Issam Fares Institute for Public Policy
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Research, Advocacy & Public Policy-Making

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The Efficiency of Food Labeling as a Rural Development Policy:

The Case of Olive Oil in Lebanon

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Research, Advocacy and Public Policy-making in the Arab World (RAPP) studies the effectiveness of think tanks and research policy institutes in influencing public policy in the region. It aims to establish a permanent network of self-financed think tanks and research centers across the Middle East that are better able to impact public policy in their respective countries.

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Abstract

Several regional products have been very successful as region-based products, such as Saudi Dates, Jordanian Thyme, Syrian *Barazi*, Egyptian *Foul Mdamas,* and Lebanese Chick Pea paste *(Homos Tahini)*. These trends of region-based, Geographic indicator (GI) and governmental labeled products are considered to be an added value to agro-industrial sector, and are highly efficient tactics to increase small and medium-sized enterprises (SME's) revenues. However, some agricultural products are correlated with persistent consumer's socio-cultural purchasing behaviors, such as Lebanese olive oil and the friend-family network purchasing patterns. Many local and international NGO's are seeking to liberate olive oil sector into modern market chain through packaged and labeled small sized bottles, without taking into consideration the Lebanese socio-cultural purchasing behavior of olive oil. In this research paper, a survey was done in the American University of Beirut (AUB) showing the willingness of the Lebanese consumers to try governmental labeled olive oil, and a regression then used with an econometric model using variables such as gender, age, occupation, and friend/family network role. The results show that females are more willing to try government labeled olive oil, and people who get advice about olive oil purchasing through their friend/family network are also more likely to try these products.

Introduction

In recent years, an increasing number of food products have been marketed in a way that shows where they come from and how they are produced. Regional products or "origin-based" products are *"local products based on a strong territorial identity and reputation, and /or typical products based on specific modes of production and whose quality, reputation or any other characteristics are attributable essentially to their geographical origin"* (van de Kop et al., p.22). In 1992, because of the growing importance of regional products, the European Commission introduced Regulation (EEC) No. 2081/92, which enabled producers to legally protect regional agricultural and food specialties from counterfeit imitation products and name abuse.

Origin-based labeling strategy aims at decreasing asymmetry of information, preserving product reputation, and inferring quality signals and fairness values, like producers' socio-economic welfare. Geographical indications (GIs)1 may provide a strong rural development tool that has been recognized by the EU, as reflected in various policies and regulations.

This 'origin-based' labeling strengthens relations between producers and consumers, adds value to farm produce, and preserves local knowledge and culture (Sylvander et al., 2000). GIs are likely to contribute to raising the revenues of farmers, and thus encouraging employment. This rural development potential is an important incentive for developing countries to adopt and support origin-labeled products within their territory. More and more developing countries express a strong interest for GIs since local products are overwhelmingly present in developing countries (Van de Kop and al., 2006).

The majority of studies show that origin-based labeling influences consumer attitudes and registered products can be sold in the market at a premium price. However, the impact of origin-based labeling varies across countries (Duman 2004). Empirical studies were conducted in different European countries to assess the value that consumers place on origin-based labeling information, and a number of these studies showed that origin-based labeling of regional food products have a favorable impact on product valuation by consumers. Van Ittersum et al. (2007) established that consumers of regional products value regional certification labels, which are perceived as warranties of quality and as economic support cues for the region. Caporale and Monteleone (2001) conducted a study on virgin oil and found a significant positive impact on product acceptability when consumers were provided information on the origin of the olive oil. A study conducted by Roosen, Lusk and Fox (2003) indicated that consumers of beef products place more importance on labels of origin than they do on private brands.

However, another set of empirical studies led to conflicting results; Bonnet and Simioni (2001) suggest that it cannot be taken for granted that consumers value the quality signal provided by an origin-based label. Additionally, Loureiro and Umberger (2007) found that consumers value food safety inspection certification more than origin-based labels. From this information, these authors reasoned that geographical indications only become a signal of quality if the place of origin is associated with higher food safety or quality.

According to Van der Lans et al. (2001), geographical indications can indirectly influence regional product preferences through perceived quality. However, Grunert (2005) explained that origin-based labels may be relatively difficult for consumers to interpret as opposed to other labels on the products like the "best before" date labels. The author adds that when consumers lack knowledge about the region of origin or they do not consider the signaled quality to be desirable, origin-based labels are unlikely to be valued by consumers.

1 Geographical indications - GIs - are defined, according to article 22.1 of the TRIPS Agreement, as "indications which identify a good as originating in the territory of a Member or a region or locality in that territory, where a given quality, reputation or other characteristic of the good is essentially attributable to its geographical origin".

Lusk et al. (2006) found that perceptions of quality and consumers' ethnocentrism are primary motivations for purchasing products with origin labels. Ethnocentrism, in food context, relates to the belief of the superiority of local food, thus yielding a strong preference for those products. Van Ittersum et al. (2007) confirmed that origin-based labeled food products appealed more significantly to residents in the region of provenance of the considered foods.

Therefore, origin-based labels may be related to specific quality warranties and economic support dimensions; however they are not necessarily associated with quality signals. Origin-based labels have an indirect influence on consumers' preferences through perceived quality; however, in order to be more likely to appreciate these labels, consumers must be familiar with them and/or have a positive attitude towards the region-of-origin. Quality perception and personal attachment to the region of origin determine the role of the origin-based labels. Furthermore, the perceived value of quality labels depends on product-related, environment-related and person-related factors (Verbeke W. and Roosen J., 2009). Lastly, appropriate market segmentation and examination of particularities within identified market segments is strongly recommended for origin-based labeling strategies since origin-labeled food products may appeal more to particular market segments than to others, such as specific socio-demographic groups (Bonnet and Simioni, 2001).

A number of projects have investigated origin-based labeling for agro-food products in Lebanon from a stakeholders' perspective[2], but to our knowledge, no research has undergone an in-depth investigation of the targeted end-user (the Lebanese consumer) and the determinants of the consumer's receptiveness to an origin-based labeling strategy for Lebanese regional food products.

There is a significant lack of documentation and scientific research on regional and traditional food consumption behavior in Lebanon, and more broadly in Arab countries. Conducting this research will help in determining the cultural, institutional, socio-economic and psychographic specificities of the origin-based or regional agro-food system(s) in Lebanon. This paper will contribute to the international literature body on consumer interest in origin-based labeling strategy, including the aspect of cross-cultural differences, thus allowing for cross-cultural comparisons and for tailoring origin-based public and private policies and strategies to local contexts.

