ITALIAN INNER AREAS: DEMOGRAPHIC CHARACTERISTICS, EMPLOYMENT AND COMMUTING AND TERRITORIAL DIFFERENTIATIONS[1]

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1. Introduction

Most of the Italian territory is characterized by the aggregation of citizens in smaller centers, even very small ones, located in inland areas. Starting from this assumption and from the variety and specificity of the same, the need was felt to study and interpret the interaction between urban and metropolitan territories and these areas through the comparison of specific socio-demographic and economic indicators (Dip. politiche di coesione. 2022. *Criteri per la Selezione delle Aree Interne da sostenere nel ciclo 2021 – 2027),* aimed at highlighting which are the main determinants of marginality of these territories. The policy for Inner Areas originated in 2013 and has its roots in the more general strategy for "territorial cohesion based on places", which draws direct foundation and legitimacy from the Treaty on the Functioning of the European Union, in particular, art. 174. As regards Italy, the Partnership Agreement 2014-2020 defines the approach aimed at addressing the demographic challenges of the regions and tends to respond to the specific needs of geographical areas characterized by serious and permanent natural and demographic handicaps (De Rossi, 2019). That's the context in which the general definition of "Inner Areas" is presented, and means that most part of the Italian territory characterized by the significant distance from the centers of supply of essential services identified in education, in health and mobility; in particular, such services shall mean: 1) a complete upper secondary education offer (i.e., at least a high school, a technical school and a vocational school); 2) a hospital of DEA (Department of Emergency and Acceptance I level); 3) a railway station at least of the silver type (medium/small plants, with a frequency generally greater than 2,500 average users/day) and services for the long, medium and short distance or - in the case of urban subway - medium/small stations and stops, with consistent attendance (even greater than 4,000 average users/day). However, these areas normally have important environmental resources (agricultural systems, forests,

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natural and human landscapes, water resources, etc …) and cultural assets (archaeological heritage, historic settlements, abbeys, small museums, craft centres, etc …); they are however deeply diversified territories, outcome of the dynamics of the various natural systems and the peculiar processes of settlement. Referring to their first perimeter, these areas represented about 60% of the territory and 21.5% of the population. (Barca et al., 2014). In 2022, however, Istat (Italian National Institute of Statistical) updated from 2013 to 2020 the national geography of the Inner Areas, reclassifying all 7,903 Italian municipalities according to the levels of accessibility to the nearest "Service Offering Centre". The adopted methodology identifies the nature of the Inner Area of a municipality based upon the distance, expressed in terms of minutes of road travel, to the nearest service offering centre. In this way it was possible to classify the municipalities according to the degree of peripherally and group them into 6 types: Pole, Inter-municipal Pole, Belt, Intermediate Areas, Peripheral Areas and Ultra-peripheral Areas. The municipalities that are comprised into the last 3 classes constitute the whole of the Italian Inner Areas, while the municipalities of the first two represent the service offering centres. It was also carried out a mapping on the territory of the structures related to the three services mentioned above and the comparison with the services present in the 2013 edition has brought out a lower spread of services on the territory, regarding the decrease in hospitals with level I or level II DEA. This dynamic has generated a net contraction of the number of the Poles and the intercommunal Poles, resulting in a reduction of the number of centres of offer of services. Specifically, in the comparison 2013-2020 (Table 1), it goes from 217 Poles and 122 intercommunal Poles (in total 339), to 179 and 85 (in total 264), with a loss of 75 centers overall. It should be considered that, within the "Polo" Municipalities there are all three services considered while the Municipalities defined as "Intercommunal Pole" are a set of neighboring municipalities where, as a whole, there are all three services considered. The innovations introduced, which have substantially refined the ability of classification of the Municipalities with respect to the supply centres, have determined an increase in their degree of peripherally, as a result of the combination of the reduction in the number of poles and the increase in average journey times. The expected overall geography has therefore been characterized by a significant increase in the extension of the Inner Areas, both in the number of municipalities and the resident population involved. From the comparison 2014-2020 emerges the contraction of the municipalities classified in Pole, Pole Intercommunal and Intermediate, and a consequent increase of those identified in Belt, Peripheral and Ultra peripheral. In particular, the number of intercommunal Poles is reduced by more than 50% (from 122 Municipalities in 2014 to 59 in 2020), with the effect of a decrease in the total resident population in the Poles and inter-municipal Poles that goes from about

24.3 million in 2014 to 22 million in 2020. The decrease is clear (-16%) also in the number of intermediate municipalities, which go from 2,288 to 1,928. By contrast, they increased by 9.1%, the Municipalities of belt (from 3,509 to 3,828) and the peripheral and ultra-peripheral municipalities of 7.9% (from 1,767 to 1,906).

