profitable occupation are stimulated to invest more in sustainability. This can be explained by the higher incomes that usually are provided by a better work status. Consumers with higher incomes might afford the premium price that allows to purchase sustainable products (Zarnikau, 2003). Moreover, it is well known that education is a relevant factor in the labour market; indeed, it affects work outcomes such as occupational status, occupational prestige, or social class (Andersen and Van de Werfhorst, 2010). In the database, *employment status* is a categorical variable that refers to the occupational status of individuals and includes 4 categories: self-employed, employee, manual worker and without professional activity. Finally, the variable reports 147 missing values. It is noticeable that the 51.2% (13,756 observations) of respondents is without job, this is probably explained by the fact that most of the respondents are students, retired or are looking for an occupation. Finally, the variable reports 147 missing values for a total of 26,495 observations. Table 4 provides information about the variable.

Table 4: Illustration of variable Employment status reporting: Frequencies, Percentage, Mean, Standard Deviation

<b>Respondent occupation scale</b>	<b>Frequencies</b>	<b>Percentage</b>	<b>Mean</b>	<b>Std. Dev.</b>
Self-employed	2,220	8.38		
Employees	8,868	33.47		
Manual Workers	1,831	6.91	3.010115	1.087292
Not working	13,576	51.24		
<b>Total</b>	<b>26,495</b>	<b>100.00</b>		

### Country

Firstly, Shavit and Blossfeld (1993) study the educational attainment across 13 European countries. They find a strong educational inequality between students coming from different regions. This proves that consumer's country influences individual education. Secondly, sustainable behaviours are differently influenced by country of origin. Some countries are more sensible about sustainability topics and through governmental policies and reforms incentive citizens to behave in a sustainable way (Bendel et al., 2011). In the sample, the variable *country* provides information about 28 different nations (in the appendix, a full list of the considered countries is available). Noticeably, observations are equally located in every country, counting almost 1000 observations each. Malta, Cyprus and Luxembourg represent an exception and report 500 observations each. Finally, a dummy variable with France as base category is constructed in order to study the main relation of the analysis across European countries.

### 3.3 Methodology

The dependent variables of the analysis are categorical and thus, a logistic regression seems to be the most accurate one to use. Specifically, variables are ordered multinomial and thus, ordinal logistic models are chosen. Consequently, three main logit models are run based on the three different depend variables of the analysis. Model1 considers *sustainable\_product* as dependent

variable, Model2 refers to *ecolabelling*, while Model3 to *energy\_efficiency*. Furthermore, a hierarchical regression is applied. This type of regression allows to observe the relationship between education and sustainable behaviours controlling for variables. Base models consider the association between the dependent and control variables (*gender, age, employment status and country*). The second step is made by including the explanatory variable *education*. Models including education as explanatory are called: Edu.Model1, Edu.Model2, Edu.Model3. The interpretation of the results is based on average marginal effects. Indeed, average marginal effects allow to interpret the magnitude of coefficients of logistic regressions. Finally, through the command *fitstat*, measures of Goodness of Fit are obtained to see which model fits the data better. Specifically, the following indexes are analysed: Log-likelihood, McKelvey & Zavoina R<sup>2</sup>, Mc Fadden R<sup>2</sup>, AIC and Count R<sup>2</sup>. The McKelvey & Zavoina index is selected as an alternative of Effrons R<sup>2</sup> because it is considered as the best estimator to assess the fit of binary and ordinal logit models. Specifically, it measures the model fit as the proportion of variance accorded and therefore, allows to study the variation of dependent variables explained by the explanatory variable *education* is analysed.

#### **4. Results**

The following section provides obtained results of the analysis. The three models will be initially analysed separately to show how education affects the three dependent variables. Furthermore, a comparison between models is reported to study how education's influence varies across different types of sustainable product. The table 5 illustrates marginal effects of each model. This table provides exclusively marginal effects of education by leaving out results of control variables. Indeed, the relation between education and purchasing decision of sustainable products is the main focus on the analysis and only interpretations based on this association are decided to be reported. However, in the appendix is possible to find full tables reporting results from logistic models including control variables.

