

The University of Chicago

Rethinking the Housing Crisis: Historic  
Preservation's Role in Rental Housing  
Affordability

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## **Abstract**

This paper seeks to test the claim commonly put forward by preservation advocates that older housing is less expensive than newer housing and that this warrants policy intervention expanding the preservation of old buildings, by employing regression analysis, spatial data analysis, and visual surveying to elucidate the relationship between residential housing units' decades of construction and median rent cost across Cook County, Illinois. This paper finds that, across Cook County, newer housing is typically more expensive than older housing, yet with significant variation in this relationship between census tracts. This paper also finds that, although density of housing is important in informing this relationship, much older housing is also intrinsically more affordable than newer housing when accounting for upkeep and density. Accordingly, this paper recommends the expanded preservation of older housing of middle densities and wider permitting of the construction of accessory dwelling units on parcels with historic single-family houses.

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## **Introduction**

Among advocates, historic preservation has been lauded as a potential tool of housing affordability, due to findings of older housing being a significant share of naturally occurring affordable housing and typically being more affordable (Young 2022; Meeks 2017). However, historic preservation (defined in this study as the effort to preserve old buildings and landmarks considered aesthetically, historically, or otherwise significant) as applied within housing has proved contentious in this realm, due to an association with gentrification, rising rents, and NIMBYism. Indeed, historic preservation in Chicago's Lincoln Park has contributed to the rising of rents within the neighborhood, reducing its socioeconomic diversity (Schondelmayer 2019). Thus, although older buildings are more affordable in some circumstances, preserving old buildings does not unequivocally increase affordability of housing, as many historic preservation advocates claim. In order to better understand and elucidate this tension, this study seeks to answer three questions regarding the interplay between historic preservation policy questions and rental affordability, namely:

- 1) Is rental housing in older buildings more affordable than those in newer buildings, as many historic preservation policy advocates claim, within Cook County, Illinois?
- 2) How does the relationship between building age and rental affordability differ spatially across Cook County?
- 3) What factors may explain variation within relationships between building age and rental affordability (i.e., why may this relationship be positive, negative, or near zero, within specific neighborhoods)?

It is important to note that building age does not measure the undertaking or implementation of historic preservation, and thus cannot be used to draw direct conclusions about the effect of historic preservation on rental affordability writ large. Nevertheless, examining the relationship between building age and rental affordability and the spatial variation in this relationship can reveal the factors that contribute to increased rental affordability with older building age (and those that contribute to decreased rental affordability with older building age), which can reveal the viability of using historic preservation policy to enhance rental affordability, uncovering other relevant characteristics affecting this trade-off.

This thesis will first discuss the background of historic preservation policy debates and scholarship surrounding its economic role, specifically within cost of housing, with a focus on the interplay of historic preservation policy and housing affordability. Because much of the previous scholarship on the topic of historic preservation's interplay with housing cost examines the outcome variable of property value, this research seeks to instead study the outcome variable of rental affordability as another measurement of housing cost that does not necessarily correlate with property value. For example, a 6-unit building likely has a higher property value than a single-family home, but each unit in that building likely has a lower rent cost than the single-family home does. Additionally, most of the literature uses historic landmark and district designation as the independent variable. However, causation between these variables and housing cost is not readily discernible. Specifically, many buildings that are designated as historic likely are done so because they are considered valuable (whether for historic significance, architectural beauty, or other factors). In those cases, you cannot make a causal inference regarding historic designation's effect on property values, as the causation may very well run the other way.

For these reasons, this study's examination of the correlation between building age and rental affordability fills a gap in the literature, especially as it addresses a common justification for historic preservation policy put forth by historic preservation advocates (namely, that housing rentals in older buildings are more affordable). This thesis seeks to see if, where, and why this claim is true within Cook County and use this information to draw informed conclusions on historic preservation's potential role in contributing to rental housing affordability. Cook County is chosen as the focus of this study due to the high prevalence of historic housing and related preservation debates within the city of Chicago.

Overall, this paper found that across Cook County, older rental housing is more affordable than newer rental housing, although this relationship varies significantly spatially across the county on the census tract level, with a notable preponderance of tracts on Chicago's north side in which newer housing has higher rent costs and a preponderance of tracts in which older housing has higher rent costs on Chicago's south and west sides. Through visual surveying of notable tracts, this thesis finds that, although density of housing is important in informing the relationship between building age and rental affordability, much of Chicago's older housing stock is also intrinsically more affordable than newer housing when accounting for density of housing and building upkeep and physical condition.

## **Background**

The United States is in the midst of a housing affordability crisis, which continues to grow as a result of high interest rates and low supply of housing. Low-income renters are especially hard-hit by the crisis, with nationwide rents having increased 24% over the past three years (U.S. Government Accountability Office 2023). Chicago has been far from spared from this crisis, with 47.4% of Chicago's renters being cost-burdened by their housing expenses

(defined as spending over 30% of their income on housing) and a third of Chicago renters describing their current housing situations as unstable (Institute for Housing Studies at DePaul University 2023). As mentioned, low supply of housing is one of the central causes of the present housing affordability crisis. Indeed, in recent years, there has been significant loss of Chicago's unsubsidized, lower-cost rental units, termed naturally occurring affordable housing. Chicago's stock of naturally occurring affordable housing consists largely of older, two- to four-flat buildings, which are more likely to be affordable and are most common in communities of color. These buildings are being lost to various causes. In more affluent neighborhoods, two- to four-flats are commonly either converted into single-family homes or demolished and replaced by single-family homes, which lowers housing supply by the number of units and generates more expensive housing typologies, thus restricting housing accessibility and affordability. Meanwhile, in poorer neighborhoods, two- to four-flats are demolished due to foreclosure, vacancy, and abandonment, with lots often being left vacant after demolition, lowering the supply of affordable housing to an even more drastic extent (Institute for Housing Studies at DePaul University 2023).

Because a significant amount of older, naturally occurring affordable housing has been lost as a result of demolition and conversion, historic preservation policy has enjoyed moderate attention as a potential tool of easing the housing affordability crisis. Outside of preserving naturally occurring affordable housing, various arguments exist as to how historic preservation can be leveraged to increase housing supply, access, and affordability. Adaptive reuse of historic buildings, which consists of converting historic buildings with obsolete original uses (e.g., factories, warehouses, vacant office space, retail space, etc.) into housing units, is promising in boosting supply and affordability of housing. Los Angeles County, for example, gained 46,000

units of housing as a result of its adaptive reuse ordinance adopted in 1999, and could have 9-14% of its housing needs over the next eight years provided via adaptive reuse. Meanwhile, of housing units created through adaptive reuse of older commercial buildings between 2010 and 2020, 65% were targeted towards low- to middle-income renters (McDonald 2022). Indeed, in late 2022, Chicago introduced the LaSalle Reimagined program, which funds developers to convert often-historic, vacant office and retail buildings along downtown LaSalle Street to contain housing units, at least 30% of which are to be affordable to households making 60% or less of the area's median income (Mortice 2023). Preserving old housing is also less expensive than demolishing old housing and constructing anew (Bernstein n.d.), and, theoretically, lowering the costs of constructing housing can lower the cost of housing for consumers (Hoyt and Schuetz 2020).

However, findings of historic preservation's contributions to housing affordability are far from unequivocal. In the Chicago neighborhood of Lincoln Park in the late twentieth century, policymakers and community members reinstated and expanded the neighborhood's historic district, attracting wealthy homebuyers and decreasing the neighborhood's affordability and diversity (Schondelmayer 2019). Building preservation and renovations increased property values, and as property values and incomes rose, rents did as well, displacing thousands of people who were disproportionately low-income Latino and Black people (Kay Hertz 2019). Historic preservation has also been used as a tool to stymie the construction of new housing, with restrictive historic preservation regulations halting plans to increase housing supply. Even when historic preservation regulations do not outright prohibit change, review processes often required for the alteration of buildings considered historic can make otherwise financially viable housing developments financially infeasible. In fact, many of the housing developments halted by historic

preservation regulations and review have sought to incorporate pre-existing historic buildings, being in line with adaptive reuse projects acclaimed by advocates of historic preservation and affordability (Bertolet 2017). It is thus apparent that there is no conclusive relationship between historic preservation and housing affordability and availability and that, even if implemented with the goal of increasing housing supply, access, affordability, historic preservation could have the opposite effect. For this reason, this thesis seeks to generate insights into the dynamic between historic preservation and rental affordability within Cook County.

## **Literature Review**

Overall, there are several gaps in the literature, which are reviewed below. After introducing the main gaps this thesis aims to fill, which are the paucity of studies investigating rental affordability and preservation and the narrow focus of prior literature on historic designation and landmarking as measures of historic preservation, I present the relevant literature, grouped by two themes prevalent in the literature: property value and rent burden.

Within the pre-existing literature on the intersection of historic preservation policy and cost of housing, there is a breadth of scholarly work investigating how historic preservation policy contributes to property values. However, there is a dearth of scholarly work investigating the interplay between historic preservation and rental affordability. Most pertinent scholarly articles document an increase in home values associated with historic preservation (commonly quantified using the concentration of designation of historic districts and historic landmarked properties). While some may intuit that an increase in property values should necessarily correlate with an increase in rents (as higher property values imply increased desirability of residence in a building), such a relationship cannot be assumed as existing, as other variables could counteract such a relationship. For example, a building with 6 units may be worth more

than a single-family home; however, the rent of a unit in the building with 6 units may be less than the rent of the entire single-family home.

As previously mentioned, the literature also heavily skews towards selecting historic districting and landmarking as the independent variable of choice, despite there being many different historic preservation policies and factors for which there has been relatively little scholarly attention heretofore. This may likely be a result of data availability and research feasibility.

However, as aforementioned, assessing a causal relationship between the most two studied variables, historic designation and affordability, is also difficult due to high interference by confounding variables. Thus, due to these particular gaps in the literature, I seek to specifically investigate if a conclusive relationship between building age and rental affordability exists in Chicago and what this relationship is. Although this research question is not investigating the effects of a specific historic preservation policy, this research question will ideally answer whether and how preservation of old buildings in general can also preserve housing affordability. This literature review will now discuss the pre-existing literature organized by common themes contained within it.

### *Property Values*

Most of the scholarly work pertaining to historic preservation and housing cost reviewed sought to measure property value as the dependent variable. In their 2001 work “Historic Preservation and Residential Property Values: An Analysis of Texas Cities”, Leichenko, Coulson, and Listokin investigate the relationship between historic district designation and property values across multiple cities in Texas. Using appraisal district data from these cities in conjunction with historic designation data, they run multivariate hedonic regressions using

historic designation status (i.e., whether or not a house is located in a historic district or is designated as a historic landmark), neighborhood characteristics, and structural characteristics as independent variables in order to assess the impact historic district or landmark designation has on property value (which also allows them to control for other non-historic designation variables that could independently affect property value). They find that historic designation generally increased property value by 5 to 20 percent in the cities studied. Such increases in property value conferred by historic designation are considered to come about due to the fact that historic designation provides prospective buyers and homeowners the assurance that historic neighborhoods' pleasant qualities will be retained in the future and not subject to diminishment.

Douglas Noonan also examines the impact that historic landmark designation has on property values in his 2007 work "Finding an Impact of Preservation Policies: Price Effects of Historic Landmarks on Attached Homes in Chicago, 1990-1999". Like Leichenko, Coulson, and Listokin, Noonan applies a hedonic regression assessing how property values vary based on historic landmark designation, controlling for other variables that may independently confer an increase in property value, and finds an increase in property value associated with historic landmark designation. Noonan considers the possibility of the mechanism of this increase in property value as being the result of historic landmark designation adding positively to a neighborhood's perceived prestige, identity, and "charm". However, Noonan also notes that unobservable traits of a property may independently increase its likelihood of receiving landmark designation and simultaneously increase its value. Thus, Noonan stops short of concluding that landmark designation directly causes an increase in property value.

In their 2012 study, Zahirovic-Herbert and Chatterjee apply a quantile regression model to specifically determine the disparate impacts of historic designation on property values

between various property value brackets in Baton Rouge, Louisiana. They find that lower-priced properties tend to gain the largest increase in value as a result of historic designation and thus conclude that low-income residents are at high risk of displacement as a result of historic designation. However, they do not actually assess whether or not rents increase or if displacement actually occurs as a result of historic designation, which leaves the question of impact of historic designation on low-income renters unanswered. The question of gentrification and displacement is examined in Coulson and Leichenko's 2004 work, which finds, through conducting regressions comparing the use of historic districting and demographic indicators, that districting did not seem to alter demographic indicators in Fort Worth, Texas between 1990 and 2000. Nevertheless, due to the narrow focus on historic districting of this study, the question of historic preservation's impact on displacement is still not fully resolved.

### *Rent Burden*

The question of the impact of historic preservation on rental affordability and rent burden, as opposed to on property values, is considered significantly less within the literature and has contradicting results. To the best of my knowledge, only two studies aim to answer this question within the U.S.. Ryberg-Webster and Kinahan's 2017 study employs longitudinal rehabilitation tax credit investment data from 2000 and 2010 and finds that rehabilitation tax credits facilitated private investment in generating affordable housing in the cities studied, showing a case in which historic preservation can contribute positively to accessibility and supply of market-rate and low-income housing. Meanwhile, ThinkBrooklyn's 2016 paper assesses the relationship between historic district designation and various affordability indicators, such as rent burden and rental prices, using a regression to assess the relationship between the concentration of historic districting within census tracts and affordability indicators within

census tracts. This study finds very little correlation between historic district designation and rental affordability. Thus, historic preservation's impact on rental affordability has not been conclusively understood or elucidated and is still largely unresolved. This thesis thus aims specifically to examine the association between historic preservation and rental affordability.

## **Methodology**

As aforementioned, this study seeks to answer three research sub-questions: 1) if rental housing in older buildings is more affordable than those in newer buildings, as many historic preservation policy advocates claim, within Cook County, Illinois, 2) how the relationship between building age and rental affordability differs spatially across Cook County, and 3) what factors may explain the spatial variation within relationships between building age and rental affordability (i.e., why may this relationship be positive, negative, or near zero, within specific neighborhoods). To answer these questions, I employ two categories of methodology: a primarily quantitative approach, using regression analysis to answer the first two sub-questions ascertaining the spatial relationship between building age and rental affordability, and a more qualitative approach, using street-level observation and visual surveying of tracts to explain the spatial variation across census tracts in the relationship between building age and rental affordability, in order to glean the mechanisms behind this variation so as to inform conclusions about historic preservation policy's role in promoting rental affordability.

