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An Analysis of Housing Price in Los Angeles County

Introduction

One of the severe problem that plagues the LA County is affordable housing. This trend of price surge has led to a displacement of many residents, to the extent where many people have been forced to migrate to other parts of the country due to their inability to afford a house in Los Angeles. Based on the latest Quarter3 2018 U.S. Home Affordability Report of the Attom Data Solutions, the cost of a median-priced house unit in LA costs around $610,000.

Using a normal front-end DTI ratio (i.e. the housing expenses divided by gross income) of 28%, the minimum the annual income needed to buy a median-priced house can be computed to be around $170,778. For those who can earn proportional to this estimate, perhaps, more than $170k would typically afford such properties.

Looking at the current, skyrocketing trend of the median home price, the growth rate is 6%, which is 2% more than the annualized wage growth rate.

Considering this pattern, affordability may continue to remain a severe issue for individuals trying to secure a place in LA. If this trend continues, in a few years, we may notice a dip in affordability altogether.

Statistics in the Report of the Attom Data Solutions reveal that net migration of LA County in 2017 was estimated to be -42,836. By now, it is fairly simple to guess that affordability is one of the important reasons behind driving over 40,000 people out of LA County.

Looking at the severity of the situation in discussion, I was curious to delve deeper into this issue and figure out some potential factors that impact the increase of market rates of such properties.

After some research, I narrowed down two facts that can play a significant role in determining housing price – 'household income level' and 'household ownership rate'. The factor household income is fairly self-explanatory and has a directly related to affordability. The higher the household income is, the greater monetary power a household has to afford a housing unit at a certain price Thus, I would expect a positive relationship between the housing price and the household income level.

The 'household ownership rate' can be expressed as the number of owner-occupied housing units by the total number of households (presented as a percentage). A higher household ownership rate would indicate a more stable community, a safer neighborhood and the higher school achievement for children. (Dietz & Haurin, 2003) The demand for buying housing units which have such factors should be high. Thus, the high demand for housing could lead to the prices of houses shooting up. As a result of this, I would expect a positive relationship between the housing price and the household ownership rate.

Data Analysis

1. Data Selection

The most recent housing data (i.e. for the year 2016) was collected and analyzed from the

US Census.

For the housing price, I started by using the median value of the owner-occupied housing units of different cities in LA County. Further, the occupied housing units can be subdivided into two parts i.e. the owner-occupied housing units, and the renter-occupied housing units. For the sake of convenience of interpretation of results, I will only discuss the housing value of owner-occupied housing units.

For the household income level, I gathered the median household income for the last 12 months (for owner-occupied housing unit) of different cities in the LA County. I choose the owner-occupied household income rather than the individual income because the household income is more relevant to the housing price.

For the household ownership rate, I collected the number of owner-occupied housing units and the total number of households for different cities in the LA County.

2. Data Source

- Cities of LA County Shapefile from Barry's GIS Page

- US Census Bureau, 2012-2016 American Community Survey 5-Year Estimates, Table S2503 - FINANCIAL CHARACTERISTICS: Median Household Income in the Past 12 Months (in 2016 Inflation-adjusted dollars), Owner-occupied Housing Units and Total Occupied Housing Units

-US Census Bureau, 2012-2016 American Community Survey 5-Year Estimates, Table DP04 - SELECTED HOUSING CHARACTERISTICS: Median Value of Owner-occupied Housing Units

