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Neighborhood Historic Preservation Status and Housing Values in Oklahoma County, Oklahoma

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Abstract. Using county tax assessor data, this paper estimates the property value impacts of historic designation of neighborhoods for Oklahoma County, Oklahoma. Methodological contributions of the study include allowing for spatial and temporal variation of hedonic prices and historic district property values along with the use of finely-delineated spatial fixed effects. Neighborhood historic designation is found to be associated with significant relative appreciation of housing values in most districts. Factors appearing to influence the rate of appreciation are the time span of neighborhood historic designation and the area crime rate. The variation in results across historic neighborhoods suggests that policy makers need to take into account the conditions under which historic designation most likely can succeed.

1. Introduction

An important consideration regarding historic designation of neighborhoods is the effect on property values. Historic designation of residential neighborhoods can either positively or negatively affect property values. It can increase property values by enhancing neighborhood prestige, providing protection from construction projects, increasing neighborhood social capital, and providing tax incentives for improvements in neighborhood properties, while designation potentially hurts property values because of regulatory restrictions on development (Listokin, Lahr and Grady, 2008, Ch. 6).

The issue is of importance both for local homeowners and for those involved in local planning and economic development policy making. Historic designation may be seen as a way to revitalize central city areas. Similarly, declining or stagnant rural areas may view historic designation as a way of increasing both tourism and the amenity attractiveness of the area for prospective residents. Given this interest, the property value impact of historical designation continues to be discussed, debated and examined empirically (e.g., Coffin, 1989; Gale, 1991; Schaeffer and Millerick, 1991; Clark and Herrin, 1997; Coulson and Leichenko, 2001; Leichenko, Coulson and Listokin, 2001; Coulson and Lahr, 2005). Yet, the empirical approaches used have been varied and refinements of the methodology continue to be pursued.

Therefore, this study uses a hedonic pricing approach to estimate the impacts of historic designation on residential property values in Oklahoma County, Oklahoma. Using county assessor tax data, changes in property values across all Oklahoma County neighborhoods are examined, including National Register Districts, state and locally designated historic districts, and control areas without any historical designation. Contributions of the study include allowing for spatial and temporal variation in hedonic prices and values of historic district designation, while also using Geographic Information System (GIS) identifiers to create finely-delineated spatial fixed effects.

The next section reviews the empirical literature on estimating the economic effects of historic designation of neighborhoods for guidance in empirical specification. Section 3 then formulates and discusses the empirical model used in the study. Results and discussion follow in Section 4. Generally it is found that historic district neighborhoods experience increased property values relative to non-historic district neighborhoods. However, the increases are not uniform across districts and appear related both to the length of time the neighborhood has had historic designation

and to the area crime rate. The final section of the paper contains summary discussion and conclusions to be drawn from the study.

2. Lessons from the empirical literature

The literature on historic designation's influence on property values consistently indicates a positive effect. Only a few studies that focus primarily on the costs of alteration and demolition come to a conclusion that there are negative impacts (Listokin, Lahr and Grady, 2008). However, the methods of analysis are varied across the studies.

Much of the literature regarding historic designation's effect upon property values has analyzed differences across neighborhoods that are judged as similar by the researcher. But as discussed by Heudorfer (1975), it is difficult to construct treatment and control neighborhoods for a scientific comparison. Almost any reason used to designate a neighborhood over another somewhat similar one also might help to explain relatively higher property prices in the designated neighborhood. By the very distinction of being historic, many districts have no comparable control group; there must have been a reason why the control neighborhoods were not designated, and if this is in some way related to differences in property values, the results are biased. Essentially, high property values could have been what induced designation in the first place, rather than the reverse.

The difference-in-differences approach used in many early studies relies solely on comparing sample averages of the growth rate in property values in historic areas versus non-historic areas. This controls for the influence of unobserved cross-sectional neighborhood characteristics. Yet, the statistical significance of any difference between designated and non-designated areas generally is not determined in this approach. Typically, there also are no controls for other variables (e.g., property characteristics) or very limited controls (Ford, 1989; Gale 1991). Thus, to the extent that other omitted correlated variables help explain the differences in the time paths of property values the results will be biased and inconsistent.

Subsequently, analysts have tried to overcome the above shortcomings (e.g., Shaeffer and Millerick, 1991; Clark and Herrin, 1997; Coulson and Leichenko, 2001; Leichenko, Coulson and Listokin, 2001; and Coulson and Lahr, 2005). For example, researchers have come to control for a multitude of housing and neighborhood characteristics. The added variables control for trends in property values which are causally independent of historic designation but potentially correlated. Features of certain properties (e.g., type of siding or architecture) may make them more likely to experience price appreciation or depreciation. It is desirable then to isolate the effects of such variables using multivariable analysis.

There also is the issue of timing. For one, growth rates have to be compared during the same period for both the historical and control neighborhoods. Yet, using the designation date of the historic district and comparing growth rates around the same date for non-historic districts may be confounded by the fact that the two districts are at different stages of development.

The above discussion suggests the use of a hedonic pricing approach which extensively controls for structural housing and neighborhood characteristics. It is best to examine rates of housing value appreciation over time because they control for unobservable fixed location effects on housing prices (e.g., Cyrenne, Fenton and Warbanski, 2006; Noonan, 2007). Such fixed effects could capture spatial influences of schools, parks, water recreation, and access to urban consumer amenities (Redfearn, 2009). Yet, because the value of housing and location characteristics can change over time (Redfearn, 2009) for reasons such as shifts in tastes or changes in spatial influences, separate regressions should be run for each period. Differences in estimated fixed effects across regressions should reflect general changes in location demands. The regressions also should be examined for whether a linear or nonlinear specification best explains the variation in housing values, in which numerous studies have found the semi-log to produce the best fitting regression (e.g., Asabere and Huffman, 1994).

3. Empirical approach

In this study, samples of housing values and characteristics from the Oklahoma County Assessor's Office for two years of observations are examined.[1] Oklahoma County is selected because sufficient quality and quantity of data are available to implement an approach consistent with lessons learned from the literature. First is a sample whereby the latest appraisal dates occurred in 2000, which is thus referred to as the

[1]Use of assessed values has advantages over other sources of housing prices. Self-reported values such as those found in Census data can be seriously biased since owners may perceive value differently from the market. Sales data may contain insufficient information on property characteristics and for a particular time period may not be a representative sample of all properties in the area. Admittedly, assessed values likewise can reflect subjective judgments. Nonetheless, if the bias is consistently in the same direction and of the same magnitude (such as if assessors always overestimate value by 10 percent), then the measurement error becomes less important. Examination of changes in housing values over time also should mitigate this concern.

Year 2000 Sample. Second is a sample in which the latest appraisal dates occurred in 2003, referred to as the Year 2003 Sample. Separately, for each sample, housing values are regressed on a host of structural housing characteristics, variables representing geographic location, and variables denoting whether the house is located in a particular historic district.

The empirical equation for property i in time t can be written as:

$$Y_{it} = \alpha_t + \boldsymbol{\beta}_t \mathbf{X}_{it} + \boldsymbol{\gamma}_t \mathbf{H} + \boldsymbol{\delta}_t \mathbf{D} + \varepsilon_{it}, \quad (1)$$

where Y denotes the assessed property value, **X** is vector containing housing characteristic variables, **H** is a vector of j dummy variables indicating whether the property is located in a particular historic district (location in the district=1), **D** is a vector of *n-1* dummy variables reflecting broader neighborhood location to control for spatial fixed effects across n areas in the county, ε is a stochastic term, while α is the constant term and **β**, **γ**, and **δ** are coefficient vectors.

Housing characteristic variables include square footage of the house and its square, age of the house and its square, rooms per square foot, the share of rooms which are bedrooms, the number of bathrooms, the most recent year the house was remodeled, the square footage of the garage, whether the house contained a carport, the square footage of the porch, the number of stories, whether the foundation was a slab (slab=1, other=0), whether the roof type was gable (gable=1, other=0) or flat (flat=1, other=0), whether the roof type was composition shingle (composition shingle=1, other=0) or wood shake (wood shake=1, other=0), and whether the exterior of the house was frame masonry veneer (frame masonry veneer=1, other=0). A series of dummy variables indicating the general condition or quality of the structure also are included in each regression.