## *Data*

The source of the quantitative data that I am using to answer the first two research questions is the U.S. Census Bureau, with this data being publicly available through its online data portal (accessible at <https://www.census.gov/data.html>). The data I am using was compiled in the 2021 American Community Survey, a nationwide collection of various demographic,

housing, and labor data conducted annually by the U.S. Census Bureau. This data consists of 5-year estimates, representing data collected over the past 5 years of the American Community Survey, of the median gross rent across rental housing units within buildings constructed during each decade within each census tract in Cook County, Illinois. The code for this data is B25111. I reshape the original dataset from wide to long, so that each observation is a decade-tract pairing, as this aids in my regression analyses. An example of one such observation is all residential units in Cook County Census Tract 105.02 that were built between 1940 and 1949, among which median rent is 997 U.S. dollars. The dataset contains about 11,150 such observations, for which 4,400 possessed a median rent value. This study is specifically examining Cook County due to the salience of historic preservation policy in and around the city of Chicago (owing to its relatively high proportion of historic homes (Heacock n.d., n.p.)) and due to the viability of conducting field research during my academic year spent in Chicago. Census tracts provide an optimal level of observation so as to yield a statistically sound number of observations within Cook County (there being 1332 census tracts included within Cook County) while allowing for geographic analysis of data.

The .csv file downloaded from the U.S. Census Bureau data portal consists of a row for each census tract in Cook County, with columns for the median gross rent of units in buildings constructed during the 2010s, and so on for buildings of each prior decade until the 1940s (with all buildings built before 1939 being grouped into one column). As a result of some census tracts not having any or having extremely few residential buildings constructed within a given decade, some cells within the .csv table are empty. This lack of data is more prevalent for buildings constructed in more recent decades. Nevertheless, given the large number of census tracts within Cook County, missing data do not compromise the soundness of this study. The American

Community Survey's 2021 5-year estimate of the number of buildings constructed during each time period within each census tract (code B25034) also provides assurance that the data I am considering in my analysis are minimally influenced by the dangers of small sample sizes within census tracts.

*First Research Question: Is rental housing in older buildings more affordable than those in newer buildings, as many historic preservation policy advocates claim, within Cook County, Illinois?*

To answer the first research question, I use Stata to first regress median gross rent (in U.S. dollars) on the decade of construction (quantified as the final year of each decade, such that, for example, a building built within the 1980s is quantified as 1989), with observations consisting of these values for each census tract within Cook County. Because some census tracts lack buildings constructed within certain decades, missing values are present for some cells in the .csv file. I decide not to replace missing values with estimations, as missing values are varyingly the result of an absence of housing built within the corresponding decade and tract or a result of suppression of statistically weak and personally revelatory data by the Census Bureau, so it is more sound to not replace them. All census tracts in Cook County, regardless of the ages present in their building stock, are used in the regression of rent on building age for the county as a whole. This is important, as excluding census tracts with any missing values could introduce bias resulting from a different relationship between these variables in census tracts with a wide range of housing of different ages versus in census tracts with different concentrations of housing of various ages. Also important to note is that I opt not to include covariates in this regression. This is an intentional choice, and not an oversight, as the variables that I anticipate will be most relevant to investigate to base policy claims off of are not readily quantifiable in a dataset and are

best examined using visual surveying (discussed in depth towards the end of this section). Overall, the resulting scatterplot and regression statistics will be informative of both the relationship between the two variables and the strength of this relationship on a countywide level. In addition to the above regression, I also conduct a regression using median imputation to estimate missing values. This will help provide a more robust array of quantitative results.

*Second Research Question: How does the relationship between building age and rental affordability differ spatially across Cook County?*

To answer the second research question (how does the relationship between building age and rental affordability differ spatially across Cook County?), I use Stata to regress rent (in dollar terms) on decade built separately for each census tract. In other words, for each census tract within Cook County, I will assess the relationship between buildings' time of construction and their median rent (per time period group). These regressions translate into a dataset of coefficients for each census tract that estimate the relationship between building age and average rent.

A central concern in making comparisons between different tracts' relationship between rent and building decade in dollar terms is the bias that tracts' rents, on average, may introduce. If rent is quantified in dollars, as it is for the analysis for the first research question as outlined above, and holding the strength of the relationship constant, a tract in which rent is generally high will display larger positive or negative changes in rent with decade than does a tract with lower rents. To illustrate this, consider two tracts in which buildings built in the 2000s command twice the rent of those built in the 1950s, where all decades have an estimated average rent available (a minimum number of buildings built in each decade). In a low-rent tract where median rent in buildings built in the 1950s is \$500, this would register as a \$10 average increase

for each one-unit increase in year built. For a high-rent tract where median rent for 1950s buildings is \$2000, this would register as a \$40 average increase for each one-unit increase in year built, and thus tracts with higher rents, generally more affluent, would disproportionately compose the “extreme” findings.

To check for robustness of results and account for this potential issue, I use a secondary approach in which I divide the rent values in each census tract by that census tract’s average rent before conducting the looped regression. Here, I use the regression coefficient generated for each census tract (i.e., the amount that average rent changes with increases in year built), generating a new variable containing each census tract’s regression coefficient. In addition to this, I divide the rent values in each tract by the median rent value for that tract’s earliest decade available (i.e., scaling rents in relation to tracts’ base year rents) and conduct the looped regression using these base year scaled rents for additional robustness. In sum, I find that these methods yield generally similar spatial findings and patterns (explored in the results section), and thus continue with the average scaled method in answering the final sub-question. I also generate a variable indicating the p-value for each census tract’s regression coefficient, and dummy variables indicating whether or not a tract has a p-value below 0.1 and whether or not a tract has a p-value below 0.05.

I then input the .csv file into GeoDa, a spatial data analysis software. I use a shapefile containing all census tracts in Cook County, downloaded from the U.S. Census Bureau website, to enable me to make a mapped visualization of the spatial variation in regression coefficients (i.e., spatial variation in the relationship between buildings’ time of construction and rents)<sup>1</sup>. Of note here is that some tracts lack coefficients because regressions cannot be conducted if there

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<sup>1</sup>I do this by merging the shapefile’s associated .csv table with the .csv file imported from Stata, matching observations by census tract ID number, which allows the values of the regression coefficients variable within each census tract to be mapped visually.

are zero or one decades with a value for median rent, which occasionally happens if housing built in all other decades is absent from a tract or is so few that the data is suppressed by the Census Bureau (discussed in greater detail in the limitations subsection). These tracts are displayed in dark gray on the maps. In GeoDa, I create various types of maps displaying the spatial variation in regression coefficients, referenced as follows:

- Figures 2A-C indicate (by color) the number of standard deviations that each census tract's regression coefficient is from the median regression coefficient across all census tracts. Figure 2A displays this information for unscaled (dollar value) rents. Figure 2B displays this for rents scaled by tract mean rent. Figure 2C displays this for rents scaled by base year rent. Bins include census tracts with a value greater than 2 standard deviations below the mean, between 1 and 2 standard deviations below the mean, less than 1 standard deviation below the mean, less than 1 standard deviation above the mean, between 1 and 2 standard deviations above the mean, and greater than 2 standard deviations above the mean.
- Figures 3A-C separate tracts' regression coefficients into deciles, indicated by shade. The letters' correspondence is the same as above, in which Figure 3A displays dollar-value rents, Figure 3B displays rents scaled by tract mean rents, and Figure 3C displays rents scaled by base year rent.
- Figures 4A-B separate census tracts into 4 even quartiles based on their regression coefficients, only including tracts with regression coefficients with a p-value below .1 (Figure 4A) and those with a p-value below .05 (Figure 4B); the latter of these I draw from in answering my final research sub-question.

- Each map has an equivalent with the outlines of Chicago neighborhoods highlighted, to highlight variation within these<sup>2</sup>. These are to the right of the original figure.

*Third Research Question: What factors may explain variation within relationships between building age and rental affordability (i.e., why may this relationship be positive, negative, or near zero, within specific neighborhoods)?*

I use the results of the above analysis targeting the second research question to inform my approach to the third research question. First, I use the map displaying the regression coefficients of tracts for which those coefficients have a p-value below 0.05. This filters out all tracts except for those that have very statistically robust relationships between rent and decade built. On the map, these tracts are organized into four quartiles based on their value of the regression coefficient, indicated by color. To investigate closely, I choose two tracts in the bottom quartile (in which a one-unit increase in year built is associated with an estimated change in rent of between -3.4 and -0.8 percent of that tract's mean rent across all units), one in the second quartile (in which a one-unit increase in year built is associated with an estimated change in rent between -0.7 and +0.5 percent of tract mean rent), one in the third quartile (in which a one-unit increase in year built is associated with an estimated change in rent between +0.5 and +1.0 percent of tract mean rent), and two in the top quartile (in which a one-unit increase in year built is associated with an estimated change in rent between +1.0 and +2.1 percent of tract mean rent). I choose to survey two tracts for each of the two extreme quartiles, as I suspect that these extremes will yield the most informative findings to answering my research question and surveying two tracts for each of these quartiles will strengthen findings. My selection of tracts to survey from each quartile is not done at random, as I want to avoid anything in the extreme edges of Cook County

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<sup>2</sup>I used a program called kepler.gl to create the outline of the neighborhoods, which I then superimposed on the maps.

and anything in the high-density downtown area of Chicago, as the anomalous nature of such areas restricts their applicability to housing policy questions for Chicagoland as a whole. For the two quartiles for which I investigate two tracts, I also want a fair amount of geographic variation between the tracts so as to strengthen findings, which I consciously ensure through non-random choice. It is important to note that I do not preliminarily “scan” tracts before choosing them; in other words, I do not filter tracts based on how satisfying and uncomplicating the results they seem to provide are.

Using Google Street View or in-person observation when feasible, I then visually survey residential buildings in each of these tracts, taking notes as I proceed, using two themes to guide my survey:

- Density<sup>3</sup>: what levels of housing density (that is, amount of housing units on a given area of land) are present and how does this vary with building age? Common levels of density in Chicago, from low to high density, include detached single-family homes, attached single-family homes, two- to three-flat buildings, four- to six-flat buildings, low-rise (i.e., four or fewer story) multi-unit (here referring to seven or more units) buildings, mid-rise multi-unit buildings (five to twelve stories), and high-rise buildings (thirteen or more stories). Also, is there a significant presence of non-residential buildings or land uses?
- Upkeep: what state are buildings in and how does this vary with building age? Are any buildings of certain ages visibly dilapidated? Relatedly, how is neighborhood upkeep as a whole? Are there lots of vacant, overgrown lots?

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<sup>3</sup>Density is commonly quantified using floor area ratio, which is the ratio of floor space to the area of the plot of land used. There is no data available providing this information for housing built within specific decade bins, hence why I plan to employ a qualitative analysis to tease this.

These themes are both pertinent to housing cost: density is found to correlate with rental costs, in which increases in housing density are found to translate into lower rents (Baca et al. 2019), and improved physical upkeep of historic buildings is one way in which historic preservation leads to decreased affordability of housing as shown in the case of Lincoln Park (Schondelmayer 2019)<sup>4</sup>. Additionally, these questions are feasible to answer using visual surveying. Thus, exploring them will assist in teasing out policy conclusions. I also use spatial visualization tool of the ages of specific buildings across Chicago, designed by Kirtika Arora, and Redfin to obtain the ages and densities of specific buildings within a tract, for comparative purposes.

### *Limitations*

There exist a few limitations to the methods employed in this study. Notably, when calculating the relationship between decade built and median rent within each tract, standard errors will be very high due to there being solely one observation per time period (i.e., median rent for all buildings). For this reason, confidence intervals for each tract will not be informative or accurate. Additionally, as previously mentioned, building age cannot be interpreted as a proxy for historic preservation undertaken. Thus, while this study's findings are expected to enable valuable inferences to be made about historic preservation policy's potential role in housing affordability and availability, this study's quantitative analysis results cannot directly inform or answer the question as to what the effect of certain types of historic preservation policy would be on rental affordability and accessibility. Lastly, the American Community Survey suppresses any data that is either revelatory of individuals' personal information or is statistically weak (both typically in the cases of very small sample sizes). This suppression is significantly minimal for

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<sup>4</sup>I have also anecdotally witnessed the themes of density and upkeep to be primary determinants in rental cost in various discussions with housing and historic preservation professionals in Chicago, from before I began this study.

the 5-year aggregates, which is what I am using, and the remaining dataset both is still very robust (due to the large sample size), so I anticipate the findings to still be relevant and informative, but still introduces potential bias if rental units of a certain decade differ depending on whether or not buildings built in that decade are common in their tract.

## Results

### *Countywide Relationship between Decade Built and Median Rent*

The regression of median rent on decade constructed across all tracts in Cook County yielded the below regression table. To reiterate, here, each observation consisted of all residential units in a specific tract built within a certain decade. Of note in this regression's results is the regression coefficient of 4.67, rounded and significant at the 95% confidence level. This indicates that, for a one-unit increase in the year a residential housing unit was constructed, average monthly rent is on average \$4.67 higher. At 95% confidence, this value is between \$4.05 and \$5.30. The t-value of 14.67 and the p-value of 0.000 indicate that this value is statistically significant, indicating that newer housing is, across Cook County, more expensive than older housing.