3. Data Processing

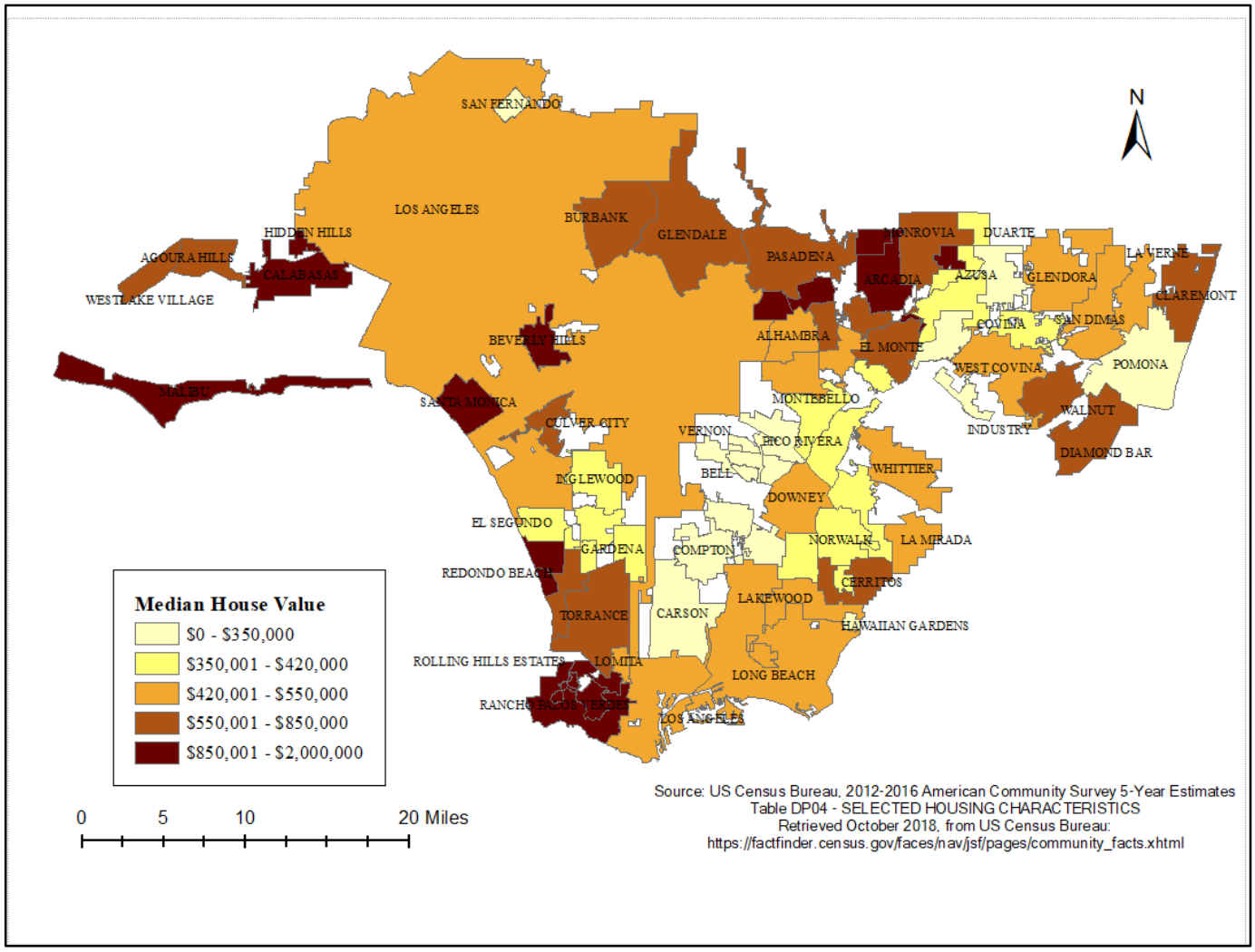
I used the shapefile of the Cities of LA County as the basic map layer, which is obtained from Barry's GIS Page (http://www.barrywaite.org/gis/data_and_links.htm). I gathered data from U.S. Census and generated three Excel files. They included data on the median value of owner-occupied housing units, the median household income, and owner-occupied housing units and total occupied housing units respectively. A calculation is needed in the third Excel file, simply divided the owner-occupied housing units by total occupied housing units to get the household ownership rate.

Further, I imported the first Excel file into ArcMap and joined the median housing value data with the Cities of LA County layer. Then, named the new layer as 'housing price'. The similar process, I got the 'median household income' layer and the 'household ownership rate' layer.

All my maps are composed by these four layers (i.e. the basic cities of LA County layer plus three new layers).

