

# Greek consumers attitudes and motivations against PDO/PGI Agrifoods

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## Abstract

The study was set out to investigate the factors affecting consumers' purchasing attitudes and their intention to buy PDO/PGI food products. A total of 615 consumers took part in the study from the municipality of Attica, Greece. The majority of the respondents consider PDO/PGI products of better quality and higher safety than the conventional ones, and they are also able to identify them. However, respondents are unsure whether these products are superior in terms of health benefits, less expensive and tastier than the conventional ones. Furthermore, consumers, who pay attention to the origin, the health claims, the label of a product, and have a high level of consumer awareness, are more likely to buy PDOs/ PGIs. Understanding the main factors that influence consumers to purchase PDO/PGI products, is a vital step towards the promotion of special labeled agri-foodstuffs, which could contribute to the local sustainable development.

**Keywords:** PDO/PGI products, label, consumer preferences, sustainability, agrifoods.

## Atitudes e motivações dos consumidores gregos contra DOP/IGP Agrifoods

### Resumo

O estudo foi elaborado para investigar os fatores que afetam as atitudes de compra dos consumidores e sua intenção de comprar produtos alimentícios DOP/IGP. Um total de 615 consumidores participaram do estudo do município de Attica, na Grécia. A maioria dos inquiridos considera os produtos DOP/IGP de melhor qualidade e maior segurança do que os convencionais, sendo também capazes de os identificar. No entanto, os entrevistados têm dúvidas se esses produtos são superiores em termos de benefícios à saúde, mais baratos e mais saborosos que os convencionais. Além disso, os consumidores que prestam atenção à origem, às alegações de saúde, ao rótulo de um produto e têm um alto nível de consciência do consumidor, são mais propensos a comprar DOP/IGP. A compreensão dos principais fatores que influenciam os consumidores a adquirirem produtos DOP/IGP, é um passo fundamental para a promoção de produtos agroalimentares com rótulo especial, que possam contribuir para o desenvolvimento sustentável local.

**Palavras-chave:** produtos DOP/IGP, rótulo, preferências do consumidor, sustentabilidade, agroalimentar.

### 1. Introduction

#### 1.1. General

Research has shown that consumers, before buying food, tend to value quality, authenticity, ethical standards<sup>1</sup> and compliance with all applicable legislation, country of origin and sustainable production standards. As a result, there is an ever-increasing number of research and studies on Protected Designation of Origin (PDO) and Protected Geographical Indication (PGI) foods (Herrera & Blanco, 2011, Aprile et al., 2012).

In accordance with Regulation (EC) No. 510/2006, a PDO label refers to agricultural products and foodstuffs produced, processed, and prepared in a defined geographical area, of a specific place or country, the quality or characteristics of which are mainly or exclusively due to the particular geographical environment that includes them. physical and human factors. The PGI label, on the other hand, describes agricultural foodstuffs closely

related to a defined geographical area. At least one of the stages of production, processing or manufacture of the final product takes place in the area. These products have a specific quality, reputation or other characteristic, which can be attributed to the geographical origin.

In addition, the EU considers that PDO and PGI labels play an important role in rural regeneration, as food produced in this way preserves local varieties, supports rural diversity and social cohesion (Commission of the European Communities 2008, p. 12).

More specifically, PDO certification can be a source of entrepreneurship and local development (Borg and Gratzner, 2013; Vakoufaris, 2010). It is argued that this strategy prevents the closure of existing agricultural enterprises and facilitates the development of new ones, while allowing the creation of new jobs in the field of tourism and related activities. Moreover, PDO / PGI certification of agri-food, in specific sectors, could offset the negative effects of globalization and offer a significant economic opportunity, especially in the case of less-favored and remote areas, to diversify products and, consequently, this differentiation to contribute to their development (Van der Ploeg et al., 2000, Borg & Gratzner, 2013, Vecchio & Annunziata, 2011).

At the end of 2017, Greece had certified 105 PDO / PGI products, occupying the fifth position in the register of EU certified products. (Elgo Dimitra, 2014).

### *1.2. Factors affecting the market of PDO / PGI products*

There is evidence that trust is considered an extremely important factor in consumers' purchasing decision (Bredahl, 2001). Confidence is closely linked to safety and risk perception, as well as nutrition and health characteristics. According to Herrera and Blanco (2011), the role of consumer confidence, as a factor in reducing perceived risk and as a precursor to satisfaction, loyalty and market willingness, is a critical role in its attitude towards products. The results of the above research showed that there are links between perceived risk, trust, satisfaction, faith and buying intention. Consumers with more familiarity and experience with PDO products, showed higher levels of trust and satisfaction.