Table 5: Marginal effects of education: Coefficients and Standard Deviations Errors in Parenthesis

	<b>Edu.Model1</b>	<b>Edu.Model2</b>	<b>Edu.Model3</b>
Education			
Predict 1	-0.0006743*** (0.0001271)	0.011899*** (0.0008533)	-0.0030157*** (0.0002546)
Predict 2	-0.0016676*** (0.0003101)	-0.0027585*** (0.0002047)	-0.0032936*** (0.000273)
Predict 3	-0.0019125*** (0.0003553)	-0.0091405*** (0.0006626)	-0.003932 *** (0.0003228)
Predict 4	0.0042543*** (0.0007875)	(/)	0.0102413*** (0.0008274)
Observations	21,760	21,801	21,807
Note: *p-value < 0.1, **p-value < 0.05, ***p-value < 0.01			

#### 4.1 Model 1

Firstly, results from Model 1 that considers the relationship between education and the purchasing decision of sustainable products are illustrated. Table 6 shows a comparison of Goodness of Fit between the base model (Model1) and the model with education as explanatory variable (Edu.Model1). By doing this, it is possible to study which model fits data better and whether education influences the dependent variables of the analysis. Specifically, Log-likelihood, McKelvey & Zavoina R2, Mc Fadden R2, AIC and Count R2 are analysed and reported. Firstly, is noticeable that both models are statistically significant at 1% significance level, showing a p-value equal 0.000. Secondly, Log-likelihood results to be higher for Edu.Model1 and thus, it explains a higher probability. Mc Fadden R2 is higher for the second hierarchical step and suggests that Edu.Model1 is characterized by a better improvement over a constant term. McKelvey & Zavoina R2 is higher in

the second model as well. Therefore, it is possible to state that Edu.Model1 reports a higher variation of the dependent variable explained by the introduction of the explanatory variable. Moreover, Count R2 that explains the rightest prediction is equal amongst the models. Finally, AIC is smaller for Edu.Model1. On this basis, Edu.Model1 seems to fit data better and McKelvey & Zavoina R2 estimator demonstrates an influence of education on the depend. After having compared hierarchic regressions, specific results about the relation between level of education and purchasing decisions of sustainable products, controlling for gender, age, employment status and country, are provided. Concerning this, table 5 reports the marginal effects of education of each model, by showing standard deviation and p-value as well. Firstly, on average, one additional year of education decreases the probability of considering not important the product's impact on the environment during the decision process of what to buy by 0.06743 percentage points, ceteris paribus. This effect is statistically significant at 1% significance level (p-value 0.000). Secondly, on average, one additional year of education decreases the probability of considering rather not important the product's impact on the environment by 0.16676 percentage points, ceteris paribus. This effect is statistically significant at 1% significance level (p-value 0.000). Third, on average, one additional year of education decreases the probability of considering rather important the product's impact on the environment by 0.19125 percentage points, ceteris paribus. This effect is statistically significant at 1% significance level (p-value). Finally, on average, an increment of one year in education increases the probability of considering very important the product's impact on the environment by 0.42543 percentage points, ceteris paribus. This effect is statistically significant at 1% significance level (p-value 0.000). On the base of these average marginal effects the hypotheses H1: *“Education is positively associated with the importance of products with a low environmental impact during a purchasing decisional process”* is accepted.

Table 6: Measure of Goodness of Fit for models considering sustainable products as dependent variable

Estimators	Model 1	Edu.Model1
Log-likelihood	-22758.634	-22744.060
Mc Fadden R2	0.037	0.038
McKelvey & Zavoina	0.087	0.088
Count R2	0.524	0.524
AIC	45589.268	45562.120
P-value	0.000	0.000

