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Conference Paper

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44th Congress of the European Regional Science Association: "Regions and Fiscal Federalism", 25th - 29th August 2004, Porto, Portugal

Provided in Cooperation with:

European Regional Science Association (ERSA)

Suggested Citation: Biagi, Bianca; Faggian, Alessandra (2004) : The effect of Tourism on the House Market: the case of Sardinia, 44th Congress of the European Regional Science Association: "Regions and Fiscal Federalism", 25th - 29th August 2004, Porto, Portugal, European Regional Science Association (ERSA), Louvain-la-Neuve

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ERSA CONFERENCE – PORTO, 25TH – 29TH AUGUST 2004

THE EFFECT OF TOURISM ON THE HOUSE MARKET: THE CASE OF
SARDINIA¹

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(PRELIMINARY VERSION, NOT TO BE QUOTED WITHOUT THE AUTHORS' PERMISSION)

¹ Though the work is the result of a joint effort of the two authors B. Biagi is responsible for the writing of sections 1, 2 and 5, while A.Faggian of sections 3 and 4.

1. Introduction

Tourism activity involves consumption of many goods and services, all of them supplied by different firms (hotels, restaurants, travel agencies, local public and private services) and required by different consumers (tourists and residents). For this reason the tourism product is defined as a basket of goods and services (Gilbert 1990, Candela 1996, Sinclair and Stabler 1997) which includes natural, cultural and man-made resources. This heterogeneity makes it not an easy task to calculate the actual and overall effect of tourism on a local economy. Generally, the impact of tourism has been studied applying standard approaches, such as input–output and keynesian multipliers which calculate the direct, indirect and induced effects of the activity at local, regional or national level. One part of the literature goes in the direction of applying - or considering the possibility of applying- other methodologies in order to include non-priced goods in the economic evaluation of tourism (Stabler, 1998). Nevertheless, all these approaches do not take into account the economic relationship between house prices and tourism.

The main purpose of the paper is to investigate the correlation between house prices and tourism in order to confirm the general expectation that local housing market should benefit from the presence of the vacation industry, i.e. the more tourist the urban area is, the higher the prices of houses located there are. Using the HPM, we estimate the implicit value of tourism which is embodied in house prices for the case of Sardinia (Italy) at municipality level. Before reaching the final estimations, however, we pass through one fundamental step: the creation of a reliable tourist index through which discriminating in a scientific manner among the locations under analysis. The purpose here is to go beyond the too general binary classification based on the subjective knowledge of the region or on rough data to create objective indices using different methodologies. In the final step, the two indices are included in the hedonic model to test the effect of tourism. Both performed as we expected confirming the hypothesis of positive and significant correlation between tourism activity and house price.

The organisation of this paper is as follows:

- ❖ section 2 introduces the theoretical framework of HPM;
- ❖ section 3 explains the methodologies on the basis of the two indices and the hedonic regression used in this case;
- ❖ section 4 describes the results obtained for the Sardinian municipalities;

❖ section 5 highlights the main conclusions and further development of the paper.

2. HPM: a theoretical framework

In the case of heterogeneous goods, hedonic price measures the contribution of each qualitative attribute to the total price. From a technical point of view the implicit price of attributes are obtained regressing them against the total price of the good itself. One of the first studies on HPM is due to Waugh's work in 1929 (Sheppard, 1999). However, the term "hedonic" dates back to 1939, when Andrew Court used it, for the first time, to indicate "the analysis of prices and demand for the individual source of pleasure" (Sheppard 1999, p. 1597). After Court's contribution HPM is not applied until the 1960s, in which Griliches (1961, 1971) gives the popularity to the method². Until that moment, however, HPM is considered exclusively a statistical technique not linked to any economic theory. It is Rosen (1974) to offer the fundamental theoretical framework for hedonic analysis. In his theoretical framework, consumers see heterogeneous goods as bundle of quantitatively measurable characteristics. The prices difference among similar goods reflects the concentration and composition of characteristics.

The HPM has not been broadly used in tourism studies. Some contributions analyse the price competitiveness of holiday packages promoting London and Paris (Clewer et al 1992), others calculate the competition between Mediterranean resorts starting by the inclusive tour holidays supplied by tour operators (Papatheodorou 2002, Espinet et al. 2003, Clerides et al. 2003, Mangion et al. 2003) and other studies estimate hedonic price models for tourist resorts (Sinclair et al. 1990 for the case of Malaga).

Conversely, the hedonic literature on housing is quite extensive, the implicit price of each characteristic find through the regression represents the equilibrium between demand and supply. As in Rosen the consumer's utility is represented by:

$$u = u(Z, Y, \alpha) \quad (2.1)$$

where: Z = characteristics of the house;

² According to Goodman (1998), the reasons behind this gap in time is due to the major interests of academic world during the 50s and 60s for more macroeconomic themes along with the difficulty to apply techniques requiring sophisticated computer programmes which allow to individuate the most suitable functional form and the most significative variables among the explicative ones.

Y = composite good;

α = vector of consumer attributes (such as education, income, social status).

The budget of each individual is constraint by the income, the price of Y (all the other goods) and the price of housing (function itself of housing characteristics). Therefore, for each level of income and utility the willingness to pay (θ) for housing or “bid rent function” is:

$$\theta = \beta(Z, M, u, \alpha) \quad (2.2)$$

where: Z= the quantity of attributes of the house;

M= consumer’s income;

u= the satisfaction of buying other goods;

α = individual’s preferences.

Implicitly the (2.2) assumes that consumer’s utility is:

$$u = u(Z, M - \beta, \alpha) \quad (2.3)$$

where: Z= vector of attributes of the house

M – β = amount of income used for other goods

α = consumer’s preferences

The first derivative of the bid rent function is $\partial\beta/\partial Z_i$, i is the finite number of house attributes. This derivative indicates the consumer’s willingness to pay each attribute maintaining constant the level of his total utility. Given preferences and income, the maximisation of individual’s utility in consuming both, the house and the composite good is:

$$\max_{Z, Y} u = u(Z, Y, \alpha) \quad (2.4)$$

s.t.

$$M \geq P(Z) + Y$$

where: P(Z)= income used to buy the house

Y = income used to buy others goods

The first order condition in this case is:

$$\frac{u_i}{u_Y} = P_i \nabla_i \quad (2.5)$$

where: $u_i = \partial u / \partial Z_i$

$$P_i = \partial P / \partial Z_i$$

The derivative P_i represents the demand implicit hedonic price for characteristic i (while $P(Z)$ represents the hedonic function of the total price).

If we equal the first order condition (2.5) to the derivative of the bid rent function we obtain the consumer optimum:

$$\frac{\delta \beta}{\delta Z_i} = \frac{u_i}{u_Y} = P_i \quad (2.6)$$

To introduce the supply side in the model, let us start by defining the cost function of each firm:

$$C = C(Z, N, \gamma) \quad (2.7)$$

where: Z = characteristics of the house;

N = number of houses already produced

γ = vector of producer attributes which are different among producers (the cost of the production factors and the parameters of the production function).

Each producer is price-taker with respect to the total market price $P(Z)$, the optimum profit is obtained when the difference between total revenue and total cost is maximised:

$$\max_{Z, N} \pi = P(Z) * N - C(Z, N, \gamma) \quad (2.8)$$

The first order condition to maximise the profit is:

$$P_i = C_i \quad (2.9a)$$

$$P(Z) = C_N \quad (2.9b)$$

where: C_i = marginal cost of an additional unit of characteristic i ;

C_N = marginal cost of an additional house.

Equation (2.9a) implies that each characteristic will be produced until the marginal cost to produce will be equal to the marginal price (the hedonic price). The (2.9b) means that a new house will be produced until the marginal cost of producing an additional house is equal to the total market marginal price of the house (which itself depends on the characteristics embodied in the house).

Given the profit, the producer bid rent function is the combinations between house attributes and the price the firm is willing to receive for each type he produces:

$$\phi = (Z, \pi, \gamma) \quad (2.10)$$

where: Z = quantity of attributes of the house

π = desired profit;

γ = costs of production.

The supplier is price-taker with a market price equal to $P(Z)$ and, in order to maximise the profit, the total market price has to be equal to the his willingness to receive for each attributes (the reservation price):

$$P(Z) = \phi(Z) \quad (2.11)$$

Finally, in the equilibrium situation for each house type exists an hedonic price function $P(Z)$ for which demand is equal to supply (the willingness to pay, the willingness to accept and the hedonic price are the same).

