TERRITORIAL COMPETITIVENESS IN EUROPEAN OLIVICOLTURE: AN OUTLOOK THROUGH THE FADN DATABASE

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INTRODUCTION

Olive oil has been defined as a regional production with a global market (Pupo D'andrea 2007), In spite of being produced on a very small scale in well defined geographic range, it is in fact sold world-wide. It is therefore characterized by a plethora of region-specific production techniques, whose adoption is generally determined by cultural and physical factors.
It is in fact likely to find extensive oliviculture in the plain areas of the warm south Mediterranean regions (Andalucia, Puglia) where oliviculture is considered as a valuable source of income, while terraced olive orchards are spread over landscapes with hard acclivity (Liguria) where olive oil production has a mere function of income support (CEC, 2003). In between of these two extreme points lies a large variety of holdings, whose production techniques are determined by the concurrent actions of several factors (e.g: grove acclivity, olive variety, labour forces availability, mechanization etc.).
An increasing number of studies have dealt with European oliviculture and its productions in the last few years, either from a technical perspective or from a market one (Tardaguila et al., 1996; Timesis, 2005, Gabrielli et al., 2008), but no one has put a focus on the economic analysis of the sector.
It could be therefore of a certain interest to draw a comparison between the different local production on the basis of common economic parameters.
Micro economic theory provides a series of tools suitable in outlining efficiency, income capacity and productivity of a specific economic sector in order to appraise a comparison between the different local productions. The aim is to become to a placement of the various regional olivicultures in respect to the competition.
The competitiveness of an economic sector could be appraised both by positioning it in relation to its direct competitors or by *ad hoc* proxies, usually those suitable in outlining efficiency (Vagnozzi, in press).
This paper explores, by mean of these techniques, the competitiveness of European regions with a strong tradition in olive growings in respect the one each other, in order to define and describe strengths and weaknesses of such an important sector in European agriculture.
The study has been run on the basis of indexes derived from the Farm Accountancy Data Network, a precious source of harmonised micro-economic data, based on standardized bookkeeping principles. Proxies are therefore obtained from the balance sheets of agricultural holdings themselves.

MATERIAL AND METHODS

The data concerning the years 2004 – 2005 - 2006 has been extracted from the FADN database website, and then the means of the variables that were going to be entered in the model have been calculated.
The mean values of the three-years period were extracted with the purpose of reducing the variability of the productions which usually characterizes oliviculture. The changes brought by the Fischler reform of the CAP, occurred in 2005, don't affect the analysis because in the totality of the regions that have been considered in this paper the payments have been calculated on historical basis (Roberts & Gunning-Trant, 2007). It's therefore possible to calculate a mean payment on a three years basis and to draw a comparison among European regions.
Only the regions whose data were available for all the three years have been taken in consideration.
The positioning of a region in respect to its competitors has been investigated by mean of the "index of specialization" (IS), (Cagliero & Henke, 2006), it is defined as:

$$IS_i = \frac{\left(\frac{O_i}{H_i}\right)}{\left(\frac{O_{eu}}{H_{eu}}\right)}$$

Where:

O_i is the number of olive-specialist holdings in the *i* region, H_i is the overall number of agricultural holdings in the *i* region while O_{eu} an H_{eu} are respectively the number of olive specialist holdings in the EU and the overall number of agricultural holdings in the EU.
When IS = 1 there's a perfect identity between the regional and communitarian status; on the other hand, if IS > 1 it means that the given region is more specialized in oliviculture than the average European region; otherwise IS < 1.
The IS values have been pooled with those referred to the index (FNVA/TO), expressed in terms of mean distance from European mean value and arranged on a Cartesian plan.

Economical and technical parameters provided by the FADN database can be combined in forming indexes (ratios among variables) capable of offering synthetic informations about farm management, factors productivity, costs and income capacity. Those quotients can be combined in chains of indexes, made by the results of the products of the quotients themselves, which leads to an "head" index which summarizes the informations contained in the chain. Each element of the chain brings along a precise economic meaning, being an essential step in forming the final results.

