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The Demand for Historic Preservation

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<u>**The Demand for Historic Preservation**</u>

<u>**Abstract**</u>

Historic preservation is commonly used to protect old buildings and neighborhoods from deterioration. In 1981, the City of Milwaukee established a historic preservation commission to develop and maintain a local register of places with historical importance to the area. The commission also reviews all applications for historic status as well as any requests for exterior alterations. As such, there are numerous rules and restrictions that are imposed on property owners once it has been declared a historic site. Thus, while historic designation can serve to internalize the externalities in neighborhoods with historic buildings, it also imposes costs on homeowners who wish to make improvements to their homes. This paper uses a hedonic model to estimate the impact of historic preservation on the sale price of a single family home in the Milwaukee area. Preliminary results show that the impact of historic preservation is positive when it is significant, with the average impact at 26.6%. However, there was significant variation between districts, with the impact significantly positive in 13 of 22 districts used in the sample. Specifically, the positive impact ranged between 11% and 65%, holding other factors constant. None of the 22 districts had a negative and significant impact. An evaluation of spillover effects reveal that just over one third of them displayed positive and signficant spillover effects, whereas 21% had negative and significant spillover effects. The remainder were insignificant. An important question is what factors influence this variability in historic preservation effects. The eventual goal of this research is to extend our preliminary analysis to two stages using a recently developed method that employs spatial econometric methods to solve the unique identification problems inherent in hedonic models (Carruthers and Clark, forthcoming in *Journal of Regional Science).* This will permit us to determine the specific factors that influence these premiums. While the spatial estimates presented in this preliminary work do not permit a two-stage model, we did explore whether implicit prices appear to be correlated with the household income and racial makeup of the neighborhoods in which they are located. The findings show little evidence that the implicit values of historic districts are correlated, but the implicit price associated with historic district spillovers was positively correlated with both neighborhood measures.

The Demand for Historic Preservation

1. Introduction

The National Historic Preservation Act was passed by Congress in 1966 and it allowed the Secretary of the Interior to create and maintain a national register of historic places that is comprised of various buildings, sites, and districts that are of historic significance. However, much of the historic preservation that is done in the US is initiated at the local level, where local communities establish their own historic districts. There are a number of reasons to create a local district within a city. First, a district can be used to preserve the character of the neighborhood for current and future generations, and reduce the externalities associated with modifications that are inconsistent with the other homes in the community. Second, many cities have used historic preservation designation as a neighborhood revitalization tool to attract new residents and businesses to an area. Generally speaking, historic districts are thought to have a positive effect on property values, and numerous studies have documented the positive impact of these districts on local home values (Ford, 1989; Coffin, 1989; Asabere and Huffman, 1994b; Clark and Herrin, 1997; Coulsen and Leichenko, 2001; Leichenko, Coulson and Listokin, 2001; and Coulson and Lahr, 2005). However, several studies have documented negative impacts (Asabere and Huffman, 1994a; Asabere, Huffman and Mehdian, 1994), and even among those studies that generally find a positive impact, the size of the premium can vary substantially. Of course, historic preservation does not come without costs. Once a district has been established, the owners must abide by a number of rules and guidelines applying to everything from general maintenance to exterior alterations. In most cases, approval must be obtained from the commission before any work can be performed on the house. It is possible that the costs associated with the additional rules and regulations could outweigh any of the benefits with historic preservation, especially for districts that have only recently been designated.

The objective of this paper to study the factors that influence the demand for historic preservation in the Milwaukee area. While the literature on the hedonic impacts of historic preservation focuses on single stage models which examine the impact of historic districts, or proximity to districts on the implicit price function, we extend the hedonic model to two stages as suggested by Rosen (1974) in his original work. However, we recognize the unique identification challenges generated by the hedonic model (e.g., see Brown and Rosen, 1985; Epple, 198x). In a recent paper, Carruthers and Clark (2010) employ the Geographically Weighted Regression (GWR) to derive demand functions for environmental goods in the Seattle area (i.e., King County, WA). While it is our intention to ultimately use that methodology in this study, the estimates presented in this preliminary draft focus primarily on a less complex spatial econometric approach (i.e., spatial 2SLS) in the first stage.

2. Hedonic Prices and Implicit Markets

Willingness to pay for historic preservation can be estimated either directly using stated preference approaches (e.g., conjoint analysis or contingent valuation methods) or indirectly using revealed preference approaches such as hedonic price analysis. There are two broad forms of hedonic modeling, both of which examine how nonmarket goods are capitalized into local input prices. The intercity hedonic approach derives implicit prices by examining interregional compensating differentials in wages and/or land rents. This technique which was first suggested by Rosen (1979) and more thoroughly developed by Roback (1982) and Blomquist, Berger and Hoehn (1986). The intercity hedonic model has been used to derive implicit values for various nonmarket goods[1] and has been extended to two stages to derive demand for nonmarket goods (Clark and Kahn, 1988, 1989).

The intracity hedonic model, in contrast, primarily focuses on the capitalization of local attributes into local housing prices, although intracity wage variations have also been examined (Eberts, 1982). The intracity model builds on the seminal work of Lancaster (1966), and was more formally developed by Rosen (1974) and Freeman (1979). In Rosen's original paper, demand for locational attributes was done in a two-stage process. In the first stage, the transacted housing price is regressed on measures of all of the things that matter to the buyer, including structural features, neighborhood characteristics, and environmental factors that vary by location. This stage is the hedonic price function, and it produces a vector of parameters that can be used to derive marginal implicit prices for each attribute. Then, in the second stage, quantities of the attributes of interest are regressed on their estimated implicit prices, which are endogenous, a set of exogenous demand shifters and the prices of relevant complements and/or substitutes. This stage derives the inverse demand function, and it is needed for recovering the values of non-marginal differences in the quantity consumed and for estimating assorted elasticities of demand.

[1] Blomquist, Berger and Hoehn (1986) derived an urban quality of life index, whereas Clark and Nieves (1993) examined implicit values of various types of noxious activities.

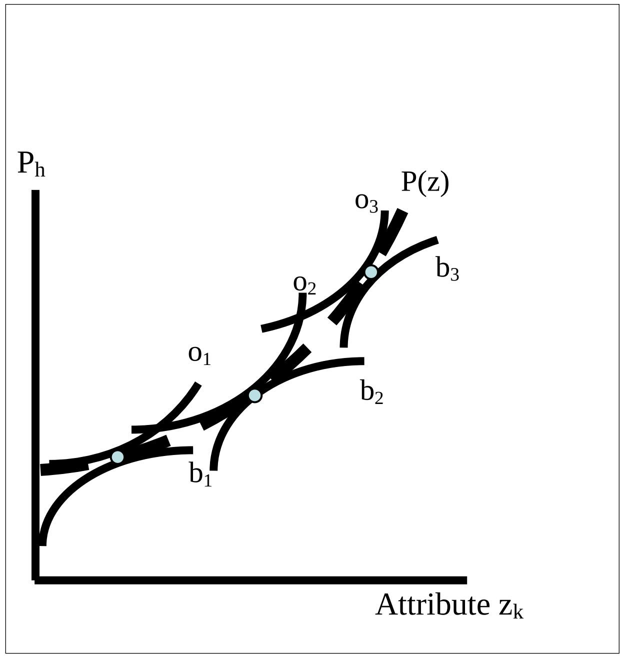

Figure 1 – Offer Function, Bid Function and Hedonic Price Function

The hedonic housing price model characterizes housing as a bundle of attributes contained in a vector $\boldsymbol{z}$, where $\boldsymbol{z} = (z_1, z_2, ..., z_k)$. These attributes can be related to the structure or the neighborhood. Thus, the equilibrium market price for a given house is dependent on the vector $\boldsymbol{z}$ (i.e., $p(\boldsymbol{z}) = p(z_1, z_2, ..., z_k)$). As shown in Figure 1, the hedonic price function (P(z)) for attribute z_k is a reduced form function that is derived from the interaction of sellers with offer functions (o_1, o_2, o_3), and buyers with bid functions (b_1, b_2, b_3) in an implicit market. The model assumes that (a) there is perfect information about the bundle; (b) there are no transactions costs associated with the trading of attributes, and (3) there is a continual offering of housing attributes in the housing market. The hedonic price function is believed to be nonlinear since housing is immobile, and cannot be easily repackaged. If these assumptions hold, then the marginal implicit price of any given attribute, z_k, is derived as the partial derivative of the hedonic price function with respect to that attribute, or $p_{z_k}(\mathbf{z}) = \partial p / \partial z_k$.