Table 1 – *Population in 2020 and distribution of municipalities in SNAI areas in 2014 and 2020.*

	Number of municipatlities			
Regional groups	2014	2020	Absolute change	Change %
Urban Poles	217	182	-35	-16.1
Inter-municipal Poles	122	59	-63	-51.6
Belt	3,509	3,828	319	9.1
Intermediate	2,288	1,928	-360	-15.7
Peripheral	1,475	1,524	49	3.3
Ultra-peripheral	292	382	90	30.8
	Population			
Regional groups	2014	2020	Absolute change	Change %
Urban Poles	21,271,729	20,470,301	-801,428	-3.8
Inter-municipal Poles	2,992,749	1,576,586	-1,416,163	-47.3
Belt	22,248,629	23,756,465	1,507,836	6.8
Intermediate	8,495,430	8,059,454	-435,976	-5.1
Peripheral	3,585,164	4,653,355	1,068,191	29.8
Ultra-peripheral	642,512	720,052	77,540	12.1

Source: Our data processing from Istat.

1.1 The distance matrix and relevant thresholds

As regards the methodologies for calculating road journey times, an impedance factor was then used with the aim of taking into account the effective capacity of the communication routes, considering also the presence of possible slowdown factors due to the vehicular traffic, the presence of traffic lights, etc…, and thus providing results that are more in line with reality. The distribution of travel times so calculated for all Italian municipalities was on average higher than the previous edition, initiating also a more precise reflection on the possible necessity to revise the thresholds of distance used in order to classify the Municipalities in the three typologies of Inner Areas. After identifying the Service Offer Centers, the matrix of the distances between each Municipality and the nearest gravitation pole was constructed with a calculation methodology for the threshold values similar to that of 2014 (distances calculated considering the ordering of the Municipalities in based on the increasing value of the distance of each one from the nearest pole and considering the values at the median, the third quartile and the 95th percentile) (Table 2). The elaborations were carried out using the ArcGIS software. For the update of the IA 2020 Map, Istat has calculated the average travel times from a municipality to the centroid of the municipal or inter-municipal pole (identified using the census section that contains the Municipality of the Municipality)

considering the movements detected in the week that goes from 14 to 20 October 2019 in the three time slots 7.30, 8.30, 9.30 of all working days, in which the majority of the population travels for work or study. For each municipality, the travel time considered is given by the average value of the travel times in the three-time bands indicated in the five working days considered. In the methodologies for calculating road travel times, an impedance factor was used with the aim of taking into account the effective capacity of the communication routes, also considering the presence of possible slowdown reasons due to vehicular traffic, in the presence of traffic lights, etc. and therefore providing results that are closer to reality. The distribution of travel times thus calculated for all Italian municipalities was on average higher than in the 2013 edition, also initiating a reflection on the possible need to review the distance thresholds used to classify the Municipalities in the three types of Areas Internal (NUVAP Technical Note, 2022).

Table 2 – *Comparison of 2014 and 2020 map threshold values based on distance distribution in minutes.*

Threshold	Map IA 2014	Map IA 2020
Median	20	27.7
3°quartile	40	40.9
95°percentile	75	66.9

Source: Our data processing from Istat.