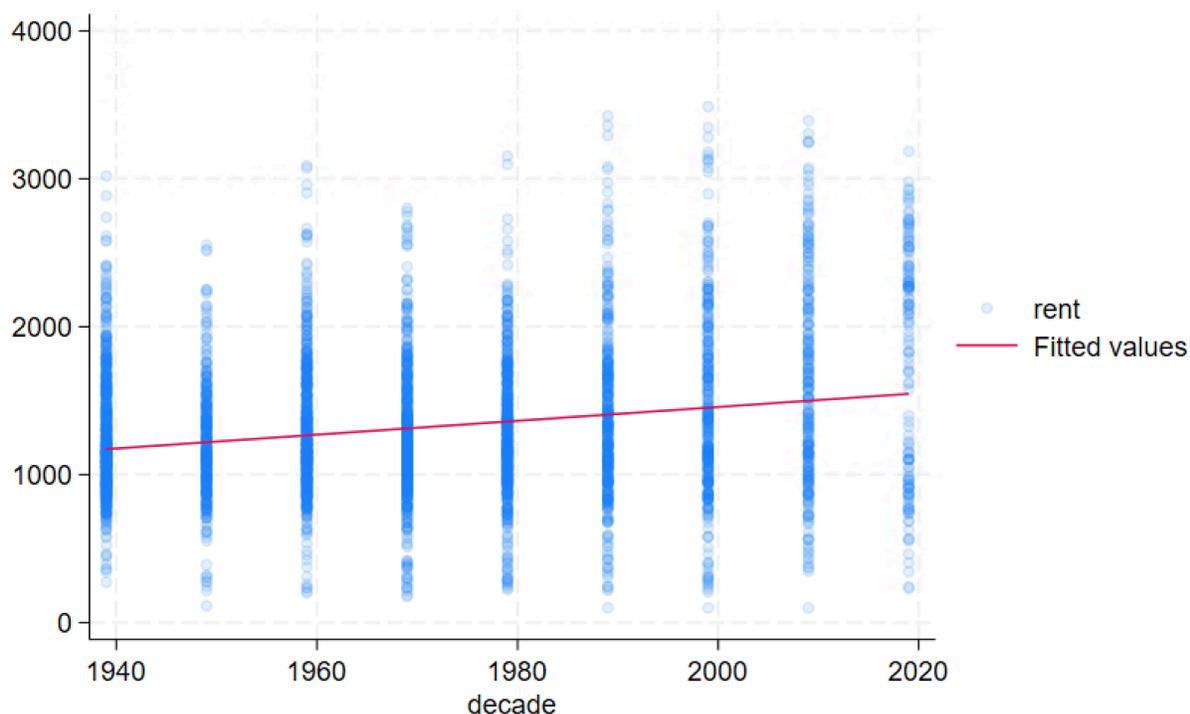
**. regress rent decade**

Source	SS	df	MS	Number of obs	=	4,400
				F(1, 4398)	=	215.22
Model	50170707.2	1	50170707.2	Prob > F	=	0.0000
Residual	1.0252e+09	4,398	233112.425	R-squared	=	0.0467
				Adj R-squared	=	0.0464
Total	1.0754e+09	4,399	244464.458	Root MSE	=	482.82

rent	Coefficient	Std. err.	t	P> t	[95% conf. interval]	
decade	4.671453	.3184268	14.67	0.000	4.047176	5.29573
_cons	-7885.167	627.3488	-12.57	0.000	-9115.086	-6655.247

The below scatterplot displays the distribution of observations, with the associated last year of decade of construction of residential units on the x axis and the associated median rent on the y axis, with a line of best fit. Observations are not fully opaque so as to visualize density of observations. One interesting factor here is the bifurcation of 2010s rent values, in which tract median rents for housing built in the 2010s are divided into two distinct groups, one seemingly concentrated around \$2200/month and one around \$900/month. The reason for this is unclear, but seems to indicate that among newer rental housing, there exist two distinct price tiers which are absent in older housing.



Lastly, the below regression table displays the results of the regression of median rent, with missing values imputed using each tract's mean rent, on the decade constructed. As expected, imputing these values causes the regression coefficient to be less stark, at an estimated \$0.47 average increase in median rent associated with a one-year increase in year constructed.

However, with a t-value of 2.85 and a p-value of 0.004, this positive trend is still statistically significant.

```
. regress rentimpute decade
```

Source	SS	df	MS	Number of obs	=	11,151
Model	1630268.35	1	1630268.35	F(1, 11149)	=	8.12
Residual	2.2393e+09	11,149	200853.649	Prob > F	=	0.0044
				R-squared	=	0.0007
				Adj R-squared	=	0.0006
Total	2.2409e+09	11,150	200981.848	Root MSE	=	448.17

rentimpute	Coefficient	Std. err.	t	P> t	[95% conf. interval]	
decade	.4682937	.1643723	2.85	0.004	.1460949	.7904924
_cons	379.991	325.3204	1.17	0.243	-257.6946	1017.677

### *Spatial Variation in Relationship*

Regarding my targeting of the second research subquestion, in which I sought to observe how the relationship between the decade that residential units were constructed and the median rent varies spatially across Cook County, I have included the most informative of the maps I generated using GeoDa. **Figure 1** is sourced from the National Weather Service, and situates Chicago's city limits and the names of major areas on a map of Cook County. This is included to help readers better visualize the maps' corresponding spatial and geographic realities. Overlaying the two maps and adjusting the opacity made the maps harder to see, so I have elected to include the reference map as a separate item.

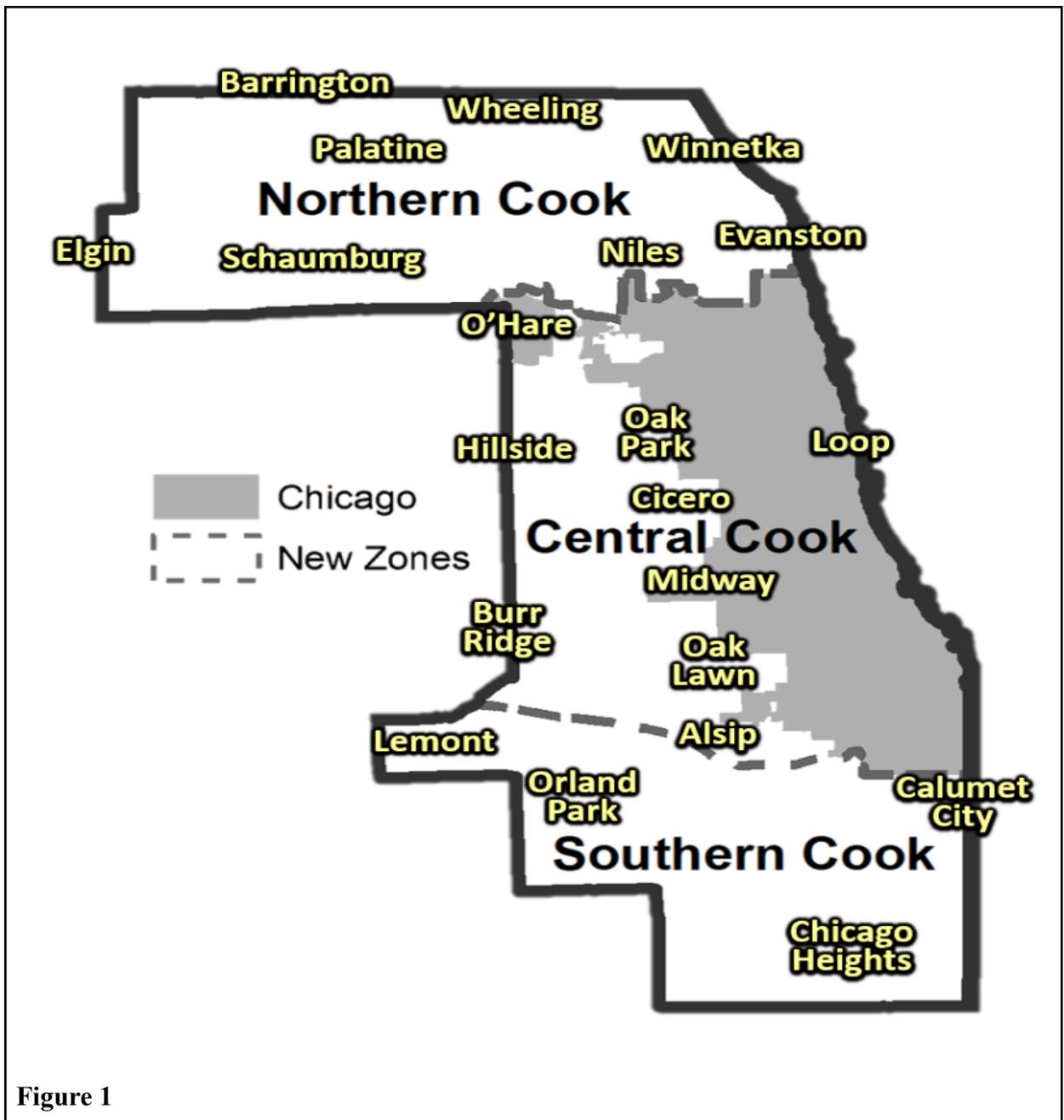


Figure 1

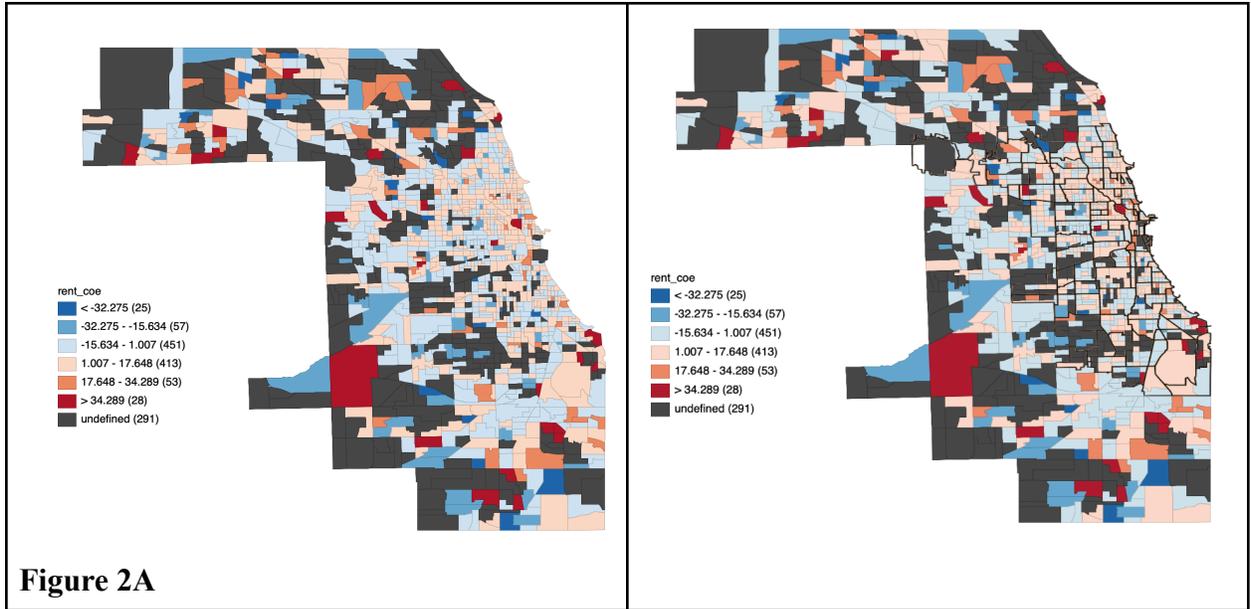


Figure 2A

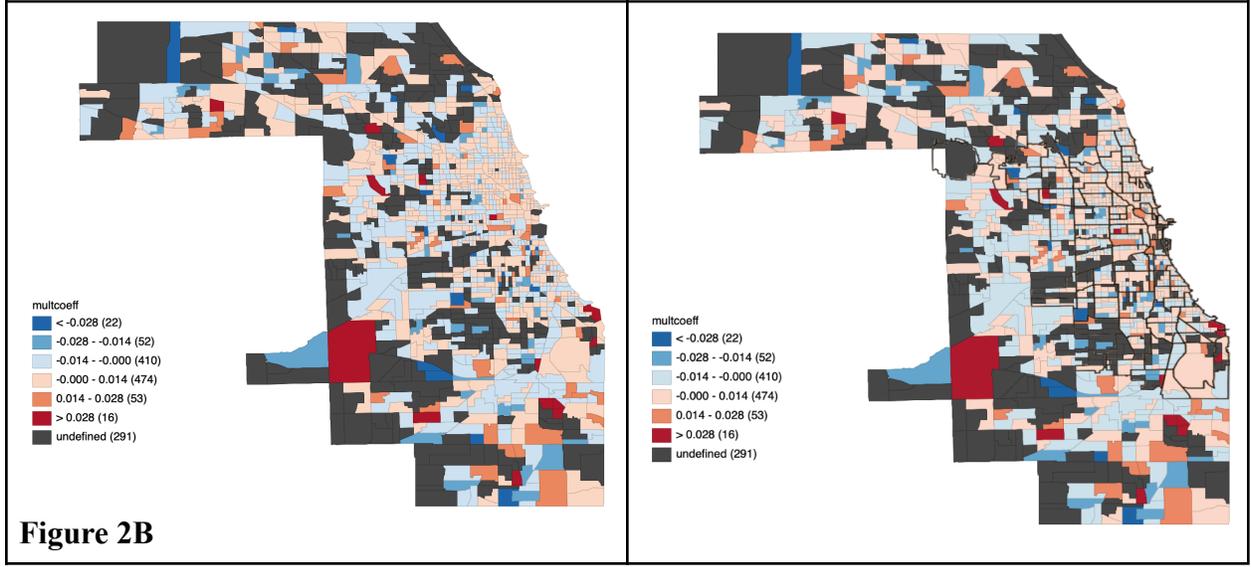
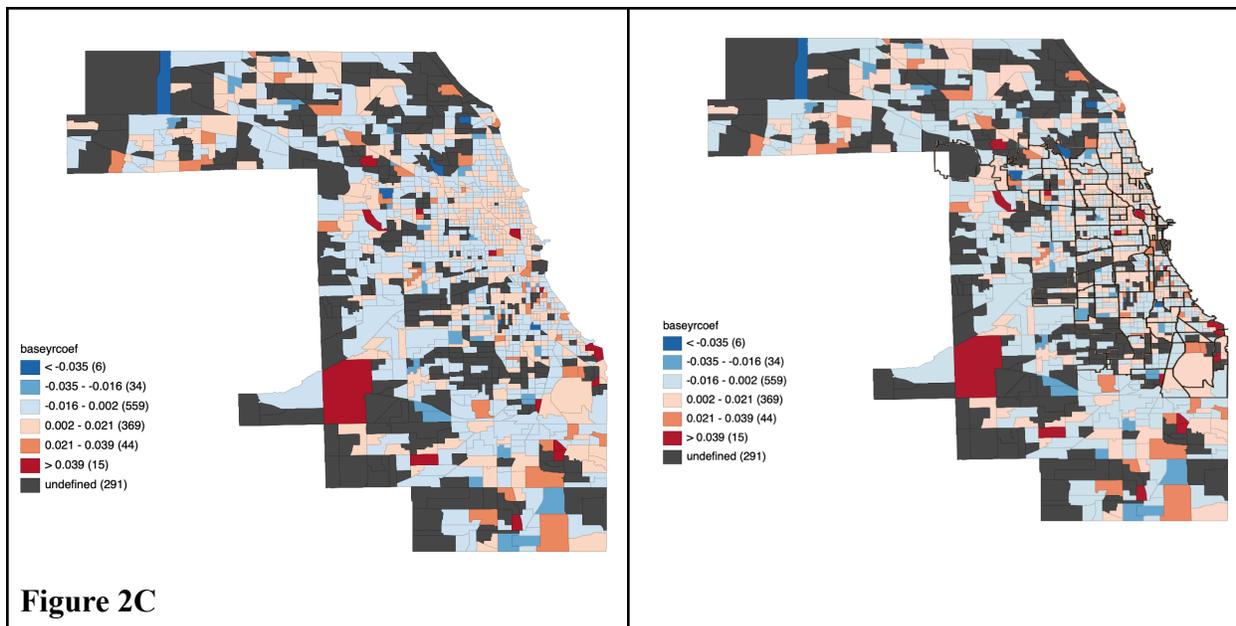
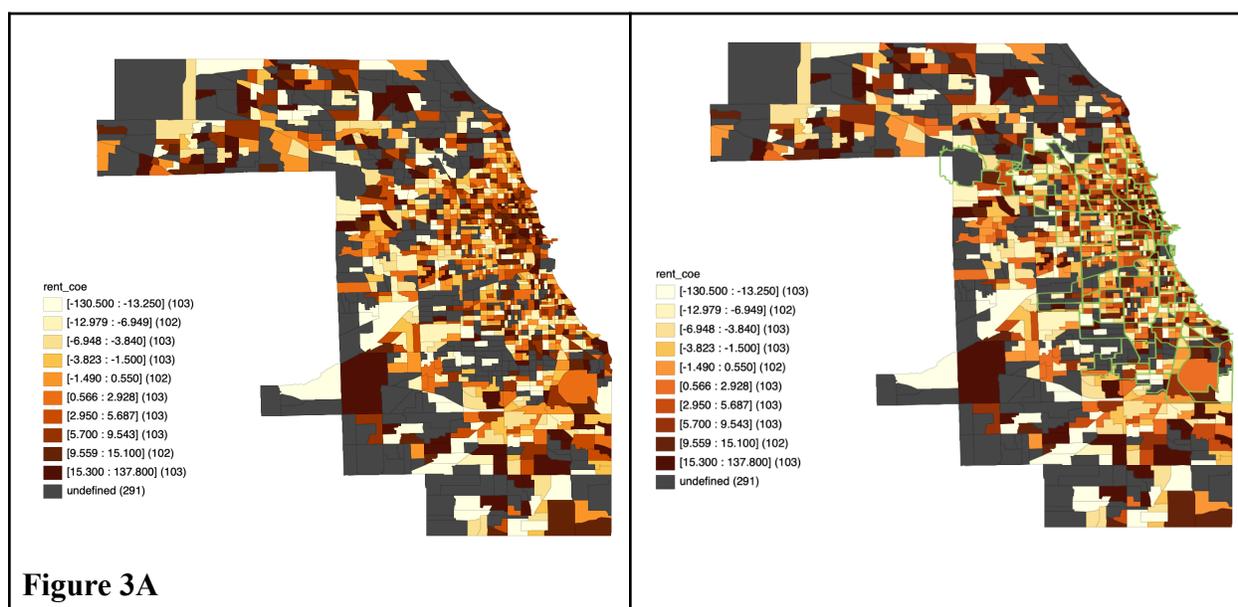