#### 4.2 Model 2

Table 7 provides Goodness of Fit comparison between the base model (Model2) and the model with education included (Edu.Model2). It is noticeable that both models are statistically significant at 1%, with a p-value of 0.000. Furthermore, Edu.Model2 is the one that fits data better. Indeed, it shows higher Log-likelihood, Mc Fadden R2, Mckelvey & Zavoina, Count R2 and a smaller AIC. Concerning the effect of education on the importance of eco-labelled products in purchasing decisions, average marginal effects are provided. Firstly, on average, one additional year of education increases the probability that eco-labelling plays an important role in the purchasing decision by 1.1899 percentage points, ceteris paribus. This effect is statistically significant at 1% confidence level (p-value 0.000). Secondly, on average, one additional year of education decreases the probability that eco-labelling does not play an important part during purchasing decisions by 0.27585 percentage points, ceteris paribus. The effect is statistically significant at 1% significance level (p-value 0.000). Finally, on average, an increment of education by one year leads to reduce the probability that an individual has never read any labels by 0.91405 percentage points, ceteris paribus. Also, this effect is statistically significant at 1% significance level (p-value 0.000). On the base of these results, it is possible to accept the second hypothesis H2: *“Education is positively associated with the importance of eco-labelled products during a purchasing decisional process”*.

Table 7: Measure of Goodness of Fit for models considering eco-labelling as dependent variable

<b>Estimators</b>	<b>Model 2</b>	<b>Edu.Model2</b>
Log-likelihood	-21976.562	-21880.092
Mc Fadden R2	0.029	0.033
McKelvey & Zavoina	0.064	0.073
Count R2	0.515	0.518
AIC	44023.124	43832.184
P-value	0.000	0.000

#### 4.3 Model 3

Table 8 reports the Goodness of Fit of the last models. Both models are statistically significant at 1% significance level. Even in this case indexes demonstrate that the model that includes education fits better the data. Indeed, Edu.Model3 shows to have a higher Log-likelihood, Mc Fadden R2, Mckelvey & Zavoina R2, Count R2 and a smaller AIC. Furthermore, average marginal effects prove a positive relation between education and the importance of energy efficient products in purchasing decisions. Specifically, on average, one additional year of education decreases the probability that consumers almost never take into account the energy efficiency of products they buy by 0.30157 percentage points, *ceteris paribus*. This effect is statistically significant at 1% significance level (p-value 0.000). Again, on average, one additional year of education decreases the probability that individuals rarely consider the energy efficiency of products they buy by 0.32936 percentage points, *ceteris paribus*. This effect is statistically significant at 1% (p-value 0.000). Third, on average, one-year increment of education decreases the probability to take into account most of the time the energy efficiency of products by 0.3932 percentage points, *ceteris paribus*. The effect is statistically significant at 1% confidence level (p-value 0.000). Finally, on average, one additional year of education increases the probability to always consider the energy efficiency of products during purchasing decisions by 1.02413 percentage points, *ceteris paribus*. This effect is statistically

significant at 1% (p-value 0.000). Therefore, is possible to accept the third hypotheses of the analysis *H3: "Education is positively associated with the importance of energy efficiency products during a purchasing decisional process"*.

Table 8: *Measure of Goodness of Fit for models considering energy efficient products as dependent variable*

<b>Estimators</b>	<b>Model 3</b>	<b>Edu.Model3</b>
Log-likelihood	-24782.437	-24706.474
Mc Fadden R2	0.022	0.025
McKelvey & Zavoina	0.054	0.062
Count R2	0.461	0.466
AIC	49636.874	49486.949
P-value	0.000	0.000

Finally, the comparison of Goodness of Fit and marginal effects amongst models considering eco-labelling and energy efficient products allows to examine how the influence of education differs across sustainable products and consequently, to realize whether the prediction related to the fourth hypothesis is satisfied. The comparison of Mckelvey & Zavoina R2 index between these models reveals that Edu.Model2 explains a higher variation of the dependent variable controlling for education; indeed Mckelvey & Zavoina R2 index is 0.073 in Edu.Model2 while 0.062 in Edu.Model3. Average marginal effects prove this stronger influence as well. On the one hand, on average, one additional year of education increases the probability that eco-labelling plays an important role in the purchasing decision by 1.1899 percentage points, ceteris paribus. On the other hand, on average, one-year increment in education increases the probability to always consider the energy efficiency of products during purchasing decisions by 1.02413 percentage points, ceteris paribus. It is noticeable that the influence of education on purchasing decisions is

stronger for eco-labelling than energy efficient products. These results contradict previous predictions in which a stronger effect of education on energy efficient products due to income effect was expected and therefore, that last hypothesis H4: *“Education is expected to have a stronger effect on purchasing decision of energy efficient products than eco-labelling”* is rejected.

