

## **PROCESSES OF MARGINALIZATION: DYNAMICS IN LOMBARDY<sup>1</sup>**

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### **1. Introduction and theoretical framework**

The study of the dynamics of territories and urban areas is fundamental to the analysis of the evolution of demo-social phenomena not only in terms of welfare but also in terms of environmental sustainability and economic growth.

The marginality of territories can be declined in various ways. There is no single formula for determining marginality situations of a socio-economic nature. There are numerous studies that have addressed the issue, including from a plurality of viewpoints. But the method followed, especially in terms of the selection of variables, varies according to the conception of development taken as the basis of the analysis. For instance, for economists, development is predominantly understood as economic growth. For environmentalists, on the other hand, it is respect for the ecosystem. Here we adopt a socio-economic perspective. In other words, we assume that the development gap is primarily determined and fueled by social and economic conditions, which in turn are directly related to the demographic dimension, in a process of action and feedback (Crescimanno, 2009).

At the sub-national level, already since the 1950s, many territories have experienced, and still experience, a process of population contraction, which in small areas can be defined as depopulation (demographic marginality). Indeed, in these areas, a negative balance between births and deaths has been and is also accompanied by a negative migration balance (Reynaud and Miccoli, 2018a).

Depopulation mainly affects mountain and rural municipalities (Rizzo, 2015; Istat, 2018; De Rubertis, 2019). At first, it involves northern municipalities more, then it spreads and affects the rest of the country. Migration to industrialized and urban areas has thus determined or accentuated depopulation processes in many localities (Del Panta and Detti, 2019).

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<sup>1</sup> Although the work is the joint responsibility of the authors, paragraph 1 and 4 is attributed to S. Ballabio, paragraph 2 is attributed to F. Verrecchia and paragraph 3 is attributed to A. Vitalini.

The rural exodus has never ceased completely, although it has sometimes lost intensity. After the counter-urbanization at the end of the last century, in the 2001-11 decade Italy's largest cities were characterized by a stabilization in the number of residents, followed by a process of urban polarization in recent years. This process has led, in years of demographic stagnation or decline, to a further depopulation of rural areas and smaller towns. Indeed, between 2011 and 2018, small and very small municipalities experienced a drastic decrease in the number of residents. Thus, it is rural areas-characterized by small and diffuse towns, low population density and relative remoteness from larger urban centers-that have suffered the most severe demographic hemorrhages in the long run (Reynaud and Miccoli, 2021).

Negative demographic dynamics are certainly also among the main causes of the socio-economic marginalization of municipalities. The process of depopulation, in fact, underlies a series of recessionary effects described in the literature through the concept of the "spiral of marginality" (Buran, 1998).

A process that is particularly evident in small towns, where limited decreases in absolute terms produce much greater effects than in larger municipalities. Among the consequences attributable to population contraction are: the flight of the high-income population, the weakening of the productive structure (economic marginalization), the cutting back of local services, the degradation of the physical and natural environment, etc. These effects in turn produce further depopulation pressure, generating a perverse spiral and a structural obstacle to territorial revitalization efforts (Martínez-Filgueira *et al.*, 2016). However, there are also other processes that lead to the impoverishment of development opportunities in the territory: scarcity of endowments affects negatively on the attraction of activities and businesses; scarcity of resources and activities affects on the service system and development opportunities; aging of the population, like depopulation, affects on local social networks (Crescimanno, 2009).

From a demographic point of view, depopulation and aging processes are closely linked (Hospers and Reverda, 2015), especially in some areas (Miccoli and Reynaud, 2016). On the one hand, intense out-migration has effects on the age structure of the population, reducing the youth component; on the other hand, young people tend to leave very old settings more, where economic and social opportunities are lower (Reynaud and Miccoli, 2016; 2018b).