This theoretical framework is behind the following general hedonic function use by the housing literature³:

$$HP = f(S, QE) \quad (2.12)$$

where: HP = vector of housing price

S = vector of structural characteristics of housing

³ For a survey on this literature see Sheppard (1999).

QE = vector of location characteristics (level of amenities and disamenities which affect housing price).

Among the several functional forms expressing the (2.12), the most common one is the linear:

$$HP = \alpha + \beta' S + \gamma' QE \quad (2.13)$$

where: β = vector of coefficients of the structural factors S

γ = vector of coefficients of external factors QE

As said before, the implicit price of each attribute indicates how much the total price increases if the characteristic k (either structural or environmental) increases of one marginal unit. The expected signs of the vectors are:

$$\beta' > 0 \quad (\partial P / \partial S)$$

$$\gamma' > 0 \quad (\partial P / \partial QE > 0) \text{ if the QE factor represents an amenity}$$

$$\gamma' < 0 \quad (\partial P / \partial QE < 0) \text{ if the QE factor represents a disamenity}$$

3. Methodology

3.1. Indices of Tourism

To achieve the first goal of the paper, i.e. building reliable tourism indices for the Sardinian municipalities, we apply two different methodologies and compare the final classifications resulting from them.

The first of the two methodologies is based on a ranking procedure. Firstly, we collect data on six variables linked with tourism: expenditure in the recreation and tourism sector, number of summer houses, total number of recreational structures (hotels, campings and tourist villages), number of employees in the tourism industry (which was used to calculate location quotients), distance from the coast and altitude of each municipality. Secondly, we create six different rankings, one for each variable, for all municipalities. To do this, we used the Van der Waerden ranking scores (VdW), which is a type of fractional rank. In order to understand what a fractional rank is, let us call

our observations y_i and the corresponding case-weight⁴ W_i with $i=1,2,\dots,377$. After defining $A=\sum_{i=1}^{377} W_i$, a “fractional rank” can be expressed as $RF_i = R_i / A$ where R_i is the rank of each observation. Van der Waerden slightly modified this index proposing the following formula:

$$VdW_i = R_i / (A + 1) \quad (3.1)$$

The VdW fractional rank is simply a way of standardising scores⁵ so that they range from $1/(n+1)$ to $n/(n+1)$. In our case, with $n=377$, the domain of the scores is between a value of around 0.0026 to a value of 0.9973. Note that a higher score corresponds to less touristic areas and vice versa. After having calculated the VdW index for each touristic variable separately, we average out the six scores to obtain the final index of tourism (INDTUR4):

$$INDTUR4_i = \sum_{j=1}^6 VDW_{ij} / 6 \quad (3.2)$$

The second methodology borrowed the idea of Euclidean distance, which is at the core of cluster analysis. Cluster analysis is a statistical procedure used to create groups of similar cases from a sample of observations. Our initial thought was to use cluster analysis to create different groups with increasing levels of tourism (from low to high tourist locations). However, this would not provide a sequential ranking of all the municipalities, which is essential for a comparison with the previous VdW index. Even though cluster analysis calculates the distance of each observation from the centroid of its corresponding cluster, it says nothing about the direction away from the centroid. Therefore, it is impossible to know whether the distance means that the specific municipality is more or less touristic than the central observation of its cluster. To overcome this problem, we selected a priori the municipality with the highest values for the 6 tourist variables under analysis and we then calculated an n-dimensional ($n=6$)

⁴ We decided to give the same weight to all cases, but this hypothesis can be removed and weights like the population or the surface of each municipalities can be used to create a more sophisticated index.

⁵ For alternative ways of standardising scores see Tukey (1962) and Blom (1958)

Euclidean distance from this top-touristic municipality and each of the observations⁶. The municipality we selected as a benchmark was Alghero. This urban area has 61 recreational structures, a location quotient of 2.14 for the tourism sector, an index per-capita expenditure for recreational activities of 25.01, an average of 0.19 summer houses per inhabitant, a distance from the coast of just 0.54 km and an altitude of 7 meters. After we select Alghero as a benchmark, we calculate the Euclidean distance from it and the rest of the municipalities. The Euclidean distance between two items, i and j , is the square root of the sum over the 6 variables of the difference in values squared. In our case the Euclidean distance between Alghero (point A) and another municipality (point y_m) is expressed as:

$$E_{Ay_m} = \sqrt{\sum_{j=1}^6 (A_j - y_{mj})^2} \quad m=1, 2, \dots, 377 \quad (3.3)$$

These distances can be easily calculated by creating a cluster for each observation in the sample (i.e. 377 clusters in our case) and using the distance matrix that is included in the outcome of the cluster analysis. The distance matrix gives all the distances between pairs of observations. By looking at the column (or row) corresponding to Alghero, we had all the distances needed for our index (INDTUR5).

$$INDTUR5_{y_m} = E_{Ay_m} \quad (3.4)$$

with A=Alghero, $m=1, \dots, 377$

This index has a lower bound of zero (specifically Alghero with itself), but no upper bound since the distance can take any value. In the future, one might consider standardising this index, but we are not concerned with that here. All we care about is that a lower value of INDTUR5 corresponds to a higher degree of tourism vocation of the area as the case for the previous INDTUR4 index.

3.2. Hedonic Regression

⁶ The top-touristic location is also included

The indices described in the previous section, INDTUR4 and INDTUR5, are now incorporated in an hedonic regression of type:

$$HP_i = f(S_i, E_i, QL_i, T_i) \quad (3.5)$$

with $i=1,2,\dots,377$

where HP=housing market variable

S=Vector of structural characteristics of the housing market

E=Vector of economic and location characteristics of the municipality

QL=Vector of quality of life variables at the municipality level

T = municipality tourist indices (either INDTUR4 or INDTUR5)

The function in equation (3.5) can be expressed using a variety of different forms. In this work, we choose a simple linear form, not having any a-priori reason to assume a different functional form. Equation (3.5) becomes therefore:

$$HP_i = \alpha + \beta^{(k)} S_i^{(k)} + \gamma^{(m)} E_i^{(m)} + \delta^{(p)} QL_i^{(p)} + \phi T_i + \varepsilon_i \quad (3.6)$$

with $i=1,2,\dots,377$

where k=number of structural characteristics

m=number of economic and location characteristics of the municipality

p=number of quality of life variables

Notice that β , γ and δ are vectors and ϕ is a scalar, which gives us the effect of tourism on the house market. We expect tourism to have a positive effect on housing market, which means, recalling the way tourist indices have been built, that we expect

$$\frac{\partial HP_i}{\partial T_i} = \phi < 0.$$

4. Results of the empirical Analysis

Before analysing the results of our empirical analysis, it is important to give some information about Sardinia. Sardinia is the second main island of Italy and is seven hours away from the mainland by boat (around one hour by plane). It has a surface of 24.089 square km. (7,9% of the national surface) and a coastal line of 1.731 km.

Bathing water is safe in 847 kilometres of the coast (17% of the Italian safe coasts). The island belongs to that group of Italian regions having a special statute (that means among other legislative autonomy). Administratively the island is divided in four provinces: Cagliari (in the South), Nuoro (in the East), Oristano (in the West) and Sassari (in the North). The province of Cagliari has 108, Nuoro 104, Oristano 78 and Sassari 90.

More than one and half million people live in Sardinia (1,651,888 in 1999, 2.8% of Italian population). 50% of these live in the province of Cagliari and 28% in the province of Sassari. The average population density is less than one third⁷ the average population density of Italy (67 inhabitants per km² versus 191). Sardinia relies upon five ports (Arbatax, Cagliari, Golfo Aranci and Olbia) and three airports (Alghero, Cagliari and Olbia). Since the 1960's, when the tourism industry started developing very fast, the province of Sassari has been the strongest attraction of Sardinia. Nowadays, 50% of tourist demand is concentrated in Sassari and so are 50% of all the tourist beds (hotels, camping sites and tourist villages).