2 Publications and reports from the website of the Lebanese Ministry of Economy and Trade (MOET): www.economy.gov.lb/

- Integrated Assessment of the Lebanon-EU Association Agreement: A Pilot Study on the Lebanese Olive Oil Sector, FINAL DRAFT Feb 2006
- Swiss- Lebanese Project on Geographical indications, 2006

Why Olive Oil?

Lebanon's GDP for the agriculture sector accounts for 5.5% of the total GDP, and employs 7.5% of the total labor force (Salibi, 2007). This small percentage does not ensure agricultural progress, nor does it ensure employment in this field. The total cultivated land in Lebanon is 27% of the total land area (273,000 ha), where fruit trees constitute 44% of the total crop production, and olives alone account for 8% of the latter. As a consequence, olive oil is considered an important part of the Lebanese agro-industry. Olive production in Lebanon ranges between 70 thousand tons in its low production years to 190 thousand tons in its high production years. Olives are mainly a rain fed crop, and the largest olive and olive oil production is mainly concentrated in North 40% (Akkar, Koura), Nabatiyeh 20%, South 18%, Mount Lebanon (17%), and a very small percentage in Beqaa area (Salibi, 2007). The main olive varieties are the local ones like, Souri, Samakmaki, Airouni, and Balabdi, and few foreign varieties like the Italian and Spanish. More than 70% of the olives are destined for olive oil production, and the remaining are used for table olives, and soap production. During the years 2004 and 2005, Lebanon's olive oil production is estimated to be 25,000 tons and 11,500 tons, respectively. This variation in production is attributed to the alternate bearing nature of the olive tree, faulty harvesting practices of farmers, and old milling technology.

In Lebanon, the olive oil sector is considered to be a family business, and its market is different from the other crops' usual market; the product is directly marketed from the farmers or producers to the consumers. Lebanese consumers rely heavily on the friend/family network when choosing where to purchase olive oil, and the consumer takes into consideration the reputation of the farmer or producer when making his or her decision. By relying on the friend/family network, the consumer will better avoid purchasing a bad product that has been mixed with vegetable oil or tainted with colorants. Lebanese olive oil purchasing patterns are characterized by several socio-cultural patterns.

The Lebanese Ministry of Agriculture estimates that 57% of all farmers in Lebanon are olive growers; out of 195,000 Lebanese farmers, 111,000 are olive growers. As an agricultural food product, olive oil typically has qualities that derive from the place of production and it is influenced by specific local factors, such as climate, altitude, soil and cultural practices related to production methods. The synergy between local variety and the environment produce distinguishing characteristics and tastes distinct to each region.

Olive oil in Lebanon is mostly a family run and seasonal business, and it provides a considerable proportion of household family activity and income. However, local olive oil production cannot keep up with the increasing domestic consumption. The annual average per capita consumption of olive oil in Lebanon is about 2.5 kg or 3.12 liters. The total consumption of olive oil in Lebanon averages about 9,500 tons per year and the FAO forecasts that local demand should reach 19,000 tons by 2010.

There have been several recommendations to develop geographical indications for olive oil at the institutional level in Lebanon with the assistance of the European Union. The aim was to encourage each region in Lebanon to use regional branding, in order to market their products as 'unique' or 'distinct' and better target niche markets. Several international donors are already active in funding development initiatives in the olive oil supply chain, and this present research will serve as a reference point for rural economic and marketing interventions.

Olive Oil Sector Overview

Lebanese olive oil is considered to be a gift of the ages, and holds an important place in Lebanese history; including culinary traditions that date back to the Phoenician civilization in the 3rd millennium BC. Olive oil produced in Lebanon is characterized by its area of origin due to differences in climate, topography, olive varieties, and cultural practices of processing methods. The olive oil sector is facing an increase in domestic consumption, and olive supply is not meeting the consumers demand. Annually, the average per capita consumption of olive oil in Lebanon is about 3.12 liters, and the total consumption averages about 9500 tons per year; however, the FAO forecasts that the local demand will reach 19,000 tons by 2010 (Salibi, 2007). Lebanese olive oil consumers' purchasing pattern is usually through the friend/family network, family owned farms, contacts, and occasionally through supermarkets. Olive oil is unlike other food product that can be purchased from any source, and great weight is given to ensuring the vendor is trustworthy. The majority of Lebanese consumers select the source of their olive oil very carefully. Lebanese purchase olive oil in gallons (18-20 liters), and give very little consideration to whether the containers are labeled or not. Consumers rely on their organoleptic evaluation (sight, taste, and smell) for olive oil. The majority of consumers buy olive oil yearly, or every 2-3 years, and olive oil is an important ingredient in Lebanese cuisine resulting in bulk purchasing.

With Lebanese olive oil priced at 150,000-200,000 LBP/ gallon, it is considered to be an expensive product; however, it is purchased by the majority of Lebanese, in varying degrees of quantity and quality. For example, high and medium income Lebanese consumers can afford to buy three to four gallons of local olive oil, with occasional purchases of Italian and Spanish olive oil; whereas low income consumers typically purchase one half to one gallon of local olive oil, and in many cases they might buy Syrian olive oil, which is cheaper.

Another important factor that determines food consumption, specifically olive oil, is the urban/rural differences; since the 1950's, the Lebanese population has migrated internally from the rural areas (South, North and Beqaa) toward urban areas (Beirut and Mount Lebanon). This migration has revealed some differences in the food habits between these two groups. For example, residents from the South, North, and Mount Lebanon are experts in olive oil production, whereas residents from the Beqaa and Beirut are not; as a result, the former group has transferred their high olive oil consumption patterns to the latter. Since then, olive oil has been highly consumed by residents from each of these counties, or cazas, as a culmination of urban/rural migration, openness of areas among each other, and improved transport facilities.

Geographical differences also play an important role in influencing food habits, and food consumption patterns may differ slightly from area to area based on the available food resources (Musaiger, 1993). This is the case of Lebanese consumption patterns of olive oil that is high in some *cazas* (South, North, and Mount Lebanon), and lower in other *cazas* (Beqaa). This is mainly due to the geographical differences of the regions, but recently the Beqaa started olive plantation and olive oil production mainly in Hermil area.

