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Costs of providing local public services and compact population in Spanish urbanised areas

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ABSTRACT

This paper addresses the impact of land use patterns associated with compact population on the costs of provision and maintenance of urban public services for local entities, controlling for other factors. The aim is to develop an econometric analysis using a panel data set of municipalities of the Spanish Mediterranean area and Madrid in the period 2006–2014. The estimations derived from the study confirm one main hypothesis and indicate that compact population impacts positively on the decrease of municipal costs of urban public services. This study suggests that municipal planning instruments of local entities could contribute to efficiently manage their budgets, as well as orients public policy in terms of its local land use decision-making.

1. Introduction

Sprawl and compact development have both costs and benefits, and no development pattern is optimal in all respects (Ewing and Hamidi, 2015). Nevertheless, it is expected that increasing urban sprawl and spatial processes of spread by decreasing the number of compact population higher provision and maintenance costs of public services, ceteris paribus the growth in number of inhabitants or revenues of local governments (Downing and Gusteley, 1977; Frank, 1989; Speir and Stephenson, 2002; Hortas-Rico and Solé-Ollé, 2010; Vallés and Zárate, 2011). In this sense, several local public services (water supply, sewerage and cleansing of waters or paving and lighting) have been shown to display economies of density in Spain (Prieto et al., 2015).

Here, the concept compact population is used to describe an aspect of the spatial pattern of urban development, and in particular whether such development is more or less compact, as concentration, one of the dimensions of land use patterns which describes the multidimensional process of urban sprawl (Galster et al., 2001).

The factors that has surely played some role in explaining the decreasing of compact population in Spain are: lower transportation costs with higher dependence on the private automobile and changes in gross domestic product (GDP) per capita (Ortuño-Padilla and Fernández-Aracil, 2013); socioeconomic dynamism and an increased accessibility by road (Molero-Melgarejo et al., 2007); tourism and the lack of territorial planning (Grindlay et al., 2011); the filtering process of the urban land market (Catalan et al., 2008); as well as newer forms of mobility, expansionary policies of land development or housing typology specialisation of some municipalities, (Bellet and Gutiérrez, 2015).

Therefore, sprawling cities are the opposite of compact cities, full of empty spaces that indicate the inefficiencies in development and highlight the consequences of uncontrolled growth (EEA, 2006). In terms of land take, Spain is in an outstanding position, compared to the rest of Europe (EEA, 2013) and, according to EEA (2006), Barcelona, Valencia, Murcia, Palma de Mallorca, Costa del Sol and Madrid are the most sprawled areas of Spain.

Moreover, according to Hennig et al. (2015), in terms of some indicators at NUTS-2 level such as weighted urban proliferation (WUP), which combines three components – percentage of built-up area (PBA), the spatial distribution of built-up areas (DIS), and the land-uptake per person (LUP) in the built-up areas – and urban permeation of the landscape (UP), the most sprawled regions in Spain are the Mediterranean areas and Madrid.

Several studies have dealt with the sources of urban sprawl, but consequences have been less studied in the literature, where the empirical discussion of this nexus has usually focused on

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Fig. 1. Area of study.

cross-sectional data in prior periods (Hortas-Rico and Solé-Ollé, 2010; Prieto et al., 2015) or some specific budgetary dynamic relationships founded (Hortas-Rico, 2014), and the current links between budgetary issues and compact population have not been sufficiently explored. For these reasons, it might be predicted that as compact population increases occur, detract from urban sprawl, the savings in the provision of public services also increase.

In recent years, governments have encountered the problem of ensuring suitable levels of productive investments while having to face serious budgetary restrictions; what is more, future recurrent costs of operation and maintenance should be taken into account when planning for new investment (Lara Galera et al., 2011). In this regard, the "Ley 27/2013, de 27 de diciembre, de racionalización y sostenibilidad de la Administración Local" (27/2013 Act, dated 27 December, of rationalization and sustainability of local administration) establishes the concept "actual cost" of each individual provision of services, which implies the determination of a threshold on the basis of objectively quantifiable criteria and in accordance with the principle of sound management. The provision of local services has to be ensured at a price no greater than justified by the actual cost, which is determined by the mandatory and specific report.

Based on these notions, the present work addresses the impact of compact population on local budgets of Spanish municipalities, proposing an econometric panel data model, which includes a novel variable that can be used in order to measure the level of compact population in a municipality. The primary goal is to analyse the role of sprawled development models as determinants of local public spending by means of their opposite concept: urban compact development. The econometric model is estimated with reference to data for Spain's local administration sector from 2006 to 2014, analysing the main factors that have determined the costs of providing local public services in that period, and considering data at the municipality level for the Spanish provinces of Alicante, Almeria, Balearic Islands, Barcelona, Castellon, Girona, Granada, Madrid, Malaga, Murcia, Tarragona and Valencia (Mediterranean area and centre, see Fig. 1).

2. Materials and methods

The analysis focuses on the 2006–2014 period, spanning a term of nine years, a time series with available homogeneous statistical data on municipal budgets and land use variables. The research concentrates on Mediterranean and central areas of Spain, which includes the provinces of Girona, Barcelona, Tarragona, Castellon, Valencia, Alicante, Murcia, Almeria, Granada, Malaga, Balearic Islands and Madrid (Fig. 1). The municipality is considered the geographical unit of analysis because land use plans are determined at the municipal level and are embedded in large scale urban extensions.

The econometric analysis presented in this paper is based on the conceptual understanding of the theoretical base that combines cost and demand models (Borcheding and Deacon, 1972) which leads the variables choice, and also taking into account the context, the availability of data and the econometric principle of parsimony. This aspect allows us to differentiate the effects of the urban development model on local expenditure from those of other variables.

The dependent variable (EXPEN) is the expenditure on public services of local entities in the area of study. EXPEN is defined as the sum of expenditure subsections of: public safety, traffic management, urban planning, water supply, sewerage, waste management, street lighting, parks and gardens, energy, infrastructures, and public transport, among others. But structure which categorises public spending in sections of the liquidations of budgets of local entities is different in two periods of the span considered. The regulation of reference in year 2009 and before is "Orden de 20 de septiembre de 1989, por la que se establece la estructura de los presupuestos de las entidades locales" (Order issued by the Ministry of Economy and Finance, dated 20 September 1989, which establishes the structure of budgets of local entities); from 2010 onwards, "Orden EHA/3565/2008, de 3 de diciembre, por la que se aprueba la estructura de los presupuestos de las entidades locales" (Order issued by the Ministry of Economy and Finance/3565/2008, dated 3 December, which approves the structure of budgets of local entities) is the baseline: