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Quantifying the Value of a View in Single-Family Housing Markets

How much is a "good view" worth in a single-family housing market? While the market value of a view amenity may be difficult to estimate, this article demonstrates the use of multiple regression analysis to estimate the value of a view in a residential housing market. Although the empirical results may be location specific, the basic technique illustrated here could be used in other markets.

Determining why housing prices differ, and how much this difference can be attributed to particular distinguishing features, is a difficult task. The market value of "a good view" may be difficult to estimate. Paired-sales analysis may be used to estimate the value of a view when appropriate comparables are available; however, appropriate comparables are often unobtainable, making it difficult to simultaneously examine several features that are believed to affect real estate prices.

Adjustments for items that are difficult to measure (e.g., a view amenity), however, may significantly contribute to the value of a property, and therefore should be examined by appraisers. The Appraisal Institute recommends that appraisers consider the view of a parcel of real estate when estimating property value.[1] The standard appraisal form requires, when appropriate, an adjustment for view.[2] There is little guidance, however, on how to arrive at an adjustment amount, especially when paired sales are not available.

Multiple regression analysis (MRA) can be a useful tool in estimating the appropriate adjustment for a view amenity. In this article, MRA is applied to estimate the

1. Appraisal Institute, *The Appraisal of Real Estate*, 10th ed. (Chicago: Appraisal Institute, 1992), 301.
2. Ibid., 567.

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market value of a view amenity in a residential real estate market.[3]

An informal survey of real estate professionals active in the subject area revealed that homes with attractive views are preferred to homes without such views. However, some sales agents said that the marketplace does not provide a premium for sellers of homes with good views, while others suggested that homes with good views often sell for 5% to 15% more than comparable homes that do not provide these views.[4]

DATA

The data for this study come from Fairfax County, Virginia. A typical regression model for residential real estate is employed. Models such as these traditionally include variables to control for physical and location characteristics, market conditions, and unusual conditions of sale, such as nonmarket financing. We control for location characteristics by selecting sales from the same geographic subarea of Fairfax County.

None of the transactions in our sample contains any unusual conditions of sale. Transactions involving duress (e.g., foreclosure or eminent domain cases); transfers between related parties; transfers of convenience (e.g., to correct title, to create joint tenancy, to avoid a lien); transfers to nonprofit institutions; transfer of doubtful titles (e.g., questionable special warranty deed or quit claim deed); transfer of partial interest; and transfers involving nonmarket financing are not included in the sample.

For further control purposes the data had to meet the following criteria: 1) the zoning is residential and the land use is residential, single-family, and detached; 2) the sale date must be between the start of 1985 and the end of 1991; 3) the property is not exempt from local property taxes; and 4) the property must be purchased by an owner–occupant.

There are many variables that could be included in a real estate pricing model. Any variable that is believed to significantly affect the value of real estate could be considered. To be included in a model, the characteristics should vary among at least a few of the properties being analyzed. If there is no variation in a particular characteristic, there will be no need to make adjustments for that characteristic.

Any empirical model can be subject to criticisms regarding the exclusion of particular variables or the functional form employed.[5] The best an appraiser can do is to use a model believed to most reflect the "true" model. Appraisers must of course be able to gather data to control for the characteristics of interest. In this study, we control for all of the varying characteristics that affect the value of the properties under study, and for which we were able to obtain data.

All homes in this sample have air conditioning and none are in a recorded floodplain. Therefore these characteristics are not a part of our model. The total sample contains 194 observations.

MODEL

The model to be estimated is:

$$LNSP_{it} = f(BED_i, BATHS_i, OTHRMS_i, LANDAREA_i, VIEW_i, YEAR_{it}, SQOUT_i, WF_i, AGE_i)$$

where the dependent variable $LNSP_{it}$ is the natural log of the sale price of the ith house in year t, and the independent variables are defined as follows:[6]

BED_i = Number of bedrooms[7]
$BATHS_i$ = Number of bathrooms
$OTHRMS_i$ = Number of other rooms

3. For a review of the basic issues related to MRA see Lloyd T. Murphy III, "Determining the Appropriate Equation in Multiple Regression Analysis," *The Appraisal Journal* (October 1989): 498–517. See also Appendix B in *The Appraisal of Real Estate*. For a more in-depth discussion see George G. Judge et al., *Introduction to the Theory and Practice of Econometrics*, 2d ed. (New York: John Wiley & Sons, 1988); and William H. Green, *Econometric Analysis*, 2d ed. (New York: Macmillan Publishing Company, 1993).
4. Obviously, all parcels of land provide a view of one form or another even if it is a neighbor's brick wall. In this study we are defining view as a "good view"; that is, something that a typical buyer is likely to find appealing.
5. Excluding variables may lead to biased estimation.
6. The results are qualitatively the same when sale price is the dependent variable.
7. We would prefer to include the square footage of living space as an explanatory variable, but only room count data were available. The model was checked for multicollinearity and little correlation was found between the variables in the model.

$LANDAREA_i$ = Lot size in thousands of square feet
$VIEW_i$ = 1 if the house has a good view and zero otherwise[8]
$YEAR_{it}$ = 1 if the house sold in year t and zero otherwise
$SQOUT_i$ = Amount of constructed space other than the house in thousands of square feet. (This includes garages, carports, and work sheds.)
WF_i = 1 if the house has wood floors and zero otherwise
AGE_i = Age of the house in years

It is expected that buyers will pay more for more space. Therefore the number of bedrooms, bathrooms, other rooms, square feet of constructed space outside of the house, and land area are expected to be positively related to sale price. Similarly, buyers are expected to pay more for more costly amenities such as wood floors.[9] Wood floors are therefore expected to be positively related to sale price.