For the purposes of our work, three indexes chains have been taken in consideration:

$$1) \quad \left(\frac{TO}{UAA}\right) \bullet \left(\frac{UAA}{TLI}\right) = \left(\frac{TO}{TLI}\right)$$

This chain connects land productivity, expressed by the ratio between Utilised Agricultural Area and Total Output, with labour intensity, given instead by the ration between UAA and Total Labour Input, expressed in Annual Working Unit (AWU). The results of the product of the indexes gives the value of labour productivity.

$$2) \quad \left(\frac{GFI}{TO}\right) \bullet \left(\frac{FNVA}{GFI}\right) \bullet \left(\frac{FFI}{FNVA}\right) = \left(\frac{FFI}{TO}\right)$$

The second chain calculates the efficiency of the total expenditure (given by the ratio between Family Farm Income and Total Output) as the result of the product among the incidence of variables costs (the Gross Farm Income/TO index), the incidence of the fixed costs (Family Net Value Added/GFI) and the remuneration of the fixed factors of production owned by the family (labour, land and capitals), given by the quotient (FFI/FNVA). It represents the income capacity of the revenues.

$$3) \quad \left(\frac{TO}{TLI}\right) \bullet \left(\frac{FFI}{TO}\right) \bullet \left(\frac{TLI}{ULI}\right) = \left(\frac{FFI}{ULI}\right)$$

The last index expresses the income capacity of familiar manpower (Unpaid Labour Input) and the remuneration of the fixed factors of production owned by the family. It springs from the product between the two previous "head" indexes and the ratio among Total Labour Input and Unpaid Labour Input.
The results given by the exploitation of the chains have been arranged in a frequency distribution obtained by mean of a Jenk's optimization (natural breaks), which gives groups internally homogeneous but maintains heterogeneity between classes. It is therefore suitable in order to detect coherent sets of items inside a given distribution (Davis, 2003).
Natural breaks defined three groups, where the first collects the observations with the lowest values and the third the highest.

RESULTS

The positioning of the specialization index in respect to the European mean values allows us to "split" the sample in two groups, spread all around the point of intersection of the continuous black lines, representing the European mean values of IS and FNVA/TO.
The first group gathers together Andalucia, Calabria, Peloponissos, Puglia and Liguria: that is, those regions presenting an high index of specialization but an average income capacity (here expressed in terms of distance from the European mean). The second group is composed by regions with an average specialization index but a very variable income capacity. It is possible to identify, in this second category, three further groups.
The first one collects regions with a very low income (Cypreus, Toscana and Abruzzo); the second one has its only representative in Madrid, whose income incomes are the highest in the sample.

The third group is instead constituted by all those regions with an average value of the FNVA/TO. It is worth to note that Italian Regions present a value below European average while the same index is slightly higher in Castilla – La Mancha.

Figure 2 gathers the values of the index (T.O./T.L.I.) for the 15 regions trialled.
The analysis of the steps that contributed in forming the index, clearly shows that the low labour remuneration, which describes the oliviculture of some regions (Cyprus, Peloponissos, Madrid , Tras o Montes), it is not simply due by the low values of the yield. In fact, some regions, although presenting an high remuneration of the land, display an high labour intensity that lowers the TO/TLI values. On the other hand, those regions whose oliviculture is not capable of valuable outputs (Madrid, Tras os Montes) compensate with a very low labour intensity.
The oliviculture of the regions grouped in the category “1” by the natural breaks routine could therefore be defined as “structurally weak”.
Group three collects all the regions whose oliviculture presents a very high remuneration of the land and, therefore, of the labour input. It gathers all the Italian regions but Liguria. Abruzzo e Campania. It could defined as “quality oliviculture” because of the high value granted to the productions.
All the regions belonging to group 2, instead, present some transitionary feature between the two categories described above. Castilla- La Mancha, for instance, combines a low output value with an high labour intensity and, on the other hand, Liguria joins the highest land remuneration with the lowest labour intensity.
Anywhere oliviculture has a low land productivity (Madrid, Castilla-La Mancha, Extremadura and Tras os Montes), growing techniques are characterized by low labour input and a subsequent increase in labour intensity. In those regions olive growing could be described as “extensive”.
Data exposed in Figure 2 also show that, in spite of the high labour intensity, work is not well-remunerated wherever productions have a scarce value (i.e.: Tras-os-Montes/Beira interior). On the other hand, where outputs are guaranteed with an high price (such as Italian Region) labour inputs are well paid, even in case of evident over-employment, as it seems to happen in Liguria, where olive growings present the highest outputs in the sample.