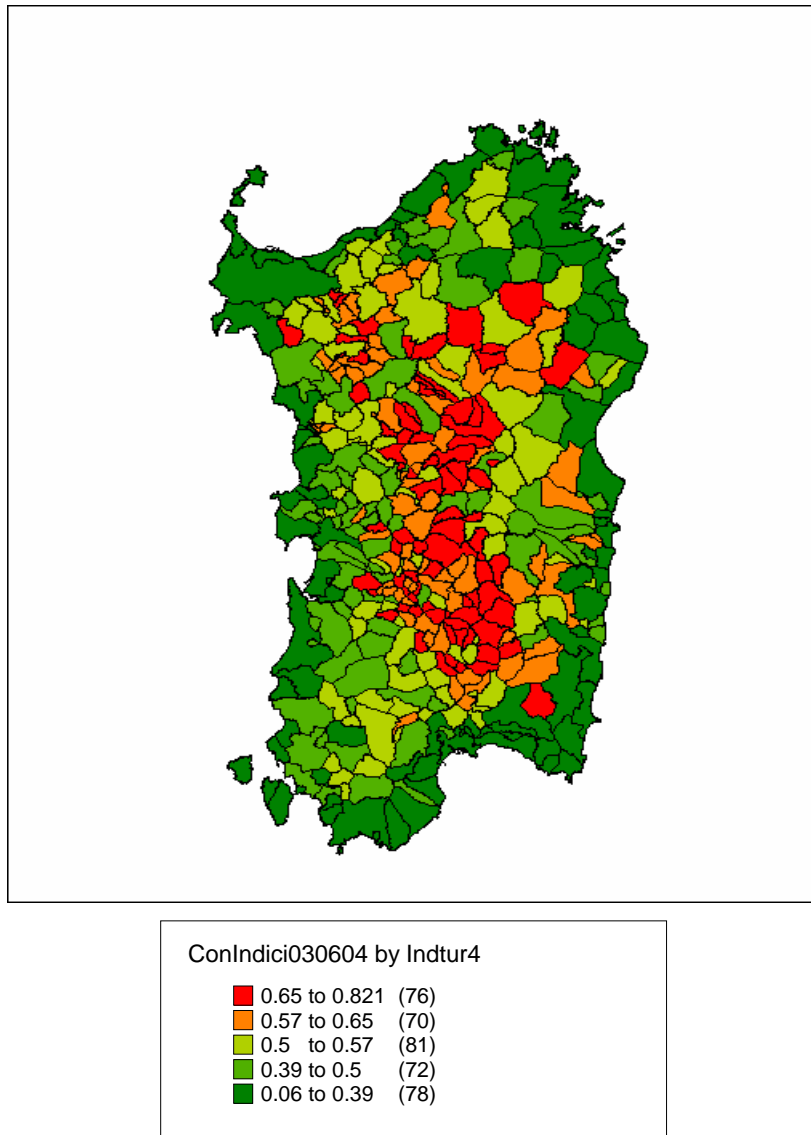
This background information on the economy and tourism industry in Sardinia helps us better understand the results of the empirical analysis, which are presented in the next two sections.

4.1 Tourism indices

As already explained in the previous paragraph, we devised two different methodologies to create an index of how “touristic” each municipality is. The results of the first index (INDTUR4), based on the Van Der Waerden proportional ranks, are given in Figure 1 (see Table A.1, Appendix A, for a full list of the indices by municipality).

⁷ More precisely 112 in Cagliari, 61 in Sassari, 60 in Oristano and 39 in Nuoro

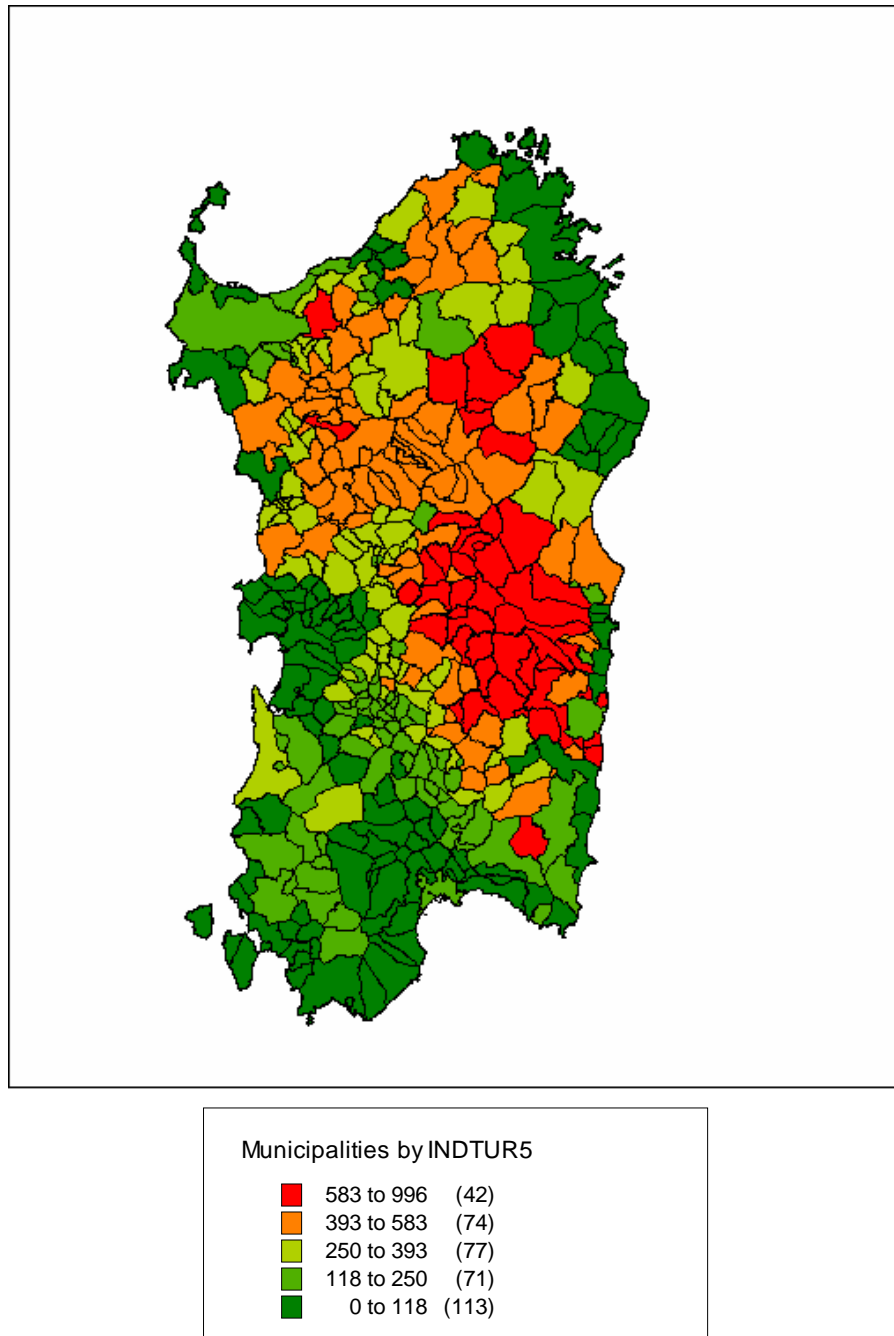
Figure 1: Classification of Sardinian municipality according to INDTUR4



Tourist municipalities are mainly located along the coastal line, as it is reasonable to expect, while the central municipalities, more rural and less densely populated, are the least tourist.

A similar result is obtained by applying the second methodology based on cluster analysis (INDTUR5). Figure 2 presents the outcome of this (see Table A.2, Appendix A, for a full list of indices by municipalities).

Figure 2: Classification of Sardinian municipality according to INDTUR5



The division between coastal-tourist municipalities and central-non tourist areas is still evident, though with some exceptions on the East coasts (Orosei and Dorgali). The least tourist municipalities now are mainly “centred” around the Nuoro area. The two indices, though giving slightly different results, show a significant degree of correlation⁸.

⁸ The Pearson’s correlation between the two indices is 0.509, significant at the 0.01 level (two-tailed).

4.1 Hedonic regression analysis

The main aim of this section is to evaluate the effect of tourism on local house market, i.e. are prices affected by tourism and, if so, is this effect significant?

To answer this question, we add the two statistical indices of tourism created in the previous section in a hedonic regression analysis in which we regress the average house rents on structural characteristics of houses, quality of life variables and economic characteristics of the municipalities. A list of the explanatory variables used in the analysis is shown in Table 1.

