



# New wine in old bottles: The (changing) socioeconomic attributes of sprawl during building boom and stagnation



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## ABSTRACT

European cities are shifting towards scattered urban models with important transformations in the local socioeconomic context. With the aim to identify relevant associations with different urban patterns, the present study compares the socioeconomic profile of districts with respectively continuous and discontinuous settlements along the urban gradient in Rome, Italy, during building boom (early 1970s) and economic stagnation (late 2000s). Non-parametric correlation statistics and multivariate techniques were used to investigate the spatio-temporal evolution of 24 indicators (population, settlement, labor market, economic structure) and 14 land-use, environmental and topographic indicators at the municipal scale. The socioeconomic context discriminating discontinuous from continuous settlements in the early 1970s was significantly different from what was observed in the late 2000s. In the early 1970s, economic structure and labor market indicators have played a major role, while demographic variables and heterogeneity in the natural landscape surrounding discontinuous settlements were particularly important in the late 2000s. Policies oriented to urban sustainability and sprawl containment may benefit from an in-depth understanding of the different socioeconomic contexts associated with scattered settlements in expansion and recession times.

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## 1. Introduction

In the last decades, compact growth and population increase in urban centers have been progressively replaced with a discontinuous metropolitan expansion reflecting population de-concentration in sub-urban rings progressively far from central cities (Catalán et al., 2008; Arapoglou and Sayas, 2009; Terzi and Bolen, 2009; García-Palomares, 2010). Discontinuous urbanization has been demonstrated to influence class segregation (Lemanski, 2007; Maloutas, 2007; Dujardin et al., 2008; Arapoglou and Sayas, 2009) and inner city gentrification (Dura-Guimera, 2003; Hatz, 2009; Bayona-Carrasco and Gil-Alonso, 2012), determining urban congestion and a generalized increase in energy demand (Galster et al., 2001; Kahn, 2000; Deal and Schunk, 2004; Shammin et al., 2010; Helbich, 2012), landscape fragmentation (Irwin and Bockstael, 2004) and loss of natural resources, local culture, traditions and practices (Beriatos and Gospodini, 2004; Alberti, 2005; Nuisl and Rink, 2005; Andersson, 2006; Leontidou et al., 2007). On the other side, the positive impacts on urban competitiveness are widely discussed and quite uncertain (e.g. Camagni et al., 2002; Pacione, 2005; Lang et al., 2009).

Compared with Anglo-American metropolitan regions (Gordon and Cox, 2012), continuous and compact expansion has been the most common pattern of growth for cities in Europe (e.g. García and Riera, 2003; Tsai, 2005; Gospodini, 2009), especially in regions where long-established development paths and planning practices result in specific settlement characteristics and urban morphologies, such as in southern and eastern Europe (Couch et al., 2007). However, after World War II, the rapid growth of European cities showed evidence of the uneven transformation of compact mono-centric urban areas into more complex - scattered and/or polycentric - metropolitan structures (Kasanko et al., 2006; Haase et al., 2010; Arribas-Bel et al., 2011; Kabisch and Haase, 2011). By prefiguring polycentric development as a tool to achieve more cohesive and spatially-balanced regions (Coccosis et al., 2005; Rivolin and Faludi, 2005; Faludi, 2006), the European Spatial Planning Perspective framework has driven, at least indirectly, urban transformations towards more dispersed morphologies and decentralized functions in the last two decades (Giannakourou, 2005; Phelps et al., 2006; Catalán et al., 2008). As a consequence, mixed and indistinct urban continuums have expanded into agricultural and semi-natural land modifying a socioeconomic structure traditionally oriented along the urban gradient (Richardson and Chang-Hee, 2004; Schneider and Woodcock, 2008; Schwarz et al., 2010; Sarzynski et al., 2014). This process was partly driven by the economic decline of rural areas around big cities (Bourne, 1996; Longhi and Musolesi, 2007; Turok and

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Mykhnenko, 2007). Demographic dynamics have consolidated the polarization in urban and rural areas, accentuating the decline of economically-disadvantaged, less accessible and marginal districts (Cohen, 2006; Angel et al., 2011; Haase and Tötzer, 2012). With discontinuous and dispersed settlements expanding into rural areas (Muñoz, 2003; Paul and Tonts, 2005; Chorianopoulos et al., 2014), the restructuring of European cities has also determined new - and more subtle - forms of economic polarization and social inequalities (Kourliouros, 1997; Balibrea, 2001; Dura-Guimera, 2003; Delladetsima, 2006; Maloutas, 2007; Melih Pinarcioglu and Işik, 2009).

Taken as one of the most influential processes of urban transformation along the last century (Bourne, 1996; Bruegmann, 2005; Salvati et al., 2016), suburbanization is influenced by a variety of contextual factors being the object of a vast literature (European Environment Agency, 2006). Couch et al. (2007) reviewed suburbanization trends in Europe classifying cities according to demographic, social and economic attributes reflected into distinct models of sprawl. Sprawl 'patterns' and 'processes' have been increasingly investigated (e.g. Schwarz et al., 2010; Sarzynski et al., 2014; Salvati and Carlucci, 2015a) pointing out the inherent diversity in the approaches proposed by social sciences (Muñoz, 2003). A multifaceted stratification of immediate and underlying causes was seen influencing (and in turn being influenced by) urban sprawl (Leontidou et al., 2007), being the result of a complex system of interacting agents (Salvati and Serra, 2016). However, causes and consequences of urban sprawl were frequently debated without producing a general interpretative scheme (see, for instance, Coisson et al., 2014; Laidley, 2015; Oueslati et al., 2015).

