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The Value of Housing Characteristics: A Meta Analysis

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THE VALUE OF HOUSING CHARACTERISTICS: A META ANALYSIS

by

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Although the market generally agrees that house prices reflect the value of individual housing characteristics, there is no consensus as to how some characteristics affect value. Researchers have examined numerous data sets and hedonic pricing models to determine the marginal effect of characteristics on house prices. Historically, hedonic pricing results have been considered to be model specific, especially regarding location and time. This study should help to answer the question of whether hedonic results are unique or whether results are more universal than traditionally believed. While researchers often focus on the theoretical relationship between house prices and housing characteristics, empirical evidence of the effects of these characteristics is of considerable interest to practitioners such as real estate brokers, developers, and appraisers.

To examine the results of hedonic pricing models, this study uses meta analysis. Meta analysis is the quantitative analysis of a body of studies and provides a more comprehensive framework for reviewing the literature by providing statistical evidence of the overall impact of one variable on another. Meta analysis has its foundation in medical, psychological, and educational research; however, there is also an emerging body of literature using meta analysis in economics, examining primarily the labor market and wage rates.

Meta regression analysis is superior to a simple narrative in that it allows a quantifiable assessment of empirical studies. It can be used to identify sources of variation across estimated regression coefficients on a given variable of interest. In meta regression the estimated coefficient becomes the dependent variable and the coefficient from each study is an observation. The meta regression model expresses the functional relationship between the regression coefficients and a set of moderator (explanatory) variables that describe important model and data characteristics.

This study uses meta regression analysis (MRA) to evaluate the relationship between house price and nine housing characteristics: (1) square footage, (2) lot size, (3) age, (4) bedrooms, (5) bathrooms, (6) garage, (7) swimming pool, (8) fireplace, and (9) air conditioning. The regression coefficients for these variables that are produced in hedonic pricing models are examined for differences across a set of moderator variables. Primary questions of interest are: Is a characteristic's estimated coefficient in a hedonic pricing model a function of geographical location, the source of the data used in the study, or the time period of the data?

A meta regression for each of the above nine variables is estimated against these moderator variables:

(1) Geographical location in the U. S. segmented into the following regions: Northeast, Southeast, Southwest, Midwest, and West. The objective is to determine whether the housing characteristic's hedonic pricing model estimated coefficient varies by location;

(2) The time period of the data. This is designed to determine whether the effect of the housing characteristic on house price has changed over time. Time is measured by a time trend variable representing years from 1976 through 2003;

(3) The median household income for the study's data year and location. This measures whether the value of the household characteristic varies by the area's level of income. Income is measured as the median household income for the data area for a given study;

(4) The type of data used to estimate the hedonic pricing model. The purpose is to determine whether the characteristic's regression coefficient varies by the type of data used in the analysis. Type of data is measured as Multiple Listing Service (MLS), Assessor, or American (formerly Annual) Housing Survey (AHS);

(5) Control variables in the hedonic pricing models. These are binary variables indicating that a study has controlled for certain other variables. This is designed to measure whether controlling for other variables in the hedonic model affects the estimated coefficient of the characteristic;

(6) The specification of the model measured as the number of variables included in the hedonic model. This is to help determine whether a more inclusive model affects the estimated coefficient of the housing characteristic.

Meta regressions are estimated for each of the nine housing characteristics stated above. These are the characteristics that have appeared most often in hedonic pricing models. Conclusions for the individual housing characteristics are:

- The square footage coefficient differs by some geographical locations but not by time, household income, or source of data;

- The lot size coefficient differs across some geographical locations and controlling for square footage lowers the lot size coefficient. Lot size is not affected by time, income, or the type of data;
- The age coefficient is affected by geographical location, time and type of data but not by income;
- The bedrooms coefficient is sensitive to some geographical locations but not to time, income, or type of data. Controlling for square footage lowers the effect of bedrooms on house price;
- The coefficient for bathrooms is sensitive to some geographical locations and type of data but is not affected by time or income;
- The garage coefficient differs by some geographical locations but not by time, income, or type of data;
- The swimming pool coefficient is sensitive to some geographical locations but is not affected by time, income, or type of data;
- The fireplace coefficient is affected by type of data but not by geographical location, time, or income; and
- The air conditioning coefficient is affected by some geographical locations but not by time or type of data. Household income does have a negative effect on the air conditioning coefficient.

This study examines the effect of several moderator variables on the estimated coefficients of the nine housing characteristics. The moderator variables of primary interest are geographical location, time, and type of data. Some conclusions are:

- Most of the characteristics had at least some variation by location. Controlling for geographical location produced differences in coefficients for square footage, lot size, age, bedrooms, bathrooms, swimming pool, garage, and air conditioning but not for fireplace;

- The effects on house price of most of the housing characteristics have not changed over time. Only the age coefficient was affected by time and the effect is negative;
- Controlling for the type of data (MLS, Assessor, AHS) produced differences in coefficients for age, bathrooms, and fireplace;
- The coefficient for air conditioning was the only characteristic affected by the level of household income and the effect was negative;
- Controlling for square footage produced lower coefficients for lot size and bedrooms; and
- Controlling for the size of the hedonic model did not affect the coefficients for any of the characteristics.

Overall, these results provide important information regarding the effect of these characteristics on house prices and the interpretation of hedonic pricing model results. Historically, hedonic pricing model results have been considered to be specific to the model, especially regarding location and time. The results of the meta regression models show that hedonic estimates do experience some significant variation but perhaps not as much as traditionally believed.

THE VALUE OF HOUSING CHARACTERISTICS: A META ANALYSIS

Introduction

Researchers have examined numerous data sets and hedonic pricing model specifications to determine the marginal effect of housing characteristics on house prices.[1] Despite general agreement that house prices reflect the values of individual characteristics, casual observation shows heterogeneity in the empirical estimates for housing characteristics. While researchers often focus on the theoretical relationship between house prices and housing characteristics, empirical evidence of the effects of these characteristics is of considerable interest to a host of practitioners such as real estate brokers, developers, and appraisers.

According to the NAR, the median existing house price in the U. S. was $170,000 in 2003. Regionally, median prices ranged from a low of $141,300 in the Midwest to $234,200 in the West. Whereas in Peoria, Illinois one could buy a house at a median price of $93,100, buyers in the San Francisco Bay Area paid a median price of $558,100. An interesting question is whether characteristics in such diverse housing markets are valued differently by consumers. Generally, hedonic pricing model results have been considered to be specific to the model, especially regarding location and time. A major goal of this study is to help shed some light on the universality of hedonic pricing model results.