Long-held beliefs about food and food preferences are also factors that influence Lebanese consumers when purchasing olive oil; they believe that the traditional friend/family network is the best olive oil purchasing method, because it is considered to be a trustworthy source. On the other hand, supermarket brands are not trusted because it is judged as being bad quality, and not *balady* (local). Another influencing factor is the consideration of health issues, especially heart disease. Lebanese consumers believe that olive oil is better for one's health, and can help control cholesterol, cure kidney stones, and alleviate coughing. Others believe it is a skin moisturizer, and hair and face mask. Lebanese consumers often prefer one *caza's* olive oil to another, due to the many differences such as quality, origin, and family traditions. For example, some prefer Koura or Akkar's olive oil, while others prefer Hasbaya, Nabatiyeh, or Chihim's olive oil.

Education is also a very important factor that determines food consumption patterns. Illiteracy and ignorance of sound eating habits profoundly influence food consumption (Musaiger, 1993). Educated consumers select their food products carefully and buy a variety of nutritious vegetables and fruits; whereas non-educated consumers, in most cases, do not select products as carefully, nor do they understand the various components and nutrients of starch, proteins, fats and vitamins. Knowledge is one aspect of human development (Alkire, 2002), as the Millennium Development Goals (MDG's) establishes in one of its targets for a universal primary education (http://mdgs.un.org/unsd/mdg/Trendalyzer/index.html). That said, education is highly important for a generation with better health. Lebanese olive oil consumers usually do not read labels, or other product information. Certain quality measure checks should be performed by consumers, such as ensuring the absence of residues and colorants in the olive oil, and determining whether or not it is contaminated with peacock spot leafs diseases, or hydroxides. Reasons for not conducting this inspection might be due to either the consumer's trust in the source from which they are purchasing, or their lack of knowledge about these issues that can arise when purchasing olive oil.

Mass media and advertisements are also an effective strategy to change consumers' food habits. Millions of dollars are spent on commercial media advertising in many countries in the region (Egypt, Kuwait, Saudi Arabia, UAE, Lebanon, Bahrain, Jordan, Qatar, etc). Advertisements on television, radio, Internet, and highway billboards are all tools that shape the food attitudes in the Lebanese family. Some of the Lebanese consumers, who purchase olive oil from supermarkets are acting upon the advice of the aforementioned the advertisements.

Other factors such as religious differences, women's employment, and migration, play an important role in purchasing food products in general, but not necessarily in regards to olive oil purchase. For instance, some food items such as pork and alcoholic drinks are forbidden in Islam, but not in Christianity. Olive oil is not forbidden in any religion or any sect according to the author's knowledge.

Olive Oil Market Chain, Policies, Standards, and Institutional Underdevelopment

The market chain in Lebanon for olive oil is predominately a direct chain from olive farmers or olive oil producers to the consumer. This is different from other crops of fruits and vegetables that pass through the wholesale market and are then distributed in different Lebanese areas (Qab Elias, Ferzol, Sin El Fil, Bir Hassan, Saida, Tripoli, and Jbeil) and controlled by middlemen and exporters. This chain weakens the farmer's profits and capabilities, and the matter is further complicated because of the absence of suitable market structure like production units. The wholesale markets still use old manual weighing devices, and freezing storage rooms that preserve the shelf life of crops for short periods (maximum of 3-6 month), and these items are privately owned and costly. Additionally, wholesale markets use low quality delivery docks that are made of plastic or carton, and in most cases, easily breakable. Moreover, there is an absence of quality measure rooms, packing units, and auction facilities. This weak instance of market chain and structure does not solely exist in Lebanon, but in all countries in the region. A strong illustration of market chain and structure is present in Belgium, where it has been highly developed with well-organized production units. In order to purchase the necessary products, producers and exporters use auction facilities and an "hours criteria," which rotates that price of a certain crop every 3 hours and categorizes the prices in a computer for the purchasers to view in an organized manner. The Belgian system uses precise weighing devices and improved storage rooms that have a low oxygen base, preserve the quality of crops and enable longer shelf lives. They also use environmentally friendly, wooden delivery docks, sophisticated quality measure rooms (compliant with HACCP, ISO, etc), packing units that preserve the quality of crops and abide by sanitary measures, and specified well equipped transport tools for crops.

In Lebanon, farmers suffer as a consequence of the weak market chain and structure; they are not currently aspiring to the Belgian model, but they are seeking the minimum criteria for market chain and structure. Lebanon is a signatory to several bilateral and multilateral trade agreements that have the potential to enhance and liberalize agricultural trade. Such agreements are, Taysir Agreement, Arab Trade Agreement, European Union-Lebanon Association Agreement, the European Free Trade Association (EFTA) Agreement,World Trade Organization (WTO) Agreement, the Agreement on Agriculture (AOA), Sanitary and Phytosanitary measures (SPS). These trade agreements are highly efficient in a country that has a well-established market chain and structure, and high quality crops that are produced according to international quality measures, or quality measures of the receiving country. Lebanon adheres to the outdated quality measures of the Lebanese Standards Institution (LIBNOR), and farmers' products are neither monitored by the government during the production process, nor are they analyzed before marketing. Because of this, Lebanese agricultural products face huge local competitive market, but its crops will be rejected at the receiving countries. There are some international quality criteria institutions, like EUREP-GAP, Codex Alimentarius, UNECE, etc., that can support the national LIBNOR standards, but there is still a gap at the national level. In order to bridge this gap, the LIBNOR standards should be updated and oblige all farmers to apply them throughout their production chain.

Lebanese olive oil farmers are satisfied with their own unique market chain and structure, however, some local and international NGOs, including the Ministry of Agriculture (MOA), are seeking to make this sector a professional one, such as the Italian market for olive oil. For example, the Moawad Foundation, YMCA, and SRI are NGOs that are focusing on helping olive oil farmers market their yield in better ways and widening their market locally and for export purposes. Additionally, these NGOs are helping the olive oil producers refine their agricultural production chain, from farm to fork, by introducing new agricultural practices, such as experimenting with new olive varieties, improving irrigation, chemical inputs, and harvesting methods; bettering the packing process; and improving the way in which the product reaches the consumer. Furthermore, these NGOs are establishing new olive oil cooperatives in each region for farmers to combine their yield and market it under one regional name. Also, the MOA is launching several projects to market the olive oil properly and to bring the industry up to quality standards. One such project of the MOA and Italy is, "Socio-economical support for the Olive Oil producers in the Lebanese Rural Areas." This project covers many Lebanese areas such as (Akkar, Diniyey, Bshari, Hermil, Hasbaya, Marjeoun, West Beqaa, Zgharta, Minye, Sour, Nabateye, Bint Jbeil, and Rashaya Al Wadi), and its aim is to improve olive oil production and support cooperatives, especially women's' one. One of their more long-term goals is to target the market for the new olive oil trend, by bottling olive oil under the name of "Zeit Libnan"(Lebanese Oil) and analyzing the final product in Italian and Lebanese laboratories.

