UP 316 Final Project Memo

Objective: To analyze if zoning reform—the elimination of single-family zoning in Minneapolis impacted the city, through observing if there was change in the city's homeownership rate, housing affordability and housing types.

Sources and Method: All data was acquired through https://data.census.gov/ using the ACS 5-year estimate for the years 2015, 2018, 2020 and 2022. These years were chosen to establish what the existing conditions were pre policy (2015 and 2018) and compare to the most recent data post policy reform (2020 and 2022). Data was aggregated geographically to Hennepin county- in which Minneapolis is.

Link to data sources:

- Homeownership rate: ACS Table B25003 (Tenure)
    - 2015: https://data.census.gov/table?q=B25003:+Tenure&g=050XX00US27053$1400000&y=2015
    - 2018: https://data.census.gov/table?q=B25003:+Tenure&g=050XX00US27053$1400000&y=2018
    - 2020: https://data.census.gov/table?q=B25003:+Tenure&g=050XX00US27053$1400000&y=2020
    - 2022: https://data.census.gov/table?q=B25003:+Tenure&g=050XX00US27053$1400000&y=2022
- Median Household Income: ACS Table B19013
    - 2015: https://data.census.gov/table?q=B19013:+Median+Household+Income+in+the+Past+12+Months+(in+2023+Inflation-Adjusted+Dollars)&g=050XX00US27053$1400000&y=2015
    - 2018: https://data.census.gov/table?q=B19013:+Median+Household+Income+in+the+Past+12+Months+(in+2023+Inflation-Adjusted+Dollars)&g=050XX00US27053$1400000&y=2018
    - 2020: https://data.census.gov/table?q=B19013:+Median+Household+Income+in+the+Past+12+Months+(in+2023+Inflation-Adjusted+Dollars)&g=050XX00US27053$1400000&y=2020
    - 2022: https://data.census.gov/table?q=B19013:+Median+Household+Income+in+the+P

ast+12+Months+(in+2023+Inflation-Adjusted+Dollars)&g=050XX00US27053$1400000&y=2022

- Median Home Value: ACS Table B25077
  - 2015: https://data.census.gov/table?q=B25077:+Median+Value+(Dollars)&g=050XX00US27053$1400000&y=2015
  - 2018: https://data.census.gov/table?q=B25077:+Median+Value+(Dollars)&g=050XX00US27053$1400000&y=2018
  - 2020: https://data.census.gov/table?q=B25077:+Median+Value+(Dollars)&g=050XX00US27053$1400000&y=2020
  - 2022: https://data.census.gov/table?q=B25077:+Median+Value+(Dollars)&g=050XX00US27053$1400000&y=2022
- Housing Unit Types: ACS Table B25024
  - 2015: https://data.census.gov/table?q=B25024:+Units+in+Structure&g=050XX00US27053$1400000&y=2015
  - 2022: https://data.census.gov/table?q=B25024:+Units+in+Structure&g=050XX00US27053$1400000&y=2022

Data Preparation:

- Data csv's were downloaded from the census data and imported into R.
- Data was cleaned by converting all the non-numeric characters, i.e. commas in numbers, back to numbers.
- To calculate homeownership rate:
  - Owner occupied and renter occupied units were totaled across all census tracts for all four years.
  - Equation for the rate: total number of units/ the total number of owner-occupied.
    - Used mutate function to add a new column in the dataset.
    - Repeated for all four years.
- To calculate affordability:
  - Mean of the median home value across census tract for all 4 years.
  - Mean of the median household income across census tract for all 4 years.
  - The averages of home value for all four years were merged to make a new data set labeled: Home_summary.
    - Repeated with income averages for all four years, new dataset labeled: Income_summary.
  - Merge home_summary data with income_summary in preparation for graphing.

- To calculate housing Types:
    - Total the number of units by the type of structure (detached single-family, duplexes, etc.) across census tracts, for 2015 and 2022.
    - Merge 2015 total units' data with 2022 total units' data, into a new data set, to prepare for graphing.

Analysis and Visualization: Descriptive analysis to understand the graphs and track change over time. Visualizations were produced on R, using the function ggplot2

- Figure 1. Line graph: Showcases homeownership rate for all four years, with a vertical red line pointing out the year the policy changed. The line graph was chosen as its simplistic design was the most visually effective in showing a change this small, given that the data only covers 4 markers (years). The vertical line showing the year the policy was implemented also gives viewers context.

- Figure 2. Bar Graph compares median home value and median household income. The bar graph was ideal for comparisons such as this because of its contrasting colors, understandable labels make it easy to see the differences between the two variables.

- Figure 3. Bar Graph, similarly to figure 2, was chosen again because it makes it easy to compare multiple housing types across the different years.