This study uses meta regression analysis (MRA) to evaluate the published literature on the relationship between housing characteristics and selling price. Meta

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[1] For a review of the hedonic pricing literature, see Sirmans, Macpherson, and Zietz, Journal of Real Estate Literature, Vol. 13, No. 1, 2005, pp. 3-43.

regression is the quantitative analysis of the existing empirical literature and can be used to summarize a set of related studies. Meta analysis is superior to a simple narrative review in that it allows a quantifiable assessment of existing empirical results. In addition, it has the advantage of being able to examine whether heterogeneity among results of multiple studies is related to specific characteristics of the studies.[2]

This study uses meta analysis to examine the relationship between house prices and nine housing characteristics: (1) square footage, (2) lot size, (3) age, (4) bedrooms, (5) bathrooms, (6) garage, (7) swimming pool, (8) fireplace and (9) air conditioning. Specifically, this study examines the importance of moderator variables in explaining the variation in estimated regression coefficients for a given housing characteristic. For example, is a characteristic's estimated coefficient for a given study a function of factors such as the location or the data source?

The History of Meta Analysis

Meta analysis has its foundation in medical, psychological and educational research.[3] There is also an emerging body of meta analysis literature in economics. Jarrell and Stanley (1990) use meta analysis to evaluate and summarize the large set of union/nonunion wage gap estimates. In a 1998 study, Stanley and Jarrell use meta analysis to examine gender wage discrimination. It has also been used to examine other aspects of the labor market. Card and Krueger (1995) use minimum wage literature to test the prediction that there should be an inverse-square-root relationship between sample

[2] For example, in medicine, meta regression has been used to relate vaccine efficacy to geographical latitude, coronary risk benefit to serum cholesterol reduction, and properties of diagnostic tests to methodological quality of diagnostic accuracy studies (Higgins and Thompson (2004).

size and the t ratio. Also, Doucouliagos (1995) uses meta analysis to examine the effects of various forms of worker participation on productivity. A recent study by Doucouliagos and Laroche (2003) uses meta analysis to measure the impact of unions on productivity.

There have also been some real estate applications of meta analysis. A 1995 study by Smith and Huang uses meta analysis to examine market valuation of air quality. Recently, Bateman and Jones (2003) apply meta analysis in an effort to understand woodland recreation benefit estimates.

Meta Regression Methodology

Meta analysis surpasses a traditional literature review by providing a more comprehensive framework for examining an existing body of literature. It is useful in testing the universality of a relationship by providing statistical evidence of the overall impact of one variable on another. Moreover, meta regression can be used to identify sources of variation between estimated regression coefficients.[4] In meta regression, the regression coefficient becomes the dependent variable and the coefficient from each study is an observation.

The meta regression expresses the functional relationship between the estimated regression coefficient (β_j) from each of N individual studies and a vector of M moderator variables (X_{mj}) that describe important model and data characteristics of an individual study:[5]

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[3] For an early literature review, see Stanley and Jarrell (1989)

[4] Jarrell and Stanley (1990) argue that there are two major advantages of meta analysis over a traditional literature review: (1) an increase in the quantity of information that can be explicitly analyzed and (2) increased objectivity.

[5] The moderator variables are not necessarily endogenous to the hedonic pricing models.

$$\beta_j = \alpha_0 + \sum_{m=1}^{M} \alpha_j X_{mj} + \varepsilon_j$$

$$j = 1, 2, \ldots, N$$

The α's are the meta regression coefficients measuring the effects of individual factors on the resultant coefficient, β_j.

While meta regression is commonly used to examine heterogeneous results between studies, result differences are observational associations and are subject to problems such as aggregation bias. Higgins and Thompson (2004) demonstrate important limitations in meta regression in the circumstances in which it is commonly used. Examining multiple covariates increases the risk of false-positive results because of heterogeneity.

Higgins and Thompson (2004) have shown that a fixed-effect meta regression is unacceptable in the presence of heterogeneity and that it increases the risk of false positive results. In order to reduce this risk, they suggest the use of a random coefficient model in which the coefficients are assumed to follow a random effects distribution and Bayes estimates are shrunk towards the mean of the distribution. They also suggest a permutation test to determine statistical significance. An important advantage of this is that, from a set of several covariates, a permutation test may act to temper results for the "most significant" covariate.

Following Higgins and Thompson, our meta regression is estimated as a random effects model that accounts for two sources of variation: the variation within the study and the variation across the studies. Because of this, there is no reported R-squared. The tau-squared statistic (T^2) gives the regression model estimate of between-study variance while the I-squared statistic (I^2) gives the proportion of variation due to within-study heterogeneity.

A Meta Model of Hedonic House Prices

Our meta regression model examines the nine housing characteristics that have appeared most often in hedonic pricing models: (1) square footage, (2) lot size, (3) age, (4) bedrooms, (5) bathrooms, (6) garage, (7) swimming pool, (8) fireplace, and (9) air conditioning. The estimated regression coefficients are compiled for each variable from the published hedonic pricing literature.[6] A meta regression is then estimated for each variable. Studies are restricted to those that have been consistent in their model specification and measurement of characteristics. Specifically, the studies must have employed a hedonic pricing model with a semi-log specification.

Generally, hedonic pricing models have taken the form:

$$\text{Selling Price} = \alpha_0 + \beta_i X_i + \varepsilon$$

where selling price is expressed either in linear or logged form, β_i is the estimated regression coefficient for the i^{th} housing characteristic, X_i is the set of i housing characteristics, and ε is the residual error term. Across studies, hedonic models have differed in model specification, data source, variable measurement, and time period analyzed. For some variables, this has resulted in a wide range in their estimated coefficients.