Evolution trends of export/import for Lebanese olive oil accounts for 3.5% of the total value of exported agro-processed products, which amounts to 1400-1900 tons, with less than 30% being virgin olive oil (Salibi, 2007). The main Lebanese olive oil exports are the U.S. (468 tons), Canada (255 tons), Kuwait (250 tons), Spain (161 tons), UAE (154 tons), and Australia (151 tons) (Salibi, 2007). Countries like Canada and Spain are considered to be the largest importers of Lebanese virgin olive oil. The majority of olive and olive oil imports come from Syria, because of low olive oil production costs and trade agreements between the two countries.

Lebanon's production of olive oil is not considered huge compared to other countries in the region (Syria, Tunisia, etc.) and other European countries (Italy, Spain, Greece, etc.). The domestic demand of olive oil is higher than its domestic supply; therefore large quantities of raw materials (olives and olive oil) are imported from the neighboring countries as Syria. Other factors contributing to low yield are old varieties cultivated in Lebanese areas and faulty farming practices that are adopted during the harvesting process (i.e. hitting the trees with sharp tools leading to fluctuation and alternate bearing nature). Additionally, some mills are outdated and others are automatic, creating an imbalance in olive oil production, or worse, creating unsanitary conditions. The absence of quality measures and laws to be respected by farmers and producers does not lend itself to a stable industry. That said, there are many cumulative factors affecting the quantity and quality of olive oil, but with more governmental efforts put forth to support farmers and protect their enterprises, this sector can greatly contribute to an increase in the economies of rural areas. The government has several options for this sector, starting with improving the market chain and structure, consumer awareness, farmers' extension, labeling trends, farmers' economical support, the establishment of cooperatives, quality standards monitoring, analyzing laboratories, and the most importantly, gaining the consumer's trust.

Research Methodology

To gain a better understanding of the determinants of consumption of olive oil within the Lebanese community, we must investigate the dimensions that make up these determinants that influence consumers. A better understanding of the consumption determinants of olive oil may facilitate governmental policies toward infrastructure establishment of olive oil sector, support SMEs, protect consumers, update quality standards, and encourage progress in rural economies. To work toward this goal, a scientific research project has been conducted at the American University of Beirut (AUB) to identify the "Determinants of Consumption Olive Oil in Lebanon."

To examine consumer's desirability of origin-based labeled products, a "Logit-Probit" model was developed that related the consumer's gender, age, occupation (profession), and purchasing behavior, and their readiness to try governmental origin based olive oil (table 1). The model compared the effect of demographics (age, gender) and purchasing patterns, to the subject's will to try products that are labeled and packaged according to modern market chain. This model is examined on certain dependent variables such as demographics, purchasing behavior, role of trust and personal network, role of brands and packaging, and role or region of origin, with respect to the independent variable "desirability of origin-labeled products." Only few dummies correlate together and show significance, such as age, gender, occupation and purchasing behavior, and a statistical pie chart and percentages' table has been developed to account for the variables that do not fit in the Logit-probit model.

Consumers Desirability of Origin-Based Labeled Products

Origin-based labels or GI's are labels that connect the product to the region in which it is manufactured or processed. This information is important because the region indicated might be known for producing this product. These kinds of labels may increase revenues for farmers and producers, preserve culture and local knowledge, develop rural areas, increase labor force, and enhance the agricultural yield marketing of the region. In Lebanon, there are certain regions or countries that have strong reputations in olive oil production, such as, Koura, Akkar, Chihim, Hasbaya, Nabateye, and the Chouf. Many Lebanese consumers have a preference for a certain regional olive oil over another. For this reason, many NGO and MOA efforts are taking on the task of creating origin-based labeled olive oil. But in this research, a prediction is released for the failure or struggles that these organizations may face in this endeavor, based on the Lebanese purchasing behavior and preferences that are controlled by trust, quality and bulk quantities. Moreover, Lebanese consumers have little knowledge of the definition of origin-based or GI; thus, intensive governmental and private sector efforts must highlight the importance of origin-basedolive oil. These efforts must target certain issues that Lebanese consumers do not know about, such as the quality and sanitary facts, obesity factor related to bulk consumption of olive oil, and flaws (residues, colorants, diseases, etc).

Research Method

This research includes the consultation of expert stakeholders (Rami Zurayk "AUB Professor", Mohamad Al Shami "MOA", MOET "Ministry of Economics and Trade", ILO "Assad El Dorr"). The research also includes information from local shops that sell packaged and labeled olive oil (Boulos, TSC "Jnah", Matahen Lebnan, Score Market, Dekkaneh, Olio, Zuhairy Station, and Spinneys "Jnah"), and certain brands are recognized (Al Wadi Al Akhdar, Saifan, Boulous, Chtaura, etc). A survey was conducted in the city Beirut, involving a sample size of fifty consumers, equally selected gender, and age that ranges between young (19-30) and older (30-65). The survey mainly targeted AUB employees, Agriculture students at AUB, and a minority of AUB professors, teachers, housewives, and beauticians. The sampling time frame for this survey was two months. This survey was conducted before at AUB, on 15 consumers, and then the survey was conducted again in mid-November 2010 and ended in January 2011, with 50 consumers. The consumers originate from different Lebanese areas (South, North, Beqaa, and Beirut), but they are all residing in Beirut or neighboring areas. The survey questionnaire was in English, and people were interviewed face-to-face, allowing respondents to ask for clarifications when necessary. An explanation for some questions was also allowed, and definition of the GI, or origin- based olive oil was a must, since majority of those interviewed were not familiar with these terms. All respondents were given a copy of the questionnaire at the start of the interview, and given an explanation of the research topic. The interviewer (Rasha Moussawi) read each question to the respondent and then asked them to respond. The data was then collected from the survey, and the respondent's answers were coded, either using 1-0 coding for yes–no questions, or 1-8 coding for the subjective questions. Some of the survey questions that were answered by the respondents are:

- How do you get olive oil in your family?
- Where do you shop for olive oil?
- What do you use olive oil for?
- Does your personal and family network play an important role in your procurement of olive oil?
- Do you read labels and other product information when buying olive oil?
- Is the region of origin of the olive oil important for you?
- In case government decided to introduce origin labels on olive oil, do you think this would matter for your choice?