Figure 2B



**Figures 2A-C** display the spatial distribution of individual tracts' regression coefficients for the regression of median rent on the decade constructed, with **2A** displaying coefficients generated using unscaled (dollar amount) median rents, **2B** displaying coefficients generated using median rents per decade divided by each tract's overall mean rent, and **2C** displaying coefficients generated using median rents per decade divided by each tract's earliest decade's median rent (i.e., base year). In this sense, coefficients represent the change in rent associated with a one-unit increase in year built, by each map's represented scale - for example, tracts indicated with the darkest blue in **Figure 2A** are those for which a one-unit increase in year built is associated with a decrease in rent of \$32.275 per month or more, those in the darkest blue in **Figure 2B** are those for which a one-unit increase in year built is associated with a decrease in rent of about 2.8% or more of that tract's mean rent for housing of all decades of construction, and those in darkest blue in **Figure 2C** are those for which a one-unit increase in year built is associated with an expected decrease in rent of 3.5% or more of the median rent of housing built in that tract's earliest decade of rental housing. Colors indicate the number of standard deviations from the countywide mean that a tract's coefficient is, with dark blue being two or more standard

deviations below the mean, blue being between one and two standard deviations below the mean, light blue being less than one standard deviation below the mean, salmon being less than one standard deviation above the mean, orange being between one and two standard deviations above the mean, and dark red being two or more standard deviations above the mean. The maps show that there is indeed great spatial variation in the relationship between year built and rent. In some tracts, rent in older buildings tends to be significantly cheaper than in newer ones, while in others, rent in older buildings tends to be significantly more expensive than in newer buildings, and some tracts display a relationship between rent and age that is close to zero.



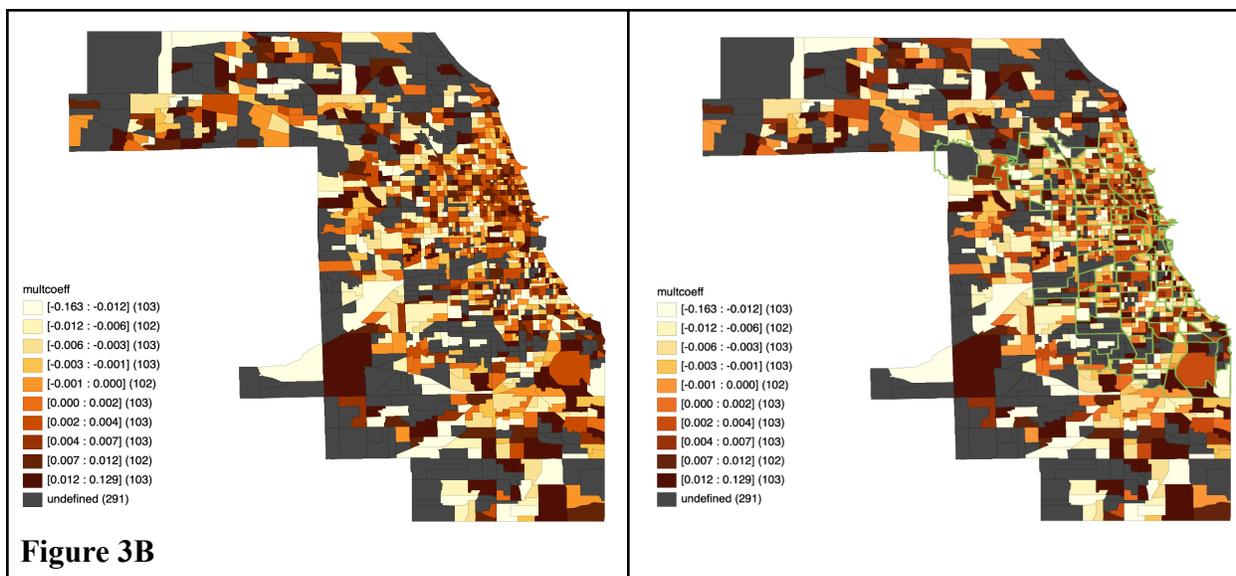


Figure 3B

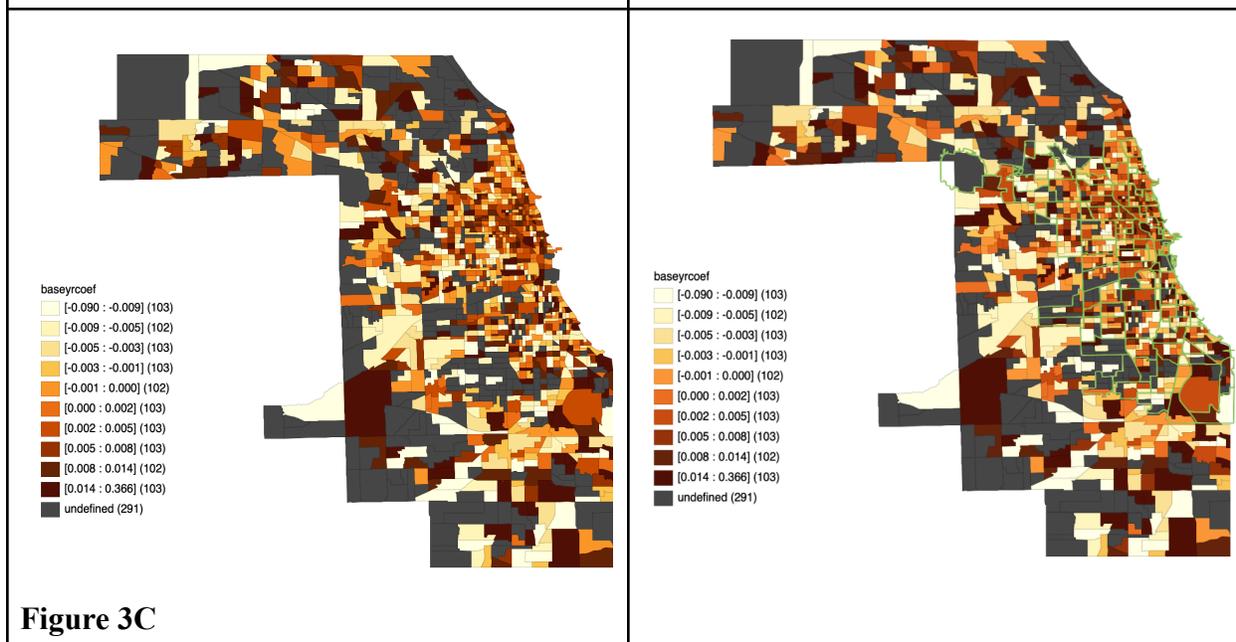
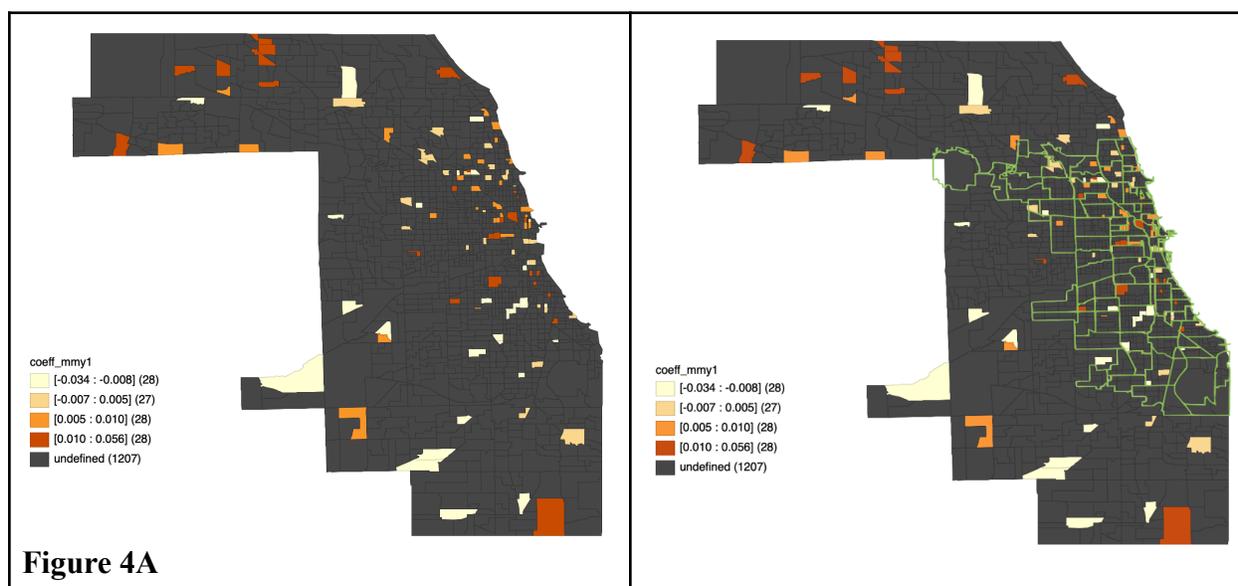
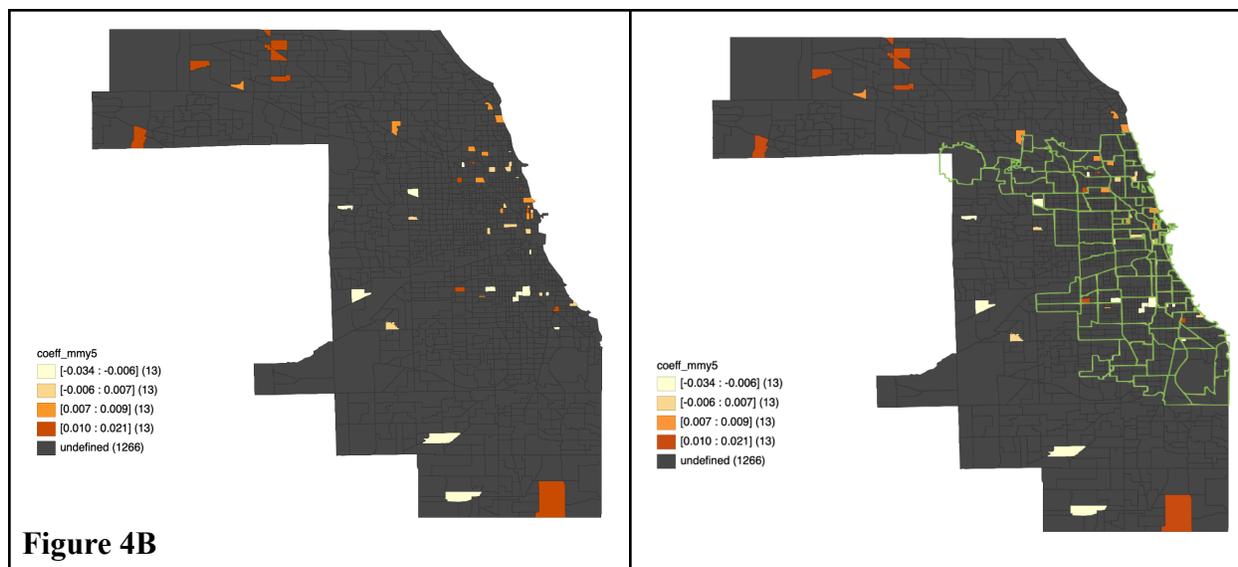


Figure 3C

Figures 3A-C display the same information, except displayed by deciles instead of by standard deviations. Here, the darkest shades indicate tracts in the top decile by coefficient, that is, those in which a one-unit increase in year built is associated with the greatest increase in rent. Both of these maps lack any notably stark spatial pattern. Interestingly, nevertheless, Chicago's north side displays a preponderance of tracts for which the regression coefficient is between zero and one standard deviations above the countywide mean, while the south side displays a

preponderance of tracts for which the regression coefficient is between zero and one standard deviations below the countywide mean. Additionally, tracts with regression coefficients below the countywide mean tend to increase in frequency towards the outer edges of the county. Thus, generally, on Chicago's north side, newer units tend to have higher rents than older units, and on Chicago's south side, west side, and suburbs, newer units tend to have lower rents than older units. This is particularly intriguing, as Chicago's north side is more affluent than Chicago's south and west sides, which is commonly held to translate to better upkeep of older buildings and thus greater desirability and cost of older buildings in relation to new buildings. The spatial relationship I have found seems to contradict this common supposition.





