The Impact of Mixed-Income Housing Developments on Chicago's Property Values

A Hedonic Analysis

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Introduction

Mixed-income housing developments (MIHDs) are fast becoming the *modus operandi* of Public Housing Agencies (PHAs) across the United States. Designed as a replacement for the isolation of blighted "projects" in inner cities, MIHDs aim to reintegrate residents of public housing into the mainstream fabric of their cities. In order to eliminate the stigma of being a recipient of public housing, subsidized residents and market-rate renters are placed in identical units in new developments to help assimilate the groups seamlessly. MIHDs have raised hopes of social integration, neighborhood stabilization, and improved living arrangements for lower-income households. Between 1993 and 2006, the U.S. Department of Housing and Urban Development (HUD) allocated about $6.25 billion for the demolition of distressed public housing and the creation of MIHDs. As the biggest recipient of funds from HUD for the creation of such developments, the Chicago Housing Authority (CHA) has built fifteen MIHDs since 2000 to house its relocated tenants. Many have hailed this move as a revolutionary era for public housing in Chicago. The CHA itself has titled this new perspective on public housing as the "Plan for Transformation" (the Plan) and has called it "the largest, most ambitious redevelopment effort of public housing in the United States, with the goal of rehabilitating or redeveloping the entire stock of public housing in Chicago" (CHA Web site 2010).

In tearing up high-rises and relocating residents to other forms of public housing, the Plan intends to not only change the physical attributes of public housing but also to transform the role and presence of public housing in Chicago's urban landscape. The earliest forms of public housing in Chicago were isolated clusters of towering high-rises that were criticized vehemently for concentrating poverty and subsequently encouraging risky behaviors in their residents. Historically, high-rises have exhibited some of the highest rates of crime, disease, risky sexual behavior, and drug abuse in all of Chicago since the 1980s (Venkatesh 2008). Many scholars have pointed out the detrimental effects of living in isolated regions of extreme poverty for youth and adults. When it became clear in the 1990s that high-rises were dysfunctional, the CHA turned towards new models of public housing. Currently the CHA houses residents through Section 8 vouchers, scattered site housing, family developments, and MIHDs.

The feasibility of mixed-income housing is a hotly debated topic. Proponents argue that by dispersing low-income families across Chicago, MIHDs will eliminate the harmful effects of concentrated poverty. These families will have better access to schools, jobs, and safety (Lipman 2009; Levy and Gallagher 2006). Detractors, however, maintain that such artificially built communities will not be able to foster relationships of trust between neighbors. Higher-income residents will not serve as role models to public-housing recipients because the hypothesized social networks between these different populations will not materialize (Rosenbaum 1998). Further, the presence of MIHDs has the potential to catalyze the departure of businesses and higher-income residents *away* from the very neighborhoods that MIHDs were placed in, directly undermining the objectives of this new model of housing.

It is difficult to understand what exactly the effects of MIHDs have been and will be in Chicago, given that the Plan has only been in existence since 2000. What happens to local residents when the CHA, the largest owner and manager of rental housing in the city, creates brand new developments that accommodate over 1,000 households in total—a third of which receive full subsidy from the CHA, and a second third of which are partially but still heavily subsidized? An important method that can be used to gauge the reaction of residents is to understand the resultant impact on property values. Prices of homes, for example, reflect the state of the housing market and reflect the perceptions of homeowners of their own residences. This paper will examine whether the values of homes changed significantly after the construction of MIHDs, and how this change manifests itself in different parts of the city.

The potential of mixed-income housing to affect housing prices in a neighborhood has several critical repercussions to the residents of that neighborhood, to the residents of Chicago, and to policymakers. First, if MIHDs brings businesses, better schools, and generally better amenities to a community, the value of that neighborhood increases. More affluent families become attracted to the area, more amenities are added, and subsequently prices of homes rise. On the other hand, if the development is among the fifteen public housing developments that CHA has built around Chicago, it comes with the stigma of being home to public housing residents. The arrival of these relocated families often brings with it perceptions of increasing crime and increasing poverty. These perceptions are then reflected in the decreasing prices of property in that area (Pollakowski et al. 2005). These divergent hypotheses about the consequences of MIHDs are part of a larger debate in housing on whether mixed-income housing is a beneficial policy for cities. While some scholars extol the virtues of integration and the potential it has to spur economic development, others argue that the creation of such synthetic communities is not just practically unfeasible but also a major driving force for gentrification and further segregation within cities. Amidst the ongoing debate, there is a need to quantifiably demonstrate what mixed-income housing has done to the price of homes in Chicago and to assess whether this change is large enough for mixed-income housing to be seen as a major factor in the changing dynamics of Chicago's neighborhoods.

Given the lack of quantitative analysis on the impact of CHA's mixed-income developments on housing prices, this paper will attempt to fill that gap. Using a hedonic-pricing model, in which the structural attributes of houses and neighborhood amenities are incorporated to normalize prices, data on home sales, prices, and date of sales are used from 1998 to 2010 to analyze whether price trends in the housing market were affected by the MIHDs.

Literature Review

Ever since its inception in 1999, the Plan's announcement of building fifteen MIHDs has been critically monitored and analyzed by scholars. In addition to relocating over one-hundred thousand residents of public housing into twenty-five thousand units of rehabbed or renovated housing, the Plan attempts to create socioeconomic reform for the working poor of Chicago by demolishing blighted high-rises of housing projects, and creating opportunities for their housing in the private market and mixed-income communities. Given its importance—both in terms of the number of people it is responsible for and its unique place in history—it is not surprising that there is a plethora of research on this topic. The most popular areas of study include the residents of public housing who are being relocated and the MIHDs to which they are relocated (Vale 2010). Many quantitative and qualitative studies are devoted to understanding the voices of the relocated residents and their experiences of relocation. Significant research also delves into the consequences of changing populations on communities and neighborhoods. Additionally, there is a bulk of commentary on the CHA's administrative handling of the relocation process.

A significant section of existing research on the Plan details whether the move from high-rises to mixed-income neighborhoods was a beneficial or detrimental transition for residents. Operating on a "culture of poverty" theory, the CHA argued that high-rises were a manifestation of concentrated poverty, which dampened the incentives for residents to find employment or achieve more in schools. MIHDs, conversely, would expose the residents to families and individuals of various income-levels and backgrounds, thus nudging them towards a more enhanced lifestyle as well. However, this claim remains a mere assumption for now, given that little is known definitively about the half of the original CHA residents who had managed to move out of the high-rises as of 2010 (Vale 2010). The primary research question addressed by many researchers is whether the Plan has improved the socioeconomic outcomes of residents. These include questions on whether earlier cohorts of movers have fared better than the later ones (Popkin 2005), and what outcomes can be predicted for those who remain in the projects (Boston 2009). Given widespread criticism of the fact that the CHA is relocating only the most mobile and independent groups of people, some researchers have questioned whether the Plan has the least to offer for the most disadvantaged, least stable households (Lewis and Sinha 2007). Research remains particularly sparse when it comes to outlining the outcomes for relocated youth, and scholars have pointed towards a need to identify whether youth have been faring better in issues such as school, youth health and well-being, adjustment to new neighborhoods, etc. (Vale 2010).

