

## Differences in development paths of tourism and agriculture within abruzzo region protected areas

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### Abstract

The paper presents an analysis of some indicators in mountain areas of Abruzzo twenty years after the institution of the two National Parks of Majella and Gran Sasso-Laga. In order to understand the development paths, insights on tourism, demographic processes and agriculture have been highlighted. The data show a transforming reality and some possible propulsive effects linked to the protected areas in the inner territories of the region, from the point of view of both agriculture and tourist development.

### Keywords

Protected areas, development paths, population, tourism, agriculture, multiple correspondence analysis

### Introduction

In statistical terms, Abruzzo mountainous areas account for 65% of the regional surface. Mountain municipalities are 166 out of 305 in total, with a population of 380.000 inhabitants, corresponding to the 28% of the total on a regional level. If we add to these numbers the municipalities classified as inland hill, we reach the number of 232 units that cover an area of 8,705 sq km, corresponding to the 81% of the region, with a population of 587.000 inhabitants, 44% of the total.

Twenty years after the institution of the National parks of Majella and Gran Sasso-Laga and of the Regional Park of Sirente-Velino, the protected surface of Abruzzo has reached the degree of more than 30 % of the region, considering also the historical National Park of Abruzzo, Lazio and Molise. For this reason, the Authors have considered interesting to conduct an analysis of the dynamics, which interested the inner municipalities by highlighting the lines of development that protected areas have undertaken.

The protected areas of the region include both mountains and hills territories, thus creating the conditions to investigate similarities and differences between the development paths of areas within the parks and outside them.

By looking at the population long-term trends, the tourism and food industries, in the present work we have tried to identify the difference in development paths according to a local dimension. The analysis has aimed at identifying: the different models of development in mountain areas, the relations with agriculture and tourism and the presence of those original paths that can feature a paradigmatic value, particularly with regard to regional protected areas (HODGE & MIDMORE 2008; MARSDEN 2009).

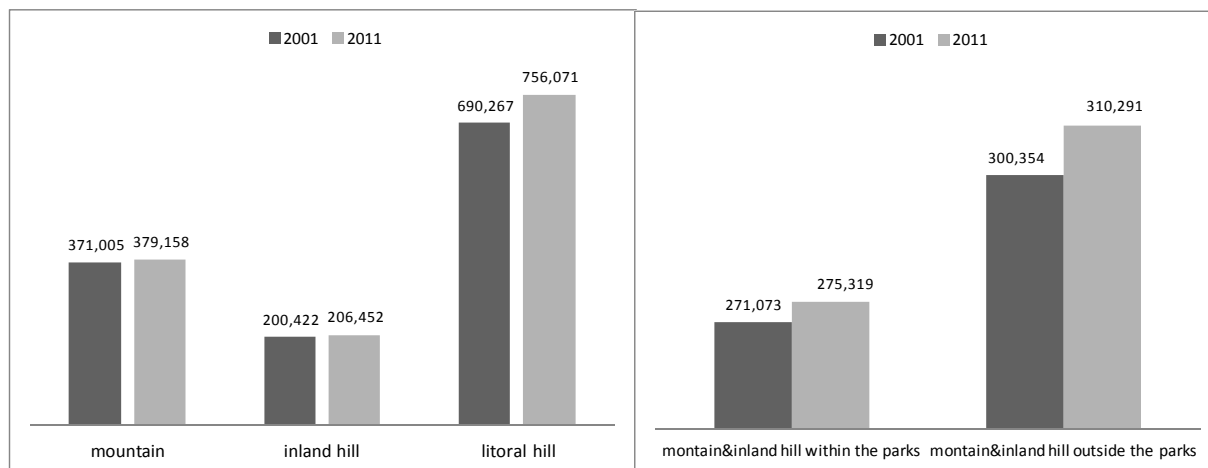


Figure 1: Population in the different altimetric areas, within and outside parks  
(Source: Authors' elaboration on Italian National Institute of Statistics (Istat) data)

The interval time considered is the period 2000-2010 (except for the population data, referring to the period 2001-2011). It represents a period sufficiently large to ensure the full efficiency of protected areas in influencing local development dynamics. Through the use of a logistic regression model some factors have been extrapolated that characterize the socio-economic dynamics in mountainous villages, and that can be considered representative of the potential development of the region.

### The trend of regional demography and territorial comparison

The analysis of the last decade reveals a relative impoverishment of the population in Abruzzo due to the falling of the birth rate, to the increase of elderly population and to migration. In 2011 the region records 1.342.000 inhabitants, with an increase in the decade (+6.3%) (Figure 1), albeit diversified among different geographical areas.

