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The value of views and open space: Estimates from a hedonic pricing model for Ramsey County, Minnesota, USA

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ABSTRACT

We examined how environmental amenities, particularly views and open space access, impact residential home sales prices in Ramsey County, MN using a hedonic pricing model. Home sale prices increase with closer proximity to parks, trails, lakes, and streams. Proximity to lakes produced the greatest impact on home sale value of these distance variables, followed by parks, trails, and streams. Increasing view areal extents as well as increasing the amount of water and grassy land covers in views also resulted in increased sale prices. Increased view richness in terms of the number of different land cover types in a view reduced home sale prices. These results illustrate the importance of these environmental amenities to single-family homeowners and can be used to inform land use planning and policy decisions aimed at their preservation.

Introduction

Development decisions in the United States frequently fail to consider the values of environmental amenities. As a result, development may occur in ways that greatly reduce these amenities with negative environmental, economic, and social consequences. Communities rarely intentionally omit such amenities from their planning, rather, they fail to consider them because they lack means for incorporating them into market driven land use decision-making or because they are unaware of their values. If the values of these amenities were better-recognized and incorporated into land use planning, negative impacts associated with urbanization could be minimized. In this way, greater recognition of the economic impacts of environmental amenities could provide justification for actions that seek to preserve them.

Open space areas provide communities with numerous amenities, among them opportunities for recreation, scenic views, and even a simple absence of development (Irwin, 2002). Open space also benefits human health by providing a location for outdoor exercise or to escape the stresses of urban environments (Giles-Corti et al., 2005; Krenichyn, 2006; Maller et al., 2006; Roemmich et al., 2006; Song et al., 2007) and may provide ecological benefits, for example, by acting as habitat for wildlife or improving water or air quality. Open space is frequently reduced as communities urbanize and along with it go the public goods it provides. Recognition of the economic benefits of open space access could enable planners to accurately assess the trade off between protecting open space and allowing land to develop (Hobden et al., 2004).

While the open space benefits described above are clearly of importance to people, their value may be difficult to quantify. As a result, communities may overlook such benefits in their planning. The benefits of open space and other environmental amenities, however, may be capitalized in the sales prices of homes in a community. If so, estimates of the dollar value of these benefits can be derived by careful analysis of home prices. Indeed, the effect of open space on residential property values has been the subject of much study in the last decade and numerous studies have found that increased proximity to open space increases home sale prices. Crompton (2001) reviewed 30 studies that investigated the impact of parks on property values, finding that all but five reported positive impacts on property values. These impacts varied considerably with park attributes (e.g., area, and type), but generally could be considered to be 10–20% of property values. Crompton also found general agreement among studies that the impact of parks on home values extends at least 500 feet and, in some cases, up to 2000 feet into surrounding neighborhoods.

Studies completed since the writing of Crompton's review support the ideas that parks positively contribute to home sales prices and that this effect varies with open space type, protection status, and size (Bolitzer and Netusil, 2000; Hobden et al., 2004;

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Lutzenhiser and Netusil, 2001; Wu et al., 2004). For example, recent studies found that larger parks increase property values more than smaller parks (Lutzenhiser and Netusil, 2001; Tajima, 2003), natural area parks have a greater impact on home sale prices than most other park types (Lutzenhiser and Netusil, 2001), and permanently protected open space increases property values more than developable open space (Geoghegan, 2002; Irwin, 2002). Increased proximity to open space with specific natural habitat types, for instance, forest and wetland, also significantly increases home sale prices (Mahan et al., 2000; Thorsnes, 2002). In these recent studies, the impacts of open space on home sale prices vary and are difficult to compare largely because studies used different methodologies, focused on different regions and time periods, measured open space access differently, and calculated marginal implicit prices for open space access in different manners. For example, Lutzenhiser and Netusil (2001) calculated marginal implicit prices of between $342 and $13,916 depending on park type and distance in Portland, OR; Wu et al. (2004) calculated an increase in home value per foot of $0.24 for a 1000 foot decrease in distance to parks in Portland, OR; and Anderson and West determined that the value of the average home increased by between $246 and $1790 depending on park type when the distance between a home and park were halved in the Minneapolis-St. Paul, MN area. Recent studies also indicate that other landscape conditions may influence the degree to which open space impacts property values. For example, open space was found to be of greater value in neighborhoods that were dense, high-income, high-crime, highly urban, or that had many children in the Minneapolis-St. Paul metropolitan area (Anderson and West, 2006). Because open space access is often reduced as communities develop, recognition of the positive value of such open space could be an important component of landscape planning in urbanizing communities.

