Evolution of olive oil import demand structures in nonproducing countries: the cases of Germany and the UK

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Abstract: Consumption patterns of olive oil have changed over recent years influencing the supply chain. The consumption has increased in countries where olive oil is not part of the traditional diet as for example Germany and the UK, where the average consumption grew by 11 and 13% respectively during the period 1995-2003. The opening of new non-traditional markets has shifted exports and re-structured the supply chain. Mediterranean countries have been the traditional suppliers of olive oil with the EU Mediterranean Member States being the main exporters and with the non-EU Mediterranean countries trying to gain market shares in the EU markets in an attempt to benefit from the preferential access due to the Barcelona Agreement. This paper tries to identify which factors influenced olive oil demand of non-traditional consumers using Germany and the UK as case studies with the help of a gravity model. The results of the random effects models corrected for serial correlation and heteroskedasticity indicate that the Barcelona Agreement has boosted the non-EU Mediterranean exports to Germany and the UK while olive oil exports are positively related to direct marketing strategies and tourism, implying that these factors have the largest impact on the olive oil exports from producing countries and consequently on the overall supply chain.

Keywords*:* Olive oil, gravity model, import demand, Germany, UK

1 Introduction

Olive oil has been produced traditionally in the Mediterranean basin and traded by Mediterranean countries. More than 95% of the world olive oil production is concentrated in the Mediterranean countries with 75% being produced by the EU Mediterranean Member States[1]. The EU Mediterranean Member States are the largest traders of olive oil, with Italy dominating imports and exports worldwide. Even though the percentage of Italy's olive oil imports slightly declined during the past three years, Italy dominates olive oil trade with its imports accounting for more than 80% of olive oil worldwide during the period 1995-2006[1]. During the same period Italy accounted for more than 50% of the worldwide olive oil exports, followed by Spain and Greece[1]. The non-EU Mediterranean countries account for nearly 1% of the world olive oil production and destine 77% of their exports to the EU (average of 1995-2007)[2].

Olive oil has been consumed mainly by the producing countries. Between 2002 and 2006 the EU-27 had an average share of about 70% of the worldwide olive oil consumption with Italy, Spain and Greece being the main consumers and accounting for about 40%, 33% 17% of the EU's consumption in average for the same period respectively[3]. In recent years though consumption grew faster in non-traditional, non-producing markets compared to Mediterranean countries, fact that could be attributed to changing consumption patterns in non-traditional markets due to various campaigns for a healthier way of living promoting cooking with olive oil instead of other fats and oils. The opening of non-traditional markets certainly gives space to Mediterranean countries to expand their market shares to new destinations affecting the export supply of the producing countries and in turn the overall supply chain of olive oil. The interest of Mediterranean countries especially of the non-EU Mediterranean countries to expand their market shares in the EU is expected to become more obvious due to the deepening of their trade relationships

with the EU as foreseen by the Barcelona Agreement[1] and the updated discussions for the creation of a Mediterranean Union.

Germany and the UK are among the top 10 biggest olive oil consumers worldwide and are the largest consumers among the non-producing countries. Olive oil consumption in Germany and the UK grew by 11 resp. 13% in average during the period 1995-2003[4], and by 4 resp. 15% during 2002-2005[3]. The difference in the consumption growth rates between Germany and the UK in recent years could be attributed to different market structures in retailing with Germany being dominated by the presence of discounters[5] and the UK with non-discount supermarkets[6], that show a different purchasing behaviour with the first importing directly and the second using more importers or brokers[5 and 6], implying that the factors that influence olive oil import demand are worth of further analysis.

Within this background objective of this paper is to describe the factors that influence import demand in non-traditional consumers using Germany and the UK as case studies and to identify if a connection between those factors and different marketing strategies exist. The paper is hence organised in five sections: The next section of the paper gives a closer look on the evolution of import demand in non-traditional consumers over the recent years focusing in Germany and the UK. The importance of the driving factors for the German and UK olive oil imports is estimated by applying a gravity model, which is described in the third section of the paper. The results of the empirical presented in the fourth section could serve as further options for marketing strategies of the producing countries, as discussed in the fifth and final section.