As many other socioeconomic processes, urban sprawl can be investigated according to model-driven or data-driven approaches. In their seminal work on the causes of sprawl, Burchfield et al. (2006) tested the mono-centric model and its generalization on United States metropolitan areas, considering the impact of physical conditions (climate, topography, presence of aquifers in the urban fringe) and political factors (land-use regulation, fiscal externalities of new developments). However, to face the problem of endogeneity in economic predictors, some assumptions were needed, e.g. by introducing the concept of the 'average city' to characterize which economic sectors have more centralized employment. However, the socioeconomic evolution of metropolitan regions - and especially patterns of sprawl - have been increasingly interpreted as processes more affected by place-specific conditions than global or regional-scale factors (Salvati and Gargiulo Morelli, 2014). According to Salvati and Serra (2016), "within a context of urban fragmentation, economic uncertainty, and changing social attitudes and political rules, urban systems have increasingly been seen as open systems shaped by nonlinear dynamics involving agents capable of anticipation and emerging types of spatial units". In this sense, econometric techniques based on underlying economic theory and distributional assumptions might fail to capture complexity and spatial heterogeneity (Gibbons et al., 2014) in the socioeconomic processes shaping contemporary cities (e.g. due to distinctive, place-specific conditions (i) between cities and (ii) within any given metropolitan region) and thus "lack some generality in their findings" (Magliocca et al., 2015, p. 115).

In this framework, exploratory data-driven approaches are particularly suitable to investigate inherently complex processes, such as urban sprawl, linking metropolitan expansion and the related population traits with spatially-varying social structures and economic performances changing over time (Muñiz and Galindo, 2005; Chorianopoulos et al., 2010; Vidal et al., 2011; Sarzynski et al., 2014). Assessing the socioeconomic profile of local districts with different building density and morphology allows evaluating the contribution of external and internal variables (e.g. institutional, cultural, political and environmental) to urban transformations. Local-scale investigation aimed at identifying socioeconomic profiles typically associated with dispersed settlements is especially needed to address sprawl as a multifaceted issue in different phases of post-war urbanization in Europe and especially in

southern Europe (e.g. Salvati and Gargiulo Morelli, 2014). Based on these premises, a data mining exercise grounded on a multi-dimensional set of socioeconomic indicators can be useful to improving our understanding on diverging patterns and processes of sprawl such as those observed in an exemplificative Mediterranean city over two distinct economic phases distanced >30 years.

Structures and functions of several European Mediterranean cities are the result of peculiar trends of urbanization and suburbanization (Leontidou, 1990) reflecting the geo-economic location 'in-between' the north-western 'global' cities and the developing agglomerations of the world south' (Leontidou, 1996). Multiple factors added to this complex picture (restricted public services and infrastructures, 'vertical' segregation coupled with a more traditional 'horizontal segregation', a 'popular land control' manifested through spontaneous building activities), with a distinct relationship between urban form and economic functions in respect to both northern and western counterparts (Allen et al., 2004; Kourliouros, 1997; Giaccaria and Minca, 2010). Being frequently related to the increased preference for suburban areas associated with the expansion of second homes (Leontidou et al., 2007), sprawl altered the traditional organization of urban and peri-urban spaces in Mediterranean cities (Salvati and Carlucci, 2015a), with many private and public actors competing for the use of non-urban land (Delladetsima, 2006). Based on these premises, studies of the interactions between urban forms and economic functions definitely contribute in the understanding of recent urbanization processes in the Mediterranean region (Evans, 2003; Couch et al., 2005; Allegretti and Cellamare, 2008; De Muro et al., 2011).

The inherent complexity of Mediterranean cities and their urban dynamics (Salvati and Gargiulo Morelli, 2014) assumed typical patterns and revealed unexpectedly complex relationships with processes involving historical, cultural and environmental factors in Rome, Italy. Metropolitan Rome constitutes a region where different forms of sprawl have manifested, possibly with distinct causes and underlying factors. Discontinuous settlements were firstly observed in the 1960s and 1970s as a response to weak urban planning and policies boosting economic growth without any form of territorial coordination (Costa, 1991). A scattered urban expansion was observed also in the following decades intermixed with demographic re-polarization at the local scale (Salvati and Carlucci, 2015b). The present study investigates different forms of sprawl, in the attempt to underpin the multiple factors underlying urban dispersion in two phases of Rome's growth - the building boom of the early 1970s and the economic stagnation observed in the late 2000s. We proposed an exploratory framework analyzing selected socio-demographic, economic and territorial indicators taken as characteristic factors of suburbanization in Mediterranean Europe. We hypothesize that discontinuous urban expansion in the two economic phases was fuelled by a different mix of factors that can be associated to 6 relevant dimensions (population, settlement, labor market, economic structure, land-use, environment and topography) shaping local contexts (Salvati and Carlucci, 2015a). By pointing to different causes of sprawl in the two time periods, this paper contributes to the long-lasting debate on European suburbanization highlighting the role of local actors and place-specific conditions in a comparative perspective.

## 2. Methodology

### 2.1. Study Area

The investigated area (5355 km<sup>2</sup>) coincides with the administrative province of Rome, central Italy, whose boundaries encompass the Functional Urban Area (FUA) defined by the Urban Audit and Urban Atlas programs (European Environment Agency, 2006). The area encompassing the province of Rome is mainly devoted to agriculture (horticulture, cereals, pastures and tree crop, especially olive groves and vineyards) and extends a small part of the Apennine mountain

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