The scenic quality of a landscape is also altered as urbanization occurs with consequent affects on values. Changes in scenic amenities may also be reflected in property values. Bourassa et al. (2004) reviewed 35 studies that examined the impact of views on home values. Although these authors found some variation in study conclusions, particularly in earlier studies, they noted that the bulk of studies reported that views positively impacted the values of residential homes. This impact varied widely from 1% (Beron et al., 2001) to as much as 147% (Benson et al., 1997). The authors suggest several reasons for this variation, among them that studies used different variables, types of views, and methods and were conducted in different cities at different points in time. A closer look at the studies reviewed and the few studies published since reveals that views including certain land use and land cover types impact property values considerably. These include water (Benson et al., 1998; Bishop et al., 2004; Bourassa et al., 2004; Jim and Chen, 2006; Loomis and Feldman, 2003; Luttik, 2000), urban green space areas (Bishop et al., 2004; Jim and Chen, 2006), and forests (Tyrvainen and Miettinen, 2000), all of which have been found to positively impact property values. Indeed, ocean views have been found to increase property values by as much as 60% (Benson et al., 1998). Conversely, views of industrial lands and roads have been found to negatively impact home values (Lake et al., 2000b). View structure or composition may also influence land sale prices. For example, views with more diversity (i.e., more land cover types) were found to increase property values in the state of Wyoming, USA (Bastian et al., 2002).

Some studies, however, have reported the impacts of views on property values to be insignificant. A study conducted in Glasgow, Scotland, concluded that views containing parks, water, and vegetation did not significantly influence property values (Lake et al., 2000a,b). Similarly, Paterson and Boyle (2002) found the impacts of views of agricultural land and water on property prices to be inconsequential. Thus, although views with certain characteristics do appear to positively impact property values, no general consensus exists as to the extent of these impacts (Yu et al., 2007) and the values calculated by studies are difficult to compare given that they used different methods, study areas, time frames, and means for quantifying views. Given the potentially large changes in views that occur with development, an important research question is the value of such changes as perceived by community residents. Assessing the impacts of land use and land cover changes on views is likely to become increasingly important to land use and natural resource planners. Here again, recognition of the value of this amenity could be an important component of landscape planning in urbanizing communities.

As environmental amenities are frequently negatively affected by urbanization and because this is often reflected in home sale prices, estimates of the monetary value of these impacts would serve to improve land use planning. This study identifies the degree of influence of the two environmental amenities discussed in the preceding paragraphs, view quality and open space access, on residential property values in Ramsey County, MN using a hedonic pricing model. In estimating the values of these amenities, we hope not only to illustrate their importance to residential property owners, but also to provide planners and policy makers with estimates of values that would permit them to better evaluate the impacts of land use change before decisions are made and landscape changes become irreversible. Our results may thus be used to inform land use planning so as to minimize the negative economic, social, and environmental outcomes associated with urbanization.

The hedonic price model

The hedonic price model applied in this paper uses data on housing prices along with observable characteristics of the house and the environment to estimate the marginal implicit price of each characteristic. The marginal implicit price of individual characteristics can be estimated using a multiple regression model with housing price as the dependent variable and various characteristics as explanatory variables (see Freeman, 2003 for a complete description of the hedonic pricing model). Under the assumptions that the housing market is in equilibrium and that the area studied lies within a single housing market, the estimated marginal implicit prices derived from regression coefficients represent the price an individual would be willing to pay for an additional unit of a particular characteristic holding all other characteristics constant. So, for example, the estimated value of proximity to open space could be derived from the coefficient on proximity to open space in the regression model.

We use ordinary least squares regression analysis to estimate the hedonic pricing model to relate home sale price to the parcel, structural, neighborhood, and environmental characteristics of each property. This model may be written as

$$\ln P_i = \beta_0 + \beta_1 S_i + \beta_2 N_i + \beta_3 Q_i + \varepsilon_i$$

where P_i is the price of property i, S_i is a vector of parcel and structural characteristics of property i (e.g., lot size, number of rooms, age, house style), N_i is a vector of neighborhood characteristics (e.g., neighborhood crime rate, population density, household income), Q_i is a vector of environmental characteristics (e.g., proximity to lakes, proximity to open space, views), and ε_i is an error term. The natural log of home sale value is the dependent variable. Natural logs were also used for distance variables and for lot acreage, finished square feet, and view area variables since the effect of these variables on home sale price was expected to decline with increased levels of these characteristics. Details on the estimation procedure and variables are described below.