2 Trade and olive oil imports in Germany and the UK

Olive oil supply both in Germany and the UK is covered entirely by imports, mainly originating from Mediterranean countries. The imports almost tripled in Germany and nearly doubled in the UK in recent years, as Table 1 and 2 show, indicating that both countries are increasingly important market destinations for Mediterranean olive oil producers.

Table 1 presents the evolution of German olive oil imports during the last decade. The German market is dominated by Italian imports, which account for more than 75% of the total olive oil imports in Germany throughout the period after 1995. Spain and Greece are the second and third biggest olive oil suppliers of Germany. Imports from those two countries increased in recent years to reach 10 resp. 8% of total German olive oil imports. The MPCs altogether account only for 0.2% of the German imports with Turkey as the distinguishing country (about 0.2% throughout the respective period).

For the UK the picture is slightly different. As Table 2 shows, Italian imports are again present but equally important as imports from Spain (about 40% of the total olive oil imports from each country). Imports from Greece decreased over the last decade from almost 10% during 1995-1997 to about 6% during 2004-2006. Imports from the MPCs are almost at the same level as in the case of Germany (0.2% of total olive oil imports) with Lebanon being the only non-EU Mediterranean country that constantly shows presence on the UK market over the years 1995-2006.

During the years 1995-2000, years that coincide with the first five years after the conclusion of the Barcelona Agreement, the average annual growth has been higher from imports coming from EU Mediterranean Member States both in Germany and in the UK (Table 1 and 2). Nevertheless, after 2000 the MPCs performed better and the average growth rate of imports originating from those countries was about 40% in Germany and 50% in the UK. For the UK it is remarkable that the average growth rate of imports from Lebanon was only about 13% during the period 1995-2000 but reached about 70% during 2000-2005. In Germany imports from Turkey exhibited a negative growth rate during the first five years but afterwards became positive so that olive oil imports from Turkey reached about 50% during the last five years. On the one hand, this positive performance could be due to the deepening of the Barcelona Agreement, and is thus expecting to continue over the coming years once the Agreement fully enters into force. Another

[1] The Barcelona Agreement was signed in 1995 between the EU and 10 Mediterranean Countries: Algeria, Cyprus, Egypt, Israel, Jordan, Lebanon, Malta, Morocco, the Palestinian Authority, Syria, Tunisia and Turkey with the aim to create a Free Trade Area by 2010 among the EU and the signatory countries. These countries are called hereafter Mediterranean Partners Countries (MPCs) apart from Cyprus and Malta, which are Member States of the EU since 2002.

reason could be the adoption of the new market organisation for olive oil in the European Union in 2004[7]. Decoupling support for olive oil is expected to lower production rates in the EU Mediterranean countries and this is likely to increase import demand from non-EU Mediterranean countries[8].

Table 1: Imports of olive oil (HS 1509) in Germany

Partner country	Average share in %				Average growth in % over	
	1995-1997	**1998-2000**	**2001-2003**	**2004-2006**	**1995-2000**	**2000-2005**
Italy	84.4	87.2	86.9	77.8	11.8	7.7
Spain	10.2	6.7	6.4	10.6	-2.6	23.5
Greece	3.0	2.7	3.2	7.8	12.5	29.8
France	1.5	1.3	1.7	2.0	5.1	18.6
rest of EU-27	0.6	1.9	1.6	1.5	29.8	10.3
Turkey	0.2	0.2	0.1	0.2	-15.6	48.7
Tunisia	0.0	0.0	0.1	0.0	-100.0	n.a
rest of MPCs	0.1	0.0	0.0	0.0	-16.5	38.3
rest of world	0.0	0.0	0.0	0.1	14.2	47.0
total imports (in € million)	64.5	88.9	120.0	183.6		

