The Train Blame Game:
Mapping Demographic Change, Gentrification, and Light Rail in West Denver

Tufts UNIVERSITY

Introduction

In November 2007, Colorado voters approved the Regional Transportation District of Denver (RTD)'s FasTracks Plan to expand transit service across the Denver metro area. Included in the Plan was the W Line, a light rail branch designed to link Denver's downtown core with the neighboring western suburbs of Lakewood and Golden in Jefferson County. The 12.1-mile line opened in April 2013, and passed through a few low-income areas of western Denver on its way to the suburbs.

The Location of the W Line in the Denver Metro Area
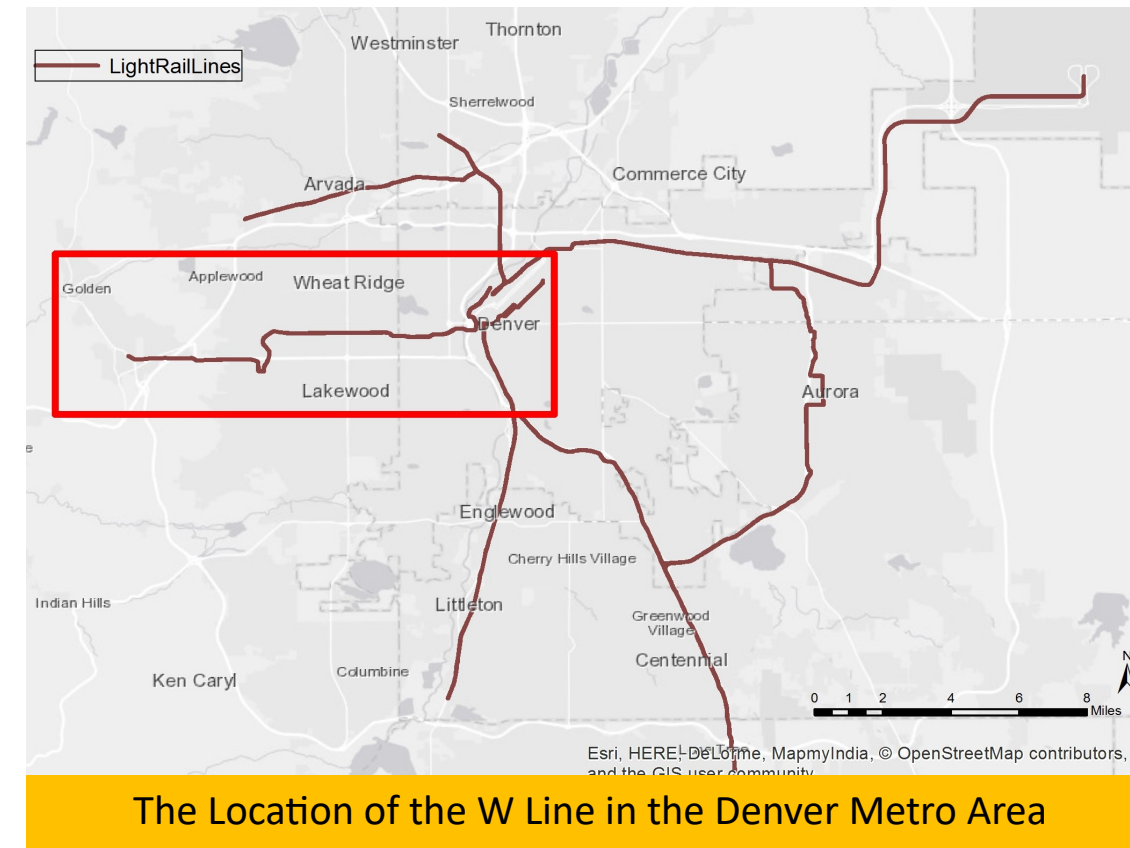
While scholars disagree on the effect that new transit lines (such as the W Line) have on the neighborhoods that surround them, studies conducted in Seattle, Berkeley, and Chicago have suggested that their construction can cause the property values in nearby neighborhoods to increase, rendering these areas more vulnerable to gentrification (Halstrom 2013, Chapple 2009, Lin 2002). Key demographic indicators of gentrification can include an increase in median income, property values, and the number of college-educated residents in traditionally low income areas with low property values (City of Portland 2013). In this project, I explore the relationship between transit and gentrification by asking the following questions: how have median house value and the educational attainment of residents changed in the census block groups surrounding the W Line since before the Line's conception (2000), during its construction (2010), and after its opening (2015)? Do these demographic changes indicate that gentrification is occurring around the light rail line?