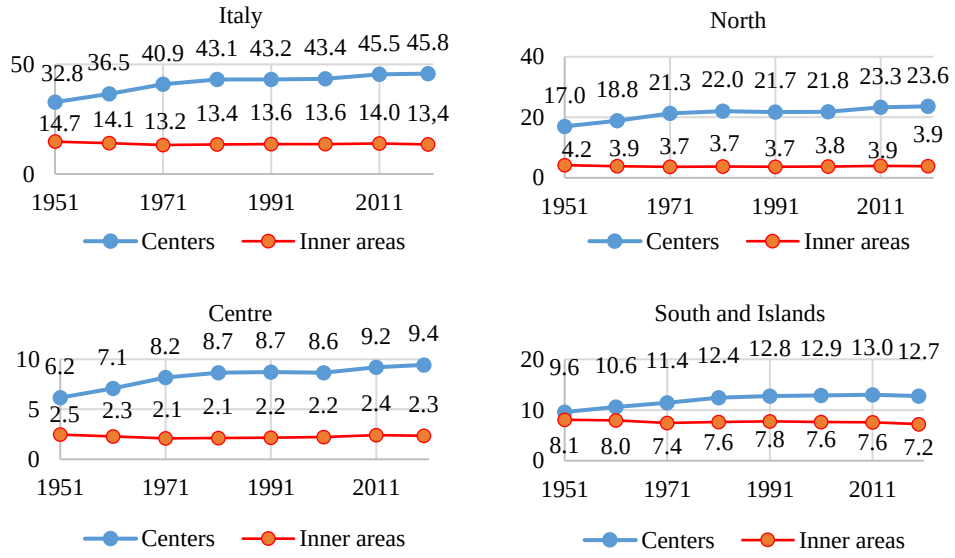
As is evident from table 2, while applying the same calculation technique as in 2014, the values for the median change (meaning the distance threshold within which a Municipality belongs to the belt belt), goes from 20 to 27.7 minutes; the threshold value that identifies the beginning of the peripheral belt slightly increases from 40 to 40.9 minutes; while the most extreme reference value decreases from 75 to 66.9 minutes.

2. Population dynamics

Between 1951 and 2020 the population decreases in the Inner Areas and increases in the Centers. In particular, the Inner Areas in Italy have lost 1.3 million residents, with an absolute variation of – 8.8% since 1951; the South and Islands, in the same period, has lost 855 thousand inhabitants with a variation of -10.6%.

In absolute values, in the Centers, the distribution with a greater increase in population is the north which gains 6.7 million inhabitants. In percentage terms, the Centre earns 53% compared to 1951 and the North 38.8% (Figure 1).

Figure 1 – *Population dynamics from 1951 to 2020 by area (millions of people).*

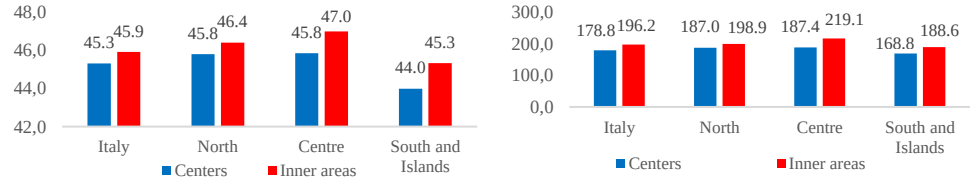


Source: Our data processing from Istat Permanent population census, year 2020

2.1. Population Structure: Demographic Indicators

Socio-demographic indicators highlight particular differences between Centers and Inner Areas. In the South, and Islands Italy, for middle age there is a difference between Centers and Inner Areas of over 1 year, while in the North it is less than one year as for the national average and, in the Centre, it is little more than one year. The municipalities on average younger are those of the inter-municipal Center and Belt of the South and Islands (43 years), the least young are instead in the outermost municipalities and in the peripheral areas of the Centre with an average age of 49 and 48 years (Figure 2).

Figure 2 – *Middle age and old age index.*



Source: Our data processing from Istat Permanent population census, year 2020

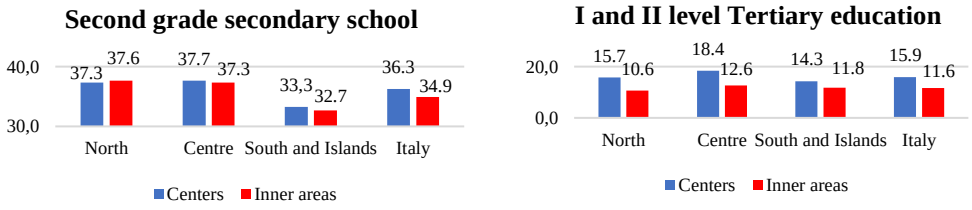
In the North, the difference between Inner Areas and Centers is less marked, while it is particularly evident in the Centre, where in the Inner Areas there are 216 over-

65s every 100 under-15s, while there are 199 in the North, 189 in the South and Islands, compared with the national average value of 196. In the outermost Areas, the ratio rises to 266 for the Centre, 239 for the South and Islands and 223 for Italy.