Perhaps one of the most researched components of the Plan is the overhaul of policies that the CHA is undertaking with this fifteen-year-long project. The model of high-rises that was so proudly unveiled and executed in the latter half of the twentieth century—the model that once defined the CHA in many senses—is now seen as one of the biggest failures of modern public housing and urban planning in general (Venkatesh 2002). The drastic shift away from this model thus can be seen as a transformative experience for the CHA itself, because with the Plan the CHA itself is undergoing a complete renovation. With the Plan, the CHA is no longer a provider of housing, but rather just a "facilitator" (Smith 2002). In owning up to the failures of the last few decades, the CHA has chosen to shed some direct responsibilities over residents, and has opted instead to act as a mediator between residents and the private market. This drastic change in the CHA's self-identification promises to have crucial consequences for the lives of Chicago's public-housing residents and for the welfare system of the city as well. It would be helpful to study how other Public Housing Authorities across the United States have or have not adopted similar transformations, and whether there are any lessons to be learned from them that could perhaps be applied to the CHA.

Literature Specific to MIHDs

While the quantity or breadth of discourse on the Plan is certainly substantial, there are some key topics that most of the research has failed to address. These include quantitative analyses of the impact of MIHDs on neighborhood dynamics and the reaction of local populations to the creation of these developments. Because the construction of CHA's fifteen MIHDs began only in 2000, it is not surprising that the amount of data related to its consequences is limited. However, as a decade has gone by, there is now sufficient data on the changing demographics and attributes of neighborhoods to come to a reasonable conclusion about what role the Plan has played in at least these initial changes. While many in-depth qualitative research methods have been used to illuminate the fate of these communities, there is a dearth of quantitative research that uses larger samples and statistical rigor to definitively draw conclusions about the influence of public housing on property values and home sales. This paper aims to address this lack of quantitative analysis by conducting regression analysis on home sale prices and their relationship to the presence of MIHDs. Ultimately, the goal of the paper is to provide new findings on whether MIHDs affect the prices of homes around them and to explain what the nature of this effect implies about the reception of MIHDs by the original residents of those homes.

There is no lack of empirical and theoretical research on the consequences of eliminating concentrated poverty to enhance the vitality of neighborhoods. Historically, the inner cities such as those of Chicago have seen a decline in the availability of high-paying manufacturing jobs, prompting middle-class residents to move out. This engenders the departure of basic neighborhood institutions and amenities, causing a concentration of poverty (Wilson 1996). The exclusion of the poor from middle- and working-class neighborhoods reinforces nonmainstream behavioral characteristics such as weak labor-force participation and results in an "underclass" culture (Massey and Denton 1993). These theories have been critical in the development of support for MIHDs, which are seen as the most efficient tool to address difficulties related to the culture of poverty. MIHDs bring better schools, access to jobs, and enhanced safety for households, enabling the residents to become more self-sufficient (Brophy and Smith 1997).

Mixed-income communities are becoming increasingly attractive for urban policymakers who seek to eliminate the incentives towards drug abuse and unemployment caused by poverty concentration. However, some empirical work has found inconsistencies between the theory and practice of MIHDs. Researchers still debate the role and importance of neighborhood characteristics in determining behavioral and social outcomes. In the South Side of Chicago, interactions between middle-income and low-income residents were found to be fraught with distrust and discomfort (Smith, 2002). Further, the fact that those who were not moved out of public housing are mostly residents with special needs such as drug addiction, criminal records, etc, implies that MIHDs are not a suitable option for all residents (Popkin et al., 2003).

There are also various and often conflicting results from the limited quantitative literature that focuses on the impact of MIHDs on the prices of nearby homes. An examination of the price of single-family homes in the greater Boston area yielded strong evidence that MIHDs did not hurt property values (Pollakowski et al. 2005). In one specific development in fact, the impact was actually positive. A similar quantitative study on several HOPE VI sites showed that because these developments replaced poorly maintained and managed public-housing projects with new stable units, property values rose (Bair and Fitzgerald 2005). While that study uses a larger, national sample that makes its results more generalizable, its use of census data instead of actual home sales prices implies that it uses suggested values of prices instead of real ones. Meanwhile, a six-year-long study of low-income housing tax credits in Polk County, Iowa, reveals a more nuanced effect on the surrounding neighborhood (MacDonald, 2007). Based on their quasi-experimental research, the authors find that there is no significant effect on home sales prices in the first two years, but that there are significant positive effects after three and four years. Further, the overall impact was also positive, although the rate of increase in prices varied by neighborhood.

While the existing bulk of literature on the Plan is insightful and commendable, it is nevertheless limited because the Plan is still an ongoing process. In attempting to predict outcomes for residents, neighborhoods, or the CHA, it is crucial to understand that such outcomes have not quite materialized yet. As such, it is difficult to distinguish between results and processes. Many researchers have comprehensively reviewed the process as an outcome in itself; others have concluded their studies by conceding that their conclusions are likely to change, based on what happens when the Plan ends in 2015. Given these limitations, this paper, too, will only be able to account for the processes that are ongoing in the development of Chicago's neighborhoods. Nevertheless, it will attempt to give an honest and rigorous analysis of the immediate consequences of MIHDs for home sales prices and provide recommendations based on this analysis on how policies in the future can be designed to enhance urban planning.

Methodology

In order to understand whether and how the presence of MIHDs (the independent variable) affects the prices of neighboring homes (the dependent variable), I will use econometric analysis to find a relationship between the two variables. I will assess the impact of all fifteen MIHDs in the Chicago-metropolitan area on home prices and answer the question: which homes are most likely to be affected directly by the presence of

MIHDs, and are thus more likely to reflect this impact in their sales price? The relationship between MIHDs and prices of neighboring homes will depend on the physical and social interactions between these two types of buildings. Since this paper is the first attempt at conducting a hedonic analysis of home prices relative to MIHDs in Chicago, I derive the methods for selection of homes from a paper of Pollakowski et al. (2005), which conducted a similar analysis in Boston. Homes further than 3,000 m from their nearest MIHD in Chicago are not included in the final dataset, since the analysis in Pollakowski et al. (2005) finds that homes outside of this range are not effected by the presence of developments.

