The performance of the Tunisian olive oil exports within the new distribution of world demand

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Abstract

The present work aims to analyze the performance of the Tunisian olive oil exports compared to its main competitors (Spain, Italy, Greece, Turkey and Portugal) during the last fifteen years, on the European market and four potential markets: the United States, Canada, Japan and Brazil using the Shift Share Analysis, in order to identify the main sources of change. The period 2011-2015 was a boom period for Tunisia in all studied markets. The gain in Tunisian competitiveness on the new markets (Canada, Japan and Brazil) is related to the growth of their global imports and the competitiveness of Tunisian exports reinforced by the superior quality of Tunisian extra virgin olive oil and the recourse to packaged oil. The results indicate that the maintenance of a sustainable international competitiveness of Tunisia on the olive oil market depends on its domestic production and that of its European competitors, to which is added recently the Turkish competition, policies and trade agreements that must be negotiated and requires the improvement of its non-price competitiveness.

***Keywords**: Olive oil, Competitiveness, Exports, Shift share, Tunisia.*

1. Introduction

Olive oil represents an economic activity of considerable importance for Tunisia, in addition to its great cultural, social and environmental significance. During the period "2016-2020", Tunisia produced 206 thousand tons of olive oil, of which 180 000 tons were exported. The olive oil sector contributed for 8% to the value of the total agricultural production and for 36.6% to the value of food exports in 2021 (NOAT[1], 2021). Olive oil export receipts covered the import expenses of seed oils and generated a surplus that contributed to the reduction of the chronic deficit of the trade balance.

At the international level, Tunisia is ranked the second world producer of olive oil after the European Union and the fourth exporter, behind Spain, Italy and Greece.They contribute, together, to over 75% of production and have a comparative advantage in the production and export of olive oil (Kashiwagi *et al.*, 2020; Klonaris and Agiangkatzoglou, 2018). Tunisia contribute with 10% of the world production and 20% of total exports. The main export market is the European Union being since the seventies the tra-

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ditional market for Tunisia (60% of total export sales). However, consumer awareness with respect to Tunisian olive oil in the EU is low. This owes in part to the fact that most of the olive oil is exported in bulk and to the practice of European importers to mix Tunisian olive oil with other olive oils without being obliged to declare its Tunisian origin (Weber *et al.*, 2019).

In recent years, Tunisian exporters have to some extent succeeded – but continue to struggle – to diversify markets (Asia, US and Canada) and to increase the share of bottled and branded products. However, since 2012, Tunisian exports faced several difficulties due on one hand to the strong fluctuation of prices in world markets and on the other hand, the increase of national production costs exceeding international market prices (NOAT, 2021). According to the (IOC, 2021a), the world production has increased by 27% passing from 2564 to 3266 thousand tons from 2017-2020 while world consumption has increase only by 6%. Consequently, this tendency has generated a drop in prices on several markets with high levels of world stock, notably European union (EU) markets, where the price of extra virgin olive oil was 33% lower than the five last years. Indeed, in Tunisia, the reference prices of olive oil have fallen significantly in response to the considerable decrease in export prices (7.08%) (ONH, 2020).

This crisis situation in international markets has directly impacted the Tunisian market where production increased at 142% in the last successive campaigns compared to 2013 (IOC, 2021b). However, exports has frozen to the EU at a level 127 thousand tonnes (57,000 tons under the preferential quota allowed by the free trade agreement with EU (ALECA agreement) and about 70,000 tonnes under bilateral regime called TPA regime for temporary exports to Italy), generating an export potential of around 93,000 tonnes that Tunisia must to sell for non-EU destinations.

On the national level, Tunisia suffers from a lack of innovation, and the high cost of packaging. In addition, the demand on the national market is characterised by a low level of consumption equivalent to 44 thousand tonnes (about 3.8 kg by capita). This consumption could not help to absorb part of the non-exportable surplus (about 88 thousand tonnes in 2020) due to the competitive prices of seeds oil subsided since 1970 by government to encourage exportation of olive oil.

Although production and exports have increased substantially, the Tunisian olive oil sector faces many challenges, including (i) high volatility of olive oil exports; (iii) dependence on the EU market; and (iv) a large share of bulk exports in total olive oil exports which makes export opportunities in new markets limited.

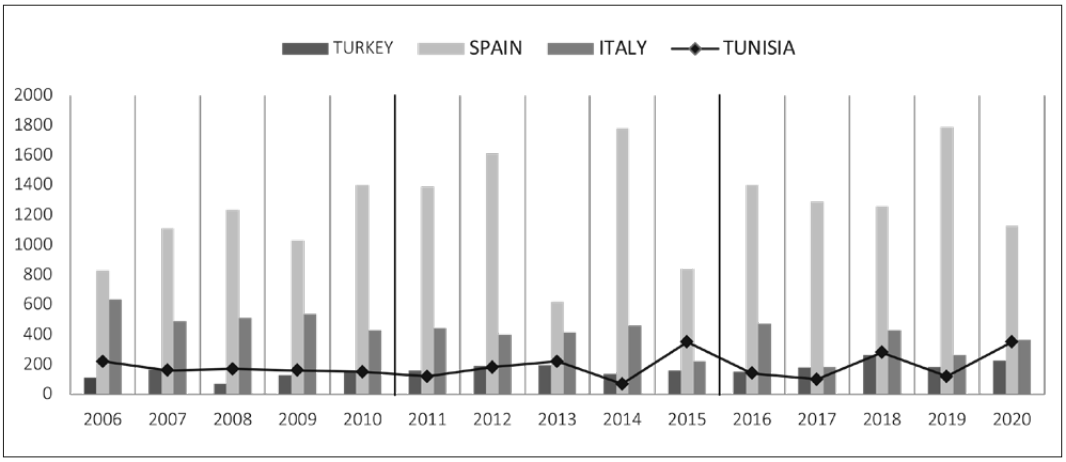
Under this context, the main research questions of this study are as follow:

- Is Tunisia facing the end of the golden era for exports to EU market?
- Does the EU market still constitute a promising market in case the Tunisian production of olive oil increases?
- Does the market share of Tunisian exports on the European market and non-European imports markets follow the evolution of Tunisian production or the evolution of European demand?
- Are Tunisian exports dependent on other factors: qualitative, marketing or others such as the volume produced by European competitors, mainly Spain, Italy, Greece and Portugal?

The objective of this study is to analyse the competitiveness of the Tunisian olive oil and more precisely the evolution of its market share on different world markets, especially the EU market, the traditional importer of olive oil in Tunisia, and four other potential markets (United States, Japan, Canada, and Brazil). Competitiveness is analysed through a shift share method applied for the main destination countries. This approach is uses to assess the export performance of Tunisia compared to its main competitive Mediterranean countries. Export performance will be explained by the evolution factors of the market share during three periods (2006-2010, 2011, and 2016-2020) of each country's exports relative to the total quantity of imports of each target market.

This paper is structured as follows: Section 1 presents the evolution of international and national olive oil exports according to the changes

Figure 1 - Evolution of the world olive oil production by country (thousand tons) (2006-2020)



Source: Own elaboration from IOC, 2021b.

in the world market. Section 2 develops the literature review of competitiveness focusing in the method used in the present study. In section 3 the methodology of the study is explained. Sections 4 and 5 present results and discussion separated and finally, section 6 proposes policy implications and some future recommendations to help decision of olive oil operators.

2. Evolution of international olive oil market and positioning of Tunisia

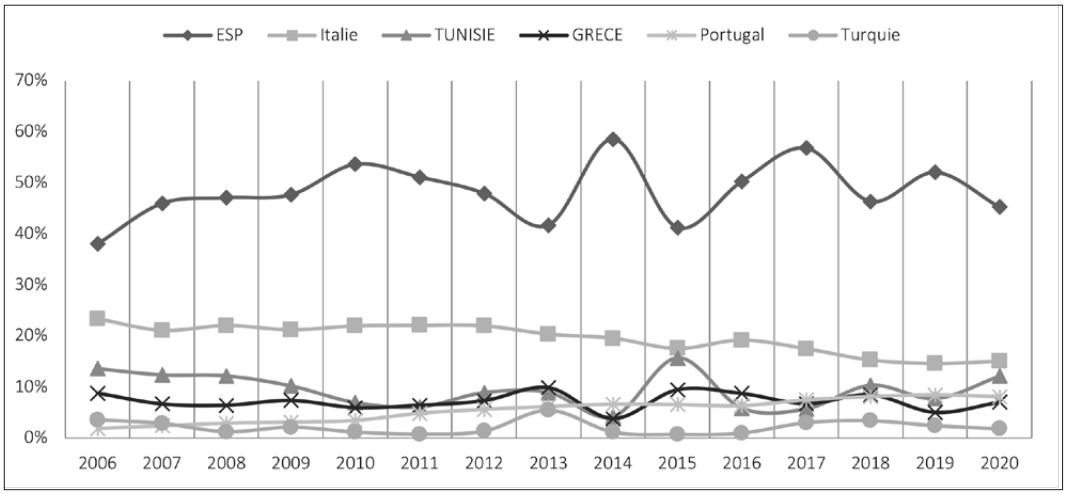
The world olive oil market is traditionally characterized by a concentration of production and demand within the countries of the Mediterranean basin, mainly the countries of the European Union (EU). Spain and Italy cover together 79% of the world's production and 60% of total exports between 2006 and 2020. In second place, some Mediterranean producers hold significant shares of global production including Greece (11%), Tunisia (6%), and Turkey (5%). Since 2006, olive oil sector has known a period of expansion of world production (from 2495.5 thousand tons to 3321 thousand tons). However, after this period of high production growth a strong instability was observed since 2013 mainly for Spain, Italy (Figure 1).

Thus, world production was characterized by the frequency of fluctuations having a significant impact on the instability of the world market in terms of quantity and price, which have altered the profitability and competitiveness of south Mediterranean countries (Karray, 2012). Both leading producers and exporters of olive oil in the world, Italy and Spain in 2015, saw their production drop by 35% from 463 to 300 and by 53% from 1781 to 841 thousand tons respectively, due to the *Xylella fastidiosa* bacterium which had decimated thousands of olive trees in both countries. Over the past three campaigns, world production has resumed its growth rate, notably in Spain, Italy and Tunisia (Figure 1) but a significant imbalance in the world market continues to occur, leading to high volatility in world prices.

At the same time, these fluctuations were accompanied by the emergence of new producers such as China, the United States and Australia, which have already increased their production, with the establishment of intensive and super-intensive agricultural systems. This change had also a significant impact on the instability of the global market.