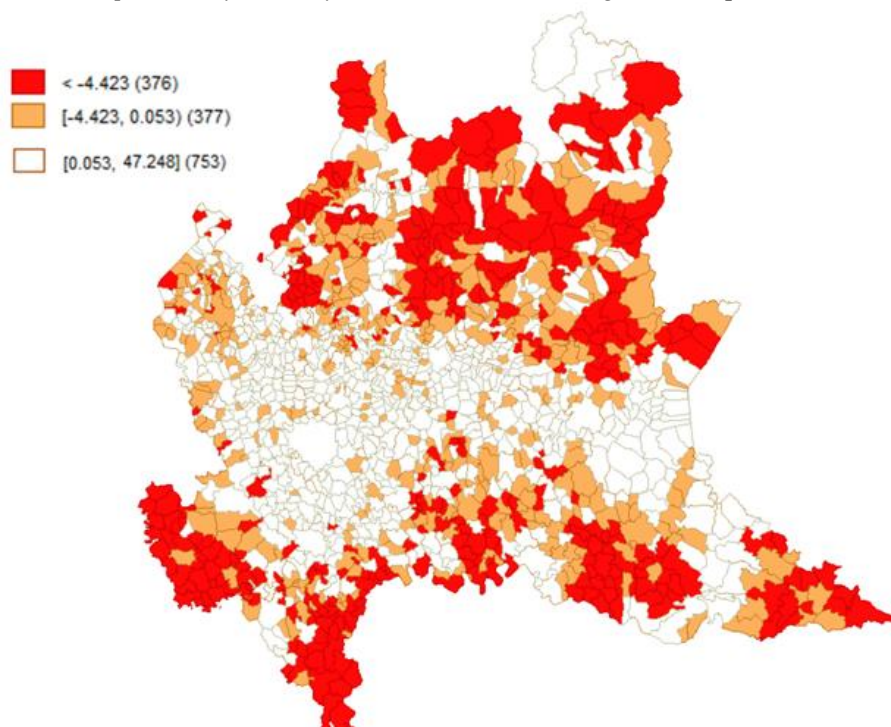
From a more historical perspective, in the past the out-migration of the working-age population, and thus depopulation, contributed to the intensification of the ongoing aging process, while in more recent times the latter has itself become the key factor in the depopulation process. Moreover, with all evidence, the aging and depopulation phenomena are both linked to a very low fertility rate (Golini and Mussino, 1987, Golini *et al.*, 2001; 2007; Golini and Lo Prete, 2019).

### 1.1 Background

This work aims to identify and study shrinking areas that have undergone processes of demographic or economic marginalization by analyzing the dynamics of the last decade, in the Lombard Region at the level of municipal detail. Both indicators from official statistics and spatial databases will be considered in the analyses. In particular, we will use demographic data released by the National Institute of Statistics in addition to income data provided by the Internal Revenue Service (Agenzia delle Entrate). In Lombardy, demographic marginalization affects two separate regional belts: the mountain belt to the north and the lower Po Valley, Oltrepo' Pavese, and Lomellina to the south (Figure 1).