Hedonic-price Method

Hedonic modeling is based on the assumption that home buyers assign quantifiable values to the individual characteristics that make up a house (e.g., size, number of rooms, area, etc.). The model estimates the contributions to the value of a house by each of these individual characteristics, allowing modelers to "price" a house. Each attribute of the house is assumed to have a marginal implicit price, such that the price of a house is seen as a function of its components. The partial derivatives of the price with respect to each of the components in the function ($\frac{\partial p_i}{\partial x_i}$) gives the implicit price of each particular attribute. Using these attributes, such as location, structural characteristics, or neighborhood characteristics, hedonic analyses identify the marginal effects of these attributes on homes. The hedonic-price method, established in the 1970s (Rosen 1974), has since been used to ascertain values of various goods, such as wetlands and lakes (Doss and Taff 1996), air and noise pollution (Palmquist 1992; Li and Brown 1980), and scenic views (Benson et al. 1998).

Data

I employed three sources of data for the hedonic and regression analysis of the paper. First, the Multiple Listing Service (MLS) provides property data on sales of condominiums between 2005 and 2010. Consistently during this time period, condominiums have composed the bulk of sales (and roughly 75 percent of the housing units) in Chicago (Noonan 2008). The MLS provided information on the sale of 49,732 condominiums and tracks many property attributes such as address, numbers and type of rooms, parking, etc. Many of these variables are converted into dummy variables for simplicity, such that the regression takes into account whether a certain amenity exists or not. I converted all sales prices to 2003 dollars using Chicago's housing Consumer Price Index (CPI) deflator. The exact conversion rates for each year are listed in Table 1 in the Appendix. For variables such as year built or square footage, which are missing in many observations, listwise deletions take care of the problem of missing variables. For information on the demographics of each of the fifteen MIHDs, their location, size, area, and other attributes, information is taken from the CHA's Web site. Finally, the analysis uses a variety of other geographic data for the city including Chicago's neighborhood maps and U.S. Census TIGER files. To link properties to their census-tract level variables (such as income levels or poverty levels), I used the mapping software ArcGIS to produce boundary-constant neighborhood demographics.

Variables

The independent variables fall into two broad categories: those relating to the home's structural attributes and neighborhood and those relating to MIHDs.

Variable	Definition
Variables Relating to Home's Structural Attributes	
lnP	ln (real sales price, adjusted to January 1, 2003 dollars using Chicago's housing CPI deflator)
dist MIHDi	Distance to Each MIHD, i = 1,2,3,…15
Year Sold	Year of Sale
Year Built	Year Home Was Built
Rooms	No. of Rooms
Bedrooms	No. of Bedrooms
Baths	No. of Baths
Mbdrm Bath	Master Bathroom Dummy
MBdrm Size	Size of Master Bedroom
Lvngrm Size	Size of Living Room
Half Bath	No. of Half Baths
Garage Spaces	No. of Garage Spaces
Basement	Basement Dummy
Variables Relating to Home's Neighborhood	
Dist Dwntwn	Distance to Millennium Station
Dist School	Distance to Nearest School
Dist Lake	Distance to Lake Michigan
Dist CTA	Distance to Closest CTA Train Stop
Northside	Dummy for in the North Side of the City
Income	Median Household Income in Census Tract
Poverty	Percentage under Poverty Line in Census Tract
White	White Residents as a Percentage of the Population of the Census Tract
Variables Relating to MIHDs	
MIH Dunits	No. of Units in Nearest MIHD
Const Comp	Dummy for Whether Construction Completed (1) or Not (0)
MIHD Playground	Dummy for Presence of Playground in MIHD
MIHD Garden	Dummy for Presence of Garden in MIHD

Geo-coding Results

First, I downloaded data from the MLS database on all condominiums that were sold between 2005–2010 in the same zip codes as the MIHDs. Then, I geo-coded the condominiums' addresses and identified which fell within a 3-km radius of the MIHDs (see figures on the next page). I identified a total of 49,732 homes. Of these, initially 97 percent (48,212) of the addresses were a perfect match for GIS, while 2 percent were tied, and 1 percent could not be matched. I then geo-coded manually all 802 of the unmatched addresses using spelling corrections. As a result, I was unable to geo-code only three of the initial 49,732 homes, representing less than $6^{10^\wedge-3}$ percent of the initial sample. These three homes were eliminated from the sample.

First Geo-coding Match — 85% Match Requirement

	Number	Percentage (%)
Matched	48,212	97
Tied	720	1
Unmatched	802	2
Total	49,734	100

Second Geo-coding Match — Manually Executed

	Number	Percentage (%)
Matched	773	96
Tied	26	3
Unmatched	3	0
Total	802	100

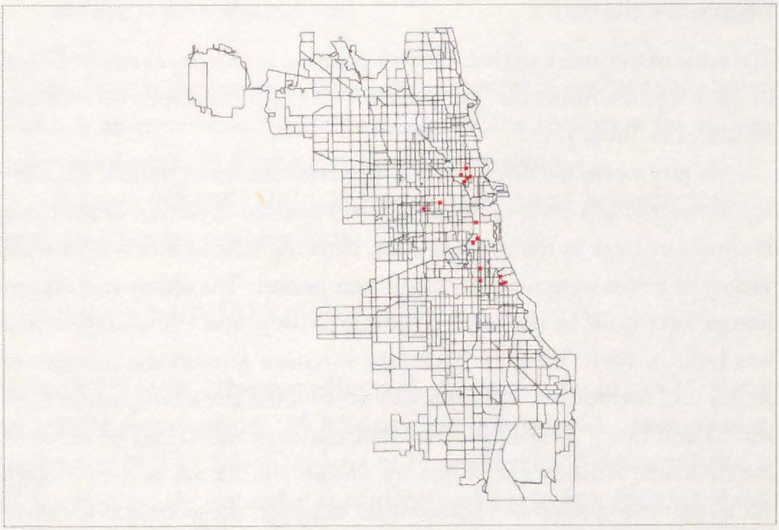

Figure 1: All fifteen MIHDs (red squares) over a layer of Chicago's census tracts

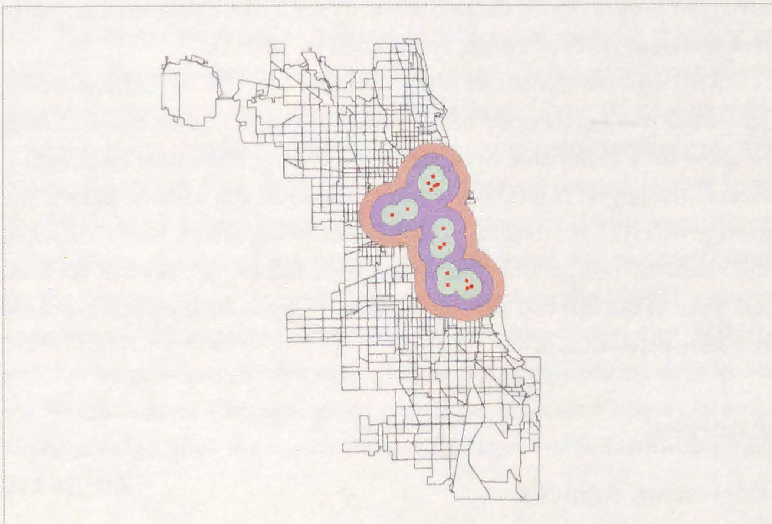

Figure 2: The fifteen MIHDs with radii of 1,000 m (blue), 2,000 m (purple) and 3,000 m (pink)

Summary Statistics

The table of summary statistics for homes used in this paper can be found in Table 2 in the Appendix. Similarly, the table for the fifteen MIHDs can be found in Table 3.