A positive estimated coefficient on a historic district dummy variable (γ_j) would suggest that after accounting for differences in housing characteristics and general location, a house located in a historic district has higher assessed value. Properties in Oklahoma are designated as historic by either the National Register, the State Register, or locally. Because of differences in qualifications and restrictions in the programs, the effects of each type of historic designation can differ.[2] In addition, the property value effects may vary depending on length of designation or there may be unaccounted-for interactive effects of historic designation with broader neighborhood characteristics such as the crime rate. Thus, **γ** is allowed to vary by historic neighborhood and time period, in which the estimated variation in changes in values for **γ** are examined for identifiable patterns in *ex-post* analysis.

Oklahoma County historic districts examined include: the Capitol-Lincoln Terrace Historic District (*Capitol*); Crown Heights Historic District (*Crown*); Edgemere Park Historic District (*Edgemere*); Gatewood East Historic District (*Gatewood East*); Gatewood West Historic District (*Gatewood West*); Heritage Hills Historic and Architectural District (*Heritage Hills*); Jefferson Park Historic District (*Jefferson*); Mesta Park Historic District (*Mesta*); Paseo Neighborhood Historic District (*Paseo*); Putnam Heights Historic Preservation District (*Putnam Heights*); and the Shepherd Historic District (*Shepherd*) (see Appendix 1 for details).

In terms of local designation, Oklahoma City's first historic district, Heritage Hills, was designated in 1969. Other current districts and year of local designation include: Crown Heights (1977), Edgemere Park (1977), Jefferson Park (1998), Mesta Park (1994), Paseo (1991), Putnam Heights (1972), and Shepherd (1998). These historic districts are supervised by the Oklahoma City Preservation Commission which ensures that "changes to properties within historic districts are consistent with the spirit and character of the historic district" (see Listokin, Lahr and Grady, 2008, p. 211, for the source). While the commission reviews many proposed changes to properties within the historic districts, excluded are interior alterations or remodeling, routine maintenance, and exterior changes not involving a change in appearance (Listokin, Lahr and Grady, 2008).

The geographic location variables account for location advantages or disadvantages in general areas of the county. Nevertheless, there may be more narrow unobserved location effects that are correlated with historic district status, which would bias the estimated historic district effects. Examining changes in the historic district effects helps mitigate this concern. It is less likely that changes in unobserved location effects are correlated with changes in valuation of historic district location. For example, only if historic districts were mostly located near a desirable location (for other reasons), which was newly created, or for which there was increased demand, would increased values

[2]As discussed in Listokin, Lahr and Grady (2008), listing on the National Register of Historic Places does not place any restrictions on a property, though there is protection from federally funded projects and property owners also can apply for certain benefits. The Oklahoma State Register follows the National Register, using similar criteria. All properties on the National Register also are placed on the Oklahoma State Register, though some properties can be listed solely on the state register. Communities in Oklahoma also can enact historic preservation ordinances and establish local preservation programs. A local historic preservation commission may provide interpretation for the ordinance and oversight.

of historic districts be wrongly attributable to historic district status.

Using county assessor parcel identification numbers and the Oklahoma County Assessor's interactive GIS mapping system, a series of dummy variables (**D**) were created regarding the general location of the house in the county. Houses located in close proximity have similar parcel identification numbers, and ranges in these numbers are used to create neighborhood dummy variables. To avoid perfect collinearity, one dummy variable is omitted. Thus, each coefficient on a neighborhood variable is interpreted as the difference in value, ceteris paribus, of a house with a parcel identification number within the variable's specified range, which corresponds to location within a broad area, relative to the value for the omitted category. A greater number of neighborhood variables for parcel identification numbers near historic districts are created to account for housing value differences across smaller geographic areas, better controlling for possible unobserved location effects in estimating the value of property location in historic districts (see Appendix 2 for details).