Methodology

Demographic data for two variables (median value of owner-occupied housing and percentage of residents age 25 and older with a bachelors degree) from the 2000 Census, and the 2010 and 2015 American Community Surveys were assembled for all block groups in Denver and Jefferson counties in Colorado, and were downloaded from Social Explorer. Colorado Block Group polygons were downloaded from NH GIS. Colorado municipality polygons were obtained from the Colorado State Demography Office, and light rail line and point vectors were downloaded from RTD Denver's website.

A W Line Train Makes the Trip to Union Station in Denver. Photo Courtesy of Wikipedia Commons
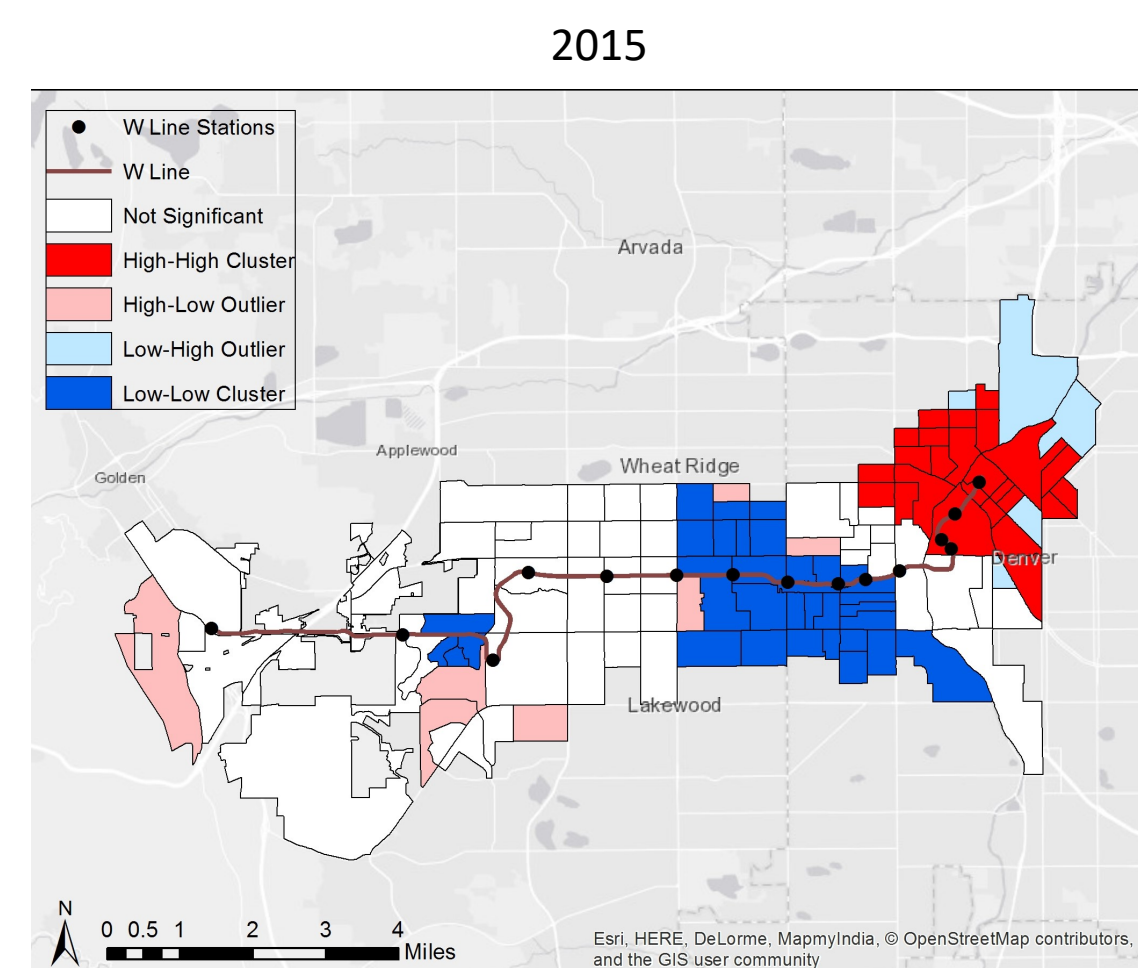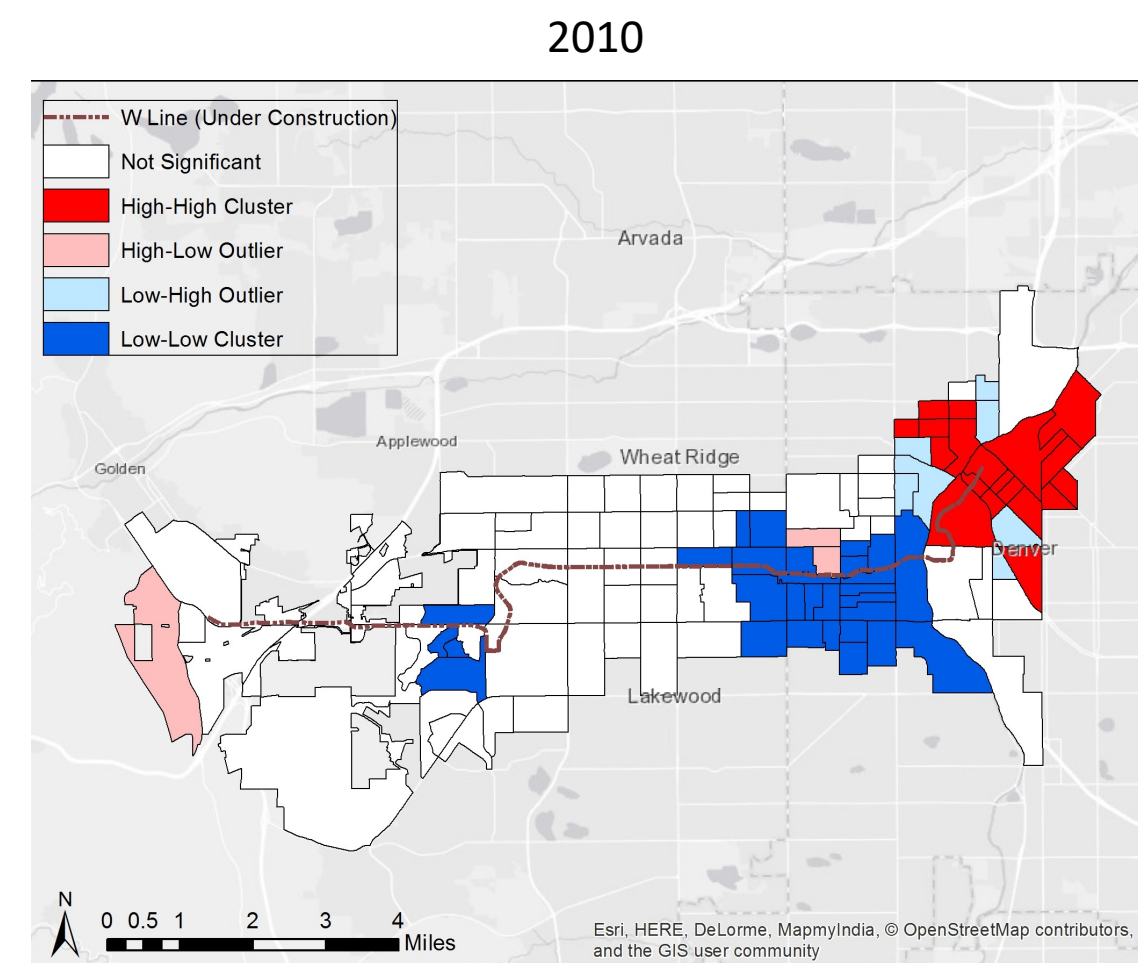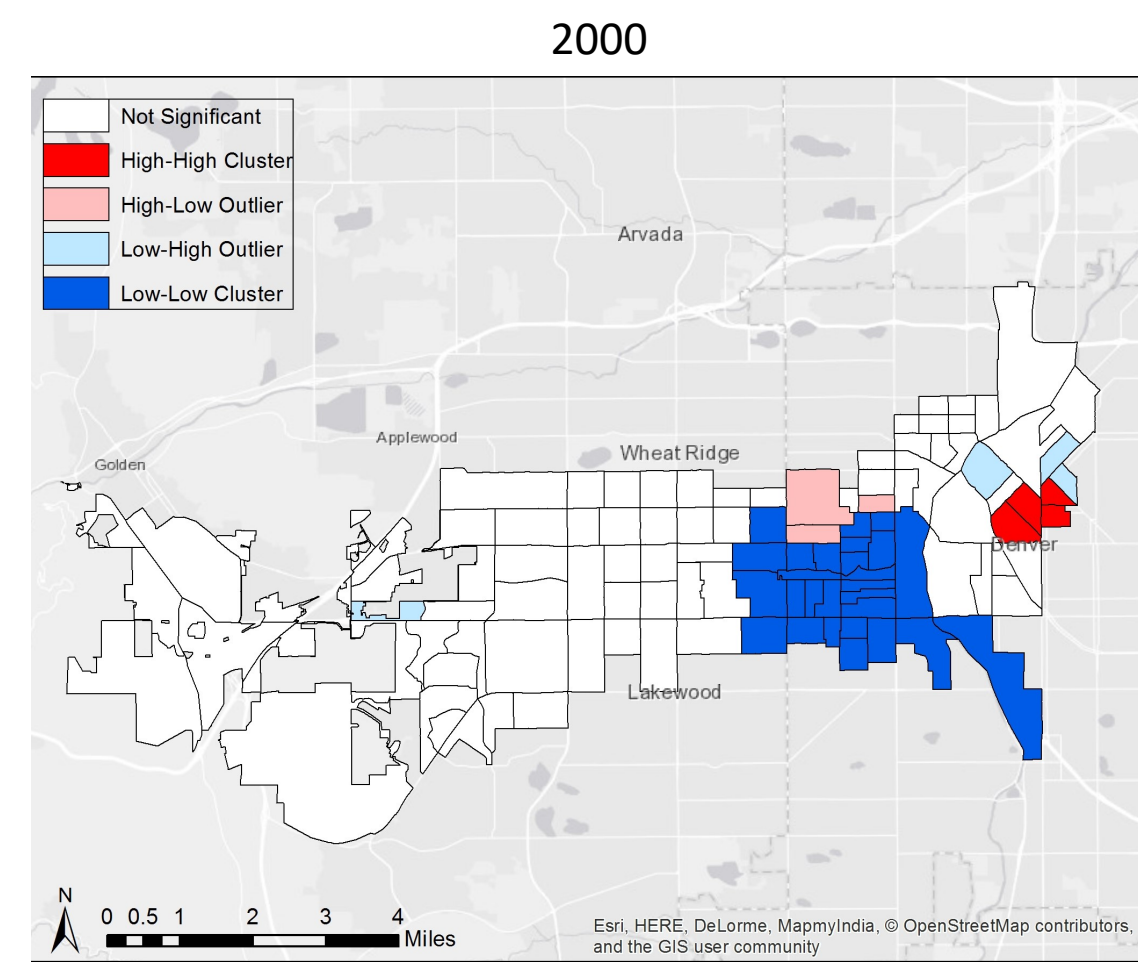
Block groups within one mile of W Line tracks were identified and exported as a W Line Corridor Layer. Demographic data from 2000 were then joined to the new Corridor Layer. The average and standard deviation of each respective demographic variable in Denver and Jefferson Counties combined was calculated. Graduated colors were then used to show how many standard deviations away from the two county average each demographic variable was in each block group of the W Line Corridor. A Local Morans I test was then used to determine block group clustering for each demographic variable (or, where block groups with similar values were located close to one another). The previous four steps were then repeated for the data from 2010 and 2015. The results of the Local Morans I test are shown in the next column.

