

AN INVESTIGATION OF THE EFFECTS OF SINGLE-FAMILY RENTAL PROPERTIES ON HOUSING VALUES WITHIN SINGLE-FAMILY NEIGHBORHOODS IN A UNIVERSITY TOWN

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Abstract

Many research studies have explored the influence of different urban variables on single-family neighborhood quality and real estate values in the United States. Researchers have considered the effects of corner lots, zoning regulations, schools, mobile/manufactured homes, office buildings, and neighborhood qualities (e.g. quietness, view, and noise) among other variables. However, none has explored the influence of renter-occupied properties on an individual unit basis on single-family home values within single-family neighborhoods in a university town. This research accordingly focuses on the impact of renter occupation on the value of a single-family unit and on surrounding units. This study concludes that in the context of single-family neighborhoods within a university town, a renter-occupied housing unit suffers a significant loss in value when it changes tenure from owner-occupied to renter occupied and it significantly affects the values of surrounding owner-occupied units. This study from an urban management and sustainability standpoint has immediate and long-term implications for single-family neighborhoods with encroachment of renter-occupied properties, and perhaps more so for neighborhoods in university towns. Implications may include impact of property tax valuation, neighborhood quality, quality of life, personal investment of homeowners, financial institutions' debt service and politics between residents and town elected officials.

Keywords: single-family house, tenure, university town.

1.0 INTRODUCTION

The influence of household occupancy types on neighborhood quality and real estate values in the United States has been studied and written about since the direct involvement in housing by the federal government half a century ago. In recognition of the more positive effects of homeownership versus renting, the federal government has intervened with a two-fold objective: firstly, it sought to encourage and facilitate widespread homeownership; secondly, it has used housing as an instrument to a) stimulate the economy, and b) to achieve social goals such as better neighborhoods, city redevelopment, or the end of poverty (Mitchell 1985).

To encourage and facilitate widespread homeownership, especially among the low- and middle-income groups, the federal government has provided tax incentives to promote permanent tenure. The National Homestead Act and precedent-setting tax laws of 1862, the Housing Act of 1954, and the Housing Act of 1965 have all helped to promote homeownership. These acts facilitated the establishment of institutions which allow for households' access to funds and mortgage credit. For example, the 1932 Federal Home Loan Bank (FHLB) and the Federal Housing Administration (FHA), have broadened the opportunities for low interest rate housing loans. They offer special insurance and credit programs to attract capital by reducing lenders' and investors' risk, thereby, lowering interest rates. Creation of the Federal National Mortgage Association (FNMA) in 1938, and the Government National Mortgage Association (GNMA) in 1968 enhanced the liquidity of mortgages in the secondary market, further reducing mortgage risk and loan cost. Finally, the Housing Act of 1949 encouraged neighborhood development by upgrading or removing substandard housing (Carlson 1987).

At the local government and private sector levels, the issue of potential conflicts in neighborhood development between security of tenure in homeownership and rental occupancy is perceived more keenly. The concern for tenure and its effect on neighborhood quality is expressed by zoning regulations which promote similar land uses and tenure, restrictive covenants in subdivision regulations, and building and housing codes, all of which aim at protecting and maintaining the quality and values of real estate property (Katz and Rosen 1987). Private institutions as well as investors are just as concerned as the local governments regarding the influence of security of tenure on neighborhood quality and values of real estate properties. Grissom and Ko (1991) expressed these concerns:

This perception is institutionalized through the local media and neighborhood associations' attempts to keep single-family and multi-family rental properties out of historically single-family areas. Prime examples of political or regulatory institutionalization are the actions of quasi-public agencies such as the Federal National Mortgage Association (nicknamed Fannie Mae). The negative force of rental properties on housing prices is reflected in section 404.06 of Fannie Mae's underwriting guidelines summarizing appraisal requirements: "The use of maximum financing must be carefully considered when the appraiser has indicated that an area is undergoing transition that could have a negative impact on property value... Properties may also change from owner-occupied to tenant-occupied, which can result in deterioration in the general appearance of the property and consequent loss in value."