## **5. Conclusion and Discussion**

### 5.1 Discussion

Generally, higher levels of education are associated to a greater chance to behave in a more sustainable fashion, based on the following reasons. Firstly, due to the strong background, knowledge and awareness about sustainability that education provides (Chen et al., 2011) and secondly, due to the higher incomes that those who receive a higher level of education usually tend to earn (Chankrajang and Muttarak, 2017). On this basis, the analysis, developed in this paper, tries to reshape the relationship between education and purchasing decisions of sustainable products in order to understand whether a positive association between them exists. Furthermore, the three questions about sustainable purchasing decisions that have been chosen as dependent variables provide information regarding the consumer’s attitudes towards buying decisions and permits the study of the effect of education on the choice of different sustainable products such as ecolabelling and energy efficient products. Results of the analysis seem to be in line with the majority of findings from previous literature that reveal a positive relationship between level of education and sustainable behaviours considered as buying decisions of sustainable products. Furthermore, this analysis provides an important additional value to the literature allowing to analyse how the influence of education differs across the purchasing choice of different sustainable products.

Concerning the results, Mckelevey & Zavoina R2 estimator reveals that education contributes to the variance explained by the dependent variable and thus, a statistically significant relationship is found. Moreover, the study of the average marginal effects shows a positive relation between level of education and the purchasing decision of sustainable products. Specifically, a higher level of education decreases the probability of individuals to consider a product’s impact on the environment not at all important or rather not important. Yet, a higher degree of education increases the possibility that consumers consider product’s impact on the environment as very important.

Interestingly, higher level of education plays a positive role on the purchase of both eco-labelled and energy efficient sustainable products, but the comparison of Mckelevey & Zavoina R2 estimators for Edu.model2 and Edu.Model3 reveals that degree of education influences the purchasing decisions of eco-labelled products more strongly than the purchase of energy efficient products. This finding is contradictory to the previous forecast that predicted a stronger influence on energy efficient product due to income effect. The two models report a slightly difference in the number of observations (21,801 observations for Model 2 and 21,807 for Model 3) that is not considered as bias for the study.

## 5.2 Limitations

Despite the statistically significant findings of this analysis, there are some limitations to this study. Firstly, the analysis explores the relation between education and purchasing decisions of sustainable products. Amongst these products, only eco-labelled and energy efficient are selected. A wider range of products could provide a more accurate measure of sustainable attitudes of consumers towards purchasing decision of sustainable products. Secondly, this analysis considers the income effect as an evidence of a positive effect of education on buying decisions. However, the dataset does not include a variable that considers individual's income and therefore, is based on theoretical assumptions. Moreover, dependent variables of the analysis refer to the importance of sustainable products during a purchasing decision. While this is a good indicator of sustainable behaviours because it allows to understand whether an individual considers the environmental impact of products want to buy, it fails to explain the effective purchasing behaviours of consumers. For instance, the effective number of sustainable products that consumers have bought is not reported. Moreover, several other factors may affect a consumer's purchasing decision such as price, quality, availability and need.

## 5.3 Further researches

Based on previous findings, explanations and limitations, the following aspects are strongly recommended to be considered for further researches. At present, many researches are focused on the relation between education and sustainable behaviours regarding specific products (Urge-Vorsatz and Hauff, 2001; Blend and Van Ravenswaay, 1999). In the future, it would be interesting if several sustainable products were investigated and compared to see how education may have a

different influence amongst them. Furthermore, some literatures refer to income effect to show the relationship between education and sustainable behaviours (Chankrajang and Muttarak, 2017). Nevertheless, as the literature regarding the relationship between income and sustainable behaviours remains limited. It would be interesting to study the relation between education and sustainable purchasing decision by including income as endogenous variable.