**Figures 4A and 4B** display only those tracts with regression coefficients with an associated p-value below .1 and below .05, respectively. These are grouped into quartiles based on the value of their regression coefficients using the mean-scaled method (because all three methods displayed similar spatial findings, I decide to continue with this method). 111 tracts displayed regression results with a p-value below .1, and 52 tracts displayed regression results with a p-value below .05. Here, interestingly, there is a less distinct north-south pattern than the maps not filtered by p-value. **Figures 4A and 4B** both display a concentration on the north side of tracts in the second and third quartiles and a concentration on the south side of tracts in the bottom and top quartiles. In other words, when filtering for only tracts with low p-values, there is a concentration of tracts on the south side in which newer rental housing is notably more expensive than older rental housing and in which newer rental housing is notably less expensive than older rental housing. Meanwhile, on the north side, there is a concentration of tracts in which newer rental housing is moderately more expensive than older rental housing and in which newer rental housing is moderately less expensive than older rental housing. Thus, there appear to be starker disparities in the relationship between building age and rent between tracts on the

south side than between those on the north side. This pattern is especially apparent in 4A. The latter of the two maps, which shows tracts with a p-value below .05, will provide the tracts that I choose to investigate in answering the third research sub-question.

### *Tracts of Interest*

For each of the tracts of interest, a table containing a few relevant summary statistics is included. These include (from left to right): the coefficient as percent change in rent in relation to the tract's average rent, the coefficient as a dollar-amount change in rent, the p-value of the regression coefficient, the tract's median rent in dollars per month, and the median year of construction across buildings in that tract. These are all sourced from the Census data employed to answer the first two research sub-questions and from my quantitative work. I also include a table indicating the number of housing units built in each decade in each tract and the median rent among residential units constructed in each decade for the tract. Below that, I have summarized the notes I took as I surveyed the neighborhood, with images of exemplary buildings, along the two guiding themes I have outlined:

- Density: what levels of housing density are present and how does this vary with building age? Common levels of density in Chicago, from low to high density, include detached single-family homes, attached single-family homes, two- to three-flat buildings, four- to six-flat buildings, low-rise (i.e., four or fewer story) multi-unit (here referring to seven or more units) buildings, mid-rise multi-unit buildings (five to twelve stories), and high-rise buildings (thirteen or more stories). Also, is there a significant presence of non-residential buildings or land uses?

- Upkeep: what state are buildings in and how does this vary with building age? Are any buildings of certain ages visibly dilapidated? Relatedly, how is neighborhood upkeep as a whole? Are there lots of vacant, overgrown lots?

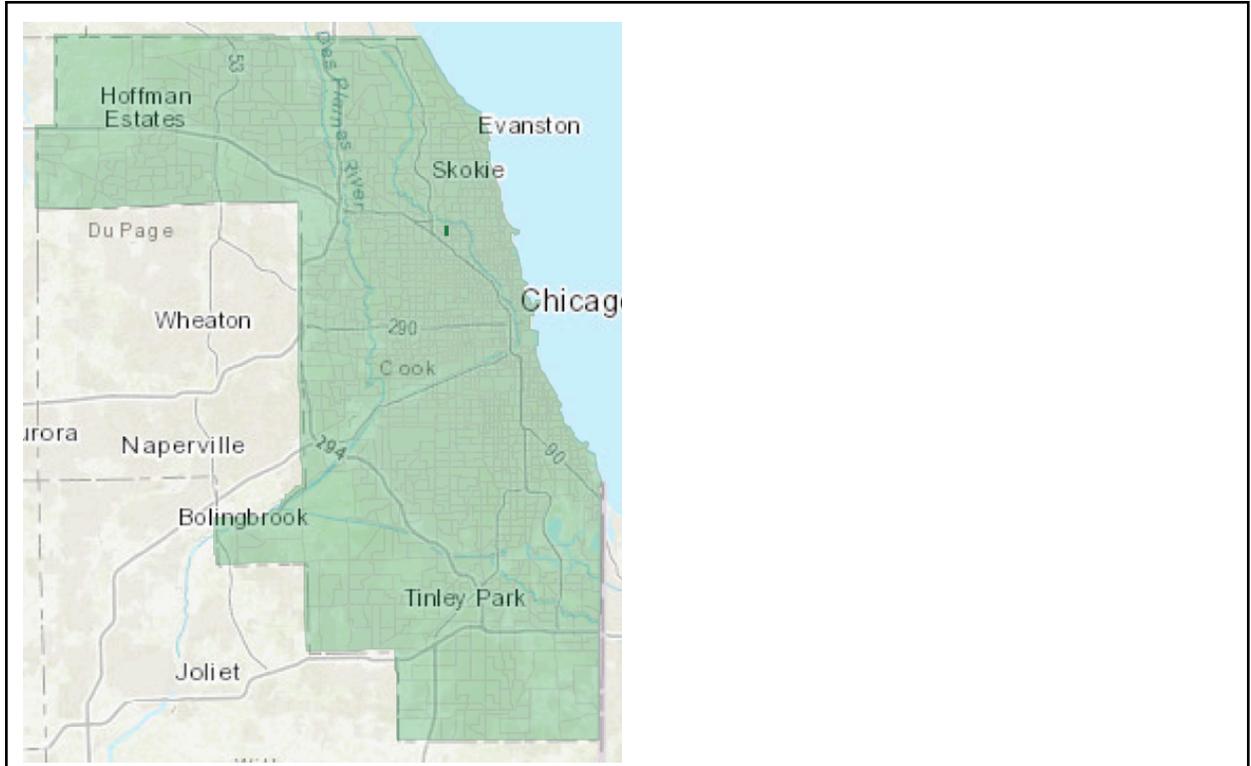
I also include screenshots from the aforementioned website that maps the age of individual buildings across Chicago, zooming in on each tract. Here, orange indicates buildings built between 1860 and 1879, red indicates those from 1880-99, pink those from 1900-19, purple those from 1920-39, indigo those from 1940-59, dark blue those from 1960-79, light blue those from 1980-99, and turquoise those from 2000-15. This allowed me to make inferences about and connections between density and cost. For example, if a tract contains two buildings built between 1980 and 1999, both of which are high-rises and contains multitudes of single-family homes built before 1939, I can draw from the Census data on median rent for each decade category to observe relationships. Lastly, for each tract I provide a map from GeoDa displaying its location within the city.

*Bottom Quartile: Census Tract 1406.01*

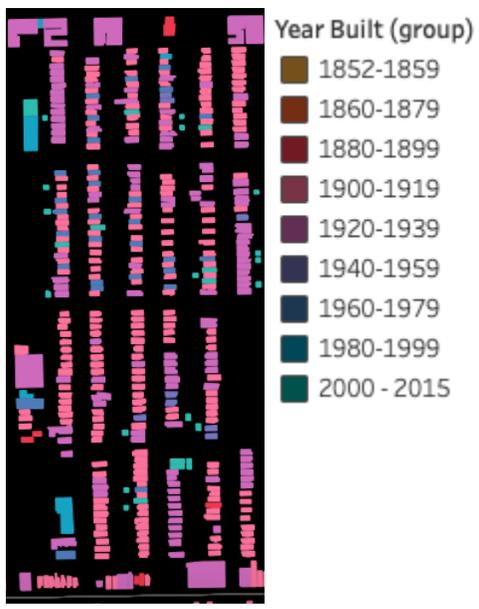
Regression coefficient divided by mean rent	Regression coefficient in dollars	p-value	Median rent	Median yr built
-.023216	-19.85	.002052	1188	Pre-1939

Decade	10s	00s	90s	80s	70s	60s	50s	40s	pre-1939
Number of housing units	13	43	8	48	11	33	46	50	656
Rent	-	-	-	244	-	-	889	1063	1224

(\$/mo)									
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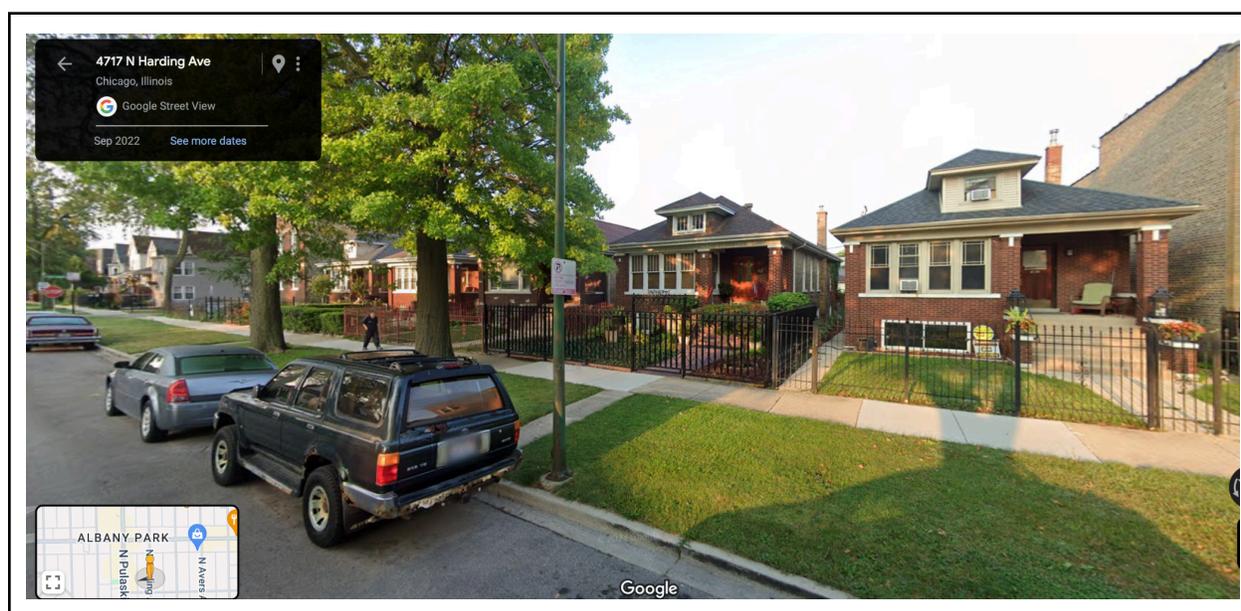


Tract denoted in solid green



(Arora n.d.)

Census Tract 1406.01 is located in the Chicago neighborhood of Albany Park. The tract is bounded to the north by W Lawrence Avenue, to the south by W Montrose Avenue, to the west by N Pulaski Road, and to the east (roughly) by N Avers Avenue. The bulk of the older (i.e., pre-1939) housing stock here consists of single-family homes, many in the workers cottage style, and some 2-flat buildings, which may contain either one or two units. This tract has relatively many single-family homes, at 1.25 times the Chicago rate (“Census Tract 1406.01” n.d.). The bulk of units constructed in the 1980s (the only post-1950s decade included in the census data) seem to be located in a mid-density senior housing complex at 4444 N Harding. The fact that median rent is included in the Census dataset for units built in the 1940s and 1950s indicates that there is a sizable number of units of this age in this tract, as data suppression did not occur. Indeed, there are two mid-density buildings not shown on the visualization tool that I would surmise were constructed in the 1940s and 1950s based on their appearance and style. Upkeep of buildings seemed good in this tract. Overall, in this tract, the older buildings commanding higher rents tend to be low-density buildings, while the newer buildings commanding lower rents tend to be relatively higher in density.

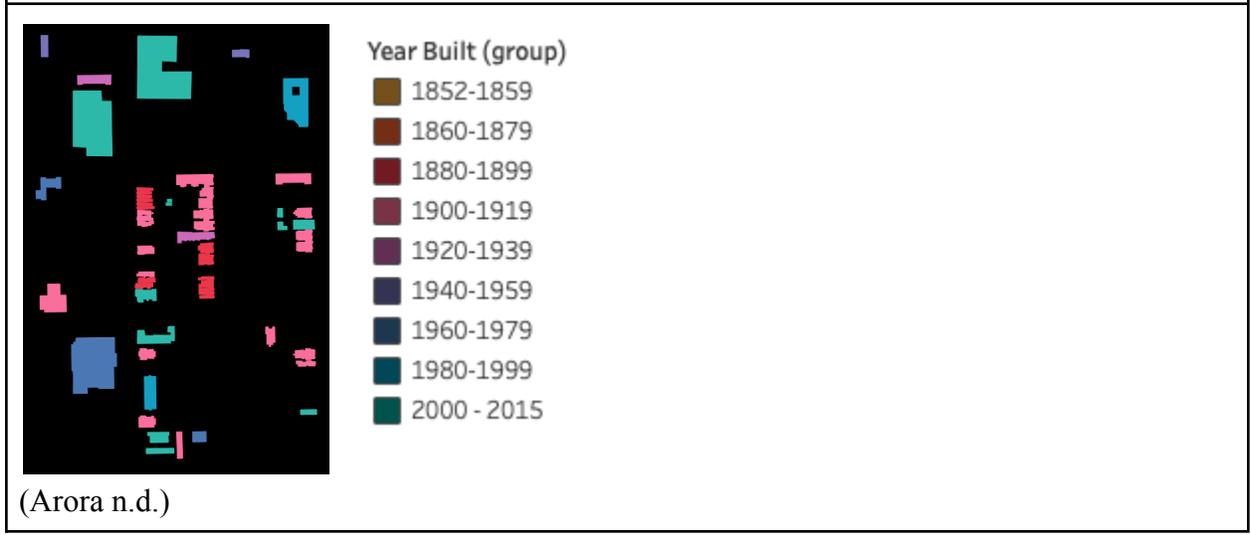


Detached single-family bungalows in Census Tract 1406.01, built between 1920 and 1939.

