

The Price of Preserving Neighborhoods: The Unequal Impacts of Historic District Designation

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Designating a historic district can “lock in” particular success stories, “lock out” potentially gentrifying agents of change, or “lock up” neighborhoods that more contemporary interests have overlooked. Historic preservation efforts can contribute to neighborhood revitalization and economic development (Gilderbloom et al., 2009; Loukaitou-Sideris & Soureli, 2012). The implications of these efforts can vary markedly for original residents, prospective residents, and developers, even for the same policy tool in the same city. As with many other urban policies, merely identifying a policy’s average effect can obscure important heterogeneity in its impact. Unpacking how historic preservation efforts impact different segments of the community differently can help inform how these tools promote revitalization, who is affected by them, and guide where to target future efforts. Navigating the tensions in preservation and development or revitalization (Glaeser, 2010; Minner, 2016) confronts issues of affordable housing, gentrification, and equity in the distribution of preservation’s costs and benefits. This study addresses how historic preservation efforts differently affect residential property values. Identifying if and how historic preservation impacts owners by affecting property values can illustrate the distributional implications of these policy tools. Some properties and neighborhoods may gain from designations, while others may not. A quantile regression model (QRM), akin to Park (2017), can help

identify unequal economic development effects as economic conditions and development pressures vary over space.

Despite a large literature on the price effects of historic preservation, the evidence of its relationship to equitable impacts is limited to just a handful of studies. A few recent studies examined gentrification and displacement related to preservation (McCabe & Ellen, 2016; Talen et al., 2015). Others acknowledged broader concerns like intergenerational equity and inclusion (Avrami, 2016; Ryberg-Webster & Kinahan, 2014). Perhaps only one other study examined distributional issues in property value impacts. For instance, Zahirovic-Herbert and Chatterjee (2012) is the only other study that employed a QRM to identify how price effects differ across the housing market. They show small but significant differences in price effects at the top and bottom of the housing market in Baton Rouge, Louisiana.

The present analysis contributes to the local economic development and historic preservation literatures in several important ways. This study analyzes the effect of historic preservation policies on (the distribution of) sales prices and adds new evidence about uniformity of impacts. We advance the literature through a QRM with more potential diversity in its data, controls for national and local historic designations, and differentiating effects inside or adjacent to districts. This helps to distinguish the symbolic and regulatory effects of designation and, for the first time, shows how those

effects operate differently across the distribution of housing values. Using a QRM allows for a much richer description of designations' price effects, avoiding the limits of estimating a simple, average price effect.

Whether historic preservation, as a tool to support neighborhood development, affects high-rent properties the same as inexpensive housing is not well understood.

Property value impacts across the price distribution are crucial for those concerned with affordable housing, equitable impacts, and targeting neighborhood development efforts.

Our case study identifies heterogeneity in preservation's impacts on property values and the implications of "locking in" or "locking out" districts in the face of development pressures.

Historic Preservation and Neighborhood Change

Historic preservation often connects to development and neighborhood change. Ryberg-Webster and Kinahan's (2014) review of these strong ties raised issues of elitism and inclusive values, affordability and displacement, incidence of subsidies, and preventing urban progress. McCabe (2018) drew attention to the importance of this nascent literature on preservation and neighborhood change. Recent work examining neighborhood change following historic preservation includes Kinahan (2018), McCabe and Ellen (2016), Talen et al. (2015), Koster et al. (2014), and Ryberg-Webster (2015). Alternatively, historic preservation may follow, rather than lead to, demographic change

in neighborhoods (Noonan & Krupka, 2010). Likewise, Maskey et al.'s (2009) study of historic designations found more listings in West Virginia counties with lower poverty rates and greater education levels. This concern over neighborhood change directly connects to housing markets and how property values respond to preservation efforts.

Historic Preservation's Impacts on Property Values

The large literature on the residential property value effects of historic preservation has been reviewed elsewhere (e.g., Been et al., 2016; Noonan, 2013). Of particular importance here is evidence of heterogeneous effects from preservation.

Heterogeneous effects might result from different mechanisms by which preservation affects policy. For instance, effects may differ for houses inside districts relative to their counterparts just outside (e.g., Heintzelman & Altieri, 2013; Oba & Noonan, 2017), as the mix of regulation, historic externality, and prestige differ. Likewise, value effects may differ with the stringency of different preservation tools, such as federal or local designations (Coulson & Lahr, 2005; Schaeffer & Millerick, 1991).

Other studies investigate whether designation's impact differs by context or property attributes (e.g., Noonan, 2007). Only a few studies include multiple markets in the same analysis (e.g., Ijla et al., 2011; Leichenko et al., 2001). Their mixed results showed heterogeneity in price effects without much evidence to support why effects

differ. Been et al. (2016) observed heterogeneity in price effects based on development pressures in New York City, where housing facing strong development pressures does not experience the same small, positive price effects as in low-density areas. Noonan and Krupka (2011) found price similarly negative effects from development pressures on preservation's price impacts. Earlier studies (Clark & Herrin, 1997; Coulson & Lahr, 2005) also found that older homes experience lower price premiums associated with local designation. Zahirovic-Herbert and Chatterjee (2012) demonstrated how hedonic price effects from historic designation vary along the distribution of house prices using a QRM for Baton Rouge. However, Zahirovic-Herbert and Chatterjee (2012) did not investigate heterogeneity in impacts of national and local designation programs. Taken together, these studies consistently show considerable heterogeneity in arising from both variation in context and preservation tools, but evidence accounting for these multiple factors in the same study is lacking.

Hypotheses

Historic district designations typically trigger multiple forces that can act on property values. On the demand side, designations can bring prestige or cachet (Coulson & Lahr, 2005), shopping externalities (Noonan, 2013), and subsidies and tax relief (Ryberg-Webster & Kinahan, 2017). Restrictive designation policies also

regulate how owners can modify or update their properties, a regulatory burden for them but potentially a benefit for neighbors. On the supply side, designations restrict future supply by attempting to freeze the current capital stock in the district. This can raise the costs of housing services in the district and displace development to outside the district. The more honorific national designations might confer some benefits to owners with fewer of the regulatory costs. More stringent, local designations, by contrast, can impose more costs on owners while also doing more to stabilize neighborhoods, ensure historic externalities from neighbors, and restrict supply.

Of particular interest here is how these competing effects operate on houses along the distribution of housing prices. If designated historic districts confer largely symbolic benefits, and reputational benefits from national designations as a luxury good, that supports the hypothesis that high-price houses exhibit greater positive price effects from national designations, in the district as well as near the district (H1).

Alternatively, local designations impose more restrictions on development and renovations. They also can give access to some additional benefits (e.g., subsidized qualifying rehabilitation). Nearby local districts, where the positive preservation spillover can be enjoyed without regulatory burden (and possibly with the benefit of displaced demand), prices should rise. Unlike houses near national districts, these benefits outside of local districts might accrue across the price distribution (H2).