2.0 THE PROBLEM STATEMENT

When housing units change from owner-occupancy to renter-occupancy in single-family residential neighborhoods, there seems to be a strong public perception that there will be a consequent loss of property values. This may be true in some neighborhoods, but this perception has never been tested for its validity in the context of neighborhoods in a university town in which this research was conducted.

The problem of transitional land uses in single-family neighborhoods has been studied under different conceptual models of the land use succession theory. Like a living organism, land use classes in "neighborhood" clusters pass through a development (growth), maturity, decline, and succession cycle (Andrews 1971). The problem has also been studied under *situs* theory. Wurtzbaach and Miles (1991) explained: "In *situs* theory, if a linkage is altered, the entire neighborhood may change. For real estate this change can be as slight as the renting of one house in a previously 100 percent owner-occupied neighborhood." However, it appears from the literature review that there has been very little study done on the change in value of a housing unit when it changes from owner- to renter-occupation and the latter's subsequent effect on the value of other surrounding owner-occupied properties in single-family neighborhoods in a university town. The bulk of the literature investigating issues affecting single-family property values often deal with independent variables other than tenure issues, or investigate changes at the macro census tract level. It seems that very few empirical studies have examined the tenure issue, using the units of statistical analysis of individual single-family properties within homogeneous neighborhoods, in the context of a university town.

The context of a university town, such as College Station, Texas, presents an interesting backdrop that could help to clarify the findings of this proposed research. The town has a population of about 60,000. There is a large population of students at Texas A&M University, which is located at the heart of the town. The university has a student enrollment of about 43,000 in the 1996 fall semester. Students, whose residence mobility rate is high, whose interests are mainly to get an education, and who have little time to spend on maintaining and enhancing their properties have little in common with the more permanent local residents. There is also the conflict between students' lifestyle and behavioral patterns against those of the long-term residents. Long-term residents have more of a family lifestyle whereas students' lifestyle patterns tend to emphasize social activities, which may make the neighborhood less attractive to prospective buyers. There is the university domination in terms of the one-industry

local economy (Messner 1969). There are the politics and conflicts among the native residents, the university officials, and the city officials, concerning growth policies that will shape the present and future building environment of the town.

3.0 THE RESEARCH QUESTION

The principal question addressed in this research is: Does a renter-occupied single-family unit suffer a loss in value with a change in tenure from owner- to renter-occupancy, and does this change affect the values of surrounding owner-occupied units?

4.0 RESEARCH DATA SOURCES

The research data were obtained from the Brazos County Tax Appraisal District Office.

The Appraisal Procedure of the Brazos County Tax Appraisal District Office

The Brazos County Tax Appraisal District Office determines the value of all taxable properties in College Station, Texas. The procedure of property valuation begins with the office compiling a list of the taxable properties in which the description of the property, name and address of the owner are printed. The appraisal office must repeat the appraisal process for property at least once every three years. The process includes mass appraisal in which the properties are classified according to a variety of factors including size, use and construction type. Using information from recent property sales, the office appraises the value of typical properties in each class. Age and location differences also are taken into consideration in the valuation. Individual property appraisals are applied as well using the three common approaches of market, income, and cost. The office uses the individual property appraisals and recent sales/appraised ratio data for adjustment of property values whenever it deems necessary (Sharp 1996).

The data obtained from the Brazos County Appraisal Office for the study were mostly related to the structural and site attributes of the individual single-family properties located in the three selected neighborhoods of College Station. The official designation of the individual units, whether they were renter-occupied or owner-occupied, were obtained through the *Identify Property by Situs Address 1995 Roll* computer database relating to the owners of the properties as well as through the *Utility Roll* computer database of July 1995. All the values of the properties as of 1995 were certified by the Appraisal Review Board for College Station and its surrounding areas.