Notes: n.a: not available
Source: Eurostat; own calculations

Table 2: Imports of olive oil (HS1509) in the UK

Partner country	Average share in %				Average growth in % over	
	1995-1997	**1998-2000**	**2001-2003**	**2004-2006**	**1995-2000**	**2000-2005**
Italy	41.5	36.4	41.9	41.9	5.1	14.8
Spain	32.7	41.4	41.6	39.4	25.6	11.7
Greece	9.8	7.5	5.6	5.6	-5.7	11.2
France	1.3	3.8	2.8	2.8	33.7	6.0
rest of EU-27	15.6	14.5	10.6	10.6	0.0	5.1
Lebanon	0.01	0.01	0.05	0.05	13.0	67.3
rest of MPCs	0.0	0.0	0.2	0.2	24.1	50.5
rest of world	40.5	32.7	39.3	39.3	2.6	12.8
total imports (in € million)	73.3	86.5	97.7	174.0		

Source: Eurostat; own calculations

Overall, the increased consumption as well as the recent developments in olive oil trade flows between non-traditional markets such as Germany and the UK as first target markets and Mediterranean countries stress the importance of analysing the factors that influence import demand in new market destinations and hence explore on developing adequate marketing strategies.

3 The gravity model

One of the tools used to examine and explain trade flows is the application of the gravity equation on the exports (imports) of commodities between two or more countries. It has been first proposed by Tinbergen[9] and Pöyhönen[10] and ever since applied by a number of authors to explain international trade flows due to migration, foreign direct investment or the existence of preferential trade agreements. Gravity models are based on the idea that the traded volumes from origin i to destination j can be explained by the economic size of the origin and of the destination country and any other forces, specific for the examined trade flow, that attract or not bilateral trade.

The basic formulation of the gravity equation is as in equation 1.

$$PX_{ij} = \beta_0 (Y_i)^{\beta_1} (Y_j)^{\beta_2} \left(Y_i / Pop_i\right)^{\beta_3} \left(Y_j / Pop_j\right)^{\beta_4} (Dist_{ij})^{\beta_5} (A_{ij})^{\beta_6} e_{ij} \quad (1)$$

where i and j to denoted trade partners and for i<j and j=1,2,3,…,n and where:

PXij	value of trade flow (import to or export from) from country i to country j
Yi, Yj	nominal GDP of country i, nominal GDP of country j
Popi, Popj	population of country i and of country j
Distij	distance between countries i and j
Aij	dummy variables
eij	error term

The second term of the gravity equation, which is meant to measure the economic masses of the trading partners, is often replaced by the population and the GDP per capita. In the literature though both options are used as there is no agreement on the most appropriate indicator[11].

Although it is commonly accepted that the gravity equation has performed well in empirical analyses, its application is seen as controversial. Anderson and Wincoop[12] note that due to lack of theoretical foundation variables are omitted and thus the results of the gravity models are biased. Moreover, the authors argue that the estimated parameters cannot be used for comparative static exercises. Anderson[13] was the first to derive the gravity equation from a model assuming product differentiation and his attempt has been followed by further authors, as for example by Bergstrand[14 and 15], Deardorff[16], and Anderson and Wincoop[12]. Further in the studies of Mátyás[17 and 18] and Egger[19 and 20] the econometric specification of the gravity equation has been improved and the advantages of the application of panel data methodology were drawn. Reviews of gravity modelling exercises of regional trade agreements are given for example by Cardamone[11] and Greenaway and Milner[21].

Gravity models have been applied only in limited cases to explain trade flows of particular commodities. Emlinger et al.[22] have built a gravity model for fruits and vegetables to analyse their access to EU markets, while Vlontzos and Duquenne[23] have applied the gravity equation to examine the trade flows of Greek olive oil. These approaches have the advantage of avoiding inconsistencies due to aggregating trade flows at country level as described in Agostino et al.[24].

In this paper, the gravity equation explaining Germany's and UK's olive oil imports is specified as:

$$lPX_{ij} = \beta_0 + \beta_1 lY_i + \beta_2 lY_j + \beta_3 l(Y_i / Pop_i) + \beta_4 l(Y_j / Pop_j) + \beta_5 lDist_{ij} + \beta_6 rer_{ij} + \sum_h \gamma_h D_{ijh} + e_{ij} \quad (2)$$

where i=importer (Germany or the UK) and l denotes natural logs.

