

Full Length Research Paper

The Turkish olive oil sector's priorities related to the factors affecting domestic and international competition

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Many researchers treat firm-level competition as the origin of competition between nations. In other words, nations are as strong as their companies. Therefore, competition lies in "firm-level competitiveness." To evaluate firm-level competitiveness, a survey was conducted in this study. Information was gathered from players in the olive oil industry, including olive oil mills, refiners, and exporters. A total of 117 firms completed the questionnaire. The Analytic Hierarchy Process was applied to determine priorities regarding factors affecting international-domestic competition and preferred arenas of competition for firms and to establish a hierarchy with respect to these preferences. The analysis gives a first-to-last ranking of branding, then food safety and quality, and finally price. The exporters emphasized incentives rather than prices as critical factors. Also, the firms stated that they can generally compete with their rivals in terms of quality, technology and food safety requirements. Taking high costs into account, it appears to be very important to continue premium support and subsidies from the standpoint of international competition.

Key words: Olive oil, competition, analytic hierarchy process.

INTRODUCTION

In the Mediterranean region, olive oil has been long known as an essential component of one's health and diet. Therefore, the olive industry has significant social, economic and environmental relevance within Mediterranean countries. Turkey, with 129 million trees, is home to 7.3% of the olive trees worldwide (TSl, 2008). This sector employs around 2 - 2.5 million people, thus guaranteeing temporary jobs during the harvest period in the productive regions (IOOC, 2006). Turkey is fifth in olive oil production and exportation, after Spain, Italy, Greece and Tunisia. Even though Turkey has a high production potential, domestic consumption is low. On average, 56% of the product is consumed domestically (IOOC, 2008a, b). Thus, exportation is a significant concern of the industry. However, certain distinctive features, including structural inflexibility, which restricts the industry's capacity to adopt to market conditions,

alternate bearing, the heterogeneity of firms, and an intense fragmentation of the sector at both farm and industry levels has adversely affected exportation. Considering the limits of the market for olive oil and competition, producing countries have established policies aimed at expansion, stabilization and improvement of this market by preserving traditional markets and by prospecting new markets. Therefore, Turkey must permanently adjust olive oil political strategies and implement measures for competition to allow the exploitation of new opportunities from free trade. The achievement of these objectives depends on various external factors as well as internal factors related to the existing production potential, the diversity of production structures, the transformation process, conditioning and commercialization, the behavior of different operators and their capacity for innovation, and the degree of organization in the olive oil industry.

This study aims to measure the preferences of the Turkish olive oil industry regarding international-domestic competition, to determine priorities concerning factors affecting competition and to establish a hierarchy with respect to preferences and priorities by employing the

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Analytic Hierarchy Process (AHP). The AHP is a useful method for evaluating multi-criteria decision-making problems and is a subjective tool for analyzing qualitative criteria to generate priorities and preferences between alternatives (Saaty, 1980). Along with its application to social, environmental and economic issues, it has been widely applied to address numerous problems related to agricultural decisions. In fact, Parra-López and Calatrava-Requena (2006) used AHP to compare conventional versus organic and integrated olive systems in Spain. The AHP has been adapted to agricultural problems in developing countries (Alphoce, 1997), optimal crop planning (Mainuddin et al., 1997), allocation of resources (Guo and He, 1999; Saaty et al., 2003), the preference of policy options (Qureshi and Harrison, 2003), choosing research priorities in international agriculture (Braunschweig and Becker, 2004), rural development (Oddershede et al., 2005), and sustainable agricultural development (Rezaei-Moghaddam and Karami, 2008). Nevertheless, in Turkey, applications of the AHP are quite limited. It has been used to analyze consumer preferences regarding where to purchase fresh fruits and vegetables with food safety, quality and price as factors (Günden et al., 2008) and to analyze farmers' fundamental farm management decisions (Günden and Miran, 2008). This paper is the first that is concerned with the evaluation of competition preferences and priorities at the sector level.

