Gracing the Land of Elvis and Beale Street:
Historic Designation and Property Values in Memphis

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ABSTRACT: We analyze appreciation rates across comparable designated and undesignated neighborhoods in Memphis, Tennessee. Using appreciation rates potentially nullifies the objection to using assessed values in such an analysis, while also mitigating some of the bias inherent in the differences between otherwise similar designated and undesignated neighborhoods. Nonetheless, in accord with previous studies, after controlling for numerous housing characteristics, we find that properties in neighborhoods designated historical by the Memphis Landmarks Commission had appreciation rates above those in other similar neighborhoods. We also find that new properties benefit as much, perhaps even more, than older properties from being within a historic district.

JEL codes: R31, R21,R52

1. *Introduction*

The designation and preservation of historical sites is an increasingly widespread tool in urban design and planning. In part, its application is intensifying because there are few vocal opponents to preserving our cultural heritage. It is implicitly an urban-oriented policy since nearly all of our nation's historic building stock is located in its cities, and moreover, older neighborhoods often are the parts of cities in greatest need of external stimuli. Thus, public incentives encouraging private investment in historic properties have attributes that give them the appearance of being a partial remedy for a myriad of urban problems. To date, in addition to a national tax credit of 20 percent of the rehabilitation costs of a property, 15 states offer state income tax credits and 25 states permit some form of property tax abatement that benefits older, if not strictly historic stock (Beaumont and Pianca, 2001). In order to qualify for many of these incentives, properties often must be officially designated as being "historic", be eligible for such designation, or be a "contributing" building in an officially designated historic district. Thus, historic designation can be bestowed either on individual sites or on entire neighborhoods.

In addition to the explicit tax benefits, designation often can add a certain cachet to a property. But designation is more than just an information transmission device or a means of catching a tax break. It typically also restricts use of the property, the types of refurbishment and rehabilitation that can be undertaken, and it burdens property owners with responsibilities for upkeep and maintenance that go beyond those found in usual zoning and building code regulations. Indeed, in the case of neighborhood designation, regulations that often accompany historic preservation appear to provide a mechanism ensuring neighborhood upkeep (Coulson

and Leichenko, 2004; Leichenko, Coulson and Listokin, 2002). Inefficient levels of maintenance are a result of a prisoner's dilemma-like interaction in which property owners have an incentive to invest only in low levels of maintenance regardless of their neighbors' maintenance behavior. The natural upshot is that all neighbors can wind up employing this strategy, resulting in an overall downward spiral in the quality of housing stock in the neighborhood. In such a situation, everybody is made worse off than if they all had agreed to provide high levels of maintenance. The restrictions embodied in the designation of a historical neighborhood may have the potential to induce owners to internalize this neighborhood externality that comes about when maintenance drops below efficient levels. Thus, at least from a theoretical perspective, compliance with preservation restrictions could overcome the momentum of low-levels of neighborhood-wide investment in properties.

But the restrictions that come with designation are a double-edged sword. Stringent building codes also can discourage the restoration of older properties (Saltzman, 1995). In particular, by their very nature they restrict the way in which property may be altered or refurbished, may require large maintenance expenditures to preserve or restore the historical character of the building or neighborhood, or significantly delay revenue generation on the property. Perhaps the most common theoretical argument is that designation can prohibit a property from attaining its highest value and best use. For example, it could detract from a property's value by prohibiting its conversion to another land use, i.e., of a current single-family property to a multistory office building. Thus, the ultimate effect of designation on property values is theoretically ambiguous.

The empirical literature on the topic reveals mixed results, though it is fair to say that studies of historic designation have discovered that it leads to increases in or at least higher property values. Some of the earliest studies of the price effects of designation involve simple comparisons of neighborhood averages. Examples include Scribner's (1976) study of Alexandria, Virginia, and Rackham's (1977) of the Georgetown area of Washington, D.C. Both found that their focal historic districts had higher property values than those of comparison neighborhoods. Heudorder (1975), on the other hand, found that historic areas in New York City had lower prices than putatively comparable undesignated neighborhoods. In the largest "comparison" study we know of, Shipley (2002) undertook a comprehensive examination of designated property in Canada and, by comparing average appreciation rates of designated property and nonhistorical property on a city-by-city basis, found that in most cities designated properties had greater appreciation rates than other properties.

Obviously, by comparing average property values without controlling for other differences between designated and undesignated lots, structures, or neighborhoods, the aforementioned analyses are neglecting other possible explanations for the observed differences in historical and undesignated property values. Regression models using individual properties as the unit of observation can overcome this problem. As it happens, regression-based studies also have generally confirmed a positive effect of designation on property values (Ford, 1989; Clark and Herrin, 1997; Leichenko, Coulson, and Listokin, 2001; Asabere and Huffman, 1994a). Alternatively, however, others (Asabere and Huffman, 1994 and Asabere, Huffman, and Mehdian, 1994) find that the special restrictions on designated multi-unit properties had adverse effects upon their values in Philadelphia.