5.0 RESEARCH DESIGN AND METHODOLOGY

Neighborhood and Individual Unit Selection Criteria

The three neighborhoods in the university town of College Station were selected on the basis of a set of criteria that was consistent with strong recommendations found in the literature review. Weaver (1976) recommends: "A word here about the properties chosen for your data bank: they should be of the same general type, location, cost, etc., as the type you are going to try and estimate for the best results." Furthermore, Goldberg and Scott (1988) relate to their use of a micro data base involving individual single-family housing units, each with their own structural and neighborhood attributes, as an "improved methodology" as compared with that at the municipality level. The set of criteria used for the current proposed project include: (1) that neighborhoods should have a high degree of homogeneity in the ages, types and sizes of single-family houses built in them; (2) that the neighborhoods should be older ones where there are clusters of renter-occupied properties; and (3) that renter- and owner-occupied housing within each neighborhood will be individually identified for this study.

The three neighborhoods selected are all located in a low density residential area and all are about 2 to 3 miles from Texas A&M University (see figure 1,2,3 and 4). The determination between the owner-occupied and rental-occupied units began by locating where the individual housing units are on the map. The *City of College Station Address Map* dated July 1994 was used for this purpose. The map provided the addresses of the units for the three neighborhoods. Then, using the Brazos County District Appraisal Office's *Identify Property by*

Situs Address 1995 Roll, which identified the owner of each property, and the corresponding *Utility Roll 1995*, which identified who paid the utility bill at that same property, the distinction was made by comparison of the two names as to which property was owner- or rental-occupied for every housing unit in the three neighborhoods. Only when the two names were totally different, then, the unit would be considered as being rental-occupied.

Sample Size Criteria and Random Sample Selection

Of a total list of 996 properties in the 3 neighborhoods, 828 were owner-occupied and 167 were rental. A sample size of 427 properties was selected in order to provide a 95% confidence level with plus or minus 4% reliability in the study (Hill, Roth and Arkin 1962). The 427 properties were made up of units from the three neighborhoods approximating the proportion of owner- and rental-occupied units in each of these neighborhoods as shown in table 5. The samples showed 21% of Southwood Valley units as rental occupied versus 19% over its population; likewise, 22% of Carter's Grove versus 20%, and 13% of Raintree versus 12%.

In order to select the individual units randomly for the sample size, each housing unit in each of the 3 neighborhoods was assigned a specific number. Using the Microsoft Excel random mathematical function (RANDBETWEEN), each unit from each neighborhood was picked randomly, one at a time until all the 427 sample units were obtained in the proportion of owner- and rental-occupied units existing in that particular neighborhood. Of the total samples, 345 units were owner-occupied and 82 units were rental-occupied, providing an overall 19% rental property.

Gathering and Organization of Information of Sample Attributes

Upon identification of the 427 sample units, the property valuation card for each unit was printed out from the Brazos County Tax Appraisal District Office. The card provided information including the address of each housing unit (denoting which neighborhood it comes from), lot size in square feet, living space, garage, and porch, the age, the percent good (a measure of the external conditions), the frontage of the lot in feet, and the availability of carport and swimming pool. Additional information was obtained using maps at a scale of 1 inch to 100 feet for each of the three neighborhoods to show the exact location of each housing unit by street, unit number, lot number, and block number. On the map, each lot had a centroid identified as a red dot on the center of the unit. This dot was generated by using the Geographical Information System. Also, the pairwise shortest distance between any owner-occupied unit and any rental unit was measured in feet. Corner lots were also noted. Finally, the 82 rental properties were examined further using the Brazos County District Appraisal Office's *Identify Property by Situs Address Roll*, and the corresponding *Utility Roll*, for 1992, 1993, and 1994, to trace how long each of the rental units was continuously rented through the four year period between 1992 and 1995. The information obtained was tabulated as shown in Table 1.

Hedonic Pricing Model Using Multiple Regression Analysis

The methodology used to analyze the research data was the hedonic pricing model using multiple regression analysis to test the hypotheses in this research. Model 1 was the basic unreduced model consisting of ten independent variables that were selected based on literature review and on the availability of information from the Brazos County Appraisal District's property valuation cards.

