Foreclosures in an Exurb: Multiple Empirical Analyses through a Prism

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Multiple Empirical Analyses through a Prism

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Abstract:

As the nation navigates through the stages of its foreclosure crisis, its journey brings with it negative outcomes that impact to the general real estate market. This paper combines two individual pieces and peruses a comprehensive illustration of the timeline of foreclosures and sheriff sales, and the effect they have on the single-family real estate market in Muskego, Wisconsin. This paper employs two econometric models to achieve its goal. First, we utilize a duration model that considers the time from a foreclosure's filing until a sheriff sale or redemption. Our second model turns to a probit model, which attempts to predict whether a home is sheriff-sold or redeemed. Our results find that despite growing experience in dealing with foreclosures, lenders do not appear to have reduced the time from filing to sheriff sale. Finally, more expensive homes are less likely to be sheriff-sold following a foreclosure in relationship to other foreclosures.

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I. Introduction

The recent crisis in sheriff's sales has created a new and costly chapter in urban sprawl. Where upscale exurbs, commuter town in which much of the workforce commutes out to earn their livelihood, appeared to benefit from sprawl as their tax bases continually expanded, the current crisis highlights how negative externalities can impose significant costs not only on borrowers and lenders, but also on, neighboring homeowners, municipal governments and others with a financial stake in nearby properties. This paper examines the impact of this crisis on a single community, an exurb on the edge of the City and County of Milwaukee, Wisconsin. While it is often argued that real estate is local, our results find that methodologies used to examine foreclosures on a national and regional basis produce similar results when applied to a specific locality, demonstrating that these national studies can forecast important local impacts. These impacts influence personal household finances, the fiscal health of the community and the viability of the financial sector.

This research recognizes the impact foreclosures have on the community, the neighborhood, and the property tax base, and estimates the extent to which foreclosures and the resulting sheriff sale has on the sale price of adjacent properties: finding that the presence of a sheriff sale has a negative effect on values that are close both in distance and time. The work being done on foreclosures is rapidly evolving to accommodate the changes in the structure of the housing market. This research is becoming increasingly important because of the dominance of sheriff sales and foreclosures within the real estate market. This trend has become evident in the city of Muskego, Wisconsin (refer to table one). Due to the mass of foreclosures and sheriff sales in Muskego, there have been very few home sales which have not been impacted by a sheriff sale or the probability of one. The remainder of this paper proceeds as follows. Section II places this paper in respect to previous empirical work on foreclosures. Section III describes the data used in the analysis and the process of identifying homes that were foreclosed and resulted in a sheriff sale. Section IV outlines the methodology used. Section V interprets the empirical findings. Section VI concludes.

II. Literature Review

While empirical work on foreclosures is extensive, the literature is dynamic and continuously evolving to incorporate new models and test new theories. This has been increasingly true today because of the recent recession and resulting mortgage crisis. Despite this, three commonly used models that estimate different problems and characteristics of foreclosures shape this research. The relevant literature that has contained each of these models is summarized below.

The early literature provides a platform upon which future research develops and examines foreclosures according to a bank's risk assessment. This research serves to examine the relationship between mortgage default and loan to value ratios, risk factors, loan quality and interest rates (Jung, 1962; Von Furtstenberg, 1969; Von Furtstenberg, 1970a; Von Furtstenberg, 1970b; Von Furtstenberg, 1974). Von Furstenberg adds an initial spatial component to the risk model by differentiating between properties

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located in Allegheny County and those outside the county (Von Furtstenberg, 1974). Much of this early foreclosure literature is covered in Quercia and Stegman (1992) and Vandell (1995).

As the United States experienced a rise in homeownership (Myers, et. al 2003 and Borjas, 2002), it also witnessed an expansion in the literature on mortgage foreclosures. This literature begins with issues of spatial impact and has gradually added intertemporal measurements. In an attempt to control for transitioning, Baxter and Lauria (2000) use racial and economic coefficients. Earlier, Carroll, et al (1985) compared the price differences of HUD foreclosures with non foreclosed properties, finding that price impact or HUD foreclosures are significant and negative within the same market.