Figure 3 shows how much of the total output becomes entrepreneur’s remuneration.
In some regions (Greece, Portugal, Spain) public intervention has a major role in raising incomes; in these places the index GFI/TO is greater that the unity because the amount of the subsidies overcomes the overall value of the specific costs and overheads.
Italian oliviculture is characterized by an heavy incidence of fixed and variable costs, even anywhere farm subsidies are large enough to compensate specific costs (Calabria)
Madrid, Castilla-la Mancha and, above all, Andalucia instead distinguish themselves for the high incidence of the Farm Net Value Added on the Gross Farm Income, given most especially by the more efficient production method which is able to guarantee a more rational allocation of the fixed factors of production.
Andalucia, however, presents a low incidence of the Family Farm Income on the Total Output attributable to the weight of the Remuneration to fixed factors of production which are not property of the holder (work, land and capital).
The weight of the remuneration of the fixed factors of production owned by the entrepreneur's family is particularly penalizing for Toscana, Abruzzo and Tras os montes.
The low value of the index FFI/TO describes farms with a scarce attitude in containing the overall expenditure, like the Italian ones. It could be also a symptom of the scarce investments in the holdings themselves, as the index is shaped with the contribution of the overall value of the subsidies on investments granted to eligible holdings. The analysis therefore shows a very low attitude to farm improvements for some italian region (with the exception of Calabria); and, on the opposite, a strong tendency to the investment for Peloponissos and Spanish regions.
Cyprus and Toscana could be therefore gathered in a group whose productions value can’t compensate the costs, while in group three can be found all those regions where oliviculture benefits of a large amount of subsidies and moreover presents a viable strategy of costs containment.
In group two, instead, are collected the regions where production techniques are burdened by the costs of the remuneration of the fixed factors (either external or family factors), hardly covered by the high value of the productions.
Figure 4 shows the trend of the quotient (F.F.I./U.L.I.). It essentially provides a measure of the income capacity of family-run holdings.
The most profitable holdings are also those with the highest productions value per Total Labour Input (Umbria, Calabria, Puglia and Andalucia) , where family incomes spring above all from the high value granted to the local production. Scarce output values generate low Family incomes, even if the greater part of the manpower comes from the entrepreneur’s family as it happens, for instance, in the Madrid region, where, moreover, incomes are beneficiary of the highest farm subsidies.

The low value of the FFI/TO index compromises the remuneration of the Unpaid Labour Input manpower in Cyprus and Tras os Montes, while the incidence of the total expenditure penalizes the incomes of Toscana and Abruzzo.