*Bottom Quartile: Census Tract 4204*

Regression coefficient divided by mean rent	Regression coefficient in dollars	p-value	Median rent	Median yr built
-.0138235	-11.24643	.0251437	925	1950

Decade	10s	00s	90s	80s	70s	60s	50s	40s	pre-1939
Number of housing units	28	0	71	63	49	109	77	40	351
Rent (\$/mo)	-	-	300	585	871	808	1210	883	1038



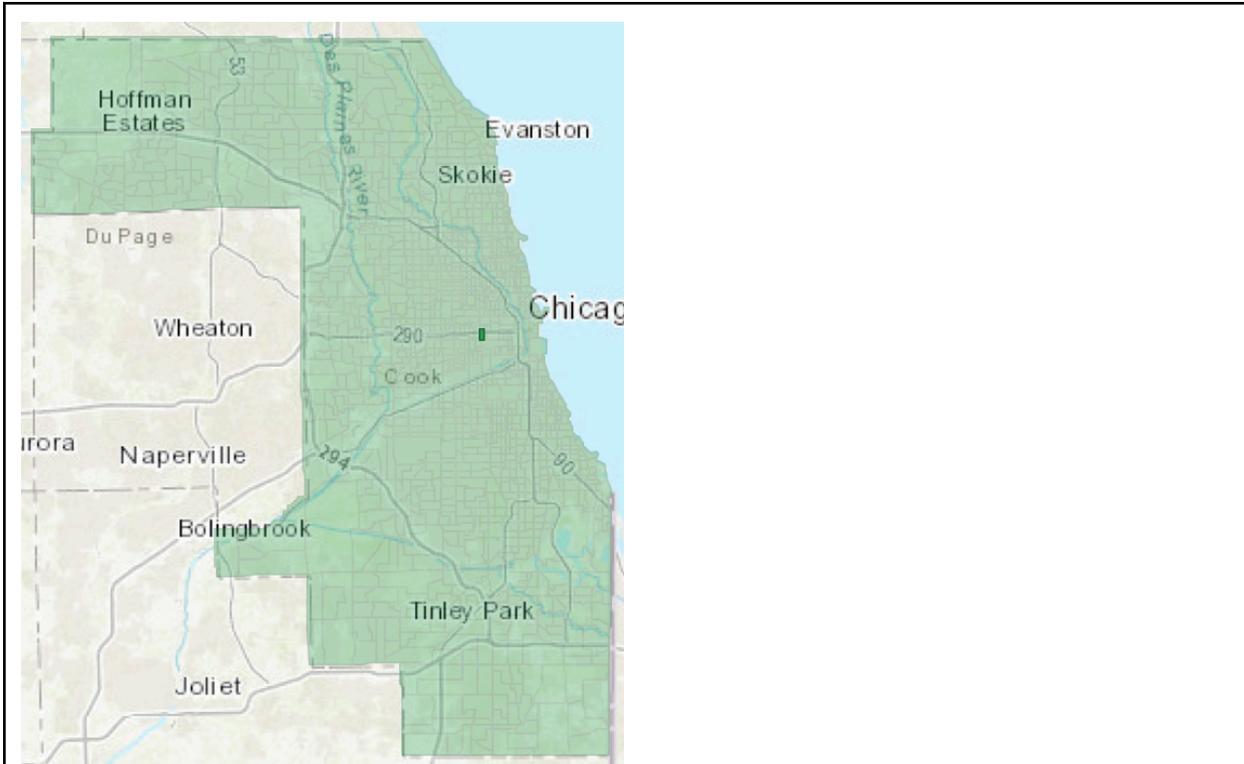
Census Tract 4204 is located in the Woodlawn neighborhood, very close to the University of Chicago, bordered by E 60th Street to the north, E 63rd Street to the south, S Cottage Grove Avenue to the west, and S Ellis Avenue to the east. Building upkeep seems good in this tract, although vacant lots are frequent. This tract has a decent share of mid-rise multi-unit buildings,

which seem to be more recent based on the style, and 3- to 6-flat buildings, which compose much of the pre-1939 building stock. This tract is overall a higher-density tract, with very few single-family homes, at  $\frac{1}{3}$  the Chicago rate (“Census Tract 4204” n.d.). Thus, here, newer buildings tend to be cheaper in rent and tend to be higher-density buildings than older buildings.

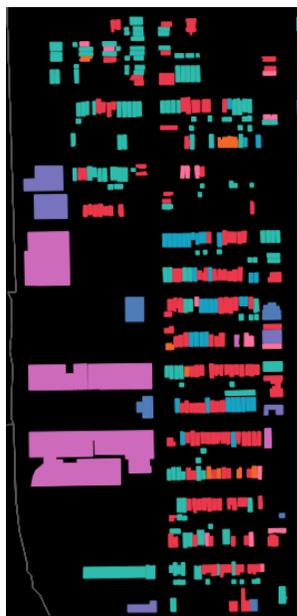
2<sup>nd</sup> Quartile: Census Tract 2827

Regression coefficient divided by mean rent	Regression coefficient in dollars	p-value	Median rent	Median yr built
-.0023757	-4.482432	.0352247	1805	1999

Decade	10s	00s	90s	80s	70s	60s	50s	40s	pre-1939
Number of units	39	482	107	58	49	0	0	29	305
Rent (\$/mo)	-	1775	1719	-	-	-	-	2017	2036



Tract denoted in solid green



Year Built (group)

- 1852-1859
- 1860-1879
- 1880-1899
- 1900-1919
- 1920-1939
- 1940-1959
- 1960-1979
- 1980-1999
- 2000 - 2015

(Arora n.d.)

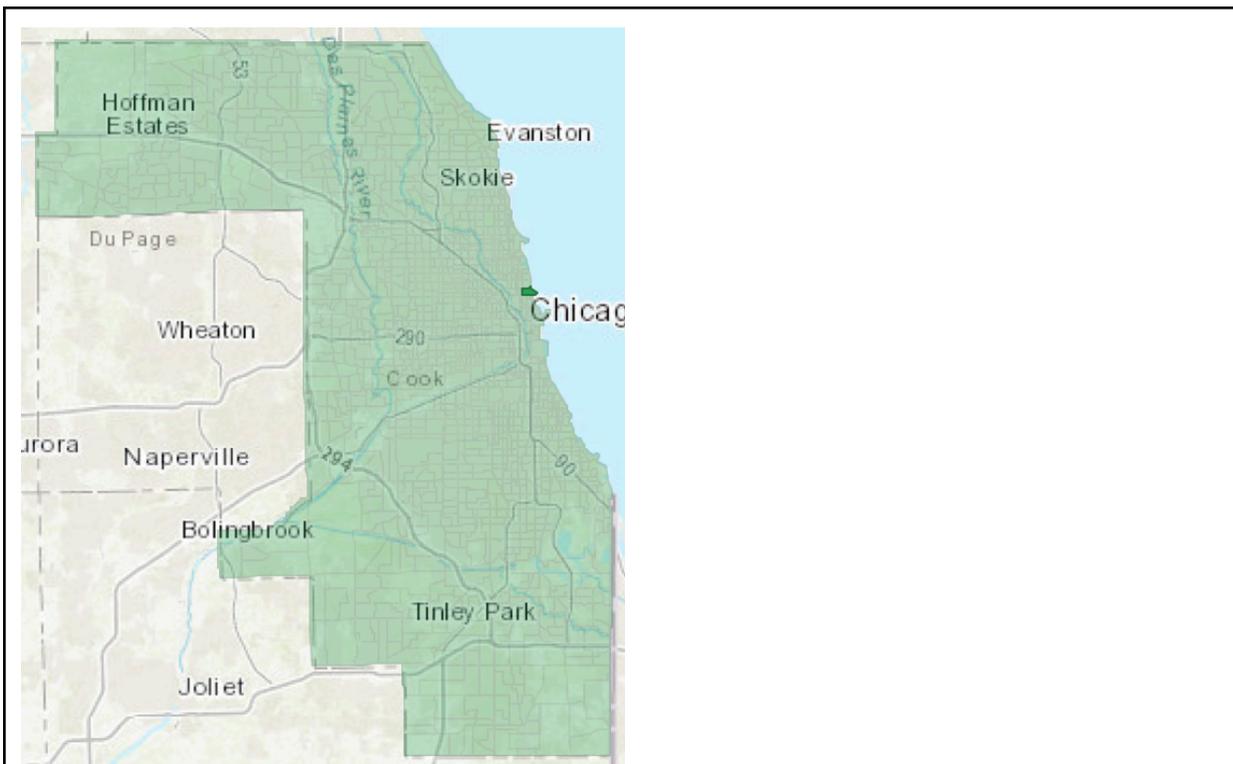
Census Tract 2827 is located in the Little Italy neighborhood, in the near west side of Chicago, and is bordered by W Van Buren Street to the north, W Roosevelt Road to the south, S

Western Avenue to the east, and the rail tracks to the west. This tract possesses a conspicuous mix of buildings built between 1880 and 1899 and buildings built in the 1990s and 2000s. Most of the buildings in this tract consist of single-family homes and 2- to 3-flat buildings, with a few 4- to 6-flat buildings and low-rise multi-unit buildings. 86% of this tract's housing units are in buildings with 2 or more units ("Census Tract 2827" n.d.). One aspect of note in this tract is that the preponderant buildings built in the 1990s and 2000s are modeled in a similar, 2- to 3-flat style as the buildings built before 1900. According to Redfin, it seems that these 2- to 3-flat buildings for both the 1990s and 2000s and the 1880s and 1890s generally possess multiple units, rather than simply being single-family homes modeled after 2- to 3-flats. Overall, the newer, post-1990 buildings in this tract are in stellar condition, while the pre-1939 buildings are in good condition. Oddly, while the negative relationship between year built and rent is small here, there still is one, with newer buildings having cheaper rents than older buildings. However, this difference is minor and could owe to characteristics I cannot observe within the scope of this study (such as interior characteristics).

3<sup>rd</sup> Quartile: Census Tract 715

Regression coefficient divided by mean rent	Regression coefficient in dollars	p-value	Median rent	Median yr built
.0088842	17.96832	.026548	1944	1971

Decade	10s	00s	90s	80s	70s	60s	50s	40s	pre-1939
Number of units	32	13	163	699	1434	609	89	120	1162
Rent (\$/mo)	-	-	2509	2648	2040	1805	-	1380	1753



Tract denoted in solid green

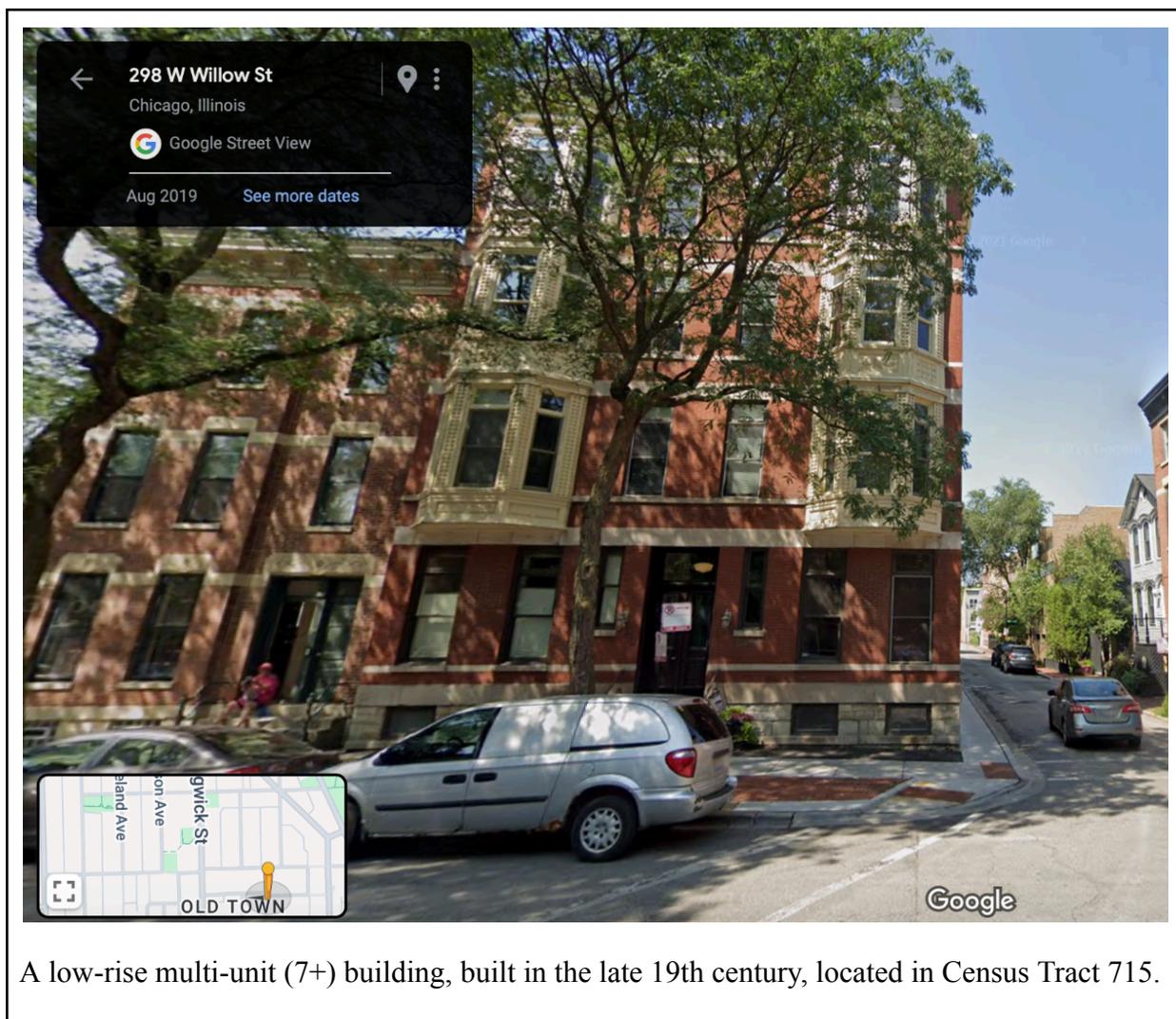


**Year Built (group)**

- 1852-1859
- 1860-1879
- 1880-1899
- 1900-1919
- 1920-1939
- 1940-1959
- 1960-1979
- 1980-1999
- 2000 - 2015

(Arora n.d.)