Since, 2016-2020, the Mediterranean producing countries tacked a more active export policy to expand this product and diversify exports outside their traditional markets following the new dynamics of supply and demand in American and Asiatic markets. Italy and Spain remain the first two suppliers of the international market despite the decline of their exports in 2015. In

Figure 2 - Evolution of olive oil exports shares by country (%), 2006-2020.



Source: Own elaboration from IOC, 2021b.

the same way, Tunisia recorded its highest average of exports during the five last years (220 thousand tons compared to 110 thousand tons between 2006-2010, thanks to its record production registered in 2015, 2017 and 2019 (340 thousand tons).

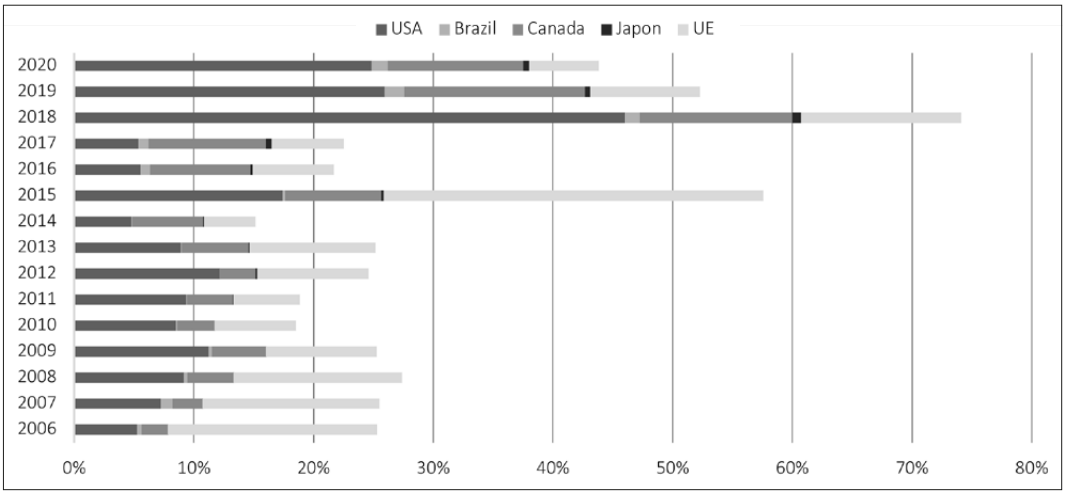
Despite the COVID-19 pandemic during the campaign 2019-2020, Tunisia has exported 365 thousand tons of olive oil with a total value of about 2.23 billion dinars (which contribute to about 4,25% of the state budget for 2020), to 54 countries (NOAT, 2021). For this campaign, Tunisia has occupied the first rank of the world's olive oil exporting countries in volume, outside the European Union. The main destinations of Tunisia's olive oil are the European and American markets, and more recently the Asian one. In spite of its respectable share in EU imports (75% of non-European imports), Tunisia did not maintain its market share in its traditional markets passing from 18% in 2006 to 6% in 2020 in EU, except for the year 2015 when the Italian and Spanish production recorded a significant decrease (Figure 3). At the same time, Tunisia has successfully diversified its markets for the export of olive oil by turning to other destinations such as the United States of America (USA) where Tunisian exports have increased from 5% in 2006 to 25% in 2020 and Canada passing from 2% to 11% for the same period, to which are added Brazil and Japan which have become major destinations in recent years with imports from Tunisia respectively 1 484 and 307 thousand tons in 2020 (Trade Map, 2021).

Moreover, the expansion of free trade and the emergence of new exporting countries such as Turkey, Syria, Portugal and recently some Latin American countries has placed Tunisia in front of new challenges to maintain its competitiveness on the world olive market.

In recent years, coinciding with the economic crisis, the sector has been going through a period of uncertainty that gives rise to great concern. Prices have fluctuated sharply, with a downward trend since 2010, and operating margins have been reduced, putting many farms in a situation that threatens their survival. This situation has revealed inefficiencies and structural problems that were latent in the sector, as well as the growing of competitiveness on European markets due to the market liberalization and the latest reform of the Common Agricultural Policy on 2013 moving from a highly protected sector to open market rules. All these factors have revealed the need to improve the functioning of the Tunisian olive oil commercialization and to promote export's competitiveness and efficiency due to its strategic importance for the national economy and its role in the balance of trade equilibrium.

However, the prevailing issues of the olive oil

Figure 3 - Evolution of the Tunisian share of olive oil exports on the main destinations (%), 2006-2020.



Source: Own elaboration from Trademap database, 2021.

sector in Tunisia remain its low productivity and limited progress achieved in terms of competitiveness, resulting from constraints in generating radical or incremental innovations – especially process-related – and weak financial capacity and low investment especially due to small and scattered farmers (lack of cooperatives), an oligopoly of private exporting operators (c. 40% share of the market) who control exports in parallel with the national olive oil office (ONH).