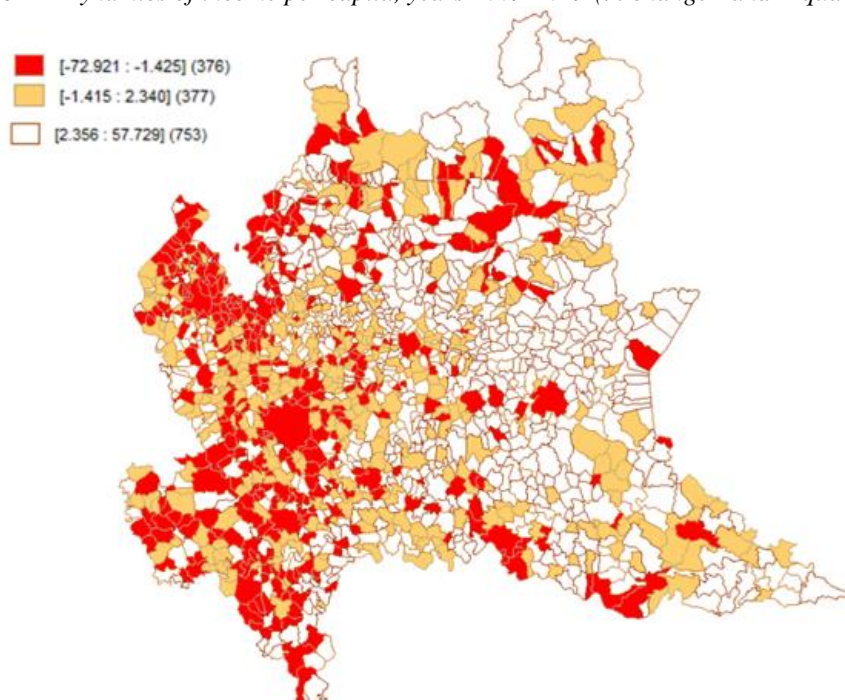
Instead, economic marginalization also, and especially, affects the western part of the region in the municipalities of the local labor systems of Varese, Milan, and Monza (Figure 2). Between the two observed dynamics, there is a slight negative Pearson correlation coefficient  $-0.31$  (Figure 3) that suggests a substantial incorrelation between the two phenomena.

**Figure 1** – Population dynamics, years 2009-2019 (% change I and II quartiles).



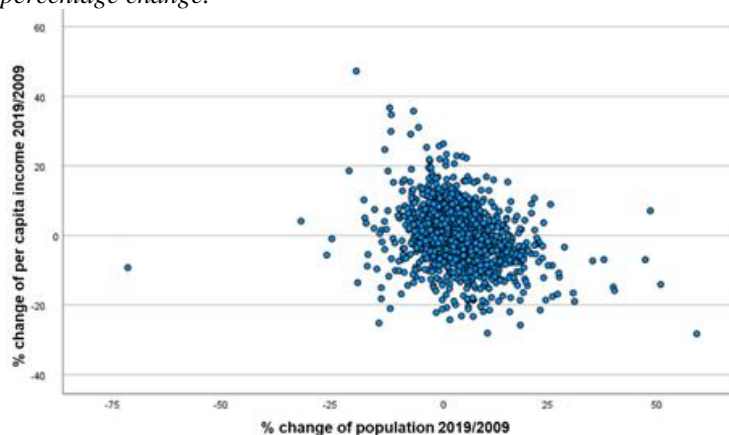
Notes. % change over the whole period 2019/09 in resident population at the municipal level.

**Figure 2** – Dynamics of income per capita, years 2009-2019 (% change I and II quartiles).



Notes. Percentage change over the whole period 2019/2009 in gross income per capita (2009 income revalued) at the municipal level.

**Figure 3** – Population and income per capita dynamics, years 2009-2019 - Scatterplot of percentage change.



Notes. Percentage change over the whole period 2019/2009, at the municipal level, in resident population and in gross income per capita (2009 income revalued).