Rosen (1974) was the first to recognize that the derived marginal implicit prices could be used to derive demand functions in a two-stage model. Briefly, a second stage model can regress levels of z_k on the implicit price, $p_{z_k}(\boldsymbol{z})$ in addition to demand shifters, or alternatively, estimate an inverse demand function in which the dependent variable is denoted by implicit price. We employ the latter approach here.

$$p_{z_k} = \beta_0 + \beta_1 \cdot z_k + \overline{\beta}_2 \cdot \overline{x} + e \qquad (1)$$

In the inverse demand function, the implicit price is a function of the level of the characteristic, z_k as well as a vector of demand shifters, $\bar{x}$. Since equation (1) includes an endogenous variable (z_k) it must be estimated via an instrumental variables procedure. Rosen (1974) characterized the identification problem as similar to any supply and demand system. If that is the case, one can either assume the supply function is exogenous meaning that the implicit price is demand determined (e.g., Harrison and Rubinfeld, 1978), or it can be assumed to be endogenous (Nelson, 1978) and supply shifters are then employed as instruments to identify the second stage demand functions. However, in the early 1980's, several studies (e.g., Brown and Rosen, 1982; Palmquist, 1984; Bartik, 1987; Epple, 1987) noted that the hedonic model had a unique form of endogeneity. Specifically, they argue that each implicit price results from a unique interaction between an individual demand and an individual supply function in the hedonic model as shown in Figure 2. Thus, a shift in the implicit supply of attribute z_k results in a corresponding shift in the implicit demand for that attribute.

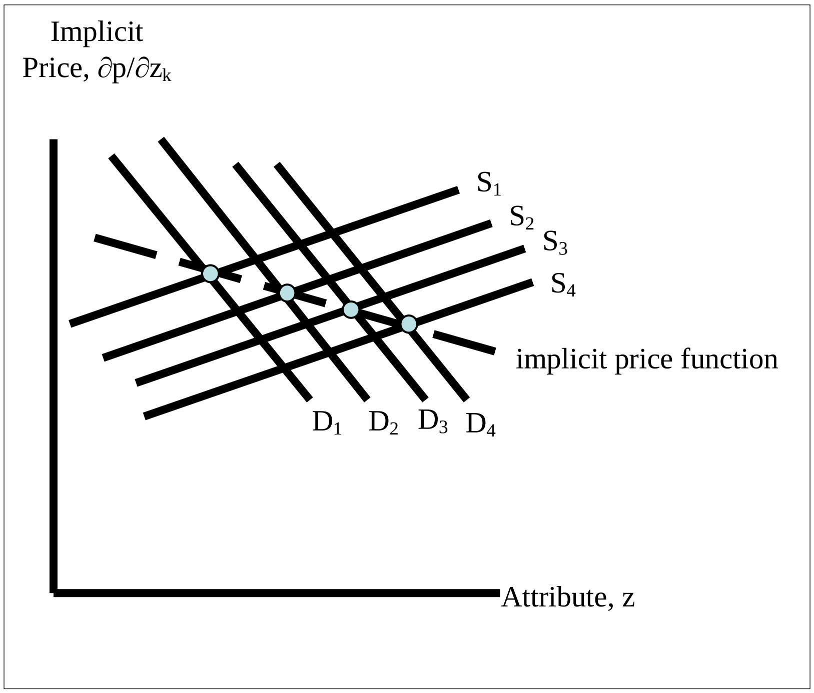

Figure 2 – Implicit Price Function

Thus, the appropriate alternative approach is to either impose functional form restrictions on the hedonic function (Chattopadhyay, 1999) or use data from multiple housing markets so as to generate inter-market variation in implicit prices (Epple (1988), Bartik (1987), Brown and Rosen (1982), Palmquist (1984)). Multiple market studies routinely employ data from different cities (Zabel and Kiel, 2000; Brasington and Hite, 2005), but Carruthers and Clark (2010) show that the spatial variation of submarkets within a single city can be used to solve endogeneity problem of the two stage hedonic model. Specifically, Carruthers and Clark use Geographically Weighted Regression (GWR) to derive the necessary spatial variation in implicit prices to derive second stage implicit demand functions.

Although GWR will be used to apply the approach outlined above to derive the demand for historic preservation, we are only in the early stages of generating GWR estimates[2]. Thus, in this preliminary version of the paper, we provide first stage hedonic regression estimates using a spatial lag model to determine first stage estimates. While this precludes the development of 2nd stage inverse demand estimates at this point, it does provide insights as to how the influence of historic preservation impacts properties in Milwaukee, and how those impacts differ across districts.

The spatial lag model is appropriate at this early stage of analysis, because housing markets are subject to a high degree of spatial dependence (Kim et al. 2003; Theebe 2004; Anselin and LeGallo 2006; Brasington and Hite 2005). On the supply side, homes in close proximity are often structurally similar. Likewise, on the demand side, homebuyers regularly emulate one another's behavior. The result is a process of spatial interaction among market participants, which, at a minimum, suggests that the first stage hedonic price function shown in equation (2) should be modified to include a spatial lag of its dependent variable (Anselin 1988; Anselin and Bera 1998). The spatial lag model is specified as:

$$\ln(P_i) = \beta_0 + \lambda \cdot W_{ij} \cdot \tilde{p} + \overline{\beta}_i \bar{z}_i + \mu_i \quad (2)$$

Where $W_{ij} \cdot \tilde{p}$ represents the spatial lag of the dependent variable ($W_{ij}, j \neq i$, is a row-standardized $n \times n$ weights matrix describing the connectivity of observations) giving the average sales price of nearby homes; and λ is an estimable spatial autoregressive parameter. Because the behavioral underpinning of equation (3) says that the sales prices of nearby homes influence one another, $W_{ij} \cdot \tilde{p}$ is endogenous to $\tilde{p}_i$ and the function cannot be properly estimated using ordinary least squares (OLS). A viable alternative, is a spatial two-stage least squares (S2SLS) estimation strategy developed by Kelejian and Prucha (1998), which, in a nutshell, involves regressing the spatially lagged variable on all explanatory variables plus spatial lags of those same variables to produce predicted values, and then using those predicted values in place of the actual values in equation (3). Like maximum likelihood estimation, S2SLS yields efficient, unbiased parameter estimates, even in the presence of spatial error dependence (Das et al. 2003). In the

[2] GWR involves calibrating a separate regression centered on the location of every single observation in the dataset and, at the location of each regression, information from other locations is discounted with distance from it, so that closer observations have a greater influence on the model's solution. The technique is computationally complex and the output is extensive, consisting of a total of $n \cdot k$ parameters, so, in the case of our more simplistic model, there are case, 602,028 unique estimates (i.e., 21,501*28). In addition, the estimation process is complicated by the fact that some historic districts that are far away from a given property fall out of that property's individual sample. Thus, time did not permit an application of GWR to this problem.

context of the present discussion, the spatial lag in equation (3) works like a flexible fixed effect, absorbing unobserved spatial correlation in the structure of supply and/or demand.