	Probit regression	
	coef	se
gender	-0.864**	0.430
young	-1.904***	0.628
occupation==3	-2.019***	0.655
network	-0.523	0.522
_cons	2.317***	0.691
note: *** p<0.01, ** p<0.05, * p<0.1		

Table 1: Logit-probit Model conducted for dependent variables (gender, age, occupation, purchasing behavior) and independent variable (consumer's desirability to try origin-based olive oil).

The model showed that gender is influential in determining who is more willing to try origin-based olive oil; the females, who are more influenced, are negatively correlated and significant at (-0.864**, P<0.05). Young people are also negatively correlated and significant at (-1.904***, p<0.01). The occupation, mainly AUB employees, showed negative correlation and high significance (-2.019***, p<0.01). Finally purchasing behavior (friend/family network) revealed negative correlation (-0.523) with the origin-based olive oil.

	purchasing Behavior of olive oil			
	Purchasing Pattern of O.O%	Family Member Responsible for Buying O.O%	Frequency	Shopping Behavior
Friend/family Network	58%			
SuperMarket	20%			
Own	28%			
Otherwise	6%			
Parents		44%		
Grandparents, Relatives		16%		
Self		24%		
Husband		8%		
No one		6%		
weekly, Monthly			16%	
yearly			66%	
2-3 years			14%	
Shopping				40%
No Shopping				42%

Table: 2 Purchasing Behavior of Olive Oil

Table 2 revealed the purchasing patterns that showed highest percentage for friend/family network (58%), supermarket (20%), and owned olives (28%). The Family Member Responsible for purchasing olive oil differs between families, but the majority showed that parents (44%) are the responsible, Grandparents/Relatives(16%), Self(24%), Husband (8%), and No one(6%). Frequency of purchasing olive oil revealed highest percentage at yearly buying (66%), weekly/monthly (16%), and every 2-3 years (14%). Shopping behavior showed unexpected results, approximately equal percentages for respondents who shop for olive oil from consumers who do not shop.

Consumption Patterns and Usage Situation

Lebanese cuisine uses vast amounts of olive oil, and people consume it with the majority of their dishes, especially salads, labne (Dairy product), and cooked meals. Olive oil is included in the 3 meals of the day (breakfast, lunch, and dinner) with all different cooked and non-cooked foods; for example, respondents expressed their preference of consuming olive oil with, salads, kibbe (Baked meat), fattouch (Lebanese salad), labne, thyme, tabbouli (Lebanese salad), pasta, makdous (eggplant pickles), eggs, and raw meat.

Perception of Quality and other attributes

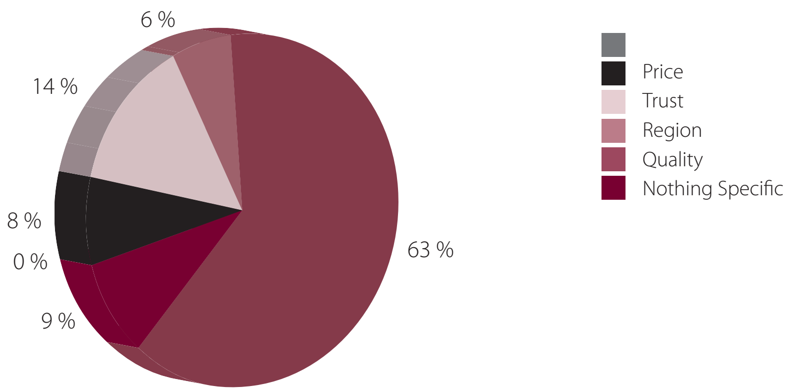

Figure 1: Influence on the Decision of Olive Oil procurement

Lebanese usually follow two dimensions in their decision for olive oil procurement: quality (63%) and trust (14%). Region (6%) and price (8%) also play a minor role in the decision (Fig 1).

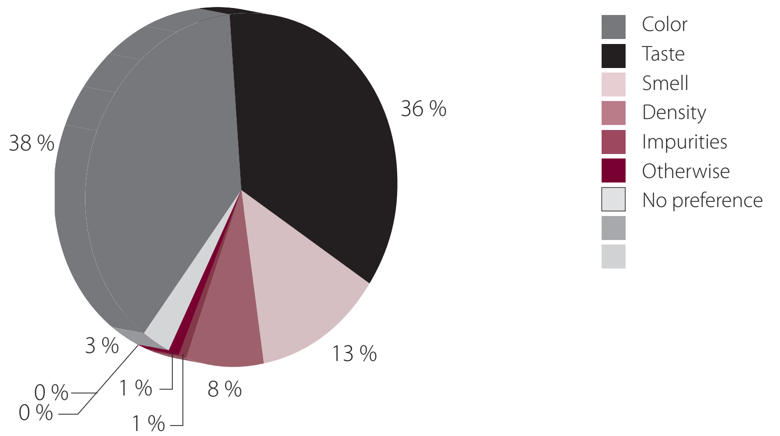

Figure 2: Quality Attributes for Olive Oil

Lebanese usually evaluate olive oil quality by their organoleptic senses, color (38%), taste (36%), and smell (13%). And also some consumers prefer olive oil to be dense (8%), and free from impurities and picked from tree directly and not collected from ground (Fig 2).

Role of Trust and Personal Network

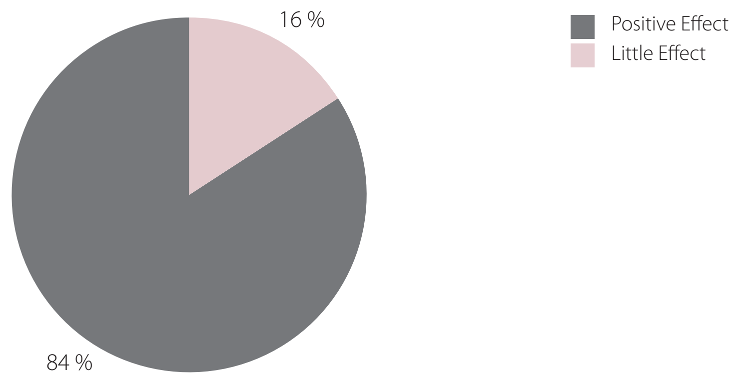

Figure 3: Family Network Effect on Olive Oil Procurement Decision

The family network effect (84%) plays a very important role in the procurement of olive oil. This kind of family network purchasing pattern is in the socio-cultural behavior of Lebanese consumers (Fig 3).