Census Tract 715 is located within the Lincoln Park neighborhood and is bounded by N Sedgwick Street to the west, Lake Michigan to the east, W Armitage Avenue to the north, and W North Avenue to the south. This tract possesses a vast majority of multi-unit (2+) buildings, at 91%, 1.3 times the Chicago rate (“Census Tract 715” n.d.). In this tract, buildings built in the 1940s stand out as having much cheaper rents than their counterparts in other decades. When surveying this tract and referencing the visualization tool, I found that residential buildings built between 1940 and 1959 according to the mapping tool are scarce, with the exception of a multi-unit low-rise building built in this time period, located at 1750 N Wells, seemingly a mix of studios to three-bedroom apartments according to various realty sites. In this tract, I found that much of the newer (1960s and later) housing stock, with generally higher rents than older housing in this tract, consisted of high-rise buildings. Older buildings, meanwhile, consist of a mix of densities, with single-family homes, 2- to 3-flat buildings, 4- to 6-flat buildings, and multi-unit (7+) low- and mid-rise buildings. The old buildings look to be in very good condition. This tract is intriguing, as the typical density-affordability relationship seems to be inverted from what it is commonly held to be along the lines of building age, in that here, newer buildings are both higher density and more expensive than older buildings. One potential explanation is that the newer, high-rise buildings, which tend to overlook Lincoln Park Zoo with views of the lake and the city skyline, are expensive due to factors such as views and building amenities, which luxury high-rise buildings offer and smaller buildings typically lack. Indeed, the units built in the 1980s and 1990s seem to be predominantly in Eugenie Terrace, a high-rise building marketed as luxury (“Eugenie Terrace on the Park” n.d.). Overall, pre-1939 buildings here, of low to mid-density, are overall lower cost than newer, mainly high-rise buildings, which presents a positive verdict for older buildings in potentially increasing housing affordability.

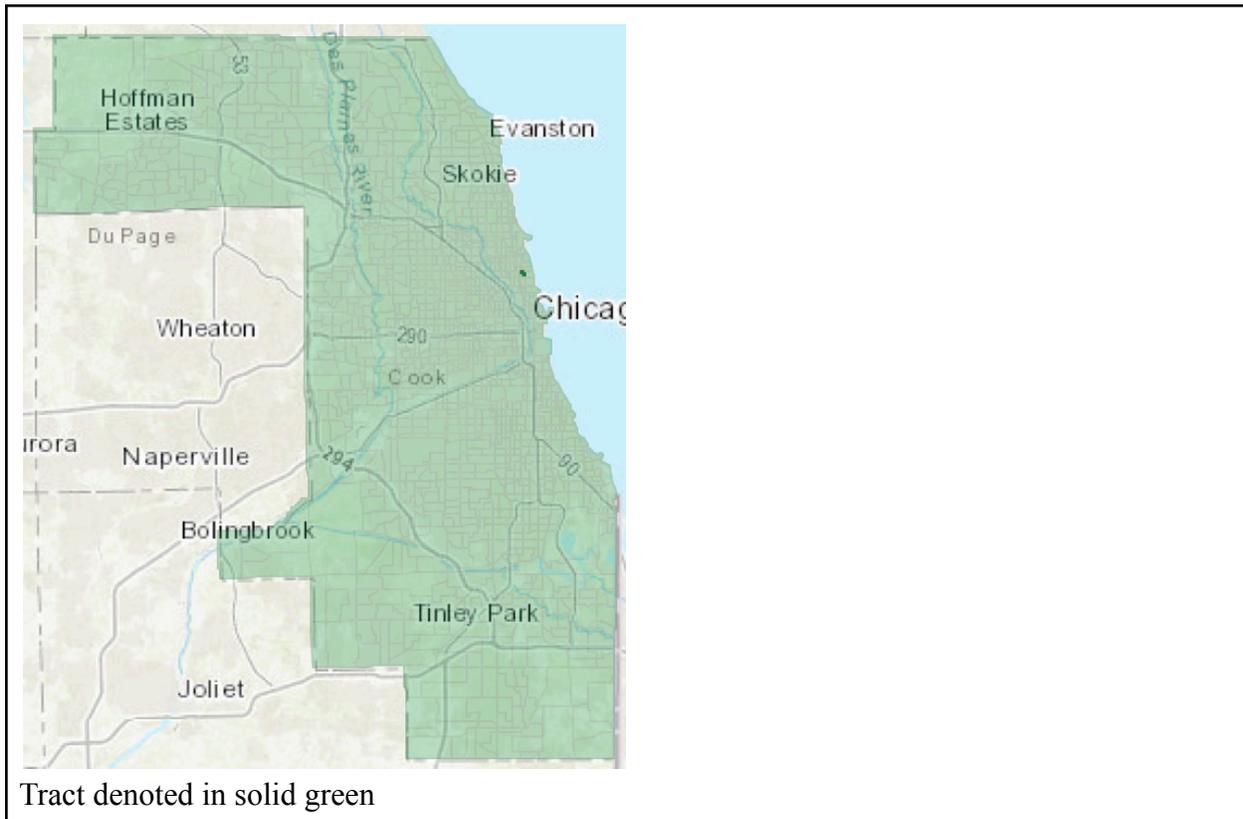


*Top Quartile: Census Tract 701.02*

Regression coefficient divided by mean rent	Regression coefficient in dollars	p-value	Median rent	Median yr built
.0104612	17.32381	.0039287	1610	1971

Decade	10s	00s	90s	80s	70s	60s	50s	40s	pre-1939
Number	245	143	139	283	417	364	81	35	641

of units									
Rent (\$/mo)	2419	-	1893	1574	1949	1682	1111	-	964

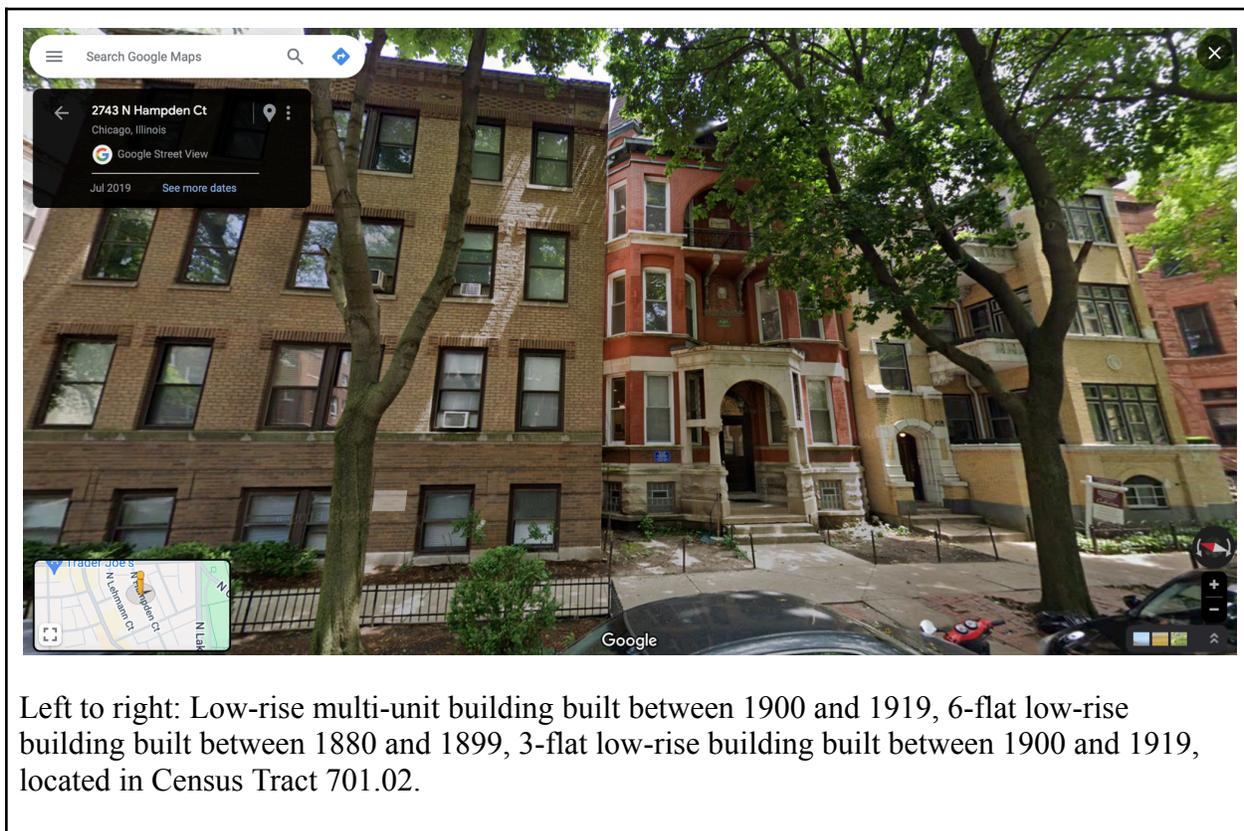


Tract denoted in solid green

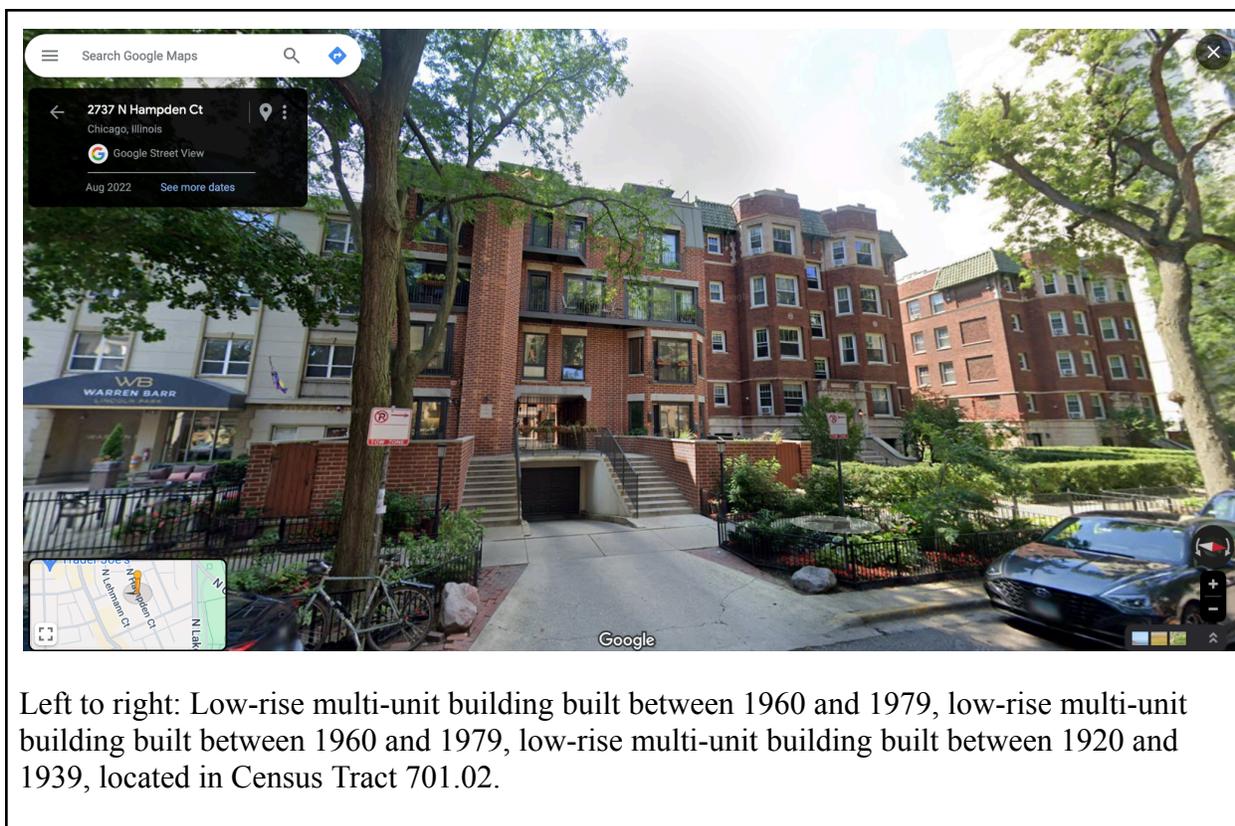


Census Tract 701.02 is also located in the Lincoln Park neighborhood and is bordered to the north by W Diversey Parkway, to the south by W St. James Place, to the west by N Clark Street, and to the east by (south to north) N Lakeview Avenue for a block, N Hampden Court for a block, the alley between N Hampden and N Pine Grove Avenue for a block, and N Pine Grove for a block. 95% of this tract's housing units are in buildings with 2 or more units, at 1.4 times the Chicago rate ("Census Tract 701.02" n.d.). Compared to other tracts, which typically were dominated by buildings built before 1939, this tract has a surprising amount of buildings built in the 1960s and 1970s (indicated in dark blue in the image). These buildings built in the 1960s and 1970s are a mix of multi-unit (7+) low- to mid-rise buildings and high-rise buildings. Here, meanwhile, the buildings built before 1939 seem to consist of a mix of 3- to 6-flat buildings and low-rise multi-unit (7+) buildings. Here, buildings built in the 1980s and 1990s seem to be almost exclusively high-rise buildings. Lastly, buildings in this tract built in the 2010s (the most expensive decade category here) are mostly a mix of multi-unit low- to mid-rise buildings and

single-family townhouses, with one high-rise built in 2010 (according to Google Street View), which likely composes the bulk of post-2010 units due to the large number of units in a high-rise building. Overall, in this tract, newer buildings are generally more expensive to rent and are higher density than older buildings. This is surprising, as higher density of housing is typically held to translate to lower cost of housing. Here, this common relationship is inverted, which suggests that such mid-density pre-1939 buildings, seemingly in excellent condition in this tract, are a vital source of housing affordability.



Left to right: Low-rise multi-unit building built between 1900 and 1919, 6-flat low-rise building built between 1880 and 1899, 3-flat low-rise building built between 1900 and 1919, located in Census Tract 701.02.

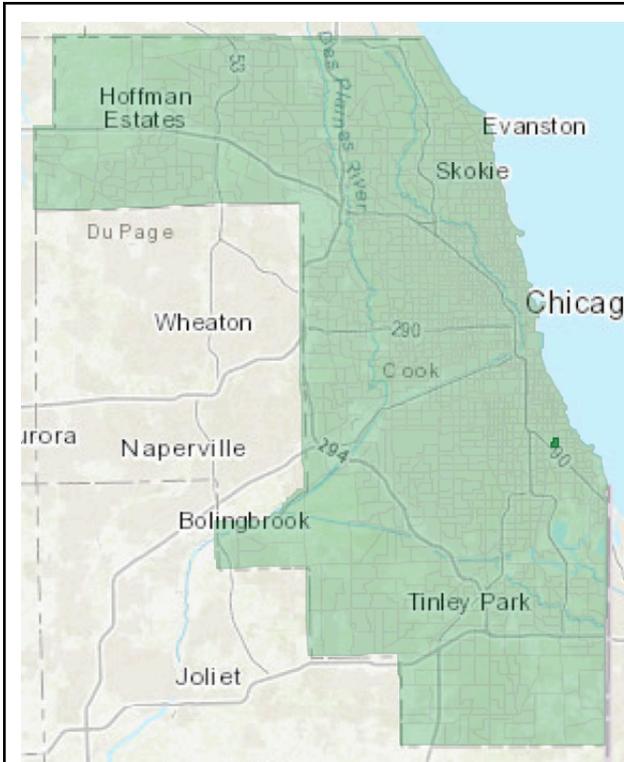


Left to right: Low-rise multi-unit building built between 1960 and 1979, low-rise multi-unit building built between 1960 and 1979, low-rise multi-unit building built between 1920 and 1939, located in Census Tract 701.02.