Inside local districts, the expected price effects depend on the option value for renovating or redeveloping the property, plus the net effect of preventing similar redevelopment of its neighbors. The value of the lost option to redevelop may be greatest for inexpensive houses, where redevelopment potential is greatest and also quite large for expensive houses in high-demand neighborhoods that forfeit much by forgoing future upgrades. In addition, “locking in” one’s neighbors may not be an ideal outcome of historic preservation when the neighborhood is deteriorated and ripe for renewal. Similarly, houses in expensive neighborhoods may benefit little from locking in their already high-quality neighboring properties, and instead may just suffer the costs of inflexibility. Taken together, these forces suggest an inverted U-shaped relationship where local districts’ price effect is most negative for low-price and high-price houses (H3). If local districts instead largely serve to restrict future supply and exclude new negative externalities, on the other hand, houses in exclusive, already expensive neighborhoods may benefit most from local designations (H4). Inequality in the ability to take advantage of subsidies or to navigate regulatory systems may exacerbate this inequity.

Data and Methodology

To test these hypotheses and explore the effects of district designations along the house price distribution, we apply a QRM to data from Atlanta, Georgia. Atlanta

offers sufficiently available data and potential for generalizability. Atlanta presents a case of a large, auto-dependent U.S. city with important historic structures and neighborhoods. The size of Atlanta's housing market, coupled with numerous historic districts at the national and local levels, offers enough data density to robustly identify the hedonic price surface. Further, with data limited to a single jurisdiction and single school district, we eliminate many potential confounders.¹ Our results are for just a single urban context, Atlanta, but may hold relevance for other contexts.

Atlanta represents a mix of historic neighborhoods in a rapidly expanding low-density urban environment. Atlanta hosts two primary registration systems intended to preserve historic properties: The National Register of Historic Places (NRHP) at the national level and the City of Atlanta Historic Preservation Ordinance at the local level. The NRHP is managed by the Historic Preservation Division of the Department of Natural Resources in the Georgia State Government. Although there is some preferential treatment (e.g., tax exemptions), a NRHP listing can be considered an indirect method of conservation because it does not limit ownership or directly stop an owner from changing or destroying the property. At the end of 2010, 48 districts were listed on the National Register of Historic Places in the city of Atlanta. Concurrently, the City of Atlanta's Urban Design Commission nominates, registers, regulates, and

¹ The sales data are limited to the Fulton County portion of the city of Atlanta, while the historic district data include for some districts in adjacent Dekalb County when those districts are potentially "nearby" housing transactions in Fulton County.

reviews historic buildings and districts in the city. At the end of 2010, 16 districts are preserved under the city's Historic Preservation Ordinance that was enacted in 1989. Any exterior alterations of registered historic properties require permission from the Urban Design Commission. Furthermore, commitments of time and effort by the owner and the neighborhood and an open hearing process whereby all opinions can be heard are required. Economic incentives for historic preservation are also in place as preservation tools, including a property tax abatement program, a federal and state income tax credit program, and a transfer of development rights. The City of Atlanta Designated Properties (CADP) district policy has more restrictions and incentives, differentiating it from the NRHP. Unlike the largely honorific NRHP designation, local designation requires a neighborhood vote to allow designation and must contend with the Urban Design Commission, "a no-nonsense collection of preservationists who take a dim view of big yellow machines," for exterior alterations and repairs and for some interior alterations (Davis, 2016).

We use the NRHP database provided by the National Park Service to specify historic districts within the area of analysis. For the four districts that changed their boundaries between 2000 and 2010, we also collect data on these changes. Ultimately, we construct spatiotemporal data representing the registration status of 48 national historic districts using Geographic Information System (GIS) software. For local

districts, we use the Landmark and Historic GIS data provided by Atlanta for CADP historic districts. We supplement this with information from Atlanta's Urban Design Commission website and detailed maps of the historic districts. Ultimately, 17 local historic districts are included in the study. Figure 1 shows the registration status of districts in the NRHP and CADP before and after 2000. As the maps indicate, several historic districts registered with the NRHP overlap CADP districts and can be found in similar areas within city limits.

The price analysis uses the tax parcel data and the property record data from 2000 to 2010 provided by the Fulton County Board of Assessors. These data consist of a tax parcel map, sales records, and the assessor's appraisal data. The sales records, which combine cross-sectional data for each year, can include various types of sales, including repeated sales of a single property. This study first extracts single-family detached housing sales from this data set. The analysis further targets the arms-length market transactions in the sales data. Therefore, multiparcel sales, government resales, sales not on the open market, sales combining other unrecorded parcels, suspicious sales, those to be demolished, and those violating other technical criteria were excluded. Following Immergluck (2009), the study also excludes transactions with a sale price of less than \$1,000.

The price analysis combines several types of data to construct variables describing the location and neighborhood characteristics. Specifically, Atlanta’s Office of Planning² provided GIS data on parcels and the Atlanta Regional Commission supplied transportation and environmental data. Furthermore, census data at the block-group level provides additional demographic data to help control for neighborhood quality. (Throughout, we refer to these block-group measures and “neighborhood” measures interchangeably.)

The final data set includes 17,084 single-family detached housing sales transactions. Each of the mapped properties is associated with a variety of locational and neighborhood characteristics based on nearby geographic features (e.g., highways, rivers) or based on the census block group that hosts it (e.g., vacancy rates). Properties are mapped onto historic district boundaries at the time of their sale, so properties’ district status depends on their location and the timing of their sale (i.e., before or after designation). Houses can be in local or national districts, both, or neither. Table 1 summarizes the variables used to estimate the empirical model, including the vector to which it belongs and descriptive statistics for each.

The dependent variable (*lnSP*) uses the market sales price converted to a natural logarithm to foster easy interpretation and comparability with prior hedonic

² City of Atlanta GIS Data Catalog: <https://dcp-coaplangis.opendata.arcgis.com/>

price analyses. The explanatory variables of interest in this study represent historic designation status at the time of the sale. The analysis controls for properties inside or near (i.e., inside a buffer of) districts, both nationally and locally designated. This includes 3,632 house sales inside national districts (*N_HD*) at the time of sale, 1,642 houses inside local districts (*C_HD*), 1,165 sales in the buffer around NRHP districts (*N_outsideBA*), and 383 houses in CADP buffers (*C_outsideBA*). Buffers are based on 100-meter buffer areas around the historic district, a relatively narrow band aimed to capture spillover effects where they are likely to be strongest.³ Observations in the buffer areas are expected to receive predominantly “spillover” effects from district designations. Observations inside the districts experience both own-effects (regulation, subsidies) and spillovers from their district neighbors.