In the above equation $\sum_h \gamma_h D_{ijh}$ is the sum of the dummy variables, which are mainly based on the studies of of Vlontzos and Duquenne[23] and Garcia Álvarez-Coque and Martí Selva[25], Mili[26] as well as of García Martínez et al.[6]. Particularly regarding the German case study the selection of the dummy variables has been also supported by the findings of the analysis of the German supply chain of olive oil that preceded this study [5]. In detail, the dummy variables define whether:

- immigrants of the exporting countries live in the importing countries (if the number of immigrants is below 1 % of total immigrants living in Germany or in the UK the dummy is set to zero, above the threshold the dummy equals one. The immigrants number is retrieved from the German statistical yearbooks for the German case study[27] and from Eurostat for the UK case study[1]
- exporting countries are EU Member states
- exporting countries are partner countries of the EU (within the Barcelona Agreement)
- German and/or British tourists visit exporting countries (this variable is relevant only for olive oil producing countries, not for re-exporters). Again if the number of tourists is below 100,000 of total German and/or British tourists that stay at least one night in the place they are visiting, the dummy is set to zero, above the threshold the dummy equals one. The respective number of tourists is retrieved from the German statistical yearbooks for Germany[27] and from Eurostat for the UK[1]

- German and/or supermarket chains buy directly from producers-traders of the exporting countries (as for instance Lidl which directly imports from Italy[5])
- the exporting countries sell mostly labelled and packaged olive oil (instead of bulk).

Following Martinez-Zarzoso and Nowak-Lehman[28] the real bilateral exchange rate index rer_{ij} has been calculated by multiplying the nominal exchange rate of the exporting country (i.e. local currency value of one unit of country j's currency value) with the GDP deflator of the export country divided by the GDP deflator of the importer. It should be noted that this relationship does not include export subsidies and ad-valorem tariffs since they were not applied during the examined period. Moreover, according to the TRAINS database[29], non-tariff trade barriers have not been reported for the examined period. As a result it was not possible to quantify non-tariff measures and to include them in the modelling exercise. Consequently, to our information all MPCs face the same (zero) tariff, that is, no heterogeneity of preferences among MPCs exists. This allows to proxy EU-Mediterranean trade integration using a dummy variable for MPCs which is not the case if the degree of protection varies among MPCs[22].

It is expected that the coefficients for the nominal GDP for both the importing and the exporting countries will be positive since a higher income level is associated with higher imports and exports. This is the case even if the imports refer to specific commodities, as in this study. Agostino et al.[24] investigated whether the commodity aggregation level is a source of bias for assessing preferential trade schemes and found that both on the aggregated and disaggregated commodity level the GDP was on average important in explaining trade flows. Moreover, studies of Emlinger et al.[22] and Vlontzos and Duquenne[23] show that the GDP coefficient is significant in explaining trade flows on a disaggregated product level (i.e. olive oil as well as fruits and vegetables), which supports the above expectation.

The coefficient of the per capita income of the importer could be either positive or negative depending on whether the imported commodities are considered as necessities or luxury goods[28]. Also the sign of the coefficient of the exporter's per-capita income is ambiguous and cannot be anticipated a priori as it depends on the capital-labour ratio[15].

Finally the distance, as a proxy for transaction costs (including transport costs) is anticipated to be negatively associated with German olive oil imports whereas the coefficients of the dummy variables are expected to be positive.

Data on German and UK imports of olive oil have been retrieved from the Eurostat's External Trade Statistics over the period 1995-2007[1]. After excluding countries with zero bilateral trade flows the dataset for Germany covers 14 exporting countries[2]. For the UK the dataset covers flows from 12 exporting countries[3]. Regarding GDP and per capita GDP (based on Purchasing Power Parity) the data are extracted from the World Economic Outlook database of the International Monetary Fund (IMF)[30]. Measures for distance are expressed as straight lines between cities using a City Distance Calculator[4]. Instead of computing the distances between capitals as it is the common practise, distances between the main trade centres and Hamburg are used as most importers of olive oil in Germany are located in Hamburg[5]. For the UK though London has been chosen as it is by far the largest urban centre. Instead of the geographical distance, Nowak-Lehman et al.[31] and Martinez-Zarzoso and Nowak-Lehman[28] use two indices to capture transport costs, the freight index and transport index, focusing not only on terrestrial infrastructure but on seaports. Although this approach would be welcomed as more precise, it has not been followed due to lack of information through which transport cannels olive oil enters the German and UK market. Table 4 shows basic descriptive statistics of all variables.