Yi and La (2004) considered that loyal consumers show a special "bond" with the product, spread it by word of mouth and are willing to pay for the product at a higher price. Adequate product information is also considered a good risk reduction strategy (Fearne et al., 2001). However, the low credibility of the media, asymmetric information about product quality and consumer concerns about the negative health effects of agricultural products (Calvo, 2001), affect the perceived risk on the part of consumers. In the case of PDO / PGI products, there are indications that consumers have a vague and insufficient knowledge of their definition and characteristics, despite the fact that they are increasing in number and becoming more and more available to the consumer. More specifically, surveys of Spanish consumers showed their ignorance of specific foods (types, characteristics, quality), since, even in the case of their consumption, they claimed that they did not know them (MARM, 2010). According to Fandos et al. (2007) and Aprile et al. (2009) consumers are confused and disoriented about the meaning of these products. For Vecchio & Annunziata (2011) the PDO and PGI logos are the main market incentive for Italian consumers who have an excellent knowledge of EU certification labels, while consumers who do not have the above knowledge tend to base their purchasing decision on the low price, the best appearance and the Italian origin.

Studies have also shown the effect of socio-demographic characteristics (gender, age, income, education level, household size) on market decision (Akhter, 2003, Bower et al., 2003, Dettmann & Dimitri, 2009). Similarly, in the case of PDO food products, Botonaki & Tsakiridou (2004), as well as Skuras & Vakrou (2002), after investigating the intention of Greek consumers to buy PDO wine, found that the socio-demographic characteristics of consumers affect their intention to buy them.

However, another study by Tsakiridou et al. (2009) showed that socio-economic factors do not significantly affect the intention to buy guaranteed traditional specialty products (EIA), while the most important motivation of consumers was the attitude towards health and safety.

Fotopoulos & Krystallis (2003) investigated the motivations of consumers to buy "PDO Zagora" apples. The findings showed that consumers who bought certified products belonged to the upper socio-economic class. In addition, consumers were positive about PDO brands, for which they were willing to pay more. However, labeling did not appear to be significant enough for more than a third of consumers in this survey. In addition, Krystallis & Ness (2005) concluded that high quality, hygiene and safety, organoleptic characteristics and convenience are the main motivations of consumers of high incomes and educational level when choosing certified olive oil.

Finally, Pinto et al. (2008) investigated the intention of consumers in Portugal to buy PDO pears. According to the survey results, consumers who intended to buy and pay the highest price of PDO pears were mainly motivated by food safety issues.

The purpose of this paper is to investigate the factors that influence the attitude of Greek consumers towards PDO / PGI products and their intention to buy them. Understanding the main factors influencing consumers to buy PDO / PGI products and consumer evaluation of these products is an important step towards promoting agri-food special labels.

## **2. Materials and Methods**

### *2.1. General*

The present survey involved 615 consumers from the greater Athens area. The research was conducted during the period "March 2011 - April 2013". The data were collected through an interview with a questionnaire and the respondents were selected from supermarkets in various areas of Attica. The interviews took place between 10:00 and 17:00 throughout the week (Monday-Saturday). The average duration of each interview was 30 minutes. The questionnaire was evaluated on a pilot basis ( $n = 30$ ) before the start of the research to ensure the absence of possible ambiguous questions. All participants in the survey received the necessary information and written justification for the purpose of the investigation as well as the preservation of their anonymity, along with specific instructions for completion. All respondents were over 20 years old.

### *2.2. Questionnaire*

The questionnaire contained closed-ended questions and was designed by grouping the questions into three sections. The questions were based on previous empirical studies (Tsakiridou et al. 2011; Tsourgiannis et al. 2011) which contained corresponding questionnaires and to which new questions were added.

The first section included the demographic characteristics of the sample, such as gender, age, level of education, occupation, annual family income and marital status. The second section contained questions about consumers' attitudes towards product labeling and the determinants that influence the purchasing decision. Finally, the third section included questions about consumers' knowledge of PDO / PGI products, the intention to purchase the products and their attitude towards them.

### *2.3. Data analysis*

Data were analyzed using descriptive statistics initially. Also, an exploratory factor analysis was performed in order to group the factors that determine the purchasing decision of the respondents. Finally, an accounting regression was conducted in order to examine the key factors that influence the respondents' intention to purchase PDO / PGI products. The accounting regression was performed with the intention of purchasing PDO / PGI products as a dependent variable. The dependent variable is a binary variable that takes the value of one (1) when the respondent intends to buy PDO / PGI and zero (0) in any other case. In order to determine the factors influencing the intention of consumers to buy PDO / PGI products, certain demographic characteristics of the sample consumers were used as interpretive variables, as well as their knowledge about PDO / PGI products and the most important factors influencing the decision. derived from the factorial analysis carried out. The description of the variables used in the estimation of the model is presented in Table 1. The data were analyzed using the statistical package for the Social Sciences (SPSS / PC version 21.0).