A host of property attributes enter the hedonic price model as well. Basic explanatory variables representing building attributes include square footage (*lnsf*) and parcel area (*lnParcelArea*), as well as the total number of rooms (*Rooms*). Several age-related control variables account for age of the property and its neighboring houses. The building’s age at the time of sale (*BldgAge*) directly controls for the age of the property itself and depreciation. To allow for vintage effects and the possibility that age

³ After examining alternative buffer distance thresholds, we selected 100 meters based on two criteria. First, we select it to align (roughly) with some prior literature in historic preservation (Ahlfeldt & Mastro, 2012; Noonan & Krupka, 2011; Zahirovic-Herbert & Chatterjee, 2012). Second, we recognize a trade-off between having the buffer be smaller to identify the strongest spillover effect and larger to contain sufficient observations to identify a significant effect. Estimating with buffers greater than 100 meters did not improve the explanatory power of our models, so we report it at 100 meters.

effects may be nonmonotonic and nonlinear, an indicator variable for a pre-1900 year of construction (*Blt1900*) complements the cubic polynomial of building age (i.e., *BldgAge*, *BldgAge2*, *BldgAge3*). Variables representing locational characteristics capture straight-line distances to major transportation facilities (e.g., MARTA train stations, highways, Hartsfield-Jackson Atlanta International Airport) and to the central business district (*CBD*). Neighborhood-level demographics are taken from the 1990 Census to avoid simultaneity and to control for socioeconomic conditions well prior to sales in the sample. A dummy variable for whether the property was inside an area that was a community area prior to World War II (*preWWII*), as designated by the Atlanta Urban Design Commission, helps account for the role of local communities in preserving built environments. Finally, a series of indicators helps control for the season and year of the sale, something particularly important for a sample time frame that spans a major recession.

Applications of hedonic price methods to analyze the impact of historic preservation policies are common in the literature. The hedonic pricing approach uses market data to decompose housing—as a bundle of valuable attributes—to infer the implicit price of particular attributes. The implicit price of the attributes of interest here, presence in or near a historic district, can be identified by estimating a model where price is a function of observed property attributes. The (first-stage) hedonic

pricing model identifies equilibrium hedonic prices; it says little about whether prices vary because of changes to demand or supply. Nonetheless, the common practice in historic preservation-related hedonic price analyses has been to treat designation status as exogenous (Noonan & Krupka, 2011). Under this assumption, implicit prices for historic district status are often interpreted as price changes caused by designation.

Estimating the sales price model allows the price effects of historic district designation status to be separated from other property, geographic, neighborhood, and temporal factors. It takes the semilog form:

$$\ln SP_i = \beta_0 + \beta_1 P_i + \beta_2 L_i + \beta_3 N_i + \beta_4 HD_i + \beta_5 T_i + \varepsilon_i \quad (1)$$

Here, i represents each individual property, $\ln SP_i$ is the natural logarithm of the sales price of property i , P_i represents property attributes, L_i is its location characteristics, N_i is its neighborhood characteristics, and T_i captures time trends. The focus of this study, HD_i , is the set of explanatory variables representing the registered historic districts or buffers. The error term, ε_i is assumed to be independently and identically distributed. Parameters β_0 to β_5 are the coefficients of each explanatory variable and represent implicit or hedonic prices. Within HD_i , indicator variables for properties

inside interiors or 100-meter buffers of (national or local) districts at the time of sale allow identification of separate local, national, spillover, and own-effects of designation.

This basic hedonic approach in (1), however, assumes that hedonic prices are the same for properties regardless of whether it is in the high-end market or inexpensive housing. Heterogeneity of price effects for designation cannot be assessed with the conventional hedonic price regression approach. To account for the heterogeneity of effects across property values, a QRM can be applied along the lines of Koenker and Hallock (2001) and Miller (2018). Conventional hedonic price analyses, which typically apply ordinary least squares (OLS; possibly with fixed effects, random effects, or spatial errors), can obtain average historic designation effect on price. The QRM approach estimates parameters for any quantile point of the dependent variable, and thus it can be used to investigate how boundary price effects differ between high- and low-value properties. QRM has the advantage of flexibly estimating the conditional distribution of the variable of interest. This allows QRM estimation results to be less sensitive to price skewness and outliers than conventional regression models. Most importantly, however, QRM allows us to better see the change in the distribution of the explained variable (price). While QRM has many advantages, a major disadvantage is that parameters are more difficult to estimate than in conventional regressions (Waldmann, 2018). Further, the results can be more complicated to interpret because

estimated price impacts of particular variables can vary along the price distribution.

Our QRM is among the first to allow designation's price effects to differ for high-end and low-end houses.

In short, the QRM approach shares many similarities to a linear regression model, the kind typically underlying hedonic price models, but departs in several ways. Most notably, QRM estimates the potential differential effects of variables on various quantiles in the conditional distribution rather than just estimate the effect of variables on the conditional mean outcome (price) given the other controls. Put another way, linear OLS hedonic regressions estimate how mean price—conditional on other control variables—differs as a variable like designation status varies. By contrast, QRM identifies how price at various quantiles, conditional on other controls, differs with designation status. See the Appendix (published as an online supplement to this article) for a more technical discussion of the QRM.

Results

Table 2 shows the results for the hedonic price model, estimated from the pooled cross-section of housing sales from 2001 to 2010 in Atlanta. The OLS uses robust standard errors to account for heteroscedasticity. In the QRM, we estimate the parameters and use bootstrapped standard errors obtained through 1,000 repeated estimations. Case 1

offers a basic model of property value impacts of NRHP and CADP historic districts.

Case 2 extends this by also including dummy variables representing the 100-meter buffer areas, which allow differentiated impacts of NRHP and CADP districts and their adjacent neighborhoods. Finally, Case 3 applies the QRM to the Case 2 model to see how the four district effects (inside national districts, inside local districts, in buffers of national districts, in buffers of local districts) vary by price quantile.

The coefficient of determination in OLS models (approximately 0.71) suggests that these models have relatively high explanatory power. Additionally, the estimated parameters for various property attributes align well with expected implicit prices. In particular, *BldgFloors*, *Baths*, and *preWWII* all have positive and significant (at the 1% level) coefficients. Higher vacancy rates (*%Vacant*) and the share of minorities (*%Black*) appear as disamenities, as do access to transit stops and the airport. Proximity to downtown, highways, and wealthier neighborhoods serve as amenities. Additionally, *BldgAge* exhibits a U-shaped relationship with price, with a negative age effect (depreciation) shrinking until buildings are 47 years old. Houses initially depreciate before their age becomes valued by the market, although very old houses see that positive age effect fade.