DISCUSSION

The comparison between regions with such different economic results, suggests that a great number of variables concurs in creating the revenues of an olive-specialized holding.
As a rule of thumb it could be said that efficient production techniques bring to a lesser global expenditure that, in turn, generate high income (FFI/ULI). In fact Regions with high labour intensity (Spanish regions, Calabria) are likely to produce an high income per person by reducing specific costs. On the other hand, in regions where yields guarantee an high value of TO/TLI a bad management of the production cycle could result in a low remuneration of family work (Italian regions)
The regions analysed could therefore be split in two groups: the first one gathers all those regions whose production strategy aims to costs containment (Spanish regions, Calabria) while the other one achieves higher incomes by enhancing the value of the productions. Olive growings with structural flaws are likely to belong to the second group. Italian regions (with the exception of Calabria) constitute a case in point, as their incomes are heavily burdened by the total expenditure. Moreover, these farms are largely dependent by paid manpower (TLI/ULI), denoting a scarce attitude to production cycle rationalization.
First group olive farms, instead, are very labour intensive (presumably because of the high mechanization of the groves) and present a ratio TLI/ULI very close to the unity. Nevertheless, public intervention has a fundamental role in shaping the economic results, in some cases becoming responsible of an actual support to productions of scarce value (e.g.:Madrid). Wherever public helps are not so massive, in fact, the FFI/TO value is lower (Andalucia).
Region applying specific policies aimed to promote the value of the productions in order to guarantee an high income per labour unit (Italian regions, Peloponissos) are gathered in the second group. Speaking of this, it is quite interesting to notice that Italy hosts the 42,5% of the European PDO/PGI designations for olive oil, followed by Greece with the 29% (Viganò, 2006). The strategy (which is not substituting public supports), put into practice in Italy and Greece, therefore consists in the commercial qualification of the production by mean of territorial certification.
Calabria and Andalucia could be defined as a “watershed” regions. Italian region presents cost effective productions, but are very dependent by external manpower, while Andalucian oliviculture, even if characterized by a remuneration of the land and a recourse to paid manpower comparable to Italian growings; nevertheless it has a low incidence of specific costs which greatly contribute in the rising of the incomes.
The two groups defined here above identify two ways of cope with the competition. It is evident, by the data concerning annual yield and olives commercial balance (INEA, 2008; Asoliva, 2008), that cost containment is the more successful one.
It is clear that to a greater specialization corresponds a greater value of the index FFI/TO. As shown by figure 1, in fact, 4 out of 5 of the regions where oliviculture grants a better remuneration of the productions are also those with a greater specialization (Andalucia, Calabria, Peloponissos, Liguria). The only exception is constituted by those regions, whose incomes, as seen here above, are sustained with a massive contribution of public subsidies (Madris, Castilla – La Mancha).
It is therefore clear that regions with a strong tradition in olive growing are also those which are likely to better deal with the globalized market. Moreover, highly specialized territories are likely to favour costs containment. However the way this happens should be investigated by further researches.

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Fig.1: Positioning of european regions by Specialization Index and FNVA/TO