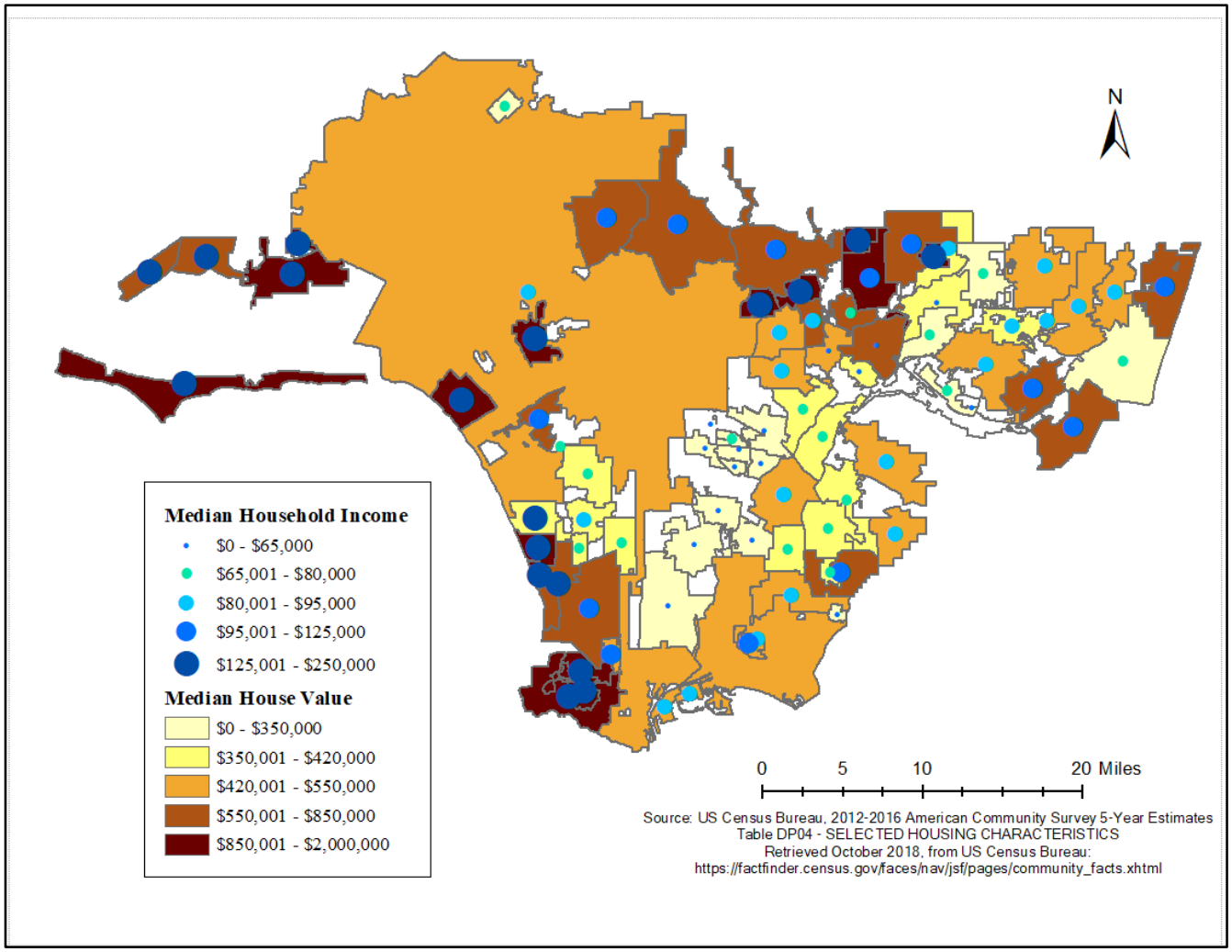
Analysis and Findings

Median Housing Value of Different Cities in LA County, 2016



Based on the distribution of median housing values, I roughly divide them into 5 ranges. From the lowest housing value range to the highest range, name them range1 to range5. Darker the color, higher the median housing value. In this map, I find out that, many cities in the median part of LA County have really low median housing value, such as Bell City and Compton City. Some seaside cities have very high median housing value, such as Malibu City, Santa Monica City, and the Rolling Hills City.