Historic designation status significantly affects property values. Properties in national districts receive premiums (around 15%) while local districts receive discounts

(around 3%), an effect that changes little after controlling for properties in neighboring areas. Houses in district buffers enjoy price premiums, about 6% for those around NRHP districts and over 20% for those around CADP districts. These compare reasonably with other estimates of NRHP district price effects in Philadelphia (+26%) (Asabere & Huffman, 1994), New Orleans (+33.1%) (Haughey & Basolo, 2000), and in seven cities in Texas (+4.9-20.1%) (Leichenko et al., 2001). Table 2 shows substantial differences in implicit prices of being inside versus just outside of districts. National districts confer a premium roughly three times the size of the premium for mere adjacency—the external (spillover) effect of national district designation. Conversely, the local district’s boundary effect tends to be much more negative, suggesting a large discount associated with inclusion in the more regulated local district. The negative CADP effects are consistent with studies showing smaller premiums for local districts than national districts (Haughey & Basolo, 2000) and local district discounts (Schaeffer & Millerick, 1991).

The QRM (Case 3) examines how those implicit prices vary across the distribution of sales price. Many of the statistically significant explanatory variables in the OLS model are also significant across the quantiles in the QRM. Across various quantile points, the implicit prices of historic district status are generally statistically significantly different from zero. Figure 2 shows the percentage effects at each quantile

point (and 95% confidence intervals) for different district status variables.⁴ The national district buffer coefficients initially decrease from the 10% to the 25% quantile of prices before increasing as house prices rise. A similar pattern holds for NRHP district status. For local district buffers the pattern differs, as positive effects increase in price quantiles before they decrease above the median and then rise again for the most expensive properties. Large parameter differences across the price range are not observed within the districts. Fairly uniform positive (negative) effects are observed for national (local) districts, although an upward trend appears for national districts and some minor curvature in Figure 2 suggests that the strongest evidence of price discounts appears for midpriced houses.

These results compare favorably with the only previous QRM hedonic analysis of historic districts (Zahirovic-Herbert & Chatterjee, 2012). Both our results and Zahirovic-Herbert and Chatterjee showed high-end houses capitalize more on proximity to national districts. The in-district effects in both studies are similar, although differences are expected because Zahirovic-Herbert and Chatterjee did not control for local designation status separately from national designation, and the

⁴ A series of Wald tests can identify significant differences in district status coefficients across the price quantiles. For many comparisons, the implicit price of district status significantly differs. For example, the implicit price is greater at the 75% quantile than the 25% quantile for *N_outsideBA* ($p=0.0019$) and for *N_HD* ($p=0.0057$), while it is smaller for *C_HD* ($p=0.0003$). Similar test results hold for comparing between the 50% and 25% quantiles. For each of the four district, status-related variables, the effect on residential sales prices significantly differs between at least two quantiles. Clearly, accounting for heterogeneity across the price distribution is important in this context, in ways that average price effects from OLS models fail to capture.

negative effect of local designation (in Atlanta at least) would impact hedonic prices of district status differently across the price distribution.

Finally, considering the difference between the national (or local) in-district hedonic price and the national (or local) buffer hedonic price can suggest which properties are most sensitive to being in designated districts. For NRHP designation, which arguably relies most on prestige or greater attention to an area, comparing coefficients for N_HD and $N_outsideBA$ reveals that the premium associated with designation drops markedly (but remains positive) upon leaving the district. Insofar as that decline reflects a loss in prestige, the loss is greatest around the 25% and 50% quantiles and is least at the 90% quantile. More expensive homes appear less susceptible to the loss in prestige from residing in a national district buffer. For CADP designation, which arguably relies more on regulating buildings inside the district (while properties inside and just outside both benefit from the preservation externality), comparing price effects just inside and outside the district boundary tells a different story. A rather large price discount accompanies the CADP designation (and restrictions), one that is greater in the middle of the price distribution than at the extremes.

Overall, the results show strong property value impacts of historic district designation, and those effects clearly vary by the type of designation and whether the

property is inside or just outside the district. The prestige or positive “status” effects of national designations, including possible shopping externalities, are evident and unsurprisingly appear stronger for properties inside NRHP districts than for those on the perimeter. These results point to positive market responses to policies that direct attention and status to certain neighborhoods and that can mitigate the risks of neighbors’ redevelopment. Conversely, locally designated districts exhibit a greater tension between the costs of regulatory oversight and the benefits of status and preservation externalities. The strong positive value effects just outside of local districts are consistent with positive spillovers, whereas the properties inside the more regulated areas exhibit small but negative value effects. This suggests a real, lost-option value for redevelopment to the directly affected properties. In this light, historic preservation presents key trade-offs for policy makers that seek to “lock up” parts of cities and to redirect investment and development in particular places, possibly at the expense of others. Turning part of a city into a living museum through a local designation may benefit the neighbors but may not benefit some residents or owners.⁵

Yet all these basic effects overlook possible heterogeneity across the distribution of housing prices. The QRM approach addresses possible heterogeneity in implicit prices. That positive hedonic prices associated with national districts—inside or

⁵ For instance, the increase in value that some owners capitalize on says little about the welfare effects on renters.

just outside—are even greater for the most expensive houses than for other houses confirms H1. The greater price effects are not dramatically larger for these high-end houses and other contexts might yield other results, so these results should be taken with caution. However, at least for these data and this model, the results suggest that more expensive properties benefit even more from NRHP designation. For local districts, the top decile of properties just outside the district tend to benefit less than those just below it. These results roughly confirm H2, although they suggest that the positive spillovers from local designation do less to benefit the top end of the housing market. Inside those local districts, however, a U-shaped relationship (where the extreme housing prices suffered less from the designation) is evident in Figure 2. Wald tests confirm more negative price effects as prices increase and lessened negative effects as prices climb to the top of the price distribution. This result rejects H3, which points to an inverse-U relationship. Instead, it offers more support for H4, where the cheaper homes and the expensive homes benefit significantly more (or suffer less) from local designations.

Taken together, some important patterns emerge. More expensive properties tend to enjoy more positive (or less negative) price premiums than some less expensive houses, except for houses outside of local districts. National districts confer price increases that generally increase for more expensive houses (inside or nearby), although

houses at the bottom of the price distribution may fare somewhat better than those at the 25% percentile. Local districts' price discounts resemble a U-shape for being inside the district and have fairly flat price premiums for houses in nearby districts.

Comparing the curves for houses inside districts to those just outside gives still another perspective on the results. For otherwise similar houses that differ only by being just outside versus just inside a national district, prices can be expected to be 4% to 10% greater when included inside the district. Expensive houses tend to benefit less from being included inside national districts, perhaps because they better capture prestige effects even when merely adjacent. For local districts, moving a house from just outside the boundary to inside the district is associated with a 16% to 24% price decline. The curves on the right side of Figure 2 combine to show that the largest losses from being inside (rather than just nearby) local districts accrue to those in the middle of the price distribution. More "average" houses may tend to benefit the most from preservation spillovers while also suffering the most from restricting their redevelopment options.