Recent analysis of foreclosures integrates spatial econometric design with housing theory. This allows for the inclusion of a distance effect in the model while recognizing housing's heterogeneous nature. On top of this spatial consideration is the intertemporal feature. In effect, this connects the impact a foreclosure has on nearby properties (the spatial consideration) to the possible decay it may have over time. This paper brings those two considerations into traditional hedonic model that controls for the characteristics of the home. However, it continues to recognize that externality factors (such as positive externalities including waterfront properties, adjacency to farmland and open space, and other positive externalities) may mitigate the impact a nearby foreclosure has on the property. In effect, this paper expands the current literature by controlling for factors that differentiate properties while taking into account the negative impact a nearby foreclosure within a fixed time period may have on the sales price of a home.

A study that examines the relationship between time and distance of foreclosed properties on subsequent sales prices for nearby properties (Immergluck and Smith, 2006) finds that, for each additional foreclosure within one-eighth of mile of a given property, there is an almost one-percent decline in that property's value. Their paper, which estimates the impact of foreclosures from 1997 to 1998 on home price sales in 1999, anticipates much of the more recent literature. Earlier, Immergluck and Smith (2005) studied the Chicago housing market finding that foreclosures decreased surrounding property values from roughly $600 million to $1.39 billion. The individual home impact are also large: Blight Free Philadelphia (2001) details a hedonic model used to estimate the house-price impact of vacant and abandoned properties on sales prices of nearby houses in Philadelphia finding that proximity to these homes can lower the sales price of a nearby house by more than $7,000.

This result has been verified in a number of papers that find that a foreclosure has a negative effect on neighboring home sales but this effect is diminished as you move farther away from it. Using hedonic models, Leonard and Murdoch (2007) find that the impact of foreclosures result in a one-percent decrease in sales price if the foreclosure was within 250 feet of the impacted property. This impact decays with distance from the impacted property, although it continued to be significant even at 1500 feet away.

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Data and Descriptive Statistics

This analysis uses a ten year panel from Muskego, Wisconsin that encompasses home sales from 2000 through 2010[1]. The dataset begins in 2000 as there were a very limited number of sheriff sales that occurred prior to this. As the decade progressed, sheriff sales have become more commonplace and appear more often in the Muskego's assessment records (Table One). The foreclosure and sheriff sale data was collected from a multitude of state and local sources. The City of Muskego Assessor Office keeps updated records on all homes sold during our data set. However, this set is limited to information on the sale price and assessed value. In order to include specific household characteristics, these were then matched with the 2010 property tax records based on a unique tax identity code[2].

Information on the location of the property relative to Muskego landmarks was provided by a mapping system offered by the City Assessor. The regression includes dummy variables for whether or not the property is next to one of the three lakes, a golf course, a farm, a park, or an outlot[3]. Information on the foreclosures that occurred in Muskego in the last decade was collected from the Wisconsin Circuit Court and matched with the home sales information based on address. Foreclosures that ultimately resulted in a sheriff sale were determined through the City Assessor's personal notes that had been included with all property sales that indicated unusual sales circumstances.

The distance calculation between a sheriff sale and a home sale were calculated using the geocoding service offered through the USC GIS Research Laboratory and were cross-checked through the Google Geocoding service. This method determined a latitude and longitude to each address. The distance between all properties from each foreclosure was calculated using the Haversine Formula (see below). It is important to note that latitude and longitude to radians so that the trigonometry functions are satisfied.

$$a = sin^2\left(\frac{\Delta latitude}{2}\right) + \cos(latitude_1) \times \cos(latitude_2) \times sin^2\left(\frac{\Delta longitude}{2}\right)$$

$$c = 2 \times atan2(\sqrt{a}, \sqrt{1-a})$$

$$distance = Radius^4 \times c$$

Once the distances were calculated, dummy variables were created for a home sale occurring within 150 meters of a sheriff sale, between 151 and 300 meters, and between 301 and 450 meters.