To give a brief overview of some key statistics about homes, the average home sold at a price of $398,192. The standard deviation of $302,990 is almost as large as the average itself, showing that homes with a wide variety of prices were sold in this six-year period. The oldest and newest homes were built in 1887 and 2010 respectively, and the average home was built in 1975. There is significant variation around the number of rooms and bathrooms, and especially around the size of the master bedrooms and living rooms. The fact that standard deviations of many of the structural attributes of homes are almost half the size of their average values (for the number of bedrooms for example, the average is 1.9 while the standard deviation is 0.9; for the size of the living room, the average is 175.85, while the standard deviation is 78.99) demonstrates the rich variety of homes in this dataset, allowing for a more detailed analysis of how different types of homes are affected by MIHDs.

Although the dataset of fifteen existing MIHDs in Chicago makes for a small sample, there are still sizeable differences in their characteristics to allow for a reasonable hypothesis of differing influences on property values. The largest MIHD has 3,000 units, while the smallest has 18. The average MIHD has 710 units. Only six out of the fifteen have completed their construction, which means that their full impact has not yet been felt. Four of the MIHDs don't have gardens within their compound; only five have playgrounds.

Analysis

Regression Analysis

The first stage of a hedonic analysis involves identifying implicit attribute prices — the total price of a home will be a function of its attributes.

$$1)\ Price_i = f(Attributes_i) + e_i$$

Where $Price_i$ is the sale price, $Attributes_i$ is a vector of attributes of a house, and e_i is an error term, all for the i^{th} house. The coefficient for each attribute indicates the marginal price for the attribute.

A more defined empirical model common to hedonic-property analyses takes the semi-log form:

$$2)\ \ln P = \alpha + \beta(SA) + \mu(M) + \omega(N)$$

where lnP is an (n x 1) vector of log property prices; M is an (n x M) matrix of MIHD characteristics, SA is an (n x SA) matrix of SA structural characteristics; N is an (n x N) matrix of N neighborhood characteristics. α, β, μ and ω are the respective coefficients and ε is an (n x 1) vector of random error terms. Because of the log transformation of the price variable, all coefficients express the percentage change in the price of a home with respect to an additional unit of their respective independent variables.

The M matrix contains hedonic variables that measure the value of MIHDs. The inclusion of these variables in the log-linear equation allows for the estimation of the influence of MIHDs on home values. I hypothesize that properties located nearer to the developments are likely to have lower sales prices than their counterparts that are located further from the MIHDs, all other things being equal. I expect a similar negative relationship as the size of the development increases. For the coefficients on the presence of either gardens or playgrounds in the MIHD, positive correlations are expected. Further, I expect that distance to MIHDs will not be as negatively (or may even be positively) related to price on the South Side of Chicago, given that these areas are likely to become more valuable after the construction of a large, stable institution such as a MIHD.

Regression Results

Model 1

Model 1 gives a preliminary look at the relationship between prices of homes and their distance to MIHDs. It is expected that homes closer to MIHDs will sell for a lower premium over comparable homes. In Model 1.a., a simple regression of distances of each home to each of the fifteen MIHDs is conducted, relative to log of price. No structural, neighborhood, or MIHD controls are used—log of price is seen as a function *only* of distance to each of the fifteen MIHDs. Some of the key results are shown below, while the entire set is shown in Table 4 in the Appendix.

Model 1.a. Results

Lnp	Coef. (%)
Distance to MIHD1***	0.373
Distance to MIHD2***	-0.037
Distance to MIHD3***	-0.212
Distance to MIHD4***	-0.078
Distance to MIHD5***	-0.201
Distance to MIHD6***	-0.194
Distance to MIHD7***	-0.099
Distance to MIHD8***	0.149
Distance to MIHD9**	0.133
Distance to MIHD10*	-0.020
Distance to MIHD11**	0.050
Distance to MIHD12***	0.062
Distance to MIHD13***	-0.048
Distance to MIHD14***	0.106
Distance to MIHD15***	0.019

* = significant at the p = 0.1 level, ** = 0.05 level, *** = 0.01 level

Each of the above coefficients expresses the percent change in the price of a home as the distance of the home from the MIHD changes by 1,000 m. In this model, the distance of homes to twelve out of the fifteen MIHDs are significantly correlated with the log of prices at the p = 0.01 level. Of these ten significant correlations, five are positive, while five are negative. A positive coefficient for distance implies that the MIHD is seen as a "bad": as residents of the neighborhood move further away from the MIHD, the price of their home increases, showing that MIHDs are associated with decreasing property values. Conversely, a negative coefficient for distance implies that the MIHD is seen as a "good": increasing distance from the MIHD causes the price of the home to decrease. In the above results, the largest coefficient in absolute value is 0.373 percent for MIHD1, showing that increasing distance from MIHD1 by 1,000 meters is related to a 0.373 percent increase in the price of the home. Given that the average price of a home is $398,192, this percentage translates to a change in the price of the *average* home by $1,488. Given the small size of this dollar value, it is reasonable to conclude from this model that MIHDs are not associated with any large changes (whether positive or negative) in the prices of surrounding properties. This conclusion is in line with results from other research in this field (Pollakowski et al. 2005; Funderburg and MacDonald 2010).

In Model 1.b., the log of price is regressed along the distance of only the *closest* MIHD to each home. This model aims at understanding the average correlation between a home and its closest MIHD. The key results are shown below, while the entire set of results is shown in Table 5 in the Appendix.

Model 1.b. Results

lnp	Coef (%)
Distance to Closest MIHD***	-5.54E-03

* = significant at the p = 0.1 level, ** = 0.05 level, *** = 0.01 level

The above coefficient of -5.54E-03 percent means that the price of an average, $398,192 home will decrease by $22 if it is shifted 1,000 m away from its nearest MIHD. This means that it is actually beneficial for a home to be closer to an MIHD. Thus, the presence of MIHDs appears to be, even though only slightly, positively associated with property values.