During the past decade, the mountain and inland hills municipalities outside the parks showed better demographic dynamics compared to those included in the parks. Furthermore, the dependency ratio (population aged 0-14 + population above 65 years / population 15-64 years) shows an improvement in mountain and inland hills municipalities, compared to the beginning of 2000, even if the ratio in litoral areas is much better (Figure 2).

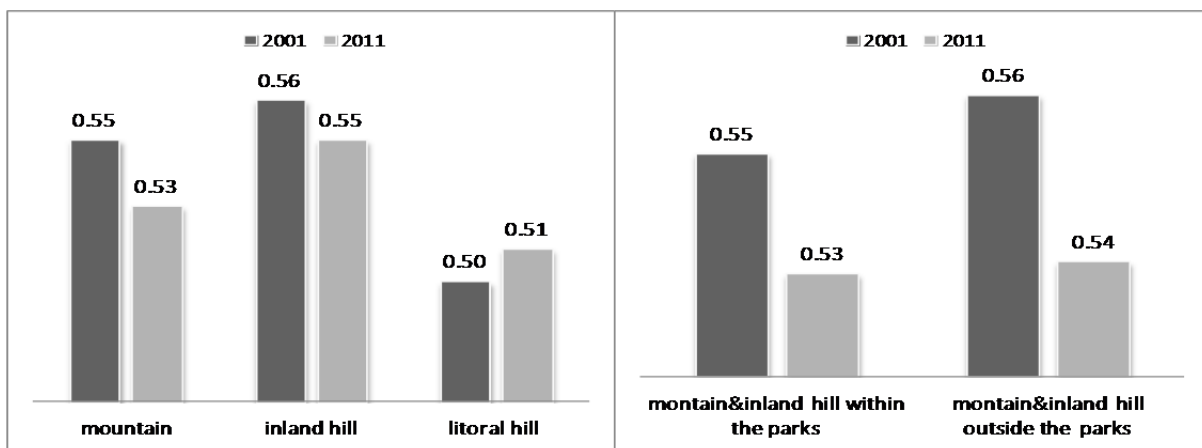


Figure 2: Dependency ratio in the different altimetric areas, within and outside parks (Source: Authors' elaboration on Istat data)

The aging index (population over 65 / population 0-14 years) shows an extreme vulnerability of the mountain areas, especially in economical terms (Figure 3). Such a demographic structure - when combined with the lack of employment prospects as good as those existing in the coastal region - may constitute a risk to reduce the potential growth of productive fabric. But then, the aging index does not improve even in the municipalities within the parks.

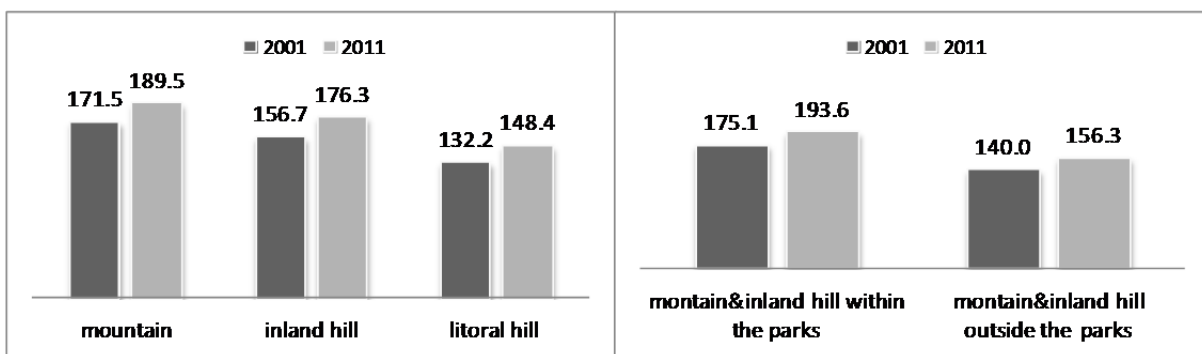


Figure 3: Aging index in municipalities divided per altimetric areas, within and outside the parks (Source: Authors' elaboration on Istat data)

The analysis of the role of the natural increase and net migration rate reveals that the population growths outlined above are not generally attributable to natural growth but to the phenomenon of migration. In the referred period, there has been a large foreign immigration, especially in inland hills and mountain towns outside the parks (Figures 4 and 5).

