

Working paper Cnr-Ceris, N.10/2014

MAPPING THE ENVIRONMENTAL PRESSURE
DUE TO ECONOMIC FACTORS. THE CASE
OF ITALIAN COASTAL MUNICIPALITIES.

Marco Modica, Elena Pagliarino, Roberto Zoboli

**Working
Paper**

**WORKING PAPER CNR - CERIS**

RIVISTA SOGGETTA A REFERAGGIO INTERNO ED ESTERNO

ANNO 16, N° 10 – 2014

Autorizzazione del Tribunale di Torino
N. 2681 del 28 marzo 1977ISSN (print): 1591-0709
ISSN (on line): 2036-8216**DIRETTORE RESPONSABILE**

Secondo Rolfo

DIREZIONE E REDAZIONE*Cnr-Ceris*Via Real Collegio, 30
10024 Moncalieri (Torino), Italy

Tel. +39 011 6824.911

Fax +39 011 6824.966

segreteria@ceris.cnr.itwww.ceris.cnr.it**SEDE DI ROMA**

Via dei Taurini, 19

00185 Roma, Italy

Tel. +39 06 49937810

Fax +39 06 49937884

SEDE DI MILANO

Via Bassini, 15

20121 Milano, Italy

tel. +39 02 23699501

Fax +39 02 23699530

SEGRETERIA DI REDAZIONE

Enrico Viarisio

e.viarisio@ceris.cnr.it**DISTRIBUZIONE**

On line:

www.ceris.cnr.it/index.php?option=com_content&task=section&id=4&Itemid=64**FOTOCOMPOSIZIONE E IMPAGINAZIONE**

In proprio

Finito di stampare nel mese di Luglio 2014

COMITATO SCIENTIFICO

Secondo Rolfo

Giuseppe Calabrese

Elena Ragazzi

Maurizio Rocchi

Giampaolo Vitali

Roberto Zoboli

Copyright © 2014 by Cnr-CerisAll rights reserved. Parts of this paper may be reproduced with the permission of the author(s) and quoting the source.
Tutti i diritti riservati. Parti di quest'articolo possono essere riprodotte previa autorizzazione citando la fonte.

Mapping the environmental pressure due to economic factors. The case of Italian coastal municipalities.


Marco Modica, Elena Pagliarino, Roberto Zoboli

*National Research Council of Italy
Institute for Economic Research on Firm and Growth*

CNR-Ceris Via Bassini 15,
20133 Milano, Italy

CNR-Ceris, via Real Collegio 30,
10024 Moncalieri (To), Italy

* Corresponding author: m.modica@ceris.cnr.it

 02-23699.501

ABSTRACT: In this paper we map the main economics characteristics that may impact the environment of the Italian coastal municipalities. The mapping aims at quantitatively characterizing the main characteristics of the coastal municipalities from the point of view of sector specialization. More in details, in this work, first we briefly quantified settlement pressure on the Italian coasts, then we provide a detailed analysis of economic specializations by sectors of coastal municipalities. Finally, we develop a more specific analysis on the specialization and dependence of coastal municipalities. This latter study is based on the classification of two specific groups of economic sectors: i) those that depend on the sea as the primary source input (tangible and intangible) and ii) those that do not depend on the sea but that have high environmental pressures. This second set of sectors can have adverse impacts, direct and indirect, on the marine and coastal environment - and consequently on the 'marine' sectors. We then provide evidence of the relationship between sectors depending from the sea, i.e. 'marine' sectors and sectors that have a high pressure on the environment, i.e. 'high pressure' sectors in coastal municipalities. The analysis is based on municipal data of the Census of Industry and Services of 2011 provided by ISTAT on seven selected Italian regions: Campania, Emilia Romagna, Friuli-Venezia Giulia, Liguria, Apulia, Sardinia and Veneto. The choice fell on them because of their regional peculiarities in terms of length of coastal territory, number of coastal municipalities and ratio between coastal areas and hinterland areas.

KEYWORDS: Italian coasts, economic specialization, environmental pressure, dependence on the sea

JEL Codes: Q20, R11.

The research described in this paper was supported by the Project "Bandiera (Flagship) RITMARE - La Ricerca Italiana per il Mare (The Italian Research for the Sea)" coordinated by the National Research Council of Italy and funded by the Italian Ministry for Education, University and Research, under the National Research Program 2011-2013.

CONTENTS

1. INTRODUCTION 5

2. The regions under analysis: the description of the contrasts between coastal and non-coastal municipalities..... 7

 2.1 *Absolute economic specialization* 10

 2.2 *Relative economic specialization* 13

3. Economic dependence on marine resources and areas of high environmental pressure 17

 3.1 *Campania*..... 20

 3.1.1 Economic dependence on marine resources 20

 3.1.2 Dependence on sectors with high environmental pressure 20

 3.2 *Liguria*..... 23

 3.2.1 Economic dependence on marine resources 23

 3.2.2 Dependence on sectors with high environmental pressure 23

 3.3 *Apulia*..... 26

 3.3.1 Economic dependence on marine resources 26

 3.3.2 Dependence on sectors with high environmental pressure 26

 3.4 *Sardinia*..... 29

 3.4.1 Economic dependence on marine resources 29

 3.4.2 Dependence on sectors with high environmental pressure 30

 3.5 *The regions overlooking the North Adriatic sea: Emilia-Romagna, Friuli-Venezia Giulia, Veneto* 33

 3.5.1 Economic dependence on marine resources 33

 3.5.2 Dependence on sectors with high environmental pressure 34

4. Conclusion 38

References 39

1. INTRODUCTION

Coastal municipalities in Italy are 645, less than 8% compared to the 8,093 Italian municipalities (2011).¹ They cover an area of 43,121 km², which represents 14.2% of the national territory (with an average area of about 67 km² compared to a national average of 37 km²). In coastal municipalities resides a population of 16.6 million of inhabitants in 2011, accounting for about 28% of the Italian population (Table 1).

The coastal municipalities have therefore a very high average population density, equal to 387 inhabitants per km² while the national average is of 197 inhabitants per km². This evidence immediately suggests a high human pressure on coastal areas resulting from longstanding economic and demographic Italian development. To provide a simple example, the Italian population density has increased between 2001 and 2011 of 7 inhabitants per km² in the coastal municipalities (on average), compared to an increase of 8 inhabitants per km² considering all the Italian territory (on average), a fact that suggests a relative slowing of the dynamics of settlement in the coast.

However, Italian coastal municipalities include some large cities, which could bias the aggregate data. Thus Table 1 shows the same values shown before by excluding the city (coastal and non-coastal) with more than 500,000 inhabitants. In the case of coastal municipalities it comes to Genoa, Rome, Naples and Palermo.

In this estimate, the coastal municipalities occupy 13.7% of the Italian territory, with 22.6% of the population (11.8 million inhabitants) living there, which leads to a population density of about 287 inhabitants / km² while the national average, calculated with homogenous standard, is of 174 inhabitants / km². At the same time, the change in population density between 2001 and 2011 (excluding the large cities) is higher (8 inhabitants / km²) compared to the figure that includes the big cities, a sign that the pressure of settlement on the four large coastal cities above has slowed more than in coastal municipalities.

It also should be noted that the four coastal cities excluded account for around 4.8 million inhabitants, almost 29% of all coastal municipalities, and this has a complex influence on the economic characterization of coastal municipalities, in particular in the case of Lazio (Rome) and Campania (Naples).

So, even excluding the larger coastal cities, the relative density of the coastal municipalities is still very high compared to the national average density (both with and without the big cities) and it is still increasing. Figure 1 shows the map of population density of Italian municipalities. The highest population density is concentrated in the larger municipalities as Genoa, Milan, Naples, Palermo, Rome and Turin, four of these are classified as coastal municipalities (Genoa, Naples, Palermo and Rome). So these early data shows a first evidence for which the coastal municipalities seem to attract more importance than non-coastal.

¹ Coastal municipalities are those defined as 'litoranei' by Istat, meaning those whose borders are touched by the sea.

Tab. 1 Italian coastal municipalities in 2011 (Elaboration from ISTAT).

	Number	Size (km ²)	Population	Density (inhab/km ²)	Variation of population density 2011-2001
Italy	8,093	302,072	59,433,744	196.75	+8.0
Costal municipalities	645	43,121	16,671,831	386.62	+7.0
% Coastal	7.97	14.28	28.05	-	-
Italy (>500,000 inhabs excluded)	8,087	299,953	52,496,335	173.8	+8.2
Coastal (>500,000 inhabs excluded)	641	41,314	11,848,912	286.8	+7.9
%Coastal (>500,000 inhabs excluded)	7.92	13.77	22.57	-	-

The goal of the analysis is to provide a characterization of the Italian coastal municipalities allowing to highlight their specialization in terms of economic activities and economic dependence on marine production sectors. Moreover, we also highlight the environmental pressure due to high pollutant sectors in the coastal

municipalities. We then will be able to determine the presence of coastal areas that are subjected to a strong environmental pressure due to both the impact caused by the economic sectors depending on the sea and the high impact sectors and we can also have evidence of a possible interrelation between the two groups of sectors.

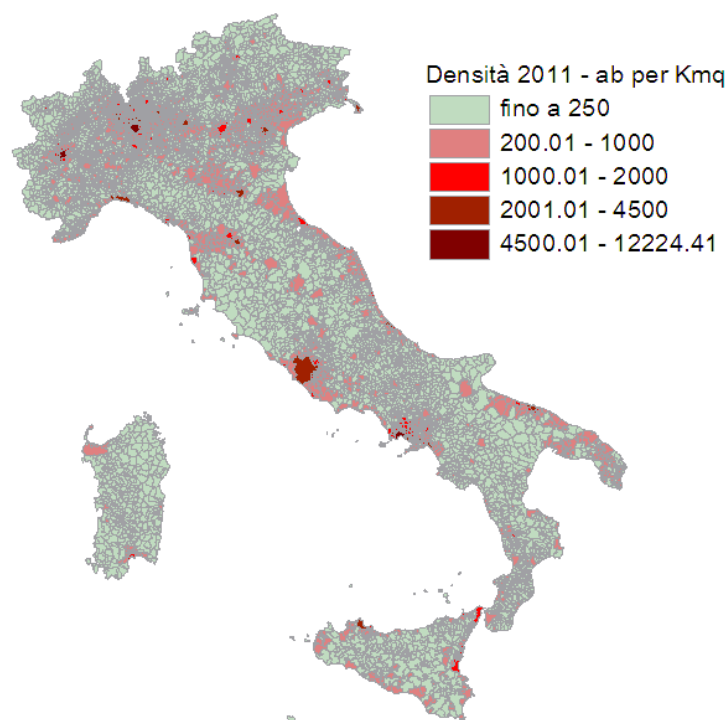


Fig. 1 Population density in Italian coastal municipalities, 2011.

The data used in this analysis come from the Census of Industries and Services developed by ISTAT in 2011. These data provide a very detailed information at municipality scale on the characteristic of firms and employments that could be sufficient to characterize municipalities in terms of productive structure.

The Census data are available at the municipal level for 352 sectors ATECO 2007 (at different levels of aggregation for Sections, Divisions, Groups), by size class (15 classes), by type of legal form (12 types) and other features. For our purposes we have used data on total employees for municipality for each sector ATECO 2007 (with a selection of 120 areas in the levels of aggregation among the three available).

The analysis is conducted on seven Italian regions Campania, Emilia Romagna, Friuli-Venezia Giulia, Liguria, Apulia, Sardinia and Veneto because they are the regions that have the most peculiar characteristics throughout the country in terms of length of coastal territory, number of coastal municipalities and ratio between coastal areas and hinterland areas.

This work provides a complete and updated map on the characteristics of the coastal municipalities and economic areas they belong. It also provides a consistent and clear indication on the human pressure and the possible environmental impact on the coastal areas of the regions object of study.