4. Results and discussion

The regression results for both sample years are shown in Table 1. For each year the table displays the variable coefficients and corresponding Huber-White heteroscedasticity-consistent t-statistics. Each coefficient is interpreted as the dollar value effect on housing values for a one-unit change in the corresponding variable, all else being equal. The results of joint F-tests for the spatial fixed effects and overall condition of the house dummy variables appear near the bottom of the table. Only observations for residential properties of at least 750 square feet and those having one or more rooms are included, though the results are not very sensitive to the exclusion of the smaller properties. This produces samples of 179,526 houses in 2000 and 188,907 houses in 2003. As indicated by the R-squared values, the variables collectively explain 88 and 85 percent of the variation in housing values, respectively, suggesting high explanatory power. Because of the large number of observations the Adjusted R-squared values are nearly identical (not shown). As discussed below, linear specifications with quadratic terms for size and age produce the best regression fits.

4.1 Base model results

The sizes, and sometimes the signs, of the housing characteristic coefficients differ across the two samples. This indicates the importance of separate regressions for each year.[3] The value of a house can change over time simply because of shifts in demand for certain characteristics emanating from changing tastes or income.

As expected, the larger the house the greater the value. The positive coefficients on the square of *Square Feet* for both samples indicate that the value of each additional square foot of the house increases with size. The average sized house in the sample is approximately sixteen hundred square feet, while that for all historic districts is about two thousand square feet.

The older the house the lower is the value, all else equal. The marginal negative effect of age slightly diminishes in absolute value with each additional year, though, as evidenced by the positive sign on the age-squared variable in each regression. As expected, historic district houses are older, with a mean age of about seventy two years. The mean age for the entire sample is approximately thirty-seven years.

House values increase with the number of rooms per square foot in both years. For 2000, though, if the additional room is a bedroom, its value is significantly lower. For 2003, rooms per square foot have significantly greater value, and it no longer matters whether it is a bedroom. The number of bathrooms in each sample year increases housing values, with their value increased dramatically in the Year 2003 sample.

The more recently the house has been remodeled the greater the value. The existence and square footage of a garage increases housing values, as does the existence and square footage of a porch. Having a carport significantly increases house values only in the Year 2003 sample. All else being equal, single-story houses are worth more than multiple-story houses, which would depress prices in historical districts, as historic district houses are much more likely to be multi-storied. The type of foundation, roof and exterior also generally significantly affect housing values, more so in the Year 2003 sample. Thus, there is substantial evidence of changing values of individual housing characteristics.

Dummy variables for neighborhood location of the house are statistically significant as a group in each regression, revealing that after controlling for most of their individual characteristics, houses have differential values across neighborhoods. This could be related to a host of location specific factors such as local school quality, the neighborhood crime rate, the

[3]Because the "overall condition of the property" variables differ across samples, Chow tests for differences in all coefficients across samples cannot be used. This, along with the fact the two samples include different properties, precludes the use of a first-difference specification, which also restricts all coefficients to be the same across years.

availability of nearby public parks, access to primary roads, proximity to attractive urban amenities such as Bricktown in downtown Oklahoma City, proximity to disamenities such as pollution, or access to water recreation opportunities. In addition, although not shown, the results reveal changes in the relative attractiveness of many neighborhoods. For example, houses in one neighborhood, which comprised about 5,500 properties in the Year 2000 sample and encompassed an area including many of the historic districts, went from having a lower house value by $3,655 in 2000 after controlling for housing characteristics to a higher value by $45,780 in 2003, an increase of $49,435. Values in other broad neighborhoods were much more stable.

Table 1. Base Model regression results.