3. Education

Only in the North, the percentage of residents aged 9 and over who have obtained the high school is higher in the Inner Areas than in the Centers (37.6% against 37.3%) while, both nationally and in the regions of Centre, South and Islands, although a few percentage points is the reverse (Figure 3). The share of residents with degree is increasingly higher in the Centers than in the Inner Areas and is higher than the national average in the Inner Areas of the Centre, South and Islands regions (respectively 12.6% and 11.8% against 11.6%).

Figure 3 – *Population aged 9 and over by level of education.*



Source: Our data processing from Istat Permanent population census, year 2019.

4. Commuting

4.1. Commuting within and outside

In 2019, every day 30,214,401 people move within the municipality of residence or in other municipalities (50.7% of the resident population): of these, 49.9% reside in the North, 20.4% in the Centre and 29.7% in the South and Islands.

The displacements are greater in the Centers (Italy 79.1 %) and inside of the just municipality of residence (46.1%) (Table 3).

4.2. Commuting for working and study

Going into the details of the motivations that drive such movements, those who travel for work (20,517,799) or for study (9,696,602) come from the Centers and reside in Northern Italy (13.9%). Although the greatest number of commuting students resides in the regions of Centre Italy (16.4%), this is also to the difference in the unemployment rate and the age of the resident population (Table 4).

Table 4 – *Resident population, daily travel for study and work. Year 2019, percentage values.*

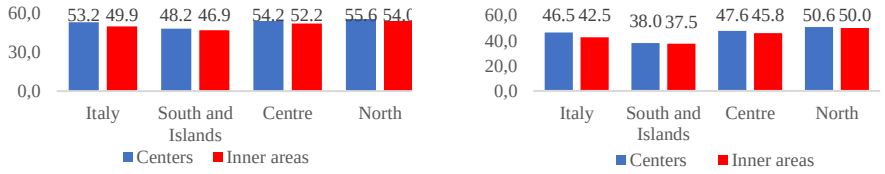
Territorial bands	Commuting for working				Commuting for studying			
	Italy	South and Islands	Centre	North	Italy	South and Islands	Centre	North
Centers	27.3	18.0	28.8	33.4	12.8	11.0	13.4	13.9
Inner Areas	7.1	9.9	6.9	5.2	3.4	5.5	3.0	2.1
Total	34.4	27.9	35.7	38.6	16.2	15.5	16.4	16.0

Source: Our data processing from Istat Permanent population census, year 2019.

5. Labor market

Italy has always been characterized by a low level of employment and a high presence of people searching work, albeit in a less active way, especially when compared to other European countries (Istat, Il Mercato del lavoro 2020).

Figure 4 – *Activity rate and employment rate, in Centers and Inner Areas.*



Source: Our data processing from Istat Permanent population census, year 2020.

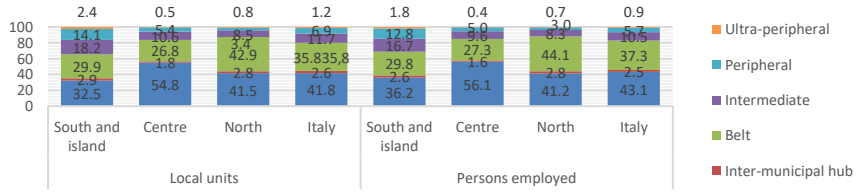
In reference to the General Census of population and housing in 2019, out of 100 people aged 15 and over living in Italy, only 46.5, among habitual residence in the Centers, are occupied; in the Inner Areas the value is reduced to 42.5 with a difference of 4 percentage points. In the common Belt the rate rises to 47.2% (+6 points compared to the common Peripherals and Ultra peripherals). In the North breakdown, the highest value is recorded in the Outermost Area (51.8%). To confirm this, labour market participation, measured by the rate of activity resulting from the ratio of persons in the labour force to the corresponding reference population, is also higher in the Centers than in the Inner Areas, with a difference in Italy of 3.3 percentage points (53.2% against 49.9%), and in the South and Islands of almost 2 percentage points (48.2% against 46.9%). The highest activity rate is recorded in the Northern Belt area (56.1%) followed by the Outermost area of the same breakdown (55.2%); the lowest is reported in the Outermost area of the South and Islands (46.4%) (Figure 4). As for the unemployment rate, always in 2019, in Italy it is higher in the Inner areas than in the centers with a difference of about 2% (14.8% against 12.7%), in reverse in the South and in the North is higher

in the centers than in the Inner areas (1% for the South and Islands, 1.2% for the North). The rate of youth unemployment, given by the ratio of job seekers aged 15 to 24 and the labour force in the same age group, is higher in the Centers than in the Inner Regions, in all territorial divisions. Considerable differences between the different parts of the Country, both in the Inner Areas and in the Centers: the youth unemployment rate is higher in the Inner Areas of the South than in the North by 27 percentage points, in the Centers the gap exceeds 26 percentage points.

