A hedonic valuation of urban green areas

Abstract

This paper analyses the link between housing prices and urban green areas endowments using the hedonic technique as methodological approach. Together with the conventional variables used to explain housing prices, three environmental variables are considered: the existence of views of a park or a public garden, the distance from the dwelling to its nearest green area and the size of that open space. The sample is made up of 810 observations gathered from the city of Castellón (Spain). Results show housing size to be the most relevant variable on price. As far as the hedonic variables are concerned, there is an inverse relationship between the selling price of the dwelling and its distance from a green urban area.

Introduction

Green areas perform important environmental and recreational functions as outlined by Costanza et al. (1997). It is well known that forest and green plants absorb atmospheric carbon, they maintain a certain degree of humidity in the atmosphere, regulate rainfall, moderate the temperatures, restrain soil erosion and they also form the basis for the conservation of fauna and flora. Recreational activities based on enjoying the contact with nature are becoming increasingly widespread. Urban parks, although on a smaller scale, also carry out the same environmental and recreational functions as forest and green areas.

In the cities, the main environmental function performed by gardens and parks is to absorb carbon dioxide (CO_2) emissions. These emissions come mainly from the use of private vehicles in urban transport and have increased considerably during recent decades.[1] The Ministerio de Medio Ambiente (2000) estimates that each inhabitant in a big city generates on average 3.3 annual tonnes of CO_2. Taking into account that one hectare of Mediterranean forest can absorb around 3.7 tonnes of carbon dioxide per year, a simple calculation leads us to conclude we need almost a hectare of forest per inhabitant to absorb the contamination caused by these emissions. The

conservation of urban green areas therefore becomes indispensable to curb the growing contamination of our cities. To the environmental functions of urban green parks, further factors should be added such as those of acoustic isolation since some gardens work as an acoustic screen between traffic roads and residential areas. Plants have individual and collective aesthetic value, playing an important role in the conservation of a pleasant landscape, being sometimes the link between residential urban areas and industrial areas. City parks and gardens are also the setting for many recreational activities (children's play areas, walking, jogging, etc.). All these services offered by urban green areas explain the influence of environmental variables on the prices of dwellings.

However, the economic valuation of the urban green areas benefits is not immediate as, from an economic point of view, these services are public goods without a market price. Their lack of value, expressed in monetary terms, prevents these open spaces from being properly considered in the cost-benefit analyses of public urban planning policies. As a consequence, we run the risk of urban green areas endowments falling below the social optimum.

Economic science has developed specific methods to capture the value of environmental assets in monetary units. This value is calculated, sometimes indirectly, by observing individuals' behavior, such as in the travel cost method. Other methods, such as contingent valuation, obtain the value of the environmental asset by directly asking people how much they would be willing to pay for its use or conservation. This last method is extremely versatile and has been applied to value urban planning projects such as the construction of a by-pass in Barcelona (Riera, 1993), the waterfront renewal in Valencia (Del Saz et al., 1999) or the conversion of dock land into a leisure area in Castellón (Del Saz et al., 2000).

Another approach for estimating the monetary value of an environmental asset is that of hedonic prices. In this case, the value is indirectly obtained through the influence exercised by the environment on the market price of another good. This methodology is applied in this paper to value urban green areas

in the city of Castellón (Spain). A representative sample of the current real estate market in this city was selected. The data set contains the sale price and other key features of 810 residential dwellings. Together with conventional determinants of housing prices (size, number of rooms, age, etc.) certain environmental factors were included such as proximity to a green area, its size and the existence or absence of views of a garden or a public park.

In the following sections of the paper, the theoretical foundations of the method, the empirical models used and the results obtained will be explained.

Section snippets

Theoretical foundations of the hedonic prices method

Griliches (1971) and Rosen (1974) provided the theoretical support for the development of the hedonic models although, according to Colwell and Dilmore (1999), the origins of this methodology may possibly be found in previous works.

The method of the hedonic prices relates the market price of a certain good with the characteristics that define it, thus enabling the monetary value of each characteristic to be calculated by observing the differences in the market price of commodities sharing the

Empirical models

The relationship between the selling price and the characteristics of the housing (living area, number of rooms, age, distance from a landscaped area, etc.) can take several functional forms. In the present work, three specifications (linear, logarithmic and reciprocal) are considered.

Conclusions

We have estimated a hedonic price function of dwellings in which the sale price is related with the endowments of urban green areas in the city. Together with a set of conventional explanatory variables, three environmental variables were included in the right-hand side of the regression: the existence of views of a garden or a public park, the size of the nearest green area and the distance of the housing from the green

space. The results show that the main variable influencing the price is

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