Table 1: definition of explanatory variables

| Variable name | Definition | Type of variable <i>(see equation 3.6)</i> | Source |
|----------------------|---|--|--|
| MEDSUPOC | Average surface of houses (square meters) | S | ISTAT |
| MEDROOM | Average number of rooms per houses | S | ISTAT |
| RED_ABI | Average individual income (Euros) | E | ISTAT |
| DENS | Population density | E | Tagliacarne Institute |
| CONS_ABI | Average individual consumption | E | Tagliacarne Institute |
| CRIME | Average of attack from 1994 to 1998 to institutional persons and their properties | QL | UNCEM - ANCI Sardegna |
| DISTPRO | Distance from the province | E | Our elaboration (MapInfo G.I.S) |
| RAIN | Yearly rain (mm) | QL | Istituto Agro Meteorologico della Sardegna |
| INDTUR4 | Index of tourism based on Van Der Waerden ranking procedure | T | Our elaboration |
| INDTUR5 | Index of tourism based on Euclidean distances | T | Our elaboration |

Table 2 presents the results of the final regression models. Model 1 includes structural house characteristics (medsupoc and medroom), economic and location variables (red_abi, dens, distpro) and quality of life variables (rain and crime) both at municipality level. Model 1 gives us an idea of how the explanatory variables perform

without the tourist indices. In Models 2 and 3 the equations have been run introducing the indices of tourism activity developed in the previous section, respectively INDTUR4 in the second model and INDTUR5 in the third one.

Table 2: Regression analysis results
Dependent variable: *Pmedio*

| | Model 1 | Model 2 | Model 3 |
|---------------------------------|------------------------|-----------------------|------------------------|
| Constant | -300.62** (-9.939) | -267.04** (-8.536) | -294.231** (-9.692) |
| MEDSUPOC | 2.143** (8.957) | 2.211** (9.352) | 2.105** (8.793) |
| MEDROOM | 2.030 (0.528) | 2.985 (0.786) | 2.653 (0.689) |
| RED_ABI | 0.00208** (10.306) | 0.00206** (10.357) | 0.00220** (10.383) |
| DENS | -0.00469** (-2.663) | -0.0064** (-3.561) | -0.0057** (-3.113) |
| CONS_ABI | -4.806** (-4.113) | -6.557** (-5.229) | -5.558** (-4.494) |
| CRIME | -2.143 (-0.338) | -6.139 (-0.986) | -2.388 (-0.385) |
| DISTPRO | -0.00016 (-1.380) | -0.0002* (-1.637) | -0.00015 (1.274) |
| RAIN | -1.373** (-3.586) | -1.351** (-3.583) | -1.405** (-3.677) |
| INDTUR4 | - | -48.859** (-3.515) | - |
| INDTUR5 | - | - | -0.019* (-1.811) |
| <i>Adjusted – R²</i> | 0.423 | 0.441 | 0.427 |
| <i>R²</i> | 0.436 | 0.454 | 0.441 |

As the table highlights, both indices are significant and have the expected sign. The negative sign⁹ of the coefficient confirms the positive effect of tourism on the house market. Moreover, the overall significativity of the model is increased, though the effect of INDTUR4 is much stronger than INDTUR5 (the adjusted R-squared increases from 0.423 to 0.441, while with INDTUR5 it increases only up to 0.427). Among the other explanatory variables, the most significant one is the average municipal income (RED_ABI). This means, as expected, that richer areas have higher rents. The negative

⁹ Note that, as mentioned in paragraph 3.2, a lower value of the indices means a more touristic area.

coefficient on population density seems to confirm that density is a proxy for congestion rather than agglomeration economies (therefore having a negative effect on housing). Another reasonable result is the sign of the coefficients of quality of life variables, such as rain and crime, which have a negative impact on house prices. Being distant from the province (an index of “centrality”) affects negatively the house market although the negative coefficients are not very significant (only in Model 2 the coefficients is significant at 10% level). Out of the two structural housing characteristics, only MEDSUPOC is significantly and positively correlated with the rent, while MEDROOM is insignificant in all three models. An unexpected result was the sign on the average consumption variable. The significant and negative sign seems to testify a substitution effect between consumption and housing (crowding out).

5. Conclusions

This paper develops two levels of analysis. The first one is dominated by the believe that the discrimination between tourist and non-tourist location should be scientific and should take into account the complex character of the tourism good. Therefore, two indices have been developed using two different methodologies with the purpose to compare their results regarding the municipalities classification. In general, both indices gives sensible results, though slightly different final rankings, and are significantly correlated.

The second level of investigation tries to find insights on the relationship between tourist activity and house prices. In order to do this, we use an hedonic function implying the dependence among house price and, respectively, the structural attributes of the good, the quality of the place in which the house is located, and the “tourist” characteristic of the place. The findings confirm the expectations, house market is affected by tourism in a positive way, namely, the more touristic is the place, the higher is the competitive pressure on the house market.

The results of the analysis are rather encouraging in continuing to research in this direction. One of the possible future developments of the work will be the introduction of a more complex hedonic equation to allow for a non-linear relationship between houses prices (therefore implicit prices) and the explanatory variables. Furthermore, it

would be important to consider spatial effects arising from the proximity of the municipalities under analysis. Some refinements of the indices could also be devised.

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Appendix A

Table A.1: Ranking of municipalities by INDTUR4

| Ranking | COMUNE | VdW Score |
|---------|---------------------|-----------|
| 1 | Palau | 0.06129 |
| 1 | Alghero | 0.06129 |
| 3 | Pula | 0.06900 |
| 4 | S.Teresa di Gallura | 0.08135 |
| 5 | La Maddalena | 0.08245 |
| 6 | S.Teodoro | 0.08488 |
| 7 | Bosa | 0.09590 |
| 8 | Olbia | 0.09766 |
| 9 | Arzachena | 0.09832 |
| 10 | Muravera | 0.09854 |
| 11 | Villasimius | 0.10428 |
| 12 | Carloforte | 0.10670 |
| 13 | Budoni | 0.10913 |
| 14 | Golfo Aranci | 0.11464 |
| 15 | Orosei | 0.12412 |
| 16 | Calasetta | 0.12698 |
| 17 | Valledoria | 0.12831 |
| 18 | Stintino | 0.13514 |
| 19 | S.Antioco | 0.13558 |
| 20 | Castelsardo | 0.14749 |
| 21 | Teulada | 0.15057 |
| 22 | Siniscola | 0.15675 |
| 23 | Posada | 0.15983 |
| 24 | S.Anna Arresi | 0.16071 |
| 25 | Quartu S.Elena | 0.16116 |
| 26 | Bari Sardo | 0.16182 |
| 27 | Domus De Maria | 0.16204 |

| | | |
|----|------------------------|---------|
| 28 | Sorso | 0.17504 |
| 29 | Badesi | 0.19092 |
| 30 | Cabras | 0.19356 |
| 31 | Fluminimaggiore | 0.19577 |
| 32 | Villaputzu | 0.19819 |
| 33 | Dorgali | 0.20018 |
| 34 | Loiri Porto S.Paolo | 0.20326 |
| 35 | Trinita' d'Agultu e Vi | 0.20459 |
| 36 | Buggerru | 0.20723 |
| 37 | Lotzorai | 0.21274 |
| 38 | Cagliari | 0.22354 |
| 39 | Tortoli' | 0.22840 |
| 40 | Castiadas | 0.23567 |
| 41 | Cuglieri | 0.24184 |
| 42 | Oristano | 0.24691 |
| 43 | Tertenia | 0.24846 |
| 44 | Cardedu | 0.24912 |
| 45 | Sinnai | 0.25022 |
| 46 | Baunei | 0.25044 |
| 47 | Maracalagonis | 0.25441 |
| 48 | S.Vero Milis | 0.25639 |
| 49 | Narbolia | 0.26213 |
| 50 | Arbus | 0.27050 |
| 51 | Sarroch | 0.27734 |
| 52 | Portoscuso | 0.28086 |
| 53 | Magomadas | 0.28439 |
| 54 | Aglientu | 0.28704 |
| 55 | Gonnesa | 0.29299 |
| 56 | Selargius | 0.29365 |
| 57 | Terralba | 0.29696 |
| 58 | Porto Torres | 0.30049 |
| 59 | Tresnuraghes | 0.30732 |
| 60 | Torpe' | 0.31724 |
| 61 | Girasole | 0.33466 |
| 62 | Capoterra | 0.34854 |
| 63 | Telti | 0.35097 |
| 64 | Arborea | 0.35604 |
| 65 | Quartucciu | 0.35913 |
| 66 | Masainas | 0.36243 |
| 67 | S.Vito | 0.36354 |
| 68 | Lode' | 0.36442 |
| 69 | S.Maria Coghinas | 0.36772 |
| 70 | Sassari | 0.36883 |
| 71 | Tratalias | 0.37059 |
| 72 | Perfugas | 0.37125 |
| 73 | Villamassargia | 0.37456 |
| 74 | Loceri | 0.37654 |
| 75 | Jerzu | 0.37941 |
| 76 | Assemini | 0.38095 |
| 77 | Berchidda | 0.38183 |
| 78 | Mon serrato | 0.38228 |
| 79 | S.Giovanni Suergiu | 0.38889 |
| 80 | Solarussa | 0.39220 |
| 81 | Iglesias | 0.39660 |