As the estimation strategy is concerned, we first estimate a regression model including the data for both Germany and the UK (in the following this model specification will be referred to as joint model). Even though the joint model includes a country dummy variable for the UK (with Germany as the reference country) to allow for unobserved differences between both countries, this approach has the disadvantage to force the estimation coefficients to be the same for Germany and the UK. That is, the joint estimation neglects the fact that the magnitude as well as the significance of parameter estimates may differ between

[2] The exporting countries for Germany included in the model are: Austria, Belgium, France, Greece, Israel, Italy, the Netherlands, Portugal, Spain, Sweden, Switzerland, Turkey, UK, and USA.

[3] The exporting countries for the UK included in the model are: Belgium, France, Germany, Greece, Ireland, Italy, Lebanon, the Netherlands, Portugal, Spain, Turkey and USA.

[4] The city distance tool of www.geobytes.com has been used.

the two countries. In order to remove this shortcoming a separate regression is estimated for both Germany and the UK.

The estimation makes use of panel data methodology which allows accounting for individual heterogeneity across countries. As focus is given on time-constant variables, such as the Mediterranean Partnership, the random effects (RE) approach is considered as more appropriate instead of a fixed effects model. However, to ensure that the assumptions of the RE model hold (i.e. orthogonality of the individual effects and the regressors) a Hausman test is carried out. As the Hausman test fails to reject the null hypothesis of no correlation between the individual effects and the regressors the RE model is chosen for estimation [32 and 33]. Moreover, we include time dummies in order to account for year-specific effects that may have affected olive oil production and exports across all countries, such as adverse weather events in the Mediterranean region. However, the time dummies do not change the results significantly and are thus not reported (in the following section).

Finally, to ensure that the estimates do not suffer from serial correlation or heteroskedasticity, the Durbin–Watson statistic modified by Bhargava et al.[34] and the Breusch-Pagan test adjusted to the panel data context are used, respectively. Both tests strongly indicate the presence of serial correlation and heteroskedasticity. Based on the test results RE models corrected for serial correlation and heteroskedasticity are estimated by employing panel-corrected standard errors (PCSE).

4 Results

The results of the econometric analysis provide interesting insights on the determinants of olive oil import demand and the olive oil supply chain in Germany and the UK. The statistical tests show that the gravity equation has a good explanatory power over the German and British imports of olive oil. The coefficients have the expected sign and most are statistically significant. Table 3 shows the detailed results of both the single regressions for Germany and the UK as well as the joint regression for the two countries using the PCSE estimation. However, the parameter estimates of the single regression for the UK are noticeably less significant than those for Germany.

The coefficient of the exporters GDP is statistically significant in all regressions and has a positive sign showing that the income of the exporting countries has a positive impact on the olive oil exports (the richer the exporters are, the more they export). The importer's GDP on the other hand is not statistically significant (apart from the single regression for Germany) and has a negative sign. This implies that the level of olive oil imports is not associated with the level of the income of the importing country. This result could be attributed to the fact that in this study the imports are examined for a particular commodity, in a rather disaggregated level, which accounts for only a marginal share of the total imports of Germany and the UK, while the results on the GDPs exporters are statistically significant since olive oil exports have a higher share on the total exports of the respective countries[1].

The elasticity of the GDP per capita is in the case of the exporting countries highly statistically significant and positive while negative and not statistically significant in the case of the importers. The results collide favourably with the results on the coefficients of the nominal GDP. For the exporters the assumption that trade increases with an increase of countries' economic size is confirmed, while for the importers it implies that olive oil is not considered a luxury good by neither German nor British consumers. Regarding the value of the GDP coefficients, they are smaller than one indicating that the larger the economies get, the more olive oil they trade, finding that collides favourably with the findings of Agostino et al.[24].