Model 2

In Model 2, with the knowledge that prices of homes are also related to attributes of the home, of the neighborhood, and of the closest MIHD, relevant controls are added to the regression in Model 1.b. It is expected that the price premium for homes in closer proximity to MIHDs will significantly depend on characteristics such as the income and poverty levels in their neighborhoods, and on the size and amenities-related nature of their closest MIHDs. This model uses all the variables shown in the Data section. Some of the key results are shown below. The entire set of results is listed in Table 6 in the Appendix.

Model 2 Results

Lnp	Coef. (%)
Dist to Closest MIHD***	0.0196
No. of Units in Nearest MIHD***	-3.41E-04
Construction in Nearest MIHD completed?***	-0.050
Playground?***	-0.055
Garden?***	0.049

* = significant at the p = 0.1 level, ** = 0.05 level, *** = 0.01 level

Given the added controls, all attributes of the MIHD appear strongly significant in their correlation with housing prices. As in the previous model, distance to the closest MIHD can be seen as a bad: as its distance from the closest MIHD increases by 1,000 m, the average house can expect to see its value increase by 0.0196%—$78 on average. Similarly, the number of units in the closest MIHD also serves as a bad (shown by the negative coefficient in this case), perhaps because a larger development implies the presence of more lower-income people, which may be associated with crime, drugs, or insecurity (Wilson 1996). Meanwhile, the presence of a garden in the MIHD has a positive coefficient (0.049 percent) and is seen as a good—by adding value to the neighborhood, a garden adds value to the home. Surprisingly, the presence of a playground appears to be a bad, as it is associated with a 0.05 percent *decrease* in the value of a home. An explanation for this could be the extra noise or congestion in playgrounds, causing the playground to be a source of dissatisfaction to its neighbors. A table representing the average monetary values of these relationships is show below. The figures in the right hand column indicate the change in the price of an average home with an additional unit of the corresponding variable. For example, if a playground is added to an MIHD, a home within 1,000 m is expected to experience a $218.37 decrease in its value, whereas if a garden is added to the MIHD, a home is expected to experience a $194.40 increase in its value.

X	**d(p)/dx ($/units of x)**
Dist to Closest MIHD (1,000 m) ***	78.05
No. of Units in Nearest MIHD***	-0.14
Construction in Nearest MIHD Completed?***	-200.55
Playground?***	-218.37
Garden?***	194.40

* = significant at the p = 0.1 level, ** = 0.05 level, *** = 0.01 level

Model 3

In Model 3, the impact on prices of the spatial distribution of homes is examined by dividing the dataset into homes that fall on the North Side of the city (Model 3.a.) and homes that fall on the South Side (Model 3.b.). This division is created because it is expected that the impact of MIHDs on housing prices will depend on the location of the homes: homes in the South Side of Chicago are expected to be less negatively associated with the presence of MIHDs, because the MIHDs will add stability and bring in amenities to the poorer parts of the city. The results of the regressions for the North Side and the South Side are shown in the Appendix in Tables 7 and 8 respectively. Some extracts from the tables are shown below.

Model 3.a. Results

Lnp	Coef. (%)
Dist to Closest MIHD**	0.0156
No. of Units in Nearest MIHD***	-3.64E-05
Construction in Nearest MIHD Completed?***	-0.053
Playground?***	0.061
Garden?***	0.054

* = significant at the p = 0.1 level, ** = 0.05 level, *** = 0.01 level

Model 3.b. Results

Lnp	Coef. (%)
Dist to Closest MIHD	0.004
No. of Units in Nearest MIHD*	-2.87E-05
Construction in Nearest MIHD Completed?	-0.080
Playground?	0.006
Garden?	0.004

* = significant at the p = 0.1 level, ** = 0.05 level, *** = 0.01 level

It should first be noted that only 2,100 homes were included in the set of South Side homes, while the North Side had almost 3,800 homes. The smaller size of the former dataset presents problems for finding statistical significance, which is reflected in the comparative lack of significance in the results for the South Side regression. Given this qualification, all further analysis of coefficients in the South Side must be looked at with caution.

First, the presence of playgrounds and gardens are positively related to housing prices in both the North Side and the South Side of the city. Homes in the North Side appear especially positively associated with playgrounds and gardens, given that the coefficients of the North Side (0.06 percent and 0.05 percent) are ten times larger than those of the South Side (0.006 percent and 0.004 percent). The sign of the coefficients affirms my hypothesis that gardens and playgrounds serve as amenities, and so should be positively associated with property values. However, the fact that homes in the North Side value them more is perplexing, because my hypothesis was that homes in the South Side have more to gain from these green spaces because the South Side has relatively fewer playgrounds and gardens. Another contradiction to my hypothesis can be found in the coefficients of distance to closest MIHD: homes in both the North Side and the South Side appear to take distance to their closest MIHD as a bad, as is shown by the positive coefficients. My hypothesis was that homes in the South Side would see the MIHDs as a good, because their value would benefit from the added presence of a stable institution in their neighborhood. Meanwhile, the coefficient in this case for the North Side (0.0156) is more than three times the size of the coefficient in the South Side (0.00419), implying that property values in the North Side are more negatively correlated with presence of MIHDs. This affirms my hypothesis that homes in the North Side have more to lose from the presence of a MIHD in their neighborhoods, because property values are generally higher in the North Side and may be deflated by an institution that brings in lower-income populations.

Finally, the dummy variable that looks at whether construction of the MIHD is complete or not is negatively related to housing prices in both the South Side and the North Side, contradicting my hypothesis that if the construction is not complete, the MIHD will deflate property prices in the neighborhood by generating noise and sound pollution. The results show that a completed MIHD is seen as a bad in the neighborhood. This may be due to the knowledge that once an MIHD is built, it will start housing persons of lower income, which may lead to a negative association between the completion of an MIHD and prices of surrounding homes. Another reason for these anomalous results may be the fact that only five of the fifteen MIHDs are technically in the South Side of Chicago, and so are not close enough to give a concrete, realistic account of their price effects in the South Side.

Model 4

In Model 4, the radius of 3,000 m around each MIHD is decomposed into radii of 0 m–1,000 m, 1,001 m–2,000 m, and 2,001 m–3,000 m (see Figure 2). This refinement allows for the measurement of specific impacts of proximity to MIHDs on home values at each distance interval. The use of different radii is widely used in hedonic-regression literature in order to offer concrete policy recommendations about the optimal proximity between MIHDs and existing homes.