MATERIALS AND METHODS

The study covers all the regions in Turkey where olive oil is produced and exported, namely the Aegean, Marmara, Mediterranean, Southeastern and Middle Anatolia territories. Correspondingly, 10 provinces were chosen from the regions, which provided a population size of 1,552 olive oil firms. The population was divided into two subgroups, exporters and olive oil mills, due to the objective of the project and the industry's heterogeneous structure. In each subgroup, the sample size was determined using the finite population proportional sample size method (Newbold, 1995). In total, the sample size was computed to be 117 firms; there were 58 exporters and 59 olive oil firms with other functions. The firms were chosen randomly from each group. The distributions of the interviewed firms are given in Table 1.

In this study, a structured questionnaire was developed to collect data from firms in the 2006 - 2007 production periods. Then, the AHP was applied to calculate factor priorities related to international-domestic competition and preferences regarding competition for firms. The Kolmogorov-Smirnov Z test was used to determine whether the variables showed normal distribution. The Mann-Whitney U test and Analysis of Variance (one-way) were used for comparing the means of the factor priorities and the preferences.

Analytic hierarchy process

The AHP, which was developed by Thomas L. Saaty (1980), is one of the most commonly applied multi-criteria decision-making techniques. The AHP is a decision-support tool to cope with complex multi-criteria problems. The method helps to structure and

analyze decision problems by breaking down the complex problem in a hierarchic order and by employing pairwise comparisons of its elements to determine the preferences among the set of alternatives. AHP is used in various decision-making areas, such as planning R and D, choosing the best policy alternative, predicting outcomes, measuring performance, and optimizing and resolving decision conflicts (Saaty, 1986). The first stage of AHP is problem structuring. The AHP decision problem is structured hierarchically at different levels, with each level consisting of a finite number of decision elements. A basic hierarchical model consists of a goal, criteria and alternatives. The top level of the hierarchy represents the overall goal while the lowest level is composed of criteria and all possible alternatives. The second stage is the assessment of local priorities. The relative importance of the decision elements is assessed indirectly from comparison judgments during the second step of the decision process. Pairwise comparisons in AHP are typically based on a nine-point scale. The third stage is the calculation of global priorities. This last step aggregates all local priorities from the decision table by a simple weighted sum.

Model application

A hierarchy of the decision-making problem related to the priorities with respect to factors affecting competition was structured (Figure 1). Two competition criteria were analyzed. The first criterion was international competition, which includes competition among firms in international olive oil markets. Domestic competition, the second criterion, represents competition among firms in the domestic olive oil market. The alternatives of the hierarchy are the factors affecting olive oil competition, which are food quality and food safety, price, brand, incentives, productivity and efficiency. Because traditional food products can achieve competitive advantages using quality, product differentiation and branding policy as marketing strategies (Fandos and Flavian, 2006). In this study, food quality and food safety are comprised of the required quality and food safety conditions for olive oil. Price represents the price of olive oil. Brand refers to a country's image in international competition or a trademark in domestic competition. Incentives include government incentives offered to the olive oil industry. Productivity and efficiency are determined by productive and efficient resource use in the olive oil industry.

