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High Demand & Low Supply: A Snapshot of the DC Housing Market

Introduction

Housing has persisted as one of DC's most challenging social issues to navigate. With increasing city population, the District's static land area for housing, and skyrocketing costs of living, many residents whose families have lived in the District for generations are being priced out. Using a dataset from July 2018 containing detailed characteristics of over 150,000 residential properties in DC, this project will explore various aspects of the DC housing market to explain what are some of the driving factors behind major market trends. To that end, the following research questions were developed to guide our research and areas of focus.

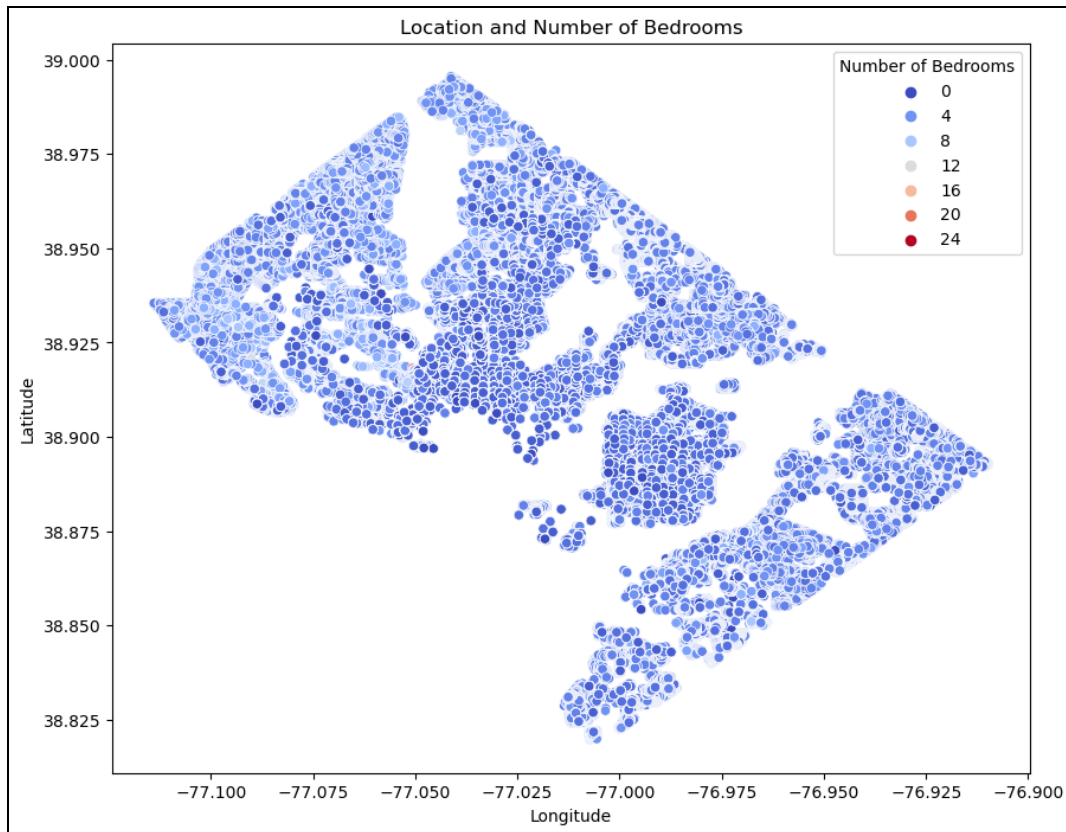
1. What are the primary characteristics of the DC housing market?
2. How do housing conditions and quality differ by geography?
3. What are the primary factors driving housing costs in the District?

Findings

Primary Characteristics

The average number of bedrooms and bathrooms in DC residences 2.73 and 1.8, respectively. The average year the main structure of each residence was built is 1941 making the average age of the DC residence building 78 years old according to the data available. The oldest residential building in the city was constructed in 1754 making it 264 years old. On average, the lifespan of a residential house in the United States is 75-100 years old and the average span of a residential apartment is 50-60 years old which suggests that much of DC's residential properties are outdated.¹

¹ Team, ROS. "Lifespan of a House: How Long Do Houses Last - Ny Rentownsell." *NY Rent Own Sell*, 15 May 2023, www.nyrentownsell.com/blog/lifespan-of-a-house/#:~:text=The%20average%20life%20span%20of,last%20more%20than%2020%20years.