Among the dummy variables, the highest values have the coefficients of the EU Membership and of the Mediterranean Partnership. This suggests that preferential agreements between countries have the intended effect of the enhancing trade, finding supported by similar studies [11, 22, 25 and 28]. The dummy variable for MPCs is the highest in the single regression for Germany implying that Euromediterranean trade integration is more intense with Germany than the UK. Being a Mediterranean Partner Country enhances olive oil exports to Germany by about 5% and 9% to the UK (although the coefficient for the UK is not statistically significant) and 2.5% for the two countries (joint model). The non significant results for the UK reflect the zero observations because the UK imported continuously after 1995 only from Lebanon and only for specific years from other MPCs with a large share coming from Turkey[1]. The analysis does not allow to distinguish between trade creation and trade diversion effects meaning that (further) Euromediterranean trade integration might have adverse effects on non-Mediterranean olive oil exporters which currently do not benefit from any preferential access to the EU and thus to the markets of Germany

and the UK. However, the fact that the average growth of olive oil imports both in Germany and the UK has been the highest from the MPCs suggests that the importance of trade diversion might be limited.

The estimated coefficients of direct marketing, that is, the retailers buy directly from the exporters and not through importers or brokers, are throughout the regressions statistically significant and suggest that importing directly stimulates trade by about 3.4 resp. 3.7 and 2.8% for the joint model and the single regression for Germany and the UK. Of the same direction but of slightly less magnitude is the value of the dummy variable for tourism, implying that exporting countries that successfully attract German and British tourists can boost exports to those markets by about 2% (average of all regressions). On the other hand the presence of immigrants is by far less important, as the respective dummy variable shows (which is non-significant and positive only for the single regression for Germany). The coefficient of the dummy variable for labelling is statistically significant and negative implying that bulk olive oil has more potential to enter the German and the UK market that packaged. This certainly reflects the current structure of the exporters' supply since apart from Italy and partially Spain, the rest of the countries export bulk olive oil, which is further marketed under brand names or trademarks of the retailers[5]. Consequently, because of the structure of the supply chain the retailers rather than the exporting countries explore the highest benefits in the supply chain. Finally, the parameter estimates of geographical distance and real exchange rate are very small, close to zero, showing that these two variables only marginally affect olive oil imports in Germany and the UK.

Table 3: Estimation results (random effects estimation using panel-corrected standard errors (PCSE))

Variables	Joint regression (UK and Germany)	Single regressions	
		Germany	UK
GDP per capita importing country	-.093	-.613	.059
	(-0.13)	(-0.76)	(0.04)
GDP importing country	-.997	-2.640*	-4.309
	(-0.60)	(-1.73)	(-1.24)
GDP per capita exporting country	.427**	.784***	.480
	(1.99)	(3.61)	(1.16)
GDP exporting country	3.286***	4.943***	6.052**
	(2.92)	(5.71)	(2.13)
Distance	-.001***	-.001***	.0003
	(-3.62)	(-6.66)	(0.54)
Immigrants	-.084	.755	-1.756
	(-0.14)	(1.35)	(-2.04)
EU-Membership	3.332***	2.953***	11.093*
	(3.35)	(4.47)	(1.95)
Mediterranean Partnership	2.575*	5.024***	9.667
	(1.73)	(4.70)	(1.47)
German and/or British tourist to exporting countries	2.031***	2.821***	1.384*
	(4.61)	(6.43)	(1.92)
Direct marketing	3.436***	3.728***	2.809***
	(9.28)	(25.78)	(5.04)
Labelling	-2.462***	-2.944***	-2.635**
	(-4.02)	(-5.98)	(-2.52)
Real Exchange Rate	-9.98e-08	1.83e-06**	2.90e-07
	(-0.18)	(1.96)	(0.90)
Dummy UK	1.121***	-	-
	(2.70)		
Constant	-14.075*	-12.667	-15.115
	(-1.68)	(-1.16)	(-0.85)
R^2	0.706	0.786	0.745
Wald test	734.46 ***	2467.13 ***	454.56 ***
Observations	321	168	153
Countries	17	14	12

Notes: Values in parenthesis are the standard errors of the regression coefficients, *** (**, *) statistically significant at the 99% (95%, 90%) level. The panel-corrected standard errors are corrected for heteroskedastic and contemporaneous correlated disturbances[35] .