## 2. Definition of a typology

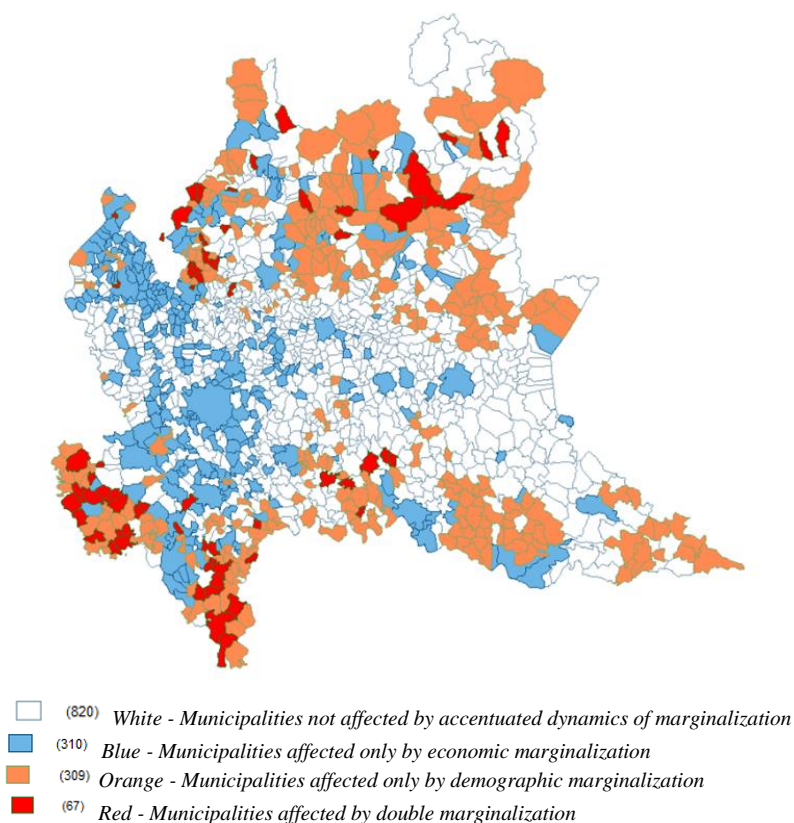
The construction of a spatial typology will be used to identify areas affected by accentuated marginalization dynamics 2009-2019, whose profiles are of interest to the study. Two dummy variables were built:

- Demographic marginalization: value “1” if the percentage reduction of population is less than 4.4 percent (I quartile) and “0” otherwise;
- Economic marginalization: value “1” if the percentage reduction in gross income per capita is less than 1.4 percent (I quartile) and “0” otherwise.

Crossing the two variables, we can identify four types (Figure 4):

- Municipalities not affected by both dynamics of marginalization;
- Municipalities affected only by demographic marginalization;
- Municipalities affected only by economic marginalization;
- Municipalities affected by both types of marginalization.