3. Historic Preservation Literature

Most of the earliest studies related to historic preservation utilized a difference-in-difference approach. With this approach, property values within a district are compared to those in non-designated areas. However, the major shortfall of this method is that it only considers changes in the average prices of the properties evaluated. It does not control for other factors that could influence the price of the house, such as neighborhood or property characteristics. In order to overcome this shortcoming, most studies now use a hedonic approach to estimate the impact on property values. These hedonic studies have produced some mixed results, with some showing that having a historic designation actually has a negative impact on property values.

The list of requirements to designate and maintain a historical property is rather extensive. Therefore, it is theoretically possible that the regulations imposed by the historical preservation committee may outweigh any potential benefits of having it designated as a historic site. Asabere, Huffman, and Mehdian (1994) observed this in their study of small, historic apartment buildings in Philadelphia. They found that these historic apartment buildings were selling for less compared to properties that were not locally certified. And since there was no statistical difference between federal and local historic districts, they concluded that the guidelines set forward in Philadelphia are too restrictive, thus leading to a decrease in property values. A similar result was found by Asabere and Huffman (1994a) in their study of residential condominium sales in Philadelphia. In this study, they examined the impact of historic façade easements on the property value. Historic façade easements are grants by the owners of historic properties that are used to preserve the outside appearance of the structure. The owner typically receives a federal income tax deduction. However, any subsequent owners are left with the restrictions of the façade easement and without a tax deduction. Therefore, properties with prior grants of historic façade easements sell at a discount compared to other properties.

Other studies have shown that historic designation increases property values. One of the earliest studies to use a hedonic approach to estimate the impact of historic preservation on home prices was done by Ford (1989). Ford studied local historic districts in Baltimore, Maryland and concluded that historic districts have higher prices than other similar properties not located in a historic district. Coffin (1989) did a study of two Chicago suburbs, Elgin and Aurora. Aurora established a historic district in 1984 and Elgin established a historic district in 1985. The difference between these two cities is that Aurora has an ordinance governing land use within the historic district, while Elgin does not. Coffin found that historic designation did increase property values in the area, but it was not statistically significant in Elgin. The differences between the two cities could not be simply explained by the lack of an ordinance in Elgin. Coffin attributes the differences to better quality information being conveyed to the citizens of Aurora compared to Elgin.

Asabere and Huffman (1994b) found that owner-occupied homes in Philadelphia located in a federally certified historic district sold at a premium even though the houses did not qualify for rehabilitation investment tax credits. This implies that the premium can be attributed to the location in the historic district. Clark and Herrin (1997) also found that property values were higher on average in historic districts in their study of Sacramento, California. Similarly, Coulson and Leichenko (2001) find that the benefits associated with historical designation in Abilene, Texas far outweigh any of the costs.

More recently, Leichenko, Coulson, and Listokin (2001) expanded upon the previous literature by developing their model on a sample of nine cities within Texas. All studies to this point have been made on a sample within a specific city. The authors argue that the conclusions drawn from these studies are made on too narrow of a sample. However, just like many studies before, the authors conclude that historic designation has a positive impact on property values. Finally, Coulson and Lahr (2005) analyzed appreciation rates across neighborhoods in Memphis, Tennessee. They argue that by using appreciation rates, one can avoid some of the objections of using appraisal data while also reducing some of the bias found in the differences between designated and non-designated areas. Nevertheless, the final outcome is similar to previous results. They find that historic designation has a positive effect on home appreciation rates.

Table 1: Summary of Previous Hedonic Studies on Historic Designation

Study	Location	Impact of Historic Designation on Property Values
Ford (1989)	Baltimore, MD	Positive
Coffin (1989)	Aurora, IL; Elgin, IL	Positive
Asabere and Huffman (1994a)	Philadelphia, PA	Negative
Asabere and Huffman (1994b)	Philadelphia, PA	Positive
Asabere, Huffman, and Mehdian (1994)	Philadelphia, PA	Negative
Clark and Herrin (1997)	Sacramento, CA	Positive
Coulson and Leichenko (2001)	Abilene, TX	Positive
Leichenko, Coulson, and Listokin (2001)	Abilene, TX; Dallas, TX; Fort Worth, TX; Grapevine, TX; Laredo, TX; Lubbock, TX; Nacogdoches, TX; San Antonio, TX; San Marcos, TX	Positive
Coulson and Lahr (2005)	Memphis, TN	Positive

4. Empirical Model

In 1981, the city of Milwaukee created the Historic Preservation Commission[3]. The purpose of the commission is to protect and preserve historical sites, buildings and districts which represent or reflect elements of Milwaukee's cultural, social, economic, political, and architectural history. It also aims to safeguard the city's historic and cultural heritage. Once a property has been designated as a historical site, no owner, renter, or other occupant of the house can make any alterations to the exterior without first obtaining a *Certificate of Appropriateness* from the historic preservation commission. This is to ensure that the proposed exterior changes are consistent with the historical character of the building or historical district. To date, there are 41 Historic Preservation Districts in the City of Milwaukee. The districts are represented in Figure 3. In this study, we evaluate the impact of 22 of those districts[4] on residential single-family home prices using a sample of 21,501 homes[5] that sold in Milwaukee County between January 1998 and March 2004[6]. From this sample, 430 homes were located within historic districts, and 96 homes were within a 100 foot buffer of a district.

As noted above, although the ultimate goals is to derive second stage demand functions, only preliminary estimates of the first stage, are available in this draft. The hedonic model is a semi-log, multivariate regression with the following basic form:

ln(RealPrice) = f(Structural, Neighborhood, Historic Preservation, Date, Spatial Lag) (3)

where *ln(RealPrice)* is the natural logarithm of the real sale price of the house, which has been deflated using the CPI-U and stated in 2004 dollars. The explanatory variables include both structural and neighborhood characteristics of the house in addition to its status as a historical site.

The first category of variables represented in the model is the actual structural characteristics of the house. These attributes include the age of the house (*Age*), the size of the house measured in square feet (*Interior Square Feet*), the total number of bedrooms (*Bedrooms*), the number of full and half bathrooms (*Fullbaths, Halfbaths*), as well as whether there is a garage with the property (*Garage*). Metro MLS also indicates whether the property is a conforming property (*Conforming*). This variable indicates that a property has passed various building inspections and is up-to-code at the time of sale, and thus it

[3] The Commission consists of seven members, of which there is one registered architect, one historian or architectural historian, and one person experienced in either real estate development or real estate finance. The Commission also includes one member from the city's Common Council. The remaining three members are citizens with an interest in the field of historic preservation.

[4] Note that the districts not included in the analysis did not have homes that sold either in the district or within 100 feet of the district in our sample.

[5] This represents approximately 45.5% of the homes that sold over that period.

[6] The authors would like to thank Metro MLS for providing the data for this study.