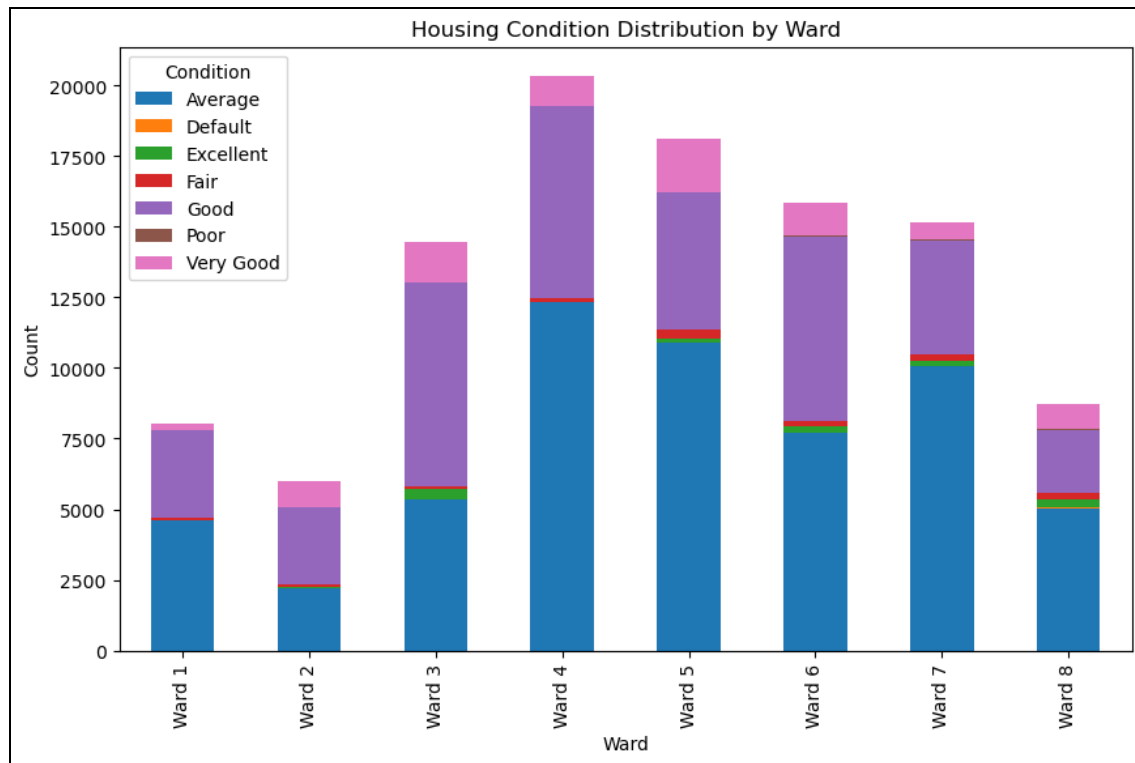
The average DC residential property has 1,714 square feet of living space. Homes in the 75th percentile have less than 2000 square feet of space while the largest home in the district has over 45000 square feet of space indicating a significant gap in living area in the upper quartile of DC properties. Although there is a positive correlation between number of bedrooms and general living area, what is most interesting is that there are still many 5 and 6 bedroom homes in the District with less than 2000 square feet of overall living space. There doesn't seem to be a direct 1:1 correlation here likely due to the scarcity of land area in DC as a whole. This indicates that, although more bedrooms are associated with higher living area in general, it can also just oftentimes cut into the overall living space of the home for many residents.



In terms of house price, there are 98000 values in the dataset with housing prices available for analysis. The price of a DC home in this dataset averages out to nearly a million dollars at \$931,351. The first, second, and third quartile price marks are \$240k, \$399k, and \$652k respectively demonstrating that the values in the dataset are negatively skewed by a considerable margin. The most expensive house in the District is priced at over \$137 million.