Interpreting these results requires some nuance, especially without an experimental design to identify causal relationships in light of potential endogeneity.

While the basic first-stage hedonic model merely identifies the implicit prices of property attributes as a description, stronger causal claims about attributes' price

“impacts” should be taken with some caution (Noonan & Krupka, 2011). These price differences in Table 2 could arise due to some unobserved (to us) qualities of designated properties, due to designation itself or some combination. Regardless, they show premiums for houses in NRHP districts (less so for those just outside), discounts for houses in CADP districts (and premiums for those just outside), and some tendencies across the price distribution (e.g., more expensive homes see greater premiums from NRHP designations). Of course, these price differences may arise due to, say, gentrification pressures (not captured by other controls in the model) rather than designations if designations are systematically anticipating but not causing gentrification. Given the strong connections among prices, neighborhood change, and preservation, the possibility that unmeasured neighborhood change influences price differentials is not easily discarded.

Historic preservation’s price effects and gentrification have long attracted attention in preservation debates (e.g., Ryberg-Webster & Kinahan 2014), and the role of race in large cities like Atlanta remains critical. Results in Table 2 show depressed prices in areas with greater shares of African American residents, yet the discount is considerably lower for higher-price houses. This underscores not just the importance (to the analyst) of controlling for *%Black* in models like these but also the importance (to preservationists and policy makers) of understanding how designation’s price

impacts arise in the context of strong neighborhood racial composition effects.

Elevating prices through designation may help alleviate some of this %*Black* discount.

The significant effects of the *saleyear* dummies reveals strong market-wide time trends for this sample of house sales. This is not surprising given the major upheaval in the real estate market during this time. The results confirm how housing prices were climbing rapidly after 2001 before dramatically falling after 2007, in line with the major recession. Beyond controlling for and confirming the much larger trends in the housing market, the *saleyear* effects in the QRM model allow for different time trends across price quantiles. This model does not, however, identify whether designated properties' prices react to recessions differently—a topic worthy of future research. Similarly, as is common in this literature, the present model also does not separately identify interactions between local and national designation. Future research may do well to unpack interdependent effects of overlapping designations. Finally, the importance of time trends in any historic preservation analysis, especially one involving a recession, underscores the limitations of pooling data over many years rather than tracing out time-varying prices.

Conclusion

This study identifies property value effects of different types of historic district designations and how those effects vary along the price distribution. The results show

considerable differences in price effects by designation tool, by being inside or outside of districts, and at different price quantiles. Much of this variation is in line with hypothesized effects (especially H1, H2), including higher prices associated with more honorific national districts and lower prices associated with houses inside the local, more regulated districts. A key finding from the application of a flexible quantile regression model here reveals that more expensive homes appear better able to take advantage of (or lessen the harms from) historic district designation. While the price effects differ significantly at times, the price differences should not be overstated. Designations' price effects do not vary radically along the price distribution, and many impacts for the least expensive houses are comparable to those for the most expensive houses. This could not have been ascertained without estimating the QRM. Historic designation's strong price effects may affect housing affordability in and near districts, but it does not appear to differentially affect affordability in the high and low ends of Atlanta's housing market. Whether similar price effects are truly equitable depends on many other factors.

Our study offers several important contributions for the literature. First, we identify price effects for different designation policy tools, inside and nearby districts, across the price distribution all within the same model. Given how theory and prior evidence has shown each of these dimensions to be separately important in this context,

our model offers important new evidence about all three within the same analysis. The differences across the graphs in Figure 2 reinforce the importance of jointly identifying these different dimensions. Second, given how much prior attention has been paid to equity in historic preservation (e.g., McCabe & Ellen, 2016; Ryberg-Webster & Kinahan, 2014), finding relative stability of price effects across price quantiles in the QRM offers important evidence to inform those discussions. Third, this paper contributes to the growing efforts to systematically understand critical equity issues related to policies affecting urban economic development (McCabe, 2018). Average price effects across a price distribution offer only limited insights, especially regarding equity concerns. Especially given the potential for historic designations to “lock in” inequity or “lock out” affordable housing options, how these policy tools affect different housing submarkets differently should receive more attention. Further, it is not just that possible unequal impacts of designations warrant more ex post analysis. Our study also underlines the importance of future research—for historic preservation as well as for other urban economic development policies—considering the drivers of how and where policy tools are implemented. What influences district designation in low-end housing submarkets may not apply for designations in other areas. A better understanding of (ex ante) policy drivers can complement these price differential findings.

The results here hold important lessons for policy makers and practitioners. Historic designations are clearly not a simple, one-size-fits-all sort of policy tool. Accordingly, their implementation can lead to mixed results across contexts and particular policy tools. Local designations' negative price effects may not help grow the property tax base in Atlanta. Policy makers should appreciate that property restrictions appear to have a cost to owners, although the evidence here also shows that preserving historic externalities has a significant social benefit. The results here show the trade-off for houses in local districts. These price effects and how they differ across price distribution can inform decisions to pursue CADP designations.

Preservationists can take away several important lessons from these results. First, designations do not appear to be disproportionately raising prices at the low end of the market. This may calm some fears over historic preservation's inequity. Further, there is strong evidence that NRHP designations are boosting property values, something not always found in the literature. This evidence is itself a mixed blessing, as it shows how the market appreciates this kind of status, but rising prices may imply reduced housing affordability and may follow from supply restrictions rather than greater demand. Preservationists should also take note how, in Atlanta at least, the more restrictive local designations' minimal price effects suggest that the positive (e.g., preserving historic externalities) and negative (regulation) effects roughly offset each

other. The large and positive price impacts of being near local districts provides strong evidence of this significant historic externality benefit. The finding that these spillovers are valued in the market at roughly equal rates across the price distribution suggests that appreciating historic externalities is not just the province of the elites in the housing market. Finally, with residents voting on potential CADP designations, property value impacts often enter the debate (Davis, 2016). These results can inform those debates and it can also guide preservationists in selecting neighborhoods that could favor designation more. New case studies for those particular markets would, of course, offer even better evidence.