6. The production system

The average size of the local units present in the Inner areas is equal to three employees against the four of the Centers, with a general tendency to decrease as you move from the North to the South; on the other hand, the difference between the average size of the Centers and the Inner Areas is growing, moving towards the South; this attests a greater structural fragility of the production system of the Inner Areas of the southern regions as regards the northern ones**.** In Italy about 80% of the local units of active enterprises are located in the Centers, involving 83% of total employees. In the South and Islands, 65% of the local units are in the Centers and employ over 68% of the workers, while in the Centers of the North 87.2% of the local units are concentrated with more than 88% of the employees (Figure 5). A first element of interest that comes out from the productivity analysis of the enterprises expressed in terms of added value for employee, depends on the fact that such value decreases considerably moving towards the Inner Areas. For this purpose, for to the particularity of the topic, it is intended to broaden and deepen the concept of Internal Areas to provide as complete a picture of the context as possible.

Figure 5 – *Local units and employees per macro regions and SNAI Areas- year 2019.*



Source: Our data processing from Istat.

Between the Poles and the Ultra-peripheral areas, the largest gap is recorded in Central Italy (18,778 €), the smallest in the North (10,632 €). Compared to the average Italy of 48 thousand 868 euros, in the South and Islands the added value is significantly lower, both in the Centers (-11 thousand euro) and in the Inner Areas

(- 17 thousand euro). At the national level, average wages are also significantly lower in the Inner Areas than in the Centers. In the Inner areas of Southern Italy, the wages are lower on average, compared to the Italian one of € 6,500. Even for the salaries per employee, the smaller gap between the Pole and the outermost area is recorded in the North (3,161€ against 4,825 € of the average Italy) (Table 5).

Table 5 – *Value added and compensation per employee and distribution in SNAI areas - Year 2019 (values in thousands).*

	Italy		South and islands		Centre		North	
Territorial bands	Added value by employee	Salary by employee	Added value by employee	Salary by employee	Added value by employee	Salary by employee	Added value by employee	Salary by employee
Urban Poles	52,491	26,901	40,970	22,423	51,781	26,093	56,983	28,844
Inter-municipal Poles	43,537	24,976	31,432	19,059	40,856	23,187	48,862	27,318
Belt	49,005	27,141	34,113	20,794	49,031	25,72	53,114	29,065
Intermediate	42,145	24,406	31,456	19,674	40,357	24,127	51,755	28,078
Peripheral	37,239	22,835	31,966	20,55	37,327	23,429	46,359	26,296
Ultra-peripheral	35,864	22,076	26,656	18,153	33,003	21,818	46,351	25,683

Source: Our data processing from Istat

7. Analysis of Inner Areas profiles

The analyzed indicators are both demographic and economic and have been compared between Centers and Inner Areas. Finally, this information was summarized through factorial and logistical analysis (Fabris L., 1997). All indicators have been adopted and principal component analysis (PCA) has been applied a statistical technique for the reduction of the size and has the aim to reduce the more or less large number of variables that describe a set of data to a smaller number of latent variables, limiting, however, as much as possible, the loss of information. The number of indicators has increased from 14 to 3: demographic indicators, work and commuting, and economic indicators. The coefficients of the three factors, elaborated in SAS, are given in the following table, contains the rotated factor loadings, which are the correlations between the variable and the factor. In particular: the first factor is related to variables related to demographic indicators and more weakly to others; the second factor is related to both indicators related to commuting (strongly influenced by the values of X9 and X7) both with the remaining variables such as labour market indicators, where it is strongly influenced by the employment rate, directly while, inversely, by the unemployment

and youth unemployment rate; finally, the third factor is exclusively related to the productivity and profitability indicators. Although the three factors are all significant, the first and second factors have a higher explained variance than the third, in particular, the first factor related to demographic structure has a greater weight in the synthesis of population characteristics (4.41) (Table 6).