Table 1: Variable Name, Description, Source, and Descriptive Statistics			
Variable	**Description**	**Descriptive Statistics**	**Data Source**
Real Sale Price	Sale price deflated using CPU-All urban consumers, put in 2004 dollars.	Mean= 128,106 σ=76,969 Min= 5235 Max=2,072,432	MetroMLS
Structural Variables			
Age	Age of property in years	Mean= 51.3 σ=26.4 Min=0 Max=149	MetroMLS
Interior Square Feet	Number of square feet of interior space	Mean= 1388.5 σ=649.4 Min=400 Max=45,130	MetroMLS
Bedrooms	Number of bedrooms	Mean= 3.01 σ=0.78 Min=1 Max=12	MetroMLS
Full Baths	Number of full bathrooms	Mean=1.27 σ=0.49 Min=0 Max=5	MetroMLS
Half Baths	Number of half bathrooms	Mean= 0.404 σ=0.503 Min=0 Max=9	MetroMLS
Garage	1=Property has a garage, 0=otherwise.	Mean=0.894	MetroMLS
Conforming	1=property is a conforming property, 0=otherwise.	Mean=0.503	MetroMLS
Neighborhood Variables			
Property Tax Rate	Property tax rate=taxes paid/sale price.	Mean=0.026 σ=0.019 Min=0 Max=1.83	MetroMLS
Milwaukee School District	1=property in MSD, 0=otherwise	Mean=0.549	U.S. Census
Commute Time	Average minutes of commute time for residents in census tract.	Mean= 23.34 σ=2.51 Min= 132.73 Max=50.26	U.S. Census
Milwaukee Distance	Distance of property from population Centroid of Milwaukee in feet.	Mean= 9542.24 σ=4757.20 Min= 85.19 Max=23262.58	U.S. Census - computed
Near Airport	1=within 1 mile of an airport, 0=otherwise.	Mean=0.051	ArcMap Streetmap
Distance to Arterial	Distance to closest major street or highway in feet.	Mean= 190.20 σ=162.19 Min= 0 Max=1627.19	ArcMap Streetmap
Near Railroad	1=within ¼ mile of railroad, 0=otherwise	Mean=0.201	ArcMap Streetmap
Near Lake, River, Stream	1=within ¼ mile of lake, river or stream, 0=otherwise	Mean=0.235	ArcMap Streetmap
Within Floodplain	1=within 100 year floodplain, 0=otherwise	Mean=0.022	FEMA
Real Median Family Income	Real median family income of homes in census tract.	Mean= 57,870 σ=19157 Min=9470 Max=213129	U.S. Census
% Occupied	Percent of housing units in the census tract that are occupied.	Mean= 0.956 σ=0.032 Min=0.71 Max=1.0	U.S. Census
% Owner Occupied	Percent of the occupied units in the census tract that owner occupied.	Mean= 0.588 σ=0.185 Min=0.012 Max=0.962	U.S. Census
Housing Unit Density	Housing units per acre in the census tract.	Mean= 4.13 σ=3.03 Min= 0.06 Max=34.34	U.S. Census
% White	Percent of the population in the census tract that is white.	Mean= 0.757 σ=0.282 Min=0.0004 Max=0.989	U.S. Census
Distance to Hazard	Distance to closest EPA air monitor, Toxic Release Inventory site, or Superfund site.	Mean= 908.08 σ=625.8 Min=3.16 Max=6207.01	U.S. Census

Table 1 – Continued: Variable Name, Description, Source, and Descriptive Statistics			
Variable	**Description**	**Descriptive Statistics**	**Data Source**
Time Related Variables			
Days on Market	Number of days from listing to accepted offer.	Mean= 55.57 σ=73.11 Min=0 Max=1114	MetroMLS
Year	Year in which property sold	Mean= 2000.88 σ=1.714 Min=1998 Max=2004	MetroMLS
Historic Preservation Variables			
Any Historic District	1=within any historic district in Milwaukee.	Mean= 0.020001	City of Milwaukee
Near Any Historic District	Within 100 feet of any historic district in Milwaukee.	Mean= 0.004465	City of Milwaukee
Near Property on Historic Registry	Within 100 feet of any property that is on the U.S. Registry of Historical Places.	Mean= 0.018	City of Milwaukee
Specific HPD's			
Bayview	1=property is in district 0=otherwise	Mean= 0.001256	City of Milwaukee
Brewer's Hill	1=property is in district 0=otherwise	Mean= 0.001209	City of Milwaukee
Concordia	1=property is in district 0=otherwise	Mean= 0.000512	City of Milwaukee
Downer Ave. Commercial	1=property is in district 0=otherwise	Mean= 0.000279	City of Milwaukee
East Side Commercial	1=property is in district 0=otherwise	Mean= 0.000744	City of Milwaukee
Garden Homes	1=property is in district 0=otherwise	Mean= 0.000465	City of Milwaukee
Grant Blvd.	1=property is in district 0=otherwise	Mean= 0.000791	City of Milwaukee
Historic Third Ward	1=property is in district 0=otherwise	Mean= 0.005861	City of Milwaukee
Kenwood Park/Prospect Hill	1=property is in district 0=otherwise	Mean= 0.000093	City of Milwaukee
Layton	1=property is in district 0=otherwise	Mean= 0.000930	City of Milwaukee
McKinley	1=property is in district 0=otherwise	Mean= 0.000372	City of Milwaukee
Newberry	1=property is in district 0=otherwise	Mean= 0.000558	City of Milwaukee
North 1st Street	1=property is in district 0=otherwise	Mean= 0.000186	City of Milwaukee
North 3rd Street	1=property is in district 0=otherwise	Mean= 0.000140	City of Milwaukee
North 47th Street	1=property is in district 0=otherwise	Mean= 0.0000465	City of Milwaukee
Plankington/Wells/Water Street	1=property is in district 0=otherwise	Mean= 0.0000930	City of Milwaukee
Prospect Mansions	1=property is in district 0=otherwise	Mean= 0.000326	City of Milwaukee
Prospect Avenue	1=property is in district 0=otherwise	Mean= 0.000558	City of Milwaukee

Table 1- Continued: Variable Name, Description, Source, and Descriptive Statistics			
Variable	**Description**	**Descriptive Statistics**	**Data Source**
Sherman Park	1=property is in district 0=otherwise	Mean= 0.001023	City of Milwaukee
Walkers Point	1=property is in district 0=otherwise	Mean= 0.000279	City of Milwaukee
Washington/Hi Point	1=property is in district 0=otherwise	Mean= 0.000837	City of Milwaukee
West Side Commercial	1=property is in district 0=otherwise	Mean= 0.000326	City of Milwaukee
Near Historic District Dummy Variables.			
Bayview	1=property is within 100 feet of district, 0=otherwise	Mean= 0.000837	City of Milwaukee
Brady Street Commercial	1=property is within 100 feet of district, 0=otherwise	Mean= 0.000186	City of Milwaukee
Brewer's Hill	1=property is within 100 feet of district, 0=otherwise	Mean= 0.000326	City of Milwaukee
Downer Ave. Commercial	1=property is within 100 feet of district, 0=otherwise	Mean= 0.000093	City of Milwaukee
Forest Home	1=property is within 100 feet of district, 0=otherwise	Mean= 0.000186	City of Milwaukee
Grant Blvd	1=property is within 100 feet of district, 0=otherwise	Mean= 0.0000465	City of Milwaukee
Highland Blvd.	1=property is within 100 feet of district, 0=otherwise	Mean= 0.0000465	City of Milwaukee
McKinley	1=property is within 100 feet of district, 0=otherwise	Mean= 0.0000465	City of Milwaukee
Newberry	1=property is within 100 feet of district, 0=otherwise	Mean= 0.000279	City of Milwaukee
North 47th St.	1=property is within 100 feet of district, 0=otherwise	Mean= 0.0000465	City of Milwaukee
North Point N.	1=property is within 100 feet of district, 0=otherwise	Mean= 0.0000930	City of Milwaukee
Prospect Ave.	1=property is within 100 feet of district, 0=otherwise	Mean= 0.001395	City of Milwaukee
Sherman Park	1=property is within 100 feet of district, 0=otherwise	Mean= 0.000279	City of Milwaukee
Washington/Hi Point	1=property is within 100 feet of district, 0=otherwise	Mean= o.000419	City of Milwaukee

can be used as a measure of building quality. In addition, we interact the *Age* variable with a dummy variable for the *Historic District* to allow the effect of age on housing prices to differ for homes in historic districts as compared to those outside a district. The complete list of variables, along with their definitions, can be found below in Table 1.