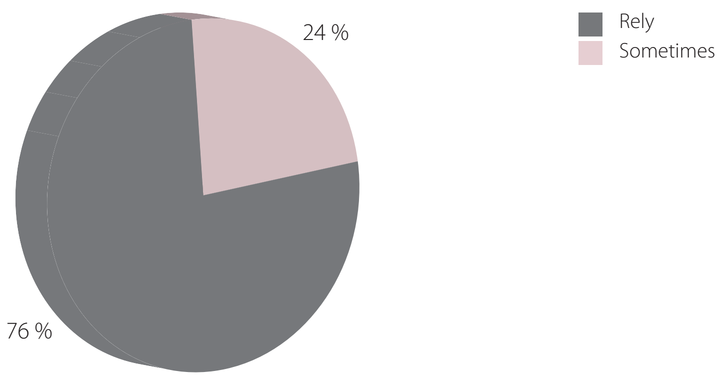

Figure 4: Family/Friend Advice for Olive Oil Purchases

Respondents' reliance on Friend/Family Network advice is clearly high (76%) when making the decision of what olive oil to buy. However, some consumers do not rely on Friend/Family Network advice (24%) (Fig 4).

Role of Brands and Packaging

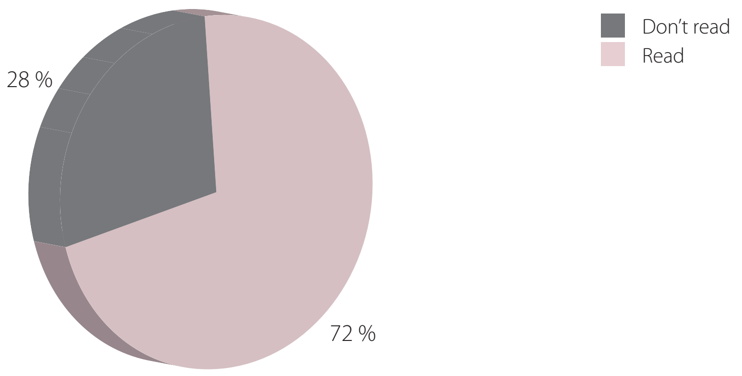

Figure 5: Respondents Who Read Labels & Other Product Info when Buying Olive Oil

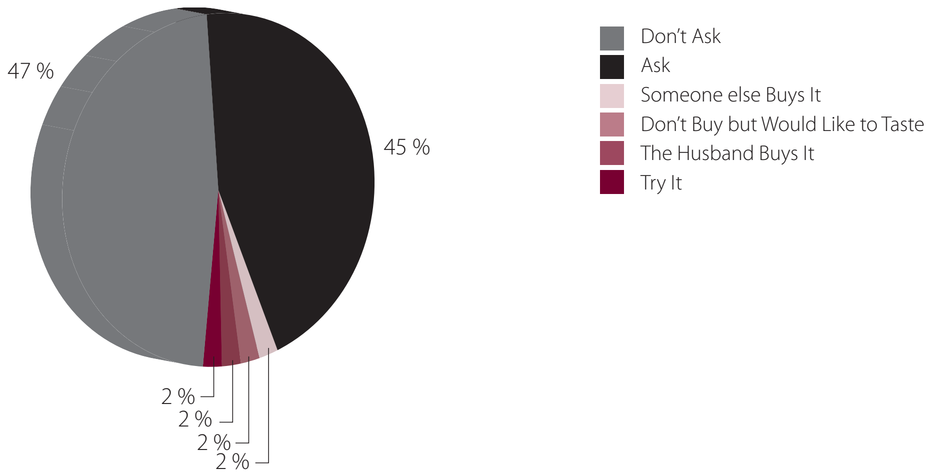

Figure 6: Quality Information Questions for Olive Oil Gallons Purchases

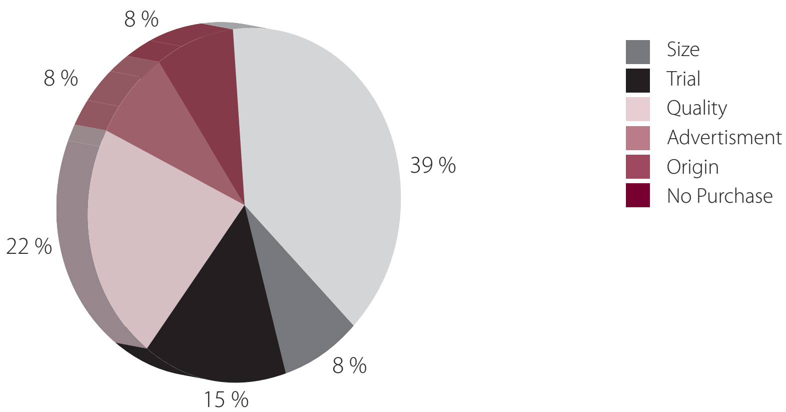

Figure 7: Effect of Brand Name on Purchases

The role of brands and packaging is not significantly important with respect to the Lebanese purchasing behavior, and the survey showed that, while 36% of consumers purchase brands, 56% of the consumers do not purchase brand names of olive oil. The research reports that the role of labeling olive oil is significantly unimportant, with 72% of consumers not reading the label on the olive oil, and only 28% reading it (fig 5). However, a different story is adopted by Lebanese consumers who are part of the gallon purchasing pattern; equally distributed percentages are showed for consumers who ask (47%) and who do not ask (45%) for information about olive oil quality, content and other characteristics (fig 6). Also, figure 7 showed the breakdown of the effect of brand name purchasing on the interviewed Lebanese consumers: 22% purchased according to quality, 15% by trial (15%), 8% by advertisement, 8% by origin, and 8% by size. A high percentage (39%) do not purchase brands (Fig 7).

