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Forest proximity and residential land values

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ABSTRACT

This study estimates a hedonic price equation for residential lands in some mountain counties of Colorado. Results suggest that per-acre price of land in a town is positively influenced by the town's proximity to ski resort and is negatively influenced by its proximity to forest. However, there is a positive fixed effect of having a protected forest such as a national park or wildlife refuge nearby, and the negative effect of proximity of forest is much lower with protected forests. Results suggest that increasingly bigger parcels of land command progressively lower per-acre prices.

Introduction

Forest lands command a market price because they bring in timber, hunting, recreation, natural amenities and ecological benefits to people. Also, they attract associated commercial activities in their surrounding areas. According to the forest-land literature, prices of forest lands depend on physical and locational characteristics such as the parcel size, timber volume, animal density, and site productivity. Aronsson and Carlén (2000) have shown that the per-acre price of forest lands decreases with an increase in parcel size, whereas Turner et al. (1991) have shown that the price tends to increase with increasing proximity of forest to ski areas. In this study however, we are examining prices of residential lands in the proximity of two types of forests: (a) national/state forests and (b) forests protected by the government as national park or wildlife refuge. Proximity of forest is expected to raise the value

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of residential lands, more so if it is a protected forest. Since the mechanism of price formation – the balancing of demand and supply – is similar in competitive markets, we expect similarities between the factors that influence forest land prices and the factors that influence residential land prices in the neighborhood of forests.

The U.S. Forest Service manages national forests for sustained yield of multiple forest products and services and attempts to balance the extractive benefits with their non-extractive benefits. In addition, the U.S. federal government has accorded special protections to some designated areas of national forests. For example, *wilderness* is a designated forest area that is preserved in its pristine state and hence, no roads or extractive utilization of forest is allowed in this area. Some other areas of national forests have been designated *roadless forests*, which have no roads in them at present and no roads shall be built in future too. Finally, some forests have been designated and protected as national parks and wildlife refuges. This paper examines whether the effect of proximity of forest on residential lands differs between protected and non-protected national/state forests.

Theoretically speaking, the proximity of a forest should increase the value of land and private property if the forest and its protection improve the livability of residents and they enhance the business and commercial prospects of the surrounding area. Morton (2000) and Loomis and Richardson (2001) have listed various potential active and passive use benefits of protected forests.[1] According to Phillips (2004), national forests and their protection limit conversion of land to more intensive uses; for example, they limit conversion of timberland to residential development, which increases scarcity of residential lands and thus their prices. Using data from sales of land near Green Mountain National Forest wilderness areas in the Southern and Central Vermont, Phillips has reported a positive relationship between residential properties' proximity to protected wilderness and their market values.

In this paper we use a hedonic price method to empirically examine the effect of proximity of forestlands on the value of private residential lands in a few selected mountain towns of Colorado. The paper is divided into five sections. The second section presents an argument that the effect of proximity of forest on land value is better measured by studying the prices of lands that have no structures built on them, rather than studying the prices of real properties or lands with structures, which is a general practice followed in the literature. The third section describes the data. The fourth section explains the choice of econometric model, and the fifth section discusses the results obtained from the estimation of the chosen model.

Hedonic price of land – with/without structures

Hedonic price method assumes that the value of a real property is the sum of the values of attributes of that property. Studies on most hedonic real estate prices have been done with residential structures, in which the price of property (P) represents the sum of the value of land (L), the value of structure (S) that stands on the land and a random error term (ε):

$$P = (L + S) + \varepsilon = f(\mathbf{X}, \mathbf{Y}, \mathbf{Z}, \mathbf{W}) + \varepsilon \quad (1)$$

In the above equation the combined value of land and structure is considered a function of four sets of independent variables: **X**, **Y**, **Z**, and **W**, where **X** is a vector of physical attributes of land, **Y** the socio-economic characteristics of the town where the parcel of land is located, **Z** the vector of environmental variables (including the proximity to ski resort, forests and protected areas), and **W** the attributes of the structure. But, this equation runs a limitation; an inappropriate or incomplete specification of attributes of structures may obfuscate the proximity value of land (the contribution of **Z** to price P), especially when the value of structure is sizeable.

[1] They list potential benefits such as recreational benefits, economic development of adjacent counties spurred by increased number of visits of recreators, passive use benefits in the form of option value, bequest value, and existence value, benefits of scientific research in the protected areas, biodiversity conservation, increase in value of private property adjacent to wilderness, ecological services in the form of watershed protection and carbon sequestration, and educational values of wilderness to high school and college courses.