The major objective of our meta regression analysis is to examine the impact of the following moderator variables on the estimates of housing characteristics: (1) geographical location of the data in the U.S.; (2) the time period of the data; (3) the median household income for the area and time of the study expressed in 1989 dollars; (4) the type of data; (5) binary variable(s) indicating that the hedonic model controls for certain other variables (such as bedrooms or square footage); and (6) model specification as measured by the number of variables included in the hedonic model. The meta regression equation is:

$$\beta_i = \alpha + \alpha_1 LOC_i + \alpha_2 TIME_i + \alpha_3 INC_i + \alpha_4 DATA_i + \alpha_5 CON_i$$
$$+ \alpha_6 MODSIZE_i + \mu_i$$

where

β_i = the estimated regression coefficient from the i^{th} study;

α_1-α_6 = the estimated meta regression coefficients for the moderator variables;

LOC_i = the geographical location of the data for the i^{th} study designed to measure whether the characteristic is valued differently by consumers in different geographic locations. This is measured as a vector of five binary variables representing regions across the U.S. (NE = Northeast, SE = Southeast, SW = Southwest, MW = Midwest, and W = West). NE is the omitted region;[7]

$TIME_i$ = a time trend indicating the year of the data (where 1=1976 …28 = 2003) designed to measure whether the value of the characteristic has changed over

[6] The primary source of data is from studies surveyed in Sirmans, Macpherson, and Zietz, JREL, 13:1, (2005): 3-43. The data are updated to include studies published subsequent to SMZ. Appendix One gives the full citation for the studies included.

[7] Appendix Two gives the studies included in each region.

time. If the i[th] study used data across two or more years, then the variable is assigned a value corresponding to the average year;[8]

INC_i = the median household income (in $10,000s) for the location and time of the study expressed in 1989 dollars. This variable matches as closely as possible the area of the study (for example, by city or MSA) and measures whether households with different income levels attach differing values to the characteristic;

$DATA_i$ = the data source for the i[th] study designed to measure whether the source of data affects the value of the characteristic. This is a vector of three binary variables that indicate the use of Multiple Listing Service (MLS) data, Assessor data, or American Housing Survey (AHS) data. MLS data is the omitted category;

CON_i = binary variable(s) to indicate that the model in the i[th] study has controlled for certain other variables (such as square footage). This is designed to measure whether controlling for other variables in the hedonic model affects the value of the characteristic;

$MODSIZE_i$ = the number of variables (in logged terms) included in the hedonic model of the i[th] study, designed to determine whether the size of the hedonic model affects the value of the characteristic; and

μ_i = the disturbance term.

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[8] The models were also estimated with binary variables representing pre- and post-1990. The results are similar to those with the time trend.

The CON variables (controlling for other variables in the hedonic model) are included only as appropriate in the meta regression models.[9]

Meta Regression Results

Meta regressions are estimated for the nine housing characteristics and the results are discussed below and shown in the accompanying tables. Summary statistics tables for the variables in each model are also provided and discussed.

Square Footage

Table 1a provides the summary statistics for the variables included in the meta model for square footage (measured in thousands of square feet). Square footage coefficients from 64 studies are included. The mean of the coefficients is 0.3376 with an average t statistic of 28.50. Recall that these coefficients are from semi-log house price models. As seen, the studies are distributed geographically across the United States with 23 percent from the West, 20 percent from the Midwest, 20 percent from the Northeast, 23 percent from the Southeast, and 14 percent from the Southwest. The median household income for the data areas is $31,465. Fifty-three percent of the studies use MLS data and 48 percent use Assessor data. Forty-two percent of the hedonic models control for the number of bedrooms and 69 percent control for the number of bathrooms. The average number of variables included in the hedonic pricing models is twenty-four.

The results for the square footage meta regression are given in Table 1b. For geographical differences, the omitted region is the Northeast. Two location variables, SE and SW, are statistically significant with positive coefficients. Recall that the meta

[9] Sample size was originally considered as a moderator variable. However, the meta regression coefficients are weighted by the standard error which is a function of sample size, thereby implicitly taking it into

regression dependent variable is the estimated coefficient for square footage in a semi-log hedonic pricing model. This means that the coefficient is the percentage change in house price relative to each unit change in square footage. Thus, the results show for the Southeast and the Southwest, square footage has a greater marginal effect on house prices.

The time trend variable is not significant, indicating that the contribution of square footage to house price has not changed over time. The square footage coefficient is not affected by the wealth (as measured by the median income) for the area. The source of data and additional control variables do not significantly affect the square footage coefficient. Similarly, the size of model also does not significantly affect the square footage coefficient.

Overall results: square footage coefficient is sensitive to location but not to time, household income, or source of data.

Lot size

Table 2a contains the summary statistics for the lot size meta regression model. For the 41 studies included, the average lot size coefficient is 0.03334 (with lot size measured in 1,000s of square feet) with an average t statistic of 7.76. Geographically the studies are distributed as follows: 22 percent use data from the West, 34 percent use data from the Midwest, 22 percent use data from the Northeast, and 22 percent use data from the South.[10] The median household income for the areas covered by the studies is $28,569. Sixty-eight percent of the studies use MLS data while 34 percent use Assessor

account.

[10] Southeast and Southwest are combined due to lack of observations.

data. Seventy-three percent of the studies control for house size in their hedonic pricing models. The average hedonic model includes twenty-four variables.

The meta regression results for lot size are shown in Table 2a. Geographically, only the Midwest is significant. Relative to the Northeast, studies using Midwest data produce greater lot size coefficients, indicating that lot size makes up a greater portion of house price in the Midwest. The time trend variable is not significant.

The lot size coefficient is not sensitive to the source of data. Controlling for square footage produces a decreased effect of lot size on house price. The size of the hedonic model does not affect the lot size coefficient.

Overall results: lot size coefficient is significantly different only for the Midwest where lot size has a greater effect on house price. Also, controlling for square footage lowers the lot size coefficient producing a lower effect on house price. This could be reasonable if the square footage/lot size ratio increases as square footage increases. This would mean, for larger houses, the value of the lot is a smaller proportion of the total value of the house. Also, larger houses would likely have more amenities that would increase the value of the house.

Age

Table 3a gives the summary statistics for the age meta regression model. The average coefficient for age from 82 studies is –0.00864 with an average t statistic of –6.53. Geographically, 24 percent of the studies each come from the West and Midwest. Twenty-two percent come from the Northeast with 18 percent from the Southeast and 12 percent from the Southwest. The median household income for the studies is $31,208.

Forty-five percent of the studies use MLS data while 48% use Assessor data and 8% use American Housing Survey data. The average model size is twenty-two variables.

Table 3b gives the meta regression results for age. Two regional variables, SE and SW, are significant with negative signs indicating that age has a greater effect on house prices in these regions relative to the Northeast. Age has the greatest negative effect on house prices in the Southwest. The time trend variable is statistically significant with a negative sign indicating that age has a greater negative effect on house prices over time. This indicates that more recent studies show a greater negative effect of age than previous studies and implies that the market has a greater negative view of age currently than previously.