Role of Region of Origin

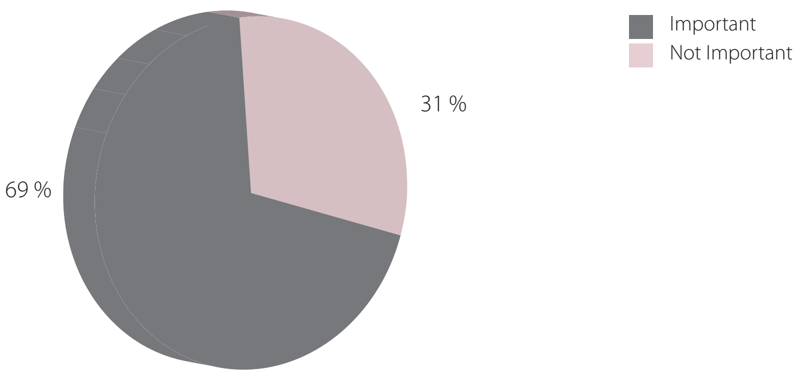

Figure 8: Importance of Region of Origin Olive Oil

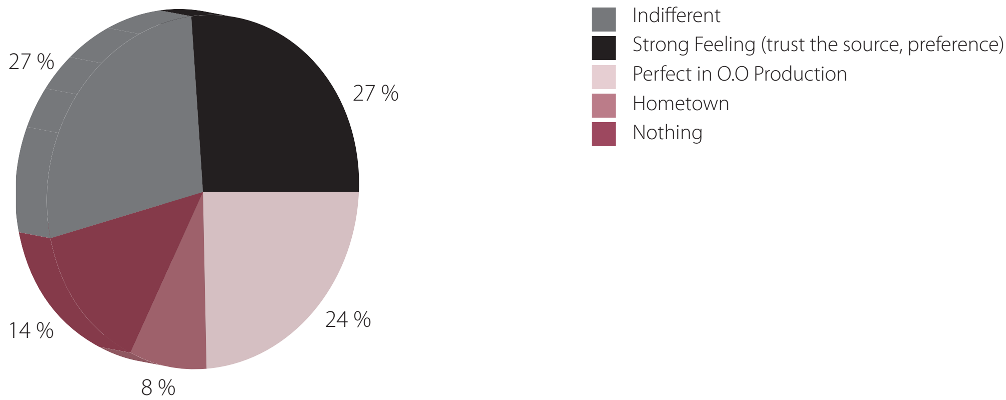

Figure 9: Respondents Feeling toward the Region where the Olive Oil is made

The role of region of origin is significantly important (69%) (Fig8). Respondents expressed their feelings toward the region where olive oil is produced; some of them are indifferent (27%); others have strong feelings (27%) toward a particular region, and another group believes the region is perfect in olive oil production (24%). A small percentage of consumers are nostalgic to their hometown (8%) (Fig 9).

The respondents' feelings toward the region where the olive oil is produced showed a high percentage of consumers who do not care (68%), and few consumers who care (20%) (Fig 9).

Desirability of Origin-based labeled Olive Oil

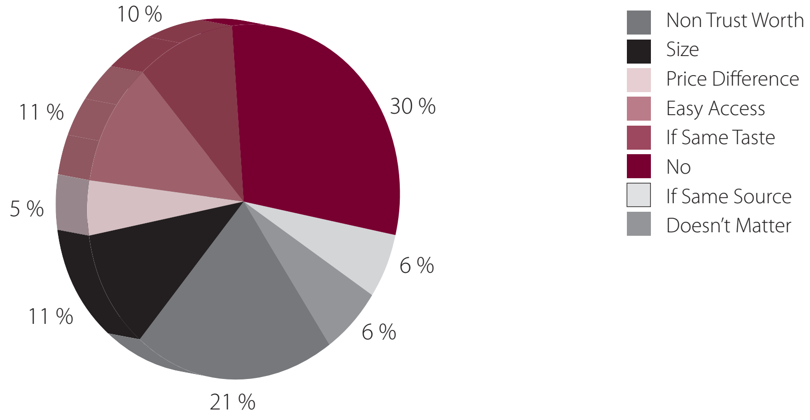

Figure 10: Consumer's Choice for Government Origin- Based Olive Oil

The final question is about the consumer's desirability for government origin-based olive oil, and it showed that there are equal percentages between people who will try it and people who refuse to try this product. A willingness to try government's olive oil may be based on the perception of easy access to such products (11%). The refusal to purchase the product may be because of the consumer's worries about size difference (11%), same taste (10%), same source (6%), or most importantly the trust factor. 21% consider government's origin-based olive oil to be a non-trustworthy product (Fig 10).

Expected Results and Policy Uses

Lebanese consumers' purchasing pattern of olive oil has its own significant characteristics, and more research studies and surveys must be performed to detect the determinants of olive oil consumption and consumers' preferences of origin-based olive oil. Such research must be done before investing in origin-based olive oil, in order to assure a successful enterprise. In this research, survey conducted on 50 olive oil consumers, show that females have the most readiness to try governmental origin-based olive oil (table 1), while males show the lease readiness. This can be explained by the fact that females are often responsible for shopping for home needs, and are more flexible to try new products, especially labeled products that include contents, nutritional facts, and characteristics that the females are more interested in this than men. This can also be explained by the fact that women are often responsible for the cooking in the family; therefore, they make the decisions of what ingredients to select for the dishes. In addition to females, young people (table 1) show a high willingness to try origin-based products. This fact is very important to support any governmental effort to establish such projects of origin-based products. Young people are indispensable partners in the development of their families, communities, states, regions and the world at large (Chaaban, 2009). Because young people are more susceptible to change their purchasing behaviors of olive oil, awareness campaigns and advertisements of the origin-based olive oil should be created with this demographic in mind, in order to captivate this generation's attention on such origin-based products. Consumers who receive advice from their friends and family (table 1) are more prone to try governmental olive oil. This result is unexpected, because one can predict the opposite; that consumers, who receive friend/family network advice, are more persistent with this network-purchasing pattern. And lastly, AUB employees (table 1), mainly males, who are at the age of maturity refuse to try any governmental origin-based olive oil; this can be correlated with the above factors that demonstrate that young people and females are more flexible to try this product.

As it is expected, the survey showed that the majority of Lebanese consumers' purchasing behavior is through the friend/family network, and parents are the ones responsible for the buying of olive oil, on a yearly basis (Table 2) (Fig 3). Moreover, they rely on the advice given by friend/family network upon their purchase (fig 4). These facts are based on the socio-cultural and traditional patterns of the Lebanese olive oil purchasing behavior. Since the Lebanese consumer often only purchases olive oil every 1-3 years, they seek advice from friends or family members in order to guarantee the quality of oil. As a result, the majority of consumers do not go shopping for olive oil unless it is urgently needed.