3. Literature revue: Competitiveness analysis context

Trade competitiveness has been analysed over time in a variety of ways. The simplest approach has been to improve the structural competitiveness of a sector or country through different indices (specialisation, dependence, market share, prices competitiveness, exchange rates…). The simultaneous use of these indicators provides an explanation of the comparative advantage in a market of perfect competition where products are homogeneous (Balassa, 1965; Alonso, 1990). In the case of agricultural products, these assumptions were quite realistic until the nineties and there have been numerous works analysing international agricultural trade. However, agricultural products are increasingly subject to manipulation and transformation – losing their homogeneous and eminently agricultural character – in order to become more differentiated (Thompson, 1981). In recent years, a number of changes have occurred whereby agricultural products are no longer homogeneous; differentiation has been imposed by new consumer demands, agricultural production has become concentrated in a few countries, leading to imperfect competition, and trade in agricultural products has become highly intra-industrial in character Alonso (1990).

The recognition that agricultural products are not perfectly homogeneous leads to import markets diversifying their external sourcing of products with a consequent product differentiation by country of origin. This led to the development of new market trade flow analytical models. In the case of agricultural products, a variety of approaches based on trade flows have been used. For this reason, multi-regional models started to be used, based mainly on simultaneous systems of individual equations that reflect the behaviour of several trade regions and their interrelationships across the world market. There are 3 classes of multi-regional models: 1) non-spatial equilibrium price models, 2) spatial equilibrium price models and 3) market trade flow models. These three models differ in the way that prices or quantities are determined. The first two models allow for the analysis of interrelationships

between countries and consider that the products exchanged are perfectly homogeneous, (which is true even for agricultural products) while the last one do not provide information on trade flows and market shares and focus more on export prices elasticity's and their effect on trade.

Since then, work has been carried out to estimate destination-based export demand equations, market share equations and elasticities of substitution for various agricultural products where the most general assumption has been differentiation by country of origin. Within these models, two different approaches can be distinguished. The first one, which uses share market desegregation in factors for analyzing trade flows without taking in account the role of prices (constant market shares such as shift share approach, Markov models, etc.). The second approaches based on elasticity prices incorporate product differentiation and impose a priori many assumptions and restrictions such us homogeneity, constant elasticity of substitution in the framework of a complete import system (Armington, 1969; Winters, 1984). The findings of the study indicated that EU demand for dates has with regards to constant share applications, this approach seems to be easier to be applied and it has largely been used in numerous agricultural trade studies due to the fact that the statistical information required is very elementary and the analytical possibilities that it offers are quite large. Lakkakula *et al*. (2015) analysed changes in country shares of global rice exports from 1997 to 2008 using a shift-share analytical framework. Their results indicated a growing concentration among a few exporting countries in the global rice market, and the competitiveness effect is often significant. Government policies affecting rice trade and the competitiveness of trading partners are identified as important factors for the shifts in rice trade patterns. To analyse the competitive position of Tunisian date exports to the European Union market, Chebbi and Gil (2002) used is a shift-share competitiveness matrix considering five markets within the EU: France, Italy, the United remained stable over the last years. Tunisia is the main supplier within the EU, France and Italy being the main destination of Tunisian exports. Albisu *et al.* (1987) and Alvarez-Coque, Bautista (1994) for vegetables and citrus foreign trade in Spain can be highlighted.

Several studies were conducted to analyze the competitiveness of olive oil exports. In their study Türkekul *et al.* (2010) used the constant market share analysis to determine the competitiveness of Turkey, Spain, Italy, Greece and Tunisia in the US, Australia, Canada, Brazil and Japan olive oil markets during two periods. Their findings showed that Tunisia was the most competitive country; however, the competitiveness of all the discussed countries decreased during the periods studied. This study concludes that competitiveness in the international market depends on production, organization and trade policies. Mokrani *et al.* (2011) used also Shift share to study the competitiveness of Tunisian olive oil on three markets, European, Canadian and American between 1997 and 2006. In this study, Both Canadian and American markets have been retained as expanding markets while considering Australia, Argentina, Syria and Chile as the main competing countries for Tunisia.

This work proposes to apply the Shift share method thanks to the usefulness of separating and quantifying the contribution of a country's business structure (market and product composition) to business performance, as well as qualifying the contribution of other factors which is the purpose of this paper. The overall growth of imports in each market (market effect), Tunisia's domestic export potential (extra-market effect) and the Tunisian capacity to maintain its share market in relation to its main competitors (residual effect or international competitiveness).

Although the model does not provide a detailed explanation of why exports grew as they did, because prices are not considered, but it is useful for numerically dividing export growth into different components. In particular, the model also helps to identify where to look for explanations of export changes: either to structural and domestic factors or to competitive forces in order to well orient deciders in establish strategic plans. The application of the Shift-Share method chosen will allow the evolution of import flows to be broken down into three periods and five markets based on changes in market shares. Calculations were easy to be held and offer exactitudes because we work with quantities which avoid incertitude due to lack of constant prices and exchange rates effects.

4. Methodology

In order to analyse the competitiveness of Tunisian olive oil by the Shift-Share method, four main olive oil producing/exporting countries are considered: Spain, Italy, Greece, and Turkey adding Portugal in Brazilian market. This approach allows evaluating the performance of Tunisian exportations with those of its main competitors by comparing their behaviours on the different importing markets: European, American, Canadian, Japanese and Brazilian markets during the last fifteen years. This period is divided in this analysis into 3 sub-periods 2006-2010; 2011-2015 and 2016-2020.