Since, from a theoretical perspective, the extent of preservation that arises from historical designation depends primarily on the tradeoff between the internal and external impacts of the regulations related specifically to designation, one might expect that associated price impacts might depend on the stringency of those regulations (in the case of local regulations– obviously national designation has the same basic influence everywhere, although there are cases where a property has both). Schaefer and Millerick (1991), in a study of Chicago, find that national designation has a positive impact, but local designation a negative impact, which they attribute to its greater regulatory stringency. Coulson and Leichenko (2001) also found national designation of individual properties to be more value-enhancing in their study of Abilene, Texas

Finally, whatever the effect of designation and preservation regulations on the historic property, undesignated property that shares a borders with historic ones should unambiguously experience positive impacts, because they bear none of the cost of the regulation and experience a presumably positive externality—that of basking in the glow of an enhanced and maintained property. While Clark and Herrin (2001) did not find any such increases, Coulson and Leichenko (2002) found strong positive price effects from having a number of historical properties in the same census tract in their study of Abilene, Texas.[1]

Much of the literature focusing on historic designation's effect upon property values has done so by analyzing differences across neighborhoods that are subjectively deemed to be

[1] On the other hand Coulson and Leichenko (2004) found *no* impact on other neighborhood (that is to say, census tract) characteristics, such as income, ethnic composition, homeownership, etc. from the presence of designated neighborhoods in Fort Worth, Texas).

similar. Unfortunately, it undoubtedly is quite difficult to select undesignated neighborhoods that have properties that are sufficiently close in age, style, and size to those in the designated neighborhoods to facilitate an unbiased statistical comparison. After all, some underlying set of characteristics of the designated neighborhoods has suggested to policymakers that the subject neighborhoods should be allotted an official historic status while the selected comparison neighborhoods were not. For example, it may be that the officially designated historic neighborhoods were selected because they embraced architecturally unique structures, a better maintained stock, or simply from a planning perspective that neighborhood could serve as a sort of buffer zone for a neighboring commercial district if it was improved. Almost any rationale used to select for designation a neighborhood over another somewhat similar one also can help to explain relatively higher property prices in the designated neighborhood. Hence, identifying higher property values or appraisals in historically designated versus undesignated neighborhoods, even using regression techniques, is at best weak proof that designation yields higher property values.

Somewhat stronger proof of designation's effect on property values can result if one can demonstrate that historic property values proportionally appreciate at a significantly different rate from that of undesignated ones during the same period and in the same city. That is, while similar arguments can be made with regard to price changes as for those in the preceding paragraph on price levels, the arguments are mitigated somewhat because the effect of unobserved time-invariant characteristics, including those associated with the selection process described above, can be eliminated.

In this paper we undertake a study of a number of the issues regarding the price effects of designation, using Memphis, Tennessee, as our laboratory. The study data set has a number of features that recommend it for this kind of study. The data (about which more later) characterize the traits of properties in a dozen well-defined neighborhoods (as opposed to census tracts). While all of these neighborhoods are "old" only about half of them are designated. Of these, all have national designation, but some carry in addition a local designation bestowed by the Memphis Landmarks Commission. Some of the designated neighborhoods have relatively large shares of new buildings in them. The richness and size of the data base allow for the explanation of several interesting research questions. We eventually concentrate in this paper on the pricing patterns for properties of different ages. Essentially we set out to answer the following question: what is the differential effect of age between properties in neighborhoods that are historically designated and those that are not officially designated as historic? Not all buildings in designated areas are old, but in this case they are subject to similarly stringent regulations. Do such properties "bask in the glow" of the historical cachet even though they are not themselves historical? We address these questions through a standard hedonic model that allows for a quite flexible response by the dependent variable to the "age" characteristic.

2. Description of the data

Our sample consists of appraisal data from several thousand properties in 11 different neighborhoods in the city in Memphis. Six of these neighborhoods are historic, by which we mean they are included in the National Register of Historic Places. Of these six, three, Shadowlawn, Hein Park and East Buntyn have no further designation from the local historic

preservation agency, the Memphis Landmarks Commission. Annesdale-Snowden is designated by the Commission as a Historic Preservation District, while Central Gardens and Evergreen are named Historical Conservation Zones. A Preservation District is distinguished from a Conservation Zone by the greater number and severity of restrictions with which renovation of its properties must comply. The non-historic neighborhoods, the benchmark against which we measure the impact of historical preservation (in its various forms), were chosen by the Memphis Landmarks Commission to match each of the historic neighborhoods in their broad neighborhood characteristics (except for Evergreen, which was deemed too unique to find a good match). For example, Central Gardens is a high-income neighborhood, with house prices to match: so Chickasaw Gardens, another high-priced area, of similar (though slightly younger) age and demographic characteristics, was also selected for the data base.

To be sure, none of these neighborhoods is entirely comprised of aged buildings. Evergreen, for example, has a large number of recently built properties because it was originally in the pathway of a proposed interstate highway. Demolition of many older structures occurred there as a result. In the end, the highway was never built, and the newly vacant properties, over the course of time, were developed.