[1] We include sheriff sales for the beginning of 2011 (through the end of June) in the duration model. This is discussed in more detail later. These are only included if the property entered the foreclosure process between 2000 and 2010.

[2] The home characteristics were as of 2010 (because that is the year of the tax records), which poses a potential problem for some properties because of changes to the home after it was sold which would not be reflected in the characteristics but would be in the price. Such taxes of course permit income tax avoidance rather than evasion (Cebula, 1997; 2004).

[3] For a closer look at the city refer to the map in the appendix.

[4] For our measure of the earth's radius we use 6,371 km, which is the average of distance of the radius. Although it is slightly different at Muskego, it does not provide any material difference.

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The final calculation was the number of days between a sheriff sale and a home sale. For this, dummy variables are used if, and when, a home sale is within 30 days, between 31 and 60 days, or between 61 and 90 days of a sheriff sale. The time and distance calculations are used both as standalone variables in an equation as well as interacted. This is discussed in further detail in the following section.

Tables one and two outline the descriptive statistics. Some interesting information can be gleaned from these two tables. One important thing to consider is in table one, where there were no sheriff sales in 2004. Table one also shows the boom in the housing market prior to the start of the recession. There was a steady rise in the number of home sales while the number of foreclosures and sheriff sales remained relatively low. This lasted through 2007, where home sales fell by nearly 100.

Although the fall in home sales first began to manifest in 2008, the number of foreclosures and sheriff sales was on the rise as early as 2006. Although there was a spike in the foreclosures, this was not accompanied by a similar rise in either the duration until sheriff sale or the average percentage of foreclosures that resulted in a foreclosure. Instead, there was a rise in both the number of foreclosures and the number of sheriff sales while also seeing a recent decrease in the amount of time between foreclosure and sheriff sale (almost one standard deviation below the mean in 2010). This could in part be caused by increased efficiency of the banks at selling properties, despite a depressed real estate market.

The descriptive statistics for the data used in the models, shown in table two, represents the household characteristics of the homes that were sold as well as descriptors of the area that surrounds them. The average home in Muskego is typical of what one would expect, with an average of three bedrooms and two bathrooms. A number of older homes were sold during this time period, some of which were built in the mid 1800's. Properties located on one of Muskego's three lakes were rare among the homes that sold, or sheriff-sold, with slightly more than five percent having lakefront property.

III. Empirical Model

A geospatial regression mode that includes household characteristics has been a successful tool in foreclosure research (Immergluck and Smith, Lin et. al, Rogers, and many others). Common variables include the number of rooms, bedrooms, bathrooms, half bathrooms, square footage of the home. These household variables are combined with a spatial component that includes whether or not the property is located next to several different features. The most notable of these features are the three lakes, Little Lake Muskego, Lake Denoon, and Big Muskego Lake (homes that have property adjoining Bass Bay are included with those that are on Big Muskego Lake). Also included are homes that are adjoining the one golf course in the city, a park, or an outlot (any parcel that is not designated as a log, public street, or public dedication (Statute 236.02).

Recent foreclosure research has included measures on distance and time between home sales and the nearest foreclosure. While the previous literature has incorporated similar hedonic components, there has yet to be any standard set on the distances or time parameters to use. In consideration of Muskego's relatively small area and its dense concentration of homes in its' northern section, this paper

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uses relatively small distances. These distances include within 150 meters, between 150 and 300 meters, between 300 and 450 meters and between 450 and 600 meters of a sheriff sale.

Similarly, a time measurement of the amount of time between a home sale and the closest sheriff sale is included. Time is measured using the stationary variables for whether or not the home sale is within 30 days, between 31 and 60 days, between 61 and 90, and between 91 and 120 days of a sheriff sale. Incorporating these characteristics our model takes two forms. The first of which:

$$y_i = \delta X_i + \varphi Z_t + \beta_1 \tau_i + \beta_2 \gamma_i + \varepsilon_i$$

Where y_i is the home sale price being regressed against the control variables mentioned above. X_i serves as the vector of control variables including the fore mentioned unique home characteristics and the location of the home relative to Muskego land marks. A dummy variable for each year that the home was sold, Z_t controls for the rapid rise and crash in the housing market, as well as changes in the market for sheriff sales.