The change in export quantities is expressed by the SSA analysis as follows:

$$\Delta Q\ exported\ =\ Eif\ -\ Eid$$
$$=\ Eid * Gy +\ Eid\ (Gextra\_y\ -\ Gy)$$
$$+\ Eid\ (Gi\ -\ Gextra\_y)$$

Where:

Y: the market considered in each analysis;

Eif: the exportations of olive oil from country i to market y during the period (f: end of period);

Eid: the exportations of olive oil from country i to market y during the period (d: beginning of period);

Gy: the rate of growth of total olive oil imports of market y;

Gextra_y: the growth rate of the total olive oil imports of the extra-y which represents the rest of the market;

Gi: the growth rate of exports from country i to market y;

Y_Effect = EidGy: the effect of the demand of the concerned market on the exports of each country.

Extra_y Effect = Eid (Gextra_y – Gy): the effect of demand from other markets (extra-y) on each country's exports.

Residual Effect = Eid (Gi – Gextra_y): the competitiveness component of each country. The relative values provide a measure of the performance of each exporter.

With:

Eif = (*Ei*2009 + *Ei*2010) /2: the olive oil exportations of country i to market y during the period 2009-2010 at the end of the period (f =2009-10, end of period).

Eid = (*Ei*2006 + *Ei*2007) /2: olive oil exportations from country i to market y during the period 2006-2007 at the beginning of the period (d = 2006-07, beginning of period).

The average annual growth rate is calculated by the following formula, which takes into consideration the variations in quantity during the studied period:

(exp(*S*/10) –1) *100 with:

$$\boldsymbol{S} = (\sum_{i=1}^{5} i * Ln\ Vi) - 3 * \sum_{i=1}^{5} Ln\ Vi$$

With:

Vi: the quantity of olive oil exported by the country studied to the market in question during year i.

The use of the exponential allows to follow the evolution taking into consideration all studied years, contrarily to the average which could hide some peaks.

The data used was collected from the databases and statistics of international and European trade, namely TradeMap, FAOSTAT, the Tunisian National Institute of Statistics (NIS), the Ministry of Agriculture, Hydraulic Resources and Fishing of Tunisia (MAHRFT), and the national customs agencies.

5. Results

5.1. *Competitiveness in European market*

During the first sub-period 2006-2010, Tunisian and Turkish exports to the European market decreased by 71681.5 and 11372.5 tons respectively, offering the first places to Spain and Italy. These results explain the unfavorable position of Tunisia shown by the negative component of the residual effect (Table 1).

During the second period 2011-2015, the increase of Tunisian exports allowed to an improvement in its competitiveness component thanks to the increase of European demand (positive market effect 79056.8) and the decrease of Spanish and Italian exports. This is due mainly to the high Tunisian production in 2015 coupled with a decrease of Spanish and Italian production in 2015 caused by the *Xylella fastidiosa* bacterium (Semeraro *et al*., 2019).

Table 1 - Shift-Share analysis of imports from the European E27 and US markets for the periods 2006-2010; 2011-2015; 2016-2020.

	Export growth		*Market effect*		*Extra market effect*		*Residual effect*	
2006-2010								
	EU	USA	EU	USA	EU	USA	EU	USA
Spain	134074.5	19651	1098792.3	78706.1	-862621.3	-37011.7	4821407.7	555232.6
Italy	16749.5	-4231.5	275954.6	298742.3	-216641.8	-140484.3	491486.2	-241828.5
Turkey	-11372.5	-4547.5	40551.2	28113.1	-31835.3	-13220.3	-609132.1	-221538.9
Greece	-4492.5	-440	223295.8	10252.6	-175301.3	-4821.3	-325186.6	-17465.3
Tunisia	-71681.5	10522.5	-1462842.1	41860.0	-289948.3	-19684.8	-2903937.1	256620.5
2011-2015								
Spain	63644.5	27536	599050.4	83153.4	2290188.7	94375.4	-3092586.1	445974.6
Italy	-4779.0	-17477	138744.5	159394.0	530424.5	180905.1	-876668.9	-942983.2
Turkey	-1417.0	-484.5	2334.0	4207.4	8922.9	1251.5	-34570.3	-111.9
Greece	6523.5	2108.5	99304.5	4559.3	379644.3	5174.5	-23546.9	51900.3
Tunisia	47465.0	1556.5	79056.8	41144.7	302236.7	46697.4	1165492.0	52601.4
2016-2020								
Spain	56293.0	33756	1625196.9	683900.0	-123928.8	-355449.2	173746.2	616652.1
Italy	-23289.0	191324	380178.9	632163.2	-28990.4	-328559.6	-1266869.4	1678487.8
Turkey	-5004.5	8268.5	51663.0	56986.6	-3939.5	-29618.1	90190.0	299768.5
Greece	14343.5	18931.5	285356.3	44794.7	-21759.7	-23281.5	-282237.0	159098.4
Tunisia	15538.0	77257	190122.4	103012.6	-14497.7	-53539.6	-33188.7	1099012.9

Source: Own elaboration based on FAOSTAT data and TradeMap (2021).

This position is counterbalanced during the last five years despite the expansion of European demand (market effect has increased for all countries).

5.2. *Competitiveness in potential markets*

During the last years, Tunisia started to take a good position on new destinations outside the community, mainly the *American* and *Canadian* markets and lately the *Japanese* and *Brazilian* ones.