In this way this paper might be considered as an useful tool for implementing policies that reduce the environmental impact and the exploitation of areas largely populated which turn out to be the coastal areas.

2. THE REGIONS UNDER ANALYSIS: THE DESCRIPTION OF THE CONTRASTS BETWEEN COASTAL AND NON-COASTAL MUNICIPALITIES

The main population data are available in Table 2 and are based on the data of the Census of population and housing of 2011 carried out by ISTAT.

Campania is made up of 551 municipalities, 60 of which are classified coastal. These cover a small part of the entire region, that is 13% corresponding to an area of 1748 km². However, in terms of population there lies more than 38% of the population (2,153,646). Then, Campania is characterized by a high population density, 421.83 / km², which increases to 1214.32 inhabitants / km² if only data relating to coastal municipalities are taken into account. Emilia Romagna consists of 348 municipalities but only 14 are classified as coastal. These cover a small part of the entire region, that is the 7% of entire territory corresponding to an area of 1523 km². In terms of population no more than 12% of the entire population (506,031) lies in those municipalities. Nevertheless, the Emilia-Romagna region is characterized by a high population density in the coastal municipalities, 332.21 inhabitants / km².

Friuli-Venezia Giulia has 218 municipalities, 9 of which are classified as coastal. In terms of area they cover only 6% of the entire land of the region (434.30 km²) but there reside a population of 24% of the total (288,490). Note that Friuli-Venezia Giulia, in contrast to the other two regions that make up the area of the northern Adriatic (Emilia Romagna and Veneto) is

characterized by a relatively low population density (less than the national average) of 155.04 inhabitants / km² but a coastal population density about twice that of the national average (664.27 inhabitants / km²) and far superior to the other two regions.

As for the Liguria, of its 235 municipalities, 63 are coastal. They cover 24% of the region (5416.2 km²) but reside there more than 80% of the total regional population (1,262,633 inhabitants). This results in a population density in coastal municipalities exceptionally high, 955.2 / km² in 2011 (about 5 times the Italian average and about 2.5 times the average of the Italian coastal municipalities). The non-coastal areas instead show a much lower population density of about 75 inhabitants / km². This indicator, which reflects in part the historic depopulation process of the hinterland of Liguria, immediately suggests a strong human pressure on the coast.

Apulia is made up of 258 municipalities, 67 of which are classified as coastal (municipalities). These represent the 31% of the whole territory (5993.03 km²) and are inhabited by the half of the regional population (1,701,712 people). Given this data, Apulia is characterized by a residential density, 207.39 inhab/km², that is a bit higher than the Italian average. This density increases to 283.95 inhab/km² in coastal municipalities. This latter value is lower than the average value of the Italian coastal municipalities. We can infer, therefore, that the coast, even if subjected to a stronger anthropological pressure than the hinterland, has a population consistent with the rest of Italy. Sardinia is made up of 374 municipalities, 70 of which are classified as coastal (municipalities). These represent the

31% of the whole territory (7452.70 km²) and are inhabited by a bit more than the half of the regional population (835,039 people). Despite this, Sardinia is characterized by a low residential density, 68.02 inhab/km², which increases to 112.05 inhab/km² if we consider the data referring merely to the coastal municipalities, data which, in any case, are by far lower than the Italian average (about three times lower of both the Italian and the Italian coastal municipalities averages). But, if we compare this evidence with the data referring to the hinterland municipalities, that have a residential density of 48.32 inhab/km², we can conclude that the coast is subject to a stronger anthropological pressure.

Veneto is made up of 581 municipalities, 11 of which are classified as coastal. These represent the 9% of the entire regional territory, equal to a surface of 1654 km², and also in terms of population there is not more than the 9% of the whole population (420,986). Moreover, Veneto is characterized by a residential density not very different from the Italian average: 254.44 inhab/km² in the coastal municipalities, which is a bit lower than the value of the non-coastal municipalities (264.80 inhab/km²). In this situation the anthropological pressure is higher in the hinterland than in the coast.

This evidence shows that even if the total surface of coastal municipalities cover only a small part of the entire regional area however, coastal municipalities are almost always subject to a strong human pressure greater than that of non-coastal areas. These data, however, reflect only the demographic characteristics. Regarding the economic data, there are some differences.

Tab. 2 Coastal and non-coastal municipalities of the selected regions, 2011.

	Number	Size (km ²)	Population	Density (inhab/km ²)	Employment
CAMPANIA					
Total	551	13670.95	5766810	421.83	939776
Coastal	60	1748.02	2153646	1214.32	404103
Non Coastal	491	11922.98	3548285	421.83	505673
% Coastal	11	13	38	-	43
Main city		119.02	962003	808270	-
EMILIA ROMAGNA					
Total	348	22452.78	4342135	193.39	1518243
Coastal	14	1523.23	506031	332.21	151824
Non Coastal	334	20929.55	3836104	183.29	1366419
% Coastal	4	7	12	-	10
Main city		140.86	371377	263650	
FRIULI-VENEZIA GIULIA					
Total	218	7862.30	1218985	155.04	80450
Coastal	9	434.30	288490	664.27	18504
Non Coastal	209	7428.01	930495	125.27	61943
% Coastal	4	6	24	-	23
Main city		85.10	202123	237512	
LIGURIA					
Total	235	5416.21	1570694	289.99	433371
Coastal	63	1321.82	1262633	955.22	372700
Non Coastal	172	4094.40	308061	75.23	60671
% Coastal	27	24	80		86
Main city		240.29	586180	2439	
APULIA					
Total	258	19540.90	4052566	207.39	700432
Coastal	67	5993.03	1701712	283.95	316009
Non Coastal	191	13547.87	2350854	173.52	384421
% Coastal	26	31	42	-	45
Main city		117.39	316532	269642	
SARDINIA					
Total	376	24100.02	1639362	68.02	294992
Coastal	70	7452.70	835039	112.05	184472
Non Coastal	306	16647.32	804323	48.32	110520
% Coastal	19	31	51	-	63
Main city		85.45	149883	1763	
VENETO					
Total	581	18407.42	4857210	263.87	1642359
Coastal	11	1654.57	420986	254.44	144527
Non Coastal	570	16752.84	4436224	264.80	1497832
% Coastal	2	9	9	-	8
Main city		415.90	261362	62843	

According to the Census of Industries and Services developed by Istat in 2011, in Campania the employees in all sectors were 939,776 (17% of the total regional population), of these, 43% of the total were employed in activities located in coastal municipalities. This indicates an even higher density of employment for coastal municipalities, albeit slightly, with respect to the population density and, therefore, these coastal municipalities could be thought as net attractors of work.

In Emilia-Romagna the employees in all sectors were 1,518,243 (35% of the population), of these, about 10% of the total were employed in businesses located in coastal municipalities. This value still indicates a lower density of employment than population density and therefore, the coastal municipalities of Emilia Romagna might be seen as net "exporters" of work.

In Friuli-Venezia Giulia, the employees in all sectors were 352,169 (29% of the population). Of these the 23% of the total were employed in activities located in coastal municipalities (net attractors of work). In Liguria the employees in all sectors were 433,371 (28% of the population). The 86% of the total were employed in businesses located in coastal (net attractors of work). Apulia has 700,432 employed which represent about 17% of the entire population. Of these, 316,009 were employed in companies located in the coastal municipalities, a value equal to 45% of the total (net exporters of work).

Sardinia has 294,992 employed which represent about 18% of the entire population. Of these, 184,472 were employed in companies located in the

coastal municipalities, a value equal to 63% of the total (net attractors of work).

In Veneto, finally, the employees in all sectors were 1,642,359 (34% of the population). Of these, 144,527 (8% of the total) were employed in businesses located in coastal municipalities. Value that still indicates a density of employment in line with the population density. These data therefore draw a very heterogeneous picture between regions.

2.1 Absolute economic specialization

A first indicator of (absolute) specialization is represented by the percentage of each sector on the employment in the municipality. The main results are presented as the average of all municipalities of a region in Tab.3.

In Campania, considering the major sectors as presented by ATECO 2007, the primary sector (agriculture, forestry and fishing) represents an average of 1,53% of the whole municipal employment in the coastal municipalities with respect to about 0,6% in the non-coastal municipalities. Almost all the manufacturing sectors have a higher average of the percentage of the employment in the non-coastal municipalities than in the coastal ones. On the contrary, most of services have a higher average of the percentage of the employment in the coastal municipalities than in the non-coastal ones. More specifically, the trade represents a very high level of employment in the coastal municipalities (an average of 27,32% with respect to the 26,98% in the non-coastal municipalities), and the same happens in the sector of tourism.

Tab. 3 Average share of employment of productive sectors of coastal municipalities of the regions under study and comparison with common non-coastal, %, 2011 for some selected sectors.

Comuni costieri	Addetti totali	A: Agricoltura	03: Pesca	B: Estrazioni	C: Manifattura	D: Energia	E: Acqua e rifiuti	F: Costruzioni	G: Commercio	H: Trasporto	I: Servizi di alloggio e ristorazione	J: Servizi di informazione	K: Attività finanziarie	L: Attività immobiliari	M: Attività professionali, scientifiche e tecniche	P: Istruzione	Q: Sanità
Campania	939776	0.28	0.14	0.06	16.32	0.18	1.83	10.66	27.01	7.41	7.36	1.49	2.22	0.96	7.49	1.12	4.91
<i>Average for coastal</i>	-	1.54	1.40	0.04	9.79	0.03	1.43	13.15	27.32	4.34	18.28	1.17	1.16	0.99	7.13	0.52	4.39
<i>Average for non-coastal</i>	-	0.64	0.01	0.16	19.71	0.06	1.02	17.22	26.98	4.51	9.08	0.68	1.04	0.44	7.32	0.78	4.16
Emilia Romagna	1518243	0.45	0.20	0.08	29.84	0.42	0.50	8.88	19.26	4.97	8.38	2.15	3.39	2.26	6.52	0.30	2.82
<i>Average for coastal</i>	-	5.99	5.74	0.04	16.84	0.05	1.00	10.67	22.38	3.54	15.09	1.30	1.66	4.70	5.32	0.21	2.41
<i>Average for non-coastal</i>	-	0.79	0.07	0.16	35.91	0.09	0.61	14.05	18.11	4.80	9.16	1.07	0.86	1.70	4.24	0.20	2.31
Friuli-Venezia Giulia	352169	0.48	0.21	0.08	31.76	0.20	0.99	9.61	17.32	4.18	7.19	2.07	5.41	1.74	6.72	0.35	3.12
<i>Average for coastal</i>	-	6.53	6.31	0.02	15.13	0.02	0.59	12.50	20.46	3.26	15.96	1.72	3.47	3.16	5.70	0.33	4.02
<i>Average for non-coastal</i>	-	1.22	0.09	0.26	31.91	0.35	0.41	16.06	17.71	3.09	12.84	0.89	1.12	1.36	4.61	0.41	2.17
Liguria	433371	0.25	0.17	0.08	18.11	0.29	1.37	10.30	20.58	8.97	8.97	1.76	3.04	2.15	7.91	0.34	3.09
<i>Average for coastal</i>	-	0.60	0.55	0.15	8.64	0.08	0.57	14.35	24.35	3.72	22.35	1.19	1.09	3.57	6.34	0.30	2.94
<i>Average for non-coastal</i>	-	0.91	0.05	0.24	19.47	0.01	0.22	24.56	20.68	3.78	15.78	0.54	0.77	1.10	4.41	0.11	1.66
Apulia	700432	0.71	0.43	0.22	17.82	0.15	1.69	12.96	26.89	5.22	0.08	0.02	1.93	0.79	7.55	0.42	4.45
<i>Average for coastal</i>	-	2.08	1.64	0.37	16.64	0.07	0.82	13.75	28.15	2.92	0.14	0.01	0.97	0.70	6.77	0.31	3.79
<i>Average for non-coastal</i>	-	0.99	0.02	0.29	18.58	0.14	1.26	17.24	28.80	3.84	0.08	0.01	1.27	0.47	6.42	0.31	3.91
Sardinia	294992	0.94	0.72	0.60	12.55	0.39	1.92	13.89	26.17	6.05	9.54	2.31	2.58	1.08	7.35	0.49	3.93
<i>Average for coastal</i>	-	3.17	2.75	1.18	11.78	0.07	1.16	18.61	25.44	3.35	15.55	0.89	0.80	1.31	5.80	0.30	2.79
<i>Average for non-coastal</i>	-	0.69	0.07	0.57	16.17	0.06	0.70	21.57	28.43	4.55	11.43	0.52	0.38	0.19	5.59	0.18	2.49
Veneto	1642359	0.49	0.27	0.08	32.48	0.14	0.83	9.52	21.26	4.40	7.39	2.03	3.42	2.26	6.15	0.28	2.34
<i>Average for coastal</i>	-	7.42	7.02	0.00	11.19	0.04	0.52	14.42	25.09	4.37	15.58	0.74	0.63	3.73	4.81	0.25	2.36
<i>Average for non-coastal</i>	-	0.59	0.06	0.16	39.48	0.13	0.53	13.14	18.33	3.69	8.76	0.92	1.27	1.91	4.29	0.21	1.79