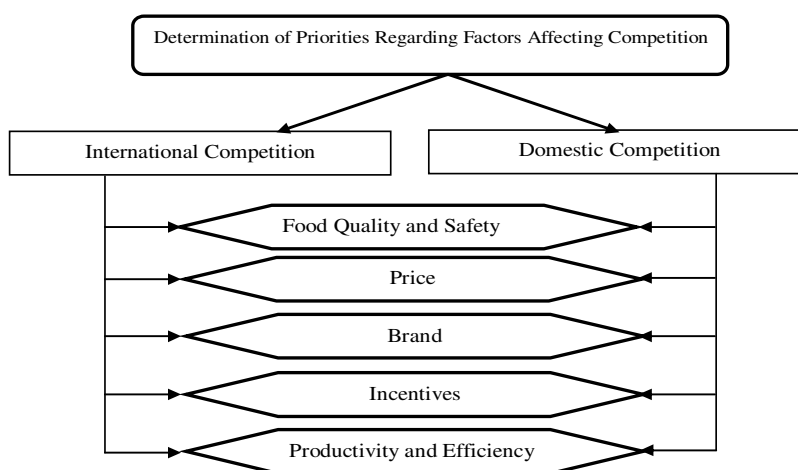
RESULTS

General characteristics of the firms

It is important to note that the division between crushing, processing and exporting is often not clear in the Turkish olive oil supply chain. Consequently, the sample of processing firms consists of firms engaging in a variety of situations, including production, processing, and commercialization activities, often simultaneously. Of the total number of firms, 42.7% are olive oil mills, while 23.1% of them are specialized in crushing and exporting and 20.5% of them are export-only firms. Firms established after 1990 amount to 54.7% of the total, and 2,484 people are employed in these firms. Recently, considerable technical innovations have been introduced in the Turkish olive oil mills. The traditional extraction systems have been widely replaced by continuous systems. Of the olive oil mills surveyed, 64% use a three-phase system, and 22% of them use a two-phase

Table 1. Distribution of the interviewed exporting firms and other firms.

Province	Exporting firms		Other firms	
	n	(%)	n	(%)
Ankara	2	3.4	1	1.7
Antakya	5	8.6	2	3.4
Aydın	6	10.3	13	22.0
Balıkesir	11	19.0	6	10.2
Çanakkale	1	1.7	7	11.9
Gaziantep	2	3.4	1	1.7
Istanbul	9	15.5	2	3.4
Izmir	18	31.0	13	22.0
Manisa	1	1.7	4	6.8
Muğla	3	5.2	10	16.9
Total	58	100.0	59	100.0

**Figure 1.** Hierarchy of the factors affecting competition.

system. Approximately 96% of the firms interviewed use a continuous system. The firms have also upgraded their production technology with additional investments to reduce their costs. All of the survey firms interviewed, except two of the exporters, have domestic capital. According to the survey feedback, the majority of the firms do not use their capacity at present. Of the olive oil mills, 96% operate under full capacity, and 100% of the refiners and exporters and 64% of the exporters operate under full capacity. In 2005, the olive oil mills had a capacity of 75 tons/day, of which 45.6 tons/day (63.3%) were utilized.

Competition

The preferences of firms with regards to factors affecting

international and domestic competition were determined. The results were analyzed comparatively between olive oil mills and exporters.

International competition

The origins of the olive oil-trade brand (0.259) and food quality-food safety (0.255) have the highest priority level with respect to international competition for firms. Following these factors, the other factors affecting firms with regards to international competition are olive oil price (0.215) and incentives (0.164), respectively (Table 2). The origin-brand factor is a higher priority in international competition, followed by the quality-safety factor.

There is a statistically significant difference between olive oil mills and exporters in terms of olive oil price

Table 2. Priorities regarding factors affecting international competition.

Factor	Mean	Std. deviation	Minimum	Maximum
Food quality and safety	0.255	0.164	0.025	0.609
Price	0.215	0.159	0.025	0.577
Brand	0.259	0.153	0.025	0.692
Incentives	0.164	0.132	0.014	0.528
Productivity and efficiency	0.107	0.091	0.013	0.532

Table 3. Priorities of olive oil mills and exporters regarding factors affecting international competition.

Factor	Firms							
	Olive oil mills				Exporters			
	Mean	Std. deviation	Min.	Max.	Mean	Std. deviation	Min.	Max.
Food quality and safety	0.277	0.143	0.068	0.565	0.241	0.176	0.025	0.609
Price [*]	0.157	0.123	0.026	0.501	0.252	0.169	0.025	0.577
Brand	0.273	0.153	0.034	0.692	0.250	0.154	0.025	0.609
Incentives ⁺	0.186	0.132	0.014	0.527	0.150	0.130	0.025	0.528
Productivity and efficiency	0.106	0.099	0.025	0.532	0.107	0.086	0.013	0.405

^{*} Significant at $p < 0.05$ by ANOVA (one-way) test.