Using Assessor or AHS data produces a greater negative effect on house price. Relative to MLS data, using Assessor data increases the negative effect of age by 0.31 percentage points. The corresponding figure for AHS data is 0.65 percentage points. This could result from age measurement differences across the data types.[11] Neither median household income nor the size of the hedonic model affects the age coefficient.

Overall results: the age coefficient is affected by geographical location, time, and the type of data but not by income or the size of the hedonic model.

Bedrooms

Table 4a provides the summary statistics for the bedrooms meta regression model. For the 45 studies included in the analysis, the average coefficient for bedrooms is 0.03772 with an average t statistic of 2.13. The geographical distribution of the data is:

[11] In the case of the American Housing Survey the data are provided via a national housing sample survey of a fixed sample of about 55,000 homes. Data collected from homeowners include household characteristics, structural characteristics, housing and neighborhood quality, and financial characteristics including value.

one-third from the West, 20 percent from the Northeast, 18 percent from the Midwest, 18 percent from the Southeast, and 11 percent from the Southwest. The median household income is $30,973. About 51 percent of the studies use MLS data while 38 percent use Assessor data and 13 percent use the American Housing Survey. Ninety-one percent control for bathrooms and 75 percent control for square feet. The average hedonic model contains twenty-seven variables.

The meta regression results for the bedroom model are given in Table 4b. The only significant regional variable is SW with a positive sign indicating that bedrooms have a greater impact on house prices in the Southwest. The bedrooms coefficient is not sensitive to time, income, or type of data. Hedonic pricing models that control for bathrooms do not produce significantly different bedroom coefficients than those that do not. Those models that control for square footage, however, do produce bedroom coefficients that are significantly less than those models that do not. Controlling for the size of the hedonic model does not affect the bedroom coefficient.

Overall results: the bedrooms coefficient is sensitive to location only for the Southwest and is not sensitive to time, income, or data type. Controlling for square footage in the hedonic model lowers the effect of bedrooms on house price.

Bathrooms

Table 5a gives the summary statistics for the bathrooms meta regression model. For the 58 studies included in the analysis, the average bathroom coefficient is 0.08759 with an average t statistic of 7.79. The geographical breakdown for the studies is: twenty-nine percent from the West, 10 percent from the Midwest, 21 percent from the Southeast, 15 percent from the Southwest, and 26 percent from the Northeast. The median household income is $30,500. The data sources are 43 percent from MLS, 45 percent from Assessor data, and 14 percent from the American Housing Survey. Sixty percent and 74 percent, respectively, control for bedrooms and square footage. The average hedonic model size is twenty-one variables.

The results for the bathrooms meta regression are shown in Table 5a. The only significant location variable is West, and the negative coefficient indicates that the effect of bathrooms on house price is less in the West than for the other regions. The bathroom coefficient is also sensitive to using AHS data. Using AHS data produces a larger bathroom coefficient in a hedonic pricing model. The bathroom coefficient is not sensitive to time, income, controlling for bedrooms or square footage, or hedonic model size.

Overall results: the coefficient for bathrooms is sensitive to the West location variable and using AHS data. The value of bathrooms does not vary with time, income, controlling for other variables in the model, or the size of the hedonic model.

Garage

Table 6a shows the summary statistics for the garage meta regression model. For the 31 studies included in the analysis, the average garage coefficient is 0.10819 with an average t statistic of 7.28. The geographic distribution of the studies is: 32 percent of the studies use data from the West, 26 percent use data from the Midwest, 22 percent use data from the South, and 22 percent of the studies use data from the Northeast.[12] The median household income is $26,944. Forty-two percent of the studies use MLS data and 32 percent and 26 percent, respectively, use Assessor and American Housing Survey

[12] Southeast and Southwest are combined due to lack of observations.

data. Fifty-two percent of the studies control for square footage. The average hedonic model contains 24 variables.

Table 6b gives the results for the garage meta regression model. The garage coefficient is sensitive to geographical location only for the South. The positive coefficient for South indicates that garage has a greater effect on value in the South relative to the Northeast.[13] The garage coefficient is not sensitive to time, income, or type of data. Controlling for square footage or controlling for the size of the hedonic model does not affect the garage coefficient.

Overall results: the garage coefficient is affected by geographical location only for the South but not by time, income, or type of data.

Swimming Pool

Table 7a gives the summary statistics for the swimming pool meta regression. For the 37 studies included in the analysis, the average coefficient for swimming pool is 0.07714 with an average t statistic of 9.54. Geographically, the studies are: 27 percent from the West, 19 percent from the Midwest, 19 percent from the Southeast, 27 percent from the Southwest, and 8 percent from the Northeast. The median household income across the studies is $29,388. Sixty percent of the studies use MLS data while 40 percent use Assessor data. The average model size is 28 variables.

The results for the swimming pool meta regression are shown in Table 7b. The regional results show that swimming pool has a greater positive effect on house price in the Southwest. The presence of a swimming pool adds 5.7 percentage points more to the

[13] Because of weather conditions, etc. garages may not be as common in the South.

price of a home in the Southwest than in the Northeast. The swimming pool coefficient does not vary by region otherwise. The effect of swimming pool on house price does not vary with time, the type of data, income, or controlling for the size of the hedonic model.

Overall results: the swimming pool coefficient in hedonic models is not sensitive to time, income, or the type of data. Swimming pool coefficients from studies using data from the Southwest are significantly greater than for other geographical areas.

Fireplace

The summary statistics for the studies included in the fireplace meta regression are given in Table 8a. Thirty-five studies are included and the average coefficient for fireplace is 0.0893 with an average t statistic of 8.01. These studies measure fireplace as a binary variable with a value of one if the house has a fireplace(s). About 17 percent of the studies use data from the West with one-third of the studies coming from the Midwest. Twenty-six percent use data from the Southeast with 11 percent from the Southwest and 11 percent from the Northeast. The median household income is $28,885. Sixty-three percent of the studies use MLS data while 34 percent and three percent use Assessor and AHS data, respectively. Seventy-eight percent of the studies control for square footage. The average hedonic model contains 28 variables.

Table 8b shows the results for the fireplace meta regression. The fireplace coefficient is not sensitive to geographic location, time, or income. Using Assessor data does produce significantly higher fireplace coefficients. This could be a function of errors in fireplace data measurement. Controlling for square footage and model size does not affect the fireplace coefficient.