In Emilia Romagna, the primary sector (agriculture, forestry and fishing) represents an average share of 5,99% of the whole municipal employment in the coastal municipalities with respect to about 0,79% in the non-coastal municipalities. These values reach relatively high levels in the sector of fishing (5,74%) with respect to agriculture (0,2%). The manufacturing sectors have in average a higher employment level in non-coastal municipalities than in coastal ones. The services, instead, show higher averages of employment in coastal municipalities, especially for activities linked to tourism.

In Friuli Venezia Giulia, the primary sector (agriculture, forestry and fishing) represents an average share of 6,53% of the whole municipal employment in the coastal municipalities with respect to 1,22% (with very high values for fishing). In the manufacturing sectors, the pattern shows a typical trend similar to other regions with higher averages in non-coastal municipalities.

In Liguria, the primary sector (agriculture, forestry and fishing) represents an average share of 0,6% of the whole municipal employment in coastal municipalities with respect to about 0,9% in non-coastal municipalities. These values reach relatively high levels in the sector of fishing (0,5%) with respect to agriculture (0,04%), and this is the opposite trend of non-coastal municipalities.

In Liguria, constructions represent a significant sector of employment, with average percentages that reach 14,3% in coastal municipalities and 24,5% in non-coastal municipalities. Most of services have a higher average of the percentage of

the employment in coastal municipalities than in non-coastal ones.

In Apulia, the primary sector (agriculture, forestry and fishing) represents an average share of 2,08% of the whole municipal employment in coastal municipalities with respect to about 0,99% in non-coastal municipalities. This percentage is mainly due to the employment in the fishing, which is 1,64% with respect to the 0,32% of agriculture. The manufacturing sector has an average employment of 16,63% in coastal municipalities and an average of 18,57% in non-coastal ones. It has to be noted that in some sectors, especially those in which a certain quantity of freshwater is required (such as the production of beverages or the leather manufacturing), the average employment is higher in coastal municipalities than in non-coastal ones. The building sector instead hires more people in non-coastal municipalities (17,24% with respect to 13,75%). Finally, in the sector of services the averages in the coastal municipalities (28,15%) is almost the same as in non-coastal ones (28,78%). In the tourism (hotels and restaurants), information services, financial services, education and real estate are generally higher in coastal municipalities.

In Sardinia, the primary sector (agriculture, forestry and fishing) covers an average share of 3.17% of the occupation in coastal municipalities compared to a much lower 0.69% for non-coastal. This difference is due mainly to the level of employment of the fisheries sector, equal to 2.75% compared to 0.35% of the agriculture sector. These values are greater in comparison to the average share for the non-coastal areas.

The opposite occurs in the manufacturing sectors, which have an average of 11,78% of employment in coastal municipalities and an average of 16.17% of employment in non-coastal areas.

The constructions instead occupy a larger share of individuals in non-coastal areas (21.51% vs. 18.61%).

Finally, with regard to services, the average share of employment of the commercial activities of the coastal municipalities (25.44%) is lower than the average of the employment shares of common non-coastal (28.43%), while accommodation services and catering (tourism), information services and communications, financial services, education and real estate activities are on average higher in the coastal municipalities.

Veneto in the primary sector (agriculture, forestry and fishing) covers an average share of 7.42% of total employment in the coastal municipalities compared to a 0.59% in non-coastal areas. In most manufacturing sectors and services the employment shares exceed those of non-coastal areas, following a pattern similar to that of Emilia-Romagna.

2.2 Relative economic specialization

The economic specialization of the municipalities can be seen in relative terms through local specialization indices given by the ratio between the shares of each sector in each municipality with respect to the share that the same sector has in the regional employment. An index greater than 1 suggests a specialization relative to the region. More in detail, defined i the municipality and j the sector, the index of local specialization is given by:

$$Spec.loc_{ij} = \frac{A_{ij}}{\sum_i A_{ij}} \cdot \frac{\sum_i \sum_j A_{ij}}{\sum_j A_{ij}}$$

where A_{ij} is the number of employees in the sector j in the municipality i ; $\sum_i A_{ij}$ is the number of employees in all sectors in the municipality i ; $\sum_j A_{ij}$ is the total number of employees in the municipality and $\sum_i \sum_j A_{ij}$ is the total number of employees in the region.

Another indicator that measures the difference in specialization between coastal municipalities and the region consists of the index of dissimilarity. This is given by:

$$Ind. Diss. = \frac{1}{2} \cdot \sum_i \left| \frac{A_{ij}}{\sum_i A_{ij}} - \frac{\sum_j A_{ij}}{\sum_i \sum_j A_{ij}} \right|$$

that is half of the sum of the absolute differences between the sum of the shares of sector j in the employment of the municipality i , and the sum of the shares of employment of sector j to the total regional employment in all sectors.

This index varies between zero and one with zero indicating complete correspondence, and 1 full difference between the production structures of municipality i and region. The results are provided in Table 4

In summary, Campania presents a situation where the coastal municipalities show a dissimilarity index slightly lower, in average (0.55) than that of non-coastal (0.60) thus presenting a greater similarity, albeit slight, of production structure (employment) than non-coastal. Figure 2a confirms this slight tendency, although it is not delineable a dominant structure.

In conclusion, although the coastal municipalities have a production structure typical and different from the non-coastal

ones, (i.e. high shares of certain sectors municipal employment, specialization or de-specialization in given sectors), they influence the entire production structure in a slightly more pronounced way than non-coastal areas. Emilia Romagna presents a varied situation, as shown by the dissimilarity index presented in the last column of Table 4 and in the Figure. 2b. Coastal municipalities present an identical dissimilarity index, with an average value of 0,44 very close to the 0,45 of coastal municipalities, presenting a lack of differentiation in the productive structure (employment) with respect to non-coastal municipalities. It is therefore possible to conclude that, even if coastal municipalities have typical productive structures different from those in non-coastal municipalities, they nevertheless influence the entire regional productive structure much more than non-coastal municipalities.

In Friuli Venezia Giulia (Fig.2c), both coastal and non-coastal municipalities have in average a positive localized specialization (>1) –with respect to the regional average- in the primary sector (the same as in the previous two regions). It is possible to find differences in the making of fish and shellfish, sector that represents a high specialization of non-coastal municipalities. This is due to the high level of specialization of some non-coastal municipalities very close to coastal municipalities. In some manufacturing activities, coastal municipalities are de-specialized but there are some sub-sectors in which coastal municipalities are highly specialized, such as the fruit manufacturing, the textile industry, and oil refining. In some sectors in which coastal

municipalities are de-specialized (index <1), they have in average a higher specialization index than non-coastal municipalities.

In Liguria (Fig.2d), with an average index of 0.39 coastal municipalities have a stronger similarity of their productive structure (employment) with respect to non-coastal municipalities (index 0.54). Therefore, coastal municipalities have a typical productive structure very different from non-coastal municipalities, they have a certain specialization or de-specialization with respect to the regional average in the different productive sectors (e.g., manufacturing vs. services), but nevertheless they influence the whole Ligurian productive structure, much more than non-coastal municipalities. This result reflects also the fact the 86% of the whole employed people belong to companies localized in coastal municipalities.

In Apulia (Figure 2e), coastal municipalities have a positive average (>1) in the local specialization (with respect to the regional average) in the primary sector (2.93), value given by a higher local specialization in almost all the primary sub-sectors (agriculture 1.23; forestry 6.38; fishing 3.79). Non-coastal municipalities, instead, are in average specialized in this sector (1.39), but have an exclusive specialization only in the agriculture (3.09) and forestry (8.39). Coastal municipalities are de-specialized in manufacturing. In some other sectors in which coastal result to be de-specialized (index <1), these have in average a lower specialization index than non-coastal municipalities. It is the case of energy, water and garbage, transports, education, public health.

Tab. 4 Local specialization index of productive sectors (employment) in coastal municipality compared to non-coastal municipality, 2011.

	A: Agricoltura	03: Pesca	B: Estrazioni	C: Manifattura	D: Energia	E: Acqua e rifiuti	F: Costruzioni	G: Commercio	H: Trasporto	I: Servizi di alloggio e ristorazione	J: Servizi di informazione	K: Attività finanziarie	L: Attività immob.	M: Attività professionali	P: Istruz.	Q: Sanità	Ind_diss
<i>Campania</i>																	
<i>Average index for coastal municipality</i>	5.50	10.3	0.69	0.60	0.18	0.78	1.23	1.01	0.59	2.48	0.79	0.52	1.03	0.95	0.47	0.89	0.55
<i>Average index for non coastal municipality</i>	2.28	0.09	2.52	1.21	0.35	0.56	1.62	1.00	0.61	1.23	0.46	0.47	0.45	0.98	0.70	0.85	0.60
<i>Emilia Romagna</i>																	
<i>Average index for coastal municipality</i>	13.24	29.1	0.54	0.56	0.12	1.99	1.20	1.16	0.71	1.80	0.61	0.49	2.08	0.82	0.69	0.86	0.43
<i>Average index for non coastal municipality</i>	1.74	0.38	2.06	1.20	0.22	1.22	1.58	0.94	0.97	1.09	0.50	0.25	0.75	0.65	0.65	0.82	0.44
<i>Friuli-Venezia Giulia</i>																	
<i>Average index for coastal municipality</i>	13.70	30.3	0.27	0.48	0.10	0.60	1.30	1.18	0.78	2.22	0.83	0.64	1.82	0.85	0.92	1.29	0.46
<i>Average index for non coastal municipality</i>	2.57	0.43	3.05	1.00	1.80	0.42	1.67	1.02	0.74	1.79	0.43	0.21	0.78	0.69	1.15	0.70	0.55
<i>Liguria</i>																	
<i>Average index for coastal municipality</i>	2.39	3.27	1.83	0.48	0.26	0.42	1.39	1.18	0.41	2.49	0.68	0.36	1.66	0.80	0.89	0.95	0.39
<i>Average index for non coastal municipality</i>	3.62	0.28	3.06	1.09	0.04	0.16	2.38	1.00	0.42	1.76	0.31	0.25	0.51	0.56	0.33	0.54	0.54
<i>Apulia</i>																	
<i>Average index for coastal municipality</i>	2.93	3.79	1.64	0.93	0.42	0.48	1.06	1.05	0.56	1.79	0.55	0.50	0.89	0.90	0.75	0.85	0.26
<i>Average index for non coastal municipality</i>	1.40	0.06	1.29	1.04	0.93	0.75	1.33	1.07	0.73	1.07	0.49	0.65	0.59	0.85	0.75	0.88	0.28
<i>Sardinia</i>																	
<i>Average index for coastal municipality</i>	3.37	3.81	1.97	0.94	0.17	0.60	1.34	0.97	0.55	1.63	0.38	0.31	1.21	0.79	0.62	0.71	0.31
<i>Average index for non coastal municipality</i>	0.73	0.10	0.96	1.29	0.16	0.36	1.55	1.09	0.75	1.20	0.22	0.15	0.18	0.76	0.37	0.63	0.40
<i>Veneto</i>																	
<i>Average index for coastal municipality</i>	15.13	25.7	0.00	0.34	0.31	0.63	1.52	1.18	0.99	2.11	0.36	0.19	1.65	0.78	0.88	1.01	0.46
<i>Average index for non coastal municipality</i>	1.24	0.22	2.08	1.23	0.94	0.62	1.38	0.85	0.84	1.19	0.46	0.36	0.84	0.70	0.73	0.77	0.47