Concerning the American market, between 2006 and 2015, Tunisia is ranked second after Spain. In fact, despite the increase of its exports to this market by 47467 tons, during the second sub-period, Tunisia maintained the same position (Table 1). The negative competitiveness components of Turkey indicate that this country does not concentrate on the countries whose imports grew relatively fast over the period.

During the last five years, Italy recorded the highest increase in exported quantities (191324 tons) compared to studied countries, which allows it to dominate in competitiveness followed by Tunisia which shows a stagnation of its competitive position in the American market.

Regarding the Canadian market Italy recorded the highest growth in export quantities, between 2006 and 2010, followed by Tunisia (5472 and 540 tons respectively) as well as competitiveness (Table 2).

Similarly, in the Japanese market, the European countries are the best positioned, thanks to the market size effect that shows the Japanese demand in continuous increase until 2015.

During the second period, Tunisia has gained in competitiveness being in first position in Canadian market and fourth in Japanese one, thanks to its record production in 2015 and the decrease in Spanish and Italian production. Tunisia recorded a relative gain of about 1300 tons and a growth rate of 17% in Canada.

Table 2 - Shift-Share analysis of imports from the Canadian and Japanese markets the periods 2006-2010; 2011-2015; 2016-2020.

	Export growth		*Market effect*		*Extra-market effect*		*Residual effect*	
				2006-2010				
	Canada	Japan	Canada	Japan	Canada	Japan	Canada	Japan
Spain	161	4372	2411.7	83323.1	-1265.8	-66512.1	5610.5	100427.7
Italy	5472	2173.5	51544.8	120659.2	-27053.1	-96315.4	157241.3	47277.1
Turkey	-2428	567	11290.0	12203.7	-5925.5	-9741.5	-123058.7	19872.2
Greece	-592.5	162	10059.4	2148.5	-5279.7	-1715.0	-5729.4	4210.7
Tunisia	540	3	2585.6	30.4	-1357.0	-24.2	12456.9	89.5
				2011-2015				
Spain	507.5	11159	-1354.0	204731.7	4140.1	-162732.5	7994.0	290192.4
Italy	-1605.5	2523	-29652.1	233420.4	90669.0	-185535.9	-159956.1	47458.8
Turkey	-182.5	552.5	-533.1	22129.9	1630.2	-17590.1	-2135.0	-2223.4
Greece	100	384.5	-3446.3	5300.5	10537.8	-4213.1	-2676.5	9443.2
Tunisia	1345	42.5	-1736.2	427	5309.0	-339.4	27270.7	1306.1
				2016-2020				
Spain	8544	12153.5	30198.7	220815.5	-22258.8	-140235.4	196230.0	-495406.0
Italy	-2285.5	-35.5	196987.7	142216.0	-145195.1	-90318.5	-132892.0	-70908.6
Turkey	441	1372	2591.8	6469.1	-1910.4	-4108.4	10450.4	27229.5
Greece	-1244	-95	28806.4	5408.7	-21232.5	-3434.9	-54263.7	-6190.5
Tunisia	3293	138.5	34723.8	1160.2	-25594.1	-736.8	69758.9	3540.6

Source: Own elaboration based on FAOSTAT data and TradeMap (2021).

From 2015, Tunisia benefited from the increase in Canadian demand and improved its residual effect, but this is not enough to maintain its first place, Spain has regained its first position, followed by Tunisia. The situation has counterbalanced, from 2015, in favor of Turkey which occupies the first rank followed by Tunisia with respective quotas of about 27229.5 and 3540.6 tons respectively in the Japanese market. Turkey during this period has recorded for the first time in the last fifteen years a positive component of competitiveness, as in the case of the European and American markets.

These finding do not agree with those found by Türkekul *et al*. (2010), who revealed that all the studied countries (the same of the present study) except Tunisia have decreased their competitiveness between 2000 and 2008. When two periods are compared, it is seen that part of a country's export growth is attributable to the general increases in Japanese imports.

For the Brazilian market, Portugal is added to the studied countries, given that it represents the first olive oil supplier to Brazil. During the first period, Tunisian exports have decreased, by 158 tons (Table 3) what explains its negative component of competitiveness from where it occupied the last rank compared to the studied countries. This situation is completely reversed in the following period, where Tunisia ranked first before Portugal, recording the only positive competitiveness component. From 2015, Turkey started to benefit from the expansion of Brazilian demand, and Tunisian exports increased allowing this country to be second after Portugal. In fact, Brazilian imports of olive oil from Tunisia have marked a strong annual growth of 116% in terms of quantity between 2014 and 2018, all in packaged form (or 5% of Tunisian exports of olive oil) which shows that it is a market with high potential for Tunisia.

Table 3 - Shift-Share analysis of imports from the Brazilian market on the periods 2006-2010; 2011-2015; 2016-2020.