Overall results: the fireplace coefficient in hedonic pricing models is not affected by geographical location, time, or income but is affected by the type of data used in the hedonic model.

Air Conditioning

Table 9a shows the summary statistics for the air conditioning meta regression. For the 31 studies included in the analysis, the average coefficient is 0.08347 and the average t statistic of 4.80. Geographically the studies are: 13 percent from the West, 13 percent from the South, 52 percent from the Midwest, and 26 percent from the Northeast.[14] The median household income for the studies is $26,630. Fifty-eight percent of the studies use MLS data while 26 percent and 16 percent, respectively, use Assessor data and AHS data. About 65 percent of the studies indicate that the house had central air conditioning. Fifty-eight percent of the studies control for square footage. The average hedonic model contains 27 variables.

The results for the air conditioning meta regression model are given in Table 9b. The effect of air conditioning on house price varies only for the South. South has a positive coefficient indicating that air conditioning has a greater effect on house prices in the South. The air conditioning coefficient is not sensitive to time or the type of data. Household income does have a negative effect on the air conditioning coefficient. This may be reasonable if housing consumption is commensurate with income. Higher-priced houses would likely have greater amenities and would more likely have air conditioning meaning that air conditioning could play a smaller role in setting the house price.

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[14] Southeast and Southwest are combined due to lack of observations.

Controlling for central air conditioning or square footage does not have a significant effect on the air conditioning coefficient. Controlling for hedonic model size does not affect the air conditioning coefficient.

Overall results: the coefficient for air conditioning is affected by geographical location only for the South and is not affected by time or type of data. Controlling for central air, square feet, or model size also does not affect the value of air conditioning. Household income has a negative effect on the air conditioning coefficient. This may be reasonable if housing consumption is positively correlated with income and air conditioning may play a smaller role in setting the value of the house. For example, in a higher income region such as the Northeast where air conditioning is less critical, air conditioning would likely have a lower effect on value.

Summary

This paper reports meta analyses on the estimated regression coefficients of the nine housing characteristics that have appeared most often in hedonic pricing models for single-family homes. The major interest was to determine if these estimated coefficients vary by geographical location, time, and type of data. The characteristics are: square footage, lot size, age, bedrooms, bathrooms, garage, swimming pool, fireplace, and air conditioning.

Conclusions for the individual characteristics are:

- The square footage coefficient is sensitive to some geographical locations but not to time, household income, or source of data;

- The lot size coefficient differs significantly across some geographical locations and controlling for square footage lowers the lot size coefficient. Lot size is not affected by time, income, or the type of data;
- The age coefficient is affected by geographical location, time, and type of data but not by income;
- The bedrooms coefficient is sensitive to some geographical locations but not to time, income, or type of data. Controlling for square footage lowers the effect of bedrooms on house price;
- The coefficient for bathrooms is sensitive to some geographical locations and type of data but not to time or income;
- The garage coefficient is affected by some geographical locations but is not sensitive to time, income, or type of data;
- The swimming pool coefficient is sensitive to some geographical locations but not to time, income, or type of data;
- The fireplace coefficient is affected by type of data but not by geographical location, time, or income; and
- The air conditioning coefficient is affected by some geographical locations but is not sensitive to time or type of data. Household income does have a negative effect on the air conditioning coefficient.

The study examined the effect of several moderator variables on the estimated coefficients of the nine housing characteristics. Some conclusions are:

- Controlling for geographical location produced differences in coefficients for square footage, lot size, age, bedrooms, bathrooms, swimming pool, garage, and air conditioning but not for fireplace;
- Controlling for time showed that the contribution of housing characteristics have not changed over time. Only the age coefficient was affected by time and the effect was negative;
- Controlling for the type of data (MLS, Assessor, AHS) produced differences in coefficients for age, bathrooms, and fireplace;

- The level of household income only affected the coefficient for air conditioning and the effect was negative;
- Controlling for square footage produced lower coefficients for lot size and bedrooms; and
- Controlling for the size of the hedonic model did not affect the coefficients for any of the characteristics.

Overall, these results provide important information regarding the effect of various characteristics on house prices and the interpretation of hedonic pricing model results. Generally, hedonic pricing model results have been considered to be specific to the model, especially regarding location and time. The results of the meta regression models show that hedonic estimates do experience some significant variation but perhaps not as much as traditionally believed.

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Table 1a: Summary Statistics for Square Footage Observations					
Variable	**N**	**Mean**	**Std. Dev.**	**Min**	**Max**
Sqft Coefficient	64	0.33757	0.23130	-0.087	0.920
Sqft t-statistic	64	28.50011	42.63188	-0.731	244.020
W	64	0.23438	0.42696	0	1
SE	64	0.23438	0.42696	0	1
SW	64	0.14063	0.35038	0	1
MW	64	0.20313	0.40551	0	1
NE	64	0.20313	0.40551	0	1
Time trend	64	16.65625	4.88021	1	26
MLS	64	0.53125	0.50297	0	1
Assessor	64	0.48438	0.50371	0	1
AHS	64	0	0	0	0
Median Household Inc	64	31,465	8,825	20,775	74,553
Control beds	64	0.42188	0.49776	0	1
Control baths	64	0.68750	0.46718	0	1
Total Variables	64	24	22	8	169

Table 1b: Meta-Analysis for Square Footage			
Variable	**Coefficient**	**t**	**P>t**
W	0.09651	1.17	0.248
SE	0.22091	2.24	0.029
SW	0.24092	2.60	0.012
MW	0.06737	0.72	0.474
Time trend	0.00208	0.28	0.782
Median Household Inc	-0.01021	-0.24	0.808
Assessor	-0.06838	-1.08	0.287
Control beds	0.00826	0.13	0.898
Control baths	0.08630	1.18	0.244
ln(Total Variables)	-0.07211	-1.39	0.170
Constant	0.39734	1.47	0.147
N	64	I^2	0.998
T^2	0.0422	df	53

Table 2a: Summary Statistics for Lot Size Observations					
Variable	N	Mean	Std. Dev.	Min	Max
Lot Coefficient	41	0.03334	0.05929	-0.006	0.213
Lot t-statistic	41	7.75818	9.56597	-2.040	52.110
W	41	0.21951	0.41906	0	1
South	41	0.21951	0.41906	0	1
MW	41	0.34146	0.48009	0	1
NE	41	0.21951	0.41906	0	1
Time trend	41	17.17073	4.34685	8	28
MLS	41	0.68293	0.47112	0	1
Assessor	41	0.34146	0.48009	0	1
AHS	41	0.00000	0.00000	0	0
Median Household Inc	41	28,569	7,546	16,888	60,632
Control sqft	41	0.73171	0.44858	0	1
Total Variables	41	24	26	8	169