The Memphis Landmarks Commission provided us data from their appraisal information system that included value and housing characteristics for properties located in each of the historical and non-historical neighborhoods. From the dataset that was extracted for our use, we assembled 5,889 usable observations.[2] We use a large number of characteristics in

[2] Some observations had no assessed values (probably public buildings) or were missing data items required in our study. Other properties were not improved until after 1998, making measurement of change during the period of

our regression models including a number of interaction terms; to save space, we present in Table 1 the means of housing characteristics customarily thought to be important in the valuation process, stratified by historical status. The first item to note is that the comparison neighborhoods are indeed appropriate comparisons; while not quite as old as the designated neighborhoods, they are old by any usual standard in US metropolitan areas. And they are similar in quality, as measured by the Table 1– the undesignated properties are somewhat smaller in terms of living area, but have larger lots, and have a similar number of bathrooms. Despite the similarity in these (and most other) characteristics the historically designated neighborhoods have an appreciation rate that is more than twice that of the undesignated neighborhoods. In order to know more, we turn to regression analysis.

3. The models

We develop a series of models to highlight the role of historical designation in the determination of appreciation rates. We assume the pricing process takes the following form:

$$\log P_{it} = \alpha_0 + \alpha_1 t + \alpha_{2t} X_i + \theta_i + \varepsilon_{it} \qquad (1)$$

where P_{it} is the appraised value of the ith unit in year t. In this study there are two years of data, 1998 and 2002. The α_j's are parameters to be estimated, of which α_{2t} is a vector of coefficients for the attribute vector X. This includes the usual hedonic attributes, as well as the key variables in our study, measures of age and historical status. We allow α_{2t} to be time-varying. Note also the existence of a time trend and the usual intercept term.

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study (1998-2002) impossible to assess. And yet others (four properties in total) had implausibly high rates of appreciation that were difficult to include in our analysis without a rigorous investigation that had to take place onsite back in the City of Memphis itself.

We view the error term as consisting of two components. The first, θ_i, measures the impact of unmeasured attributes on the price of the *i*th unit. Note that this is time-invariant. The second component is a time-varying error term which is uncorrelated with everything else on the right hand side of (1). Taking differences we have

$$\log(P_{it} / P_{it-1}) = \alpha_1 + (\alpha_{2t} - \alpha_{2t-1})X_i + \varepsilon_{it} - \varepsilon_{it-1} \qquad (2)$$

The regression is now a simple cross-section of first differences of log housing prices (i.e. appreciation rates) on a vector of characteristics and an intercept term. The time-invariant portion of the error term is eliminated, in turn eliminating a potential source of correlation between the error term and the regressors, demonstrating a rationale for using appreciation rates as the dependent variable. Note that since the regression is a single cross section, the time-dependence properties of the first difference in the remaining error term need not be specified. The coefficients of the housing attributes in the appreciation rate specification are, as can be seen, changes in the coefficients over time. We are, in essence, asking which attributes are associated with high appreciation rates, and in particular asking if historical designation is one of those.

4. Discussion of Findings

In this section we develop a set of models by progressively enhancing the specification in equation (2). We do so to demonstrate how the apparent effects of historic designation are influenced by fuller articulation of the array of factors that can enhance a property's value.

Model 1: The Gross Effects of Designation. The first model merely regresses the 1998-2002 nominal appreciation rate on the binary variable *National Designation*, which takes on the value of one for a neighborhood in the National Registry: as noted earlier, for the neighborhoods in our database, all of areas designated as historic by any institution have been placed on the National Registry. Hence, the implications of *National Designation* can be interpreted more generally simply as "historic designation" here. The coefficients are identical to what one can discern from Table 1. *National Designation* adds 12.6% to the appreciation rate, thus what was indicated in the bulk of the literature reviewed in Section 1— that historic designation has a positive effect on housing prices and appreciation rates. This coefficient is statistically significant at all conventional levels of type I error (its *t*-ratio is 16.85).

Model 2: Gross Effects of Different Designations. In column 2 we separately estimate the impact of the various types of designation available in Memphis. *Local Designation* indicates location in a locally designated historic zone or district. *Local District Designation* denotes the more strictly regulated type of local preservation area in Memphis. Among the neighborhoods in the study dataset, this status was uniquely bestowed upon the Annesdale-Snowden neighborhood. As can be seen from the table, the coefficient on *National Designation* is statistically insignificant but, even so, negative and very small in absolute value. From this it would appear that, in Memphis at least, it is not enough to be listed on the National Register of Historic Places. There, this particular brand of prestige does not help property values to appreciate faster than usual. On the other hand the coefficient for *Local Designation* is significant (the associated *t*=16.7), positive, and large, indicating that on average such designation adds on average 17 percentage points to

property appreciation in Memphis over the course of four years. Evidently, the ability of historic designation to add to property values comes only when the restrictions associated with historic neighborhoods are in place. Interestingly, the additional restrictions created under the aegis of a *Local District Designation* do not add very much to the appreciation rate, for its coefficient is statistical significant only under the most generous of criteria (t=1.41). And, while it affect is in net positive, *Local District Designation* merely added on average 3.8 percentage points to the rate of property appreciation over the study period.

