The Market Value of Mature Trees in Single-Family Housing Markets.

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Abstract

How does the existence of mature trees change the market value of single-family homes? This article demonstrates the use of multiple regression analysis to estimate the market value added by the existence of mature trees in a residential real estate market. The market-derived estimate shows that mature trees contributed about 2% of home values in the examined market. Although the magnitude of the reported results may be location specific, the described technique can be applied in other markets.

Appraisers have the difficult task of determining why housing prices differ and how differences can be attributed to particular existing characteristics. This article illustrates how multiple regression analysis (MRA) can be used to estimate the value added by the existence of mature trees in residential single-family housing markets.

The marker value of some attributes, such as the existence of mature trees, may be difficult to measure. However, because they may significantly contribute to the value of property appraisers should consider them in the valuation analysis. For example, a company that sells trees in Cincinnati reports that it would sell a red maple tree measuring only seven inches in diameter for about $2,400. (Price quotes of this magnitude were also obtained for different types of trees of similar size from sellers in Louisiana and Texas.) An informal survey of real estate professionals active in the subject area revealed that, all else being equal, homes with mature trees are preferred to homes without mature trees. However, the professionals surveyed did not quantify how much value could be attributed to mature trees.

The Counsel of Tree & Landscape Appraisers provides a detailed guide for establishing value estimates of trees. [1] The recommended appraisal technique for valuing trees in residential markets focuses on a cost approach. [2] The replacement cost approach is straightforward for transplantable trees. Current market values for transplantable trees can be used along with estimated labor and transportation costs.

A cost approach is also suggested when appraising trees that are too large to transplant. A value estimate can be arrived at by estimating a cost per unit of trunk area from the largest transplantable tree and applying this cost per unit measurement to the trunk area of the subject tree. [3] An alternative technique involves adding the maintenance costs and compounded interest costs to the replacement cost of a transplantable tree for the number of years that it would take the replacement tree to reach the size of the subject (not transplantable) tree.

Mature trees (those more than 9 inches in diameter) are not often transplanted successfully. Therefore, mature trees are typically not transferable attributes between home sites. The lack of transferability makes cost-based estimates less applicable than market-derived methods for estimating the value associated with mature trees.

One study estimates the value of mature trees by comparing the mean sales price of homes that had mature tree cover on their lots to the mean sales price of homes that did not have mature tree cover on their lots. [4] The study arrived at the estimated tree values by comparing the mean values of what were considered comparable house sales to estimates for mature tree values. (These values were based on the cost approach and the Guide for Establishing Values of Trees and Other Plants.) [5] The result was a significantly higher tree value estimate from the comparable sales method than the value obtained from evaluating trees on individual lots based on the arboricultural appraisal cost method (or $9,500 versus $6,000). These authors acknowledge that the reported mean values contain properties with different characteristics (besides mature tree cover). Hence, there may be other factors driving the large discrepancy in estimated tree values.

Appropriate comparable sales are often difficult to obtain for paired sales analysis, which can determine the market value that mature trees can add. MRA, which captures multiple factors determining marker values, can be valuable in many circumstances, including determining the market value added by the existence of mature trees in a residential real estate market.6 Our focus is not on the replacement cost of trees--since mature trees may be difficult or impossible to replace--but on how the existence of mature trees contributes to single-family house sales prices.

Data

The data used in this study come from Baton Rouge, Louisiana. A standard MRA model controls for physical and locational characteristics, time trends, and unusual conditions of sale. Three variables are created to control for the location of the property and one variable to control for below-market financing. For further control purposes, the transactions had to meet the following two criteria: (1) the land use is residential single-family detached; (2) the sales date must be between the start of 1985 and the end of 1994.

Because analysts must select variables for inclusion and choose the functional form, the potential for bias is often a criticism incurred by studies like this. Appraisers should use the model that is believed to reflect the "true" price-determining mechanism subject to the realistic constraints imposed by the availablity of data. These guidelines are used to establish the model employed here, using data obtainable for the subject market area (see table
1).

The average sales price in the sample of homes sold was $93,272. The sales prices ranged from $31,000 to $179,900. The living area for the sample homes ranged from 931 square feet to slightly more than 3,100 square feet. The sample homes had an average living area equal to 1,979 square feet. On average, these homes were a little older than nine years and averaged about 2 1/2 months on the market. The sample contains 269 homes, with notations on the existence of mature trees as a highlighted characteristic for the home. The identification of mature trees employed herein may not be perfect. It is possible that a real estate agent did not highlight this feature for a home that did have the mature tree characteristic. Classification imperfections of this nature should bias the sample away from finding any contribution from the existence of mature trees.

Model

The employed model is:

[LNSP.sub.it] = f([LIVAREA.sub.i] [OTHERAREA.sub.i], [AGE.sub.i] [YEAR.sub.t] [FP.sub.i], [LOC.sub.i] [DOM.sub.i] [VAC.sub.i] [BM.sub.i] [TREES.sub.i])

where, [LNSP.sub.it] is the natural log of sales price of the ith house at time t, and the independent variables are defined as follows: (The findings reported here are essentially the same when sales price is the dependent variable.)