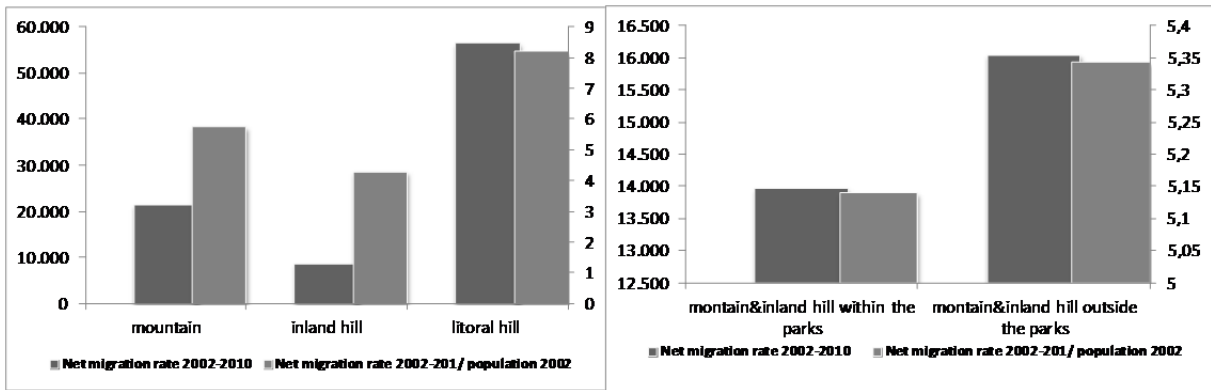


Figure 4: Net migration rate and migration rate over population  
(Source: Authors' elaboration on Istat data)

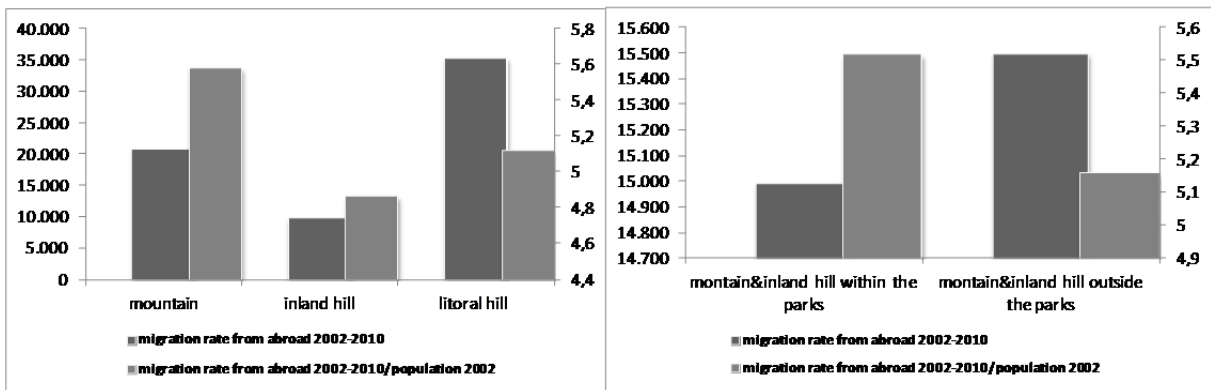


Figure 5: Migration rate from abroad and migration rate from abroad over population  
(Source: Authors' elaboration on Istat data)

With special concern to the examination of the registry office movements, some meaningful migration fluxes from mountain areas toward the inland hills and the coastal cities can be highlighted. This is a phenomenon that should be monitored in future work to understand what the implications for local development asset might be (BARBERIS 2009). The changes occurred within the population show markedly negative balances. Mountain areas in general suffer a lot from this phenomenon, but and the areas included in the parks even more (Figure 6).

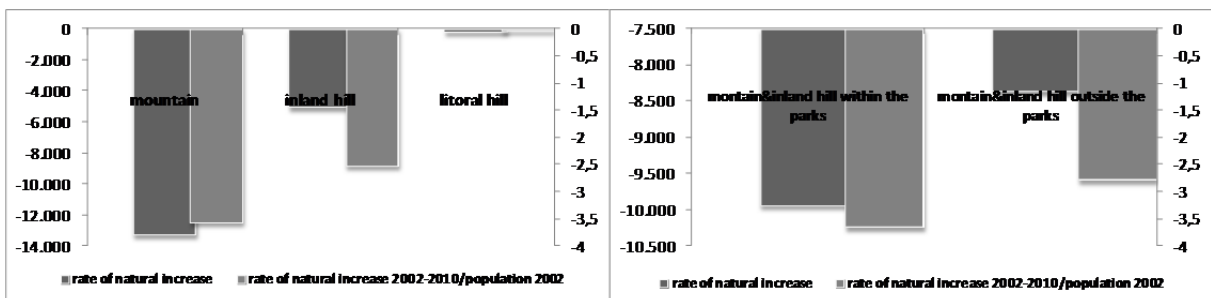


Figure 6: Rate of natural increase and rate of natural increase over population  
(Source: Authors' elaboration on Istat data)

According to the analysis, the most important aspects to be mentioned are the progressive reduction of births and the persistence of negative natural balances, mainly in mountainous areas. The situation appears even more problematic in the parks areas. Because of that, they are also unlikely to reverse this trend on their own. The role of immigration in the process of development appears as a positive trait because is giving to mountain areas the possibility of acquiring new residents.