Model 4 Results

Lnp	Coef. (%)
Distance to Closest MIHD <= 1,000 m***	0.164
Distance to Closest MIHD between 1,000 m and 2,000 m***	0.223
Distance to Closest MIHD > 2,000 m***	1.812

* = significant at the p = 0.1 level, ** = 0.05 level, *** = 0.01 level

The above results demonstrate that MIHDs are seen as a bad by homeowners. Each coefficient on varying distances from a home to its closest MIHD is positive, showing that prices of homes increase as they move further away from MIHDs. Moreover, homes further away from the MIHD seem to experience a greater change in price than homes closer to the MIHDs, suggesting that there are increasing returns to moving further away from MIHDs. For example, if a house moves 1,000 m away from its closest MIHD, it experiences a 0.16 percent increase in its price. However, if it moves 2,000 m, it experiences a 1.81 percent increase in its price—more than ten times the increase from the previous move.

This result thus demonstrates the non-linearity of the correlation between prices of homes and their distances to MIHDs.

Model 5

In Model 5, interaction effects between year of sale of homes and the distance to their closest MIHD are included in the regression. This is done in an attempt to understand whether the housing crisis in the late 2000s significantly influenced the relationship between homes' prices and their distances to MIHDs. The key results are shown below, while the entire set of results can be found in Table 10 in the Appendix.

Model 5 Results

Lnp	Coef. (%)
Interaction Effect (2005 x Distance to Closest MIHD)	0.0196
Interaction Effect (2006 x Distance to Closest MIHD)	0.0173
Interaction Effect (2007 x Distance to Closest MIHD)	0.0241
Interaction Effect (2008 x Distance to Closest MIHD)	0.0084
Interaction Effect (2009 x Distance to Closest MIHD)	0.0171
Interaction Effect (2010 x Distance to Closest MIHD)	1.97E-05

* = significant at the p = 0.1 level, ** = 0.05 level, *** = 0.01 level

First, because none of these coefficients were significant even at the p = 0.1 level, the results should be looked at with caution. All the coefficients are positive, showing that through all six years of the study, MIHDs were consistently seen as a bad—property values increased as distance from MIHDs also increased. The largest interaction effect occurs in 2007, where the combination of the year and the distance to the closest MIHD are related with a 0.0241 percent change in the price of a home. On average, this percentage translates to a change in the price of a home by $96 if it were sold in 2007, and if it moved 1,000 m away from the MIHD. This small value suggests that the interaction effects between the year of sale and distance to the closest MIHD have a minimal and insignificant relationship with the price of a home. As a result, the housing crisis does not seem to have impacted the nature of the relationship between houses' prices and distance to MIHDs.

Statistical Tests

Given that for Models 3 and 5 the dataset was divided into two and six subgroups respectively (North Side and South Side; 2005, 2006, 2007, 2008, 2009, and 2010), it is important to check for the joint significance of the coefficients derived from each of these two models. The Chow test allows for this investigation by demonstrating whether the independent variable has differential impacts on each of the subgroups of the data population. The null hypothesis of the test is that all the coefficients of the subgroups are identical. The Chow statistic is given by $F=\frac{(SSR_r - SSR_u)/(k+1)}{SSR_u/[n-5(k+1)]}$, where n is the total number of observations (Woolridge 2006). SSR_u is the sum of squared residuals obtained from the regression for the *i* th subgroup, for i=1,2,3,4,5, while SSR_r is the sum of squared residuals from the regression that combines all groups into one equation (the equation used in Model 2). For Model 3, the critical F value is given by F(29,39616) at the p=0.01 level, which equals 1.71. Since the F statistic for the model (174.01) exceeds the critical F value, the null hypothesis can be rejected. For Model 5, the critical F value is given by F(39616,35) at the p=0.01 level, which equals 1.64. Since the F statistic for this model (72.73) exceeds the critical F value, the null hypothesis can again be rejected. Thus, joint significance is established for both these models.

In order to check for the presence of multicollinearity in the independent variables, the VIF test is used. This test functions to analyze whether the independent variables are linear functions of each other. In an OLS regression framework, multicollinearity leads to biased estimates, and so must be avoided. Upon conducting the VIF tests on these variables, all but three (number of rooms, number of bedrooms and basement) are found to be multicollinear. The rest of the variables, including all that relate to the MIHDs, are found to be independent of each other, as the reciprocal of their VIF values are higher than the critical level of 0.1.

Policy Recommendations

1. The CHA should not be deterred by fears of housing prices being lowered by MIHDs. The results of both Models 1 and 2 show that although MIHDs are significantly related to the price of homes, this relationship on average amounts to less than 1 percent of the house's price. It is therefore reasonable to conclude that MIHDs are not associated with any significant changes (whether positive or negative) in the prices of surrounding properties. This conclusion concurs with the conclusions of Pollakowski (2005) and MacDonald et al. (2007) with regard to the impact of MIHDs in Massachusetts and Iowa respectively. The claims that MIHDs would cause gentrification by significantly changing the prices of homes around them do not appear to hold in Chicago, and thus the CHA should not use this argument when considering building its next MIHD.

2. The CHA should add gardens and playgrounds to its developments, because Models 3.a. and 3.b. show that they are associated with increasing housing values in both the North Side and the South Side. Adding these green spaces will add to the attractiveness of the MIHD and will also increase property values. However, the CHA might have to consider substituting playgrounds with gardens when designing the overall layout of its developments. The presence of a garden is positively (and significantly) related to the price of a nearby home—results from Model 2 show that the presence of a garden in the MIHD is associated with a 0.05 percent increase in the value of surrounding homes. Meanwhile, the presence of a playground is conversely associated with a 0.05 percent *decrease* in the value of surrounding homes. An explanation for this could be the extra noise or congestion in playgrounds, causing the playground to be a source of dissatisfaction to its neighbors.

3. In terms of locating the MIHD in the North Side versus the South Side, the CHA should choose the latter for its future plans. In the analy-

sis of whether homes in the North Side are differentially affected by MIHDs compared to homes in the South Side (Model 3), prices of homes in the North Side are more negatively affected by MIHDS than are prices of homes in the South Side. Despite the small size of these effects, the results imply that the presence of MIHDs has a larger, detrimental impact on property values in the North Side than in the South Side. (However, it should be noted that only slightly more than 2,100 homes were included in the set of South Side homes, while the North Side had almost 38,000 homes. The small size of the former data-set prevents problems for finding statistical significance, which is reflected in the comparative lack of significance in the results for the South Side regression.)

Conclusion

Given that the CHA aims to spur neighborhood revitalization and integration through MIHDs, it is important to understand the direct impact on the original residents of neighborhoods in which these developments are placed. The fear of potential asset-value loss is a key theme that has plagued affordable housing projects in other parts of the country as well. Past research into these projects has shown that MIHDs mostly have a negligible or positive impact on home prices, especially in lower-income neighborhoods. Given the results of this paper, this negligibility of impact, or lack of a negative impact, appears to be true for Chicago as well. The rich data enable controls of quality of the MIHD, neighborhood quality, and property attributes to allow for a rigorous analysis, and thus a confident conclusion.