	Export growth	*Br-Effect*	*Extra-Br effect*	*Residual effect*
		2006-2010		
Spain	4684.5	97325.0	-89611.5	131038.4
Italy	1549.5	20466.5	-18844.4	35592.2
Turkey	36	305.2	-281.0	---
Greece	200	2681.0	-2468.5	6480.9
Tunisia	-158	3728.7	-3433.2	-6489.6
Portugal	10764	252881.6	-232839.5	304197.1
		2011-2015		
Spain	-5087	-35213.6	81074.5	-228936.5
Italy	-147	-8061.0	18559.3	-24383.2
Turkey	137.5	-3.1	7.2	----
Greece	-25	-782.5	1801.5	-2973.2
Tunisia	56	-59.3	136.6	1013.9
Portugal	1230	-35213.6	179867.5	-82316.2
		2016-2020		
Spain	5308.5	212345.2	-189890.8	110638.3
Italy	676	68595.3	-61341.7	12829.7
Turkey	61	1029.6	-920.8	1317.6
Greece	-93.5	8609.0	-7698.6	-4101.2
Tunisia	998	9190.5	-8218.7	19187.6
Portugal	32273.5	666294.8	-595837.6	779893.2

Source: Own elaboration based on FAOSTAT data and TradeMap (2021).

6. Discussions

The results found regarding the competitiveness of Tunisian exports in European markets indicate that the share Tunisian exports to this market depends on the volatility of Spanish and Italian production. On the other hand, the Tunisian share in non-EU imports decreased from 78% between 2014 and 2016 to 70% between 2017 and 2019. This regression was accompanied by an increase in the shares of Syria, Morocco and Turkey during the same period. This result contrasts with those found by Mokrani *et al.* (2011) during the period (1997-2006) in this market compared to non-European competitors where Tunisia occupied the first rank in terms of competitiveness. In fact, Turkish exporters benefit from several incentives for the access to the European olive oil market, among which the support for the creation of a brand abroad, the promotion of quality signs, the participation in professional fairs abroad and other marketing tools of conception and market studies. Moreover, additional supports are given to Turkish exporters if they are not able to access the European market (Türkekul *et al.*, 2010).

Similarly, on the American market the main competitors of Tunisia are the EU countries and Turkey. Indeed, Spain and Italy have positioned themselves well thanks to the recent American consumers awareness of the benefits of the European olive oil, and to the marketing campaigns carried out by the European leaders on this market. These findings are in contrast with those obtained by Klonaris and Agiangkatzoglou (2018) who concluded that Tunisia has the competitive advantage in the US market. The loss of competitiveness of Tunisia can be explained also by the increased preference of American consumers for extra virgin

olive oil from California over imported oil (Delgado *et al.*, 2013). The position of Tunisia on the American market is not affected by this competition and explains the regression of its performance on the European market. The market size effect is the main contributor to the increase in exports from these countries. However, the magnitude of this contribution varies for each country.

In the Canadian market, the effect of extra-Canadian demand is the main regulator of the competitiveness of studied countries and the Tunisian position explains its regression observed in the European market during the last period. In fact, the evolution of the values of exports of agricultural products between Tunisia and Canada in recent years witnessed a significant increase recording an annual growth rate of about 21.7% and the extra virgin olive oil packaged in containers less than or equal to 1 liter (66%) is the main agricultural product exported to Canada in 2019.

Market size effects, shows the continuous increase in Japanese demand for olive oil The olive oil market has developed from the 2000s in Japan thanks to the confirmed health benefits of olive oil which attract consumers to this product (Mtimet *et al.*, 2011) Japanese olive oil imports have increased sharply since 1996 to reach 67950 tons in 2020. According to TMAHRF (2021) the Asian market in general, and Japanese in particular, opens up new horizons for the Tunisian olive oil exports today. Indeed, Japanese imports from Tunisia scored a strong annual growth of 57% between 2014 and 2018, all of which is in packaged form. In 2019, 94% of these oils were extra virgin olive oil, the rest (6%) were virgin oil.

The results show that Tunisia has focused on promoting its quality competitiveness on these two markets which has improved its export performance compared to European countries. As recommended by Klonaris and Agiangkatzoglou (2018), strategic shift to export high-quality branded virgin olive oil instead of bulk seems necessity, in order the Tunisian virgin olive oil to dominate to the international markets.

The period 2011-2015 can be considered as the period of expansion of Tunisian exports, on all studied markets. This is attributed to its record production in 2015 and the fall of European production because of the bacterium that decimated thousands of olive trees.

The first position of Tunisia on Japanese market shows that Tunisia, during the last years, has followed a strategy of diversification of its destinations of olive oil, obeying the new geographical distribution of the world demand and explains its regression in their traditional markets.

In this context, trade agreements have been successful. Indeed, the customs tariff applied to Japanese imports of olive oil from Tunisia is zero and that to Brazilian imports is 9%. The Turkish competition is again learned on this market, of which Tunisia must face.

The improvement of the Tunisian position on the Canadian, Japanese and Brazilian markets whose imports are 100% virgin olive oil and packaged, confirm that Tunisia should invest more in the differentiation of its product by quality signs under the increased competition and changes in the agri-food market and the new requirements of consumers.

Indeed, this improvement in the quality of olive oil is linked to several factors such as the increase in the crushing capacity, the reduction of its period, the modernization of oil mills through a program of upgrading since 1996. The supervision and awareness of operators providing them with a guide to good practice summarizing the results of several years of scientific research in the field of olive cultivation and the alignment of Tunisian regulations on quality to international standards (Codex Alimentarius, International Olive Oil Council).

Thus, it was found that the hottest areas (Tunisia, Greece) have relatively low values for oleic acid which favors the extra virgin oil.