### Analysis of mountain tourism in Abruzzo

In 2010, the municipalities in inner Abruzzo have accounted in terms of tourist supply, 1,224 accommodation establishments, corresponding to 54% of the region. The detail of bed places (numerically equal to 31% of the regional total) shows how the tourist facilities in these territories are have a smaller size compared to those in hillside and coastal areas.

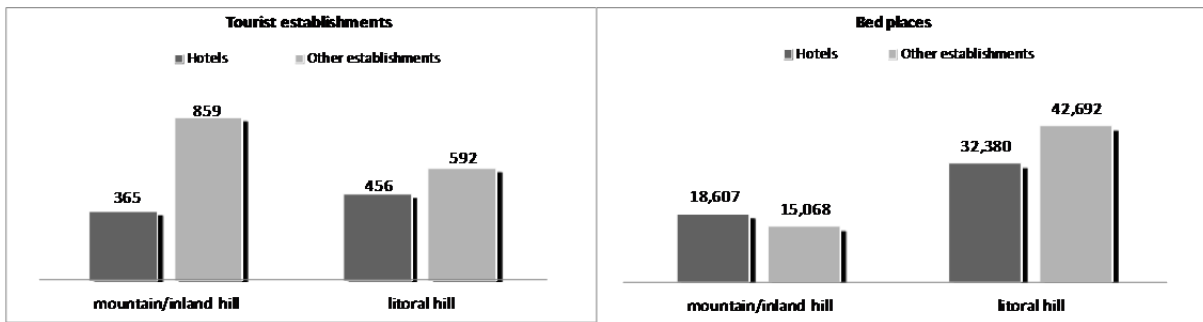


Figure 7: Comparison between different types of establishment and number of bed places, in 2010. Absolute values (Source: Authors' elaboration on Abruzzo Region data)

At the special purposes of an analysis that proposes to evaluate the role of parks in tourism offer, it could be useful to read the data by focusing the attention upon agri-tourisms and B&B. Both types of facilities, in fact, compared to others, have a less impact in terms of architectural building and are more life-style oriented than hotels (CARLSEN et al. 2008). The territorial comparison shows that the agri-tourist facilities have a more meaningful incidence in inland areas, where they represent the 29% of the complementary offer in terms of number of establishments, even if both regional contexts the B&B is the most common type of accommodations in the non-hotel sector. The situation is completely different if the comparison is made on the basis of the distribution of bed places (Figure 9). In fact, both in the case of agri-tourisms and B&B, the incidence within the complementary sector is clearly lower compared to the numbers of the establishments. In the particular case of mountain and inland areas, instead, the data concerning the agritourist hospitality is quite significant because, in terms of beds, it represents the 19% of the total in the complementary sector.

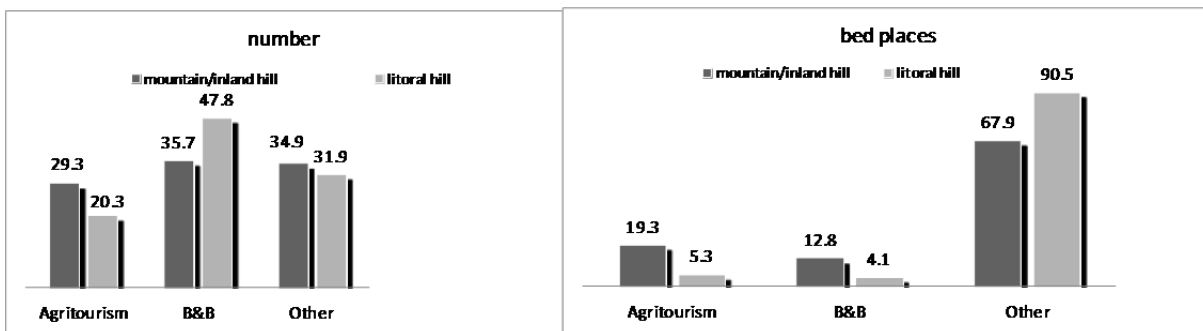


Figure 8: Comparison in the distribution of agritourisms and B&B, 2010 (%) (Source: Authors' elaboration on Abruzzo Region data)

In order to analyse the dynamics in the development of these areas in terms of tourism, it could be useful to consider how the accommodation capacity has changed over the time (CST 2009). With reference to the period 2000-2010, the data record an overall increase (+89%) in the number of establishments in the context of mountains and inner hills, with an over 8% than in coastal territories.

Furthermore, the municipalities within the parks can exert a greater force in terms of attractiveness of tourist facilities. Among the 1.224 establishments existing in the mountain/internal hill areas, 66.7% of them is located in a protected area.