**Figure 4** – Choropleth map of marginalization typology (four types).

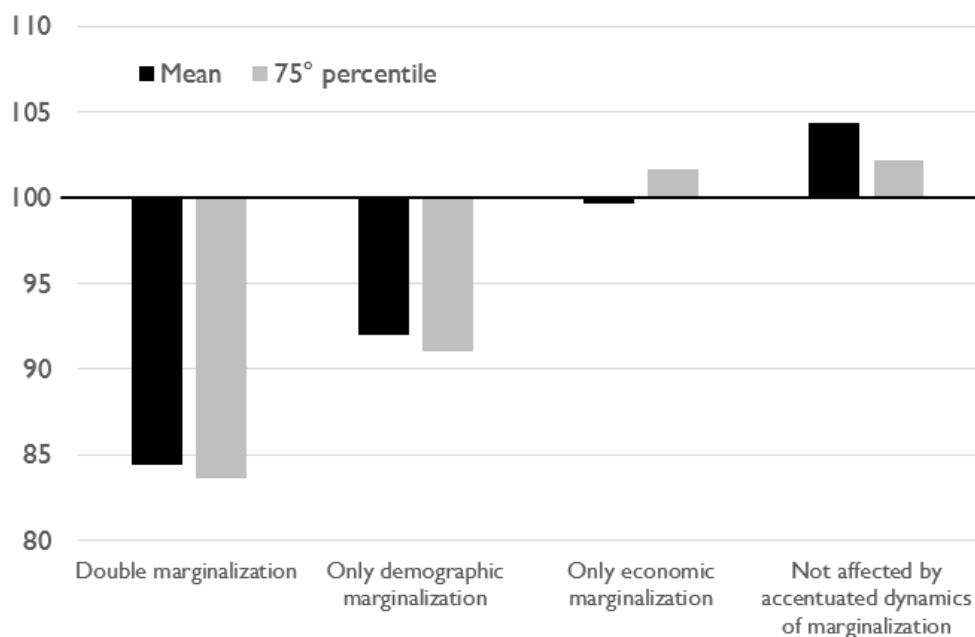


Accentuated dynamics of both economic and demographic marginalization concern, on the one hand, Lomellina, Oltrepo' Pavese, Lodigiano and Cremonese, and on the other hand, in the North, some small hill and mountain municipalities generally under 1,000 inhabitants. As anticipated accentuated dynamics of economic marginalization only concern the west of the region. While accentuated dynamics of only demographic marginalization concern the southern and northern regional belts.

As can be guessed from the indices on income at the local level, the municipalities that seem to be affected by processes of marginalization only economically are among those in which there is greater wealth per capita produced in 2019. In fact, if one looks at both the average income per capita and the 75th percentile of the income per capita of the municipalities grouped in the different types, the areas affected by processes of economic marginalization only - together with the municipalities not affected by pronounced marginalization dynamics - have higher values for these income indicators than the regional figure (Figure 5).

That is, these are municipalities in which diseconomies of urbanization or renewal of labor force with non-EU manpower employed in personal services, which, as is well known, provide low added value.

**Figure 5** – *Income per capita, 2019 (Index, Lombardy = 100).*



*Notes. Mean of municipal income per capita; 75th percentile of municipal income per capita.*

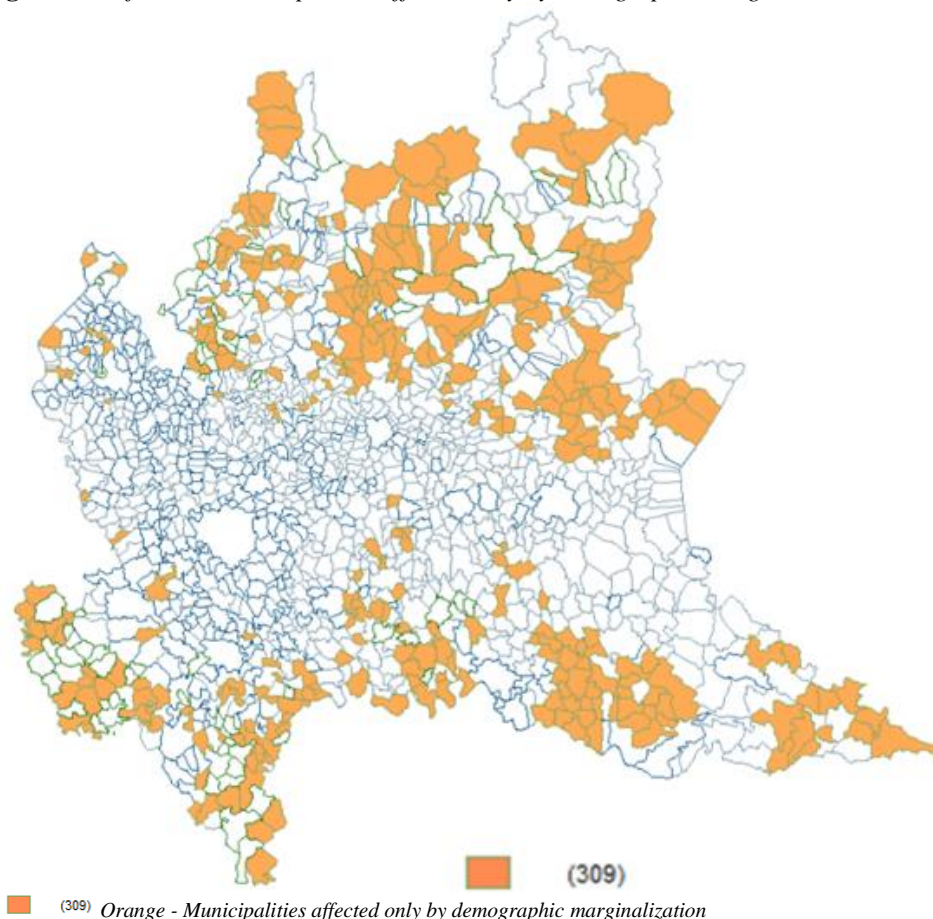
### 3. The characteristic of demographic marginalization

We focus on the 309 municipalities affected only by demographic marginalization: that is in first quartile percentage change of population and not in first quartile percentage change of income per capita (Figure 6).