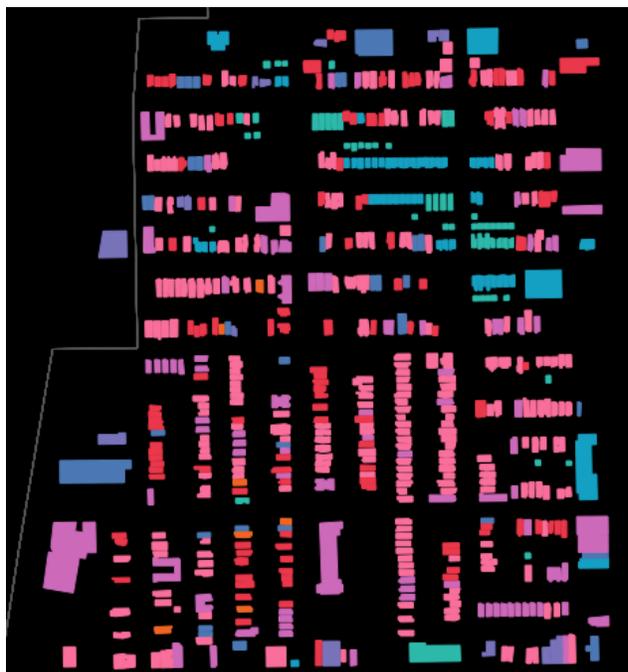
*Top Quartile: Census Tract 4304*

Regression coefficient divided by mean rent	Regression coefficient in dollars	p-value	Median rent	Median yr built
.0165423	26.37388	.0262721	1116	1944

Decade	10s	00s	90s	80s	70s	60s	50s	40s	pre-1939
Number of units	78	49	189	0	171	102	162	98	769
Rent (\$/mo)	3186	-	1836	-	1617	777	1068	-	1082



Tract denoted in solid green



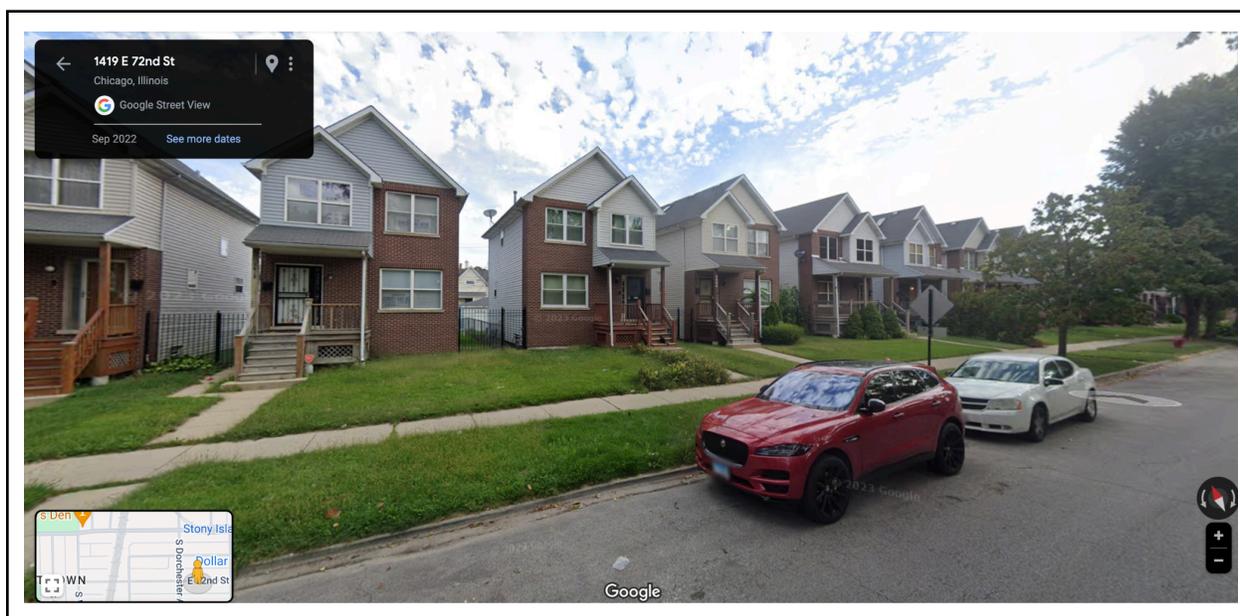
Year Built (group)

- 1852-1859
- 1860-1879
- 1880-1899
- 1900-1919
- 1920-1939
- 1940-1959
- 1960-1979
- 1980-1999
- 2000 - 2015

(Aurora n.d.)

Census Tract 4304 is located in the South Shore community area and is bounded by E 71st Street to the north, E 75th Street to the south, S Stony Island Avenue to the east, and the

nearby railroad tracks to the west. 77% of this tract's housing units are in single-family homes, which is 1.1 times the Chicago rate ("Census Tract 4304" n.d.). One of the first impressions of this tract upon visually surveying it is the preponderance of vacant and overgrown parcels. Nevertheless, most buildings look to be in good shape. The buildings built after 2000 in this tract seem to consist of a mix of detached single-family homes, duplexes, and triplexes. Meanwhile, the buildings built in the 1990s are mostly two-story detached single-family homes. As with many areas in Chicago, this tract is dominated by buildings built before 1939, here displaying a variety of forms and densities, from single-family homes, 2-flat buildings, 3- to 6-flat buildings, and some low-rise multi-unit (7+) buildings. Here, newer (1990s and later) buildings seem to slightly trend to lower density than older (pre-1939) buildings, which may explain some of their higher rents. However, there is still clearly a relatively high number of pre-1939 single-family homes (as many of this tract's residential buildings were built before 1939, and 77% of the tract's buildings are single-family homes). Additionally, most older buildings were still in good condition. Thus, here, it doesn't seem that solely density makes older housing cheaper, but rather something more intrinsic to older housing.



Detached single-family houses in Census Tract 4304, all built in the 1990s.

## Discussion

Tract	As decade built increases (i.e., becomes more recent), how does cost change?	As decade built increases (i.e., becomes more recent), how does density change?	Most common typologies of older housing stock	Most common typologies of newer housing stock
1406.01	Decrease	Increase	Detached single-family houses	Mid-rise multi-unit buildings
4204	Decrease	Increase	3- to 6-flat low-rise buildings	Mid-rise multi-unit buildings
2827	Decrease (very slight)	Equal	2- to 3-flat low-rise buildings	2- to 3-flat low-rise buildings
715	Increase (slight)	Increase	Mix of densities	High-rise buildings
701.02	Increase	Increase	3- to 6-flat low-rise buildings and mid-rise multi-unit buildings	High-rise buildings
4304	Increase	Decrease (slight)	Detached single-family houses	Detached single-family houses

The above table summarizes the result of my analysis targeting my third research sub-question, by displaying, for each of the six tracts, the difference in rent cost, on average, between newer and older housing, the difference in housing density between newer and older

housing, and the common housing typologies for older and newer buildings in that tract.

Commonly, denser housing is held to have generally cheaper rent, as denser housing presents a more maximal use of provided land (in terms of floor area to land area), a greater supply of housing (supply of goods generally translating to increased affordability), and smaller unit sizes. As the table shows, in tracts where older housing is more expensive than newer housing, older housing tends to be of lower density than newer housing (in two thirds of the tracts surveyed, with density being roughly the same between older and newer housing in the tract with the smallest negative relationship between year built and cost). Meanwhile, in tracts where older housing is more affordable than newer housing, older housing also tends to be of lower density than newer housing (in  $\frac{2}{3}$  tracts surveyed). Thus, it is clear that the relationship between buildings' decade of construction and rent cost is not simply one in which whichever age of housing is denser is less expensive to rent.

General observations about housing in each of the six tracts individually yield valuable insights in teasing the factors that determine the relationship between building age and affordability. All tracts in my sample happened to be residential areas with a negligible number of non-residential land uses. Census Tract 1406.01, in which older housing is more expensive to rent than newer housing to the greatest degree, overwhelmingly consists of detached single-family homes as its older housing stock and mid-rise multi-unit housing as its newer housing. Tract 4204, in which older housing is moderately more expensive to rent than newer housing, generally consists of 3- to 6-flat buildings as its older housing and mid-rise multi-unit housing as its newer housing. Tract 2827, in which older housing is minimally more expensive to rent than newer housing, possesses similar, low-density housing typologies in both older and newer building age categories. Tract 715, in which older housing is minimally cheaper to rent

than newer housing, consists of older housing of middle densities, as does Tract 701.02, in which older housing is moderately cheaper to rent than newer housing. In Tract 4304, in which older housing is significantly cheaper to rent than newer housing, both older and newer housing seem to consist largely of single-family homes.

Thus, overall, density matters situationally in determining the relationship between building age/historicity and affordability. However, situations in which the expected inverse relationship between density and rent cost is absent along age lines indicate that factors intrinsic to older housing affect its affordability. It seems that increased rental affordability (that is, lower rent costs) accompanies historicity (older building age) most closely when older buildings are of middle densities, including 3- to 6-flats and low- to mid-rise multi-unit (7+) buildings, as is the case in Tracts 715 and 701.02. Meanwhile, as Tract 1406.01 demonstrates, when older buildings are very low density (i.e., single-family detached homes) and when higher density, newer housing is available, increased historicity may be associated with unaffordability. Meanwhile, Tract 4304, in which the newer and older housing stock are similar in density, upkeep, and external quality, yet in which older housing is still more affordable, indicates that preserving and maintaining old buildings, rather than tearing them down and building anew, can plausibly benefit housing affordability.

Interestingly, I did not find that upkeep was a significant factor in the relationship between building age and rental affordability, as evidenced by my tracts of interest: all tracts generally displayed insignificant differences in external quality and upkeep between newer and older buildings. This seems to negate a common hypothesis for the affordability of older rental housing, which is that older rental housing is less expensive than newer rental housing primarily because the former tends to be more rundown. This in turn seems to discredit the implication,

commonly drawn from this hypothesis, that preserving and restoring these old buildings necessarily causes their rents to appreciate. Because of the constraints of visual surveying of the exteriors of buildings, other variables that could potentially be of interest in further elucidating variation in the relationship between building age and rent cost were not able to be explored in this study. Further research investigating interior qualities of rental units of varying ages and how this influences the relationship between building age and rent cost would be an ideal next step in further understanding the role of historic preservation in rental affordability.

### **Policy Recommendations**

In line with securing housing affordability, this paper therefore offers two preservation policy recommendations stemming from its findings: density-conserving preservation of historic buildings of middle densities and infill construction of accessory dwelling units (ADUs) on lots containing low-density historic housing.

#### *Preservation of Medium-Density Housing*

Evident in the findings of my research is that older rental housing of medium densities (i.e., 3- to 6-flat low-rise buildings and multi-unit (7+ unit) low- to mid-rise buildings) proves to be a particularly promising source of affordable rental housing. In specific, across tracts, older rental housing of medium densities is shown to be more affordable than newer rental housing of higher densities, despite the fact that generally, higher density translates to lower housing cost per unit due to placing more units on a given parcel of land (Baca et al. 2019). This finding, combined with the negligible differences in upkeep noticed between housing of various ages across tracts, attests to older rental housing of medium densities being a naturally and intrinsically affordable source of housing. Accordingly, I recommend the preservation of these typologies of historic housing at these densities. This can be achieved through preservation

ordinances (Potter 2013), passed by municipalities, which would bind owners to maintaining these properties at this ideal level of density. Municipalities could also offer financial incentives, such as grants and tax credits, to owners of these properties who wish to reconvert such buildings that have been previously converted to low-density forms, such as Chicago's 2- to 4-flat buildings that have been converted to single-family homes (Institute for Housing Studies at DePaul University 2023), back to their original medium densities. From a fiscal standpoint, these increases in housing density would ideally increase residency within the city, expanding the city's tax base to offset revenue decreases brought by tax credits.

#### *Infill Construction of Accessory Dwelling Units (ADUs)*

Meanwhile, because this research has shown low-density (mostly single-family) older housing to still be affordable in comparison to newer housing of similar densities, yet more expensive compared to newer housing of higher densities, this paper recommends municipal permitting of accessory dwelling units (ADUs). ADUs broadly refer to any housing constructed on a single-family parcel in addition to a primary house on that lot. ADUs can be constructed as attached (i.e., structurally connected to the existing house) or detached (i.e., as a structure separate from the existing house) (Building an ADU). As detached ADUs can be constructed on the same parcel as a single-family house without requiring the alteration or removal of that house, ADUs can be paired with historic single-family houses to raise a parcel's density closer to a medium density, ideal for affordability as seen above, while still preserving historic housing. In 2020, Chicago passed an ordinance allowing for the construction of ADUs for the first time since 1957 (Additional Dwelling Units (ADU) Ordinance). For the above reasons, I recommend the continuation of the provisions of this ordinance. Municipalities such as Chicago could also consider wedding historic preservation and housing access priorities through ADU programs.

Owners of historic houses, for example, could be provided financial incentives, such as tax credits and grants, better enabling them to finance the construction of a detached rental ADU on their property while preserving their historic house. The specifics of the fiscal viability and conditions of such a policy could be a valuable point of further research to be undertaken.

## **Conclusion**

Overall, the quantitative analyses conducted in this paper identify significant spatial variation in the relationship between residential buildings' decade of construction and median rent cost across Cook County, which I explore to tease what factors may inform the relationship between building age and rental affordability in order to draw policy conclusions about historic preservation's role in expanding rental affordability. Visual surveying of a selection of tracts reveal that, while density of housing plays a significant role in the relationship between building age and rental affordability, older housing seems to be intrinsically affordable, in a way that is not explained by any of its external characteristics. Because of the particular relative affordability of older housing of medium densities in comparison to newer housing, I recommend the focused preservation of older housing of medium densities and infill construction of ADUs on parcels with low-density older homes, to bring these parcels closer to medium density, as keystone policy recommendations to wed historic preservation and rental housing affordability. To solidify this paper's findings, investigating internal characteristics of rental housing in the above tracts of interest and how these may explain the relationship between building age and rental affordability is strongly recommended as an avenue of further research.

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