Quality and trust are the most important variables that Lebanese take into account when purchasing olive oil (Fig 1). One of the tricks that some farmers or producers use, is that they mix vegetable oil with olive oil at the processing interval. One of the survey respondents revealed that at his village in Koura, some farmers mix vegetable oil with olive oil and then throw the tanks of vegetable oil away, even though consumers still seek him out from different areas, thinking that he is a trustworthy source and has good quality olive oil. Another trick used, is that farmers squeeze olive leaves with the olives, and do not separate them before processing, leading to bad quality olive oil. Also, some farmers squeeze olives infected with peacock disease, leading to contamination in the olive oil. Consumers often do not recognize such contamination, mainly because there are no laboratories to analyze this issue and there are no awareness campaigns to highlight such quality measure failings. Moreover, Lebanese farmers use high quantities of chemicals in their crops, because of several prevalent diseases, like the peacock disease, mentioned above. This high chemical application leaves residues in olives, and as a consequence, in the olive oil, as well, especially if it is applied directly before harvesting. Although this creates severe problems in the olive oil, the Lebanese still consider this to be good quality olive oil, based off of their organoleptic senses: color (38%), taste (36%), and smell (13%) (Fig 2). Other quality criteria are often ignored. Lebanese consumer behavior is characterized by the use of their organoleptic senses to determine qualities, such as flavor, fragrance, color, and clearness.

The role of brands and packaging is not a suitable market strategy to attract Lebanese attention and to change their olive oil purchasing behavior. The survey showed that 56% of the consumers do not purchase brand names of olive oil, and only 36% purchase brands. Moreover, the majority of olive oil consumers do not read labels (Fig 5). This is demonstrated by the tendency to purchase gallons of olive oil, which are frequently without a label. And they believe that they are buying oil from a trusted source, the Lebanese consumer does not feel that he or she needs to read such information. The usual questions asked are often about the olive oil content, year of production, origin of olives, and other characteristics. Still, there are other consumers that buy blindly without asking about the purchased olive oil (Fig 6). Brand name olive oil is rarely consumed by Lebanese consumers; however, some use the brands if they are out of the gallons of olive oil. And again, they depend greatly on quality and trial upon purchasing brands, and some consumers purchase brands due to advertisement, origin and price (Fig 7).

Lebanese consumers are highly concerned with purchasing their olive oil from a region they prefer (Fig 8), even if this region of olive oil origin is not their home region (Fig 9). The government can use this to their advantage to market an origin-based olive oil, since majority of Lebanese prefer a certain regional olive oil over another. The government should make different sizes of this origin-based olive oil, in order to satisfy consumer's preference; for example, they can make a size of 1-2 liters glass bottles and 5-10-15-20 liters tin package.

Finally, survey respondents showed equal percentages between people who will try governmental origin-based olive oil and people who refuse to try this product. This refusal may be characterized by the consumer's worries about size, taste, and source difference. The most important factor in purchasing olive oil is the trustworthy factor, where 21% consider it as non-trustworthy product (Fig10).

Research Implications, Policy Uses and Recommendations

This research paper has several findings. First, it recognizes the determinants of olive oil purchasing in Lebanon, such as quality, trust, friend/family network, and importance of regional olive oil. Second, the paper reveals the non-important factors in olive oil consumption, such as brands, labels, and packaging. These two findings allow the government to focus on the important determinants to create a market strategy or policies and to prompt additional research studies. These findings also help SME's to establish an origin-based olive oil, enterprise in order to develop their rural areas.

Several recommendations can be gleaned from this research paper:

1. Establish infrastructure for the olive oil sector: organize mills and improve their performance by shifting them into automatic mills, enhance sanitary measures within the mills and storage rooms, and train farmers and producers on the most efficient processing modes and storage ways. Changes in these areas will increase quantity and quality of olive oil production.
2. Import new productive olive oil varieties, and replace the old ones.
3. Extension services to farmers and producers must be from farming practices to marketing strategies. Train farmers on the appropriate agricultural practices, such as Integrated Pest Management (IPM). Introduce new farming techniques to be adopted by farmers, and remove old and ineffective practices, such as the fruitless harvesting method of hitting the tree, that ultimately leads to alternate bearing and a decrease in yield.
4. Improve and update new standards (in addition to LIBNOR standards) in order to make the Lebanese olive oil competitive in the international market.
5. Establish laboratories to analyze olive oil for any hydroxides, contaminants, impurities, color, acidity, and other characteristics.
6. Create a consistent quality control system for the farms and mills, and coherent packaging units according to consumers' size preference (1-2 liters glass bottles, 5-10-20 liters tin package).

7. Train producers and farmers on the quality measures that must be respected in order to market their yield.
8. Create origin-based labeling awareness and education campaigns that target consumers, farmers, and producers. Consumers can be targeted by advertisements or short films about the importance of purchasing origin-based olive oil that is well-produced, certified and monitored, and is also from a trustworthy source, of high quality, and for suitable price. The better the consumers' knowledge about the quality of governmental-labeled olive oil the easier it will be to enhance the marketing of such a product. Farmers and producers can be targeted by arranged meetings, presentations and field visits with agricultural engineers and agribusiness for promotion of their products.
9. Improve the niche market for extra-virgin and virgin olive oil, since the quantities of produced olive oil are not high.
10. Establish niche market for Protected Designation of Origin (PDO), especially within the foreign market.
11. Establish production management that constitutes a value chain from field to mill, to ensure a better product with better quality.
12. Invest in mechanization of olive oil sector (to improve harvest and pruning practices).
13. Improve Lebanese olive oil soap production as an additional product for the farmers to benefit from in their business.
14. Establish olive oil farmer's cooperatives, in order to increase communication between farmers, exchange experiences, increase benefits, and increase the labor force. Also, establish women's cooperatives for the marketing purposes of the origin-based olive oil.

Research Limitations

The research survey was conducted on a sample of 50 consumers, mainly at AUB; therefore, these measures cannot be considered as a representative sample for all Lebanese community. More research studies must be done in order to cover a larger scale and more variables. Many variables are not included in this research survey, such as income, education, etc. It would be an interesting direction for future research to examine these variables on a larger representative sample.

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