#### 5.4 Conclusion

In conclusion, it is plausible to derive the following assumptions from this research. Education is a relevant demographic factor in purchasing decisions regarding sustainable products, thus policies should focus on supporting individuals to be able to afford educational programs. Milton Friedman winner of the Nobel Memorial Prize in Economic Sciences highlighted the importance of the role of the Government in education, stated in his paper "The Role of Government in Education" (1955). Friedman explained the relation between institutions and education. Firstly, stating that education is funded and administrated by governmental entities or non-profit institutions. This underlines the relevant role that institutions play in the field of education. Furthermore, he points out that education plays the primary role in creating a stable and democratic society. Undoubtedly, education provides a common set of values and a minimum degree of literacy and knowledge that allows creation of a functional society promoting general welfare. On this basis, education should be facilitated by governments encouraging people to keep studying. It is well known that university programs are usually expensive and thus, not affordable to everybody. Scholarships and economic facilitations allow and incentive individuals to continue educational programs and thus, institutions should implement and extend such grant programmes. By doing this, it would be possible to increase the average level of education and consequently, improving sustainable behaviours and attitudes.

Furthermore, besides the importance associated to level of education in achieving sustainable purchasing decisions, also the nature of education is worth to be considered. Institutions must also improve and reshape education programs by, for instance, establishing mandatory or optional environmental educational programs. Literatures refer to environmental education that is defined as the education focused on teaching knowledge and concepts about environment, with the aim to evaluate environmental problems, to find suitable solutions and to promote sustainable behaviours (Pooley, 2001). By implementing such courses, individuals can gain the necessary

knowledge and awareness to understand topics fundamental for environmental sustainability and sustainable behaviours. Concerning this, a meta-analysis developed in USA about environmental education programmes reveals that after the implementation of these programs an improvement in participation rate of sustainable behaviours has been registered (Dunlap and Scarce, 1991). By understanding the important social and sustainable role played by education, this should be considered and utilized by governments as a method to promote sustainable development.

Finally, education is considerably a relevant demographic factor influencing life of individuals. It provides knowledge about the surrounding world, it allows developing perspectives, opinions, points of view and consequently a critical approach. Again, it gives competences to aspire to prestigious jobs. Education is the primary tool whereby individuals may evaluate and improve themselves; it plays a main role in the shape the figure of individuals and stimulates them to adopt sustainable behaviours. However, today education is still hardly focused on sustainability, and topics about sustainable word seem not to be a main priority in schools (McIntosh et al. 2002). For example, just few architecture universities rely on sustainable design as basis of their educational programmes (Glyphis, 2001). In this modern world, companies run amok, continuously failing to meet jurisdictional and international environmental agreements and everything seems to be ruled by capitalism. Radical changes are imperative for sustainable development. Education may provide this change by training future generations and teaching moral and sustainable values.

## Appendix:

Table 9: *Country*

<b>Country</b>	<b>Frequencies</b>	<b>Percentage</b>
France	1,006	3.78
Belgium	1,003	3.76
The Netherlands	1,010	3.79
Germany	1,010	3.79
Italy	1,011	3.79
Luxemburg	504	1.89
Denmark	1,000	3.75
Ireland	1,003	3.76
UK	1,001	3.76
Greece	1,004	3.79
Spain	1,002	3.76
Portugal	1,009	3.79
Finland	1,000	3.75
Sweden	1,000	3.75
Austria	1,002	3.76
Cyprus (republic)	501	1.88
Czech Republic	1,002	3.76
Estonia	1,015	3.81
Hungary	1,007	3.78
Latvia	1,005	3.77
Lithuania	1,005	3.77
Malta	503	1.89

Poland	1,005	3.77
Slovakia	1,007	3.78
Slovenia	1,005	3.77
Bulgaria	1,004	3.77
Romania	1,009	3.79
Croatia	1,009	3.79