Model 3: The Effects of Physical and Neighborhood Variables. It is of course possible that these results are generated from other differences in housing attributes other than historic designation alone. Therefore as shown in Column 3, we added a large number of covariates to the regression model. We briefly discuss these covariates and the size and significance of their coefficients here.

The most relevant covariate is *Age*, the number of years (as measured from the year 2002) since the construction of the unit. The coefficient is insignificant, and its size quite small (.0002): although it has the expected negative sign. The size of the coefficient is not a surprise since previous research indicates that the age coefficient in hedonic price equations typically is in the .002 -.01 range (see for example Rubin (1993)). On the other hand, in other hedonic studies the coefficient on the age variable is typically significant: this certainly is not the case here. We surmise that in the context of historical neighborhoods, age has two main confounding effects: a pure aging effect—where greater age is associated with higher maintenance costs— and a cachet effect—wherein older properties become more valuable. (For

a sophisticated take on this confounding effect, see Clapp and Giacotto (1998).) We describe our attempt to articulate age effects in somewhat more detail later in this paper.

The next group of variables measures the physical attributes of the property. Among them we first elaborate the basic parameters of property assessment— its size. The evidence reveals that properties with a larger *Perimeter*, broader building *Footprint*, and more sizeable *Living Area* naturally appreciated more rapidly (i.e., were precisely estimated with statistically significant *t*-ratios and had expected positive signs).[3]

Interestingly, structures with more stories to them also appreciated more rapidly. The continuous variable *Stories* denotes the number of stories, including fractions of them, in the primary structure. The series of nested binary variables *Stories≥1.5*, *Stories≥2*, and *Stories≥2.5* take on the value of unity when the building has more than the indicated number of stories.[4] All of the variables are significant, and only that on *Stories≥2.5* was negative. Note that the negative effect of this binary variable is overwhelmed by the corresponding positive effect of the continuous variable *Stories*.

Because the footprint of the building helps to define or is defined by some of the other measures of building size, we interacted it, assuming we would discount some of the benefits to property appreciation of the size of the *Living Area* and the number of *Stories* by doing so. Indeed, the pair of interactions was significant with negative signs. In fact, the interaction term

[3] Note that we opted not to add a variable representing the lot size in square feet. This was because a lot's perimeter naturally is heavily collinear with its lot size. In this case, *Perimeter* lent greater explanatory power to the equation so we let it stay in as opposed to the variable *Lot Size*. The implication in the set of neighborhoods investigated here is that narrower lots are favored over lots of the same size that are shaped more like a square.

[4] We attempted nonlinear forms of the variable *Stories*, but they added no explanatory power to the equation and were subsequently dropped.

*Footprint*Stories* is so large that it we felt compelled to calculate whether it washed out that of *Stories*. We found that the coefficients cancel each other when a footprint is about 30,000 square feet, a mansion of large proportion. The largest building footprint in our population, however, was 16,731 square feet. Thus the value of the term implies that all properties in our database got strong appreciative benefits from having more than a single story.

The next subset of physical property characteristics pertain to the type of land use and the number of living units in the structure. More living units denotes the greater income-generating power of the structure thus we expect this variables sign to be positive, but we thought that for a given physical size a building would yield net decreasing returns to the *Number of Living Units*. Hence, we also tried a set of polynomial terms as well. Only the squared and linear terms provided any explanatory power, so the others were dropped. Both of the remaining terms were significant, although the linear term was positive and the squared one confoundingly negative. Figure 2 displays the net effect of the two terms *Number of Living Units* and $(Number\ of\ Living\ Units)^2$. Note that the benefits to appreciation of the number of living units do diminish. The buildings in our database began to do so starting with a third unit. Moreover, the average benefit per unit even appears to go negative when there are five units.[5]

Because nearly all of the properties (95.4 percent) we studied were residential, we hypothesized that the limited supply of properties reserved for other land uses within the well-defined neighborhoods sampled here would be in high demand. As a consequence, we expected their appreciation rates to be somewhat higher than average. Our expectations were

[5] There was only one five-unit property in the database that we used.

borne out. The variables denoting properties designated for *Commercial Land Use* purposes and that for *Other Nonresidential Land Uses* were significant and positive. Moreover the magnitudes of the two coefficients reveal substantial contributions to their properties' average four-year appreciation rates— 18.0 and 14.3 percent, respectively.