	Year 2000		Year 2003	
Variable	Coefficient	t-Statistic	Coefficient	t-Statistic
Constant	32,744.69	4.972	-744.0	-0.066
Square Feet	19.903	4.866	32.911	4.582
(Square Feet)^2	0.004	5.393	0.007	6.423
Age	-455.160	-41.319	-614.98	-16.648
(Age)^2	0.415	7.327	2.002	4.641
Rooms/Square Feet	1,093,897	2.406	5,350,646	5.39
Bedrooms/Rooms	-3,887.943	-2.947	-1,082.821	-0.388
Bathrooms	896.266	1.683	10,706.93	10.576
Year Remodeled	1.056	11.900	0.343	2.256
Garage Square Feet	12.673	27.806	16.726	27.861
Carport Dummy Variable (Yes=1)	939.558	1.047	9,104.345	7.346
Porch Square Feet	8.835	10.099	11.136	7.490
Number of Stories	-7,284.721	-15.187	-3,603.818	-5.259
Foundation is a Slab	-413.565	-1.772	-5,099.968	-15.189
Roof Type: Gable	4,664.230	24.293	-2,862.608	-15.282
Roof Type: Flat	-1,520.997	-12.607	-16,895.01	-8.113
Roof Cover: Composition Shingle	-2,118.425	-1.369	-7,863.394	-7.362
Roof Cover: Wood Shake	1,055.740	1.524	-2,663.464	-1.931
Exterior: Frame Masonry Veneer	199.077	0.224	-6,341.225	-9.878
Crown Heights	8,855.167	4.957	61,823.22	47.073
Edgemere Park	6,854.990	3.201	41,013.14	27.463
Jefferson Park	6,562.413	8.427	-2,802.856	-2.708
Shepherd	-837.900	-1.205	8,740.323	12.206
Paseo	-2,434.624	-1.444	1,289.545	0.712
Heritage Hills	-11,390.75	-1.917	33,808.32	3.031
Putnam Heights	-6,365.538	-1.747	-17,303.18	-4.523
Mesta Park	-1,409.864	-1.365	2,171.240	1.362
Gatewood East	1,752.864	1.290	6,523.245	5.043
Gatewood West	-2,490.629	-3.251	9,928.553	9.769
Capitol-Lincoln	-2,446.370	-2.370	15,207.58	10.762
Condition/Quality Variables (Joint F-statistic and p-value)	632.152	0.000	90.904	0.000
Neighborhood Fixed Effects (Joint F-statistic and p-value)	491.949	0.000	376.059	0.000
R-squared	0.877		0.852	
Number of Observations	179,526		188,907	

In the Year 2000 sample, only four of the eleven historic districts have higher housing values (Crown Heights, Edgemere Park, Jefferson Park and Gatewood East), though the eleven variables are jointly significant (F=14.77, p-value=0.00). However, in the Year 2003 sample all but two (Jefferson Park and Putnam Heights) have higher housing values and the eleven variables are jointly significant (F=111.22, p-value=0.00). Dramatic increases occurred in Crown Heights, Heritage Hills and Edgemere Park.

For comparison purposes, the first column of Table 2 displays the raw average change in housing values, i.e., the change which occurred not controlling for housing and location characteristics. The average change ranged from a low of approximately thirteen thousand dollars to a high of over ninety thousand dollars. For reference, the average property value in the samples increased from $66,201 to $84,027, an increase of $17,826. This is exceeded by the increases in historic neighborhoods in all but three cases. For houses between 2,000 and 3,000 square feet, in which the mean square footage is 2,385 and the mean age is 25 years, the average value increased from $106,501 to $125,984 (not shown), producing an increase comparable to the entire sample.

Table 2. Historic district house value appreciation ($).