---

Total	26,642	100.00
-------	--------	--------

---

Table 10: *Logistic regressions models*

	<b>Edu.Model1</b>	<b>Edu.Model2</b>	<b>Edu.Model3</b>
Education	0.0194335*** (0.0036036)	-0.0505435*** (0.0036781)	0.0435282*** (0.0035554)
Female	0.3409747 *** (0.0278749)	-0.3997783*** (0.0276832)	0.0504389* (0.0273117)
Age	0.0493575 *** (0.0052526)	-0.0678612*** (0.005161)	0.098364*** (0.0051427)
Age2	-0.0003176 *** (0.0000519)	0.0005946*** (0.0000508)	-0.0009082*** (0.0000508)
Employment status			
Employees	-0.137879*** (0.0483057)	0.1402873*** (0.0491018)	0.050352 (0.0474061)
Manual worker	-0.1523242** (0.065257)	0.2172981*** (0.0651203)	-0.0589144 (0.0640889)
Not working	-0.0208387 * (0.0518354)	0.1809664*** (0.0524822)	0.0274561 (0.0507532)
Country	<i>The variable Country is considered in the models, but it is not showed due to its length</i>		
Cut1	-1.109271 (0.170611)	-2.714166 (0.1696242)	0.8319987 (0.1658611)
Cut2	0.4434374 (0.168383)	-1.586391 (0.1689497)	1.858314 (0.1656035)
Cut3	2.855227 (0.169655)	(/)	3.640078 (0.1670715)
Pseudo R2	0.0379	0.0332	0.0248
Note: *p-value < 0.1, **p-value < 0.05, ***p-value < 0.01			

## 6. Reference

Abeliotis, K., Koniari, C., & Sardianou, E. (2010). The profile of the green consumer in greece. *International Journal of Consumer Studies*, 34(2), 153-160. doi:10.1111/j.1470-6431.2009.00833.x;

Andersen, R., & Van de Werfhorst, H. (2010). Education and occupational status in 14 countries: The role of educational institutions and labour market coordination. *The British Journal of Sociology*, 61(2), 336-355. doi:10.1111/j.1468-4446.2010.01315.x;

Boshara, Ray; Emmons, William R. & Noeth, Bryan. (2015). The Demographics of Wealth: How Age, Education and Race Separate Thrivers from Strugglers in Today's Economy. *Education and Wealth, Federal Reserve Bank of St. Louis*;

Bhatt, S., & Sharma, S. (2012). Going green. *International Journal of Management Research and Reviews*, 2, 1400–1404;

Bendell, J., Miller, A., & Wortmann, K. (2011). Public policies for scaling corporate responsibility standards. *Sustainability Accounting, Management and Policy Journal*, 2(2), 263-293. doi:10.1108/2040802111118541;

Bettio, F., & Villa, P. (1999). To what extent does it pay to be better educated? education and the work market for women in italy. *South European Society and Politics*, 4(2), 150-170. doi:10.1080/13608740408539574;

Black, J., Stern, P., & Elworth, J. (1985). Personal and contextual influences on household energy adaptations. *Journal of Applied Psychology*, 70(1);

Blend, J., & Van Ravenswaay, E. (1999). Measuring consumer demand for ecolabeled apples. *American Journal of Agricultural Economics*, 81(5), 1072-1077;

Callan, S., & Thomas, J. (2006). Analyzing demand for disposal and recycling services: A systems approach. *Eastern Economic Journal*, 32(2), 221-240;

Chankrajang, T., & Muttarak, R. (2017). Green returns to education: Does schooling contribute to pro-environmental behaviours? evidence from thailand. *Ecological Economics*, 131, 434-448. doi:10.1016/j.ecolecon.2016.09.015;

Chen, Xiaodong & Peterson, Nils & Hull, Vanessa & LU, CHUNTIAN & Jenni, Grace & Hong, Dayong & Liu, Jianguo. (2011). Effects of attitudinal and socio-demographic factors on pro-environmental behavior in urban China. *Environmental Conservation*. 38. 10.1017/S037689291000086X;

