GEOSPATIAL STATISTICS, TRANSPARENCY AND REAL ESTATE MARKET DYNAMICS

The current issue of "Territorio Italia: Land administration, cadastre, real estate" is in large part devoted to the housing market, to which a broad and consolidated literature has been dedicated both nationally and internationally through careful experiments of analytical techniques and various applications. Clearly, the goal is to highlight the contributions that mark the progress of methodologies and tools, focusing particular attention on the analysis and interpretation of results and their potential as support for public policy and best practices.

Some articles propose the analysis of markets - in Tainan, Swindon and Turin - with specific analytic approaches and models focused on the "spatial aspects of property values" and how to face the issue of "location" which is one of the most explanatory price variables. The use of GIS (Geographical Information System) integrated with geospatial statistics is considered by the journal as a field for future development; connecting knowledge, analysis and policy with obvious repercussions for interoperability.

Other articles take up the issue of transparency in the real estate market, already discussed in the first issue as a problem in Italy that has not yet been fully resolved in relation to other nations where data sources are much more highly available. Still others study the temporal variations in prices, real estate cycles, the evolution of market dynamics, starting from the crisis in the form of "bubble" that began in the United States and affected the entire world due to the distorted relationship that developed between finance and real estate markets, encouraged by the deregulation of the international financial system. Still others show the emerging interest in studies that do not consider real estate markets as local markets but as phenomena that increasingly depend on higher-level economic and financial systems and, thus, the process of economic globalization currently underway.

The first article by Bor-Ming Hsieh on the new Tainan Metropolis introduces the issue of the segmentation of the housing market, a theme long debated by the international scientific community and that touched Italy in the late nineties as a result of the approval of Presidential Decree 138 of 1998, by which municipalities were required to identify - as a preliminary step in the process of revising the property assessment system - "cadastral micro-zones" corresponding to submarkets. In the past, the former Rivista dell'Agenzia del Territorio, now "Territorio Italia," has treated the issue in terms of methodology, addressed by Bor-Ming Hsieh, of how to define submarkets and how to face "location" as an explanatory variable of house prices. Bor-Ming Hsieh seeks to identify submarkets in Tainan Metropolis, the new metropolis born from the merging of Tainan City and Tainan County. After tracing the literature up to the present day and exploring spatial techniques, the author verifies the regional submarkets pre-defined by the local government using cluster analysis and spatial autocorrelation techniques, in particular the Moran index. Obviously the ultimate goal is to use submarkets to estimate their impact on housing prices.

Borruso, Battaglia e Porceddu address the case of Swindon in the UK. They use spatial analysis models for purposes different from those of Bor-Ming Hsieh. The article frames the Swindon market in the UK context by opening to the relationship between local and national markets. The main goal is to verify the real effects produced by development projects implemented by the municipality to revitalize the historic city center and to identify areas of greater concentration of sales, not only to analyze the spatial distribution of prices but also to verify buyers' choices regarding location and the various building typologies and related housing types. Density and local analyses, while