[LIVAREA.sub.i] = Amount of living area in square feet

[OTHERAREA.sub.i] = All other constructed area such as garages

[AGE.sub.i] = Age of the house

[YEAR.sub.it] = 1 if the ith house sold in year t and zero otherwise

[FP.sub.i] = 1 if the house has a fireplace and zero otherwise

[LOC.sub.in] = 1 if the ith house is located in the nth area and zero otherwise

[DOM.sub.i] = Number of days the ith house was on the market

[VAC.sub.i] = 1 if the ith house was vacant and zero otherwise

[BM.sub.i] = 1 if below-market financing were used in the transaction of the ith house

[TREES.sub.i] = 1 if the ith house sold had mature trees and zero otherwise

Given that people are willing to pay more for more space, the amount of living area (LIVAREA) and other area (OTHERAREA) are expected to be positively related to sales price. However, the marginal utility of acquiring more and more living area is expected to decline. Therefore, living area squared ([LIVAREA.sup.2]) and other area squared ([OTHERAREA.sup.2]) are included in the model. [LIVAREA.sup.2] and [OTHERAREA.sup.2] are expected to be negatively related to sales price, thus reflecting the declining marginal utility of additional space.

Older homes, all else being equal, have experienced greater depreciation than newer homes. Therefore, the age (AGE) of the property is expected to be negatively related to sales price. However, homes typically depreciate at a slower pace as time goes on. A home may depreciate more in its first five years than from its 10th through 15th years of existence. Hence, [AGE.sup.2] is included to capture the declining rate of depreciation.

In light of the decline and recovery of the examined real estate market during the sample period, the year (YEAR) variables that control for market conditions (relative to the first year in the sample, 1985) are anticipated to be negatively related to prices during the first few years, followed by a positive relationship in the later years.

Fireplaces (FP) are often a desired characteristic in owner-occupied homes and may or may not be desired by landlords. These individuals may appreciate the potential increased rent that this feature may bring, but may not want the potential fire hazards associated with fireplaces. Overall, the prediction is that fireplaces will be positively related to home sales values.

According to one study, owners of vacant homes will lower reservation prices to reflect comparatively higher carrying costs vis-a-vis owner occupied homes. [7] Therefore, vacant homes (VAC) are expected to be negatively related to sales prices. The days on market variable is used to control for how long a property was on the market (DOM). It is difficult to predict how DOM relates to sales prices a priori. On the one hand, a seller may be more willing to settle for a lower price after a given time period. On the other hand, a home that has been on the market longer potentially has more time to appreciate in value. A variable is used to control for any significant interaction between VAC and DOM

The availability of below-market financing (BM) is attractive to homebuyers. All else being equal, homes selling with below-market financing will probably sell for more than those without this feature.

As mentioned, mature trees may add value to real estate. They help prevent soil erosion, provide privacy; and are aesthetically pleasing. Further, the shade provided by mature trees could reduce utility bills; hence, any cost savings should be capitalized into the price that a buyer is willing to pay. [8] The existence of mature trees (TREES) should, all else being equal, increase the value of existing single-family homes. Although the same may be true for undeveloped lots, clearing costs may also have to be considered.

Results

Multiple regression analysis is used to estimate the model. Overall, the model fits the data well. When the model was checked for multicollinearity, little correlation was found between the explanatory variables. The model was also checked for serial correlation and heteroskedasticity. No problems associated with serial correlation were found, but heteroskedasticity was evident. The form heteroskedasticity is unknown; therefore, White's heteroskedasticity-consistent covariance matrix estimation procedure [9] was used to correct for the unknown form of heteroskedasticity. Table

2 displays the results that correct for heteroskedasticity. Similar results were obtained when ordinary least squares estimation was applied.

The adjusted [R.sup.2] indicates that 85% of the variance in the dependent variable (the natural log of sales price) is explained by the independent variables in the model. All independent variables have the predicted sign, and all are significant except for fireplace and the variable that controls for below-market financing.

The variable that controls for the existence of mature trees is positively related to house sales price and is significant at the 1% level. The market estimates show that mature trees contributed about 1.9% of home values in the examined market. (Although the magnitude of the reported results may be location specific, the described technique can be applied in other markets.) Trees contributed about $1,800 to a home selling close to the mean price of $93,300.

Given the high cost for large transplantable trees and that it may take several of these trees before this characteristic is highlighted, it appears that the market-derived estimate for this characteristic is below what one would estimate based on a cost approach.

Conclusion

Adjustments for landscaping contributions to real estate value are not difficult to estimate for cases involving transplantable plants and trees. Cost estimates are readily available for them. Mature trees may provide sought-after shade and aesthetic benefits, but they typically cannot be transplanted and the value they add can be difficult to estimate. MRA is used to arrive at an estimate of the value added by mature trees--a very useful method for appraisers to apply when estimating the value of a home that may require an adjustment for the existence of mature trees.

The existence of mature trees is reflected in the market price of residential real estate. According to this study, an appraiser adjusting a comparable sale of an average-size home without mature trees in the studied geographic area would be supported in adding approximately 2% to the value of a single-family house that has mature trees.

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