It is common knowledge that certain types of rooms in a home enhance a property's potential to appreciation more than do others. The number of bedrooms, bathrooms, and even garage spaces and fireplaces are best-known for their ability to support home prices.[6] On the other hand, for a specific home size, after accounting for bedrooms and bathrooms, having more other kinds of rooms robs space from what are typically common areas so that having more of them should be detrimental to its broad market appeal, dampening its ability to appreciate. Thus we specified not only the *Number of Bedrooms*, *Full Bathrooms*, and *Half Bathrooms* but also the change in the number of them, figuring that homeowners would likely update these older homes with more bathrooms and possible subtract from or add to the existing number of bedrooms to fit their household needs during the four-year study period. We also added a variable that was a count of the *Number of Exterior Fireplace Stacks*. In general most of these variables yielded no significant effect upon the property appreciation rates, although there were exceptions. Adding one or more bathrooms (full or half) enhanced appreciation rates, as expected. Having more than the average *Number of Non-bath Fixtures* as well as more than the average *Number of Rooms* each yielded a significant but small negative effect on property appreciation rates.[7]

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[6] This is, of course, after accounting for the number of living units.

[7] The average number of rooms per property was about 7.5. The average number of non-bath fixtures per property

In order to account for the very real possibility that historical dwellings are more desirable because of stylistic characteristics that are currently fashionable or in particularly high demand, we also tested binary variables denoting various kinds of exteriors. In the end we included only those that were significant—*Frame*, *Stucco*, *Brick Veneer*, and *Stone*.[8] Of the battery of possible exterior wall types, we expected only *Stone* and *Frame* to yield superior appreciative value. Each of the included exterior wall types, perhaps surprisingly, received a positive coefficient: *Stucco*'s was the greatest in magnitude.

Properties in the database were also characterized by a set of 16 architectural styles: *Colonial American*, *English*, *European*, *Old Style Two Story*, *Traditional/Conventional*, Bungalow, *Ranch*, *Raised Ranch/Split Level*, *Shotgun*, *Contemporary*, *Cottage*, *Cape Cod*, *Townhouse*, *Rowhouse*, and *Other*. Again, we had no expectations and limited the set included in the model to those that were able to enter in with significance (or close to it). Four remained: *Colonial American*, *Old Style Two Story*, *Traditional/Conventional*, and *Bungalow*. Only *Colonial American* had a negative coefficient.

We were also able to attempt to articulate style differences through seven types of roofs on the built portion of the properties: *Gable*, *Hip*, *Gambrel*, *Mansard*, *Pitched/Shed*, *Mixed*, and *Other*. As with the other style variables, we opted to include only those that came in with significance (or close to it) and had no expectations, except perhaps that in as much as Mansard roofs are associated with Victorian homes they might yield higher value. Perhaps surprisingly,

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was about 0.5, but about 75 percent of the properties had none at all.

[8] Exterior styles that we left out and which consequently helped to form the intercept value, were *Block*, *Aluminum/Vinyl Siding*, *Composite*, *Brick & Frame*, *Condo Wall*, and *Other*. *Brick Veneer* composed nearly 55 percent of the population of properties in the database.

only *Hip* roofs yielded a statistically different result, and it was positive, although the result was not large in magnitude.

Finally, Table 2 reveals coefficients for variables that carry the names of the designated areas. These coefficients values are attached not to binary variables for those neighborhoods, but to both the historical neighborhood and its matched, undesignated neighborhood. These variables act as controls for unobserved characteristics in these matched neighborhoods. For example, the binary variable *Central Gardens* indicates location in either that neighborhood or its "companion", non-designated neighborhood, Chickasaw Gardens. The binary variable *Evergreen* is an exception since it has no companion. The neighborhood pair omitted from the list and included in the intercept is that for Hein Park and, its companion, Red Acres. As it happens, all of the coefficients are positive, indicating (conditionally) higher prices for these neighborhoods (than the Hein Park/Red Acres pair) although *Evergreen* and *Annesdale-Snowden* (and its companion Annesdale-Rozelle) yielded no statistically different result here.

The most important facts to be gleaned from the third column of Table 2 are mild changes in the coefficients that describe the historical status of the units. The coefficient on *National Designation* moves from -.012 to -.043 and becomes significant. Hence, accounting for the structural differences exhibited in nationally designated indicates that properties in these neighborhoods appreciate more slowly. While the coefficient for *Local District Designation* increases slightly, it remains imprecisely estimated. The most important finding in this column is that the coefficient on *Local Designation* remains significant, although its magnitude declines by about 3.7 percentage points to about 13.3%. The ability of local restrictions to significantly raise appreciation rates remains in force even after accounting for differences in the

characteristics of properties in the different neighborhoods. Most interestingly, only about four percentage points of the difference in appreciation rates in locally designated historic areas is due to these other characteristic differences.