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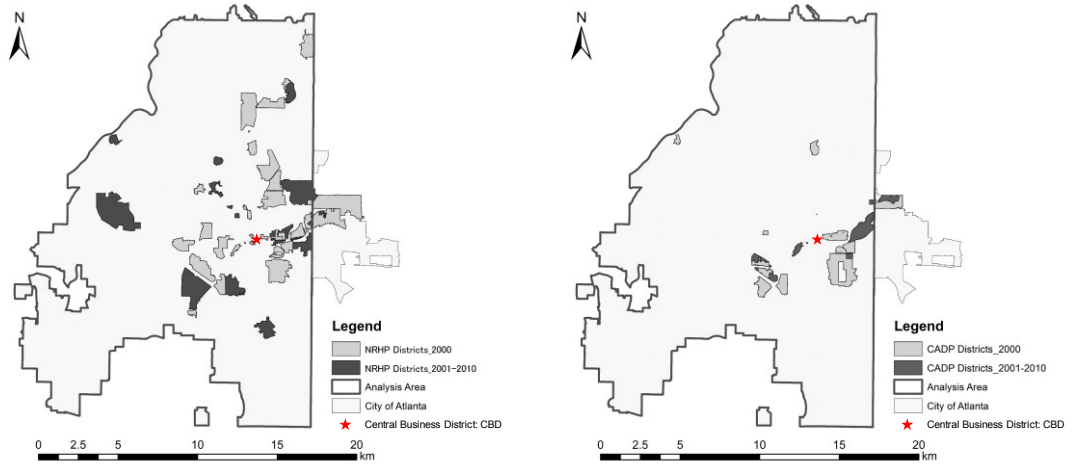
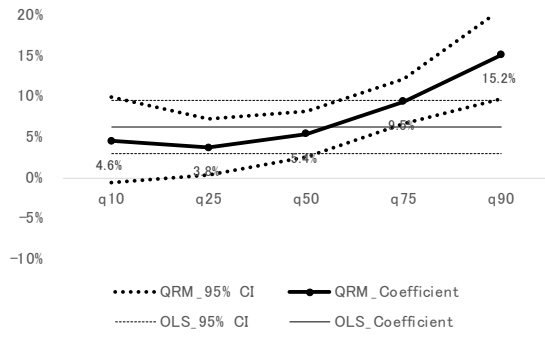
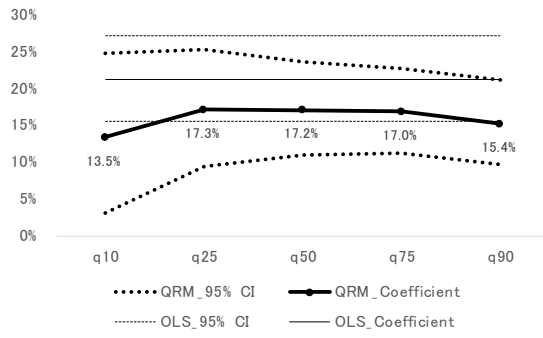


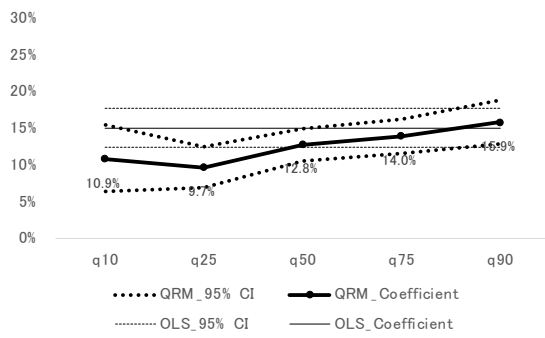
Figure 1. NRHP/CADP Historic Designation Status in Atlanta



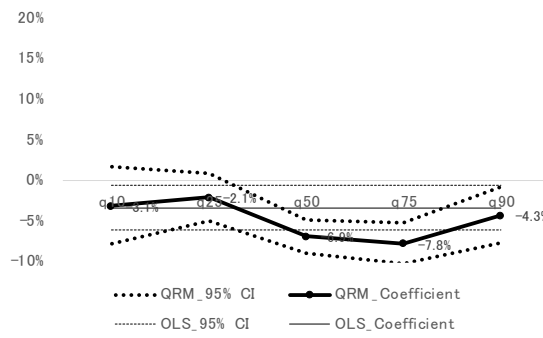
“N_outsideBA”



“C_outsideBA”



“N_HD”



“C_HD”

Figure 2. Quantile Percentage Effects for Historic Designation Status Dummy

Variables

Table 1. Variable Descriptions

Variable	Definition [Unit]	Mean	Std. Dev.	Min	Max
Dependent Variable					
InSP	Logged Market Sale Price [\$]	12.254	0.878	7.208	16.124
Property (P)					
Insf	Logged Square Footage [sq ft]	8.515	1.165	5.796	13.285
InParcelArea	Logged Parcel Area [sq m], 2010	5.927	2.955	-0.872	11.906
BldgAge	Building Age	38.243	31.177	0	139
BldgAge2	Building Age Squared	2434	2667	0	19321
BldgAge3	Building Age Cubed	172852	232364	0	2685619
Bl1900	Built Year is below 1900 (Dummy Variable)	0.002	0.046	0	1
BldgFloors	Construction Floor	1.264	0.447	0	3
Rooms	Number of Total Rooms	6.074	2.003	1	26
Bedrooms	Number of Bedrooms	2.648	1.070	1	14
FamRooms	Number of Family Rooms	0.298	0.486	0	5
Baths	Number of Fixed Bathrooms	1.766	0.872	0	10
HalfBaths	Number of Fixed Halfbathrooms	0.307	0.506	0	5
Location (L)					
InAirport	Logged Distance to ATL Airport [m]	9.611	0.332	8.399	10.247
InMARTA	Logged Distance to Nearest Marta Station [m]	7.360	0.888	3.479	9.183
InHwy	Logged Distance to Highway [m]	6.803	0.954	2.165	8.368
InHydro	Logged Distance to Nearest Lakes and Ponds [m]	6.892	0.870	0.489	8.399
InCBD	Logged Distance to CBD [m]	8.531	0.616	4.866	9.707
Neighborhood (N)					
InBGarea	Logged Block Group Area [sq m], 2010	-0.087	0.800	-2.931	3.295
InHHincome	Logged Median Household Income [\$] in BG, 1990	10.140	0.597	8.517	11.827
InMedValue	Logged Median House Value [\$] in BG, 1990	11.302	0.773	8.304	13.122
InPopDens	Logged Population Density [person/sq km] in BG, 1990	7.153	0.674	4.457	8.664
MedYearBl1	Median Year of House Construction in BG, 1990	1955	11.158	1925	1984
%Vacant	Percent of Housing Units that are Vacant in BG, 1990	0.147	0.090	0	0.505
%Black	Percent of Population that is Black in BG, 1990	0.520	0.404	0	1
preWWII	BG is wholly inside PreWWII Neighborhood (Dummy Variable)	0.376	0.484	0	1
Historic Designation (HD)					
N_outsideBA	Property is inside a NRHP 100-m Buffer Area (Dummy Variable)	0.068	0.252	0	1
C_outsideBA	Property is inside a CADP 100-m Buffer Area (Dummy Variable)	0.022	0.148	0	1
N_HD	Property is inside a NRHP District (Dummy Variable)	0.213	0.409	0	1
C_HD	Property is inside a CADP District (Dummy Variable)	0.096	0.295	0	1
Time-Variant (T)					
Spring	Sold in Spring, March - May (Dummy Variable)	0.305	0.460	0	1
Summer	Sold in Summer, June - August (Dummy Variable)	0.284	0.451	0	1
Fall	Sold in Fall, September - November (Dummy Variable)	0.201	0.401	0	1
saleyear=2003	Sold in 2003 (Dummy Variable)	0.056	0.229	0	1
saleyear=2004	Sold in 2004 (Dummy Variable)	0.096	0.295	0	1
saleyear=2005	Sold in 2005 (Dummy Variable)	0.122	0.327	0	1
saleyear=2006	Sold in 2006 (Dummy Variable)	0.116	0.321	0	1
saleyear=2007	Sold in 2007 (Dummy Variable)	0.178	0.383	0	1
saleyear=2008	Sold in 2008 (Dummy Variable)	0.113	0.316	0	1
saleyear=2009	Sold in 2009 (Dummy Variable)	0.106	0.307	0	1