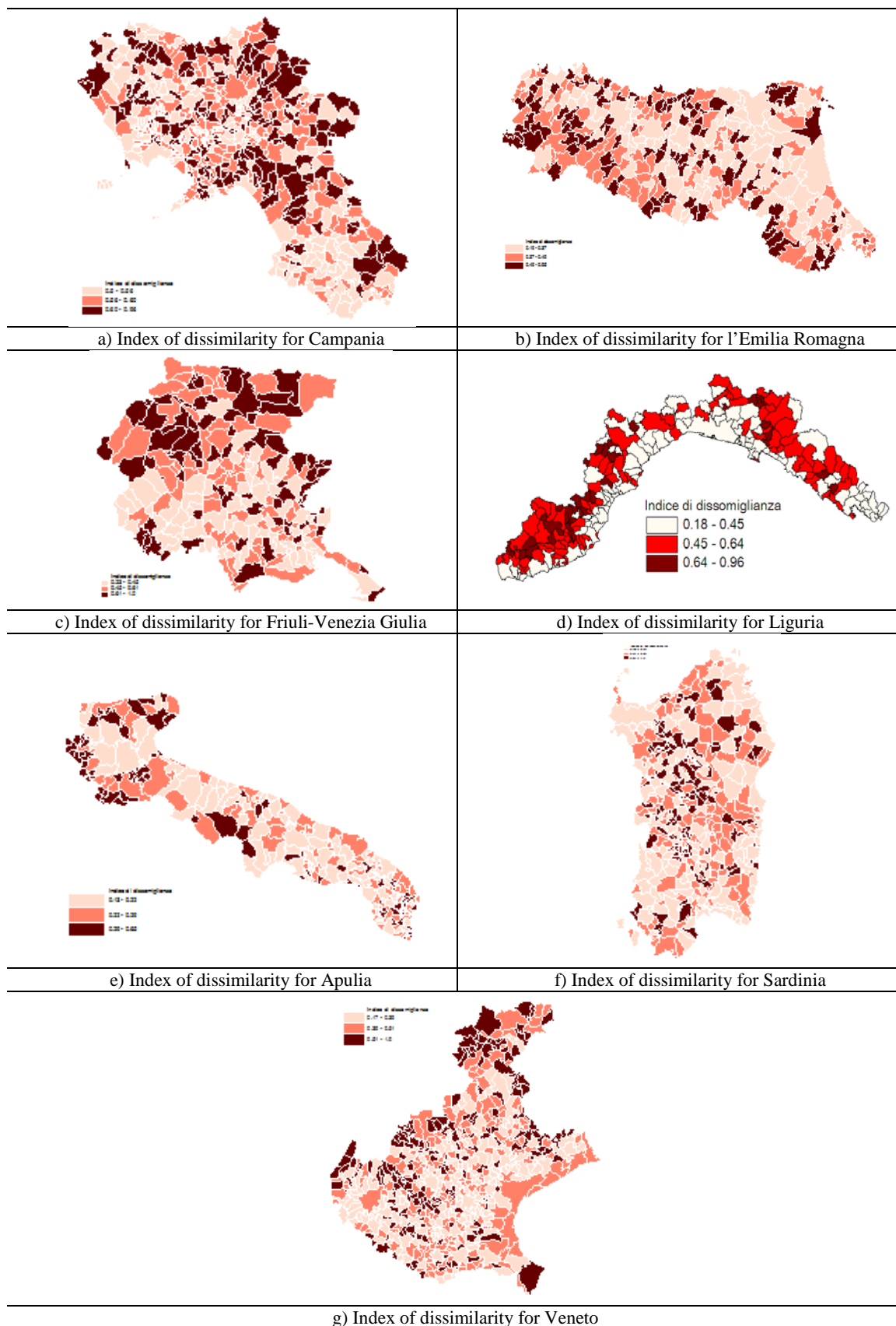


Fig.2 Index of dissimilarity for the municipalities of regions under study, 2011

Sardinia has a pretty varied situation because there is not a clear pattern distinguishing coastal and non-coastal municipalities. Some sectors have an absolute specialization in coastal municipalities, but do not have a relative specialization with respect to the region, where the same sectors present higher shares of sectorial employment.

Other sectors, instead, have a high absolute specialization in non-coastal municipalities, but do not have it in relative terms with respect to the region.

Moreover, it is possible to figure out intermediate situations where there is not an absolute specialization either in coastal or in non-coastal municipalities. The average dissimilarity index in coastal municipalities is 0.31 and is lower than the average index in non-coastal municipalities (0.40).

This shows that coastal municipalities have a higher degree of similarity of the productive structure (employment) with respect to non-coastal municipalities.

Finally, Figure 2f shows that the highest degree of dissimilarity is in the inner part of the region. Given this evidence, it is possible to conclude that, even if coastal municipalities have typical productive structures different from those of non-coastal municipalities, they influence the whole regional productive structure. This result reflects also the fact that the 63% of the whole employed people work for companies localized in coastal municipalities.

In Veneto (Fig.2g) the results and the productive structure result to be coherent with those obtained for Emilia Romagna and then it is possible to refer to the conclusions obtained for that region.

3. ECONOMIC DEPENDENCE ON MARINE RESOURCES AND AREAS OF HIGH ENVIRONMENTAL PRESSURE

The analysis and the indicators above can be detailed for two groups of sectors that represent a more direct interface between the local economy and marine resources, namely sectors highly dependent on sea ('marine' sectors) and 'non-marine' sectors with high pressures on the coastal environment (from now on 'high impact' sectors).

First, as part of the census data for the sectors ATECO 2007, were identified sectors that are closely dependent on the sea because of its ecological conditions (i.e. fishing).

The four groups of selected sectors are shown in Table 5. Compared to the classification ATECO, they have been identified by selecting the entire section (as in the case of the 'activity of accommodation and catering'), or specific Divisions (as in the case of 'fishing and aquaculture' which belongs to Section A, Agriculture, and 'shipping', which belongs to Section H and so on), or individual groups (as in the case of 'canned fish' and 'construction of ships and boats' which belong to Section C, manufacturing).

The sectors of fishing and tourism need some clarifications. In the case of fisheries, as already noted, the census data may represent an underestimation of the actual systematic employment sector, which reduces the weight of the industry compared to other organizations that work with enterprise more structured. A more thorough analysis of the figures for fishing will be carried out in future works.

Tab. 5 Sectors dependent on marine resources by sections, divisions and groups ATECO 2007.

Sectors depending on the sea	Section	Division	Group
1. Sectors related to fishing		03: fishing and aquaculture	10.2: processing and preserving of fish, crustaceans and mollusks
2. Shipbuilding			30.1: construction of ships and boats
3. Maritime transport		50: maritime transport and inland water	
4. Tourism and related services	I: accommodations services and catering	79: travel agencies, tour operator and other reservation service and related activities	

In the case of tourism, it is obvious that the distinction between marine tourism and other accommodation and food activities is not immediate. However, to our level of analysis, that we recall lies in analysis of the employment in this sector for the coastal municipalities it might be logically expected that the sea is the main attraction for tourist destination and recreation in coastal municipalities.

Anyhow, the activities of accommodation and catering in medium and large coastal cities, such as Genoa in Liguria, may cover activities that have nothing to do with the marine tourism but unfortunately, there is not a systematic survey of the motivations of the presences in hotels and acquaintances of shops which allow a clear picture to the municipal level. More detailed analysis on the number of tourists will be developed in future works.

The economic variables (employment, in our case) for these four aggregates of sectors can point that coastal municipalities, and the areas they belong to, are economically dependent on the sea.

These same groups of sectors are the immediate interface between the local economy and the sea and present, always according to the productive techniques they use, significant environmental impact on the marine resources, on the coasts and on the environment in general. For example, in terms of CO2 emissions per each employed person, fishing and maritime transports are among the sectors with the highest indicators. According to this same indicator, tourism seems to be a “light” sector in terms of expected direct impacts, but several other sectors are linked to tourism, such as touristic service providers or tourists themselves. Moreover, even if the justification of tourism or of the stay is not linked to the sea, for the fact itself that it takes place in maritime municipalities it makes some pressures on the maritime-coastal environment. On the other hand, these same sectors critically depend on the availability and the quality of natural maritime and coastal resources, without which fundamental inputs are missing. These groups of sectors are therefore the midpoint of a “sustainable maritime economy” which may guarantee

continuous incomes and employment, both quantitatively and qualitatively significant, using natural and environmental resources.

A second group of sectors is made up of those “high pressure” economic activities, that is to say those activities not directly linked to maritime resources, but localized in coastal zones and that may exert environmental pressures, both directly and indirectly, on the coast and the sea (pollution, industrial risks, permanent territorial changes). These are sectors belonging to heavy industries or intensive manufactures of resources. These sectors have been selected on the basis of: (i) the literature on pressures; and (ii) an indicator on the CO₂ emission intensity, atmospheric pollutant and heavy metals per employed derived by NAMEA.

Even if this indicator represents a non-exhaustive set of pressures, it can be disaggregated according to the ATECO

sectorial economic divisions into a wide range of pressures and can summarize several environmental characteristics of the productive sectors. For example, the intensity of CO₂ per employed summarizes the energy technology of the sector, which is in turn linked to the capital intensity of the sector (plant design). therefore It can indirectly suggest the presence of localized aggregate pollution, the intensive presence of infrastructures (e.g., communications and transports), the presence of industrial incidents. Further details on the pressures of some of these sectors will be presented in future works.

The sectors selected on the basis of the literature and the indicators deriving from NAMEA are shown in Table 6 and are composed either of whole ATECO section or of Divisions selected within Section C, Manufacturing activities.

Tab. 6 High environmental pressure sectors by sections and divisions ATECO 2007.

High environmental pressure sectors	Section	Division
1. Extractive sector	B: mining and quarrying	
2. Coal and oil		19: coke products deriving from oil refining
3. Chemistry		20: chemical products
4. Non-metallic Minerals		23: manufacture of other products from the processing of minerals not metallic mineral
5. Metallurgy		24: metallurgy
6. Metal products		25: metal products (except machinery and equipment)
7. Energy Production	D: supply of electricity, gas, steam and air conditioning	
8. Water and waste	E: water supply sewerage, waste management and remediation	
9. Construction	F: construction	

It should be noted that, while the mining, quarrying, manufacturing, energy, water and waste, and those selected are manufacturing-intensive emissions per employee, in the cases of extractive and construction sectors the direct emission, according to NAMEA, are relatively low.

However, these two sectors are intensive of the territory, in the sense that involve permanent or semi-permanent alterations, and also produce a high intensity of waste (by weight) thus loading the territory of high overall environmental pressures (see, among others, Mazzanti, Paleari, Zoboli 2007).

The joint consideration of specialization of coastal municipality in sectors that are directly related to the sea (in economic-environmental terms) and the specialization of coastal municipality in sectors of high environmental pressure can then provide an overview of: (i) dependence of the economy from the sea; (ii) the pressure of the local economy on the sea, through the impacts of 'marine' and high pressure sectors that are resources intensive; (iii) potential conflicts between economic sectors that are dependent from the sea and the high environmental pressure sectors that overwork the sea and the coasts.

