Assignment Three GIS
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Overview

- I have chosen to analyze the market for affordable housing and several metrics that measure the effects and drivers of community gentrification. This analysis includes changes in single-family home development over time, which are displayed as a choropleth map. Additionally, I examine the density distribution of affordable housing units segmented by type and size, represented as a Kernel Density map. Lastly, I analyze changes in property assessments over time and the distribution of financial lending establishments, both of which are visualized as a choropleth map with spatial points.

- I have chosen to study affordable housing and community gentrification because over the past 10 years, Chicago has experienced the largest decrease/displacement of Black and African American residents. Due to high housing costs (including rent and mortgage rates), increased localized violence, and limited economic and job opportunities, Black Chicago residents have been leaving the city and relocating to nearby suburbs and surrounding states. Research from the Institute for Housing Studies shows that predominantly Black census tracts in Chicago experienced a decline in homeowner households from 2010 to 2019. The number of owner-occupied households in Black neighborhoods dropped by 13.6%, compared to a 2.8% decrease for the entire city. Simultaneously, there has been a noticeable influx of White residents from California and nearby Midwest states. Therefore, Chicago is experiencing a population shift that significantly impacts Black racial and ethnic groups more than their minority counterparts.

- This market report aims to capture and visualize some of these trends on a map of Chicago's community areas. The specific Chicago community area I will focus on is South Deering. This is because common literature and public discourse have heavily analyzed and discussed Englewood and Austin neighborhoods, yet South Deering has rarely received the attention that it needs. South Deering has a population that is more than 65% Black, with a median income level of $34,000, and was once a hub for steel and meatpacking factory employees. However, today it faces hundreds of empty vacant lots, shutdown businesses, and a 3% decrease of Black residents annually. Thus, although I will discuss broader trends throughout Chicago's community areas, I will also narrow down my analysis to South Deering because of the lack of public awareness.

- Examining affordable housing density allows us to determine the city's prioritization of housing resources and tax grants, as well as identify marginalized areas. The map displaying single-family home developments also serves as an indicator of where private investors are purchasing vacant lots and transforming them into expensive homes

intended for external residents. Lastly, the property assessment map demonstrates the percentage difference in property values over a ten-year period. This effective indicator helps measure the extent of property tax increases and the potential for housing to become unaffordable for existing residents due to rapid spikes or exponential growth in tax bills. All of these factors contribute to our understanding and measurement of community gentrification.

### *Description of Data Sources and Methods*

- In the Kernel Density map, I utilize data from the Chicago Data Portal to download both the shapefile for Chicago's community areas and geospatial data that identify the various types of affordable housing and their locations across the city. Using this data, I generate a Kernel Density map that effectively illustrates the distribution of affordable housing throughout Chicago. To enhance clarity, I incorporate spatial points for each unit and differentiate them based on their type, using color coordination. The radius of each spatial point corresponds to the capacity of residents that each unit can accommodate.

- To provide further context, I display the density ranges for the 75th, 50th, 25th, and 5th percentiles of all the affordable housing units in Chicago. The spatial points represent both continuous and categorical information, as they indicate the total number of residents each unit can house and the type of affordable housing it represents, respectively. To calculate the density, I employ aggregation analysis to compute the kernel density estimation (KDE) for each percentile range.

- For the Chicago single-family map, I downloaded the 2017 and 2021 data from the Cook County Assessor's office. The data listed the total number of single-family homes for each Chicago community. After downloading the data, I calculated the percent difference between the two years and added those values in a separate column. Next, I merged this dataset with the Chicago community areas shapefile in GeoDa. Using this combined data, I created a choropleth map that illustrates the variations across the different communities. To generate the choropleth map, I utilized the quantiles method with five distinct bin ranges.

- For the final map, I downloaded property assessment data from the Cook County Assessor's Office for the years 2010 and 2020 (the latest available). This data is segmented based on Chicago communities. I calculated the percentage difference between these two years and created a separate column for it. Using GeoDa, I merged this dataset with the Chicago community areas shapefile and visualized the values through a choropleth map. The data is visualized using natural breaks with five different ranges. Additionally, I included another layer of spatial points that show the distribution of

private and public financial lending establishments (banks) throughout Chicago. To obtain the bank data, I edited it in R by extracting the longitude and latitude coordinates using the Geocode function for each bank's specified address. The bank data was obtained from the Chicago data portal.