The next category of variables involves the surrounding neighborhood of the property. The data for these attributes was attained from a number of different sources. These include data reported by MetroMLS, the U.S. Census Bureau (2000), FEMA, the US. EPA, as well as variables computed using ArcGIS software and the Streetmap data disk which includes geocoded shapefiles for various geographic (e.g., airports, railroads, roadways, and water etc) to determine proximity to those sites (*Near Airport, Distance to Arterial, Near Railroad, Near Lake, River or Stream*). The MetroMLS data was used to capture the amount of property taxes paid, and this was put in rate form by dividing by the sale price (*Property Tax Rate*). Also reported in the MetroMLS data was the school district, and we include a dummy variable for the *Milwaukee Public School District.* U.S. Census data for the Census Tract in which the property resides was used to identify various neighborhood features including *Real Median Family Income* (deflated to 2004 dollars); percent of the homes in the tract that are occupied (*% Occupied*); the percent of the occupied units that are owner occupied (*% Owner Occupied*); the number of housing units per square mile (*Housing Unit Density*); and the percent of the population in the tract that is white (*% White*). Also included is the U.S. Federal Emergency Management Administration's 100 year floodplain boundaries (*Within Floodplain*), as well as the distance of the property to the closest EPA air quality site, Toxic Release Inventory site, or Superfund site (*Distance to Hazard*), and also the distance of the property to the population weighted center of Milwaukee (*Milwaukee Distance*).

To capture the influence of time, two variables are included. The first is the date (*Year of Sale*) and the second is the number of days that the property was on the market (*Days on Market*). The latter variable likely proxies unmeasured qualitative characteristics of the property, or a listing price that was too high. Finally, given that the primary goal of this study is to examine the impact of historic districts on home sale prices, and then determine what factors influence those prices, we include several different types of variables, and we include two different types of models. The first model uses three variables to explore the influence of historic preservation. A dummy variable was created if a property was in a historic preservation district (*Any Historic District*), and a second variable measured whether a property was outside, but within 100 feet of a district (*Near Any Historic District*) to capture any possible spillover effects associated with a district. Finally, although none of the properties that sold in our sample were actually on the U.S. Registry of Historic Places, a number of properties were within 100 feet of such a property (*Near Property on Historic Registry*). The second specification uses individual dummy variables for the specific historic district in which the property resides (there were 22 in total), as well as dummy variables for the district which borders the property (i.e., is within 100 feet of the property), and there were (14 of these), in addition to the *Near Registry of Historic Places* variable.

5. Empirical Findings

The findings from the simple specification of historic preservation are reported in Table 2. Overall, the model explains 83.7% of the variation in real home prices. A White's test revealed the presence of heteroskedasticity, and White's correction was used to generate robust estimates of the standard errors. Turning to the individual variables, it is not surprising to find that there are strong neighborhood effects captured in the *Spatial Lag* variable, as its coefficient is positive and highly significant. An examination of the structural features of the property reveal that older homes decline in age (i.e., about 0.3% per year), although the negative effect of age is mitigated (i.e., it falls just 0.2% per year) when the property is located in a historic district. Note that the latter coefficient has a prob. value of 0.16. All remaining structural variables have the anticipated sign and are highly significant. Specifically, an additional 1000 *Interior Square Feet* increases the real sale price by 9.8%. An additional *Bedroom* adds 8% to the value, whereas another *Full Bath* increases the price by 10.5% and another *Half Bath* increases it by 8.4%. The strongest influence on the real price is the presence of a *Garage* which adds 27.5%. Finally, not surprisingly, *Conforming* properties have higher real prices than those that are non-conforming (i.e., +6.8% higher).

The variables measuring the impact of *Neighborhood Characteristics* generally perform as expected, although not all are statistically significant. Higher values of the effective *Property Tax Rate* significantly reduce the real sale price (e.g., a 1 percentage point change in the rate reduces real prices by 6.1%) whereas location within the *Milwaukee Public School District* has a negative but insignificant effect on the real price. The model predicts a negatively sloped distance gradient, with an additional minute of *Commute Time* reducing the real value by 1.1%. Proximity to the population weighted centroid of Milwaukee has a positive, but insignificant impact on the real property value, but distance from roadways (*Distance from Arterial)* and also distance from railroads (*Near Railroad)* both significantly increase the real sale price of homes in the sample. Interestingly, being within a mile of the airport (*Near Airport*) raises the sale price by 2.9% compared to more distant properties suggesting the noise disamenities are not significant enough to offset the benefits of proximity. Being within ¼ mile of water (*Near Lake*, *River*, *Stream)* has a positive and significant impact on real home values (+3.3%), and being *Within a Floodplain* has a negative, but insignificant influence. Higher values for *%Occupied* and *Housing Unit Density* significantly increase real property sales prices, as does a higher *%White*, but higher *% Owner Occupied* in the neighborhood surprisingly significantly reduces real home values. Finally, the *Distance to Hazard* variable is not statistically significant. The variables related to time indicate that the longer a property is on the market (*Days on Market)*, the lower is the real sales price. Specifically, each additional 100 days, reduces real home values by 3.2%, and there is a positive rate of appreciation (5.7% per year) over the 1998 – 2004 period.