The primary variables of interest in this model are those represented by τ_i and γ_i which are the time and distance between the most recent and closest sheriff sale. This presents a challenge stemming from the lack of interaction between distance and time. This means that homes sold within a close proximity to a sheriff sale might have sold either before or after a significant period where the sheriff sale might not have influenced the home sale price.

To address this problem τ_i and γ_i are interacted into an equation which takes the following form:

$$y_i = \delta X_i + \varphi_t + \beta_3 \tau_i \times \gamma_i + \varepsilon_i$$

The variables above are identical to those previously described with the lone difference coming from the interaction between the two terms. This poses an additional problem because of the limited number of observations in coming from the interaction of the two terms. This results in several of the variables being dropped from the equation.[5]

IV. Results

a. No Interaction

The results from the regression with no interaction between time and distance between a foreclosure and the affected property show some interesting, if not unorthodox results. Table three lists the results of this model with the primary variables of concern being those that involve the time and distance between a foreclosure and an affected property. There is some significance for four of the six time and spatial variables, but this significance dissipates after 300 meters and 60 days. The effect is also largest for home sales that are within 150 meters or between 31 and 60 days. This effect is a fall in home value of 13 percent for homes within 150 meters and an increase of 17 percent for homes between 31 and 60 days.

[5] Using this same methodology, we also estimate a purely hedonics equation which takes the following form: $y_i = \delta X_i$

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Although this does display the problem when considering the variables of interest, there are a number of other results that can be seen in this model which support the use of including hedonic variables (this is especially true in the logged results). The results of the other variables resemble those that previous work has found with the results that other had found. For example, an increase in the number of bedrooms and bathrooms results in a higher selling price.

After considering the coefficients on the year of home sale dummy variable, this model also shows the quick ascent in home prices. The coefficient rose quickly in the early part of the dataset and reached a peak of 23.9 percent in 2006 (meaning that compared to 2002, homes sold at a 23.9 percent premium). After this, home prices fell and appear to be bottoming out at a level that was last seen between 2003 and 2004.

b. Interaction

An improvement over the previous model is the one with the results represented in table four. In this model, the standalone variables for time and distance are removed and are instead interacted with each other to look at the effects of a sheriff sale on a home sale that is close in both time and distance. This is a marked improvement over the previous model because it avoids the fore mentioned problems with not interacting these terms.

The results of the hedonic variables and year dummies do not differ greatly from the previous model and will not be discussed in this section. Instead the primary variables of concern are the interaction terms between time and distance. The results show a diminishing effect of a sheriff sale as you move away from it in both time and distance, although distance appears to be a more important indicator of a sheriff sales effect. The two largest impacts from this come from the interaction between the time variables and the home being within the smallest ring, 150 meters. In the event that a home sold within 150 meters and within 30 days of a sheriff sale, the negative impact on the corresponding neighborhood home was 11.9%. This impact decays with time and distance.

Similar to the previous model, the location of the home is an important determinant in value. The largest of these is whether the property is next to one of the three lakes in the city. Having this location increases property values by as much as 53 percent (the case for homes on Lake Denoon). Other important determinants are the hedonics of the home that plays an important role in the sale price. The square footage and its squared term are particularly interesting because they show the decreasing value of the size of the home.

i. Hedonics

The results of the hedonic regression in table five confirm what others have found in addition to what was expected in the previous two models. That is, the home characteristics are important in determining home value. This is truer for the model with the logged dependent variable, but there is still some significance in the linear model. This also shows the importance of home location on its sales price.