The model was expressed mathematically as shown below:

Model 1:

$$\ln Y_i = \beta_0 + \beta_1 \text{AGE}_i + \beta_2 \text{SQFTLA}_i + \beta_3 \text{GARAGE}_i + \beta_4 \text{PORCH}_i + \beta_5 \text{CORNER}_i + \beta_6 \text{LOTSIZE}_i + \beta_7 \text{FRONT}_i + \beta_8 \% \text{GOOD}_i + \beta_9 \text{POOL}_i + \beta_{10} \text{CARPORT}_i$$

where,

Y_i = Market price of the i th house in natural logarithm

β = Estimated coefficients

AGE_i = Age in years of the i th house

SQFTLA_i = Living area in square feet of the i th house

GARAGE_i = Car garage in square feet of the ith house
 PORCH_i = Porch in square feet of the ith house
 CORNER_i = Corner location of the ith house [yes=1, no=0]
 LOTSIZE_i = Lot size in square feet of the ith house
 FRONT_i = Frontage in feet of the ith house
 %GOOD_i = Level of exterior condition in percent of the ith house
 POOL_i = Availability of swimming pool of the ith house [yes=1, no=0]
 CARPORT_i = Availability of carport of the ith house [yes=1, no=0]

The β's represented the incremental effects of each value-influencing attribute. The incremental effect of the nearest distance between the owner-occupied and renter-occupied housing units on the sales price was shown through β_p. The effect of the dummy variable of tenure was determined through β_m. Finally, the time-series effect due to the length of time each rental property was rented out continuously was measured by the coefficient, β_t. The coefficients of all the dummy variables were checked and interpreted according to the rendition of Kennady (1981), where their marginal effects were derived by the mathematical formula: exponential [β - 1/2 VARIANCE (β) - 1]. This rendition provides the correct reading for the relative effects of dummy variables which were used in the models.

6.0 DATA ANALYSIS

The primary analysis involved a random sample (using Microsoft software's random function) of 427 housing units ranging from 10 to 25 years of age with slightly less than 1000 units in the three neighborhoods. The sample size provided a 95% confidence level and plus or minus 4% reliability in the study (Hill, Roth and Arkin, 1962).

The natural logarithm form was used for the dependent variable for two reasons: (1) the ease of interpreting the results; and (2) comparability with other studies (Butler 1982). The result of the effects of the coefficients, β, were in percentages. The ANOVA procedure outlined in the *SAS System for Regression* (Freund and Littell, 1991) was used. The following tests were implemented at α = 0.1, which was the level of significance used *a priori* to accept or reject the null hypothesis, H₀, and to reduce the likelihood of a Type I error. The results of this study failed to reject the null hypothesis at this level which meant that the alternative hypothesis, i.e. the research hypothesis, was upheld as true (Borg and Gall 1989):

$$H_0 : \beta_1 = \beta_2 = \beta_3 = \dots \beta_k = 0$$

$$H_\alpha : \text{At least one } \beta \text{ is not zero.}$$

In addition, the correlation in terms of the coefficient of determination, R², and the adjusted coefficient of determination, adjusted R², were obtained to explain the efficiency of the hedonic model. Tests for multicollinearity and heteroscedasticity were performed during the process of data analysis using residual plotting and variance inflation factor (VIF) procedures (Webster 1995).

7.0 RESULTS AND FINDINGS

The results and findings of this study are presented in two sections. The first section addresses the use of the 1995 appraised values as a proxy for market value. The second section provides statistical analysis for the research question of the study.

1995 Appraised Values as Proxy for Market Values

The dependent variables in the hedonic pricing models of this study consisted of the 1995 certified appraised values of the Brazos County Appraisal District, College Station. In the literature review discussed in the previous chapter, it appears that appraised values are used less often as a proxy for market price as compared to sales values. Is the use of the 1995 appraised values in this research a good proxy for market values?

To answer that question, a total of 128 properties sold in the year 1995 were obtained from the three single-family neighborhoods of Southwood Valley, Raintree and Carter's Grove.

The Pearson correlation coefficient matrix for these two series of data showed that the appraised values were highly correlated with the sales value at 97.7%. In addition, the univariate regression, using sales values as the dependent variable and appraised values as the independent variable, showed further that they both had a significant positive relationship with t-ratio value of 50.81 which exceeds the critical value of 1.645 at $\alpha = 0.1$. For every \$1.00 dollar increase in appraised value, there was an increase of \$0.96 in sales value — almost a one-to-one relationship (figure 5). The univariate regression model also showed, for example, that for a house that was sold for \$100,000 in 1995, the appraised value was \$96,971, which was about 97% of the market value. The results of the nearly perfect positive correlation and relationship between sales values and appraised values strongly supports the validity of using 1995 appraised values as a set of proxy values for the dependent variables in this study.