Table 2: First Stage Hedonic Model – Spatial 2SLS Estimates Simple Specification with Single Historic Dummies				
Dependent variable – Natural Log of Real Home Sale Price (2004 dollars)				
	Coefficient	**Std. Error**	**t-Statistic**	**Prob.**
Intercept	-108.0563	4.482919	-24.104	0.0000
Spatial Lag	0.340351	0.017934	18.978	0.0000
Structural Characteristics				
Age	-0.002890	0.000309	-9.357	0.0000
*Age*HPD*	0.001025	0.000732	1.399	0.1618
Interior Square Feet	9.80E-05	3.82E-05	2.565	0.0103
Bedrooms	0.080185	0.009668	8.294	0.0000
Full Baths	0.104674	0.016706	6.266	0.0000
Half Baths	0.083645	0.009262	9.031	0.0000
Garage	0.274865	0.022145	12.412	0.0000
Conforming	0.068162	0.003635	18.754	0.0000
Neighborhood Characteristics				
Property Tax Rate	-6.101008	2.790557	-2.186	0.0288
Milwaukee School District	-0.004212	0.008773	-0.480	0.6311
Commute Time	-0.010518	0.001288	-8.167	0.0000
Milwaukee Distance	-5.90E-07	4.86E-07	-1.214	0.2249
Near Airport	0.029022	0.006475	4.482	0.0000
Distance to Arterial	4.65E-05	1.28E-05	3.643	0.0003
Near Railroad	-0.010662	0.005250	-2.031	0.0423
Near Lake, River, Stream	0.032625	0.005128	6.362	0.0000
Within Floodplain	-0.014928	0.013206	-1.130	0.2583
Real Median Family Income	5.12E-06	3.32E-07	15.389	0.0000
% Occupied	1.187056	0.161828	7.335	0.0000
% Owner Occupied	-0.220704	0.020644	-10.691	0.0000
Housing Unit Density	0.010558	0.001597	6.612	0.0000
% White	0.497594	0.035162	14.152	0.0000
Distance to Hazard	-4.45E-07	3.58E-06	-0.124	0.9012
Variables related to Time				
Days on Market	-0.000321	3.67E-05	-8.768	0.0000
Year of Sale	0.056827	0.002142	26.535	0.0000
Historic Preservation Variables				
Any Historic District	0.266374	0.074255	3.587	0.0003
Near Any Historic District	0.135584	0.036595	3.705	0.0002
Near Property on Historic Registry	-0.078301	0.058778	-1.332	0.1828
R-squared	0.837248	Mean dependent var		11.59320
Adjusted R-squared	0.837028	S.D. dependent var		0.632223
S.E. of regression	0.255227	Sum squared resid		1398.638
F-statistic	3661.414	Second-Stage SSR		1676.953
Prob(F-statistic)	0.000000	Included observations		21501

In the simple specification, properties that were in *Any Historic District* sold at a significant premium (i.e., 26.7%) as compared to those outside a district. In addition, there appears to be a spillover effect, with properties *Near a Historic District* selling for 13.5% higher real prices than more distant properties. However, being in close proximity to the individual properties on the Historic Registry does not have a beneficial effect, with homes within 100 feet of a Historic Registry home selling at 7.8% lower real prices, other things equal. The negative coefficient is not significant however.

While the simple specification gives an overall impression of the average impact, a more complete picture requires that individual districts be examined separately. The results of this more detailed specification are reported in Table 3. The findings on the *Spatial Lag,* ***Structural Characteristics*** variables, ***Neighborhood Characteristics*** variables and ***Variables related to Time*** are remarkably robust between the two specifications. Thus we turn to the variables of interest in the ***Historic Preservation Dummy Variables,*** and the ***Adjacent to Historic Preservation Dummy Variables***. A review of the point estimates for the individual district dummies reveals that 16 of the 22 districts have positive coefficients, with 10 statistically significant at the 5% level of significance, and three others significant at the 10% level. Of these 13 positive coefficients, the magnitudes vary between 0.11 (i.e., an 11% premium) for the *Washington/Hi Point* district to 0.65 for the *North 3rd Street* district. Of the 6 coefficients with a negative coefficient, none have t-scores over 1.0. In contrast, the spillover effects as seen in the coefficients of properties that are within 100 feet of a specific district show 6 of 14 coefficients positive and significant at the 5% level of significance; 3 negative at the 5% level and the rest insignificant. Finally, once again, the proximity to properties on the Historic Registry do not significantly influence the real sale price of housing.

Table 3: First Stage Hedonic Model – Spatial 2SLS Estimates Detail Specification with Individual District Dummies					
Dependent variable – Natural Log of Real Home Sale Price (2004 dollars)					
	Coefficient	**t-Stat**		**Coefficient**	**t-Stat**
Intercept	-109.3462	-23.536	*Spatial Lag*	0.361510	20.245
Structural Characteristics					
Age	-0.002836	-9.251	*Full Baths*	0.104118	6.206
*Age*HPD*	0.000877	1.095	*Half Baths*	0.083930	9.080
Interior Square Feet	9.94E-05	2.538	*Garage*	0.271803	13.040
Bedrooms	0.083301	8.912	*Conforming*	0.067614	18.705
Neighborhood Characteristics					
Property Tax Rate	-5.989783	-2.160	*Within Floodplain*	-0.010216	-0.760
Milwaukee School District	-0.004887	-0.607	*Real Median Family Income*	4.81E-06	13.294
Commute Time	-0.008746	-7.078	*% Occupied*	1.417647	6.581
Milwaukee Distance	-3.23E-07	-0.620	*% Owner Occupied*	-0.231021	-10.114
Near Airport	0.025594	4.161	*Housing Unit Density*	0.011300	6.710
Distance to Arterial	4.11E-05	3.331	*% White*	0.487288	14.876
Near Railroad	-0.014139	-2.679	*Distance to Hazard*	-1.09E-06	-0.313
Near Lake, River, Stream	0.028499	5.998			
Variables related to Time					
Days on Market	-0.000335	-9.303	*Year of Sale*	0.057227	26.14404
Historic Preservation Dummy Variables					
Bayview	0.119949	1.795	*Newberry*	-0.026453	-0.432
Brewer's Hill	0.374984	2.894	*North 1st Street*	-0.088349	-0.197
Concordia	-0.034292	-0.248	*North 3rd Street*	0.647216	4.808
Downer Ave. Commercial	0.387068	4.476	*North 47th Street*	0.402501	5.110
East Side Commercial	0.326354	4.680	*Plankington/Wells/Water Street*	0.401526	2.354
Garden Homes	-0.130595	-0.944	*Prospect Mansions*	-0.060334	-0.412
Grant Blvd.	0.406160	5.198	*Prospect Avenue*	0.129389	1.720
Historic Third Ward	0.334764	3.189	*Sherman Park*	0.374325	4.484
Kenwood Park/Prospect Hill	0.041340	0.733	*Walkers Point*	-0.095139	-0.698
Layton	0.012717	0.244	*Washington/Hi Point*	0.110143	1.787
McKinley	0.283911	1.185	*West Side Commercial*	0.557311	4.753

Table 3 - continued: First Stage Hedonic Model – Spatial 2SLS Estimates Detail Specification with Individual District Dummies					
Dependent variable – Natural Log of Real Home Sale Price (2004 dollars)					
Adjacent to Historic Preservation Dummy Variables					
	Coefficient	**t-Stat**		**Coefficient**	**t-Stat**
Bayview	0.360571	10.091	*McKinley*	-0.440563	-12.012
Brady Street Commercial	-0.076795	-0.274	*Newberry*	-0.072013	-0.752
Brewers Hill	0.395936	2.494	*North 47th Street*	-0.062941	-1.618
Downer Ave. Commercial	0.173869	3.138	*North Point North*	0.210008	3.639
Forest Home	-0.177621	-0.932	*Prospect Ave.*	0.205899	3.769
Grant Blvd.	-0.888202	-17.369	*Sherman Park*	0.121186	0.712
Highland Blvd.	-0.351465	-17.269	*Washington/Hi Point*	-0.001928	-0.025
Near Property on Historic Registry	0.020854	0.256			
R-squared		0.840436	Mean dependent var		11.59320
Adjusted R-squared		0.839967	S.D. dependent var		0.632223
S.E. of regression		0.252915	Sum squared resid		1371.242
F-statistic		1725.572	Second-Stage SSR		1639.842
Prob(F-statistic)		0.000000	Included observations		21501