Model 4: A Polynomial Articulation of Age. As noted above, one of the puzzles from this specification is the small and insignificant coefficient on *Age*. Perhaps this is because part of the age effect is captured by the designation and neighborhood variables, but it would seem more generally that there is great variation in the effects of age when comparing historical and other buildings. While Coulson and Leichenko (2001) used piecewise interaction terms to model this phenomenon, we opt for a more flexible parameterization through the use of polynomials. We add the second through seventh powers of *Age* to the specification: all were highly significant (except for the cubic, which we subsequently omitted). We interact *Age* with *National Designation* to allow the appreciation path of historic and undesignated properties to differ, and the first, second, and third powers of *Age* are interacted with *Local Designation* to allow the time paths to differ across the different designation modes. We also allow there to be a shift in the age-appreciation rate relationship for houses built before 1900 (more than 102 years of age) by creating the interaction variable *Age*Built Before 1900*, which takes on the value of Age only for those properties built before 1900 and the value zero otherwise. [9]

The results of this exercise are presented in the final column of Table 2. The structural variables are robust: their coefficients remain virtually unchanged in terms of significance and

[9] We also tested for heteroskedasticity due to age effects using a similarly parameterized test in the spirit of Goodman and Thibodeau (1996) but found that we could not reject the null of no heteroskedasticity. This may be due to our generous age parameterization in the mean.

magnitude. An exception is that a change in the sign of *Evergreen*, although the coefficient remains insignificant. There is some movement in the variables that indicate historical designation status, but the overall conclusion that the main impact of designation comes about from local designation is unchanged. Indeed, it is even strengthened, in that the coefficient on *Local Designation* increases from 0.133 to 0.211. While Table 2 displays all of the coefficients' values for the polynomials, they are not readily interpreted in that format. Instead we present Figure 2: a plot of the polynomial effect of *Age* on the appreciation rate against building age for each of the three types of neighborhoods. (We do not separately measure the *Local District Designation* here.) There are several interesting things to be gleaned from this Figure.

First, the impact of neighborhood designation is uniformly greater when that designation is tougher (emanates from local preservation authority). Moreover, regardless of age, the increment to the appreciation rate is always higher on average for properties in locally designated neighborhoods.

Second, the impact of that local designation tends to be strongest for the newest properties. The *difference* between the local line and the other two lines is greatest for buildings that are less than a few years old. (Recall that all of the neighborhoods have some newer construction in them, despite the restrictions in these areas.) Moreover, it appears that these buildings reap the most benefit from whatever drives price outcomes in historic districts.

Third, while new buildings had the highest appreciation rates the apparent appreciative benefit of newness dropped rapidly with age through to those about 25 years old and older. Structures between 24 and 50 years old had similar appreciation rates for undesignated and nationally designated neighborhoods: the appreciation rates of properties in locally designated

districts, however, tended to increase with age for those between 28 and 80 years old. It is tempting to interpret this as an example of the conflict of depreciation and style. Buildings in historical areas (at least locally designated areas) that have neither the cachet of being quite new, nor the cachet of being fashionably old will have the lowest appreciation rates. But during the 30-80 age range buildings acquire whatever historical cachet is available to them, and, within the context of an overall preservation effort, become more desirable.

Fourth, the appreciation rates of all buildings more than 80 years of age or so in all neighborhoods tended to become successively lower. While we allow for there to be a shift in the function for very old units, and this shift is positive, the relevant effect (coefficient) is not particularly large, although it could be deemed statistically significant under a liberal rule. The fact that its significance is in question is not surprising in that only 26 observations in the data set were built before 1900. In this sense, the effect of these very old buildings is included in the drawing of Figure 1 only for interest's sake. We speculate that the overall successive age-associated reduction in the appreciate rate with properties more than 80 years old is the result of a perceived increased need for maintenance and deterioration that occurs with these older properties, which overcomes whatever additional prestige accrues to such units.

There are several obvious caveats when interpreting Figure 2. The first is that the age polynomials are probably fairly collinear; the individual coefficients may be sensitive to small changes in the data or in the specification of the regression, although such small changes that we did implement did not reveal any major alterations to the pattern seen here. A more important caveat is that the higher polynomials can only become less collinear to the extent that there are rather old buildings in these neighborhoods. Such buildings, indeed, do exist in the data set but as

alluded to earlier comprise only a small portion of it: two percent of the structures in the sample are over 100 years old. Under normal circumstances this is a large number of buildings, but in trying to identify statistically significant price patterns for very old units, the evidence we are working with is quite thin. The third caveat is that this is a cross-section and as such is a model of vintages, not of actual aging effects, which would be observed only over time.

5. Conclusions

The literature on the effect of historic designation of neighborhoods has sharpened over the years. It started in the mid-1970s with comparison of average aggregate neighborhood property values and since the early 1990s elevated to work on individual property values. In this paper, we believe we take the analysis one step further by analyzing the change in property values, rather than simple differences in assessed property values, across comparative designated and undesignated neighborhoods. We believe this nullifies some of the objections of using assessed values in such an analysis, while at the same time mitigating some of the bias that may be inherent in the differences designated and undesignated neighborhoods that are otherwise deemed to be similar.

In our analysis we used a rather unique set of appraisal data for the years 1998 and 2002 obtained from Memphis's Landmarks Commission. As in several similar studies before this one, our data set contained relatively equal numbers of properties in designated and undesignated districts. It also contained a single historic neighborhood with no undesignated companion that had a large swath of historic structures replaced by new construction during the past few decades.