| | | |
|-----|----------------------|---------|
| 82 | Pozzomaggiore | 0.39683 |
| 83 | Palmas Arborea | 0.39705 |
| 84 | Nurachi | 0.39969 |
| 85 | Oschiri | 0.40476 |
| 86 | Villa S.Pietro | 0.41027 |
| 87 | Riola Sardo | 0.41270 |
| 88 | Santadi | 0.41601 |
| 89 | Guspini | 0.42284 |
| 90 | Narcao | 0.42284 |
| 91 | Bortigiadas | 0.42328 |
| 92 | Padria | 0.42681 |
| 93 | Villaurbana | 0.43011 |
| 94 | Galtelli' | 0.43011 |
| 95 | Santu Lussurgiu | 0.43034 |
| 96 | Uras | 0.43034 |
| 97 | Fordongianus | 0.43386 |
| 98 | Monti | 0.43519 |
| 99 | Gonnosfanadiga | 0.43651 |
| 100 | Sennori | 0.43849 |
| 101 | S.Sperate | 0.43893 |
| 102 | S.Giusta | 0.43915 |
| 103 | Baratili S.Pietro | 0.44114 |
| 104 | Pau | 0.44136 |
| 105 | Abbasanta | 0.44158 |
| 106 | S.Nicolo' D'Arcidano | 0.44180 |
| 107 | Bauladu | 0.44466 |
| 108 | Simaxis | 0.44489 |
| 109 | Villanova Monteleone | 0.44511 |
| 110 | Uta | 0.44577 |
| 111 | Sardara | 0.44643 |
| 112 | S.Antonio di Gallura | 0.44974 |
| 113 | Tempio Pausania | 0.45018 |
| 114 | Oliena | 0.45040 |
| 115 | Villanova Truschedu | 0.45150 |
| 116 | Sennariolo | 0.45282 |
| 117 | Irgoli | 0.45326 |
| 118 | Laerru | 0.45392 |
| 119 | Tuili | 0.45525 |
| 120 | Viddalba | 0.45547 |
| 121 | Carbonia | 0.45569 |
| 122 | Olmedo | 0.45657 |
| 123 | Bonarcado | 0.45657 |
| 124 | Bonorva | 0.46010 |
| 125 | Elmas | 0.46010 |
| 126 | S.Gavino Monreale | 0.46098 |
| 127 | Seneghe | 0.46208 |
| 128 | Villasor | 0.46384 |
| 129 | Bulzi | 0.46407 |
| 130 | Allai | 0.46539 |
| 131 | Triei | 0.46583 |
| 132 | Ollastra Simaxis | 0.46649 |
| 133 | Marrubiu | 0.47156 |
| 134 | Montresta | 0.47200 |
| 135 | Siamaggiore | 0.47685 |

| | | |
|-----|-----------------------|---------|
| 136 | Arzana | 0.47817 |
| 137 | Villacidro | 0.47884 |
| 138 | Giba | 0.47994 |
| 139 | Lanusei | 0.48038 |
| 140 | Masullas | 0.48082 |
| 141 | Samassi | 0.48236 |
| 142 | Bolotana | 0.48369 |
| 143 | Tramatza | 0.48391 |
| 144 | Gairo | 0.48523 |
| 145 | Villagrande Strisaili | 0.48545 |
| 146 | Seui | 0.48765 |
| 147 | Ballao | 0.48787 |
| 148 | Ales | 0.49140 |
| 149 | Sorgono | 0.49449 |
| 150 | Mores | 0.49493 |
| 151 | Gavoi | 0.49537 |
| 152 | Tonara | 0.49537 |
| 153 | Gonnoscodina | 0.49669 |
| 154 | Ghilarza | 0.49691 |
| 155 | Milis | 0.49802 |
| 156 | Luras | 0.49934 |
| 157 | Villaperuccio | 0.50088 |
| 158 | Nuoro | 0.50198 |
| 159 | Aritzo | 0.50265 |
| 160 | Senorbi' | 0.50287 |
| 161 | Vallermosa | 0.50375 |
| 162 | Sestu | 0.50485 |
| 163 | Luogosanto | 0.50529 |
| 164 | Desulo | 0.50573 |
| 165 | Monastir | 0.50794 |
| 166 | Nulvi | 0.50948 |
| 167 | Villa Verde | 0.50948 |
| 168 | Macomer | 0.50970 |
| 169 | Decimomannu | 0.51058 |
| 170 | Nuraminis | 0.51058 |
| 171 | Osilo | 0.51124 |
| 172 | Ossi | 0.51190 |
| 173 | Ittiri | 0.51323 |
| 174 | Tergu | 0.51411 |
| 175 | Padru | 0.51477 |
| 176 | Siliqua | 0.51477 |
| 177 | Settimo S.Pietro | 0.51543 |
| 178 | Sedini | 0.51918 |
| 179 | Tadasuni | 0.52006 |
| 180 | Perdasdefogu | 0.52160 |
| 181 | Sanluri | 0.52293 |
| 182 | Serramanna | 0.52359 |
| 183 | Uri | 0.52535 |
| 184 | Borore | 0.52557 |
| 185 | Onifai | 0.52756 |
| 186 | Suni | 0.52844 |
| 187 | Ula Tirso | 0.53020 |
| 188 | Perdaxius | 0.53153 |
| 189 | Modolo | 0.53175 |

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|-----|---------------------------|---------|
| 190 | Gonnostramatza | 0.53263 |
| 191 | Soleminis | 0.53307 |
| 192 | Osini | 0.53351 |
| 193 | Domusnovas | 0.53373 |
| 194 | Mamoiada | 0.53417 |
| 195 | Thiesi | 0.53483 |
| 196 | Seulo | 0.53616 |
| 197 | Scano di Montiferro | 0.53638 |
| 198 | Bono | 0.53704 |
| 199 | Banari | 0.53726 |
| 200 | Villanovaforru | 0.53902 |
| 201 | Musei | 0.54034 |
| 202 | Escalaplano | 0.54123 |
| 203 | Piscinas | 0.54211 |
| 204 | Tula | 0.54431 |
| 205 | Barumini | 0.54541 |
| 206 | Bultei | 0.54630 |
| 207 | Fonni | 0.54630 |
| 208 | Ozieri | 0.54740 |
| 209 | Orgosolo | 0.54784 |
| 210 | Senis | 0.54850 |
| 211 | Calangianus | 0.54872 |
| 212 | Decimoputzu | 0.54894 |
| 213 | Onani' | 0.54916 |
| 214 | Pabillonis | 0.54938 |
| 215 | Ploaghe | 0.55004 |
| 216 | Ortacesus | 0.55071 |
| 217 | Sindia | 0.55115 |
| 218 | Paulilatino | 0.55159 |
| 219 | Zeddiani | 0.55203 |
| 220 | Norbello | 0.55225 |
| 221 | Nuxis | 0.55644 |
| 222 | Budduso' | 0.55710 |
| 223 | Albagiara | 0.55754 |
| 224 | Usini | 0.55886 |
| 225 | Serrenti | 0.56063 |
| 226 | Martis | 0.56085 |
| 227 | Dolianova | 0.56107 |
| 228 | Nughedu S.Vittoria | 0.56195 |
| 229 | Monteleone Rocca Doria | 0.56217 |
| 230 | Mogoro | 0.56261 |
| 231 | Ussassai | 0.56349 |
| 232 | Samugheo | 0.56504 |
| 233 | Simala | 0.56548 |
| 234 | Bidoni' | 0.56592 |
| 235 | Ortueri | 0.56636 |
| 236 | Florinas | 0.56768 |
| 237 | Pompu | 0.57231 |
| 238 | Armungia | 0.57518 |
| 239 | Bortigali | 0.57628 |
| 240 | Mara | 0.57628 |
| 241 | Borutta | 0.57804 |
| 242 | Isili | 0.57848 |
| 243 | Zerfaliu | 0.57870 |