With these results, the CHA has an opportunity to further the economic vitality of poorer neighborhoods by providing affordable housing to a variety of individuals and families. The MIHDs considered in this study make up high-quality housing and represent affordable housing that is desperately needed in the context of severe shortage of housing in Chicago. It also becomes an opportunity for researchers to take a more holistic approach to understand the impact of MIHDs on overall neighborhood dynamics. For example, if MIHDs in Chicago are found to be associated with home-price stabilization, research should address whether they have led to lower crime or higher employment as well. It would also be beneficial for studies to question just how instrumental MIHDs are in attracting businesses or amenities to neighborhoods, as this is certainly an important justification that the CHA has been using to defend MIHDs. Finally, many scholars have attempted to understand what the home price appreciation may mean for local residents who will not be able to afford their rented apartments or property taxes anymore. As mentioned earlier, a potential consequence of this "success" of MIHDs could be aggravated gentrification of poor- or middle-class non-subsidized families and households away from areas with MIHDs. In attempting to rehabilitate its tenants, the CHA may indirectly hurt and displace residents of similar economic backgrounds, who do not have the security of having the CHA as their landlord. Since some of these MIHDs have been built in the mid-South Side, there is concern about whether the original residents will be able to afford to enjoy the hypothesized influx of businesses and amenities into their neighborhoods. This phenomenon is troubling, and further study is required to investigate whether this could be realized in the future.

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Appendix

Table 1

Conversion of Sales Prices

	Value in 2003
$1 in 2010	$0.84
$1 in 2009	$0.86
$1 in 2008	$0.87
$1 in 2007	$0.89
$1 in 2006	$0.91
$1 in 2005	$0.94

Table 2: Summary Statistics for Condominiums Sold between 2005 and 2010

	Average	Std. Dev	Max	Min
Sale Date	1/24/06	412.2243	1/13/11	10/25/04
Sales Price ($)	398,192.652	302,990.87	9,875,000	1,000
Northside of City Dummy	1	0.22	1	0
No. of Rooms	4.625	1.481	17	0
No. of Bedrooms	1.9	0.865412	10	0
Full Baths	1.6966	0.63	8	1
Half Baths Dummy	0.161	0.368	1	0
Master Bedroom Bath Dummy	0.754	0.431	1	0
Garage Spaces Dummy	0.684	0.465	1	0
Area of Living Room	314.97	123.10	980	0
Area of Master Bedroom	175.85	78.99	980	0
Approx Year Built	1,975.19	122.67	2,010	1,197
Basement Dummy	0.15	0.357	1	0
Distance to Downtown	10,494.13	7,609.303	66,633	775
Dist to Closest MIHD15	1,1932	7,365	60,254	531
No. of Units in Nearest MIHD	702.9	953.02	3,000	18
Const Complete Dummy for Nearest MIHD	0.446	0.497	1	0
Playground Dummy for Nearest MIHD	0.277	0.448	1	0
Garden Dummy for Nearest MIHD	0.764	0.424	1	0
Distance to Nearest CTA Station	2,030.83	1,456.45	1,5973	34
Distance to Nearest School	978.36	594.04	3,332	0
Dist to Lake	3,411.44	2,447.607	16,481.03	7.63
Total Population in Census Tract	5,034.25	3,199.32	11,494	89
Median Household Income	78,878.23	24,987.74	250,001	6,923
% White in Census Tract	0.654	0.248	1	0
% Below Poverty Level in Tract	0.132	0.11	0.772	0

Table 3: Summary Statistics for MIHDs

No.	Name of MIHD	Total Units	Construction Completed?	Garden Dummy	Playground Dummy
1	Jazz on the Boulevard	39	1	0	0
2	Archer Courts	43	1	0	0
3	Lake Park Crescent	148	0	1	1
4	Legends South	2,400	0	1	0
5	North Town Village	79	1	1	0
6	Oakwood Shores	3,000	0	1	0
7	Old Town Square	113	1	1	0
8	Park Boulevard	391	0	1	1
9	Parkside of Old Town	391	0	1	1
10	Hilliard Towers Apartments	654	1	1	1
11	River Villages	55	1	1	0
12	Jackson Square at West End	116	0	0	0
13	Westhaven Park	764	0	1	0
14	Renaissance North	18	0	0	0
15	Roosevelt Square	2,441	0	1	1

Table 4: Results of Model 1.a.

lnp	Coef.	(%)
Distance to MIHD1***	0.374	(11.46)
Distance to MIHD2***	-0.0374	(-2.94)
Distance to MIHD3***	-0.212	(-7.87)
Distance to MIHD4***	-0.078	(-5.93)
Distance to MIHD5***	-0.201	(-13.59)
Distance to MIHD6***	-0.194	(-10.15)
Distance to MIHD7***	-0.099	(-3.28)
Distance to MIHD8***	0.149	(9.75)
Distance to MIHD9**	0.133	(2.49)
Distance to MIHD10*	-0.020	(-1.79)
Distance to MIHD11**	0.050	(2.48)
Distance to MIHD12***	0.062	(21.23)
Distance to MIHD13***	-0.048	(-11.34)
Distance to MIHD14***	0.106	(12.82)
Distance to MIHD15***	0.019	(5.80)
Constant***	12226.45	(334.24)
N = 49728	R^2 = 0.1614	

*= significant at the p = 0.1 level, ** = 0.05 level, *** = 0.01 level

Note: t-statistics in parentheses

Table 5: Results of Model 1.b.

lnp	Coef.	(%)
Dist. To Closest MIHD***	-5.54E-06	(-7.40)
Constant	12.67	(2872.92)
N = 49729	R^2 = 0.0011	

*= significant at the p = 0.1 level, ** = 0.05 level, *** = 0.01 level

Note: t-statistics in parentheses

Table 6: Results of Model 2

lnp	Coef.	(%)
Northside	-0.004	(-0.48)
Rooms***	0.118	(52.66)
Bedrooms***	0.095	(21.20)
Baths***	0.280	(56.99)
Half Bath	0.008	(1.57)
Mbbth***	0.086	(17.14)
Garage Spaces	0.002	(1.05)
Year Built***	0.001	(25.74)
Basement ***	-0.049	(-7.64)
MBdrm Size***	-9.34E-04	(-3.13)
Lvngrm Size	-2.61E-04	(-1.59)
Dist Dwntwn***	-0.037	(-89.59)
Dist to Closest MIHD***	0.020	(27.03)
MIH Dunits***	-3.41E-04	(-7.23)
Const Comp***	-0.050	(-6.75)
MIHD Playground***	0.055	(7.41)
MIHD Garden***	0.048	(6.37)
Dist School	1.52E-04	(4.87)
Dist CTA	7.29E-04	(0.24)
Income	-2.20E-09	(-0.02)
White*	0.016	(1.71)
Dist Lake***	-0.027	(-29.51)
Poverty***	-2.43E-06	(-3.30)
Constant***	8.60	(77.02)
N = 39616	R^2 = 0.6335	