3.1 *Campania*

3.1.1 *Economic dependence on marine resources*

In Campania much of the coastal municipalities has a high share of employment in sectors related to the sea.

The average share of employment of coastal municipalities is around 21%, well above the average for non-coastal (about 9%).

It is however important to note that the index of local specialization for sectors depending on the sea (Table 7) is less than 1 in very few occasions (5 coastal municipalities of 60). In one case it is a min city, Salerno, which has an economic structure composite and complex. The index of local specialization of coastal municipalities in average is equal to 2.4 compared with a 1.08 for non-coastal (where there are tourist activities that affect the data).

3.1.2 *Dependence on sectors with high environmental pressure*

For sectors with 'high environmental pressure' the value of total employment in Campania is equal to 16%.

The coastal municipalities have an average of shares slightly higher (17.2%), but lower than in non-coastal areas (24.04%). It should be noted, however, that the indices of local specialization of these sectors in the majority of cases is less than 1 and the average value of the indexes of local specialization in coastal municipalities is slightly above this threshold (1.05).

This value is lower than the average of the index of specialization of non-coastal municipalities (1.46). So as a first conclusion in several coastal municipalities, there is the presence of high environmental pressure on the environment however this plays a greater role in non-coastal areas.

Table 7 and Figures 3a and 3b show that in many coastal municipalities coexist sectors depending on the sea and intensive sectors that have high impact or also a potential impacts on the environment (environmental risks) and on the same marine activities.

Tab. 7 Comparison between specialization index of sectors related to the sea and sectors with high impact for coastal municipality (if negative: relative specialization in sectors with high pressure), Campania, 2011.

Coastal Municipality	Index of local specialization for sectors depending on sea	Index of local specialization for sectors with high pressure	Difference between the two index
Castel Volturno	1,63	0,84	0,79
Mondragone	1,22	0,79	0,43
Sessa Aurunca	1,03	0,92	0,11
Cellole	1,96	1,04	0,92
Anacapri	1,74	1,29	0,45
Bacoli	3,46	0,95	2,52
Barano d'Ischia	1,62	1,26	0,36
Capri	2,82	1,06	1,77
Casamicciola Terme	2,57	1,20	1,36
Castellammare di Stabia	1,37	0,80	0,57
Forio	3,35	0,77	2,58
Giugliano in Campania	1,08	1,15	-0,07
Ischia	3,36	0,77	2,59
Lacco Ameno	3,73	0,68	3,05
Massa Lubrense	2,08	1,45	0,62
Meta	2,06	1,00	1,07
Monte di Procida	4,65	0,34	4,31
Napoli	1,09	0,56	0,53
Piano di Sorrento	1,28	0,69	0,59
Portici	0,69	0,64	0,05
Pozzuoli	1,42	1,98	-0,55
Procida	2,70	1,00	1,70
Ercolano	0,94	1,69	-0,75
Sant'Agnello	2,11	0,83	1,28
Serrara Fontana	4,31	0,99	3,32
Sorrento	4,41	0,76	3,65
Torre Annunziata	1,34	0,73	0,61
Torre del Greco	1,80	0,62	1,18
Vico Equense	2,30	1,05	1,25
Agropoli	1,47	0,99	0,48
Amalfi	4,98	0,73	4,25
Ascea	2,73	1,38	1,35
Atrani	3,41	1,61	1,80
Battipaglia	0,74	0,87	-0,12
Camerota	2,95	0,77	2,18
Capaccio	1,93	1,07	0,86
Casal Velino	2,42	1,19	1,23
Centola	2,78	1,02	1,76
Cetara	5,35	0,39	4,97
Conca dei Marini	3,53	1,33	2,20

Coastal Municipality	Index of local specialization for sectors depending on sea	Index of local specialization for sectors with high pressure	Difference between the two index
Eboli	0,89	0,82	0,07
Furore	3,79	2,05	1,74
Ispani	2,35	1,56	0,79
Maiori	2,57	0,73	1,84
Minori	1,99	1,25	0,75
Montecorice	3,27	1,26	2,01
Pisciotta	2,34	1,94	0,40
Pollica	3,43	1,23	2,20
Pontecagnano Faiano	0,70	0,74	-0,04
Positano	3,52	0,90	2,62
Praiano	3,80	1,65	2,15
Ravello	4,21	1,28	2,93
Salerno	0,86	0,71	0,15
San Giovanni a Piro	1,62	1,56	0,06
San Mauro Cilento	2,47	0,51	1,96
Santa Marina	2,98	1,04	1,94
Sapri	2,21	0,72	1,49
Vibonati	1,81	0,83	0,98
Vietri sul Mare	3,12	1,69	1,44
Average index for coastal municipalities	2,45	1,05	1,4
Average index for non-coastal municipalities	1,08	1,46	-0,38

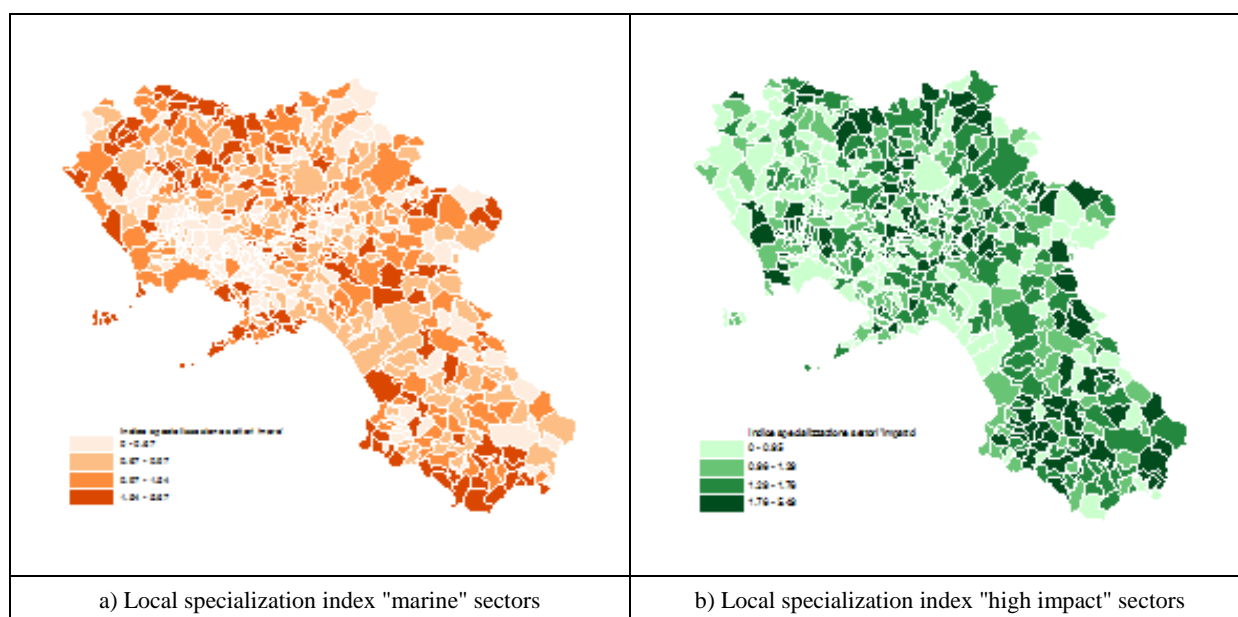


Fig. 3. Local specialization index for "marine" and "high pressure" sectors in the municipalities of Campania, 2011.

3.2 Liguria

3.2.1 *Economic dependence on marine resources*

In Liguria, most of coastal municipalities has high levels of occupation in sectors linked to the sea, as they are defined here. In some cases, these shares are over the 50% and are in most cases higher than the regional average (12%), and only in few municipalities they are lower than 10%. The average of coastal is around 24%, significantly higher than the average for non-coastal (16%), with a significant variability. It has to be noted, anyhow, that tourism is the leading sector, in the whole region and for both types of municipalities. Tourism has employment shares very close to the total (with a low variability among coastal municipalities).

The result of the relative weight of tourism among the maritime sectors may derive from an underestimation of the effective number of employed in the fishing and other sectors linked to the sea (transports). Moreover, some sectors, such as shipbuilding and maritime transports, are presented with companies and employees only in some municipalities, in particular in larger ones (e.g., the maritime transports in Genova that use the 4% of the total operators) or in some very specialized municipalities (such as shipbuilding in Ceriale, Ameglia, Lerici). These same sectors present shares that, even if low overall, they are nevertheless multiple with respect to the same sectors in non-coastal municipalities.

It is relevant to note that the local specialization index for the sectors depending on the sea (ratio between the share of the sectors in the municipality and the share of the sectors in the region, Table 8) is less than 1 (lack of specialization) for 11 coastal

municipalities over 63. In some cases, these are the main cities and Genova, that have complex economic structures. In any case, in the other 52 coastal municipalities the index reaches values >1 with peaks of 5. The local specialization index of coastal municipalities is on average 2.1 with respect a value of 1.3 for non-coastal ones (where there are touristic activities influencing the data).

3.2.2 *Dependence on sectors with high environmental pressure*

For the sectors identified here as a 'high environmental pressure', Liguria shows a 18.8% of total employment. The coastal municipalities have an average of units lower (17.3%) compared to non-coastal municipalities (about 30%). In addition, the local specialization indices of these sectors in coastal municipalities are very often less than 1 (lack of specialization), with an average of 0.9. Non-coastal municipalities instead, show an average of 1.6 (specialization relative to the region). This would seem to indicate a poor relative importance of these sectors in the economy of the coastal municipalities.

The overall figure for sectors with high pressure is generally dominated by constructions, which represent the bulk of the overall share in all municipalities (coastal or not), with some tips to 30%, and in only 12 coastal municipalities represent less than 10% of total employment.

Finally, in 24 coastal municipalities the local specialization indices are greater than 1. This figure is certainly influenced by the construction sector, where there is widespread specialization in many coastal municipalities. The strong presence of the constructions may be partly related to the tourist activity, which is strong in the coastal municipalities.

Table 8 and Figures 4a and 4b show that in many coastal municipalities there is a specialization in ‘marine’ sectors higher than those in ‘high pressure’ sectors. However, for 14 coastal municipalities the situation is reversed with an index of specialization in the high-pressure sectors that exceeds that in the sectors related to the sea (between these municipalities there are also larger cities as Genoa and La Spezia).

Even in the presence of a link between tourism and specialization in construction, a dominant sectors among those at ‘high pressure’, many coastal municipalities contemporary show an important presence of sectors that depend on the sea and sectors not related to the sea but that have high (potential) impacts on environment (environmental risks) and on the same marine activities.

Tab. 8. Comparison between specialization index of sectors related to the sea and sectors with high impact for coastal municipality (if negative: relative specialization in sectors with high pressure), Liguria, 2011.