| | | |
|-----|------------------|---------|
| 244 | Bonnannaro | 0.57892 |
| 245 | Nureci | 0.58047 |
| 246 | Sedilo | 0.58047 |
| 247 | Busachi | 0.58422 |
| 248 | Ulassai | 0.58444 |
| 249 | Urzulei | 0.58466 |
| 250 | Ussana | 0.58840 |
| 251 | Baressa | 0.58951 |
| 252 | Gergei | 0.58951 |
| 253 | Sini | 0.59039 |
| 254 | Gesturi | 0.59061 |
| 255 | Ussaramanna | 0.59061 |
| 256 | Tiana | 0.59083 |
| 257 | Assolo | 0.59281 |
| 258 | Flussio | 0.59347 |
| 259 | Lunamatrona | 0.59722 |
| 260 | Cossoine | 0.59810 |
| 261 | Tinnura | 0.59854 |
| 262 | Giave | 0.59899 |
| 263 | Talana | 0.60009 |
| 264 | Villaspeciosa | 0.60229 |
| 265 | Loculi | 0.60384 |
| 266 | Usellus | 0.60406 |
| 267 | Codrongianos | 0.60780 |
| 268 | Ilbono | 0.60957 |
| 269 | Chiaramonti | 0.61067 |
| 270 | Romana | 0.61287 |
| 271 | Elini | 0.61486 |
| 272 | Illorai | 0.61508 |
| 273 | Villa S. Antonio | 0.61684 |
| 274 | Donori | 0.61706 |
| 275 | Genuri | 0.61772 |
| 276 | Sagama | 0.61772 |
| 277 | Ottana | 0.61861 |
| 278 | Segariu | 0.61993 |
| 279 | Villasalto | 0.62037 |
| 280 | Erula | 0.62213 |
| 281 | Tissi | 0.62257 |
| 282 | Goni | 0.62280 |
| 283 | Bitti | 0.62434 |
| 284 | Nuragus | 0.62434 |
| 285 | Nurallao | 0.62566 |
| 286 | Aggius | 0.62765 |
| 287 | Guasila | 0.63117 |
| 288 | Curcuris | 0.63228 |
| 289 | Boroneddu | 0.63338 |
| 290 | Orune | 0.63426 |
| 291 | Benetutti | 0.63646 |
| 292 | Serdiana | 0.63779 |
| 293 | Ollolai | 0.63845 |
| 294 | Villamar | 0.63911 |
| 295 | Siamanna | 0.64308 |
| 296 | Ardauli | 0.64396 |
| 297 | Torralba | 0.64396 |

| | | |
|-----|------------------|---------|
| 298 | Anela | 0.64418 |
| 299 | S.Nicolo' Gerrei | 0.64418 |
| 300 | Ardara | 0.64484 |
| 301 | Esterzili | 0.64484 |
| 302 | Morgongiori | 0.64616 |
| 303 | Villanovafranca | 0.64638 |
| 304 | Silanus | 0.64660 |
| 305 | Siligo | 0.64660 |
| 306 | Siris | 0.65035 |
| 307 | Ruinas | 0.65123 |
| 308 | S.Andrea Frius | 0.65123 |
| 309 | Siapiccia | 0.65278 |
| 310 | Gonnosno' | 0.65366 |
| 311 | Laconi | 0.65454 |
| 312 | Silius | 0.65564 |
| 313 | Suelli | 0.65829 |
| 314 | Orroli | 0.66005 |
| 315 | Turri | 0.66204 |
| 316 | Sarule | 0.66248 |
| 317 | Meana Sardo | 0.66424 |
| 318 | Aidomaggiore | 0.66468 |
| 319 | Esporlatu | 0.66512 |
| 320 | Putifigari | 0.66601 |
| 321 | Cargeghe | 0.66645 |
| 322 | Collinas | 0.66909 |
| 323 | Orotelli | 0.67086 |
| 324 | Bottidda | 0.67174 |
| 325 | Pattada | 0.67240 |
| 326 | Sadali | 0.67306 |
| 327 | Las Plassas | 0.67394 |
| 328 | S.Basilio | 0.67416 |
| 329 | Samatzai | 0.67416 |
| 330 | Semestene | 0.67416 |
| 331 | Ala' dei Sardi | 0.67681 |
| 332 | Siddi | 0.67747 |
| 333 | Belvi' | 0.68166 |
| 334 | Barrali | 0.68210 |
| 335 | Baradili | 0.68254 |
| 336 | Bessude | 0.68342 |
| 337 | Selegas | 0.68386 |
| 338 | Lula | 0.68673 |
| 339 | Gadoni | 0.68717 |
| 340 | Cheremule | 0.68739 |
| 341 | Setzu | 0.68981 |
| 342 | Burcei | 0.69026 |
| 343 | Nurri | 0.69026 |
| 344 | Soddi | 0.69070 |
| 345 | Pimentel | 0.69158 |
| 346 | Neoneli | 0.69246 |
| 347 | Siurgus Donigala | 0.69687 |
| 348 | Gesico | 0.69731 |
| 349 | Muros | 0.70216 |
| 350 | Dualchi | 0.70282 |
| 351 | Villanova Tulo | 0.70304 |

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|-----|-------------------|---------|
| 352 | Sorradile | 0.70392 |
| 353 | Furtei | 0.71032 |
| 354 | Guamaggiore | 0.71076 |
| 355 | Ovodda | 0.71186 |
| 356 | Mandas | 0.71605 |
| 357 | Asuni | 0.71715 |
| 358 | Nughedu S.Nicolo' | 0.71892 |
| 359 | Burgos | 0.71914 |
| 360 | Olzai | 0.71980 |
| 361 | Atzara | 0.72134 |
| 362 | Pauli Arbarei | 0.72443 |
| 363 | Noragugume | 0.72619 |
| 364 | Austis | 0.73280 |
| 365 | Orani | 0.73369 |
| 366 | Mogorella | 0.73369 |
| 367 | Lodine | 0.73567 |
| 368 | Ittireddu | 0.73743 |
| 369 | Birori | 0.74228 |
| 370 | Genoni | 0.75000 |
| 371 | Serri | 0.75463 |
| 372 | Nule | 0.75750 |
| 373 | Lei | 0.75992 |
| 374 | Teti | 0.76499 |
| 375 | Osidda | 0.77072 |
| 376 | Oniferi | 0.78219 |
| 377 | Escolca | 0.81680 |

Table A.2: Ranking of municipalities by INDTUR5

| Ranking | COMUNE | INDTUR5 |
|---------|---------------------|-----------|
| 1 | Alghero | 0 |
| 2 | Olbia | 22.460183 |
| 3 | Muravera | 36.055777 |
| 4 | Pula | 39.344614 |
| 5 | Budoni | 45.359459 |
| 6 | Orosei | 46.592827 |
| 7 | Quartu S.Elena | 46.723608 |
| 8 | La Maddalena | 47.721338 |
| 9 | S.Teodoro | 47.757764 |
| 10 | Palau | 47.948213 |
| 11 | S.Teresa di Gallura | 48.3206 |
| 12 | Tortoli' | 49.096676 |
| 13 | Villasimius | 51.140141 |
| 14 | Oristano | 51.261185 |
| 15 | Bosa | 51.710135 |
| 16 | Stintino | 52.106178 |
| 17 | S.Antioco | 54.635131 |
| 18 | Valledoria | 54.722018 |
| 19 | Arborea | 56.828689 |
| 20 | Carloforte | 58.26556 |
| 21 | Golfo Aranci | 58.323474 |
| 22 | Porto Torres | 58.426072 |
| 23 | Assemini | 59.123864 |
| 24 | Calasetta | 59.748488 |