*= significant at the p = 0.1 level, ** = 0.05 level, *** = 0.01 level

Note: t-statistics in parentheses

Table 7: Results of Model 3.a.

lnp	Coef.	(%)
Rooms***	0.119	(52.52)
Bedrooms***	0.098	(21.65)
Baths***	0.275	(55.35)
Half Baths	0.008	(1.63)
MBdrm Bath***	0.087	(17.00)
Garage Spaces	0.001	(0.44)
Year Built***	0.001	(25.74)
Basement***	-0.055	(-8.37)
MBdrmSize***	-1.04E-04	(-3.46)
Lvngrm Size	-6.19E-07	(-0.04)
Dist Downtown***	-0.037	(-88.10)
Dist to Closest MIHD***	0.016	(4.95)
Dist School	-2.50E-03	(-0.82)
Dist CTA	2.60E-05	(0.27)
Income	6.83E-03	(0.71)
White***	-2.56E-04	(-28.02)
Dist Lake	7.84E-04	(1.01)
Poverty***	1.33E-04	(43.91)
MIH Dunits***	-3.64E-04	(27.65)
Const Comp***	-0.053	(-7.47)
MIHD Playground***	0.061	(-6.90)
MIHD Garden***	0.054	(7.97)
Constant***	8.44	(6.80)
N = 37516 (23.06)	R^2= 0.6439	

*=significant at the p = 0.1 level, ** = 0.05 level, *** = 0.01 level

Note: t-statistic in parentheses

Table 8: Results of Model 3.b.

lnp	Coef.	(%)
Rooms***	0.122	(11.68)
Bedrooms**	0.038	(1.81)
Baths***	0.355	(15.51)
Half Baths	-0.022	(-0.94)
MBdrm Bath**	0.040	(1.77)
Garage Spaces***	0.043	(2.85)
Year Built***	0.001	(5.08)
Basement**	-0.061	(-2.08)
MBdrm Size	2.26E-04	(1.49)
Lvngrm Size***	-1.62E-04	(-2.65)
Dist Dwntwn***	-0.039	(-19.29)
Dist to Closest MIHD	4.19E-03	(1.15)
Dist School	6.08E-06	(0.38)
Dist CTA	0.045	(2.35)
Income	-1.86E-08	(-0.06)
White	0.029	(0.94)
Dist Lake***	-0.034	(-7.83)
Poverty	-1.36E-06	(-0.51)
MIHD Units*	-2.87E-04	(-1.65)
Cons tComp	-0.080	(-2.50)
MIHD Playground	0.006	(0.20)
MIHD Garden	0.004	(0.12)
Constant***	8.935342	(16.86)
N=2100	R^2= 0.6013	

*= significant at the p = 0.1 level, ** = 0.05 level, *** = 0.01 level

Note: t-statistic in parentheses

Table 9: Results of Model 4

lnp	Coef.	(%)
Rooms***	0.116	(52.42)
Bedrooms***	0.104	(23.43)
Full Baths***	0.272	(56.17)
Half Baths	0.007	(1.42)
MBdrm Bath***	0.091	(18.44)
Garage Spaces	0.001	(0.83)
Year Built***	0.001	(27.14)
Basement***	-0.047	(-7.37)
MBdrm Size***	-8.69E-04	(-2.96)
Lvngrm Size	-1.26E-04	(-0.78)
Dist Downtown***	-0.0409	(-79.94)
Dist to Closest MIHD***	-0.0457	(-9.71)
MIHD Units***	-0.074	(-9.77)
Const Comp***	0.074	(9.67)
MIHD Playground***	0.033	(4.21)
MIHD Garden***	0.024	(7.52)
Dist School	-2.21E-03	(-0.74)
Dist CTA	3.68E-05	(0.41)
Income	0.007	(0.71)
White***	-2.36E-04	(-21.31)
Dist Lake	7.17E-04	(0.97)
Poverty***	1.33E-05	(45.21)
Distance to Closest MIHD <= 1000m***	0.164	(4.34)
Distance to Closest MIHD between 1000m and 2000m***	0.223	(5.93)
Distance to Closest MIHD> 2000m***	1.81	(30.07)
Constant	8.25	(22.47)
N = 39616	R^2= 0.6454	

*= significant at the p = 0.1 level, ** = 0.05 level, *** = 0.01 level

Note: t-statistic in parentheses

Table 10: Results of Model 5

lnp	Coef.	(%)
Northside	-0.002	(-0.26)
Sold in 2005**	-0.033	(-2.82)
Sold in 2006	0.020	(1.62)
Sold in 2007	-0.005	(-0.37)
Sold in 2008***	-0.080	(-6.48)
Sold in 2009	(dropped)	
Sold in 2010*	-0.026	(0.013)
Rooms***	0.120	(0.002)
Bedrooms***	0.095	(21.50)
Full Baths***	0.279	(57.58)
Half Baths	0.007	(1.39)
Master Bedroom Bath***	0.083	(16.67)
Garage Spaces	0.001	(0.73)
Year Built***	0.001	(26.61)
Basement Dummy***	-0.055	(-8.60)
MBdrm Size***	-8.67E-04	(-2.94)
Lvngrm Size	-1.03E-04	(-0.63)
Dist Downtown ***	-0.037	(-89.88)
Interaction Effect (2005 x Distance to Closest MIHD)	0.020	(0.36)

lnp	Coef.	(%)
Interaction Effect (2006 x Distance to Closest MIHD)	0.017	(0.32)
Interaction Effect (2007 x Distance to Closest MIHD)	0.024	(0.44)
Interaction Effect (2008 x Distance to Closest MIHD)	8.40E-03	(0.15)
Interaction Effect (2009 x Distance to Closest MIHD)	0.017	(0.31)
Interaction Effect (2010 x Distance to Closest MIHD)	1.97E-05	(0.36)
Dist to Closest MIHD***	0.015	(4.84)
Dist School	-1.55E-06	(-0.52)
Dist CTA	3.26E-05	(0.36)
Income	0.008	(0.83)
White***	-2.6E-05	(-29.12)
Dist Lake	7.31E-04	(0.99)
Poverty***	0.013	(44.31)
MIH Dunits***	-3.54E-05	(0.04)
Const Comp***	-0.0528121	(-7.57)
MIHD Playground***	0.056	(-7.14)
MIHD Garden***	0.049	(7.64)
Constant***	8.53	(76.89)
N = 39616	R^2= 0.6425	

*= significant at the p = 0.1 level, ** = 0.05 level, *** = 0.01 level

Note: t-statistic in parentheses