using not-particularly innovative deterministic and statistical data interpolation techniques (IDW and Kriging), yielded excellent results precisely in the analysis and interpretation of spatial phenomena, also thanks to access, via the internet, to UK Land Registry data.
The next article by Patacchia and Politi brings us back to Italy. Given the shortage and poor quality of information regarding construction and real estate values, our country has to close the information gap, even in relation to European Union guidelines and regulations aimed at ensuring greater and more timely information regarding production and the housing market. This requirement can no longer be postponed after the housing bubble in Europe that occurred as a result of the perverse relationship between finance, banking and real estate markets. The ISTAT (Istituto Nazionale di Statistica -National Institute for Statistics) project, conducted with the assistance of the Agenzia del Territorio and the Agenzia delle Entrate (Tax Agency), has verified both the stratification approach combined with the method of hedonic re-pricing as well as the adequacy of the OMI (Osservatorio Mercato Immobiliare dell'Agenzia del Territorio - Property Market Observatory) data banks based precisely on cadastral microzones identified by the application of Presidential Decree 138 of 1998 and corresponding to segments of the local real estate market. If the experimentations still underway regarding deeds of sale furnish good results, Italy will have a dual advantage. Apart from having the price indices regarding time changes, acts of buying and selling can be an important data source (in terms of amounts and quality) and answer the need for transparency in the Italian real estate market.
The article by Curto, Fregonara and Semeraro also starts from the problem of transparency of the real estate market which, beyond forcing researchers and analysts to use bid prices, produces distortions in the mechanism of price formation. In particular, the statistical approach to the real estate market in Turin considers the Italian context characterized by a generalized condition of poor transparency and a high level of differentiation of real estate properties and by the fact that supply is largely made up of individuals similar to buyers. By acting simultaneously, these conditions amplify price variability and the weight of the stochastic components already intrinsic to every market. The article uses the PCA (Principal Component Analysis) technique and regression analysis (analysis of incidence) - both well known and widely-used - to test whether bid prices can be used to represent market variabilty and then, with due caution, to explain the functioning of the markets themselves and the mechanism of the formation of values. The analyses use OICT (Osservatorio Immobiliare della Città di Torino - Real Estate Observatory of the City of Turin) data, structured in a Geographic Information System set up to monitor the values of the 40 microzones of the city, identified by Presidential Decree 138/98. The results confirm that the micro-zones are considered true market segments. Given the results obtained, the statistical approach lends itself to other experiments and, in particular, could be useful in verifying the quality of prices contained in the acts of sale, explored in the previous article.
Lazzari and Pavese analyze the dynamics of the Italian property market to test the possible effects of planning policies and, in particular, real estate development projects based on the sale of development rights (very common in our country), through the integration of information in public databases (OMI, Istat - Istituto Nazionale di Statistica e Banca d'Italia - Real Estate Observatory of the Agenzia del Territorio, National Institute for Statistics and Bank of Italy) considering data regarding 18 Italian cities (provincial capitals). The analyses conducted using the VAR (Vector Autoregressive)

method consider two equations to represent housing demand and supply which, in a market state of equilibrium – a condition that is more theoretical than practical - should determine price. The function of the demand for housing in 18 cities (Turin, Aosta, Milan, Venice, Trieste, etc..) take as explanatory variables housing prices, rental income net of taxes, real disposable income, number of units sold, rate of population growth, mortgage interest rate, rate of unemployment, housing stock and a random error term; supply considers nominal housing prices, real construction costs, real land costs, number of new buildings and a random error term. In addition to the interest in the empirical results, the importance of this line of research should be underlined in a literature that is still too focused on the explanation of prices depending on the characteristics of the goods; even if this literature should certainly not be underestimated, especially where it might be considered appropriate to restart the process of revising estimates. Lazzari and Pavese's approach is very useful not only in understanding and explaining the profound crisis in the real estate market but also in forecasting potential and opportunities for further policy development in eventual actions to "sustain" the construction and real estate market.
Festa, Ghiraldo and Storniolo furnish another contribution to understanding the housing market dynamics in Italy, starting from the well-known theoretical honeycomb cycle approach, applying it to Italian data and information located in administrative files, allowing more accurate matching between databases (even with large dimensions). To analyze market dynamics, the authors use information relating to the normalized number of transactions (NTD) derived from the transaction deeds in real estate advertising databases and OMI databases to consider the price. The database consists of the number of seasonally adjusted transactions (2001-2010) and average house prices, deflated and broken down by region and by the largest 8 Italian cities. After the cycles are identified, the authors identify 9 clusters by applying a fuzzy logic technique. Beyond its empirical results, this paper also introduces new insights and analyses into today's structural conditions.
The article by Cina, Ferrante, Piras e Porporato should be considered in relation to the fact that the cadastral, cartographic and alphanumeric databases could become the core of the "Land Administration Systems," characterized by being integrated or "integratable" with other multiple and diverse spatial information infrastructure to support territorial policy and management on many levels ranging from the economic and fiscal to the environmental. In particular, the cadastral map is the only large-scale property map of the entire Italian territory. The interoperability of over 300,000 maps of the Agenzia del Territorio in vector format with the topographic data base of other agencies is essential both for supporting territorial planning, programming and management as well as for achieving the long-awaited process of optimizing related administrative practices. The authors present the geodetic procedure of transforming cadastral DATUM applicable both towards the DATUM Rome 1940 as well as ETRF2000. This procedure was applied to the Piedmont Region, after an experiment involving scientific collaboration was carried out; the collaboration was established in agreements both between the Agenzia del Territorio, the Piedmont Region and CSI Piemonte (Consortium for Information Systems) and between Politecnico di Torino and CSI Piemonte.

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