Further, buyers are expected to pay more for homes with nicer views than similar homes without views. If appropriate data were available, one could estimate how different views are related to house prices (e.g., views of lakes or golf courses could be examined). This study is limited to an examination of homes with a good view in general versus those without such a view. View is expected to be positively related to sale price.

Age should be negatively related to sale price because, all else being equal, older houses have experienced greater depreciation. The time variables that control for market conditions are expected to be positively related to sale price. In light of the appreciation experienced in the subject market, the time variable coefficients are expected to be positive and large in magnitude for most of the time periods studied.

Table 1 contains descriptive statistics for the variables used in the model. The average home sold for about $281,000. Twenty-seven, or about 14%, of the homes in the sample have a good view. The average age of the homes in the sample is about 14 years. Approximately 17% have wood floors. The sample is evenly distributed through time with each year containing about 15% of the sales.

RESULTS

Initially, ordinary least squares is used to estimate the model. Overall, the model is significant at the 1% level of significance (f-value = 38). The adjusted R^2 indicates that about 73% of the variance in the de-

TABLE 1 Descriptive Statistics for Sample of 194 Single-Family Detached Homes in Fairfax County, Virginia

Variable	Mean	Standard Deviation	Minimum	Maximum
SP	281,010	66,829	157,500	455,737
BED	3.845	.591	3	5
BATHS	3.263	.626	2	5
OTHRMS	4.665	.908	3	7
*LANDAREA**	17.426	11.341	4.743	88.818
VIEW	.139	—	0	
YEAR86	.170	—	0	
YEAR87	.144	—	0	
YEAR88	.155	—	0	
YEAR89	.149	—	0	
YEAR90	.129	—	0	
YEAR91	.160	—	0	1
*SQOUT**	2.322	.461	1.268	3.934
WF	.165	—	0	1
AGE	13.881	6.272	2	28

*In thousands of square feet.

8. The classification of which houses possess a good view was provided by the Office of Assessments of Fairfax County, Virginia.

9. In this study, the homes that did not have wood floors possessed floors made from less costly materials such as linoleum.

pendent variable is explained by the independent variables.

The results were checked for serial correlation and heteroskedasticity.[10] No problems associated with serial correlation were found, but there is evidence of heteroskedasticity. The form of heteroskedasticity is unknown; therefore, we used White's heteroskedasticity-consistent covariance matrix estimation procedure to correct for the unknown form.[11]

Table 2 displays the results after adjusting for heteroskedasticity. All independent variables have the expected sign and all are strongly significant. The time-trend variables that control for market conditions show that house prices increased through the second half of the 1980s, followed by a decline in 1991.

Of particular interest for this study, a good view (*VIEW*) is positively related to the sale price and is significant at the 5% level. An appraiser making an adjustment in the studied geographic area would add about 8% to reflect the market value of a good view.[12]

TABLE 2 Regression Results*

Variable	Estimated Coefficient	T-Ratio
CONSTANT	11.4520	120.30
BED	.0682	3.19
BATHS	.0666	4.08
OTHRMS	.0207	1.93
LANDAREA	.0019	3.18
YEAR86		
YEAR87		
YEAR88		
YEAR89		
YEAR90		
YEAR91		
SQOUT		
WF		
AGE		
Adjusted R^2 = .729		
N = 194		
F-Value = 38.019		

*All estimated coefficients have the expected sign and all are strongly significant. Of particular interest for this study, a good view (*VIEW*) is positively related to the dependent variable (*LNSP*), and is significant at the 5% level.

CONCLUSION

The hypothesis that a view amenity has no effect on the market price of residential real estate is rejected for this particular dataset.[13] This article illustrates how MRA can be used to arrive at an estimate of the market value of a good view. This may be useful for appraisers to apply when the needed data are available, and especially when appropriate comparables for paired-sales analysis are not available. For the housing market examined, a good view adds about 8% to the value of a single-family house.

Appraisers should remember that there may be excluded variables for any model to be estimated and that countless potential functional forms exist. Therefore, MRA is meant to be a useful tool for analysis rather than a replacement for good judgment in appraising.

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10. In the basic regression model, heteroskedasticity is present when the errors do not possess a homogeneous variance. When heteroskedasticity is present, the conventional least squares estimator leads to estimators that are not minimum variance estimators. Thus the standard errors of the coefficients are too small, leading to a potentially incorrect interpretation regarding the significance of the coefficients.
11. Halbert White, "A Heteroskedasticity-Consistent Covariance Matrix Estimator and Direct Test for Heteroskedasticity," *Econometrica* (May 1980): 817–886.
12. The estimated coefficient is .07614, yielding an adjustment of .07833. Interpretation of dummy variable coefficient when the dependent variable is in log form is described by Peter Kennedy, "Estimation with Correctly Interpreted Dummy Variables in Semilogrithmic Equations," *American Economic Review* (1981): 801.
13. In "Residential Property Tax Capitalization: Discount Rate Evidence from California," *National Tax Journal* (June 1994): 337–344, A. Quang Do and C. F. Sirmans found that a view amenity adds about 4% to the market value of housing for a San Diego County community. Although the magnitude is not the same as that found in this study, the significantly positive relationship between a view amenity and house price is preserved.