**Table 1.** Description of the variables of the equation

<b>Dependent Variable</b>	
ITB-PDO Willingness to buy PDO / PGI (If yes = 1, Otherwise = 0)	
<b>Independent Variables</b>	
Sex	If the respondent is a man = 1, Otherwise = 0
Age	The Age in years
Age <sup>2</sup>	The square of the age of the respondent
Educational Level	If the respondent has a high level of education (university education) = 1, Otherwise = 0
Income	If the respondent has an annual family income of up to € 20,000 = 1, Otherwise = 0
Children	If the respondent has children = 1, Otherwise = 0
Knowledge	If the respondent knows the PDO products = 1, Otherwise = 0
Knowledge 1	If the respondent knows the PGI products = 1, Otherwise = 0
Degree of awareness	Quantitative variable which shows the perception of the respondents about the PDO / PGI products. Made by combining the following 5 variables: 1) The PDO / PGI products in relation to the rest are of better quality = 1, Otherwise = 0, 2) The PDO / PGI products in relation to the rest are safer = 1, Otherwise = 0, 3) PDO / PGI products in relation to the rest are cheaper = 1, Otherwise = 0, 4) PDO / PGI products in relation to the rest are healthier = 1, Otherwise = 0, 5) PDO products / PGI in relation to the rest are tastier = 1, Otherwise = 0
No chemicals	If the respondents consider that PDOs are produced without fertilizers and chemicals = 1, Otherwise = 0
Place of Origin	The attitude of the respondents towards the place of origin of the products
Health	The attitude of the respondents towards the promotion of health
Sustainable consumer through these products	Respondents' attitudes towards sustainability
Label Products	Respondents' attitudes towards label products

### 3. Results and Discussion

#### 3.1. The profile of the participants-consumers

The majority of respondents were women (55.5%). About 45% of respondents were married and the average number of household members was three. The respondents, on average, were 37 years old, with an average level of education (36.8%), with an annual family income of up to € 20,000 (72%). The demographic characteristics of the sample are presented in Table 2.

**Table 2.** Demographic characteristics of the sample

	Total (n=615)
Age	
Average	37,05
Standard Deviation	10,52
Number of Family Members	
Average	3,01
Standard Deviation	1,22
Sex	
Men	44,5
Women	55,5
Marital Status	
Married	44,8
Singles	55,2
Presence of Children	
Yes	33,5
No	66,5
Educational Level	
Primary School	16,7
High School	36,8
IEK	12,4
Higher Education	23,9
Master/ PhD	10,1
Annual family income (€)	
< 20.000	72,0
21.000– 30.000	16,6
31.000– 40.000	4,4
41.000– 50.000	4,4
51.000– 60.000	0,7
61.000– 70.000	0,3
71.000– 80.000	0,9
> 81.000	0,7

### 3.2. Attitudes of participants - consumers regarding the products that have branding and purchase incentives

Regarding the level of consumer confidence in a list of products, the participants stated that they prefer Greek products (77.5%), traditional products (70.0%), PDO / PGI (53.2%) and organic products (48.6%). On the other hand, the level of confidence in products such as "light", Genetically Modified (GM) and products with special requirements, in terms of health, ranged between 10-12%.

Regarding the factors that influence the purchase decision of the respondents, these factors were, in descending order of importance (on a 5-point scale): taste (average price = 4.4), health (average price = 4.3), product price (average price = 4.0), country of origin (average price = 3.9), nutritional value (average price = 3.8), traditional production methods (average price = 3.8), brand (average price = 3.6), quality certification (average price = 3.6)

and place of origin (average price = 3.5). Other factors, such as packaging and advertising, were less important to the survey respondents.

Finally, the type of information that respondents read on food labels is: expiration date (average price = 4.7), price (average price = 4.4), country of origin (average price = 4.2), date of manufacture (average price = 4.2), production area (average price = 3.8), components (average price = 3.4), storage conditions (average price = 3.2), quality signals (average value = 3.1), net weight (average value = 3.1), fats (average value = 3.0) and calories (average value = 2.8).