Median Household Income and Median Housing Value of Different Cities in LA County, 2016



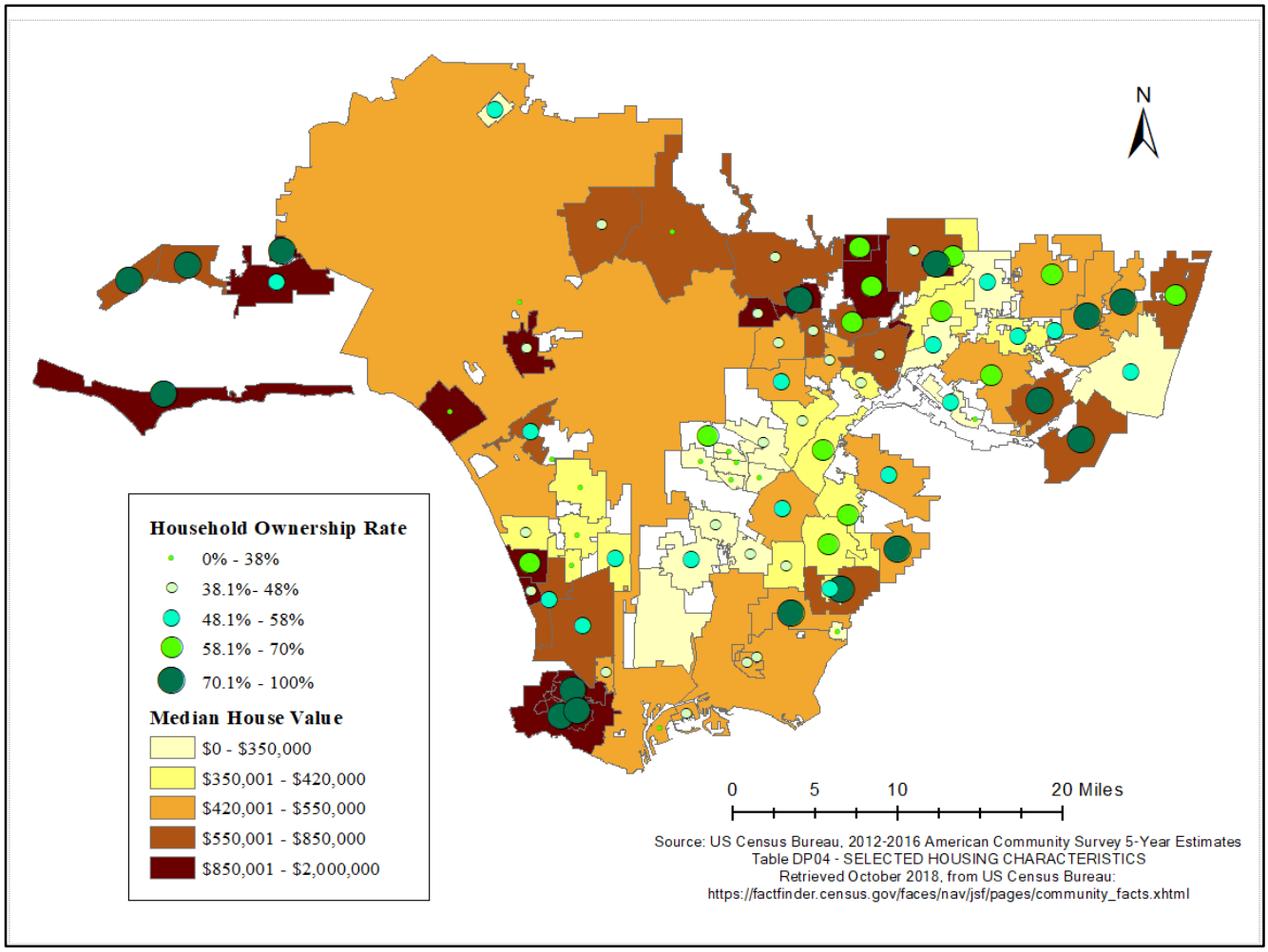
The median household incomes are divided into 5 classes. Bigger the circles, higher the median household income. Similarly, name them class1 to class5.

First of all, focusing on the dark blue circles which represent the class5. Almost all of them are located in the cities which belong to range5 (the highest median housing value range). Except 4 of the class5 circles are located in range4. So, a high median household income is associated with a high median housing value.