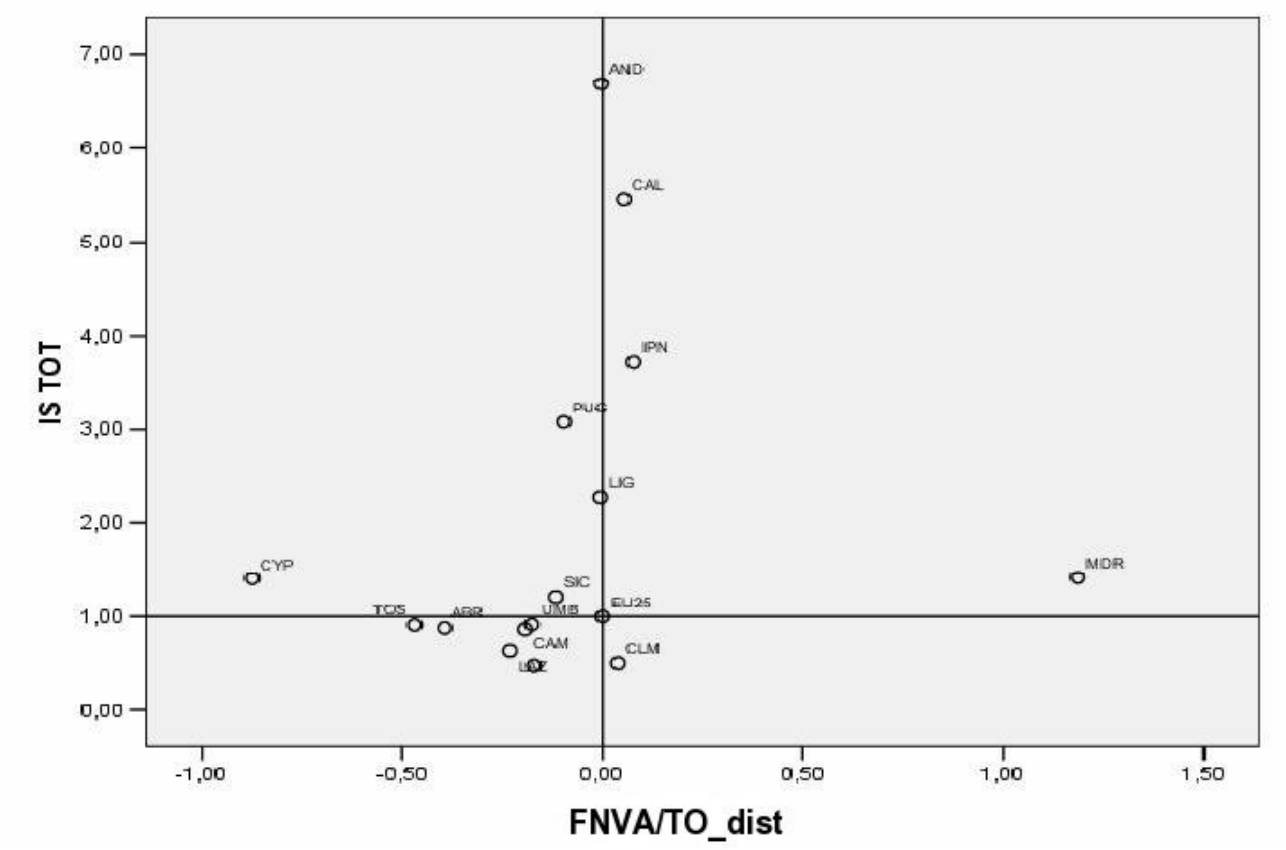
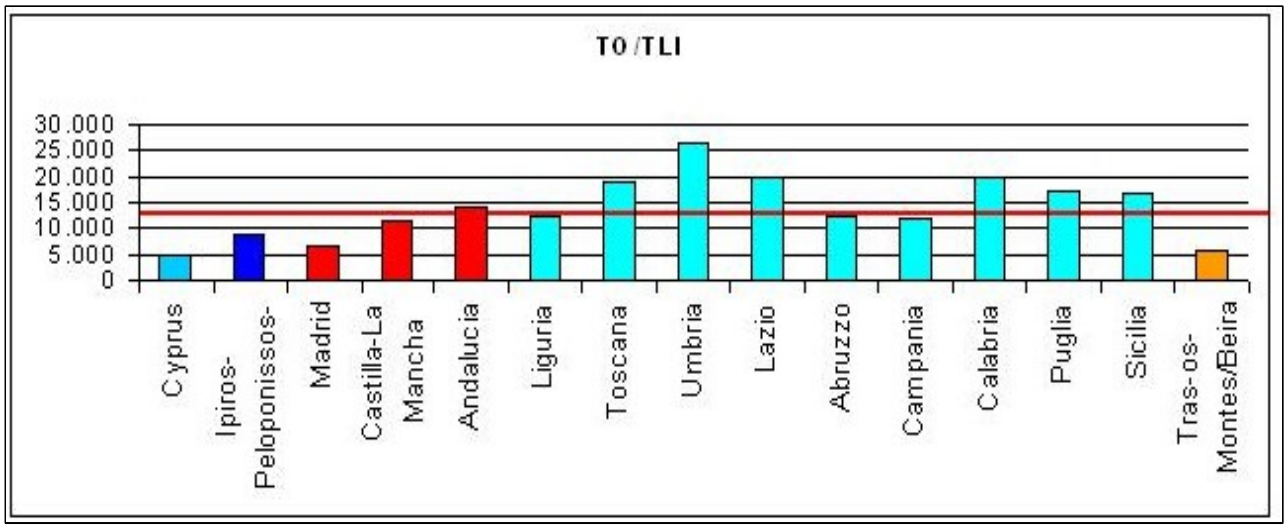
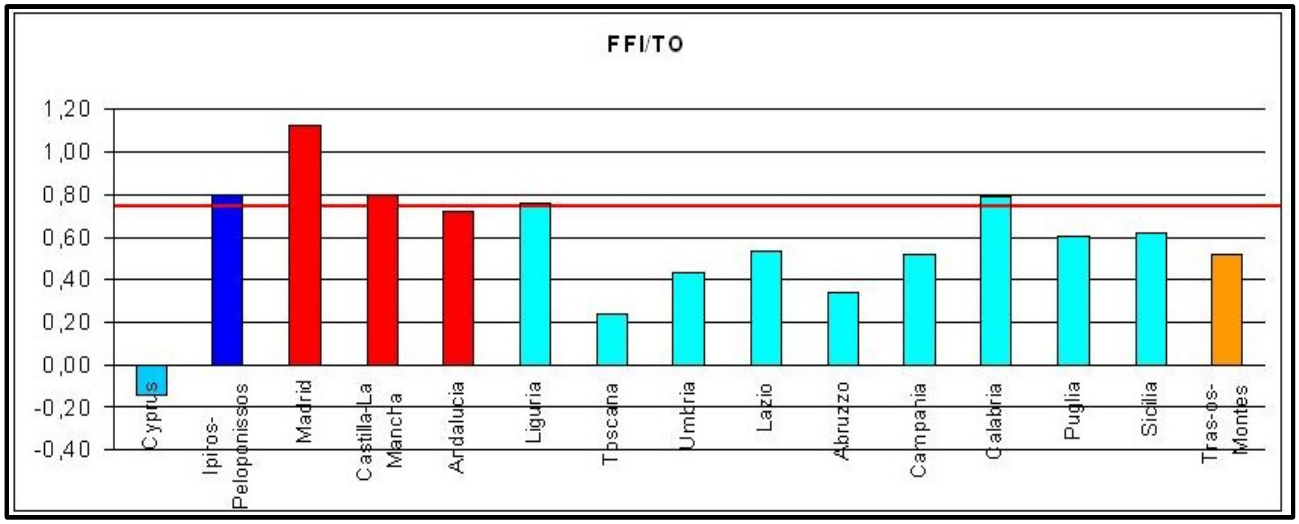