Statistical Analysis for the Research Question of the Study

Findings of Research Hypothesis Test 1

Global Testing and Finding of Hypothesis 1

H1: The market value of each single-family housing units is associated with the following: age, living area, garage, porch, corner lot location, lot size, frontage, percent good, pool, and carport.

Model 1:

$$\ln Y_i = \beta_0 + \beta_1 \text{AGE}_i + \beta_2 \text{SQFTLA}_i + \beta_3 \text{GARAGE}_i + \beta_4 \text{PORCH}_i + \beta_5 \text{CORNER}_i + \beta_6 \text{LOTSIZE}_i + \beta_7 \text{FRONT}_i + \beta_8 \% \text{GOOD}_i + \beta_9 \text{POOL}_i + \beta_{10} \text{CARPORT}_i$$

$\ln Y_i$ = The natural logarithm of market value in dollars of the i th house

β = Estimated coefficients

AGE_i = Age in years of the i th house

SQFTLA_i = Living area in square feet of the i th house

GARAGE_i = Car garage in square feet of the i th house

PORCH_i = Open porch in square feet of the i th house

CORNER_i = Corner location of the i th house [yes=1, no=0]

LOTSIZE_i = Lot size in square feet of the i th house

FRONT_i = Frontage in square feet of the i th house

$\% \text{GOOD}_i$ = Level of exterior maintenance in percent of the i th house

POOL_i = Availability of swimming pool of the i th house [yes=1, no=0]

CARPORT_i = Availability of carport of the i th house [yes=1, no=0].

The overall ability of the independent variables namely, age, living area, garage, porch, corner, lot size, frontage, percent goodness, pool, and carport to explain the behavior of the dependent variable, the natural logarithm of market values (using appraised values as proxies) depended on the association between the independent and dependent variables. Hypothesis 1 stated that the independent and dependent variables are associated. To test the hypothesis, the following null and alternate hypotheses were evaluated using tests of statistical significance:

$$H_0 = \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = \beta_9 = \beta_{10} = 0$$

$$H_1 = \text{Not all the } \beta\text{s are 0.}$$

The following test was implemented at $\alpha = 0.1$, which was the level of significance used *a priori* to accept or reject the null hypothesis, H_0 , and to reduce the likelihood of a Type I error. Table 2 showed the results through the Analysis of Variance (ANOVA). The critical value of F at $\alpha = 0.1$ was found to be 1.60 with numerator and denominator degrees of freedom of 10 and infinity, respectively. Since the computed value of 587 was much greater than the critical value, the decision rule was to reject the null hypothesis and accept the alternate. Failure to reject the null hypothesis means that the alternate hypothesis is true and therefore the research hypothesis 1 is upheld as true.

The above finding means that the independent variables are associated with the dependent variable and therefore they are able to explain the variations of the dependent variable.

Hypothesis Testing of Individual Predictors

The above test confirmed that not all of the β s were equal to zero. Further analyses were made to examine individually the regression coefficients, β s, to see which ones were not equal to zero. The following individual hypotheses were developed and evaluated for each independent variable:

AGE : $H_o : \beta_1 = 0$ and $H_1 : \beta_1 \neq 0$
 SQFTLA: $H_o : \beta_2 = 0$ and $H_1 : \beta_2 \neq 0$
 GARAGE: $H_o : \beta_3 = 0$ and $H_1 : \beta_3 \neq 0$
 PORCH: $H_o : \beta_4 = 0$ and $H_1 : \beta_4 \neq 0$
 CORNER: $H_o : \beta_5 = 0$ and $H_1 : \beta_5 \neq 0$
 LOTSIZE: $H_o : \beta_6 = 0$ and $H_1 : \beta_6 \neq 0$
 FRONTAGE: $H_o : \beta_7 = 0$ and $H_1 : \beta_7 \neq 0$
 %GOOD : $H_o : \beta_8 = 0$ and $H_1 : \beta_8 \neq 0$
 POOL: $H_o : \beta_9 = 0$ and $H_1 : \beta_9 \neq 0$
 CARPORT: $H_o : \beta_{10} = 0$ and $H_1 : \beta_{10} \neq 0$