	Raw	Sub-Model 1	Sub-Model 2	Sub-Model 3	Full Model
CROWN HEIGHTS	88,094	72,259	71,755	59,178	52,968
EDGEMERE PARK	64,229	44,398	43,894	34,346	34,158
JEFFERSON PARK	13,722	-2,353	-2,582	-8,261	-9,365
SHEPHERD	31,893	15,337	14,833	9,872	9,578
PASEO	12,926	-3,263	-3,968	4,598	3,724
HERITAGE HILLS	94,279	73,260	81,672	42,891	45,199
PUTNAM HEIGHTS	36,651	21,694	21,190	3,660	-10,938
MESTA PARK	31,773	16,300	24,712	13,762	3,581
GATEWOOD EAST	13,136	4,616	7,652	5,556	4,770
GATEWOOD WEST	31,855	11,101	19,500	14,292	12,419
CAPITOL-LINCOLN	21,304	4,955	13,367	6,539	17,654

Because they represent increases relative to the average change in their broader area, in which they also reflect controlling for housing characteristics, the increases in the final column for historic districts are smaller than those in the first column. Specifically, each house in a historic district takes a value of 1 for the broad area of location and a value of 1 for location within the historic district. A positive value for the historic district coefficient indicates a higher value for the house relative to those in the surrounding area, controlling for housing-specific characteristics. In fact, because of the large estimated increase for the Crown Heights Historic District three additional dummy variables are included in the regression to control for specific neighborhoods surrounding Crown Heights. Thus, the coefficient for the Crown Heights variable is interpreted as the effect relative to houses in the broader areas, and relative to the neighborhoods immediately surrounding it. This greatly reduces the likelihood that the estimated increased value in the Crown Heights District is attributable to general increased attractiveness because of other considerations (e.g., increased performance of its school district or increased demand for it). Moreover, many of the historic districts are located in close proximity to one another when compared to other areas in Oklahoma County.

4.2 Sensitivity analysis

To assess the sensitivity of the results shown in the final column to potential econometric issues such as multicollinearity, three other regressions are performed, with the results for the changes in house values in historic districts shown in columns 2-4 of Table 2. The column 2 results are produced from regressions which solely include the historic district dummy variables. Thus, they do not control for other housing characteristics or for the effects of location in the broader areas. The calculations reflect the change in the historic district relative to the omitted neighborhood.

The results in column 3 reflect the addition of the broad neighborhood fixed effects to the regression only containing historic district dummy variables. The historic district and neighborhood variables collectively explain about 20 percent of the variation in housing values (not shown). The similarity of the results in columns 2 and 3 suggest there are few changes in historic district housing values which are simply attributable to changes occurring in their broader areas.

Column 4 results are produced from adding square footage and age (and their squares) to the column 3 regression. The addition of these variables increases the R-squared to about 78 percent (not shown). It is here where we observe most of the large reductions in the estimated increases in house values in the historic districts.

The final column, discussed above, then reflects the addition of other housing characteristics and three additional area dummy variables (results shown Table 1). The addition of these variables only increases the R-squared to 85 percent for the Year 2003 sample and 88 percent for the Year 2000 sample. Except for the Capitol-Lincoln, Mesta Park, and Putnam Heights districts, the results in the final column do not diverge dramatically from those in the fourth column, suggesting the results are fairly robust to the inclusion or exclusion of housing characteristic variables beyond square footage and age. The estimated decline in Putnam Heights appears to have occurred because of changes in the estimated values of housing characteristic coefficients. In fact, in a separate regression (not shown), restricting the 2003 housing characteristic coefficients to equal their 2000 values produces a positive estimate for the change in housing values in Putnam Heights.

The regressions also are examined regarding functional form (not shown). For example, although nonlinearity is incorporated with quadratic terms for size and age in the above-discussed regressions, all other variables are assumed linearly related to housing values. Thus, two alternative functional forms are considered. First, rather than adding quadratic terms for size and age, these variables are included in natural logs. The corresponding coefficients reflect the marginal effects on housing values of a one percentage increase in the square footage of the house and the age of the house. Yet, the R-squared declines to 0.72 for the Year 2003 sample and 0.83 for the Year 2000 sample, indicating that the quadratic specification better fit the data. Second, a double-log form is specified, in which non-dummy variables all are included in the regressions as natural logs. In this specification, for example, the coefficient size is interpreted as the percentage change in housing values for a one percentage change in size; i.e., the coefficient represents an elasticity of response. The coefficients for the dummy variables are the percent difference in housing values for variable values of unity. Again, in terms of explanatory power regarding the (anti-logged) housing values, the R-squared declines to 0.81 for the Year 2003 sample and 0.85 for the Year 2000 sample. This further supports the use of the linear specification with quadratic terms for age and square footage.