Fig. 2: Graphical representation of the TO/TLI index per region



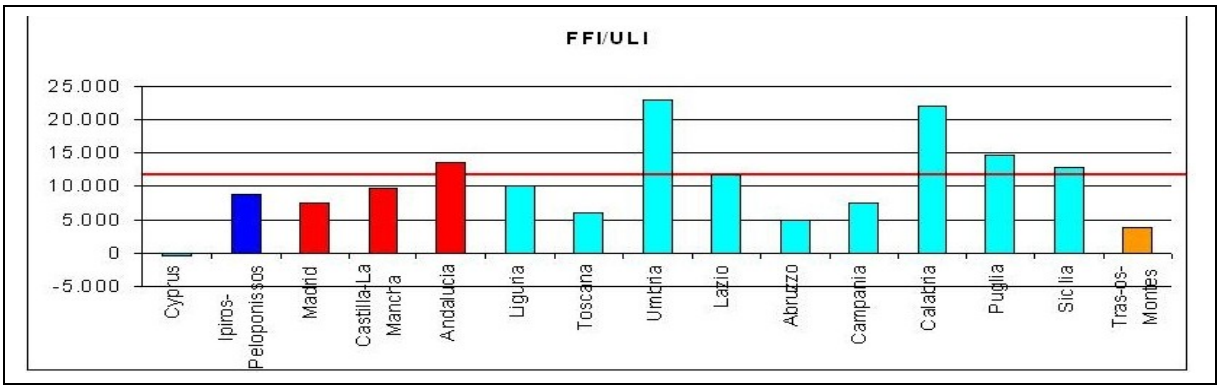
REGION		TO/UAA	UAA/TLI	TO/TLI	Jenk's
(740) Cyprus	CYP	1.295	3,96	5.038	1
(460) Ipiros-Peloponissos-Nissi Ioniou	IPN	2.045	4,39	8.982	1
(550) Madrid	MDR	651	10,43	6.482	1
(555) Castilla-La Mancha	CLM	1.210	10,28	11.603	2
(575) Andalucia	AND	1.689	8,45	14.302	2
(250) Liguria	LIG	5.608	2,23	12.472	2
(270) Toscana	TOS	2.547	7,43	18.890	3
(282) Umbria	UMB	2.251	11,50	26.562	3
(291) Lazio	LAZ	2.841	6,97	19.775	3
(292) Abruzzo	ABR	1.787	7,02	12.439	2
(302) Campania	CAM	2.880	4,35	12.053	2
(303) Calabria	CAL	3.488	5,64	19.682	3
(311) Puglia	PUG	1.684	10,22	17.201	3
(320) Sicilia	SIC	2.345	7,34	16.837	3
(620) Tras-os-Montes/Beira interior	TMB	309	18,40	5.700	1

