Gustavo de Mello Einhorn (gde2105)

Professor Adam Lubitz

Introduction to GIS Methods

May 9, 2019

**Final Project Report**

1. **Title of Project**

Is the correlation between income and rent on one major and minor cities similar?

1. **One sentence Project Summary**

This project will consider the rent and income from New York City and Austin (Travis) and compare whether the correlation between them are similar, figuring out if there is a pattern in which people with higher income do pay more rent.

1. **Purpose & Background**

Selecting the right place to live can be very challenging, many factors have to be taken into consideration, one of these factors is the price of rent. Rent in many cases is the watershed of someone’s decision, and it correlates with that person’s will to pay for that price. You can measure will throughout someone’s income, in other words, the higher the income, the more will you have to pay for higher rents. But in some cases, the income and rent do not walk together.

The goal in this report is to further analyze and draw conclusions about if rent could be a key factor in deciding where to live, and if public policies could help decrease the correlation.

1. **Literature Review**

In 2013, “Citylab” posted an article analyzing the correlation between rent and income from Baltimore and Washing D.C..

For Baltimore, the results were shown by two (very difficult to understand) maps in which one showcased rent prices in the region and the other income. On the first map, low income could be identified near the center on Baltimore, and high income in the suburbs. The second map displayed high rent on the center on Baltimore and low rent on the suburbs. Results could show that in more gentrifying neighborhoods, the ratio between rent and income are higher than in less denser areas (Citymaps).

As of Washington D.C., Henry analyzed two different Census Tracts. Census Tract 106 had a median income of $76,680, with a monthly median rent of $1,702, and Census Tract 04, with a median income of $182,578 with a monthly median rent of $1,569.

1. **Data**

American Community Survey:

New York City:

* ACS 1901 – Median Income – Updated 2017
* ACS 2503 – Median Rent – Updated 2017
* 14000 – Shapefile – Updated 2017

Austin (Travis):

* ACS 1901 – Median Income – Updated 2017
* ACS 2503 – Median Rent – Updated 2017
* 14000 – Shapefile – Updated 2017

1. **Methodology**

I started off by organizing all the data that I collected. To do this I started filtering all data needed from the excel files that were downloaded from The American Fact Finder.

Eventually, I started constructing the 5 maps that were used in this report, starting off with the New York City rent and income maps. To create my base map, I used the shape file that was downloaded from The American Fact Finder. Next, I added a new table into my layers with the data from income and joined it with my NYC shapefile using “Geo\_ID”. After that, I accessed layer properties, selected quantities and used graduated colors (green color and divided into 5). For the back layer of my map I used a layer that is already from ArcMap. After setting title, label, scale, source and scale bar the map was done.

To maintain both income and rent maps the same, I used my income map and joined rent to the NYC shapefile. For rent I used red color and divided into 5 as well.

Later on, I started doing the Austin (Travis) map, I used the same steps from the maps from New York City, to maintain consistency.

My last map was a broader vision of the US and where were the two cities that I was analyzing. For this map I used a base layer from ArcMap and added both Austin (Travis) and New York City shapefiles to the map. From this point, I labeled both cities and used red color for New York City and green color for Austin (Travis).

After all this, from the data that I had I formulated two scattered point graphs with trend lines for both cities. This made it possible to see the relationship between both income and rent.

At last, I used a formula from excel called “Correl”, which shows the correlation between rent and income.

1. **Findings**

Maps 2 and 3 exposes that in regions closer to parks and water, rent and income can be considerably higher. Rents also tend to have a higher median in Manhattan than all of the other counties. Furthermore, in the far east side of Queens County, rent tends not to follow the correlation found with income, seen as though that in most Census Tracts from east Queens have a moderate rent price but people living there have a high income.

Map 4 displays a high income on the west side of Travis County, this could be due to the fact that there is a river crossing throughout that region. Map 5 also shows that rent when following the river, is higher and some regions in the east side also have a high rent. A curious finding about Travis County is that rents on the North East side tend to be high, as for income on that region, not so much.

When comparing map 2 and 3, it is clear that there is pattern between income and rent (as income gets higher, rent also goes up). To make it easier to understand this pattern, Graph 2 shows in detail how related both variables are. A 0,7592 correlation is considered a moderately high which justifies the pattern observed in both maps 2 and 3.

After comparing maps 3 and 4, there is a fainter pattern, but still observable relationship between both variables, which is shown in Graph 1. A 0,5843 correlation is considered moderate.

**Map 1: Location of Austin (Travis) and New York City**

A close up of a map

Description automatically generated

M**ap 2: Median Income in 2017 by Census Tract in New York City**

A close up of a map

Description automatically generated

**Map 3: Median Rent in 2017 by Census Tract in New York City**

A close up of a map

Description automatically generated

**Map 4: Median Income in 2017 by Census Tract in Travis County**

A close up of a map

Description automatically generated

**Map 5: Median Rent in 2017 by Census Tract in Travis County**

A close up of a map

Description automatically generated

**Graph 1: Scatter Graph with income and rent from Austin (Travis). Correl = 0,5843**

**Graph 1: Scatter Graph with income and rent from New York City. Correl = 0,7592**

1. **Limitations**

The first limitation in this study is that it is only analyzing a one-year data (2017), and that rent prices often change prices due to housing market (which in this study is not taken into consideration).

Also, one variable that I did not take into consideration is fixed rent (specially in New York City), fixed rent could change correlation and final results. Another limitation is that this analysis is only valid for the two cities that I analyzed, and not applicable for every major or minor city in the US.

1. **Conclusion/Recommendation**

The findings in the maps shown before, can state that in more gentrified areas, the correlation between income and rent are higher. In places less densely populated, the correlation could be slightly lower, and that could be because people have many choices on where to live, as for bigger cities, the choices could be slimmer.

My recommendation would be for cities who are getting larger (starting to have gentrified zones), that they have enough housing programs and incentives like fixed rent, to alleviate the high correlation between rent and income, because that is a main reason as to why people have to leave their house, and eventually creating a gentrified zone with high rents.

1. **Bibliography**

<https://www1.nyc.gov/nyc-resources/service/1021/affordable-housing>

<https://www1.nyc.gov/site/dhs/permanency/rental-assistance.page>

<https://www.citylab.com/life/2013/03/america-mapped-income-and-rent/4892/>

<https://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t>