Housing Conditions by Geography

As it currently stands, many social and economic disparities are most starkly represented in comparisons across wards with the District's most affluent residents residing in wards in NW and lower income residents residing in NE and SE—namely, Ward 7 and Ward 8. These disparities can be found in some housing characteristics as well. While this analysis does not include a detailed breakdown of the criteria that DC's housing authorities use to determine housing conditions, certain inferences can be made to capture aspects of these disparities.

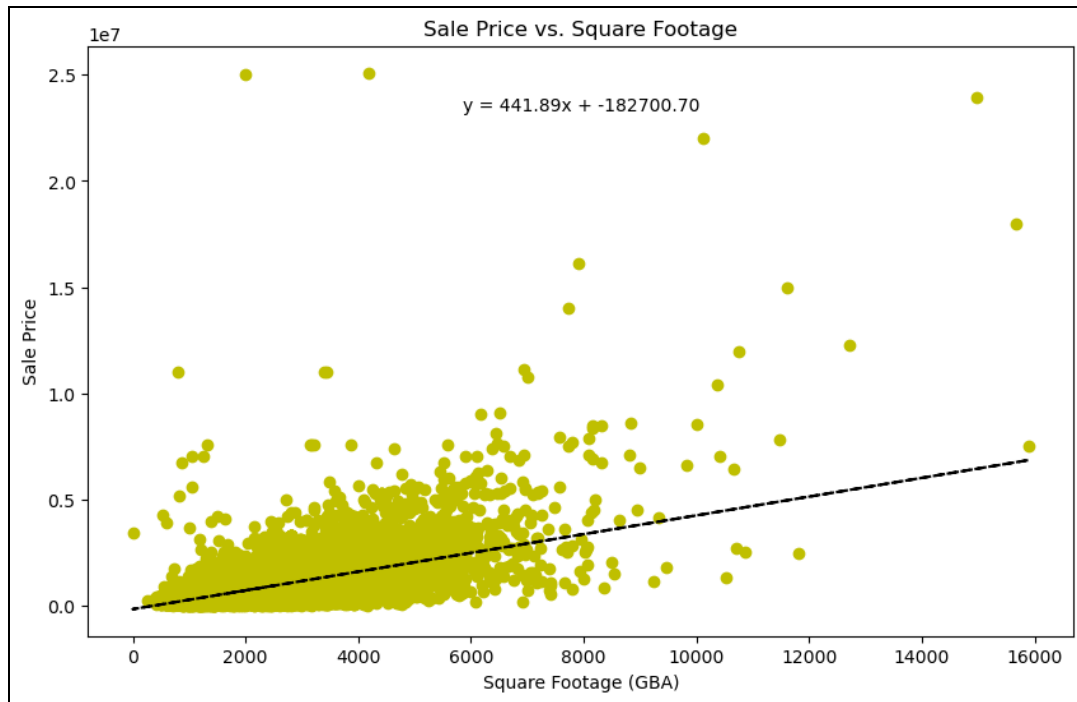


Comparing housing conditions between the two most affluent wards (Wards 2 & 3) and the two most economically challenged (Wards 7 & 8) illustrates this best. While there's a small proportion of homes in poor condition overall across the district, there's a notable difference in the number of homes in average to very good conditions. Wards 7 & 8 have a significantly higher proportion of homes in just "average" condition and less homes in "good" condition while the inverse can be said for Wards 2 & 3. Further research in the criteria and metrics used by housing authorities in DC can better detail the actual differences in quality of life for residents from these different wards but even this highly skewed dataset demonstrates how disparities in living conditions persist across ward boundaries.