Fig. 3: Graphical representation of the FFI/TO index per region



REGION		GFI/TO	FNVA/GFI	FFI/FNVA	FFI/TO	Jenk's
(740) Cyprus	CYP	0,92	-0,05	0,76	-0,03	1
(460) Ipiros-Peloponissos-Nissi Ioniou	IPN	1,06	0,87	0,86	0,79	3
(550) Madrid	MDR	1,55	0,88	0,88	1,20	3
(555) Castilla-La Mancha	CLM	1,07	0,81	0,93	0,80	3
(575) Andalucia	AND	0,99	0,94	0,77	0,72	3
(250) Liguria	LIG	0,90	0,87	0,97	0,76	3
(270) Toscana	TOS	0,72	0,67	0,48	0,23	1
(282) Umbria	UMB	0,90	0,81	0,60	0,44	2
(291) Lazio	LAZ	0,80	0,76	0,86	0,53	2
(292) Abruzzo	ABR	0,75	0,66	0,68	0,34	2
(302) Campania	CAM	0,88	0,78	0,76	0,52	2
(303) Calabria	CAL	1,03	0,91	0,85	0,79	3
(311) Puglia	PUG	1,03	0,81	0,73	0,61	2
(320) Sicilia	SIC	0,89	0,87	0,81	0,62	2
(620) Tras-os-Montes/Beira interior	TMB	1,24	0,74	0,56	0,51	2

Fig. 4: Graphical representation of the TLI/ULI index per region



REGION		TO/TLI	FFI/TO	TLI/ULI	FFI/ULI	Jenk's
(740) Cyprus	CYP	5.038	-0,03	1,07	-178	1
(460) Ipiros-Peloponissos-Nissi Ioniou	IPNMD	8.982	0,79	1,18	8.446	2
(550) Madrid	MDR	6.482	1,20	1,04	8.101	2
(555) Castilla-La Mancha	CLM	11.603	0,80	1,06	9.815	2
(575) Andalucia	AND	14.302	0,72	1,31	13.431	2
(250) Liguria	LIG	12.472	0,76	1,07	10.096	2
(270) Toscana	TOSUM	18.890	0,23	1,33	5.806	1
(282) Umbria	B	26.562	0,44	1,95	22.612	3
(291) Lazio	LAZ	19.775	0,53	1,13	11.710	2
(292) Abruzzo	ABRCA	12.439	0,34	1,15	4.789	1
(302) Campania	M	12.053	0,52	1,21	7.547	2
(303) Calabria	CAL	19.682	0,79	1,40	21.841	3
(311) Puglia	PUG	17.201	0,61	1,40	14.631	2
(320) Sicilia	SIC	16.837	0,62	1,23	12.779	2
(620) Tras-os-Montes/Beira interior	TMB	5.700	0,51	1,33	3.891	1