From the map, we also know that circles of class2/class1 are located at the range2 and range1 cities. Therefore, a low median household income is associated with a low median housing value. The El Monte city is the only city which violates this pattern. It has a class1 circle located in range4 cities. However, this doesn't impact the whole trend of housing price.

The overall trend shown in this map is that the higher median household income is associated with higher median house value. So that, the household income level has a significant positive relationship with housing price.

Household Ownership Rate and Median Housing Value of Different Cities in LA County, 2016



According to the distribution of household ownership rate, I divide them into 5 ranks. Bigger the circles, higher the household ownership rate. From the lowest rate rank to the highest, name them rank1 to rank5.

The overall trend in this map is the higher household ownership rate is associated with a higher median house value. In the map, roughly, the bigger circles are located in the higher median housing value cities. However, this trend is not really significant. Many cities go against this pattern. In the upside of this map, for example, three adjacent cities (i.e. the Burbank City, Glendale City, and Pasadena City) have low household ownership rate (in rank1 or 2), but they have high median house value (in range4).

Briefly, the map shows that there is no significant relationship between the household ownership rate and the housing price.

Conclusion

With the analysis above, we can get the conclusion that there is no significant relationship between the household ownership rate and the housing price. Although the high household ownership rate can bring us a more stable, fewer crimes and higher school achievement community. It doesn't drive up the housing price significantly. Thus, for the housing affordability problem, instead of focusing on the household ownership rate, we need to move our attention to other factors.

Also, in sum, the household income level has a significant positive relationship with housing price. Higher median household income is associated with higher median house value.

The balance between the household income level and the housing price is a key for the housing affordability. Some people think simply raising the household income level can solve the housing affordability problem. However, with an unchanging size of housing market, the increase of the

household income level will drive up the housing price significantly. People still can't afford the housing units.

Increasing the household income level and building more housing units simultaneously is one way to improve the housing affordability. Under the impact of a higher household income level and a lower demand level of housing, the housing price may maintain the same level (or fluctuate in a small range). With the same housing price level, the households have higher income now, and they can afford the houses. However, this way has a disadvantage. It costs a lot to build new houses and increasing the household income. It's a big burden on the government. This method may can be implemented in a place has really severe housing affordable problem and high government income.

Limitation

-Missing Data: There are 88 cities in LA County. In U.S. Census, the data for several cities are missing, such as La Cañada Flintridge City, Vernon City, and the City of Industry. Also, some parts of the LA County are not belonging to the cities. If I can get the data for all parts of LA County, the map can be more completed.

-Vague Data: The median housing value has an upper limit. When the median housing value exceeds $2,000,000, instead of the actual number, the data only shows "2,000,000+". So, I don't know the highest median housing value of the cities is $2,000,001 or $10,000,000. If the data can be more specific, the trend may be clearer.

- Data Incomparable Between Years: I am interested in the change of the housing price in recent years. I gathered the median housing value data for both 2016 and 2010. However, the upper limit

of 2010 is $1,000,000. And the upper limit of 2016 is $2,000,000. When I do the maps, the scale of median housing value is different and it is hard to compare the data for these two years.

Reference

Barry's GIS Page, The Cities of LA County Shape File

(http://www.barrywaite.org/gis/data_and_links.htm)

2012-2016 American Community Survey 5-Year Estimates, Table S2503 - FINANCIAL CHARACTERISTICS US Census Bureau: Median Household Income in the Past 12 Months (in 2016 Inflation-adjusted dollars), Owner-occupied Housing Units and Total Occupied Housing Units, https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml

US Census Bureau, 2012-2016 American Community Survey 5-Year Estimates, Table DP04 - SELECTED HOUSING CHARACTERISTICS: Median Value of Owner-occupied Housing Units, https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml

Quarter3 2018 U.S. Home Affordability Report, the Attom Data Solutions

https://www.attomdata.com/news/market-trends/home-sales-prices/q3-2018-home-affordability-report/

Dietz, R. D., & Haurin, D. R. (2003). The social and private micro-level consequences of homeownership. Journal of urban Economics, 54(3), 401-450.