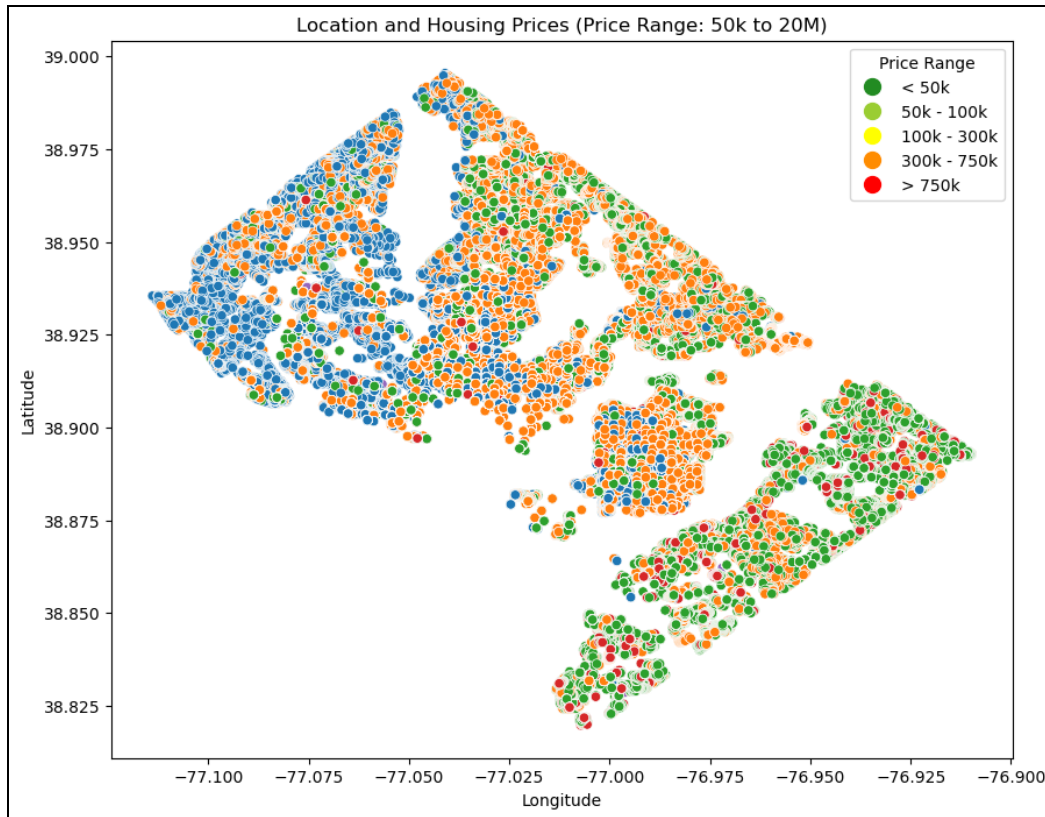


Primary Drivers of Home Price

Unsurprisingly, the primary driver of house price in DC is square footage. In a city where space is scarce, there's a premium on the amount of square footage in a residence. In order to illustrate exactly how much the space of a home influences the price, the figure below regresses sale price by square footage to evaluate how much home price increases by square footage unit. The regression below shows this phenomenon on a large scale as the equation can be interpreted as the home price increasing by \$441,890 for every 10,000 square feet. Scaled down to regular proportions, this means that for every 100 square feet, the price of the home can be expected to increase by \$4,418.



Another key driver of house price in the District could be location. Buyers are willing to pay a premium to live in the more central parts of the city as demonstrated in the chart below by the high concentration of \$300k - \$750k located in the downtown area as well as by the waterside. These are also the parts of the city with better resources such as roads, plentiful grocery stores, and schools. Conversely, Wards 7 & 8 homes are priced much lower and are known for being under resourced areas of the city. Recent studies suggest that neighborhoods east of the river are rapidly being gentrified with increased private investments in modern housing developments mirroring the rest of the city.



*Note: Blue points indicate null sale price values.

Limitations

There are several limitations to the research findings presented in this report—many of which stem from the data available from the source. Firstly, the dataset stopped being updated as of July 2018. Aside from the normal appreciation of housing costs over time, several events, such as the COVID-19 pandemic and large scale economic recession, have occurred which significantly impacted housing markets all over the world, including DC.

Another limitation is the skewed nature of the dataset. The authors cite using the Open Data DC database to create this dataset and there are several thousand properties lacking data on price, sale date, and other categories. In addition to null values, the values that are represented are heavily skewed negatively as a disproportionate number of the values included are high value properties and exclude lower cost properties as detailed in the findings above.

One plausible reason for this may be if Open Data DC sources their property data from real estate database sources or databases containing information primarily on sold homes. This has significant implications for several aspects of our research questions. For example, there are few homes in the dataset with “poor” housing conditions but that is not an accurate reflection of housing in the District. This is likely because no one would be interested in purchasing a home in poor condition and not many real estate agents would be avidly working to try and sell those homes.