Table 6 – *Rotated Factor Pattern.*

Indicators		Factor1		Factor2		Factor3	
x1	Middle age	**97**	*****	-4		-11	*
x2	Old age index	**89**	*****	-11	*	-11	*
x3	Dependency index	**87**	*****	-6		-1	
x4	Index of Elderly Dependency	**96**	*****	-10		-7	
x5	Index of Active Population Structure	**68**	*****	41	*	-5	
x6	Commuting out of the ordinary	10	*	**63**	*****	-14	*
x7	Total commuting	-55	*	**73**	*****	31	*
x8	Commuting for work	-86	*	**16**	*****	14	*
x9	Commuting for study	-31	*	**85**	*****	33	*
x10	Employment rate	-29	*	**86**	*****	32	*
x11	Unemployment rate	-12	*	**-89**	*****	-28	*
x12	Youth unemployment rate	-3		**-80**	*****	-25	*
x13	Value added per employee	-11	*	18	*	**89**	*****
x14	Compensation per employee	-13	*	34	*	**83**	*****
Variance Explained by Each Factor		**4.41**		**4.18**		**2.00**	

Source: Our data processing from Istat
Notes: The printed values are multiplied by 100 and rounded to the nearest integer. Values greater than 0.1 are marked with a ''.*

Subsequently, these three factors have been inserted in a logistic model, whose dependent variable is a dichotomy that assumes value 1 in the cases in which the municipality belongs to an Inner Area and 0 in the case in which it belongs to a Centre and, all factors constitute the independent variables. In order, to analyze the association between two variables, the method of the Maximum similarity and the odds ratio has been used. In the first table it is seen that these three factors turn out meaningful, in particular, the first factor has a positive correlation with the dichotomous variable (to be in Inner area), the other two factors point out a negative correlation and therefore a negative weight in the municipalities classified as Inner Areas, confirming that low values of productivity and profitability are typical of the Inner ones. The *odds ratio* represents instead, the probability that the event happens with the variation of the independent variable and if it is greater than 1 tell us that there is an increasing relationship between the two variables, values less than 1 show the opposite and this is evidently a different key to the model (Table 7).

Table 7 – *Analysis of Maximum Likelihood Estimates and Odds Ratio Estimates*.

Parameter	Estimate	Pr>ChiQ	Pr>ChiSq	ChiSq	Effect	Point Estimate	95% Wald Confidence Limits	
Factor1	0.6562	0.0295	<0.0001	0.3618	Factor1	1.927	1.819	2.042
Factor2	-0.7161	0.0272	<0.0001	-0.3948	Factor2	0.489	0.463	0.515
Factor3	-0.3745	0.0263	<0.0001	-0.2065	Factor3	0.688	0.653	0.724

Source: Our data processing from Istat.

8. Conclusions

The review of the Map of the Internal Areas updated to 2020 on which the study was based, confirms the high risk of marginalization of the internal territories from an economic and socio-demographic point of view. However, the renewed attention of the political decision-maker combined with the PNRR resources available, in the presence of incontrovertible data and a clear *mission* to be addressed (the adjustment in quality and quantity of services relating to work, school and mobility, with the promotion of suitable development projects that can best enhance the cultural and natural heritage of these areas, and the reversal of current demographic trends), makes us think (and hope) that the one illustrated can only be the first chapter of a series of data that over time certify the progressive, lower marginality of the internal areas of our country.

Appendix

Middle age: it is calculated as a weighted average with weights equal to the amount of the population in each age group.

Old age index: it is the ratio between the population aged 65 and over and the population aged 0-14, multiplied by 100.

Tertiary and higher education: includes tertiary education (I and II level) PhD and academic research training diploma.

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SUMMARY

The municipalities geographically located in hilly Inner or mountainous areas and quite significantly distant from essential services (collective mobility, health, high-level education, etc.) on the basis of an accessibility indicator calculated in terms of minutes of travel compared to the nearest Pole (centre of offer of services), are identified as Inner Areas (A.I.) by ISTAT. These municipalities, which are characterised by considerable environmental and cultural resources, generally point out issues in employment, demographic ageing, depopulation and commuting. The proposed study aims to outline the profiles of the Inner Areas in terms of socio-economic and economic indicators and highlights which are the main determinants of marginality of these territories.

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