⁺ Significant at $p < 0.10$ by Mann-Whitney U test.

(Table 3). Exporters place a higher priority on price than do olive oil mills. Therefore, it can be said that price is the most important factor for exporters in international competition. Also, there is a statistically significant difference regarding incentives between olive oil mills and exporters. Incentives are a more important factor for olive oil mills than for exporters in international competition. There is statistically no difference between olive oil mills and exporters with respect to food quality and safety, brand, or productivity and efficiency.

Domestic competition

The trade brand of olive oil (0.268) is the highest priority in domestic competition (Table 4). Food quality-food safety (0.247) is the second priority of firms for domestic competition. The next priority of firms with respect to domestic competition is price (0.227).

There are statistically significant differences between olive oil mills and exporters for domestic competition with respect to the importance of olive oil price and trade brand (Table 5). Exporters place a higher priority on trade brand and price than do olive oil mills. There are also statistically significant differences between olive oil mills and exporters regarding the importance of food quality-food safety and productivity-efficiency. These factors are more important for olive oil mills than for exporters. Finally, there is no statistically significant difference

between mills and exporters with respect to incentives. In summary, while food quality-food safety and productivity-efficiency are important for olive oil mills, exporters consider trade brand and olive oil price to be more important in domestic competition.

Preferences of competition

Table 6 shows that firms generally prefer international competition (0.531) to domestic competition (0.469). When olive oil mills' and exporters' competition preferences are compared to each other, there is a statistically significant difference with respect to international and domestic competition. Olive oil mills prefer domestic competition; exporters prefer international competition (Table 7).

Overall priorities

Overall, brand is the highest priority in olive oil competition. Food quality-food safety and price are the second and third highest priorities. The remaining factors are incentives and productivity-efficiency (Table 8). There is a statistically significant difference between olive oil mills and exporters with respect to the importance of price. Exporters consider price the most important factor affecting olive oil competition. There are no statistically

Table 4. Priorities regarding factors affecting domestic competition.

Factor	Mean	Std. deviation	Minimum	Maximum
Food quality and safety	0.247	0.156	0.027	0.674
Price	0.227	0.154	0.013	0.572
Brand	0.268	0.136	0.033	0.610
Incentives	0.131	0.124	0.013	0.553
Productivity and efficiency	0.128	0.101	0.025	0.519

Table 5. Priorities of olive oil mills and exporters regarding factors affecting domestic competition.

Factor	Firms							
	Olive oil mills				Exporters			
	Mean	Std. deviation	Min.	Max.	Mean	Std. deviation	Min.	Max.
Food quality and safety ⁺	0.287	0.162	0.028	0.674	0.200	0.136	0.027	0.570
Price [*]	0.187	0.132	0.013	0.511	0.275	0.165	0.025	0.572
Brand [*]	0.227	0.118	0.033	0.564	0.316	0.141	0.051	0.610
Incentives	0.142	0.123	0.013	0.537	0.118	0.124	0.025	0.553
Productivity and efficiency ⁺	0.158	0.113	0.028	0.519	0.092	0.072	0.025	0.346

^{*} Significant at $p < 0.05$ by ANOVA (one-way) test.

⁺ Significant at $p < 0.05$ by Mann-Whitney U test.

Table 6. Overall priorities regarding competition.

Type of competition	Mean	Std. deviation	Minimum	Maximum
International	0.531	0.366	0.000	1.000
Domestic	0.469	0.366	0.000	1.000

Table 7. Priorities of olive oil mills and exporters regarding competition.