Testing the individual hypothesis at the same level of confidence at $\alpha = 0.1$ and applying the two-tailed *Student t* distribution, the critical value for *t* with an infinite degree of freedom was 1.645. The computed t-ratio for the 10 independent variables was also shown on table 2. All the t-ratios of the independent variables exceeded the critical value with the exception of CORNER, FRONT, and CARPORT, which had t-ratios of 0.99, -1.64, and 1.16, respectively. Similarly, using probability, the p-values for the same three predictors were 0.325, 0.102, and 0.248 which exceeded the critical value of $\alpha = 0.1$. The null hypotheses of the three variables, CORNER, FRONT, and CARPORT, therefore, were not rejected. Since the three variables were not significant predictors, they were discarded from the basic unreduced model.

The basic reduced model was developed and tested for its soundness and would be used in subsequent models for further hypothesis testing. The basic reduced model could be represented mathematically in the following form:

$$\ln Y_i = \beta_0 + \beta_1 \text{AGE}_i + \beta_2 \text{SQFTLA}_i + \beta_3 \text{GARAGE}_i + \beta_4 \text{PORCH}_i + \beta_5 \text{LOTSIZE}_i + \beta_6 \text{POOL}_i$$

Findings of Research Hypothesis Test 2

Testing of Research Hypothesis 2

H2: Renter-occupied units in single-family neighborhoods suffer statistically significant property value losses relative to other owner-occupied units.

The basic reduced model was used and the independent variable of tenure, TENURE, was added to the model resulting in Model 2:

$$\ln Y_i = \beta_0 + \beta_1 \text{AGE}_i + \beta_2 \text{SQFTLA}_i + \beta_3 \text{GARAGE}_i + \beta_4 \text{PORCH}_i + \beta_5 \text{LOTSIZE}_i + \beta_6 \text{POOL}_i + \beta_7 \text{TENURE}_i$$

Model 2 was then used to test hypothesis 2 by regressing the dependent variable of the natural logarithm of Y, the market value of housing units, on the seven independent variables. The analysis of variance showed that at the significant level of $\alpha = 0.1$ with the critical value of $F=1.72$, the model of F-value of 437, rejected the null hypothesis that all the β s were zero. The individual and sum of the VIFs were less than 10 indicating the model had no multicollinearity problem. The model had a high degree of explanatory power with an adjusted R-square of 87.8% (table 3).

The t-ratio of all the individual variables exceeded the critical values of 1.645; hence, all the independent variables in this model are significant.

Findings of Research Hypothesis 2

The findings from this hypothesis testing show that tenure has a significant negative relationship with the market values of the housing units. In quantitative terms, the renter-occupied units have a 3.3% lower market value when compared with owner-occupied units. Applying the rendition of Kennady (1981) for accurate interpretation of dummy variables, the renter-occupied units have a 3.5% adjusted lower market value (table 4).

Findings of Research Hypothesis Test 3

Testing of Research Hypothesis 3

H3: The closer a single-family owner-occupied housing unit is to a renter-occupied unit, the higher the statistically significant losses in its property value relative to owner-occupied units farther away.