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The coefficients on the surrounding of the home appear to be a more important determinant of home value than the hedonics of that home. As was seen earlier, the largest of these effects comes from a home with lake front property, which is a significant contributor to the sales price of the home (between a 58 and 92 percent increase in home value over the mean sales price). While it is expected that lake property would sell at a premium over similar properties, the premium is larger than what others had previously found. In the Influence of lake type (Big Muskego vs. Little Muskego vs. Lake Dennon) and lake proximity on residential property values, we find that the property located next to a lake saw a 44 percent increase in value (Ross and Taff, 1996). **Conclusions**

This paper covers three commonly used estimates of foreclosures on one community. There has been a growing amount of literature concerning foreclosures as a result of the most recent recession and the bursting of the housing property bubble. This research has largely been fractured into the three distinct branches of research. This paper combines these previously untied threads and looks at a more robust analysis of the foreclosure market in Muskego, Wisconsin.

The three threads of foreclosure research are the effects of a sheriff sale on neighboring home sale prices, the duration between foreclosure and sheriff sale, and the probability of a sheriff sale once a foreclosure has occurred. Taken individually these each help explain the effects of a foreclosure, but together they provide a unique insight into the true effects of a foreclosure.

The literature consistently revealed that the presence of a foreclosure significantly lowers the sale price of a home that is both near the sheriff sale and within a close time period. By limiting the analysis to a single community, this paper has the advantage of confirming this negative factor while controlling for positive externalities, such as waterfront and farmland adjacency. These unique property characteristics are included alongside the traditional hedonic variables, such as the number of bedrooms, bathrooms and square feet.

Once a home is foreclosed, there are a multitude of factors that determine if that home will eventually be moved towards a sheriff sale or will have the ability to redeem itself. These same characteristics play an important role in how long these homes will last in foreclosure until they move to a sheriff sale. It appears that there are wealth effects at play in this crisis. For example, more expensive homes, and as a result wealthier individuals, are less likely to have their home foreclosed on. In addition, once they are foreclosed on, they will last longer in the foreclosure period than those that are less wealthy. While the impact of the popping of the housing bubble has an impact throughout the nation, it is critical to recognize that there are differences between classes of homes as to the risk they face.

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Appendix:

Table 1: A Growing Percentage of Sheriff Sales

	Home Sales	Foreclosures	Sheriff Sales[6]	Duration[7]	Average[8]
2000	315	18	8	510.625	44.44%
2001	376	19	3	377.667	15.79%
2002	436	21	10	405.300	47.62%
2003	416	18	1	986.000	5.56%
2004	380	17	0	--	0.00%
2005	459	19	3	372.333	15.79%
2006	361	36	15	427.333	41.67%
2007	349	56	19	391.895	33.93%
2008	256	60	25	464.480	41.67%
2009	280	80	36	369.167	45.00%
2010	302	92	11	244.455	11.96%
2011	119	--	10	--	--

Table 2: Descriptive Statistics

	Mean	S.D.	Min	Max
Dependent Variables:				
Sale Price	$256,417.2	$116,411.7	$59,000	$1,850,000
Duration	403.214	217.992	26	1245
Independent Variables:				
Rooms	6.227	1.537	3	14
Bedrooms	3.070	0.840	1	8
Bathrooms	1.975	0.686	.5	5
Sale Age[9]	25.404	23.549	0	157
Square Footage	1,875.155	702.561	681	7620
Lake Denoon	0.006	0.074	0	1
Little Muskego	0.043	0.203	0	1
Big Muskego	0.007	0.082	0	1
Water[10]	0.057	0.233	0	1
Outlot	0.182	0.386	0	1
Golf Course	0.011	0.104	0	1
Park	0.027	0.162	0	1

[6] It is important to note that although the sheriff sale occurred in that year it does not necessarily mean that it was the same year as the foreclosure, often times it isn't.

[7] The average amount of time from a home sold in that year until it was sheriff-sold.

[8] The percentage of homes that were foreclosed on in that year that were eventually sheriff-sold.

[9] Age is calculated as the difference between the year the home was built and the year that it was sold.

[10] Calculated from the dataset used in the duration and probit model.

