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Measuring the Existence of a Link between Crime and Social Deprivation within a Metropolitan Area

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The subjects of our analysis are the criminality and social deprivation. We want to verify the existence of a relationship between the crime observed in the place where the criminal act is committed and social deprivation. In practice, we intend to detect the relationship between crime and deprivation from a spatial perspective. We conceive the actual research results as a useful tool to support policy makers in defining the most appropriate actions, and the place where they should be undertaken, to fight crime. In addition, we want to relate these crimes to the social disadvantage, that is a deprivation index on a geographical basis divided into the same district. The aim is to identify a possible correlation between crimes committed in certain areas and the presence of elements of social exclusion.

The analysis is located in the urban fabric of Genoa. In particular, for each of the 25 Genoese districts, the levels of crime and social deprivation were first detected. In the subsequent step, these results were analyzed jointly from a spatial perspective.

Crime is related to various types of criminal acts. To measure criminality, we started from the conception that describes criminality as a deviant act, i.e. an act that “violates the norms of a community and is punished with a penalty” (Bagnasco, Barbagli & Cavalli, 2012).

To define social deprivation, we adopt the definition that P. Townsend (1987, 1988) provides, in two works of primary importance in this field of analysis. Townsend was the first to write that “social deprivation implies a non-participation in the roles, relationships, customs, functions, rights and responsibilities involved in being an active member of society or group” (Townsend, 1988). In his definition, Townsend places emphasis on the relational and demographic aspects of the deprivation. Social deprivation provides information on which groups are marginalized and vulnerable which are not within the same community.

The analysis is set on a formative approach, according to which selected indicators affect the events to be studied and determine their changes in value (Maggino, 2017 a, b). The formative approach refers to the



bottom-up explanatory approach. According to this approach, a concept is defined by a specific set of indicators, chosen because, due to their specificity, they are appropriate to define the concept itself.

The peculiarity of the study derives from the high territorial pervasiveness of the data examined, which refer to the local district dimension. The data come from Genoa Police Headquarters and refer to the three-year period 2015-2017. The data consist of criminal acts reported to the police during the period of analysis. Overall, the crime index is made up of 6 composite groups of crimes, similar in nature. In a preliminary step, the average was calculated for each type of crime, so that any anomalous data would not have a distorting effect.

The methodological approach is quantitative aggregative. Two methods of quantitative aggregative nature have been applied for the construction of the indices. Crime is measured by an additive method, i.e. a sum of standardized variables. The additive method has been used, since the different types of crimes are measured on the same scale (Carstairs, 2000; Ivaldi, 2006).

Social deprivation is measured by the DP2 method. The method proposed by Peña (1977), enjoys some desirable properties: non-negativity, commutativity, triangular inequality, monotony, exhaustiveness, existence, determination, transitivity, invariance to change of scale or origin, invariance with respect to a change in general conditions. The DP2 index also allows to solve some problems frequently encountered in the construction of statistical measures, since it is a partially non-compensatory methodology.

In order to verify the possible link between criminality and social deprivation, the Spearman *rho* index was calculated.

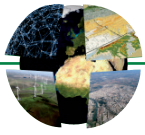
The analysis shows a trend of high crime rate in the districts closest to the center of the city of Genoa. Then crime rate decreases when moving towards the periphery. The areas of the city center are the busiest and the most difficult to control continuously due to the intense passage of people, especially during rush hours (Brantingham & Brantingham, 1991, 1993). A similar result is found for social deprivation: the districts closest to the center tend to be more socially critical, while the outermost districts have a more solid social fabric, also because of a lower fluidity of residents (Bellani & D'Ambrosio, 2011).

The Centro Est municipality shows the highest crime rates among all the districts. Portoria and Centro Storico are the districts with the first and third crime rates respectively, located closer to the city centre. Furthermore, Centro Storico and Portoria have the highest values in different specific crime groups. Centro Storico is first in receiving stolen goods and money laundering, and counterfeiting, while Portoria is the first district by thefts and robberies, and threats, insults, beatings, injuries, extortion and damage. Both Portoria and Centro Storico constitute the nerve centre of the city and very busy areas.

The situation in the Centro Ovest municipality, with reference to San Teodoro and Sampierdarena, shows homogeneity as regards the crime incidence rate, showing rather high values, but differences if we consider the type of crimes. In the Bassa Val Bisagno the crime rates of San Fruttuoso and Marassi are not particularly high for any of the crime groups. Media Val Bisagno shows dissonant values that are not referable to a single generality. In this case, Struppa has high values for how it concerns sexual violence and receiving stolen goods and money laundering; Molassana widely shows low crime rates, while Staglieno is placed in the middle. The Val Polcevera districts are distributed unevenly, although they do not appear particularly negative as a whole. In Medio Ponente, Cornigliano and Sestri Ponente perform two divergent values. The former is very negative, indicating high values of criminality. This polarization can be traced back to the proximity between Cornigliano and Centro Ovest - Centro Est municipalities, or more in general municipalities with the highest crime rates. The situation in Ponente is characterised by low index values in proximity of Prà and Pegli, while in correspondence with Voltri they increase. The Levante municipality has low crime index values, considering all its districts, i.e. Valle Sturla, Nervi and Quarto.

It is possible to state that, if the crime rate increase near to the centre of the city, it gradually decreases in areas close to the periphery, with the exception of the rate that characterises particular urban areas, such as the districts that present public housing structures.

For how it concerns the deprivation, the highest scores emerge in the areas between Centro Est and Centro Ovest, where Centro Storico, Sampierdarena and San Teodoro show the most marked social deprivation is found. By contrast, the districts Struppa and Molassana, belonging to the municipal area of Media Val Bisagno,



Pegli and Voltri in the municipal area of Ponente, are the districts with the lowest social deprivation. In this terms, a rather marked territorial polarization can be found. The least deprived areas from a social point of view are located in the hinterland or, in any case, they are the ones with a territorial extension from the coast to the interior of the region. At the same time, the districts that are closest to the city centre confirm greater social deprivation.

If we consider the Spearman correlation index value, it clearly appears that the areas with the lowest incidence of crime are also characterised by the least social deprivation. The correlation is significant between social deprivation and the crime rate (0.532). With respect to individual crime groups, the highest correlation with social deprivation is established in correspondence of the thefts and robberies group (0.540). Another relationship is identified between deprivation and the group including threats, insults, beatings, extortion, injury, damage, fire (0.462).

The findings and correlations identified in the paper are always to be contextualized with respect to the specific characteristics of the Genoese territory. This is the reason why trends can be identified on a large scale (generally more deprived and criminal areas of the East-West Centre) but, at the same time, differences at the level of micro-areas (e.g. Pontedecimo and Voltri). Indeed, R.A. Carr-Hill, J. Jamison & D. O'Reilly (2002) remember us that "not all deprived people live in deprived areas" and P. O'Mahony (1986) allows us to state with certainty that considerations on spatial socio-economic analysis should always not underestimate the differences that emerges into each geographical clusters.