Table 2. Hedonic Model Estimates from OLS and QRM, for Housing Sales 2001-2010

Variable	Case1:	Case2:	Case3: QRM				
	OLS	OLS	q10	q25	q50	q75	q90
lnsf	0.2857 *** 50.65	0.2868 *** 50.92	0.2796 *** 32.72	0.2691 *** 38.63	0.2924 *** 55.64	0.3123 *** 58.36	0.3327 *** 40.91
lnParcelArea	-0.0282 *** -20.48	-0.0272 *** -19.99	-0.0249 *** -13.02	-0.0184 *** -10.78	-0.0184 *** -14.99	-0.0212 *** -15.12	-0.0233 *** -9.81
BldgAge	-0.0179 *** -14.84	-0.0181 *** -15.09	-0.0145 *** -9.91	-0.0197 *** -14.42	-0.0211 *** -20.11	-0.0184 *** -15.02	-0.0195 *** -11.48
BldgAge2	0.0003 *** 8.06	0.0003 *** 8.25	0.0002 *** 4.31	0.0003 *** 8.91	0.0004 *** 13.42	0.0003 *** 9.35	0.0003 *** 7.05
BldgAge3	0.0000 *** -4.18	0.0000 *** -4.33	0.0000 *** -1.42	0.0000 *** -5.48	0.0000 *** -8.91	0.0000 *** -5.49	0.0000 *** -4.07
Bit1900	0.0661 0.66	0.0677 0.67	-0.1378 -0.89	0.1236 0.65	0.0891 1.40	-0.0303 -0.31	-0.0245 -0.13
BldgFloors	0.1210 *** 10.37	0.1198 *** 10.26	0.0746 *** 3.97	0.1236 *** 9.49	0.1194 *** 11.00	0.1291 *** 10.59	0.1400 *** 8.74
Rooms	0.0057 1.59	0.0054 1.53	0.0059 1.39	0.0075 * 1.74	0.0075 ** 2.37	0.0117 *** 3.98	0.0093 ** 2.31
Bedrooms	0.0065 0.92	0.0079 1.13	0.0272 *** 2.62	0.0081 1.05	0.0207 *** 3.55	0.0035 0.66	-0.0080 -0.98
FamRooms	0.0779 *** 7.84	0.0777 *** 7.84	0.0824 *** 7.06	0.0801 *** 7.99	0.0709 *** 8.61	0.0621 *** 6.60	0.0559 *** 4.45
Baths	0.1858 *** 24.38	0.1828 *** 24.06	0.1561 *** 13.63	0.1914 *** 20.08	0.1790 *** 27.94	0.1877 *** 26.74	0.1861 *** 18.90
HalfBaths	0.1338 *** 13.90	0.1326 *** 13.77	0.1244 *** 9.15	0.1236 *** 10.84	0.1129 *** 12.42	0.1213 *** 13.92	0.1323 *** 10.86
lnAirport	0.4180 *** 21.62	0.4152 *** 21.47	0.3515 *** 11.41	0.4117 *** 16.10	0.3979 *** 23.91	0.3456 *** 22.84	0.4244 *** 20.31
lnMARTA	0.0288 *** 4.53	0.0291 *** 4.53	-0.0041 -0.50	0.0098 1.33	0.0216 *** 4.57	0.0187 *** 3.28	0.0260 *** 2.94
lnHwy	-0.0092 ** -2.13	-0.0094 ** -2.18	-0.0138 ** -2.15	0.0003 0.07	-0.0008 -0.21	-0.0028 -0.67	-0.0175 *** -3.35
lnHydro	0.0095 ** 2.04	0.0096 ** 2.04	-0.0065 -0.91	0.0064 1.10	0.0133 *** 3.07	0.0218 *** 5.67	0.0409 *** 7.09
lnCBD	-0.3663 *** -35.32	-0.3616 *** -34.85	-0.3915 *** -20.19	-0.3641 *** -28.90	-0.3104 *** -39.48	-0.2672 *** -29.03	-0.2543 *** -16.77
lnBGarea	0.0238 ** 2.32	0.0258 ** 2.52	0.0325 ** 2.17	0.0184 1.35	-0.0033 -0.45	-0.0157 * -1.84	0.0036 0.26
lnHHincome	0.1158 *** 8.87	0.1160 *** 8.86	0.1674 *** 6.65	0.1319 *** 7.43	0.1087 *** 9.57	0.0896 *** 7.61	0.0789 *** 4.82
lnMedValue	0.1369 *** 12.07	0.1401 *** 12.29	0.1195 *** 5.28	0.1261 *** 7.66	0.1111 *** 11.69	0.0992 *** 8.65	0.1196 *** 8.68
lnPopDens	0.0303 *** 2.68	0.0323 *** 2.86	0.0284 1.63	0.0233 1.52	0.0236 *** 2.82	0.0242 *** 2.74	0.0585 *** 3.42
MedYearBlt	0.0046 *** 9.63	0.0048 *** 10.00	0.0065 *** 8.44	0.0046 *** 8.36	0.0027 *** 6.80	0.0019 *** 4.51	0.0014 ** 2.20
%Vacant	-0.1381 ** -2.37	-0.1287 ** -2.23	-0.3547 *** -3.32	-0.2258 *** -3.25	0.0245 0.56	0.0508 1.06	0.0774 1.39
%Black	-0.8274 *** -41.91	-0.8322 *** -42.28	-0.8253 *** -29.57	-0.7240 *** -33.96	-0.6637 *** -40.91	-0.6418 *** -32.18	-0.5796 *** -21.23
preWWII	0.1660 *** 13.68	0.1576 *** 12.93	0.1453 *** 8.33	0.1259 *** 9.27	0.1308 *** 13.64	0.1237 *** 12.62	0.1067 *** 7.61
N_HD	0.1382 *** 12.47	0.1406 *** 12.08	0.1035 *** 4.98	0.0929 *** 7.07	0.1206 *** 12.27	0.1310 *** 12.51	0.1473 *** 11.32
C_HD	-0.0419 *** -2.89	-0.0345 ** -2.38	-0.0318 -1.28	-0.0208 -1.37	-0.0712 *** -6.35	-0.0809 *** -5.82	-0.0437 ** -2.35
N_outsideBA		0.0608 *** 3.80	0.0450 * 1.74	0.0369 ** 2.16	0.0531 *** 3.87	0.0905 *** 7.11	0.1417 *** 5.80
C_outsideBA		0.1937 *** 7.97	0.1268 ** 2.58	0.1592 *** 4.59	0.1590 *** 5.78	0.1568 *** 6.21	0.1428 *** 5.60
Spring	0.0021 0.21	0.0020 0.19	-0.0052 -0.40	0.0017 0.14	0.0007 0.08	-0.0017 -0.19	-0.0180 -1.55
Summer	0.0258 ** 2.48	0.0250 ** 2.41	0.0215 1.62	0.0243 ** 2.03	0.0153 * 1.80	0.0113 1.30	0.0091 0.74
Fall	-0.0110 -0.92	-0.0108 -0.91	0.0013 0.09	-0.0044 -0.35	-0.0092 -0.97	-0.0062 -0.59	-0.0022 -0.16
saleyear=2003	0.4768 *** 23.53	0.4761 *** 23.52	1.2111 *** 28.05	0.4388 *** 12.28	0.1302 *** 7.97	0.0116 0.75	0.0092 0.45
saleyear=2004	0.5475 *** 29.55	0.5456 *** 29.51	1.3272 *** 32.26	0.5361 *** 16.38	0.1716 *** 11.07	0.0584 *** 4.27	0.0451 ** 2.21
saleyear=2005	0.7271 *** 41.24	0.7274 *** 41.34	1.4952 *** 36.16	0.7229 *** 22.30	0.3621 *** 25.04	0.2513 *** 17.78	0.2422 *** 12.97
saleyear=2006	0.6708 *** 40.61	0.6691 *** 40.62	1.4506 *** 35.46	0.7102 *** 22.42	0.3467 *** 28.58	0.2244 *** 18.10	0.2020 *** 11.10
saleyear=2007	0.6205 *** 43.53	0.6216 *** 43.70	1.4380 *** 36.49	0.6646 *** 23.16	0.3287 *** 28.91	0.2438 *** 23.06	0.2470 *** 15.18
saleyear=2008	0.5692 *** 37.71	0.5670 *** 37.88	1.4079 *** 34.94	0.6243 *** 20.74	0.2913 *** 25.39	0.2148 *** 17.58	0.1996 *** 12.26
saleyear=2009	0.3559 *** 23.85	0.3555 *** 23.93	1.1910 *** 29.31	0.4223 *** 13.64	0.1304 *** 10.61	0.0349 *** 2.84	0.0232 1.40
constant	-3.6055 *** -3.80	-4.0299 *** -4.24	-7.5094 *** -5.13	-3.6139 *** -3.32	0.3049 0.39	2.4642 *** 3.09	2.2205 * 1.80
Statistics							
Number of Obs.	17,084	17,084	17,084	17,084	17,084	17,084	17,084
R Squared	0.7141	0.7155	0.4934	0.4425	0.5022	0.5596	0.5882