### *3.3. Knowledge of PDO / PGI products*

Almost 70% of respondents said they were aware of PDO products, while about 40% said they were aware of PGI products. According to the respondents, the PDO / PGI products are of better quality (56.9%) and safer (48.6%) compared to other food products. However, a particularly high percentage is not sure whether PDO / PGI products are healthier (49.9%), less expensive (50.9%) and tastier (50.9%) than conventional foods. It is interesting to note that a significant percentage of the sample (58.2%) is not sure whether PDO / PGI are produced without agrochemicals and 25.6% consider these products organic.

### *3.4. Factor Analysis*

In order to investigate the factors that determine the consumer purchasing decision, the technique of exploratory factor analysis was performed. The method of Principal Component Analysis using Varimax Rotation (Varimax Rotation) was used for the estimation.

Based on the results of the factor analysis, a solution with the extraction of five factors was considered the most preferable, which explains 55% of the total data variance. The Kaiser Mayer Olkin (KMO) index was 0.855 and the Bartlett (Bartlett's Test of Sphericity) sphericity test was not significant ( $p < 0.05$ ), indicating the appropriateness of the factor analysis for interpretation on the sample. The identification of the main factors were based on the variable with the highest load values per factor. Table 3 shows four of the five factors.

The first factor is identified as "Product Origin". It explains 26.7% of the total variance of all the variables introduced in the analysis. The variables that show the highest loads on this factor are: "The country of origin of the product is a market criterion for me", "The geographical origin of the product is a market criterion for me", "I read the origin of the product on the label", "I read the place of origin of the product and the production on the label." The second factor can be identified as "Health" and explains 10.5% of the total variance. Includes the variables "I read the calories of the product on the label" and "I read the fats in the food label". The third factor is identified as "Consumer Awareness" and explains 6.5% of the total variance. Includes the variables "I read the storage conditions of the product on the label", "I read the net weight of the food on the label", "I pay attention to the quality labels (HACCP, ISO, PDO, PGI, AGROCERT, BIO)" and "Recyclable materials" food packaging is an important market criterion ". In addition, the fourth factor explains 5.9% of the total variation and is entitled "Products with labeling". It includes the variables "I trust organic products", "I trust traditional products", "I trust PDO / PGI products" and "I trust Greek food products". All variables included in the analysis were measured on a 5-point "Likert" scale: Strongly Disagree, Disagree, Disagree / Disagree, Agree, Strongly Agree.

**Table 3.** Factor analysis of the variables concerning the factors that determine the product purchase decision

Factors ( $\alpha$ - Cronbach)	% of Total Variance	Factor Loads	Variables
Origin (0,767)	26,7	0,766	• The country of origin of the product is for me a purchase criterion
		0,734	• The geographical origin of the product is a purchase criterion for me
		0,654	• I read the origin of the product on the label
		0,638	• I read the place of origin of the product and the production on the label
Health (0,828)	10,5	0,862	• I read the calories of the product on the label
		0,837	• I read fats on food labels
Consumer Awareness (0,698)	6,5	0,782	• I read the storage conditions of the product on the label
		0,716	• I read the net weight of the food on the label
		0,507	• I pay attention to quality signals (HACCP, ISO (etc.))
		0,500	• Recyclable packaging materials are an important purchase criterion
Marked Products (0,625)	5,9	0,672	• I trust organic products
		0,656	• I trust traditional products
		0,650	• I trust PDO / PGI products
		0,591	• I trust Greek Food Products

### 3.5. Accounting regression analysis

About 50% of respondents said they intend to buy PDO / PGI products. Table 4 presents the empirical results of the estimated rates of accounting regression, in relation to the intention of consumers to purchase PDO / PGI products. The final results for the variables on the intention of consumers to buy PDO / PGI are contained in model II.

According to the results of the research, the socio-economic characteristics do not seem to influence the intention of the respondents to buy PDO / PGI products (model I). On the other hand, participants who had a more positive attitude towards PDO / PGI were more likely to buy these products from participants with a less positive attitude. In addition, the origin and labeling of the products had a positive effect on consumers' intention to buy PDO / PGI. Respondents who consider origin and labeling as important characteristics were likely to purchase PDO / PGI. Finally, those who were knowledgeable about PGI products and with a view to sustainable development, stated that they were going to buy PDO / PGI products.