After controlling for numerous variables that mostly pertain to differences in architectural style, functional features, and housing quantity, we find across these Memphis neighborhoods that when properties were in neighborhoods zoned historical by the Memphis City's authority, it significantly raised property values at rates above those in other similar neighborhoods—on the order 13-21 percent higher.

We also found that the relationship between age of the property and the change in assessed value was quite nonlinear. When plotted the relationship looks more or less like a bath tub with more rapid rates of appreciation for all young properties (less than 10 years old) and for locally designated, moderately older properties (30-80 years old).

Finally, one of our most interesting findings is that new properties benefit as much, perhaps even more, than older properties from being within a historic district. This is a phenomenon that, as far as we can discern, has not cropped up in the literature to date. Indeed, we intend to pursue this and the appreciation of commercial land use in the near future.

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Table 1

Means of Key Housing Attributes, by Designation Status

Variable	Undesignated	Designated
Lot size	11216.76	10571.18
	(9894.762)	(9427.642)
Age	63.50446	75.04353
	(18.04824)	(21.22212)
# of baths	1.686349	1.826174
	(0.911939)	(0.775115)
Living area	1916.7	2285.122
	(1265.599)	(939.6081)
Appreciation rate	0.1336	0.2563
	(0.2349)	(0.2865)

Note: Standard Deviations in Parentheses

Table 2
Models of the Appreciation Rate of Properties in Selected Memphis Neighborhoods, 1998-2002

Variable	Model 1	Model 2	Model 3	Model 4
	0.1226	-.0124	-0.04302	0.016542
National designation	(.0073)	(.0107)	(0.012097)	(0.054911)
		.1706	0.133375	0.210794
Local designation		(.0102)	(0.017312)	(0.093839)
		.0283	0.038815	0.016754
Local district designation		(.0200)	(0.025003)	(0.027681)
			-0.00026	-0.01907
Age			(0.000218)	(0.01024)
				0.000604
Age^2				(0.000294)
				-3.20E-07
Age^4				(1.33E-07)
				6.02E-09
Age^5				(2.36E-09)
				-4.41E-11
Age^6				(1.63E-11)
				1.15E-13
Age^7				(4.05E-14)
				0.001047
*Age*Built before 1900*				(0.000567)
				-0.00081
*Age*National designation*				(0.000815)
				-0.01464
*Age*Local designation*				(0.004933)
				0.000322
Age^2 *Local designation*				(8.68E-05)
				-1.82E-06
Age^3 *Local designation*				(4.75E-07)
			0.000146	0.000143
Perimeter			(3.65E-05)	(3.65E-05)
			0.000137	0.000148
Footprint of primary structure			(2.78E-05)	(2.81E-05)
			3.77E-05	3.65E-05
Living area			(1.63E-05)	(1.63E-05)
			-5.1E-05	-6.2E-05
*Footprint*Stories*			(1.97E-05)	(1.98E-05)
			-1.91E-08	-1.82E-08
*Footprint*Living Area*			(3.97E-09)	(3.98E-09)
			1.05E-05	1.03E-05
Nonbedroom Living Area			(2.34E-06)	(2.35E-06)
			0.154323	0.174142
Stories			(0.044009)	(0.044373)

	0.053933	0.051028
Stories ≥ 1.5	(0.01459)	(0.014564)
	0.072621	0.078313
Stories ≥ 2	(0.021056)	(0.021076)
	-0.06643	-0.06962
Stories ≥ 2.5	(0.02357)	(0.023552)
	0.353848	0.37842
# of Living units	(0.055573)	(0.05571)
	-0.08153	-0.08667
(# of Living units)^2	(0.016669)	(0.016666)
	-0.03262	-0.03455
Commercial land use	(0.019851)	(0.019823)
	0.180052	0.175242
Other nonresidential land use	(0.052967)	(0.05289)
	0.143275	0.140505
Change in # of bathrooms	(0.015471)	(0.01543)
	-0.05067	-0.04946
# of full bathrooms	(0.009532)	(0.009516)
	-0.01568	-0.01437
# of half bathrooms	(0.012676)	(0.012735)
	-0.01411	-0.01309
Additional nonbath fixtures	(0.003369)	(0.003401)
	0.005074	0.005722
Change in # of bedrooms	(0.004269)	(0.004259)
	-0.00122	-0.00261
# of bedrooms	(0.00471)	(0.004709)
	-0.02554	-0.0252
# rooms	(0.007642)	(0.00765)
	-0.00676	-0.00852
# of exterior fireplace stacks	(0.005153)	(0.005184)
	0.0392	0.039618
Exterior: Frame	(0.011521)	(0.011546)
	0.063699	0.056704
Exterior: Stucco	(0.01396)	(0.013998)
	0.031671	0.031393
Exterior: Brick veneer	(0.009962)	(0.010022)
	0.034825	0.035597
Exterior: Stone	(0.015213)	(0.015262)
	0.015812	0.012112
Roof style: Hip	(0.007891)	(0.008015)
	-0.03982	-0.03095
Style: Colonial American	(0.014907)	(0.014937)
	0.030628	0.022831
Style: Old style two story	(0.013306)	(0.013468)
	0.02018	0.016138
Style: Traditional/Conventional	(0.00991)	(0.00991)