Notes: * p<.1; ** p<.05; *** p<.01

Upper value means a coefficient, and lower value means a t-value.

Estimations of OLS use robust standard errors, and estimations of QRM use bootstrap standard errors (1,000 iterations)

Appendix

Applications of quantile regression models, though rare in hedonic price analyses generally and especially in historic preservation analyses, offer a fairly straightforward way to “map out” the implicit or hedonic price of property attributes (e.g., historic designation status) across the distribution of house sale prices. In essence, the QRM can identify the attribute price for inexpensive houses, expensive houses, or at any point along the overall sales price distribution. Here, the quantile point refers to the value represented by the cumulative sum of points along the price ($\ln SP$) distribution, counting up from the bottom of the distribution. For instance, the quantile point might be the 0.05th quantile or the 0.5th percentile (i.e., median). The quantile regression model estimated at any distribution point τ between zero and one can be represented by the following equation:

$$\ln SP_i = \beta_{0\tau} + \beta_{1\tau} P_i + \beta_{2\tau} L_i + \beta_{3\tau} N_i + \beta_{4\tau} HD_i + \beta_{5\tau} T_i + \varepsilon_{ti} \quad (2)$$

$$\tau \in (0, 1)$$

Here, the estimation parameter $\hat{\beta}(\tau)$ from $\beta_{0\tau}$ to $\beta_{5\tau}$ can be represented by the following equation as a solution to the minimization problem:

$$\hat{\beta}(\tau) = \underset{\beta_\tau \in \mathbb{R}}{\operatorname{argmin}} \sum_{i=1}^n \rho_\tau(Y_i - \mathbf{X}'_i \beta_\tau)$$

$$= \underset{\beta_\tau \in \mathbb{R}}{\operatorname{argmin}} \sum_{Y_i \geq \mathbf{X}'_i \beta_\tau} \tau |Y_i - \mathbf{X}'_i \beta_\tau| + \sum_{Y_i < \mathbf{X}'_i \beta_\tau} (1-\tau) |Y_i - \mathbf{X}'_i \beta_\tau| \quad (3)$$

In this problem, $\varepsilon_{ti} = Y_i - \mathbf{X}'_i \beta_\tau$ is the error at distribution point τ , where Y_i is the dependent variable, \mathbf{X}_i is the explanatory variable vector, and β_τ is the parameter vector at distribution point τ . Additionally, the check function $\rho_\tau(u)$ can be represented by the following equation:

$$\rho_\tau(u) = u \cdot \{\tau - I(u \leq 0)\} \quad (4)$$

$$I(u < 0) = \begin{cases} I(u \leq 0) = 1 & \text{if } u \leq 0 \\ I(u \leq 0) = 0 & \text{if } u > 0 \end{cases}$$

By minimizing the absolute deviation by weighting positive and negative residual errors, any conditional quantile of the dependent variable can be estimated. In this study, the QRM clarifies the boundary effect for different property value ranges by understanding the distributional characteristics of the dependent variable and by setting five τ quantiles at 0.10, 0.25, 0.50, 0.75, and 0.90 to estimate the model.