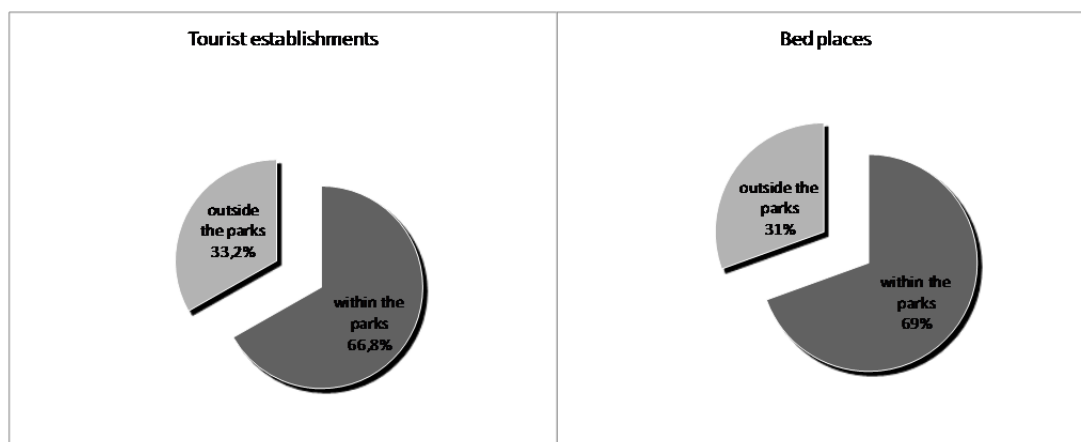


Figure 9: Distribution of accommodations and number of bed places, 2010 (Source: Authors' elaboration on Abruzzo Region data)

In percentage terms, being in or out of a park has led to a visibly differentiated increase of the accommodation capacity. In the protected areas the number of accommodation establishments increased of 96%, over 21% higher than the growth outside the park. The situation is similar, albeit with much lower rates for the beds, which increase more significantly outside the park (+36% compared to 21.8% of the beds in the park). The sector which has been most affected by this trend is the non-hotel, with an increase of the business equal to 227% within the park. Outside of a protected area, the number of non-hotel business generally tends to grow less.

Table 1: Accommodation capacity per type of accommodation in mountain/inner hill areas within a park and outside). 2000-2010 (absolute values and variation %; Source: Authors' elaboration on Abruzzo Region data)

	Type of accommodation	2000		2010		var. % 2000-2010	
		Number	Beds	Number	Beds	Number	Beds
Within a park	Hotels	250	13,378	273	14,171	9.2	5.9
	B&B			201	1,239		
	Agritourisms	79	787	114	1,626	44.3	106.6
	Other type of accomod.	87	5,031	229	6,342	163.2	26.1
	Non-hotels	166	5,818	544	9,207	227.7	58.3
	Total of establishments	416	19,196	817	23,378	96.4	21.8
Outside a park	Hotels	92	4,313	92	4,436	0.0	2.9
	B&B			106	695		
	Agritourisms	120	881	138	1,277	15.0	44.9
	Other type of accomod.	20	2,375	71	3,889	255.0	63.7
	Non-hotels	140	3,256	315	5,861	125.0	80.0
	Total of establishments	232	7,569	407	10,297	75.4	36.0

In order to integrate the analysis we have considered the rate of tourist function (the total number of beds available in a given area relative to the resident population) that can measure the density of accommodations in a specific area. From this emerges a better position of the coastal places, where beach tourism is a mature product.

Table 2: The rate of tourist function and variations (%), 2000-2010 (Source: Authors' elaboration on Abruzzo Region data)

	Mountain & inland hill	Litoral hill	Mountain & inland hill within the parks	Mountain & inland hill outside the parks	Regional total
2000	4.7	9.8	7.1	2.5	7.4
2010	5.7	10	8.5	3.3	8.1
var. %	1.1	0.2	1.4	0.8	0.7

The tourism intensity instead (indicating the accommodation potential of an area expressed in terms of places available per surface area), when detected at the different territorial contexts enables to measure the intensity of tourist movements. Even in this case the most attractive territory still remains the coastal one (Table 3). In the internal areas the decisive factor is represented, instead, by the presence of a park. To be a municipality of a protected area determines a shift toward the top of the index for more than three points.

Table 3: Rate of tourism intensity in different altimetric areas, 2010 (Source: Authors' elaboration on Abruzzo Region data)

	Inland areas	Litoral hill	Inland areas within the parks	Inland areas outside the parks	Region
Tourism intensity	2.95	7.41	4.63	1.45	5.46

The dynamic reading of the tourist flows shows an increase of hotel tourism, especially in the litoral hillside. In inland mountain/hill regions instead it seems to go down. It may be noted, however, an increase in extra-hotel accommodation, especially in protected areas (table 5). During the considered decade, the parks appear to have acted as a factor of attraction to tourists who seek an alternative to hotel accommodation. In this sector there has been an increase in arrivals equal to 145%.