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Table 3: Non Interaction Regression Results

	Linear		Log	
	Coef.	**S.E.**	**Coef.**	**S.E.**
Rooms	-7,396.353*	126.547	-0.020**	0.008
Bedrooms	3,256.723	3,329.923	0.019*	0.010
Bathrooms	10,874.490*	6,043.906	0.060***	0.016
Square Feet	111.766***	17.625	6.775×10^{-4}***	0.000
Square Feet Squared	3.165×10^{-4}	0.000	-6.300×10^{-8}***	0.000
Age of Home	154.107	126.547	4.865×10^{-4}	0.000
Golf Course	16,920.210	11,563.150	0.093***	0.026
Outlot	8,528.030***	3,275.513	0.039***	0.011
Farm	9,139.331	7,663.737	0.028	0.028
Park	-12,541.380	8,249.424	-0.105***	0.035
Little Muskego	145,833.700***	14,600.160	0.445***	0.032
Big Muskego	222,226.300***	68,908.970	0.513***	0.093
Lake Denoon	150,193.600***	35,509.740	0.525***	0.116
Within 30 Days	28,381.470**	11,708.490	0.110**	0.046
Between 31 and 60	41,988.820***	13,347.660	0.171***	0.050
Between 61 and 90	20,468.270	15,526.620	0.140***	0.053
Within 150 Meters	-31,798.780***	5,748.246	-0.133***	0.018
Between 151 and 300	-15,279.430***	5,935.317	-0.053***	0.020
Between 301 and 450	-5,061.220	6,837.663	-0.017	0.019
2003	11,935.300***	4,103.799	0.057***	0.016
2004	39,403.160***	5,493.954	0.161***	0.019
2005	50,995.220***	6,564.134	0.203***	0.018
2006	57,896.510***	4,703.596	0.239***	0.017
2007	51,555.640***	4,882.299	0.212***	0.018
2008	44,130.430***	5,230.744	0.188***	0.019
2009	34,214.700***	5,213.253	0.132***	0.020
2010	33,575.180***	5,666.732	0.132***	0.022
Constant	13,300.100	22,928.540	11.120***	0.062
R-Squared	0.6876		0.7194	
Observations	2,509		2,509	

*** The coefficient is significantly different from zero with a 0.01 or less probability of a Type I error

** The coefficient is significantly different from zero with between a 0.01 and 0.05 probability of a Type I error

* The coefficient is significantly different from zero with between a 0.05 and 0.10 probability of a Type I error

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Table 4: Interaction Regression Results

	Linear		Log	
	Coef.	**S.E.**	**Coef.**	**S.E.**
Rooms	-7,661.565**	3,768.286	-0.021***	0.008
Bedrooms	3,587.418	3,323.712	0.020*	0.011
Bathrooms	11,171.950*	6,086.635	0.061***	0.016
Square Feet	111.378***	17.565	6.750×10^{-4}***	0.000
Square Feet Squared	4.231×10^{-4}	0.004	-6.250×10^{-8}***	0.000
Age of Home	152.859	126.948	4.865×10^{-4}	0.000
Golf Course	14,630.090	11,990.870	0.083***	0.028
Outlot	9.094.605***	3,306.405	0.042***	0.011
Farm	9,203.950	7,447.938	0.028	0.027
Park	-13,006.050	8,218.721	-0.107***	0.035
Little Muskego	144,864.800***	14,628.940	0.441***	0.033
Big Muskego	224,553.600***	68,983.340	0.522***	0.094
Lake Denoon	153,874.800***	35,499.340	0.538***	0.116
30 Days 150 Meters	-27,191.540***	3,578.889	-0.119***	0.011
31 to 60 Days 150 Meters	-22,204.770***	7,548.399	-0.075***	0.024
61 to 90 Days 150 Meters	-35,586.800***	10,116.24	-0.090***	0.026
30 days 300 Meters	-9,850.223**	4,030.311	-0.035**	0.014
31 to 60 Days 300 Meters	-9,014.253	8,643.556	-0.002	0.030
2003	14,858.290***	4,078.816	0.068***	0.016
2004	43,039.000***	5,466.354	0.175***	0.019
2005	58,506.610***	6,649.366	0.228***	0.017
2006	60,151.110***	4,662.700	0.248***	0.017
2007	54,102.870***	4,874.365	0.223***	0.018
2008	47,071.430***	5,187.508	0.200***	0.019
2009	36,926.270***	5,174.281	0.143***	0.019
2010	36,455.600***	5,676.407	0.145***	0.022
Constant	34,954.430*	19,269.440	11.207***	0.043
R-Squared	0.6851		0.7166	
Observations	2,509		2,509	