Source: Own calculations.

Even though similarities in the olive oil import behaviour and supply chain can be found for several aspects (i.e. the exporter's GDP per capita, direct marketing and labelling) the estimation results clearly emphasize that import patterns and its determinants vary across EU countries. Interestingly, the trade enhancing impact of preferential agreements such as the Barcelona Agreement seems to be very strong in Germany. In fact, the impact of eliminating trade barriers between Germany and non-EU Mediterranean countries even has a stronger effect on Germany's olive oil imports than EU membership. In contrast, while controlling for potential influences such as income and the exporter's geographical proximity to the importing country, no trade enhancing effect of the Barcelona Agreement can be found for the UK. However, the effect of the EU membership seems to be much stronger for the UK (+ 11%) than for Germany (+ 3%).

As Table 2 shows, UK olive oil imports origin from a higher variety of production countries than it is the case for Germany. This might also be the reason for the lower magnitude and significance of the parameter estimates for the UK. As compared to Germany, the data for the UK show a less distinct pattern which renders it more difficult to find common factors that determine olive oil import demand. On the one hand, this finding may reflect differences in the attitude of British versus German consumers. That is, British consumers seem less focussed on Mediterranean production regions than German consumers. Another explanation might be the different marketing channels used in the supply chain in Germany and the UK. In Germany common patterns in import demand are easier to find since the retail market of olive oil is dominated by discounters (mainly ALDI and less Lidl) that buy directly from Mediterranean regions determining thus the import behaviour[5]. On the contrary, in the UK olive oil is marketed mainly by non-discount supermarket chains (such as for example Tesco and Sainsbury) which involve more importers and brokers[6]. This in turn is reflected in the brighter spectrum of exporting countries and the less evident import behaviour patterns.

5 Concluding remarks

Changing consumption patterns in non-traditional consuming countries and the ongoing deepening of the Euromediterranean trade integration influence the structure of import demand for olive oil and thus affect the behaviour of all agents involved in the olive oil supply chain.

In this context the objective of this paper is to empirically analyse the impacts of factors influencing import demand in two of the most important non-traditional countries in terms of consumption growth over the last years, Germany and the UK by employing a gravity approach.

The results suggest that being an EU Member State as well as a Mediterranean Partner Country of the EU have the highest impact on import demand of olive oil in Germany and the UK. Other things being equal, olive oil imports from these countries grew faster than imports from countries which belong neither to the EU nor to MPCs. Even though the deepening of the Barcelona Agreement appears promising for further trade creation (joint regression and single regression for Germany) some doubt on the MPC effect remains as the trade enhancing effect cannot be confirmed for the UK. The estimation exercise thus shows that the positive relationship between the Barcelona Agreement and German olive oil imports from MPCs cannot simply be transferred to other EU member states. This suggests that the success of a preferential agreement has to be evaluated at an individual level.

Further important factors influencing olive oil imports is the marketing channels and in particular direct marketing either from producers or exporters without using importers or other traders in between. Import demand is positively related to tourism (the second important factor) meaning that attracting tourists to the exporting country significantly boost olive oil trade. On the other hand the presence of immigrants from the exporting countries in Germany and the UK seem not to be particularly influential on the level of trade, the same applies to the geographical distance and the real exchange rate.

Regarding the economic size of the exporters, the results show that larger economies among the exporters have more potential to export. Looking at the economic size of the importing countries, the results reveal that olive oil is not seen as a luxury good. This could be attributed to the fact that the exporters sell mostly bulk olive oil that is further packaged and traded with the label of a discounter market name or a different brand name that does not allow to distinguish its geographic origin at once. In this sense it appears that own labelled and packaged olive oil is less successful in entering the German and the UK market compared to bulk. This allows the retailers rather than the exporting countries to reap the highest benefits in the supply chain. A way to reverse this relationship in a way that the producers can enjoy the highest

benefits from selling olive oil would be for the exporting countries to advertise more any regional quality differences and special characteristics and to develop their own brands. This would allow the exporters to sell olive oil in a higher price segment but pre-conditions adequate logistics and infrastructure.