Coastal Municipality	Index of local specialization for sectors depending on sea	Index of local specialization for sectors with high pressure	Difference between the two index
Liguria	1.00	1.00	0,00
Bordighera	2.09	0.78	1.31
Camporosso	0.46	1.39	-0.93
Cervo	3.15	1.42	1.73
Cipressa	1.44	2.12	-0.68
Costarainera	0.84	2.49	-1.66
Diano Marina	2.78	0.63	2.15
Imperia	0.90	0.91	-0.02
Ospedaletti	1.82	1.20	0.62
Riva Ligure	1.54	1.19	0.35
San Bartolomeo al Mare	1.77	0.79	0.98
San Lorenzo al Mare	1.40	1.60	-0.20
Sanremo	1.32	0.80	0.52
Santo Stefano al Mare	2.25	0.84	1.41
Taggia	0.98	1.12	-0.14
Vallecrosia	0.85	1.03	-0.18
Ventimiglia	1.45	0.88	0.57
Alassio	2.65	0.46	2.19
Albenga	0.97	0.88	0.09
Albisola Superiore	1.00	1.42	-0.41
Albissola Marina	1.55	0.60	0.95
Andora	1.66	1.22	0.44
Bergeggi	1.76	0.57	1.19
Borghetto Santo Spirito	1.33	1.45	-0.12
Borgio Verezzi	2.51	0.70	1.81

Coastal Municipality	Index of local specialization for sectors depending on sea	Index of local specialization for sectors with high pressure	Difference between the two index
Celle Ligure	1.93	0.57	1.36
Ceriale	1.84	1.26	0.58
Finale Ligure	2.12	0.96	1.16
Laigueglia	3.18	0.59	2.60
Loano	1.88	0.78	1.10
Noli	3.01	0.51	2.51
Pietra Ligure	1.94	0.88	1.05
Savona	0.78	0.75	0.03
Spotorno	2.88	0.59	2.29
Vado Ligure	1.76	1.12	0.64
Varazze	1.93	0.57	1.36
Arenzano	0.65	0.46	0.19
Bogliasco	1.14	0.44	0.70
Camogli	2.58	0.57	2.01
Chiavari	0.96	0.67	0.28
Cogoleto	1.67	1.23	0.44
Genova	0.79	0.95	-0.15
Lavagna	1.45	0.64	0.81
Moneglia	2.34	0.99	1.36
Pieve Ligure	0.75	1.24	-0.49
Portofino	4.07	0.38	3.69
Rapallo	1.25	0.96	0.29
Recco	1.64	0.75	0.90
Santa Margherita Ligure	2.41	0.62	1.79
Sestri Levante	1.69	1.07	0.61
Sori	1.32	1.54	-0.21
Zoagli	1.05	1.76	-0.71
Ameglia	3.60	0.67	2.93
Bonassola	3.48	1.21	2.26
Deiva Marina	2.88	1.30	1.58
Framura	4.22	0.74	3.48
La Spezia	0.81	1.06	-0.25
Lerici	2.90	0.47	2.43
Levanto	2.17	1.03	1.14
Monterosso al Mare	4.27	0.20	4.07
Portovenere	3.24	0.36	2.88
Riomaggiore	5.39	0.16	5.22
Sarzana	1.23	0.89	0.34
Vernazza	5.07	0.42	4.66
<i>Average index for coastal municipalities</i>	1.74	1.21	0.53
<i>Average index for non-coastal municipalities</i>	1.07	1.30	-0.23

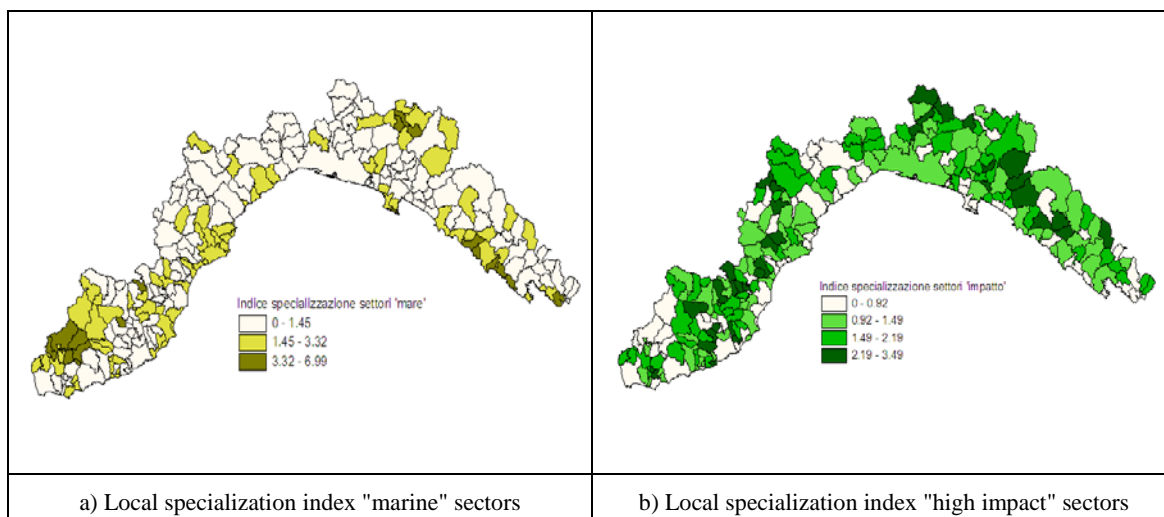


Fig. 4. Local specialization index for "marine" and "high pressure" sectors in the municipalities of Liguria, 2011.

3.3 Apulia

3.3.1 Economic dependence on marine resources

In Apulia, most of coastal municipalities present high shares of employment in sectors linked to the sea. The average of the shares of coastal is around 16%, a much higher value than the one of non-coastal municipalities (8.55%).

Also in this case, these data are largely controlled by tourism, whose employment shares are very close to the total (with a low variability among coastal municipalities).

The same considerations adopted for the two regions previously analyzed count here and we can therefore conclude that the economic dependence on the sea of coastal municipalities is controlled by tourism, both directly and, presumably, as sector of demand of fishing products.

3.3.2 Dependence on sectors with high environmental pressure

Values for the 'high environmental pressure' sectors are very similar to those of the regions previously analyzed.

The percentage of total employment in Apulia is equal to 19.23%. The coastal municipalities have an average share of 19.94%, that is lower than non-coastal areas (23.91%).

It should be noted, however, that the indices of local specialization of these sectors, in the majority of cases, are less than 1 and the average value of the indexes of localization in coastal municipalities is slightly above this threshold (1.04).

Even for Apulia a big impact is due to the construction industry and the manufacture of metal products. We can say that in some cases, certain sectors such as construction and the manufacture of metal products, have a high index of specialization also in coastal municipalities.

Table 9 and Figures 5a and 5b summarize these results.

Tab. 9 Comparison between specialization index of sectors related to the sea and sectors with high impact for coastal municipality (if negative: relative specialization in sectors with high pressure), Apulia, 2011.

Coastal Municipality	Index of local specialization for sectors depending on sea	Index of local specialization for sectors with high pressure	Difference between the two index
Apulia	1.00	1.00	0.00
Cagnano Varano	3.66	1.07	2.59
Chieuti	2.08	1.20	0.88
Ischitella	1.67	0.70	0.97
Isole Tremiti	6.12	0.36	5.77
Lesina	3.12	1.08	2.04
Manfredonia	1.55	1.11	0.45
Mattinata	2.61	0.62	1.99
Monte Sant'Angelo	1.07	1.28	-0.21
Peschici	4.12	0.53	3.59
Rodi Garganico	3.77	0.63	3.14
San Nicandro Garganico	0.80	1.18	-0.39
Serracapriola	0.98	1.05	-0.07
Vico del Gargano	1.65	1.04	0.61
Vieste	4.03	0.57	3.45
Zapponeta	0.99	0.75	0.24
Bari	0.89	0.71	0.18
Giovinazzo	2.35	1.13	1.22
Mola di Bari	2.04	0.76	1.29
Molfetta	1.23	0.87	0.36
Monopoli	1.56	0.85	0.71
Polignano a Mare	2.01	0.89	1.12
Castellaneta	1.49	0.93	0.55
Ginosa	0.85	1.04	-0.18
Leporano	1.53	0.85	0.68
Lizzano	0.90	1.52	-0.62
Manduria	0.95	1.18	-0.23
Maruggio	2.25	0.75	1.50
Massafra	0.82	1.55	-0.72
Palagiano	1.00	0.97	0.02
Pulsano	1.79	1.28	0.51
Taranto	0.92	0.73	0.19
Torricella	0.40	3.34	-2.94
Brindisi	1.33	0.93	0.40
Carovigno	2.72	1.16	1.56

Coastal Municipality	Index of local specialization for sectors depending on sea	Index of local specialization for sectors with high pressure	Difference between the two index
Fasano	2.06	1.12	0.94
Ostuni	1.45	0.82	0.62
San Pietro Vernotico	0.91	1.21	-0.31
Torchiarolo	1.15	0.71	0.44
Alessano	0.99	1.18	-0.19
Alliste	2.99	1.09	1.90
Andrano	1.73	1.25	0.47
Castignano del Capo	3.16	0.87	2.28
Corsano	0.57	1.18	-0.62
Diso	1.07	2.12	-1.05
Gagliano del Capo	1.52	1.69	-0.18
Galatone	1.94	0.99	0.95
Gallipoli	3.21	0.54	2.67
Lecce	1.28	0.81	0.47
Melendugno	2.42	0.95	1.47
Morciano di Leuca	1.33	0.91	0.42
Nardò	1.01	1.27	-0.26
Otranto	3.97	0.45	3.53
Patù	1.68	0.70	0.98
Racale	0.77	0.90	-0.13
Salve	1.90	1.32	0.58
Santa Cesarea Terme	1.98	1.68	0.31
Taviano	0.71	1.59	-0.88
Tiggiano	0.54	1.48	-0.94
Tricase	1.04	0.91	0.13
Ugento	1.93	1.15	0.78
Vernole	2.18	1.40	0.78
Castro	3.69	0.41	3.28
Porto Cesareo	5.04	0.40	4.63
Barletta	0.73	0.86	-0.13
Bisceglie	1.47	0.55	0.92
Margherita di Savoia	1.76	1.44	0.32
Trani	1.07	0.89	0.19
<i>Average index for coastal municipalities</i>	<i>1.86</i>	<i>1.04</i>	<i>0.82</i>
<i>Average index for non-coastal municipalities</i>	<i>0.99</i>	<i>1.24</i>	<i>-0.25</i>

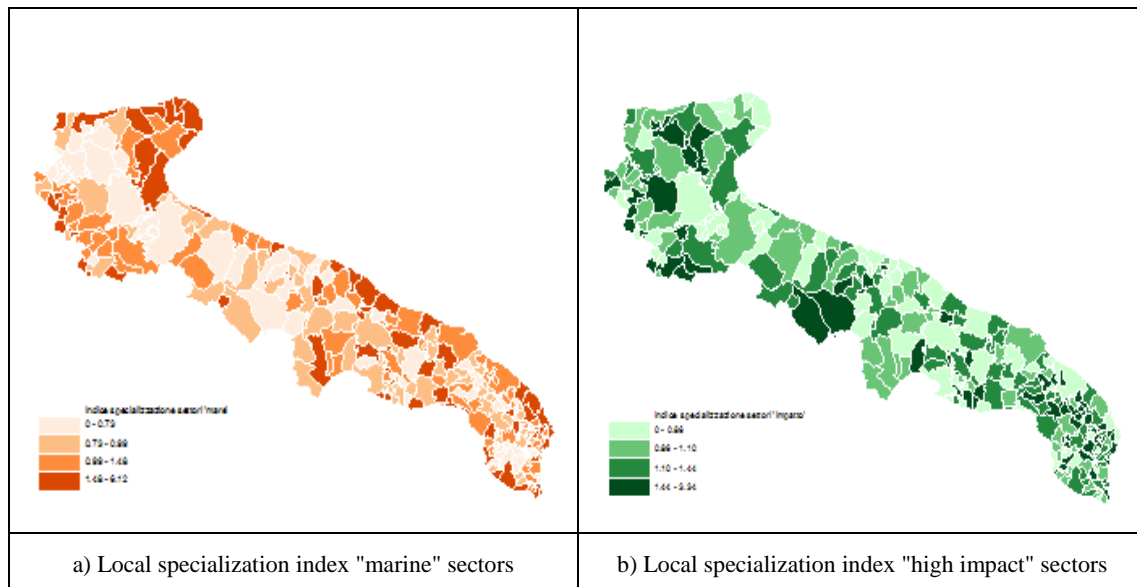


Fig. 5. Local specialization index for "marine" and "high pressure" sectors in the municipalities of Apulia, 2011.

