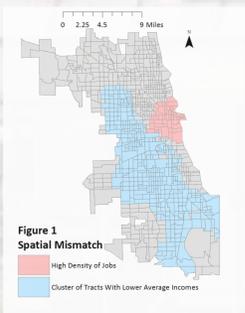


Spatial Mismatch: Commuting Patterns Along Economic Lines in Chicago

Introduction

In 2014, Americans spent around 1.8 trillion minutes commuting to and from work. That's a collective 3.4 million years. In 2016, the average American worker took 26.6 minutes to get to work, a small increase from 2014. That's nine whole days, or 2.5% of 2016 that the average American worker spent transporting to and from work. 26.6 minutes is just an average, though. Sadly, over 3.5 million Americans experience commutes longer than 90 minutes. A variety of research links longer commutes with increased rates of obesity, high cholesterol, high blood pressure, back and neck pain, divorce, depression, and death.



This project examines Chicago, the city with the longest average commute of all major US cities (32.4 minutes). Researchers have long noted a "spatial mismatch" in Chicago between the location of jobs and the residences of low income families. This project asks how the presence of a spatial mismatch and economic segregation variably affects daily commutes and livelihoods. Whose commutes take longer, and whose are shorter? Furthermore, who walks to work, who takes public transportation, and who drives?

The Process

To visualize Chicago's spatial mismatch, I created a map of estimated jobs per area for each census tract, then performed a local Moran's I analysis to find clusters of high job concentrations. Then, I performed a local Moran's I analysis on average per capita income for census tracts. **Figure 1** shows clustering of high job density census tracts and clustering of low-income census tracts.

Using ACS data to calculate the average commute time for each census tract, I created **Figure 2**. **Figure 3** is a visual summary of this data created with a local Moran's I analysis to show clustering of shorter and longer commute times. **Figures 4 and 5** are the average per-capita income by census tract and the local Moran's I summary respectively.

To investigate the distribution of different modes of transportation, I visualized by census tract the percentage of commuters who take public transit, who walk, and who drive alone. **Figures 6, 7, and 8** are local Moran's I summaries to show areas of high and low percentage clusters for each of these different commuting modes.

Lastly, I created corresponding charts. In **Figure 9**, I plotted the average per capita income against different commuting times. In **Figure 10**, I plotted the average commuting time against different income brackets. In **Figure 11**, I plotted the percentage of commuters per income bracket who commute by public transit, walking, and driving alone.

Findings

Figure 1 confirms the **presence of a spatial mismatch in metropolitan Chicago**; there is no overlap between the cluster of tracts with high job concentration and the cluster of tracts with low average per capita incomes.

Figures 2 and 3 point towards a trend whereby Downtown Chicago and its immediate surroundings have average shorter commute times, while tracts further away have longer commute times. Figures 9 and 10 confirm what these maps suggest: **the higher the average income of the tract, the lower the average commute time.**

Figures 6, 7, 8, and 11 suggest **a positive correlation between walking to work and income, a negative correlation between driving alone to work and income, and no obvious correlation between public transit and income.**

Conclusion

This project makes it clear that short commutes, along with being able to walk to work, are correlated with economic privilege in Chicago. Furthermore, those who endure long commutes and drive alone to work are more likely to have lower incomes. The spatial mismatch between jobs and low income neighborhoods is nothing short of injustice; in Chicago, having less money means being more vulnerable to all of the well-established stresses associated with long commutes.

Cartography by Gabriel Taylor
Introduction to GIS (GIS 101 / ENV 107)
December 21st, 2017
Data from: American Community Survey, County Business Patterns, TIGER (for boundaries)
Coordinate System: NAD 1983 Illinois East State Plane
Projection: Transverse Mercator

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