Table 2b: Meta-Analysis for Lot Size			
Variable	Coefficient	t	P>t
W	0.00959	0.41	0.683
South	-0.00235	-0.10	0.921
MW	0.04491	2.01	0.053
Time trend	0.00220	1.18	0.246
Assessor	-0.00536	-0.30	0.764
Median Household Inc	-0.00830	-0.77	0.448
Control sqft	-0.05706	-3.09	0.004
ln(Total Variables)	0.00355	0.28	0.783
Constant	0.03405	0.53	0.599
N	41	I^2	0.981
T^2	0.0019	df	32

Table 3a: Summary Statistics for Age Observations					
Variable	N	Mean	Std. Dev.	Min	Max
Age Coefficient	82	-0.00864	0.00773	-0.045	0.011
Age t-statistic	82	-6.53098	32.38940	-89.500	240.940
W	82	0.24390	0.43208	0	1
SE	82	0.18293	0.38899	0	1
SW	82	0.12195	0.32924	0	1
MW	82	0.24390	0.43208	0	1
NE	82	0.21951	0.41646	0	1
Time trend	82	16.03659	4.81880	1	25
MLS	82	0.45122	0.50068	0	1
Assessor	82	0.47561	0.50248	0	1
AHS	82	0.08537	0.28114	0	1
Median Household Inc	82	31,208	8,993	16,964	74,553
Total Variables	82	22	11	8	61

Table 3b: Meta-Analysis for Age			
Variable	Coefficient	t	P>t
W	0.00069	0.30	0.769
SE	-0.00737	-2.35	0.022
SW	-0.01348	-4.64	0.000
MW	-0.00463	-1.59	0.115
Time trend	-0.00038	-1.82	0.073
Assessor	-0.00312	-1.65	0.102
AHS	-0.00653	-1.80	0.076
Median Household Inc	-0.00114	-0.89	0.379
ln(Total Variables)	0.00314	1.61	0.112
Constant	-0.00234	-0.27	0.790
N	82	I^2	0.988
T^2	0.0000	df	72

Table 4a: Summary Statistics for Bedroom Observations					
Variable	**N**	**Mean**	**Std. Dev.**	**Min**	**Max**
Bedroom Coefficient	45	0.03772	0.08162	-0.082	0.310
Bedroom t-statistic	45	2.13064	6.87379	-21.333	19.075
W	45	0.33333	0.47673	0	1
SE	45	0.17778	0.38665	0	1
SW	45	0.11111	0.31782	0	1
MW	45	0.17778	0.38665	0	1
NE	45	0.20000	0.40452	0	1
Time trend	45	17.06667	4.58456	9	26
MLS	45	0.51111	0.50553	0	1
Assessor	45	0.37778	0.49031	0	1
AHS	45	0.13333	0.34378	0	1
Median Household Inc	45	30,973	6,746	21,157	60,632
Control baths	45	0.91111	0.28780	0	1
Control sqft	45	0.75556	0.43461	0	1
Total Variables	45	27	24	9	169

Table 4b: Meta-Analysis for Bedrooms			
Variable	**Coefficient**	**t**	**P>t**
W	-0.02912	-0.92	0.363
SE	-0.02604	-0.77	0.447
SW	0.06573	1.66	0.107
MW	-0.05413	-1.37	0.179
Time trend	0.00081	0.24	0.813
Assessor	0.03787	1.43	0.161
AHS	0.00952	0.19	0.853
Median Household Inc	-0.00978	-0.54	0.591
Control baths	-0.04255	-1.14	0.264
control sqft	-0.10489	-2.71	0.011
ln(Total Variables)	0.00406	0.19	0.854
Constant	0.15521	1.38	0.176
N	45	I^2	0.948
T^2	0.0033	df	33

Table 5a: Summary Statistics for Bathroom Observations					
Variable	**N**	**Mean**	**Std. Dev.**	**Min**	**Max**
Bathroom Coefficient	58	0.0875924	0.07265	-0.030	0.320
Bathroom t-statistic	58	7.78774	9.03885	-3.780	44.330
W	58	0.29310	0.45916	0	1
SE	58	0.20690	0.40862	0	1
SW	58	0.15517	0.36523	0	1
MW	58	0.10345	0.30720	0	1
NE	58	0.25862	0.44170	0	1
Time trend	58	16.87931	4.66445	7	26
MLS	58	0.43103	0.49955	0	1
Assessor	58	0.44828	0.50166	0	1
AHS	58	0.13793	0.34784	0	1
Median Household Inc	58	30,500	7,232	16,888	60,632
Control beds	58	0.60345	0.49345	0	1
Control sqft	58	0.74138	0.44170	0	1
Total Variables	58	21	9	8	49

Table 5b: Meta-Analysis for Bathrooms			
Variable	**Coefficient**	**t**	**P>t**
W	-0.06268	-2.58	0.013
SE	-0.00100	-0.03	0.973
SW	0.01559	0.57	0.574
MW	-0.02218	-0.71	0.482
Time trend	-0.00128	-0.53	0.598
Assessor	0.02788	1.28	0.206
AHS	0.06788	1.98	0.054
Median Household Inc	-0.00393	-0.31	0.756
Control beds	-0.00201	-0.10	0.918
Control sqft	-0.01831	-0.66	0.513
ln(Total Variables)	0.01497	0.61	0.542
Constant	0.08574	0.97	0.338
N	58	I^2	0.964
T^2	0.0032	df	46

Table 6a: Summary Statistics for Garage Observations					
Variable	N	Mean	Std. Dev.	Min	Max
Garage Coefficient	31	0.10819	0.07202	0.010	0.243
Garage t-statistic	31	7.28030	8.33448	0.730	44.090
W	31	0.32258	0.47519	0	1
South	31	0.22581	0.42502	0	1
MW	31	0.25806	0.44480	0	1
NE	31	0.22581	0.42502	0	1
Time trend	31	15.06452	4.21059	7	23
MLS	31	0.41935	0.50161	0	1
Assessor	31	0.32258	0.47519	0	1
AHS	31	0.25806	0.44480	0	1
Median Household Inc	31	26,944	6,078	15,694	45,000
Control sqft	31	0.51613	0.50800	0	1
Total Variables	31	24	11	9	61