To deeply study the characteristic of demographic marginalization, we will use a decision tree (or classification tree) strategy to segment the data set. The main purpose of creating a decision tree is to model a series of various events to find out how it affects the possible outcome.

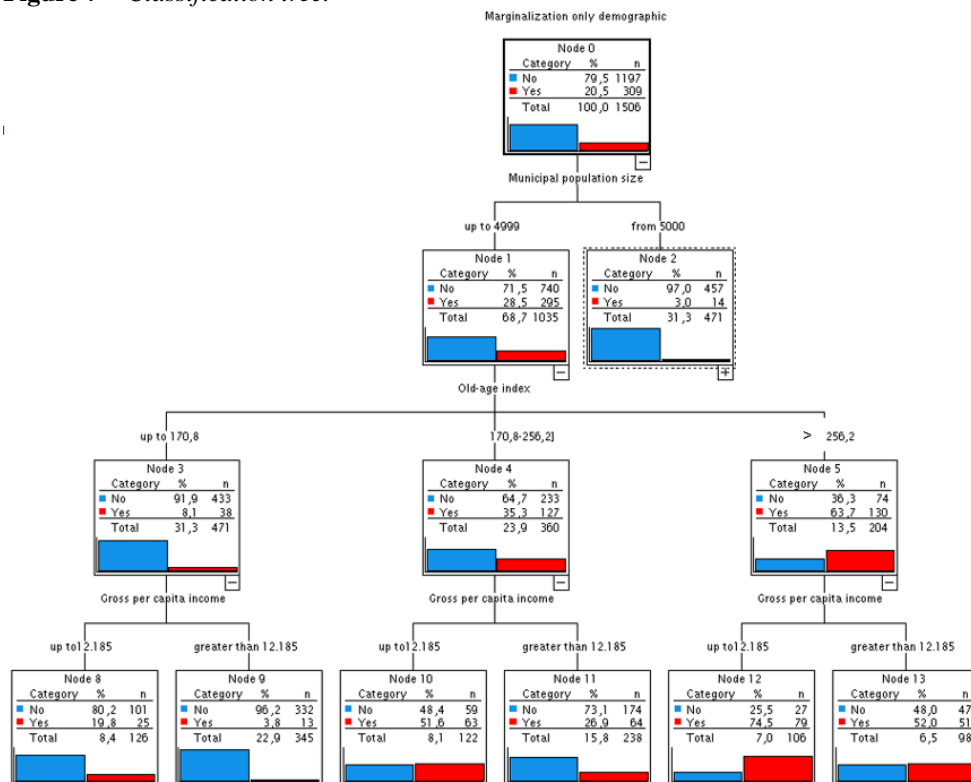
It classifies cases into homogeneous groups, based on values of independent (predictor) variables that predict the values of a dependent (target) variable.

**Figure 6** – A focus on municipalities affected only by demographic marginalization.



In particular, we will use as statistical tool SPSS Answer Tree and the growing methods CHAID (Chi-squared Automatic Interaction Detection). At each step, CHAID chooses the independent (predictor) variable that has the strongest interaction with the dependent variable. For each node, the tree shows the number and percentage who belong to the target group. The splits of municipalities occur in order of importance. Categories of each predictor are merged if they are not significantly different with respect to the target variable. The target variable is a dummy with “1” if the municipalities are affected only by demographic marginalization and “0” otherwise. The independent variables are: Municipal population size; Altitude zone; Old age index; Total dependency index; Incidence of foreigners; Prevalent tourist category; Local labor system; Agricultural zone; Mountain community; Gross income per capita 2009. Controlling for population size class, the most significant factor is the old-age index, followed by income per capita in 2009 (Figure 7).