Regarding quality signs and, in particular, the number of trademarks, quality labels and AOC, Tunisia suffers from a significant competition with EU countries. In Spain and Italy more than 100 commercial brands exist and 24 AOC against less than a dozen brands in Tunisia and a single AOC (oil Teboursouk) obtained in 2018. In terms of packaging capacity, the olive oil sector in Tunisia has a competitive disadvantage compared to other olive oil producing countries (10% in Tunisia against a capacity of 100% in Italy and Spain) and a share of 3% in total world exports.

7. Conclusions

The present study has proposed to deepen the studies that have been devoted to the analysis of the evolution of price competitiveness from the analysis of comparative advantages, export functions and Aids models (Karray, 2012; Mokrani *et al*., 2011; Ameur *et al*., 2006; Boudiche *et al*., 2003) through the interpretation of the most recent data of international trade in olive oil (between 2006 and 2020) and the identification of the determining sources of the competitiveness of Tunisia and its main competitors as well as the real opportunities offered by the various target markets in order to contribute to the implementation of an adequate strategy for a sustainable Tunisian competitiveness.

The findings of Shift-Share approach revealed that Tunisia wasted competitiveness in the European market over the last five years despite the expansion of demand and that its position is inversely proportional to the Spanish and Italian production. This regression was accompanied by the improvement of the position of Tunisia on the other studied markets which shows the Tunisian policy of diversification of its destinations. Indeed, on the American market, Tunisia occupies the second position during all the studied period, always after one of the European competitors. The period 2011-2015, was a golden period for Tunisia occupying the first position on most of the studied markets including the European one. This period was characterized by a record production in 2015 and the fall of production of European competitors.

Despite its excellent campaign 2019-2020, Tunisia has not kept this performance during the last five years. Consequently, the domestic supply is not enough to garnish an advanced position, it is linked mainly to the Spanish and Italian performance.

Indeed, in the EU, the olive sector is organized among all the actors which is effective on the international markets of oil apart from the positive image as producers of olive oil. The sector is also supported by subsidies from the Common Agricultural Policy (CAP) paid through the Common Market Organization (CMO) for olive oil which has allowed a restructuring modernization of the milling and processing industry (Türkekul *et al.*, 2010).

This work has led to the conclusion that, in Tunisia, obtaining a sustained production and quality is the key factor to increase the market share of Tunisia on new markets. In order to reduce the effect of alternation on production, and to bring Tunisia's production level closer to that of the European Union, cultivation activities such as irrigation and mechanization should be improved.

In 2006, the Tunisian Ministry of Agriculture launched a FPPOO[2] to gradually eliminate the present system of selling olive oil in bulk. Tunisia should invest in the packaging of olive oil as, apart from the allocation of this Tunisian product of a specific identity, the export price of packaged oil is twice that in bulk (15.3 Dt / kg against 8.3 Dt in 2021). To achieve this plan, the Tunisian olive oil sector will need to be better organized, given that the production of olives is small-scale and fragmented. In addition, the quality must be improved, and the production process must be modernized, because the methods of harvesting and pressing applied in Tunisia are still traditional and inefficient compared to European standards.

In addition, due to the lack of a brand or a trade name for olive oil, Tunisian olive oil remains relatively unknown in the target markets. In order to improve its competitiveness, Tunisia must capture the growing global demand for olive oil by improving its image as a country producer and exporter of olive oil and work on the quality competitiveness which has shown its effectiveness on the Canadian market, Japan where exports are fully packaged and virgin or extra virgin quality. These countries have been occupying an increasing share in the world consumption of olive oil in the recent years and hold a strong potential for consumption growth in the future (Mili and Bouhaddane, 2021), which made them as potential attractive markets to the Tunisian olive oil. Consequently, to distinguish itself on foreign markets, Tunisia should

[2] Fund for the promotion of packaged olive oil.

focus more on exports of packaged products and brand. Moreover, it is necessary to move towards the sale of olive oil products under AOC designation in order to improve the price and to carry out a detailed study of the prices. Likewise, organic olive oil could be also a force to face competition from European countries and the new olive oil producing countries which are growing more and more. In fact, as concluded by Mili and Bouhaddane (2021), demand will be prompted by the shift in consumption habits towards healthier and more natural products, and to a lesser degree by preference towards more differentiated products such as organic olive oil and oils with indications of origin.The launch of the "Bio Tunisia" label in 2010, the efforts to create AOCs in Tunisia and the respect of increasingly demanding international quality standards as well as the packaging and orientation towards flavored olive oil and its stabilization by aromatic and medicinal plants, could constitute a solution to widen the markets of destination and to offer to Tunisian olive oil an identity which is singular and unique.

Finally, Tunisia should build on its trade agreements with potential new importers around the world and revise its agreements with the European Union, which are proven to be protectionist of community producers. This country an interest to negotiate prices to align at least the export prices of extra virgin olive oil in Spain, or even the prices charged in Italy given the quality of Tunisian olive oil. The decline in prices is due to the fact of the sale to the EU in TPA and over quota. For this the negotiation on the quota is necessary.

Among the challenges that will be facing the Tunisian exporters of olive oil in the upcoming years, is to build the a good image for the olive oil "made in Tunisia" by participating in fairs and international organizations, especially that, apart from the European competition, Turkey started to take advantage, with important growth rates on all the studied markets, after the depreciation of its pound which constitutes a new challenges for Tunisia.

To achieve a complete study, more detailed analysis could be made by category of olive oil on the different markets.

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