Finally, two limitations of the study at hand should be mentioned. Firstly, the driving forces behind the differences in the factors that determine German and British import patterns need further clarification. Such can be monopolistic or oligopolistic structures from the side of the exporters which allow them to establish trade relationships with certain importers and thus influence up to a large degree the export supply, market power among retailers, influencing import demand or even product differentiation strategies (labelled vs. bulk olive oil) affecting consumer's behaviour, the analysis of which has been beyond the scope of this paper. Secondly, the analysis does not allow to distinguish whether the increasing trade volume following the Barcelona Agreement is based on trade creation and trade diversion effects. Further research is therefore needed to determine whether trade creation rather than trade diversion is the driving force behind this effect. In this context, extending the analysis to the time period prior and after the establishment of the Barcelona Agreement in 1995 would go beyond the identification of integration effects and could provide interesting insights to the question whether the Barcelona Agreement changed the structure of bilateral trade flows between the EU Mediterranean member states vis-à-vis MPCs.

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Appendix

Table 4: Descriptive Statistics

Variable	Mean	Median	Std. Dev.	Minimum	Maximum	Nb. of obs.
Joint model						
Import value[1]	7910062	308413.4	2.06e+07	0	1.35e+08	338
GDP per capita importing country[2]	2116.322	2163.23	561.970	1157.44	3320.91	338
GDP importing country[3]	26726.87	26341.74	4195.889	20268.28	35601.15	338
GDP per capita exporting country	1411.876	385	2714.978	11.119	13807.55	338
GDP exporting country	24889.14	25720.82	8393.465	5494.41	45778.45	338
Exchange rate	48808.67	1.571	262531.6	.534	2528123	337
Distance	1926.5	1113	2193.919	315	9086	338
Immigrants	.808	1	.395	0	1	338
EU	.731	1	.444	0	1	338
MPC	.154	0	.361	0	1	338
German and British tourist to exp. countries	.5	.5	.501	0	1	338
Direct marketing	.077	0	.267	0	1	338
Labelling	.654	1	.476	0	1	338
UK dummy	.462	0	.499	0	1	338
UK model						
Import value UK	8946380	1747499	1.61e+07	1070.853	8.03e+07	143
GDP per capita UK	1757.276	1502.89	495.877	1157.44	2803.4	143
GDP UK	27117.91	26833.06	4734.053	20268.28	35601.15	143
GDP per capita exporting country	1634.719	439.357	2921.083	11.119	13807.55	143
GDP exporting country	24922.24	25324.2	8205.674	7349.7	45778.45	143
Exchange rate	344.227	1.596	858.853	3260.133	1.093	143
Distance	1945.545	1037	2348.318	315	8767	143
Immigrants	.818	1	.387	0	1	143
EU	.818	1	.387	0	1	143
MPC	.091	0	.288	0	1	143
British tourist to exporting countries	.455	0	.500	0	1	143
Direct marketing	.091	0	.288	0	1	143
Labelling	.636	1	.483	0	1	143
German model						
Import value Germany	7659182	161815.8	2.41e+07	323.83	1.35e+08	182
GDP per capita Germany	2424.075	2439.35	413.774	1892.6	3320.91	182
GDP Germany	26391.7	26341.74	3654.288	21423.91	34204.93	182
GDP per capita exporting country	1314.028	360.5	2625.979	94	13807.55	182
GDP exporting country	26001.73	26553.96	7655.366	5494.41	45778.45	182
Exchange rate	30792.02	1.064	131868.9	.534	730548.9	182
Distance	1870.571	1104	2146.701	412	9086	182
Immigrants	.786	1	.411	0	1	182
EU	.714	1	.453	0	1	182
MPC	.143	0	.351	0	1	182
German tourist to exporting countries	.5	.5	.501	0	1	182
Direct marketing	.071	0	.258	0	1	182
Labelling	.714	1	.453	0	1	182

Notes: [1] The import value is in $US; [2] The GPD per capita is based on the purchase power parity (PPP) and is measured in current international dollar; [3] The GDP is in billion $US

Source: Authors' own compilation.