The model used to test for this hypothesis was formed by adding the independent variable of the shortest pairwise distance between a owner-occupied unit and the nearest renter-occupied unit to the basic reduced model. Model 3 could be represented mathematically in the following:

$$\ln Y_i = \beta_0 + \beta_1 \text{AGE}_i + \beta_2 \text{SQFTLA}_i + \beta_3 \text{GARAGE}_i + \beta_4 \text{PORCH}_i + \beta_5 \text{LOTSIZE}_i + \beta_6 \text{POOL}_i + \beta_7 \text{DISTANCE}_i$$

The dependent variable of the natural logarithm of market value of the housing units was regressed on the seven independent variables. The analysis of variance produced the F-statistic value of 421.08 which exceeded the critical value of 1.72 based on $\alpha = 0.1$ with numerator and denominator degrees of freedom of 7 and infinity, respectively. Therefore, the null hypothesis that the β s were all equal to zero was rejected. The model had an adjusted R-square of 87.4%. The critical value for the two-tailed test for the individual variables at $\alpha = 0.1$ and with infinity degree of freedom was 1.645. All the seven variables exceeded the critical value which meant that all the variables were statistically significant (table 5). The VIFs of the individual and sum of the all the independent variables were less than 10 which meant that multicollinearity was not a problem in the model.

Findings of Research Hypothesis 3

The regression coefficient of the DISTANCE variable shows that there is an increase of 0.56% of owner-occupied property value for every 100 feet distance away from the nearest renter-occupied unit. The square of the distance, DISTSQ, shows a negative regression coefficient indicating that the value of the owner-occupied property value increases at a decreasing rate over the pairwise-distance range from 55 to 670 feet (table 6). (The regression coefficient of the DISTANCE variable has a higher value of 2.2% for every 100 feet distance but this is inflated by the higher variance inflation factor.)

8.0 CONCLUSIONS, LIMITATIONS OF STUDY & DIRECTION FOR FUTURE RESEARCH

Conclusions of the Results and Findings

The results and findings provide significant empirical evidences to clarify, quantify, and support the strong public perception that a renter-occupied single-family unit suffers a loss in value with a change in tenure from owner- to renter-occupancy and that such a change affect the values of surrounding owner-occupied units.

The conclusion from the empirical testing shows that there is an overall 3.5% significant loss of value when housing units are rented out. There is also an increase of 0.56% of owner-occupied property value for every 100 feet distance away from the nearest renter-occupied unit. The conclusions are consistent with previous studies done by Grissom and Ko (1991) and Hughes and Sirmans (1993). Grissom and Ko conclude in their studies that for each percentage increase of rental properties in the neighborhoods, the average price of housing decreases by about \$331 from an average single-family unit of \$52,566. Hughes and Sirmans conclude that there is an unadjusted premium of 7.97% for owner-occupied properties relative to rented or vacant properties.

Limitations of the Study

This research was delimited to the study of single-family housing units within three neighborhoods – Southwood Valley, Raintree, and Carter’s Grove – of the university town of College Station, Texas. These are 3 of the oldest neighborhoods in the city with slightly over 1,000 housing units out of a total of about 6,900 single-family units. They have the highest percentage of renter-occupied units, averaging between 15 to 20 percent in each of the 3 neighborhoods. The housing units in each neighborhood are relatively similar in age, size and type. Since the unit of statistical analysis was the individual housing unit within each neighborhood, any extrapolation of the findings on the basis of neighborhood or town should be exercised cautiously for accuracy purposes. Although it has many similarities with other university towns, for example, it is a town with high student population and mobility, College Station in many other ways is still a unique town with a unique history. Some university towns grew at the same time when universities were built (like College Station) while others grew first and then the universities came later.

This study had several limitations. It was limited by the lack of information as to who the renters really are, though, it is highly probable that many of them are students (a recent survey of Texas A&M students showed that 15% of those surveyed live in single-family housing units).

Therefore, the empirical findings in this research should be observed and used contextually if they were to be applied to other university towns.

Directions for Future Research

The hedonic pricing models that were used in this study are proven to provide a high explanatory power and they could easily be replicated or modified to study other segments of the real estate market, for example, duplexes, fourplexes, or apartment complexes.

Finally, this study also could be replicated in other university towns or non-university towns in which the neighborhoods might be older than College Station. If these other university or non-university towns have sufficient data for single-family renter-occupied housing units that are rented over a longer period as compared to the 4 years horizon in this study, the effects of such properties over a longer timeframe could be made more comparable with the life cycle model of cluster of neighborhoods, where each phase of the cycle is surely longer than 4 years. With a longer horizon, the time-series effects study will also provide more information that could further the frontiers of knowledge in this area.

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