Table 6b: Meta-Analysis for Garages			
Variable	Coefficient	t	P>t
W	0.03261	0.76	0.458
South	0.08151	1.69	0.107
MW	-0.04045	-0.85	0.403
Time trend	-0.00177	-0.29	0.777
Assessor	-0.07857	-1.55	0.135
AHS	-0.02693	-0.44	0.667
Median Household Inc	-0.04671	-1.66	0.111
Control sqft	-0.07900	-1.64	0.115
ln(Total Variables)	0.00876	0.24	0.816
Constant	0.28723	1.77	0.091
N	31	I^2	0.933
T^2	0.0033	df	21

Table 7a: Summary Statistics for Pool Observations					
Variable	N	Mean	Std. Dev.	Min	Max
Pool Coefficient	37	0.0771445	0.03382	0.011	0.182
Pool t-statistic	37	9.54480	9.25685	0.270	30.333
W	37	0.27027	0.45023	0	1
SE	37	0.18919	0.39706	0	1
SW	37	0.27027	0.45023	0	1
MW	37	0.18919	0.39706	0	1
NE	37	0.08108	0.27672	0	1
Time trend	37	18.10811	3.82088	12	26
MLS	37	0.62162	0.49167	0	1
Assessor	37	0.40541	0.49774	0	1
AHS	37	0.00000	0.00000	0	0
Median Household Inc	37	29,388	6,532	16,964	45,000
Total Variables	37	28	26	12	169

Table 7b: Meta-Analysis for Pools			
Variable	Coefficient	t	P>t
W	0.02410	0.73	0.474
SE	0.02848	0.79	0.436
SW	0.05732	1.85	0.075
MW	0.02411	0.58	0.564
Time trend	0.00130	0.90	0.374
Assessor	0.00585	0.36	0.724
Median Household Inc	-0.00016	-0.01	0.991
ln(Total Variables)	-0.00866	-0.76	0.452
Constant	0.04430	0.50	0.618
N	37	I^2	0.924
T^2	0.0006	df	28

Table 8a: Summary Statistics for Fireplace Observations					
Variable	**N**	**Mean**	**Std. Dev.**	**Min**	**Max**
Fire Coefficient	35	0.08934	0.05345	0.002	0.232
Fire t-statistic	35	8.01048	7.90010	0.256	42.111
W	35	0.17143	0.38239	0	1
SE	35	0.25714	0.44344	0	1
SW	35	0.11429	0.32280	0	1
MW	35	0.34286	0.48159	0	1
NE	35	0.11429	0.32280	0	1
Time trend	35	16.40000	3.46580	11	23
MLS	35	0.62857	0.49024	0	1
Assessor	35	0.34286	0.48159	0	1
AHS	35	0.02857	0.16903	0	1
Median Household Inc	35	28,885	7,240	16,964	45,000
Control sqft	35	0.77143	0.42604	0	1
Total Variables	35	28	26	8	169

Table 8b: Meta-Analysis for Fireplaces			
Variable	**Coefficient**	**t**	**P>t**
W	-0.06031	-1.41	0.171
SE	-0.01306	-0.30	0.767
SW	0.00904	0.21	0.837
MW	0.01515	0.35	0.728
Time trend	0.00191	0.64	0.528
Assessor	0.05833	1.80	0.085
AHS	0.07458	1.02	0.318
Median Household Inc	-0.01396	-0.67	0.509
Control sqft	-0.02189	-0.76	0.453
ln(Total Variables)	-0.04031	-1.51	0.145
Constant	0.22990	1.99	0.058
N	35	I^2	0.943
T^2	0.0021	df	24

Table 9a: Summary Statistics for Air Conditioning Observations					
Variable	**N**	**Mean**	**Std. Dev.**	**Min**	**Max**
AC Coefficient	31	0.08347	0.07388	-0.072	0.310
AC t-statistic	31	4.80594	4.90354	-2.234	25.578
W	31	0.12903	0.34078	0	1
South	31	0.12903	0.34078	0	1
MW	31	0.51613	0.50800	0	1
NE	31	0.25806	0.44480	0	1
Time trend	31	14.83871	3.63407	7	25
MLS	31	0.58065	0.50161	0	1
Assessor	31	0.25806	0.44480	0	1
AHS	31	0.16129	0.37388	0	1
Median Household Inc	31	26,630	6,045	16,888	45,000
Central AC	31	0.64516	0.48637	0	1
Control sqft	31	0.58065	0.50161	0	1
Total Variables	31	27	28	9	169

Table 9b: Meta-Analysis for Air Conditioning			
Variable	**Coefficient**	**t**	**P>t**
W	-0.04015	-1.12	0.276
South	0.12028	2.83	0.01
MW	0.02111	0.65	0.521
Time trend	0.00298	0.64	0.527
Assessor	-0.04290	-1.30	0.21
AHS	0.05064	1.12	0.278
Median Household Inc	-0.03903	-1.76	0.093
Central AC	0.04543	1.16	0.261
Control sqft	0.01355	0.34	0.737
ln(Total Variables)	-0.02572	-1.14	0.267
Constant	0.16350	1.58	0.129
N	31	I^2	0.861
T^2	0.0029	df	20

APPENDIX ONE

REFERENCE LIST FOR STUDIES INCLUDED IN THE META REGRESSION ANALYSIS

The following is the list of papers from which estimated coefficients for housing characteristics were obtained.

Allen, Marcus T. and William H. Dare, "The Effects of Charm Listing Prices on House Transaction Prices," *Real Estate Economics*, 2004, 32:4, 695-713.

Anglin, Paul M., Ronald Rutherford and Thomas M. Springer, "The Trade-Off Between the Selling Price of Residential Properties and Time-on-the-Market: The Impact of Price Setting," *Journal of Real Estate Finance and Economics*, 2003, 26:1, 95-111.

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Asabere, Paul K. and Forrest E. Huffman, "Negative and Positive Impacts of Golf Course Proximity on Home Prices," *Appraisal Journal*, 1996, 64:4, 351-355.

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Clapp, John M., Hyon-Jung Kim, and Alan E. Gelfand, "Predicting Spatial Patterns of House Prices Using LPR and Bayesian Smoothing," *Real Estate Economics*, 2002, 30:4, 505-532.