Figure 7 – Classification tree.





First: demographic marginalization processes mainly affect small municipalities: the percentage of municipalities, affected only by demographic marginality, rises from 3.0% among municipalities with more than 5,000 inhabitants to 28.5 percent among those with less than 5,000 inhabitants.

Second: as emerged from the literature, demographic marginality in Lombardy is also positively correlated with population aging. Considering the population size below 5,000 inhabitants, the percentage of municipalities, characterized by demographic marginality, rises from 8.1% in the group with an old-age index below 170.8 to 63.7% among those with an index above 256.2.

Third: considering the population size of less than 5,000 and controlling for the old-age index, gross income per capita in 2009 is correlated with the process of demographic marginality. Among municipalities with a population of less than 5,000, the percentage is significantly higher in the group of municipalities with gross income per capita up to 12,185 euros than in those with gross income per capita above 12,185 euros. Specifically, 19.8 percent versus 3.8 percent among municipalities with an old-age index up to 170.8; 51.6 percent versus 26.9 percent among municipalities with an old-age index between 170.8 and 256.2; and 74.5 percent versus 52.0 percent among municipalities with an old-age index above 256.2.

This finding suggests that municipalities, which, between 2009 and 2019, seem to be affected only by demographic marginality may also be characterized by economic fragility that is the product of socio-economic dynamics, which occurred in an earlier period, including the exit of the high-income resident population and the weakening of the production system.

#### **4. Final remarks**

The importance of a spatial analysis of socio-demographic dynamics to support local development policies is highlighted. Considering, in Lombardy, the processes of demographic and economic marginalization, during the last decade, at the level of municipal detail, some clear patterns of spatial-level organization emerge. Demographic marginalization affects two separate regional belts: the mountain belt to the north and the lower Po Valley, Oltrepo' Pavese, and Lomellina to the south. Economic marginalization affects the western part of the region in the municipalities of the local labor systems of Varese, Milan, and Monza.

Considering the two processes simultaneously, some final thoughts can be made.

First, some municipalities are affected by dual dynamics of marginalization that have been accentuated over the past 10 years.

Second, municipalities that, between 2009 and 2019, appear to be affected only by processes of economic marginalization are municipalities where diseconomies of

urbanization or attraction of non-EU labor employed in personal services may have occurred.

Third, municipalities that, between 2009 and 2019, appear to be affected only by processes of demographic marginalization could be characterized by significant economic fragility produced by the outflow of the high-income resident population and the weakening of the production system, occurred in an earlier period.

Fourth, demographic characteristics such as urban size and old-age index are important factors in the spatial variability of demographic and economic marginalization processes on a local scale.

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## SUMMARY

The observation of the dynamics of territories and urban areas is fundamental to the analysis of the evolution of demo-social phenomena not only in terms of welfare but also of environmental sustainability and economic growth.

The aim of the work is to identify and study shrinking areas that have undergone processes of demographic and economic marginalization in the last decade, in the Lombardy context and at a municipal level of detail.

Both indicators from official statistics and spatial databases will be considered in the analyses. In particular, use will be made of demographic data released by the National Institute of Statistics in addition to income data provided by the Internal Revenue Service.

The construction of a spatial typology will be used to identify areas affected by marginalization processes whose profile it is of interest to study, thanks to methods based on decision trees.

Related to the results, this paper notes that spatial characteristics -such as, for example, geographic area, urban size, etc. - are important factors in the spatial variability of demographic and economic marginalization processes at the local scale. These results highlight the importance of a spatial analysis of socio-demographic dynamics to support local development policies.

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