**Table 4.** Main variables that affect the consumer's intention to buy PDO / PGI

Constant	Model I	Model II
Constant	-1,119 (1,190)	-0,560** (8,962)
Sex	0,100 (0,207)	
Age	0,016 (0,098)	
Age <sup>2</sup>	0,000 (0,078)	
Education	-0,031 (0,016)	
Income	0,136 (0,224)	
Children	0,136 (0,294)	
Knowledge	0,154 (0,231)	
Knowledge1	0,449* (3,428)	0,541** (6,133)
Level of Awareness	0,202** (5,574)	0,235** (9,712)
No chemicals	0,505 (2,664)	
Origin of product	0,446*** (15,136)	0,439*** (16,019)
Consumer Awareness	0,288** (6,300)	0,294** (7,198)
Προϊόντα με σήμανση	0,631*** (25,502)	0,646** (29,215)
-2 Log Likelihood	516,746	535,478
Nagelkerke R <sup>2</sup>	0,283	0,273
H-L Test	10,164	7,644

Note: The parentheses show the wald statistics. \* $p < 0,10$ ; \*\* $p < 0,05$ ; \*\*\* $p < 0,01$

#### 4. Discussion

The purpose of this study was to investigate the factors that affect the intention of consumers to buy PDO / PGI products. This research is one of the few works in this field, which was conducted in Greece (Fotopoulos and Krystallis, 2001, 2003, Skuras & Vakrou, 2002, Philippidis & Sanjuan, 2003, Botonaki & Tsakiridou, 2004, Tsakiridou et al., 2009).

The findings of the present study show that certified PDO products are better recognized by consumers than certified PGI products (Menapace et al., 2011, Aprile et al., 2012). The reason for this needs to be further investigated, however it could be attributed to the great popularity of some Greek PDO products, such as "Hellenic Feta" and a number of certified PDO olive oils.

It is also important to note that, in this survey, Greek consumers believe that certified PDO / PGI products are of better quality and greater safety compared to conventional ones. However, the respondents were not sure if they are healthier, tastier or if they have a higher price, compared to conventional foods. It is worth noting that in the present survey one in four Greek consumers mistakenly considers PDOs / PGIs as organic, while 58.2% of consumers are not sure whether PDOs / PGIs are produced without the use of fertilizers and other agrochemicals. This misunderstanding must be taken into account when educating consumers in order to avoid possible confusion as to their conscious choices.

Regarding the main factors that affect the willingness of Greek consumers to buy PDO / PGI food, in contrast to other surveys (Skuras & Vakrou, 2002, Fotopoulos & Krystallis, 2003, Botonaki & Tsakiridou, 2004), the socio-economic characteristics of consumers did not seem to influence their intention to buy PDO / PGI products. This result is encouraging and marks the gradual increase of their popularity and the recognition of these products by the population, regardless of education and income.

It is also important to note that participants who had a more positive attitude towards PDO / PGI were more likely to buy PDO / PGI products than participants with a less positive attitude, an expected result. According to the results of accounting regression, the country of origin and the specific label of a product can positively affect the intention of consumers to buy PDO / PGI products (Caporale & Monteleone, 2001). More specifically, consumers who consider origin and labeling as important features during the purchasing decision are likely to purchase PDO



/ PGI. In addition, consumers who reported having a good knowledge of PGIs and those who reported being consumers of organic products had higher rates of intent to purchase PDO / PGI products. In the present work, the PDO / PGI label on food seems to be the third most common factor that Greek consumers evaluate in terms of confidence, followed by the organic label, while in the first and second place is the Greek origin of a food and its traditional way of production. This is in line with other work done in Europe and states that information on expiration date, production, price and country of origin are the most important elements in labels (Grunert, 2005). The expiration date and consumption date are likely to be the most easily understood indications from other information on quality, origin or traceability, especially if consumers do not have specific knowledge of the region of origin of the product or when they do not consider that quality plays an important role.

According to Trognon et al. (1999) (in Crystallis & Ness, 2005), the European consumer considers the origin of the products as an important indication of their quality and therefore supports this contribution to local production.

## 5. Conclusions

Consumers seem to evaluate the Greek origin of a food as very positive as an indication of good quality, which could contribute to the support of the Greek economy, especially in the current period of economic recession. In addition, PDO / PGI food is recognized as of better quality than conventional ones, which can lead to an increase in the number of certifications of these products in Greece, thus offering a significant financial opportunity for agricultural enterprises. Finally, the need for better consumer education on the specific characteristics of PDO / PGI label products is identified.

## 6. Acknowledgments

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## 7. Authors' Contributions

The authors contributed equally.

## 8. Conflicts of Interest

No conflicts of interest.

## 9. Ethics Approval

Not applicable.

## 10. Footnotes

Maintaining sensitivity and compliance with applicable law, prohibition of forced, compulsory or child labor, providing safe and healthy conditions, conducting business activities with care for the environment.

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