4.3 Understanding the historic district results

Including separate variables for the historic districts allows for examination of patterns among the coefficients and greater understanding of the reasons for housing value appreciation in historically designated neighborhoods. The districts with the largest percentage increases in housing values are Crown Heights (69%), Edgemere Park (53%) and Heritage Hills and Capitol-Lincoln (28%). Crown Heights, Edgemere Park and Heritage Hills are districts with much longer tenure of designation, of which Heritage Hills is the oldest, having been established in 1969. They also have local designation and are supervised by the Oklahoma City Preservation Commission, which provides greater protection from development than districts not having local designation (Listokin, Lahr and Grady, 2008); only the Gatewood East, Gatewood West and Capitol-Lincoln Terrace districts are not covered by the Oklahoma City Historic Preservation ordinance. In addition, crime is generally lower in the districts with the greatest housing value appreciation, in which an index of overall safety (ranging from 0 to 100) for their general area is positively correlated with the estimates of housing value appreciation shown in the final column (r=0.34). The safest districts are Heritage Hills and Mesta Park with an index value of 56, while the least safe districts are Jefferson Park and Paseo, with index values of 0 and 1, respectively.[4] An anomaly is Putnam Heights, which is tied for third as most safe but has the largest decline in housing values, which combined with the results above suggests its estimated change in the final column of Table 2 may indeed be a statistical artifact.

5. Summary and conclusions

This paper examined changes of individual residential property values in designated historic neighborhoods in Oklahoma County, Oklahoma. These were compared to the same for properties in non-designated areas of Oklahoma County. The comparison involved the use of hedonic price analysis, which controlled for the influence of structural characteristics such as square footage, age and condition of the properties, etc., on housing values. The analysis also controlled for non-historic designation location effects on property values. Separate regressions were run to allow for changing values of housing characteristics and location effects which reduce the bias in the estimated historic district effects. Location fixed effects also

[4]An interactive online mapping software was used to match historic neighborhoods with crime rates in their area: url last accessed on August 17, 2009 at www.neighborhoodscout.com/ok/oklahoma-city/crime/.

were included to control for unmeasured broad location influences on property values. Finally, use of a separate variable for each historic district rather than a single variable for all historic districts aided in understanding what type of designation and under what conditions does historic designation increase property values.

In the early sample (Year 2000 Sample), only the Crown Heights, Jefferson Park and Edgemere Park districts have significantly higher property values than other neighborhoods in Oklahoma County, controlling for differences in housing characteristics and general location of the neighborhood. However, in the later sample (Year 2003 Sample) all but the Putnam Heights and Jefferson Park neighborhoods have higher values, with seven of the positive differences statistically significant. The average percentage increase (including decreases) is 22 percent, with the largest increases occurring in the Crown Heights (69%), Edgemere Park (53%) and Heritage Hills and Capitol-Lincoln (28%), districts. The large estimated increase for Crown Heights resulted in addition to the general increase found for the immediately surrounding neighborhoods, so it is not simply an unrelated general location factor underlying the increase.

Overall, strong evidence has been provided that historic districts experienced greater appreciation of property values than other neighborhoods in Oklahoma County. This occurs even after controlling for housing characteristics and other location effects. In terms of policy implications the variation in results across historic districts also suggests there may be interactive effects with other location characteristics. The historic districts for which the largest increases occurred were generally the most established and safer. Thus, care should be taken to consider other factors which may cause historic district designation either to succeed or fail. Future research should be conducted to explore these and other potential influences in more detail.

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Appendix 1. Historic district variables

A list and description of national historic places for Oklahoma County can be found on the National Register of Historic Places (www.nationalregisterofhistoricplaces.com/ok/ Oklahoma/districts.html). The Register also provides the boundaries for the Historic Districts. A list and maps for all Oklahoma City districts can be found on the Oklahoma City website (www.okc.gov/Planning/hp/index.html). An interactive Geographic Information System mapping system on the website for the Oklahoma County Assessor's Office was used to match the parcel numbers of the properties given in the data set with its historic district (www.oklahomacounty.org/assessor/). The historic districts examined follow below.