## Agriculture dynamics

According to provisional data of the Census 2010, the dynamics of agriculture show a reversal compared to previous decades. Against a decline of farms (-13% versus -32% on a national level) there is in fact an increase in both the Total Holding Land (THL) and the Utilized Agricultural Area (UAA), respectively of 3% and of 1.5%.

Such an increase, albeit slight, is in contrast with the national trend. Above all, it could represent a turning point related to the continuous loss of agricultural land that has occurred in the recent decades, and ultimately, a possible return to the importance of the agricultural sector compared to other economic sectors. This trend is accompanied from an increase in the average size of the enterprises (which have grown up to 20.2%) and from the concentration of farming in larger units (ABRUZZO REGION 2011). Precisely for this peculiar regional dynamics, it becomes important to verify the differences between the different geographical zones of the region.

Farms decrease in all altimetric areas but the contraction in inland mountain areas (-26%) is much higher than in other areas (respectively -9% and -10% in inner hills and in the litoral hills). There are significant differences between areas within the parks and areas outside the park, in their respective altimetric areas (Figure 10).

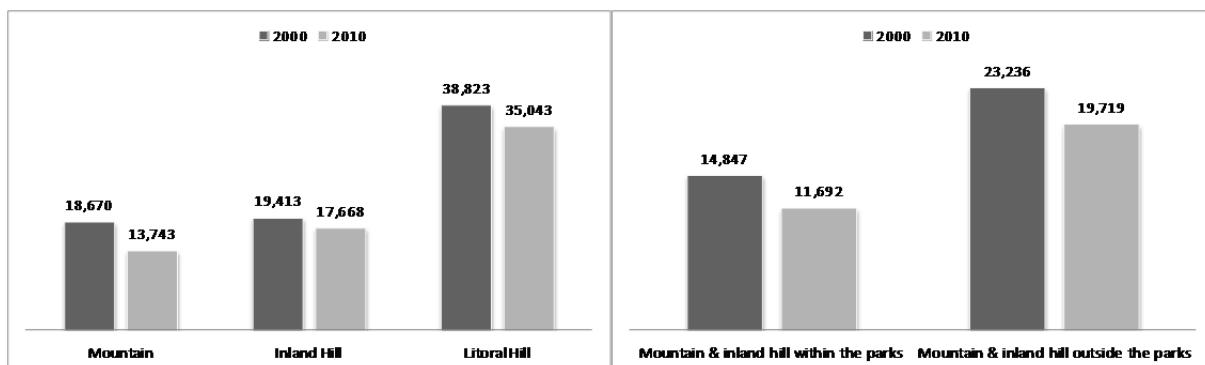


Figure 10: Variation number of farms 2000/10 per altimetric areas (Source: Authors' elaboration on Istat data)

The performances of the THL and UAA (Figures 11 and 12) are more complex. In these rates there is an increase in mountain areas (respectively of 6% and 4%), a stability in the inland areas and a decrease in hilly coastal areas (-3% for both). In mountain contexts, while the THL increases evenly both within the parks and outside them, the UAA increases of 1% in the municipalities within the protected areas and of 11% in the municipalities outside.

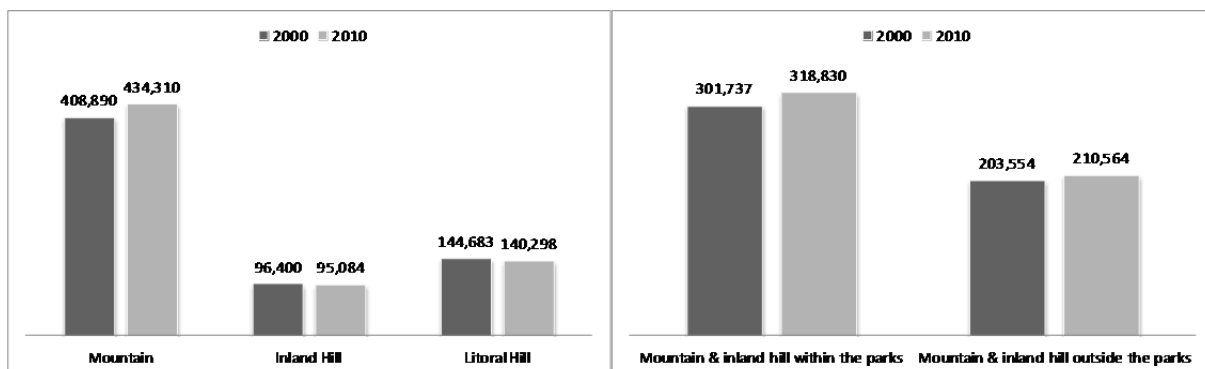


Figure 11: Variation of enterprises surface 2000/10 per altimetric areas (Source: Authors' elaboration on Istat data)