| | | |
|----|----------------------|-----------|
| 25 | Lotzorai | 60.075373 |
| 26 | Monserrato | 60.647473 |
| 27 | Cabras | 60.763697 |
| 28 | Selargius | 60.792851 |
| 29 | Villaputzu | 61.316444 |
| 30 | Portoscuso | 61.914202 |
| 31 | Posada | 62.657377 |
| 32 | Terralba | 63.429879 |
| 33 | S.Vero Milis | 63.691429 |
| 34 | Siniscola | 63.726678 |
| 35 | Quartucciu | 63.831641 |
| 36 | S.Giusta | 64.676197 |
| 37 | Girasole | 64.844061 |
| 38 | Elmas | 64.900443 |
| 39 | Uta | 65.045372 |
| 40 | S.Giovanni Suergiu | 65.272798 |
| 41 | S.Maria Coghinas | 65.468174 |
| 42 | Marrubiu | 65.631503 |
| 43 | Nurachi | 65.978585 |
| 44 | Riola Sardo | 66.100769 |
| 45 | Palmas Arborea | 66.117132 |
| 46 | Decimomannu | 66.210639 |
| 47 | Baratili S.Pietro | 66.411432 |
| 48 | Siamaggiore | 66.451223 |
| 49 | Zeddiani | 66.603153 |
| 50 | Solarussa | 66.796377 |
| 51 | S.Nicolo' D'Arcidano | 66.824518 |
| 52 | Padru | 67.047663 |
| 53 | Simaxis | 67.476386 |
| 54 | Torpe' | 67.704861 |
| 55 | Irgoli | 67.750159 |
| 56 | Villaspeciosa | 67.958688 |
| 57 | Zerfaliu | 68.006905 |
| 58 | Tramatza | 68.125572 |
| 59 | Decimoputzu | 68.69359 |
| 60 | Gonnesa | 68.813154 |
| 61 | Viddalba | 68.827705 |
| 62 | Uras | 68.964892 |
| 63 | Loculi | 69.402827 |
| 64 | Tratalias | 69.632591 |
| 65 | Onifai | 69.685613 |
| 66 | Ollastra Simaxis | 69.773701 |
| 67 | Villasor | 69.906269 |
| 68 | Villa S.Pietro | 70.437084 |
| 69 | Galtelli' | 70.73599 |
| 70 | Bari Sardo | 71.842513 |
| 71 | Cardedu | 71.848491 |
| 72 | Teulada | 72.718483 |
| 73 | Sarroch | 73.220026 |
| 74 | S.Sperate | 73.420767 |
| 75 | Serramanna | 73.516638 |
| 76 | Fluminimaggiore | 73.994034 |
| 77 | Sestu | 74.154344 |
| 78 | Bauladu | 74.520133 |

| | | |
|-----|---------------------|-----------|
| 79 | Capoterra | 75.266734 |
| 80 | Fordongianus | 75.792327 |
| 81 | Pabillonis | 76.019699 |
| 82 | Buggerru | 77.497136 |
| 83 | Siamanna | 80.142515 |
| 84 | Arzachena | 80.671957 |
| 85 | Masainas | 81.267801 |
| 86 | Narbolia | 81.314123 |
| 87 | S.Gavino Monreale | 83.145309 |
| 88 | Giba | 83.80234 |
| 89 | Domus De Maria | 84.21314 |
| 90 | Villanova Truschedu | 84.672133 |
| 91 | Samassi | 86.580113 |
| 92 | Piscinas | 88.749351 |
| 93 | Olmedo | 88.893314 |
| 94 | Allai | 89.056148 |
| 95 | Siapiccia | 89.081827 |
| 96 | Villaperuccio | 90.341279 |
| 97 | Settimo S.Pietro | 90.597123 |
| 98 | Siliqua | 90.962562 |
| 99 | S.Anna Arresi | 91.949051 |
| 100 | Milis | 93.153389 |
| 101 | Vallermosa | 94.712148 |
| 102 | Maracalagonis | 100.00413 |
| 103 | Monastir | 101.15596 |
| 104 | Villaurbana | 102.74259 |
| 105 | Perfugas | 107.31292 |
| 106 | Ballao | 108.35157 |
| 107 | Badesi | 109.07582 |
| 108 | Nuraminis | 110.44817 |
| 109 | Loiri Porto S.Paolo | 110.8593 |
| 110 | Perdaxius | 112.88668 |
| 111 | Ussana | 112.88851 |
| 112 | Furtei | 113.21647 |
| 113 | Gonnostramatza | 113.81585 |
| 114 | Castelsardo | 118.22839 |
| 115 | Carbonia | 120.99588 |
| 116 | Villamar | 126.60678 |
| 117 | Gonnoscodina | 126.67282 |
| 118 | Serrenti | 128.62711 |
| 119 | Tertenia | 130.98659 |
| 120 | Musei | 131.22464 |
| 121 | Villamassargia | 131.90855 |
| 122 | Segariu | 134.02636 |
| 123 | Narcao | 135.35645 |
| 124 | Guspini | 138.8918 |
| 125 | S.Vito | 139.86914 |
| 126 | Masullas | 140.31842 |
| 127 | Sorso | 140.34984 |
| 128 | Sinnai | 140.92317 |
| 129 | Curcuris | 141.68675 |
| 130 | Mogoro | 142.58816 |
| 131 | Modolo | 143.11968 |
| 132 | Cagliari | 144.18982 |

| | | |
|-----|-----------------|-----------|
| 133 | Santadi | 144.25163 |
| 134 | Sanluri | 146.85645 |
| 135 | Triei | 148.40486 |
| 136 | Pauli Arbarei | 148.96768 |
| 137 | Barrali | 151.12341 |
| 138 | Donori | 151.8353 |
| 139 | Pompu | 156.3126 |
| 140 | Uri | 157.9564 |
| 141 | Domusnovas | 159.85148 |
| 142 | Las Plassas | 160.48124 |
| 143 | Sardara | 162.86183 |
| 144 | Pimentel | 163.7469 |
| 145 | Simala | 163.89363 |
| 146 | Ussaramanna | 167.87181 |
| 147 | Siris | 168.82334 |
| 148 | Samatzai | 170.88722 |
| 149 | Castiadas | 171.60869 |
| 150 | Ortacesus | 171.7198 |
| 151 | Turri | 173.356 |
| 152 | Baressa | 173.57154 |
| 153 | Baradili | 173.92088 |
| 154 | Serdiana | 177.33674 |
| 155 | Laerru | 182.60758 |
| 156 | Gonnosfanadiga | 185.19101 |
| 157 | Tadasuni | 187.99325 |
| 158 | Lunamatrona | 188.01505 |
| 159 | Siddi | 191.45493 |
| 160 | Loceri | 194.58634 |
| 161 | Ottana | 195.08694 |
| 162 | Nuxis | 195.27242 |
| 163 | Ales | 199.43192 |
| 164 | Gonnosno' | 201.07533 |
| 165 | Iglesias | 201.50942 |
| 166 | Soleminis | 203.96327 |
| 167 | Usini | 204.42911 |
| 168 | Bulzi | 205.02132 |
| 169 | Senorbi' | 205.851 |
| 170 | Guamaggiore | 206.62779 |
| 171 | Oschiri | 207.79098 |
| 172 | Villa Verde | 208.95454 |
| 173 | Barumini | 209.02149 |
| 174 | Setzu | 212.38381 |
| 175 | Tuili | 213.66201 |
| 176 | Dolianova | 215.59099 |
| 177 | Guasila | 217.5521 |
| 178 | Albagiara | 219.73929 |
| 179 | Boroneddu | 221.4341 |
| 180 | Tissi | 228.20647 |
| 181 | Sassari | 231.39334 |
| 182 | Genuri | 234.75213 |
| 183 | Asuni | 237.69013 |
| 184 | Selegas | 239.33199 |
| 185 | Villa S.Antonio | 250.79725 |
| 186 | Collinas | 252.48186 |