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APPENDIX TWO

REGIONAL DESIGNATION FOR STUDIES INCLUDED IN META REGRESSION ANALYSIS

The following lists the studies included in each geographical region.

Northeast (NE):

- **Pennsylvania**
    1. Asabere and Huffman (1993)
    2. *Delaware County*: Asabere, Huffman and Mehidian (1992)
    3. *Philadelphia*: Cummings, DiPasquale, and Kahn (2002), Kiel and Zabel (1999), Linneman and Voith (1991), Sirmans and Macpherson (2003), Zabel (1999)
    4. *State College*: Yavas and Yang (1995)

- **Massachusetts**
    1. *Boston*: Stevenson (2004)
    2. *Lincoln*: Clapp, Kim and Gelfand (2002)
    3. *Woburn*: Kiel (1995)

- **New Jersey**
    1. *Mt. Laurel*: Asabere and Huffman (1996), Asabere, Huffman, and Johnson (1996)
    2. *Stone Harbor/Avalon*: Major and Lusht (2004)
    3. *Willingboro*: Asabere and Huffman (1997)

- **Maryland/Virginia/Washington D.C.**
    1. *Baltimore, MD*: Thayer, Albers, and Rahmatian (1992)
    2. *Kentlands, MD*: Tu and Eppli (2001)
    3. *Montgomery County, MD*: Tu and Eppli (1999)
    4. *Fairfax County, VA*: Rodriguez and Sirmans (1994)
    5. *Washington DC*: Benjamin and Chinloy (1995)
    6. *Washington DC/MD*: Irwin (2002)

Midwest (MW):

- **Illinois**
    1. *Chicago*: Kiel and Zabel (1999), McMillen (2003), McMillen and McDonald (2004), Zabel (1999)
    2. *DuPage County*: Colwell, Dehring, and Lash (2000)

- **Kansas**
    1. *Witchita*: Dotzour (1997), Dotzour and Levi (1992), Dotzour and Levi (1993)

- **Michigan**
    1. *Grand Rapids*: Thorsnes (2002)

- **Ohio**
    1. Brasington (2002)
    2. *Akron/Cincinnati/Cleveland/Columbus/Dayton/Toledo*: Brasington (1999),
    3. *Alum Creek/Gahanna/Grove City/Obetz*: Hite, Chern, Hitzhusen, and Randall (2001)
    4. *Dayton*: Larsen (1991)

Southeast (SE):

- *New Orleans/Atlanta/Tampa/Miami*: Arguea and Hsiao (2000)
- **Alabama**
    1. *Montgomery*: Johnson, Salter, Zumpano, and Anderson (2001), Gordon, Salter, and Johnson (2002), Salter, Johnson, and Anderson (2004)

- **Georgia**

1. *Atlanta*: Bowes and Ihlanfeldt (2001)

- **Florida**
    1. *Broward County*: Allen and Dare (2004)
    2. *Jacksonville*: Lynch (2004)

- **Kentucky**
    1. *Lexington*: Peng and Cowart (2004)

- **Louisiana**
    1. *Baton Rouge*: Dombrow, Rodriguez, and Sirmans (2000), Harding, Knight and Sirmans (2003), Hughes and Sirmans (1992), Hughes and Sirmans (1993), Hughes and Turnbull (1996), Knight and Sirmans (1996), Shilling, Sirmans, Turnbull, and Benjamin (1992), Shilling, Sirmans, and Benjamin (1989), Sirmans, Turnbull, and Dombrow (1995)

- **North Carolina**
    1. *Pitt County*: Bin and Palasky (2004)
    2. *Raleigh*: Walden (1990)
    3. *Southern Village*: Tu and Eppli (2001)

- **Tennessee**
    1. *Memphis*: Pace (1998)
    2. *Rutherford County*: Nguyen and Cripps (2001)

Southwest (SW):

- **Texas**
    1. *Abilene*: Coulson and Leichenko (2001)
    2. *Arlington*: Anglin, Rutherford, and Springer (2003), Forgey, Rutherford, and VanBuskirk (1994), Forgey, Rutherford, and Springer (1996), Springer (1996)
    3. *Dallas/Dallas County*: Goodman and Thibodeau (1998), Thibodeau (2003), Waddell, Berry, and Hoch (1993)
    4. *Harris County*: Groves and Holland (2002), Palmon, Smith, and Sopranzetti (2004)
    5. *Tarrant County*: Haag, Rutherford, and Thomson (2000)

- **Arizona**
    1. *Phoenix*: Man and Bell (1996)
    2. *Youngstown*: Guntermann and Thomas (2004)

West (W):

- **California**
    1. *Laguna West*: Tu and Eppli (2001)
    2. *Modesto*: Harding, Knight and Sirmans (2003)
    3. *San Diego/San Diego County*: Guidry and Do (1998), Grudnitski and Do (1997)

4. *Southern CA*: Sieg, Smith, Banzhaf, and Walsh (2002)
5. *Stockton*: Knight (2002), Knight, Micelli, and Sirmans (2000)
6. *Rancho Bernardo*: Do and Grudnitski (1997)

- **Colorado**
  1. *Denver*: Galster, Tation, and Pettit (2004), Kiel and Zabel (1999), Zabel (1999)

- **Nevada**
  1. *Clark County*: Clauretie, Kuhn, and Schwer (2004)
  2. *Henderson*: Carroll, Clauretie, and Jensen (1996)
  3. *Las Vegas*: Carroll, Clauretie, and Neill (1997), Grudnitski (2003)

- **Oregon**
  1. *Portland*: Mahan, Polasky, and Adams (2000)
  2. *Washington County*: Song and Knaap (2003)

- **Utah**
  1. *Orem/Provo*: Zietz and Newsome (2002)

- **Washington**
  1. *Bellingham*: Benson, Hansen, Schwartz, and Smersh (1999), Benson, Hansen, Schwartz, and Smersh (1997)

- **Oregon/Washington**
  1. *Portland/Seattle*: Wolverton and Bottemiller (2003)

Note: This study was funded by the National Association of Realtors. The authors are responsible for any errors.

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Topics of primary interest include, but are not limited to:

- Real estate brokerage
- Real estate brokerage business models
- Real estate markets
- Housing policy
- Housing markets
- Real estate wealth effect
- New economy / technology
- Cost and impact of regulation
- Land use controls
- Multifamily
- Retail
- Office
- Industrial
- Commercial property finance

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