Results

- The Kernel Density map reveals that the highest concentration of affordable housing units is located in the Humboldt Park and West Town neighborhoods. The map indicates that the majority of affordable housing units in Chicago fall into the categories of multifamily, senior, or supportive residences. Approximately 75% of all affordable housing is predominantly centered in the middle and northside areas of Chicago. However, the map also highlights a heavily concentrated pocket of affordable housing near the southeast side, close to the lakefront in the vicinity of Kenwood and Bronzeville. Upon analyzing South Deering, it becomes apparent that there is a lack of affordable housing, with only one housing unit available that accommodates fewer than 100 residents. Furthermore, the housing unit that does exist in South Deering is a senior home, which is inefficient because the age groups between 05-14 and 15-24 make up more than 31% of the total population in the community.

South Deering Density Map Zoomed-In:
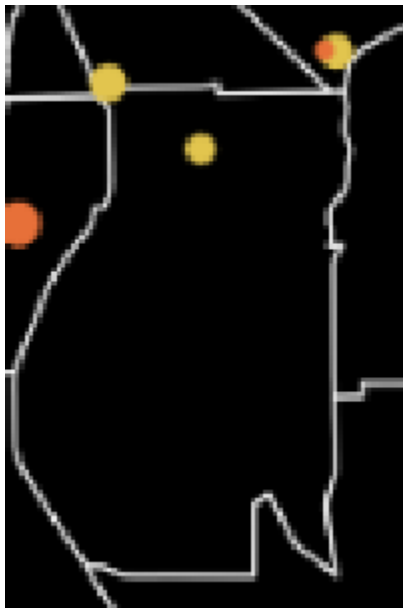
- In the Single-family Home Development map, it does not show a strong spatial pattern or geographic preferences. However, we do notice that the far southside is a regional area that is attracting significant single-family home development. Additionally, we also see

that Lincoln Park, Logan Square, Humboldt Park, and West Town are areas where single-family home development has seen a significant increase from 2017 to 2021 (just in that 5-year period. In South Deering, we see that single-family home development has increased by 25-63% over those 5 years which is much higher than surrounding neighborhoods in the southside. This is an indication that South Deering's vacant lots are being purchased by private developers and are being transformed into single-family residences with higher purchase prices.

South Deering Single-Family Home Development Choropleth Map Zoomed-In:

- The last map depicts the change over time for residential property assessments in Chicago from 2010 to 2020. It shows that the central lakefront area of the city, including the Loop, South Loop, Near Northside, and Lincoln Park, experienced the highest increases in property values over the ten-year period, with an approximate increase of more than 50%.

- In contrast, the south side of Chicago, including Englewood, Gage Park, Chicago Lawn, and New City, saw the largest decrease in property values, experiencing an approximate 27% decrease in assessed values over the ten years. However, in South Deering, we observe an increase in residential property values ranging from 15% to 50% over the 10-year period. This tells us that the rise in single-family home development in South Deering is correlating with higher property values for the neighborhood. Higher property values are metrics for how property taxes are computed and measured. Therefore, the rapid increase in property values is likely to cause taxes to increase and consequently displace residents who cannot afford to pay for their inflated monthly mortgage/tax bill.

- The map also showcases the distribution of financial lending establishments throughout the city. We can observe that the heaviest concentration of bank locations is in the city center, while the entire north side has a higher proportion of banks compared to the south side of Chicago. In South Deering, there is not a single banking establishment available for residents. Bank proximity is a correlating factor for liquid capital access and financial advice.

South Deering Property Assessment Choropleth Map Zoomed-In:
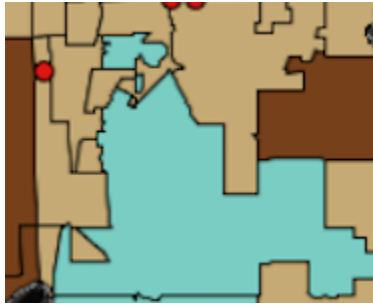
- **Overall, the maps reveal that South Deering has one of the lowest availabilities of affordable housing supply on the South Side of Chicago, despite experiencing a higher rate of single-family home development over a five-year period and a higher rate of property value increases over a ten-year period. This suggests that families facing rising property taxes and a lack of multi-family home options are unable to afford to live in South Deering. Additionally, the limited affordable housing stock in the area is primarily designated for senior-aged residents. Thus, this is forcing residents to move out and is an open invitation to private developers to purchase vacant lots and designate them for higher-income and racially different population groups, defining gentrification in South Deering.**

Sources:

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