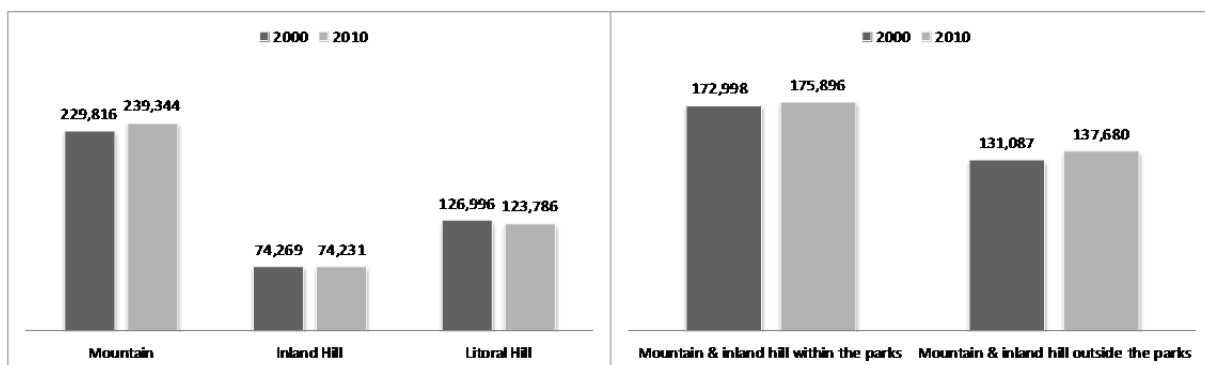


Figure 12: Variation of UAA 2000/10 per altimetric areas (Source: Authors' elaboration on Istat data)

Shortly, these developments show how both the use of land for non-agricultural purposes and the abandonment of agricultural land still remain - albeit in a limited way - in coastal and inland areas outside the protected areas. Instead, in the mountain and hilly areas of the parks, it seems evident an opposite trend. In the high mountain municipalities the number of farms is now so low that it is possible to assume that the cycle of economic conversion toward professional business has ended its course and that the remaining companies have reached a firm size sufficient to ensure farmers a certain profit.

The increase of agricultural area has also been characterized by a shift of the land availability, since the UAA property has reduced, the rent surfaces and free use ones have increased significantly, with different dynamics in different geographical areas (Figure 13).

This trend is related to the process of recomposition mentioned above, which highlights a limited number of companies in the mountain areas seeking by all means to reach that size production necessary to achieve an economical balance

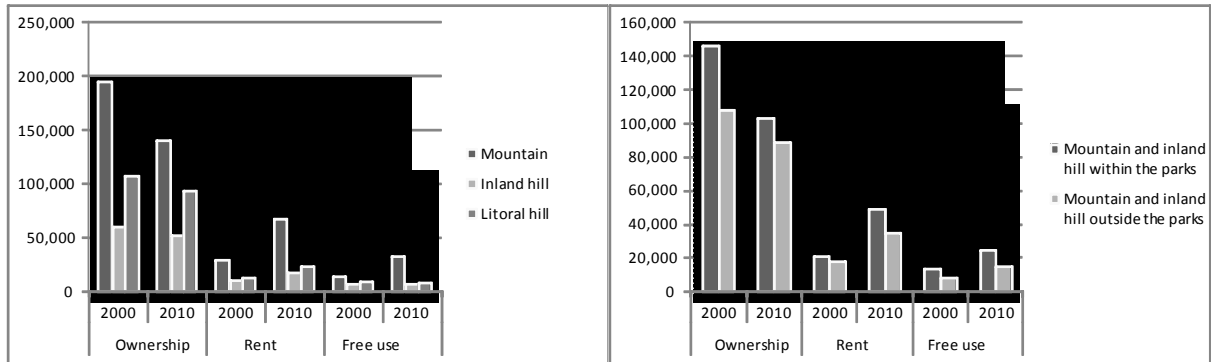


Figure 13: Variation of UAA in ownership, rent and free use (Source: Authors' elaboration on Istat data)

With concern to the tenants, the proportion of people aged under 40 years is only 7% on a regional level, with a lower share than in 2000 (when they were 9%) and a decrease in absolute terms of almost 35%. The percentage has declined in all geographic areas except than in the mountain villages, where, instead, there has been a slight increase (from 9.2 to 9.8%). Once again, then there has been a specificity of mountain communities that have the relative share of young conductors larger than other regional areas.

### Application of the logistic regression

The method of logistic regression has been chosen for its ability to define a model which shows the diversity of the context of mountains and inland hills with respect to the litoral hills one. The referred theoretical model is the one concerning the stochastic utility. Therefore, the observed phenomena allow us to go back, through their modelling, to the probability of the occurrence of a behaviour. Since we deal with an analysis of discrete choices, this family of econometric models is generally more suitable.