*** The coefficient is significantly different from zero with a 0.01 or less probability of a Type I error

** The coefficient is significantly different from zero with between a 0.01 and 0.05 probability of a Type I error

* The coefficient is significantly different from zero with between a 0.05 and 0.10 probability of a Type I error

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Table 5: Hedonics Regression Results

	Linear		Log	
	Coef.	**S.E.**	**Coef.**	**S.E.**
Rooms	-6,506.368*	3,859.220	-0.019**	0.009
Bedrooms	4,796.107	3,409.495	0.023**	0.011
Bathrooms	1,971.468	6,264.368	0.033**	0.016
Square Feet	113.484***	17.683	7.021×10^{-4}***	0.000
Square Feet Squared	1.906×10^{-4}	0.004	-6.610×10^{-8}***	0.000
Age of Home	-661.551***	108.616	-0.002***	0.000
Golf Course	-852.370	12,998.480	0.020	0.031
Outlot	6,943.912**	7,793.620	0.034***	0.012
Farm	21,136.280***	7,793.620	0.073**	0.028
Park	-28,830.030***	7,792.913	-0.217***	0.038
Little Muskego	149,268.100***	15,508.820	0.448***	0.035
Big Muskego	236,495.600***	71,122.340	0.570***	0.103
Lake Denoon	181,465.400***	32,876.890	0.638***	0.112
Constant	71,165.510***	19,334.380	11.319***	0.044
R-Squared	0.6535		0.6718	
Observations	2,530		2,530	

*** The coefficient is significantly different from zero with a 0.01 or less probability of a Type I error

** The coefficient is significantly different from zero with between a 0.01 and 0.05 probability of a Type I error

* The coefficient is significantly different from zero with between a 0.05 and 0.10 probability of a Type I error

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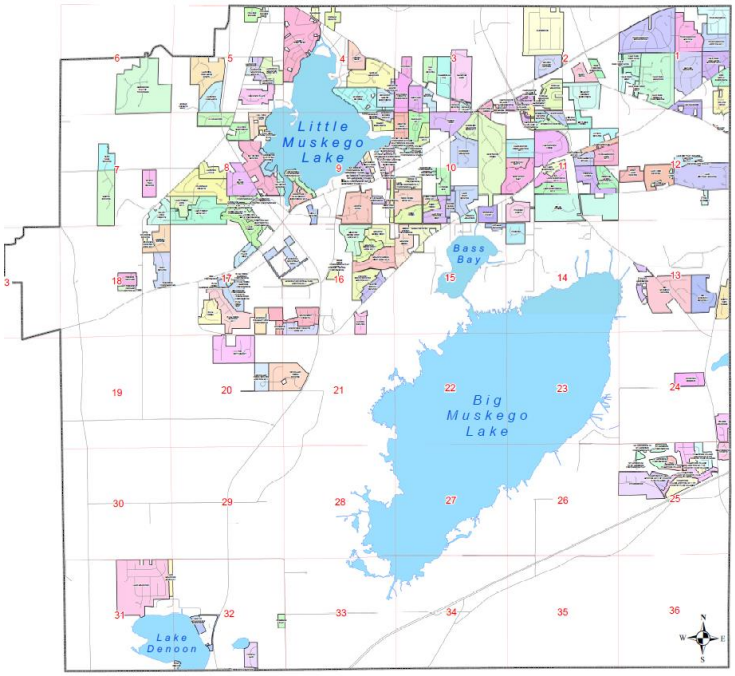
Little Muskego Lake
Bass Bay
Big Muskego Lake
Lake Denoon
N
W
E
S