			0.035859	0.028893
Style: Bungalow			(0.011282)	(0.011572)
			0.155658	0.1558
East Buntyn neighborhood pair			(0.016728)	(0.016771)
			0.151048	0.153553
Shadowlawn neighborhood pair			(0.019378)	(0.019543)
			0.108405	0.104692
Central Gardens neighborhood pair			(0.017873)	(0.017914)
			0.03077	0.038712
Annesdale neighborhood pair			(0.021184)	(0.024095)
			0.005379	-0.01071
Evergreen neighborhood			(0.020148)	(0.020267)
			-0.59581	-0.47472
Intercept			(0.071958)	(0.121633)
R^2	.0446	.0882	.2775	.2841

Note: Standard errors in parentheses

Figure 1
The Effect of the Number of Living Units
on a Property's Four-year Appreciation Rate

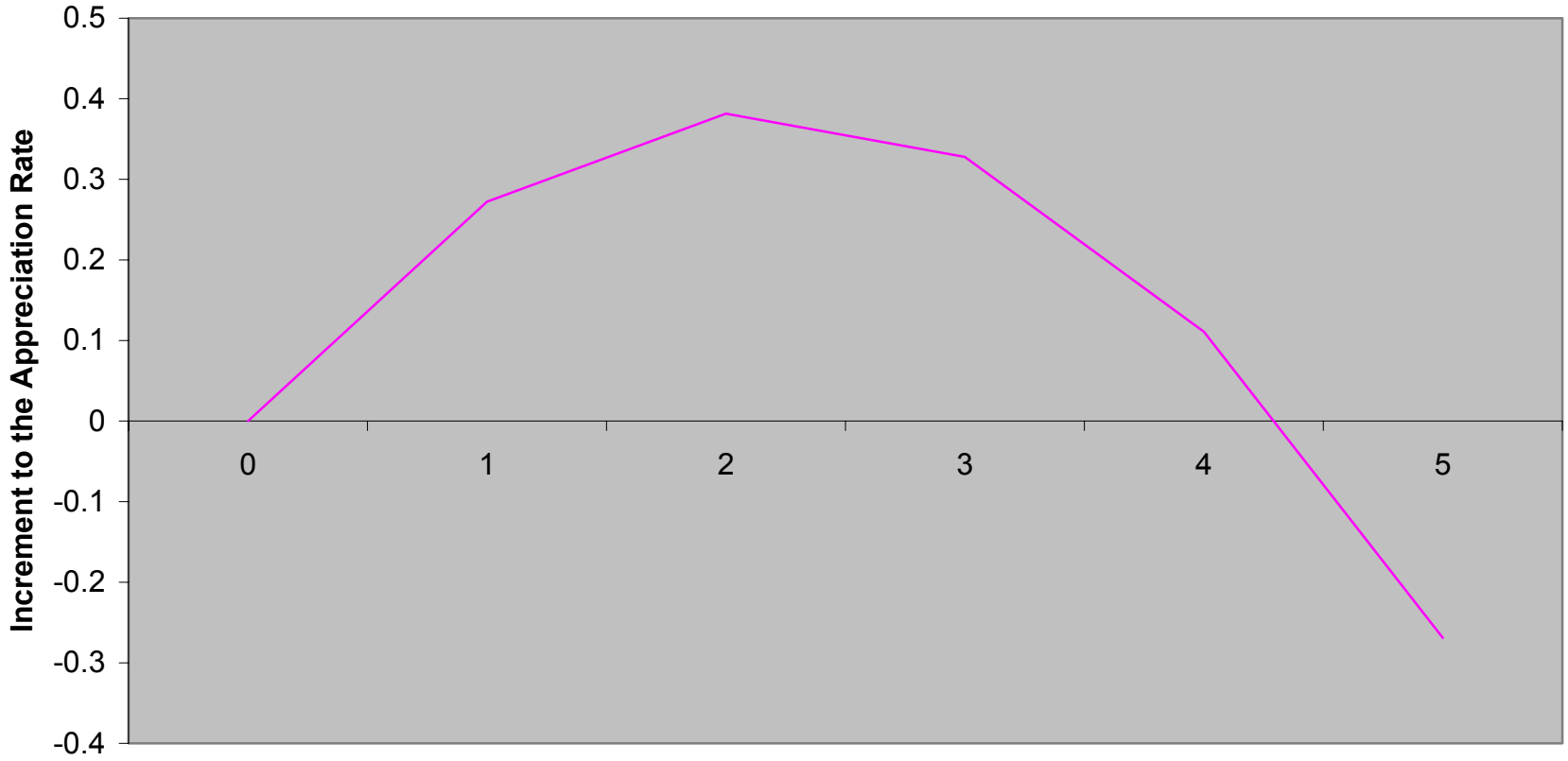

Figure 2
The Effects of Age on Appreciation Rates