Costa Pinto, D., Herter, M., Rossi, P., & Borges, A. (2014). Going green for self or for others? gender and identity salience effects on sustainable consumption. *International Journal of Consumer Studies*, 38(5), 540-549. doi:10.1111/ijcs.12114;

De Silva, D., & Pownall, R. (2014). Going green: Does it depend on education, gender or income? *Applied Economics*, 46(5), 573-573;

Diamantopoulos, A., Schlegelmilch, B., Sinkovics, R., & Bohlen, G. (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), 465-465;

Dosi, C., & Moretto, M. (2001). Is ecolabelling a reliable environmental policy measure? *Environmental & Resource Economics*, 18(1), 113-128;

Dunlap, R. E., & Scarce, R. (1991). The polls- poll trends: Environmental problems and protection. *Public Opinion Quarterly*, 55(4), 651-672;

D'Souza, C., Taghian, M., Lamb, P., & Peretiatko, R. (2007). Green decisions: Demographics and consumer understanding of environmental labels. *International Journal of Consumer Studies*, 31(4), 371-371. doi:10.1111/j.1470-6431.2006.00567.x;

Estrin, S., Mickiewicz, T., & Stephan, U. (2016). Human capital in social and commercial entrepreneurship. *Journal of Business Venturing*, 31(4), 449-449;

Friedman, M., (1955). The role of government in education. *Rutgers University Press*, 375;

Gilg, A., Barr, S., & Ford, N. (2005). Green consumption or sustainable lifestyles? identifying the sustainable consumer. *Futures*, 37(6), 481-504. doi:10.1016/j.futures.2004.10.016;

Global Ecolabelling Network, (2004). What is ecolabelling?  
<https://globalecolabelling.net/what-is-eco-labelling/>;

Glyphis, J., (2001). How Can the Architect Contribute to a Sustainable World? Proceedings of the Wingspread Conference, 24–26 August;

Huang, C. (1996). Consumer preferences and attitudes towards organically grown produce. *European Review of Agricultural Economics*, 23(3), 331-342. doi:10.1093/erae/23.3.331;

Ishaswini, & Datta, S. K. (2011). Pro-environmental concern influencing green buying: a study on Indian consumers. *International Journal of Business and Management*, 6,124–133;

Jain, S., & Kaur, G. (2006). Role of socio-demographics in segmenting and profiling green consumers: An exploratory study of consumers in india. *Journal of International Consumer Marketing*, 18(3), 107-146;

Kollmuss, A., & Agyeman, J. (2002). Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research*, 8(3), 239-60;

Ma, G., Andrews-Speed, P., & Zhang, J. (2013). Chinese consumer attitudes towards energy saving: The case of household electrical appliances in chongqing. *Energy Policy*, 56, 591-591;

Mannberg, A., Jansson, J., Pettersson, T., Brännlund, R., Lindgren, U. (2014). Do tax incentives affect households' adoption of “green” cars? A panel study of the Stockholm congestion tax. *Energy Policy*, 74, 286–299;

McGougall, G., H., G., (1993). The green movement in Canada: Implications for marketing strategy. *Journal of International Consumer Marketing*, 5:69–87;

McIntosh, M., K. Cacciola, S. Clermont, and J. Keniry (2002). State of the Campus Environment: A National Report Card on Environmental Performance and Sustainability in Higher Education. Reston, Va.: National Wildlife Federation;

Meyer, A. (2015). Does education increase pro-environmental behavior? evidence from europe. *Ecological Economics*, 116, 108-121. doi:10.1016/j.ecolecon.2015.04.018;

Morrison, P.S., Beer, B. (2017). Consumption and Environmental Awareness: Demographics of the European Experience. *Socioeconomic Environmental Policies and Evaluations in Regional Science*, 81-102;

Ngobo, P. (2011). What drives household choice of organic products in grocery stores? *Journal of Retailing*, 87(1), 90-100. doi:10.1016/j.jretai.2010.08.001;

Nittala, R. (2014). Green Consumer Behaviour of the Educated segment in India. *Journal of International Consumer Marketing*, 26, 138-152;

Ofstad, S., Westly, L., Bratelli, T., Norway. Miljøverndepartementet, & Symposium on Sustainable Consumption (1994). Symposium on Sustainable Consumption. Oslo, Norway.