The data used for the application of logistic regression have been largely obtained from the official statistics and the 180 variables of the initial data-base have been reduced and, in part, transformed into dynamic variables, so obtaining a definitive data-base, consisting of twenty-three variables.

A first attempt to identify specific development paths of the park areas has had an unsatisfactory outcome from the statistical point of view and few possibilities of interpretation. The logistic regression model in this case has had a capacity of correct classification between municipalities within the parks and outside them of about 73%, using the following five variables, all statistically significant, listed in order of importance for the correct classification and the correlation sign into parentheses:

Table 4: Logistic regression. List of most significant variables

D_A_3 (+)	variation % UAA 2000/2010
D_T_20 (+)	absolute variation no-hotel tourist establishments 2000/2010
D_T_24 (+)	tourist intensity (overnights and population ratio)
D_T_25 (-)	tourist density (available bed places and surface area ratio) 2010
DIN_A_7 (-)	variation farms specialized in sheep and goats 2000/2010

Shortly, the interpretation of these results indicates that the municipalities located in the parks of Abruzzo, between 2000 and 2010, have distinguished themselves from the rest of the region for a more dynamic agricultural land used, for a better tourist performance and for a greater contraction in sheep and goats livestock.

A second attempt - through the use of the binary variable to verify the differentiation of mountain and inland hill communities from the coastal hill ones - has enabled us to obtain more satisfactory results, (Table 6) both from the point of view of the capacity of correct classification (representing 83% of the cases), and from the point of view of statistical significance of the seven variables present in Equation final, listed below in order of importance for the purposes of correct classification and with the sign of the correlation in parentheses:

Table 5: Logistic regression. List of most significant variables

DIN_A_8 (+)	variation farms 2000/2010 (source: CCIAA data)
D_A_3 (+)	variation % UAA 2000/2010
D_A_5 (-)	variation % farm women managers 2000/2010
D_A_6 (-)	variation % younger than 40 farm managers 2000/2010
D_A_7 (-)	variation farms specialized in sheep and goats 2000/2010
D_A_18 (-)	variation number of agritourisms 2000/2010
DIN_P_12 (-)	variation dependency ratio 2002/2010
DIN_P_13 BIS (-)	population natural increase rate 2002/2010 on population in 2002

This model is able to classify the 83% of the Abruzzo municipalities correctly. In particular, the positive dynamics of farms and the utilized agricultural area show a contrast of inland areas compared to the coastal ones. The demographic variables, though not particularly relevant for the correct classification made by the model, instead indicate signs of further aging and declining population of mountain communities and inland hills than coastal ones. Finally, the development of rural tourism seems to have more positive performance in coastal rather than in mountains. The same happens for innovative dynamics in the management of farms, such as the increase of the corporate management by young people and women.

Table 6 – Results of the logistic regression model

**Model Summary**

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	206,661 <sup>a</sup>	,345	,517

a. Estimation terminated at iteration number 7 because parameter estimates changed by less than ,001.

**Classification Table**

Observed		Predicted			
		MONT_COL		Percentage Correct	
		,00	1,00		
Step 1	MONT_COL	,00	42	31	57,5
		1,00	20	212	91,4
Overall Percentage					83,3

a. The cut value is ,500

**Variables in the Equation**

Step		B	S.E.	Wald	df	Sig.	Exp(B)
1	D_A_3	1,469	,545	7,251	1	,007	4,344
	D_A_5	-,046	,022	4,405	1	,036	,955
	D_A_6	-,078	,027	8,325	1	,004	,925
	D_A_7	-,301	,124	5,865	1	,015	,740
	DIN_A_8	2,920	1,334	4,788	1	,029	18,541
	DIN_P_12	-7,841	3,193	6,032	1	,014	,000
	DIN_P_13BIS	-37,023	5,914	39,184	1	,000	,000
	D_A_18	-,295	,146	4,096	1	,043	,745
	Constant	,724	,412	3,093	1	,079	2,063

a. Variable(s) entered on step 1: D\_A\_3, D\_A\_5, D\_A\_6, D\_A\_7, DIN\_A\_8, DIN\_P\_12, DIN\_P\_13BIS, D\_A\_18.



Through the comparison of these results with those obtained from the model applied to municipalities within the park / outside the park, though not statistically significant, we can notice that in general the context of internal mountains and hills is less differentiated in terms of tourist dynamics, compared to the coastal hillside, than the context underlined by the difference between municipalities within the park and outside the park. Thus, tourism seems to play a positive role in the path of virtuous development undertaken by the park areas, rather than in the general framework of internal mountain and hillside, especially if it will enhance synergies with a modern and renewed management of agricultural businesses.

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