An average implicit price for the location of a property in a historic district can be derived as: $\gamma = \hat{\beta}_i \overline{P}_i$ since equation (3) is in log form. Implicit prices are derived in Table 4 for the historic districts, and also for the properties bordering these districts. In addition, the average *Real Median Family Income* and the average *%White* variables for those observations for which the respective dummy variable is equal to one are also presented. The first thing to note is that these districts are found throughout the socio-demographic strata of the city, with *Real Median Family Income* ranging between \$17,744 and \$110,844, and *%White* ranging between 7.7% and 93.9%. When examining the simple correlations between the implicit price for location within the district with these demographic features, there appears to be no relationship. Specifically, whether we consider all implicit prices for these districts, or just those that are derived from significant coefficients, neither the correlation between the implicit price, γ and either of the socio-demographic indicators was statistically significant[7]. On the other hand, when an evaluation of those properties that border historic districts reveals that the implicit price is positively correlated with both indicators, and in the case where only the values of γ that are derived from significant coefficients are considered, the correlations are highly significant[8]. It is important to not to try

[7] A simple t-test for significance was derived, where the t_{actual}=r*sqrt(n-2)/sqrt(1-r^2). The t-scores were compared to critical values with df=n-2.
[8] The 5% critical t-score, with 7 df is t_c=2.365, and the t_{actual}=3.89 for the correlation with *Real Median Family Income*, and t_{actual}=3.38 for the correlation with *%White.*

Table 4: Computed Average Implicit Price and Select Neighborhood Characteristics						
Historic District	**Coefficient**	**Signif. Level**	**Average Sale Price**	**Average Implicit Price**	**Average Real Median Family Income**	**%White**
Bayview	0.119949012	*	$184,015	$22,072	$52,621	89.4%
Brewers Hill	0.374984293	***	$123,367	$46,261	$36,574	24.2%
Concordia	-0.034291838		$172,648	-$5,920	$24,486	31.1%
Downer Ave. Commercial	0.387067506	***	$170,909	$66,153	$73,614	90.6%
East Side Commercial	0.32635363	***	$261,653	$85,391	$65,030	80.1%
Garden Homes	-0.130594653		$33,200	-$4,336	$32,397	30.9%
Grant Blvd.	0.406160412	***	$133,169	$54,088	$32,520	9.5%
Historic Third Ward	0.334764348	***	$137,876	$46,156	$106,261	90.2%
Kenwood Park/Prospect Hill	0.041340142		$313,531	$12,961	$110,844	93.9%
Layton	0.012717096		$97,213	$1,236	$36,683	58.3%
McKinley	0.283911017		$110,968	$31,505	$22,086	16.1%
Newberry	-0.026452695		$413,849	-$10,947	$101,764	93.5%
North 1st St.	-0.088349279		$58,770	-$5,192	$24,163	7.7%
North 3rd St.	0.647216223	***	$208,313	$134,824	$17,744	41.6%
North 47th St.	0.402500754	***	$111,212	$44,763	$34,561	10.7%
Plankington/Wells/Water St.	0.401526244	***	$184,545	$74,100	$67,079	80.1%
Prospect Mansions	-0.060333866		$193,134	-$11,653	$86,195	88.4%
Prospect Avenue	0.12938911	*	$144,582	$18,707	$87,305	88.4%
Sherman Park	0.374325329	***	$114,899	$43,010	$32,935	12.4%
Walkers Point	-0.095138515		$67,052	-$6,379	$28,946	69.5%
Washington/Hi Point	0.110143031	*	$255,485	$28,140	$56,374	82.5%
West Side Commercial	0.557310777	***	$291,578	$162,500	$90,506	80.6%
Near Historic District		**Signif. Level**	**Average Sale Price**	**Average Implicit Price**	**Average Real Median Family Income**	**%White**
Bayview	0.360570693	***	$151,831	$54,746	$64,391	92.7%
Brady Street Commercial	-0.076794643		$151,278	-$11,617	$40,570	78.4%
Brewer's Hill	0.395936157	***	$289,380	$114,576	$58,294	59.4%
Downer Ave. Commercial	0.173869315	***	$378,641	$65,834	$71,728	90.6%
Forest Home	-0.177620852		$61,242	-$10,878	$34,815	57.3%
Grant Blvd	-0.888201947	***	$25,309	-$22,480	$21,966	8.2%
Highland Blvd.	-0.351465136	***	$43,066	-$15,136	$27,174	32.3%
McKinley	-0.440562961	***	$30,549	-$13,459	$22,943	16.1%
Newberry	-0.072013095		$350,754	-$25,259	$106,917	93.9%
North 47th St.	-0.062940838		$71,000	-$4,469	$46,791	21.5%
North Point N.	0.210008231	***	$377,504	$79,279	$87,736	92.8%
Prospect Ave.	0.205898967	***	$224,485	$46,221	$51,522	87.4%
Sherman Park	0.121186104		$45,562	$5,521	$26,522	7.8%
Washington/Hi Point	-0.001928086		$148,519	-$286	$65,614	87.3%
*** 1% Signif. Level; ** 5% Signif. Level; * 10% Signif. Level						

to make too much of these findings. A true second stage model will employ individual data derived from the original sample, and then relate the implicit prices to a number of demographic and district specific indicators to judge why willingness to pay for homes within a specific historic district, or homes near a given district, differs. Nonetheless, these findings do suggests that there are at least broad signals that the premiums associated with proximity to historic districts are related to demographic features of the neighborhood.

6. Conclusions and Future Directions

These preliminary findings do validate what others have found, and that is that historic preservation efforts can successfully internalize the externalities that can exist in neighborhoods with older historic homes, and that on net, these positive impacts can overwhelm any negative influence that higher costs associated with satisfying the local statutes. Furthermore, as a local economic development tool, it appears that these positive impacts broadly impact the economic strata of neighborhoods, with the within-district benefits observed in both low and high income neighborhoods. It does appear that the spillover effects we observed are more likely to be seen in more affluent, as well as less diverse neighborhoods, although more extensive work needs to be undertaken before strong conclusions can be drawn. Finally, the beneficial effects do not extend to proximity to individual historic properties. This is perhaps not surprising since the external benefits would be expected to be minor, and erode relatively quickly for an individual historic property as compared to a broad district.

Time did not permit the full derivation of first stage Geographically Weighted Regression (GWR) estimates which could then be used to derived true second stage estimates of the implicit demand for historic preservation. It should be noted that an initial model estimated the regression in Table 2 using GWR, and the results were similar. Recall that there an individual weighted regression is estimated for each observation. The findings suggested that the coefficient on the *Any Historic District* dummy variable was positive in all regressions, with point estimates ranging from a minimum premium of 8.4% to a maximum premium of 51.1%. The median estimate gave a premium of 35.3%. This is slightly higher than the estimated premium of 26.6% derived from the Spatial 2SLS model. In addition, the estimated parameter on *Near Any Historic District* ranged between -21.7% to 38.1% with the median estimate at 8.8% which was somewhat lower than the 13.6% estimated premium presented in this paper. It is clear that there is substantial variation in the GWR model, and we are hopeful that such variation can be used to derive robust second stage estimates. Among the potential determinants of the implicit price are characteristics of the neighborhood itself (e.g., average income, age of housing in the neighborhood, demographic mix, type of housing, etc.) as well as some of the features of the district (e.g., How long has the district been in existence? Is there an organized neighborhood organization operating within the district? Are there homes on the National Registry in the district? Etc.).