3.4 Sardinia

3.4.1 Economic dependence on marine resources

In Sardinia, most of coastal municipalities present high shares of employment in the sectors linked to the sea, as we define them here. These shares are often higher than the average regional share (18%) and only in few municipalities it is lower than 10%. The average of the share of the coastal is around 19%, definitely higher than the average for non-coastal ones (11.7%), with a low variability. It is to be noted, still, that, as in the case of Liguria, also these data are largely dominated by tourism, that has employment shares very close to the total (with a low variability among coastal municipalities).

The same considerations adopted for Liguria can be applied to the Sardinian case. Summarizing, these data can derive from an underestimation of the effectively employed

in the fishing sector and in other sectors linked to the sea (transport). Moreover, sectors such as shipbuilding and maritime transports are present only in some "hub" municipalities, and especially in those with larger dimensions.

It is anyhow relevant to note that Sardinia presents local specialization indices, for the sectors depending on the sea, higher than 1 (presence of specialization) in most of municipalities. For 15 municipalities over 70, instead, the local specialization index results to be lower than 1 (lack of specialization). In some cases, these are main cities and Cagliari which have complex economic structures. In any case, the localized specialization index of coastal municipalities is on average 1.74 with respect to 1.07 for non-coastal ones (where some touristic activities are considered, which influence the data). Also for Sardinia we can conclude that the economic dependence on the sea for coastal municipalities is dominated by

tourism, both directly and, presumably, as sector of demand of fishing products, shipbuilding and maritime transports (passengers).

3.4.2 Dependence on sectors with high environmental pressure

For the sectors identified here as a 'high environmental pressure', Sardinia has a share of 21.24% of total employment. In the coastal municipalities the average share is slightly lower (25.6%) than non-coastal municipalities (27.6%).

Furthermore, the indices of local specialization of these sectors, in the majority of cases, prove to be higher than 1 (the presence of relative specialization with respect to the region), with an average value equal to 1.21.

This value is lower, albeit slightly, the average of the indices of local specialization of non-coastal areas that have a value equal to 1.3. This would seem to indicate a certain relative importance of these sectors in the economy of the coastal.

Table 10 and Figures 6a and 6b show the main results for Sardinia

Tab. 10 Comparison between specialization index of sectors related to the sea and sectors with high impact for coastal municipality (if negative: relative specialization in sectors with high pressure), Sardinia 2011.

Coastal Municipality	Index of local specialization for sectors depending on sea	Index of local specialization for sectors with high pressure	Difference between the two index
Sardinia	1.00	1.00	0.00
Alghero	1.74	0.68	1.06
Castelsardo	2.09	1.56	0.53
Porto Torres	1.14	1.49	-0.35
Sassari	0.72	0.73	-0.01
Sorso	1.13	1.16	-0.04
Stintino	2.79	0.56	2.24
Valledoria	1.55	1.08	0.47
Villanova Monteleone	0.75	0.87	-0.12
Dorgali	1.66	1.38	0.28
Orosei	1.71	1.77	-0.07
Posada	1.97	1.49	0.47
Siniscola	1.59	0.84	0.75
Cagliari	0.86	0.67	0.19
Capoterra	0.75	1.26	-0.51
Castiadas	2.70	1.00	1.70

Coastal Municipality	Index of local specialization for sectors depending on sea	Index of local specialization for sectors with high pressure	Difference between the two index
Domus de Maria	3.06	1.27	1.79
Maracalagonis	0.89	1.45	-0.56
Muravera	1.72	0.77	0.95
Pula	2.67	0.62	2.05
Quartu Sant'Elena	0.93	0.91	0.01
Sarroch	0.51	2.23	-1.72
Sinnai	0.81	1.54	-0.72
Teulada	3.63	0.81	2.82
Villaputzu	2.08	1.21	0.86
Villasimius	2.61	0.83	1.77
Arborea	1.26	0.50	0.76
Bosa	2.19	0.85	1.34
Cabras	3.13	0.81	2.32
Cuglieri	2.00	1.16	0.84
Magomadas	1.89	1.21	0.68
Narbolia	1.15	2.32	-1.16
Oristano	0.83	0.63	0.20
Riola Sardo	2.89	0.78	2.10
San Vero Milis	2.17	1.51	0.66
Santa Giusta	0.52	0.95	-0.43
Tresnuraghes	2.14	1.69	0.45
Aglientu	2.11	1.46	0.65
Arzachena	1.45	1.32	0.12
Badesi	1.68	0.93	0.75
Budoni	1.79	1.52	0.27
Golfo Aranci	2.66	0.61	2.05
La Maddalena	2.13	0.74	1.39
Loiri Porto San Paolo	1.81	1.44	0.38
Olbia	1.24	0.84	0.40
Palau	2.41	0.69	1.72
San Teodoro	2.09	1.30	0.80
Santa Teresa Gallura	2.37	0.73	1.63
Trinitàd'Agultu e Vignola	2.03	1.36	0.67

Coastal Municipality	Index of local specialization for sectors depending on sea	Index of local specialization for sectors with high pressure	Difference between the two index
Arzana	0.71	2.64	-1.93
Bari Sardo	1.78	1.28	0.51
Baunei	2.23	0.93	1.30
Cardedu	1.33	1.42	-0.09
Gairo	1.11	1.66	-0.55
Lanusei	0.90	1.29	-0.39
Loceri	0.80	1.60	-0.80
Lotzorai	1.99	1.07	0.92
Tertenia	1.39	1.68	-0.29
Tortolì	1.87	0.92	0.95
Arbus	1.62	1.07	0.55
Buggerru	2.88	0.86	2.02
Calasetta	2.86	1.06	1.79
Carloforte	2.27	0.99	1.29
Fluminimaggiore	1.72	1.00	0.72
Giba	1.47	0.77	0.69
Gonnesa	0.46	2.99	-2.53
Iglesias	0.95	1.21	-0.26
Masainas	1.43	1.41	0.02
Portoscuso	0.27	3.78	-3.51
San Giovanni Suergiu	1.45	0.95	0.50
Sant'Anna Arresi	3.16	0.79	2.37
Sant'Antioco	2.87	0.73	2.14
<i>Average index for coastal municipalities</i>	1.74	1.21	0.53
<i>Average index for non-coastal municipalities</i>	1.07	1.30	-0.23

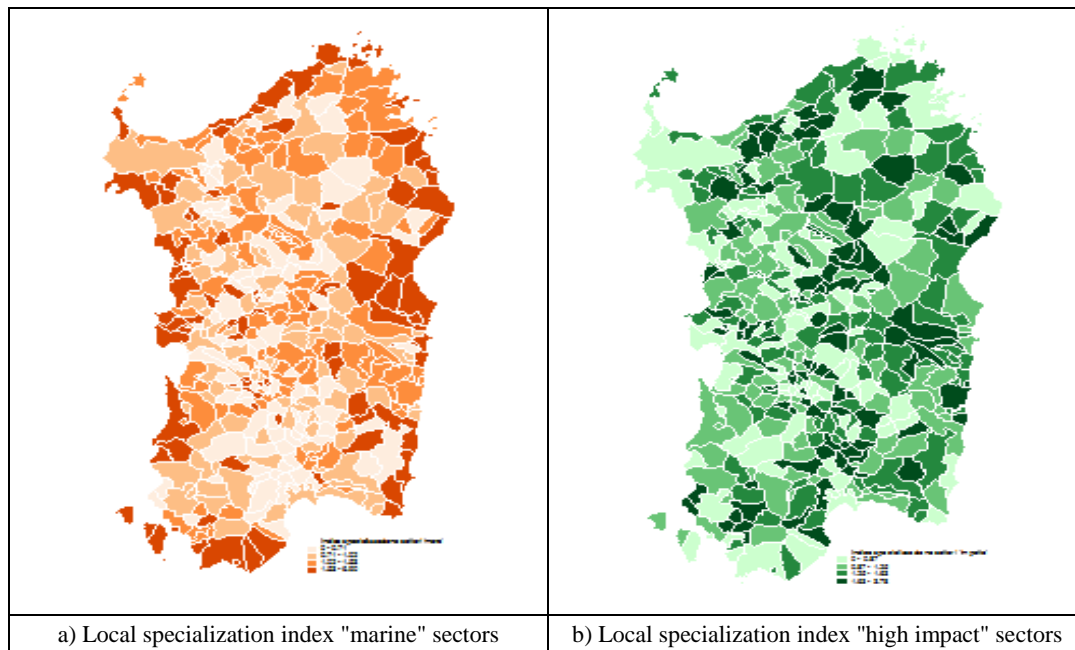


Fig. 6. Local specialization index for "marine" and "high pressure" sectors in the municipalities of Sardinia, 2011.

3.5 The regions overlooking the North Adriatic sea: Emilia-Romagna, Friuli-Venezia Giulia, Veneto

3.5.1 Economic dependence on marine resources

The regions overlooking the North Adriatic Sea, Emilia-Romagna, Friuli-Venezia Giulia and Veneto have in common some homogeneous characteristics that are hereinafter listed.

In these regions, most of coastal municipalities have high shares of employment in sectors linked to the sea and that often result to be higher than the respective regional averages.

The averages of the shares of coastal municipalities are in Emilia-Romagna, Friuli-Venezia Giulia and Veneto all very similar among them and respectively 21.4%, 24.8% and 25.5%: these values are largely higher

than the respective averages for non-coastal municipalities (between 9% and 13%).

What differs with respect to the comparison with the previous regions is a high variability both at a sectorial level and considering the entirety of the sectors depending on the sea. It has to be noted, indeed, that, differently from previous cases, the regions overlooking the North Adriatic Sea present two highly leading sectors: fishing and tourism.

Often, municipalities with a high level of employment in the touristic sector also have a high level of employees in the fishing sector, as already observed before.

In this macro-region, by the way, the values linked to the fishing are higher and more variable.

Furthermore, there are situations in which the fishing covers almost all the employment levels in coastal municipalities, also without any correlation with the touristic activities.

For example, it is useful to see the case of Goro in Emilia-Romagna where the fishing sector occupies the 64.63% vs the 3% employed in tourism.

Another example can be Porto Tolle in Veneto, with percentage of 37.4% in fishing and 6% in tourism. Finally, in Friuli-Venezia Giulia, Marano Lagunare occupies shares of 45% in fishing and 12% in touristic activities.

Even in this case, it is possible to apply some generic considerations: this can derive from an underestimation of the effective employees in fishing and other sectors linked to the sea (transport).

Moreover, sectors such as shipbuilding and maritime transports are present only in some “hub” municipalities, especially in the larger ones.

It is relevant to note that in these regions the local specialization index for those sectors depending on the sea is frequently much higher than 1 (more in detail 2.26 in Emilia-Romagna; 3.06 in Veneto and 2.47 in Friuli-Venezia Giulia) showing a strong localized specialization in sectors linked to the sea.

Given this evidence, it is therefore possible to conclude that for the regions overlooking the North Atlantic Sea, Emilia-Romagna, Friuli-Venezia Giulia and Veneto the economic dependence from the sea of coastal municipalities is largely dominated by tourism and fishing, even more than in previous regions, because of a stronger localized pressure on the few coasts available.

Tourism, but especially intensive fishing, are sectors with an ambiguous and complex relationship with the environment, and we will deal with this in a future development of this work.

3.5.2 Dependence on sectors with high environmental pressure

Also for the sectors here identified as with a “high environmental pressure”, the North-Adriatic regions, present homogeneous characteristics hereinafter listed.

These activities are present in the economy of the North-Adriatic regions with values included between 17.5% in Emilia-Romagna and 18.6% in Friuli-Venezia Giulia of the total number of employees, coastal municipalities present a lower average of shares (between 14.40% of Emilia-Romagna and 17.8% in Veneto) with respect to non-coastal municipalities (about 25% in all the regions). Moreover, the localized specialization indexes of these sectors are very often lower than 1 (lack of specialization), being in average equal to 0.9 in all the regions versus an average for non-coastal municipalities ranging from 1.30 (Veneto) and 1.42 (Emilia-Romagna).