Type of competition	Firms							
	Olive oil mills				Exporters			
	Mean	Std. deviation	Min.	Max.	Mean	Std. deviation	Min.	Max.
International ⁺	0.333	0.351	0.000	1.000	0.733	0.257	0.000	1.000
Domestic ⁺	0.667	0.351	0.000	1.000	0.267	0.257	0.000	1.000

⁺ Significant at $p < 0.05$ by Mann-Whitney U test

significant differences between olive oil mills and exporters regarding food quality-food safety, brand, incentives and productivity-efficiency (Table 9).

Conclusion

In this study, the AHP approach is applied to prioritize the critical factors related to competition in the international and domestic olive oil markets in Turkey. Generally, all the firms involved in the olive oil industry realize that the

olive oil market is characterized by increasing competitiveness. The growing competitiveness of the market requires firms to generate competitive advantages. From a marketing standpoint, these advantages can be achieved by establishing long-term relationships with customers. This strategy implies attaining a series of intermediate objectives, such as establishing higher perceived quality and achieving customer satisfaction. In fact, the AHP results show that the most important factor for firms in international competition is the origin of the olive oil, followed by food quality-safety. Olive oil mills

Table 8. Overall priorities.

Factor	Mean	Std. deviation	Minimum	Maximum
Food quality and safety	0.246	0.142	0.025	0.674
Price	0.217	0.151	0.025	0.575
Brand	0.280	0.136	0.048	0.692
Incentives	0.149	0.124	0.014	0.528
Productivity and efficiency	0.107	0.083	0.018	0.405

Table 9. Overall priorities of olive oil mills and exporters.

Factor	Firms							
	Olive oil mills				Exporters			
	Mean	Std. deviation	Min.	Max.	Mean	Std. deviation	Min.	Max.
Food quality and safety	0.277	0.143	0.068	0.565	0.241	0.176	0.025	0.609
Price*	0.157	0.123	0.026	0.501	0.252	0.169	0.025	0.577
Brand	0.273	0.153	0.034	0.692	0.250	0.154	0.025	0.609
Incentives	0.186	0.132	0.014	0.527	0.150	0.130	0.025	0.528
Productivity and efficiency	0.106	0.099	0.025	0.532	0.107	0.086	0.013	0.405

* Significant at $p < 0.05$ by ANOVA (one-way) test.

consider incentives to be the critical factor, while exporters consider price to be. Generally firms prefer international competition. Olive oil mills prefer domestic competition, and exporters prefer international competition. In olive oil competition, the distinguishing factor between olive oil mills and exporters is price.

Also, price is the most influential factor related to exportation for the exporting firms because the export price for Turkish exporters is high due to low exchange rates in recent years and high production costs compared to their competitors. All of the firms identify costs as the only area in which they cannot compete. As a result of high production costs, the demand for their products is below their expectations. Even so, almost half of the firms have increased the number of countries they export to. This increase has resulted from efficient advertisements, carrying out new marketing strategies, changes in customers' preferences, and taking advantage of opportunities in new markets. However, for successful penetration of olive oil into new markets, continuous improvements are required. These improvements can be achieved by first evaluating customer satisfaction. In this way, customers' preferences and expectations are satisfied, allowing for further market development. Turkish exporters have become aware of the fact that consumers' preferences with regard to olive oil are different in many countries. The consumers in each country demand a specific type of product (e.g., specific taste, color, size of the bottle). As a result, they have adapted their marketing strategies to the specific circumstances in each market. The other important factor

for firms in international competition is quality, and olive oil quality depends on many factors, such as post-harvest handling, the maturity of olives, harvesting and transportation. Also, to improve quality, firms have upgraded their extraction, filling, and filtration equipment and have switched to using chrome tanks to improve storage conditions. On the other hand, due to the absence of a leading name brand, Turkish olive oil remains relatively unknown and unrecognized in international markets. To improve its competitiveness, Turkey must take advantage of the world's growing demand on olive oil and improve its image as a producer and exporter.

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