In addition, there do remain some important issues to address as we develop this model. Demand for historic preservation, in the context of a local housing market can be thought of as a dichotomous, as opposed to a continuous choice. That is, either you choose to buy a home in the district, or you do not. And while it is possible to live near the district, it is likely that the beneficial effects from that proximity erode relatively quickly with distance from the district. Thus, unlike environmental goods in which distance from the hazard can be used to represent gradations of quantity demanded, measuring quantity changes in historic preservation is more challenging. Thus, it is our intention to estimate an inverse demand function, with the implicit price being the dependent variable. One approach to measuring the quantity measure is to combine implicit prices for location within various districts, and then include dummy variables for the specific districts in the community as the endogenous quantity measure. That is, the unique level of quantity of historic preservation would be reflected by the district dummy variable. A similar approach can be used with the *Near Any Historic District* variable, only in this case, one can also consider a distance based measure as well to see how quickly the proximity premium erodes. We are interested in other ways of measuring quantity as well.

References

Asabere, Paul K. and Forrest E. Huffman (1994a). "The Value Discounts Associated with Historic Façade Easements." *The Appraisal Journal,* Vol. 62, No. 2, pp. 270-277.

Asabere, Paul K. and Forrest E. Huffman (1994b). "Historic Designation and Residential Market Values." *The Appraisal Journal,* Vol. 62, No. 3, pp. 396-401.

Asabere, Paul K., Forrest E. Huffman, and Seyed Mehdian (1994). "The Adverse Impacts of Local Historic Designation: The Case of Small Apartment Buildings in Philadelphia." J*ournal of Real Estate Finance and Economics,* Vol. 8, No. 3, pp. 225-234.

Bartik, Timothy J. (1987). "The Estimation of Demand Parameters in Hedonic Price Models," *Journal of Political Economy.* Vol. 95, pp. 81-88.

Benson, Earl D., Julia L. Hansen, Arthur L. Schwartz Jr., and Greg T. Smersh (1998). "Pricing Residential Amenities: The Value of a View." *Journal of Real Estate Finance and Economics,* Vol. 16, No. 1, pp. 55-73.

Brown, J.N., and Rosen, H.S. (1982). "On the Estimation of Structural Hedonic Price Models," *Econometrica*, Vol. 50, pp. 765-768.

Cassel, E., and R. Mendelsohn. (1985). The Choice of Functional Forms for Hedonic Price Equations: Comment. *Journal of Urban Economics*, Vol. 18, pp. 135-142.

City of Milwaukee Historic Preservation Commission Act (1981)

Clark, David E. and William E. Herrin (1997). "Historical Preservation Districts and Home Sale Prices: Evidence from the Sacramento Housing Market." *The Review of Regional Studies,* Vol. 27, No. 1, pp. 29-48.

Clark, David E. and James R. Kahn, "The Two-Stage Hedonic Wage Approach: A Methodology for the Valuation of Environmental Amenities" *Journal of Environmental Economics and Management*, Vol. 16 (March 1989), pp. 106-120.

Clark, David E. and James R. Kahn, "The Social Benefits of Urban Cultural Amenities" *Journal of Regional Science*, Vol. 54, August 1988, pp. 363-377

Coffin, Donald A. (1989). "The Impact of Historic Districts on Residential Property Values." *Eastern Economic Journal,* Vol. 15, No. 3, pp. 221-228.

Coulson, Edward N. and Eric W. Bond (1990). "A Hedonic Approach to Residential Succession." *The Review of Economics and Statistics,* Vol. 72, No. 3, pp. 433-444.

Coulson, Edward N. and Michael L. Lahr (2005). "Gracing the Land of Elvis and Beale Street: Historic Designation and Property Values in Memphis." *Real Estate Economics,* Vol. 33, No. 3.

Coulson, Edward N. and Robin M. Leichenko (2001). "The Internal and External Impact of Historical Designation on Property Values." *Journal of Real Estate Finance and Economics,* Vol. 23, No. 1, pp. 113-124.

Cropper, Maureen L., Leland B. Deck, and Kenneth E. McConnell (1988). "On the Choice of Functional Form for Hedonic Price Functions." *The Review of Economics and Statistics,* Vol. 70, No. 4, pp. 668-675.

Diamond, Douglas B., and Smith, Barton A. (1985). "Simultaneity in the Market for Housing Characteristics," *Journal of Urban Economics*, Vol. 17, 280-292.

Do, Quang A. and Gary Grudnitski (1995). "Golf Courses and Residential House Prices: An Empirical Examination." *Journal of Real Estate Finance and Economics,* Vol. 10, No. 3, pp. 261-270.

Do, Quang A., Robert W. Wilbur, and James L. Short (1994). "An Empirical Examination of the Externalities of Neighborhood Churches on Housing Values." *Journal of Real Estate Finance and Economics,* Vol. 9, No. 2, pp. 127-136.

Eberts, Randall W., and Timothy J. Gronberg (1982). "Wage Gradients, Rent gradients, and the Price Elasticity of Demand for Housing: An Empirical Investigation." *Journal of Urban Economics,* Vol. 12, No. 2, pp. 168-176.

Epple, D. (1987). "Hedonic Prices and Implicit Markets: Estimating Demand and Supply Functions for Differentiated Products," *Journal of Political Economy,*Vol. 95, pp. 59-80.

Freeman, A.M. III. (1979). *The Benefits of Environmental Improvement: Theory and Practice*, Johns Hopkins University Press, Baltimore, MD.

Harrison, D. and D.L. Rubinfeld (1978), "Hedonic Housing Prices and the Demand for Clean Air," *Journal of Environmental Economics and Management*, **5(1)**, 81-102.

Ford, Deborah Ann (1989). "The Effect of Historic District Designation on Single-Family Home Prices." *Real Estate Economics*, Vol. 17, No. 3, pp. 353-362.

Kane, Thomas J., Douglas O. Staiger, and Gavin Samms (2003). "School Accountability Ratings and Housing Values." *Brookings-Wharton Papers on Urban Affairs,* pp. 83-127.

Lancaster, Kelvin J. (1966). "A New Approach to Consumer Theory," *Journal of Political Economy*, Vol. 74, pp. 132-157.

Leichenko, Robin M., N. Edward Coulson, and David Listokin (2001). "Historic Preservation and Residential Property Values: An Analysis of Texas Cities." *Urban Studies,* Vol. 38, No. 11, pp. 1973-1987.

Mahan, Brent L. Stephen Polasky, and Richard M. Adams (2000). "Valuing Urban Wetlands: A Property Price Approach." *Land Economics,* Vol. 76, No. 1, pp. 100-113.

National Historic Preservation Act, (1966).

Rasmussen, David W., and Thomas W. Zuehlke. (1990). "On the Choice of Functional Form for Hedonic Price Functions". *Applied Econ.* Vol. 22, 431-438.

Roback, Jennifer. (1982). "Wages, Rents and the Quality of Life." *Journal of Political Economy,* Vol. 90, pp. 1257-1278.

Rosen, Sherwin (1974). "Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition." *The Journal of Political Economy,* Vol. 82, No. 1, pp. 34-55

Rosen, Sherwin (1979). "Wage-based Indexes of Urban Qujality fo Life," in Peter Mieszkowski and Mahlon Straszheim (eds.) *Current Issues in Urban Economics*. Baltimore, MD: Johns Hopkins University Press, pp. 74-105.

Shilton, Leon and Anthony Zaccaria (1994). "The Avenue Effect, Landmark Externalities, and Cubic Transformation: Manhattan Office Valuation." *Journal of Real Estate Finance and Economics,* Vol. 8, No. 2, pp. 151-165.

White, Halbert. (1980). "A Heteroscedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroscedasticity." *Econometrica*. Vol. 48, pp. 817-838.