Tabs 11, 12 and 13 and Fig.7 show that the few coastal municipalities have a strong specialization in maritime sectors. Instead, it results to be low the specialization in “high-impact” sectors.

Tab. 11 Comparison between specialization index of sectors related to the sea and sectors with high impact for coastal municipality (if negative: relative specialization in sectors with high pressure), Emilia Romagna 2011.

Coastal Municipality	Index of local specialization for sectors depending on sea'	Index of local specialization for sectors with high pressure	Difference between the two index
Emilia-Romagna	1.00	1.00	0.00
Codigoro	0.94	1.08	-0.13
Comacchio	2.92	1.10	1.82
Goro	6.82	0.14	6.68
Cervia	3.15	0.71	2.45
Ravenna	1.14	1.16	-0.02
Cesenatico	2.87	0.92	1.95
Gatteo	0.99	1.01	-0.02
San Mauro Pascoli	0.55	0.73	-0.18
Savignano sul Rubicone	0.89	1.06	-0.17
Bellaria-Igea Marina	2.77	0.92	1.84
Cattolica	2.37	0.53	1.84
Misano Adriatico	1.92	0.94	0.98
Riccione	2.56	0.60	1.96
Rimini	1.75	0.60	1.15
<i>Average index for coastal municipalities</i>	2.26	0.82	1.44
<i>Average index for non-coastal municipalities</i>	0.99	1.43	-0.44

Tab. 12 Comparison between specialization index of sectors related to the sea and sectors with high impact for coastal municipality (if negative: relative specialization in sectors with high pressure), Friuli-Venezia Giulia, 2011.

Coastal Municipality	Index of local specialization for sectors depending on sea	Index of local specialization for sectors with high pressure	Difference between the two index
Friuli-Venezia Giulia	1.00	1.00	0.00
Latisana	1.02	1.55	-0.53
Lignano Sabbiadoro	2.91	0.49	2.41
Marano Lagunare	5.74	0.17	5.57
Grado	4.04	0.33	3.71
Monfalcone	1.50	1.38	0.13
Staranzano	0.76	1.72	-0.96
Duino-Aurisina	2.26	0.86	1.39
Muggia	2.00	0.85	1.15
Trieste	2.04	0.53	1.50
<i>Average index for coastal municipalities</i>	2.47	0.88	1.59
<i>Average index for non-coastal municipalities</i>	1.29	1.39	-0.10

Tab. 13 Comparison between specialization index of sectors related to the sea and sectors with high impact for coastal municipality (if negative: relative specialization in sectors with high pressure), Veneto, 2011.

Coastal Municipality	Index of local specialization for sectors depending on sea	Index of local specialization for sectors with high pressure	Difference between the two index
Veneto	1.00	1.00	0.00
Caorle	4.57	0.70	3.87
Chioggia	3.08	0.89	2.19
Eraclea	1.73	1.85	-0.12
Jesolo	3.09	0.94	2.15
San Michele al Tagliamento	2.58	1.21	1.37
Venezia	2.19	0.65	1.55
Cavallino-Treporti	3.52	0.88	2.64
Ariano nel Polesine	2.79	0.97	1.82
Porto Tolle	5.35	0.30	5.05
Rosolina	3.23	0.98	2.25
Porto Viro	1.47	1.25	0.22
<i>Average index for coastal municipalities</i>	3.06	0.97	2.09
<i>Average index for non-coastal municipalities</i>	1.11	1.30	-0.19

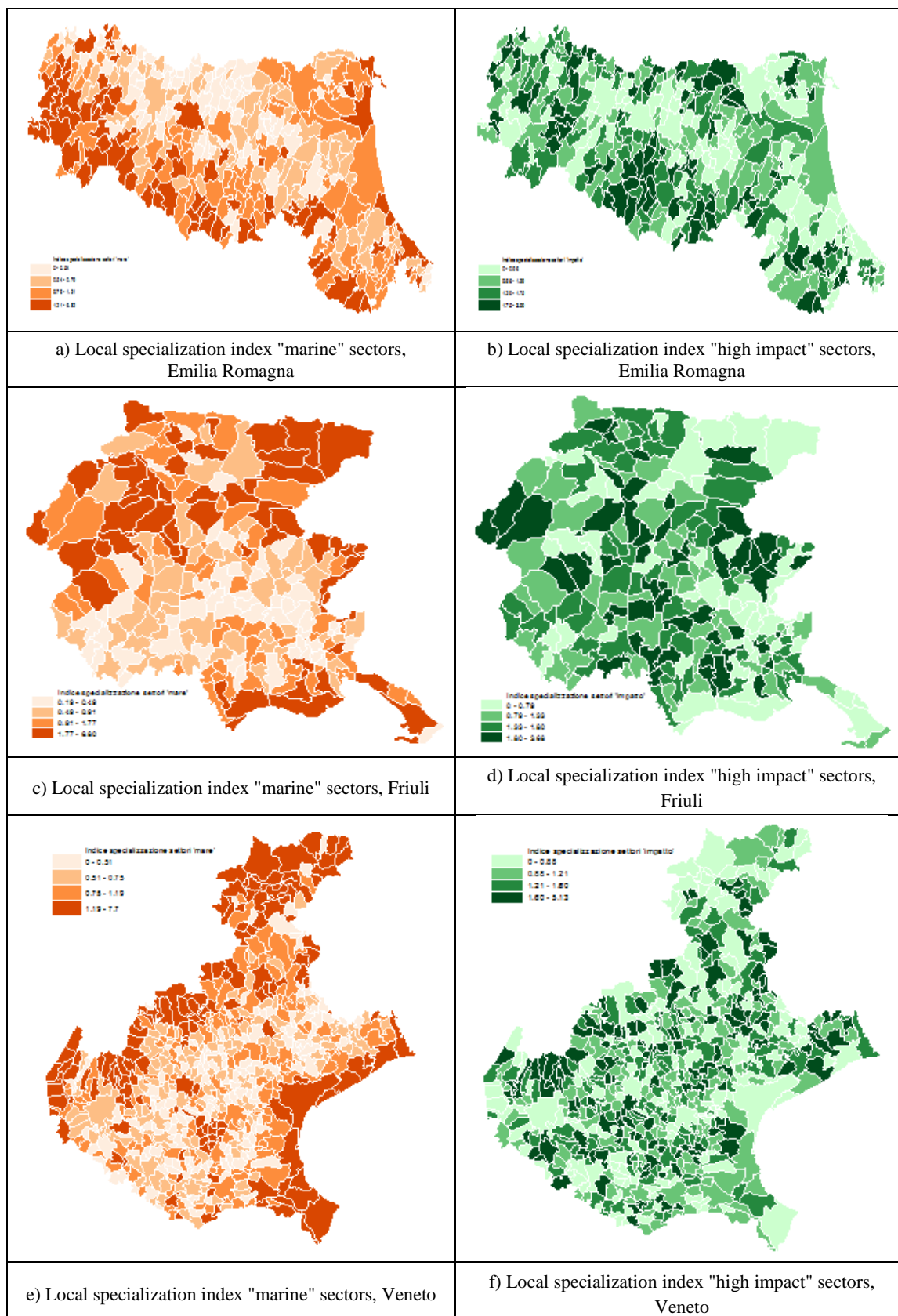


Fig. 7 Local specialization index for "marine" and "high pressure" sectors in the municipalities of regions overlooking North Adriatic sea, 2011.

4. CONCLUSION

We show that coastal municipalities seem to attract more importance than non-coastal, however the huge impact on the marine resources in the coastal municipalities might be considered in a double way. First of all, 'marine' sectors play a key role in the wealth and in the economy of the country. Second, 'high impact' sectors put a high pressure on the coastal environment that might influence the 'marine' sectors both in term of use of marine resources that lower touristic potential. Our study shows that in some regions the two groups of sectors coexist and then particular attention have to be devoted in regulating the exploitation and use of marine resources in order to have a positive economic balance between all sectors.

REFERENCES

- Arto I., Genty A., Rueda-Cantuche J.M., Villanueva A., Andreoni V. (2012), *Global Resources Use and Pollution*, Volume 1: Production, Consumption and Trade (1995-2008); Volume 2: Country Factsheets, JRC Seville.
- EEA (2013), *Environmental pressures from European consumption and production. A study in integrated environmental and economic analysis*, Technical Report 2/2013, European Environment Agency, Copenhagen.
- Coppola G., Mazzotta F. (2005), *I Sistemi Locali del Lavoro in Italia: Aspetti Teorici ed Empirici*, CELPE - DISES, Università di Salerno, Online at <http://mpa.ub.uni-muenchen.de/13173/>, MPRA Paper No. 13173, posted 5. February 2009 18:53 UTC.
- Cainelli G., Zoboli R. (eds) 2004, *The Evolution of Industrial Districts*, Physica-Verlag, Eidelberg.
- Mazzanti M., Zoboli R. (2010), *Joint Economic and Environmental Efficiency. Empirical Analyses on the Italian NAMEA over 1993-2006*, *Economia Politica*, XXVII(3), 421-449.
- Mazzanti M., Zoboli R. (2009). *Environmental efficiency and labour productivity: Trade-off or joint dynamics? A theoretical investigation and empirical evidence from Italy using NAMEA*. *Ecological Economics*, vol. 68; 1182-1194.
- Mazzanti M. Montini A. Marin G. (2012), *Aggregation biases in environmental extended input output: evidence from Italy and Spain*, *Ecological Economics*, 74: 71-84.
- Mazzanti M., Montini A., Zoboli R. (2008). *Environmental Kuznets Curves for greenhouse gas emissions. Evidence from Italy using National Account Matrix including Environmental Accounts and provincial panel data*. *International Journal of Global Environmental Issues*, vol. 8(4); 392-424.
- Mazzanti M. Montini A. Zoboli R. (2007), *Struttura produttiva territoriale ed indicatori di efficienza ambientale. Un'analisi attraverso la NAMEA regionale*, *Economia delle fonti di energia e dell'ambiente*, n.1.
- Mazzanti M., Paleari S., Zoboli R. (2007), *Effectiveness of environmental taxes and charges for managing sand, gravel and rock extraction in selected EU countries: Italy*, ETC/RWM working paper 2007/4 European Topic Centre on Resource and Waste Management, Copenhagen.
- Moll S., Vrgoc M., Watson D., Femia A., Pedersen O., Villanueva A. (2007), *Environmental Input-Output Analyses based on NAMEA data. A comparative European study on environmental pressures arising from consumption and production patterns*, ETC/RWM working paper 2007/2, European Topic Centre on Resource and Waste Management, Copenhagen.
- Sforzi F. Lorenzini F. (2002), "I Distretti Industriali", in *Ministero delle Attività Produttive-IPI, L'esperienza italiana dei distretti industriali*, Roma, IPI.
- Istat (2005), *I Sistemi Locali del Lavoro, Censimento 2001. Dati definitivi*. Istat, Roma.

 Consiglio Nazionale delle Ricerche

CERIS

Working Paper Cnr-Ceris

ISSN (*print*): 1591-0709 ISSN (*on line*): 2036-8216

Download

www.ceris.cnr.it/index.php?option=com_content&task=section&id=4&Itemid=64

Hard copies are available on request,
please, write to:

Cnr-Ceris
Via Real Collegio, n. 30
10024 Moncalieri (Torino), Italy
Tel. +39 011 6824.911 Fax +39 011 6824.966
segreteria@ceris.cnr.it www.ceris.cnr.it

Copyright © 2014 by Cnr-Ceris

All rights reserved. Parts of this paper may be reproduced with the permission
of the author(s) and quoting the source.