Capitol-Lincoln Terrace Historic District
Irregular pattern roughly bounded by NW 13th, NW 23rd, Lincoln Blvd., and Kelley Ave., Oklahoma City

Crown Heights Historic District
Roughly bounded by NW 36th, N Western Ave., NW 43rd and N Walker Ave, Oklahoma City

Edgemere Park Historic District
Roughly bounded by Robinson Ave., Walker Ave. and NW 30 and NW 36, Oklahoma City

Gatewood East Historic District
NW 16th to N of NW 22nd, N Classen Blvd to N Blackwelder Ave. and N Florida Ave., Oklahoma City

Gatewood West Historic District
NW 16th to NW 23rd, N Blackwelder Ave. and N Florida Ave. to Pennsylvania Ave.

Heritage Hills Historic and Architectural District
Roughly bounded by Robinson and Walker Aves, NW 14th, NW 15th, and NW 21st Sts. and Classen Blvd., Oklahoma City

Jefferson Park Historic District
Roughly bounded by NW 23rd, N Walker Ave., NW 30th and I-235, Oklahoma City

Mesta Park Historic District
Roughly bounded by NW 22nd, NW 16th, N Walker, N Robinson, Oklahoma City

Paseo Neighborhood Historic District
Roughly by NW 30th, North Western Ave., NW 24th and N Walker Ave., Oklahoma City

Putnam Heights Historic Preservation District
Georgia and McKinley Blvds., NW 35th, NW 37th, and NW 38 Sts., Oklahoma City

Shepherd Historic District
Roughly bounded by NW 30th and NW 25th, N Pennsylvania Ave. and N Youngs Blvd., Oklahoma City

Appendix 2: Broad neighborhood variables

Using county assessor parcel identification numbers and the Oklahoma County Assessor's interactive GIS mapping system, a series of dummy variables were created regarding the general location of the house in the county. Houses located in close proximity have similar parcel identification numbers. Thus, the following variables were created.

Neighborhood_100: takes a value of 1 if the house has parcel id between 1000000000000 and 1499999999999
Neighborhood_150: takes a value of 1 if the house has parcel id between 1500000000000 and 1999999999999
Neighborhood_200: takes a value of 1 if the house has parcel id between 2000000000000 and 2099999999999
Neighborhood_210: takes a value of 1 if the house has parcel id between 2100000000000 and 2199999999999
Neighborhood_220: takes a value of 1 if the house has parcel id between 2200000000000 and 2299999999999
Neighborhood_230: takes a value of 1 if the house has parcel id between 2300000000000 and 2399999999999
Neighborhood_240: takes a value of 1 if the house has parcel id between 2400000000000 and 2499999999999
Neighborhood_250: takes a value of 1 if the house has parcel id between 25000000000000 and 2599999999999
Neighborhood_260: takes a value of 1 if the house has parcel id between 26000000000000 and 2699999999999
Neighborhood_270: takes a value of 1 if the house has parcel id between 27000000000000 and 2799999999999
Neighborhood_280: takes a value of 1 if the house has parcel id between 2800000000000 and 2899999999999
Neighborhood_290: takes a value of 1 if the house has parcel id between 2900000000000 and 2999999999999
Neighborhood_300: takes a value of 1 if the house has parcel id between 3000000000000 and 3499999999999
Neighborhood_350: takes a value of 1 if the house has parcel id between 3500000000000 and 3999999999999
Neighborhood_400: takes a value of 1 if the house has parcel id between 4000000000000 and 4499999999999

The greater number of neighborhood variables for parcel identification numbers beginning with 2 is because the parcel identification numbers of the historic districts generally begin with 2. The greater number of variables then accounts for housing value differences across smaller geographic areas, better controlling for possible unobserved location effects in estimating the value of property location in historic districts.