Ortega-Egea, J., García-de-Frutos, N., & Antolín-López, R. (2014). Why do some people do "more" to mitigate climate change than others? exploring heterogeneity in psycho-social associations. *Plos One*, 9(9), 106645. doi:10.1371/journal.pone.0106645;

Pachauri, R., K. & Meyer, L., A., (2014). Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. IPCC, Geneva, Switzerland, 151 pp;

Patel, J., Modi, A., & Paul, J. (2017). Pro-environmental behavior and socio-demographic factors in an emerging market. *Asian Journal of Business Ethics*, 6(2), 189-214. doi:10.1007/s13520-016-0071-5;

Pooley, J. (2001). Environmental education and attitudes: Emotions and beliefs are what is needed. *Journal of Planning Literature*, 16(1), 80-163;

Poortinga, W., Steg, L., & Vlek, C. (2004). Values, environmental concern, and environmental behavior: A study into household energy use. *Environment & Behavior*, 36(1), 70-93;

Potoglou, D., & Kanaroglou, P. (2007). Household demand and willingness to pay for clean vehicles. *Transportation Research Part D*, 12(4), 264-274. doi:10.1016/j.trd.2007.03.001;

Putrevu, S. (2001) Exploring the origins and information processing differences between men and women: implications for advertisers. *Academy of Marketing Science Review*, 10, 1–14;

Rowlands, I., Parker, P., & Scott, D. (2002). Consumer perceptions of "green power". *Journal of Consumer Marketing*, 19(2), 112-129. doi:10.1108/07363760210420540;

Santos, F. (2012). A positive theory of social entrepreneurship. *Journal of Business Ethics*, 111(3), 335-351. doi:10.1007/s10551-012-1413-4;

Shavit, Y., & Blossfeld, H. (1993). *Persistent inequality: Changing educational attainment in thirteen countries*. Boulder, Colo.: Westview Press;

Straughan, R., & Roberts, J. (1999). Environmental segmentation alternatives: A look at green consumer behavior in the new millennium. *Journal of Consumer Marketing*, 16(6), 558-575;

Thompson, G., & Kidwell, J. (1998). Explaining the choice of organic produce: Cosmetic defects, prices, and consumer preferences. *American Journal of Agricultural Economics*, 80(2), 277-287;

Torgler, B., & García-Valiñas, M. (2007). The determinants of individuals' attitudes towards preventing environmental damage. *Ecological Economics*, 63(2-3), 536-552. doi:10.1016/j.ecolecon.2006.12.013;

Urge-Vorsatz, D., & Hauff, J. (2001). Drivers of market transformation: Analysis of the hungarian lighting success story. *Energy Policy*, 29(10), 801-810. doi:10.1016/S0301-4215(01)00013-1;

Vlek, C., & Steg, L. (2007). Human behavior and environmental sustainability: Problems, driving forces, and research topics. *Journal of Social Issues*, 63(1), 1-19;

Vorsatz, D. (1996). *Exploring US residential and commercial electricity conservation potentials: analysis of the lighting sector*. Environmental Science and Engineering, and Energy and Resources Group. University of California, Los Angeles, CA;

Wolla, S., & Sullivan, J. (2017), Education, Income, and Wealth, *Page One Economics Newsletter*.

Xu, P., Zeng, Y., Fong, Q., Lone, T., & Liu, Y. (2012). Chinese consumers' willingness to pay for green- and eco-labeled seafood. *Food Control*, 28(1), 74-82. doi:10.1016/j.foodcont.2012.04.008;

Zarnikau, J. (2003). Consumer demand for 'green power' and energy efficiency. *Energy Policy*, 31(15), 1661-1672;