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| 187 | Aidomaggiore | 253.72198 |
| 188 | Soddi | 253.89551 |
| 189 | Bidoni' | 254.50412 |
| 190 | Tresnuraghes | 258.00635 |
| 191 | Suelli | 258.30876 |
| 192 | Sini | 258.39074 |
| 193 | Assolo | 258.40694 |
| 194 | Mara | 259.09751 |
| 195 | Senis | 259.56943 |
| 196 | Magomadas | 263.65987 |
| 197 | Villacidro | 266.25564 |
| 198 | Mogorella | 267.47396 |
| 199 | Putifigari | 268.38544 |
| 200 | Romana | 268.69314 |
| 201 | Sennariolo | 275.09903 |
| 202 | Tula | 277.13431 |
| 203 | Sennori | 277.6173 |
| 204 | Tergu | 280.85056 |
| 205 | Paulilatino | 281.60054 |
| 206 | Bonarcado | 283.77237 |
| 207 | Sedilo | 286.03379 |
| 208 | Usellus | 290.63038 |
| 209 | Noragugume | 290.96765 |
| 210 | Ghilarza | 291.58452 |
| 211 | Ardara | 297.87978 |
| 212 | Monti | 300.3682 |
| 213 | Martis | 300.6695 |
| 214 | Berchidda | 301.32349 |
| 215 | S.Andrea Frius | 301.48023 |
| 216 | Villanovafranca | 303.16273 |
| 217 | Gesico | 303.4068 |
| 218 | Padria | 304.4146 |
| 219 | Flussio | 305.21613 |
| 220 | Seneghe | 305.23166 |
| 221 | Sedini | 306.20285 |
| 222 | Muros | 308.5773 |
| 223 | Arbus | 309.4076 |
| 224 | Villanovaforru | 311.51554 |
| 225 | Gesturi | 312.65122 |
| 226 | Pau | 315.46893 |
| 227 | Ittireddu | 315.76679 |
| 228 | Abbasanta | 316.02483 |
| 229 | Norbello | 316.24533 |
| 230 | Codrongianos | 317.56966 |
| 231 | Luogosanto | 320.98636 |
| 232 | Dualchi | 322.72054 |
| 233 | Tinnura | 327.7308 |
| 234 | Telti | 331.57774 |
| 235 | Sagama | 332.68184 |
| 236 | Cargeghe | 333.05678 |
| 237 | Ossi | 334.60116 |
| 238 | Nureci | 336.40745 |
| 239 | Escalaplano | 338.31795 |
| 240 | Sorradile | 338.52417 |

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| 241 | Suni | 339.44627 |
| 242 | Lode' | 344.33643 |
| 243 | Ula Tirso | 349.00257 |
| 244 | Morgongiori | 350.76119 |
| 245 | S.Antonio di Gallura | 354.2959 |
| 246 | Ruinas | 359.26286 |
| 247 | Nuragus | 360.45228 |
| 248 | Trinita' d'Agultu e Vi | 362.3587 |
| 249 | S.Nicolo' Gerrei | 364.86644 |
| 250 | Armungia | 365.59167 |
| 251 | Mores | 366.70896 |
| | Monteleone Rocca | |
| 252 | Doria | 367.22866 |
| 253 | Samugheo | 370.32574 |
| 254 | Gergei | 375.56409 |
| 255 | Oliena | 377.34673 |
| 256 | Scano di Montiferro | 378.82378 |
| 257 | Busachi | 379.19886 |
| 258 | Goni | 382.75413 |
| 259 | Dorgali | 385.6422 |
| 260 | Ozieri | 390.0828 |
| 261 | Nurallao | 391.13424 |
| 262 | Borore | 393.27502 |
| 263 | Bottidda | 397.13375 |
| 264 | Ittiri | 398.34927 |
| 265 | Ilbono | 398.56401 |
| 266 | Semestene | 404.10092 |
| 267 | Bonnannaro | 404.37828 |
| 268 | Siligo | 405.53249 |
| 269 | Benetutti | 406.37255 |
| 270 | Orotelli | 406.63917 |
| 271 | Montresta | 408.23051 |
| 272 | Florinas | 415.75889 |
| 273 | Escolca | 416.67394 |
| 274 | Aglientu | 417.26208 |
| 275 | Banari | 417.87341 |
| 276 | S.Basilio | 419.55151 |
| 277 | Ardauli | 420.64107 |
| 278 | Ploaghe | 423.66499 |
| 279 | Jerzu | 424.94305 |
| 280 | Chiaramonti | 428.44656 |
| 281 | Torralba | 429.08308 |
| 282 | Silanus | 431.33836 |
| 283 | Pozzomaggiore | 436.16404 |
| 284 | Bessude | 445.92499 |
| 285 | Genoni | 446.54422 |
| 286 | Anela | 446.83863 |
| 287 | Siurgus Donigala | 451.47292 |
| 288 | Erula | 455.17221 |
| 289 | Lei | 455.27535 |
| 290 | Mandas | 456.80517 |
| 291 | Thiesi | 459.16014 |
| 292 | Birori | 462.55091 |
| 293 | Borutta | 469.63358 |
| 294 | Elini | 469.79713 |

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| 295 | Bolotana | 471.00338 |
| 296 | Esporlatu | 472.68564 |
| 297 | Olzai | 473.33556 |
| 298 | Nulvi | 475.54513 |
| 299 | Bortigiadas | 476.75719 |
| 300 | Baunei | 477.08981 |
| 301 | Oniferi | 477.09104 |
| 302 | Cuglieri | 479.85129 |
| 303 | Onani' | 480.10142 |
| 304 | Nughedu S.Vittoria | 494.9293 |
| 305 | Calangianus | 497.82492 |
| 306 | Villasalto | 499.74228 |
| 307 | Santu Lussurgiu | 500.12181 |
| 308 | Bortigali | 503.14735 |
| 309 | Luras | 505.59981 |
| 310 | Bonorva | 505.82579 |
| 311 | Sindia | 507.43872 |
| 312 | Urzulei | 508.30525 |
| 313 | Bultei | 508.79287 |
| 314 | Aggius | 511.47183 |
| 315 | Lula | 513.66633 |
| 316 | Illorai | 514.11564 |
| 317 | Orani | 519.46089 |
| 318 | Isili | 521.73482 |
| 319 | Cossoine | 526.6741 |
| 320 | Orroli | 528.04042 |
| 321 | Cheremule | 537.68572 |
| 322 | Bono | 538.98708 |
| 323 | Atzara | 539.02499 |
| 324 | Nuoro | 545.17369 |
| 325 | Bitti | 545.59363 |
| 326 | Laconi | 548.53325 |
| 327 | Neoneli | 552.26173 |
| 328 | Burgos | 559.64087 |
| 329 | Macomer | 559.74601 |
| 330 | Tiana | 562.49505 |
| 331 | Tempio Pausania | 562.51804 |
| 332 | Silius | 562.57485 |
| 333 | Villanova Monteleone | 563.63608 |
| 334 | Villanova Tulo | 569.09929 |
| 335 | Nughedu S.Nicolo' | 575.48793 |
| 336 | Ortueri | 583.04425 |
| 337 | Meana Sardo | 586.40221 |
| 338 | Nurri | 587.75993 |
| 339 | Lanusei | 591.35593 |
| 340 | Giave | 592.33173 |
| 341 | Perdasdefogu | 595.76365 |
| 342 | Osilo | 611.60131 |
| 343 | Serri | 615.02967 |
| 344 | Orgosolo | 616.66018 |
| 345 | Sarule | 623.54518 |
| 346 | Mamoiada | 640.88466 |
| 347 | Osini | 641.53473 |
| 348 | Burcei | 644.48809 |

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| 349 | Nule | 647.71428 |
| 350 | Osidda | 647.84128 |
| 351 | Belvi' | 657.56126 |
| 352 | Ala' dei Sardi | 660.02212 |
| 353 | Ussassai | 666.65525 |
| 354 | Arzana | 668.14583 |
| 355 | Talana | 678.2212 |
| 356 | Gairo | 681.2233 |
| 357 | Sorgono | 685.63428 |
| 358 | Gadoni | 693.3927 |
| 359 | Villagrande Strisaili | 696.03957 |
| 360 | Budduso' | 697.1422 |
| 361 | Sadali | 701.88939 |
| 362 | Ovodda | 707.22174 |
| 363 | Teti | 711.41807 |
| 364 | Esterzili | 727.6961 |
| 365 | Austis | 734.39344 |
| 366 | Orune | 746.31891 |
| 367 | Ulassai | 770.84821 |
| 368 | Pattada | 775.03123 |
| 369 | Gavoi | 786.33511 |
| 370 | Aritzo | 792.49727 |
| 371 | Seulo | 795.52829 |
| 372 | Seui | 816.10394 |
| 373 | Lodine | 880.1687 |
| 374 | Desulo | 884.00033 |
| 375 | Tonara | 896.07165 |
| 376 | Ollolai | 916.12401 |
| 377 | Fonni | 995.47069 |