The percentage of block groups in each cluster type produced by the Local Morans I test (high value surrounded by high value, high value surrounded by low value, low value surrounded by high value, and low value surrounded by low value) were then calculated for each year and aggregated into two graphs.
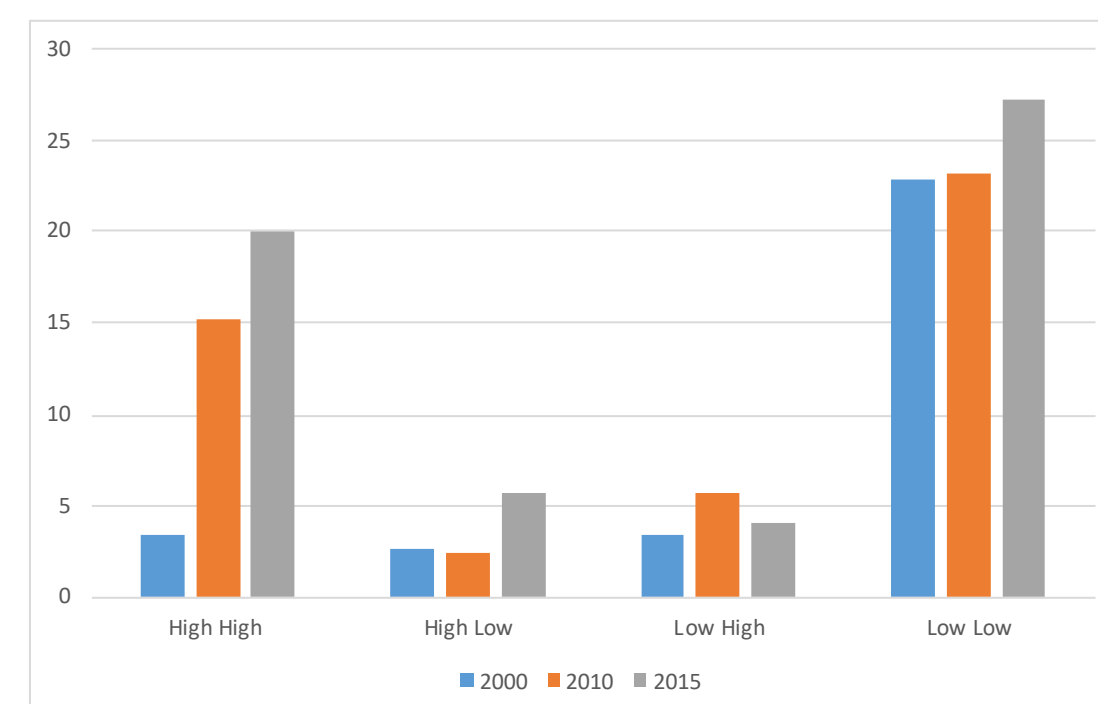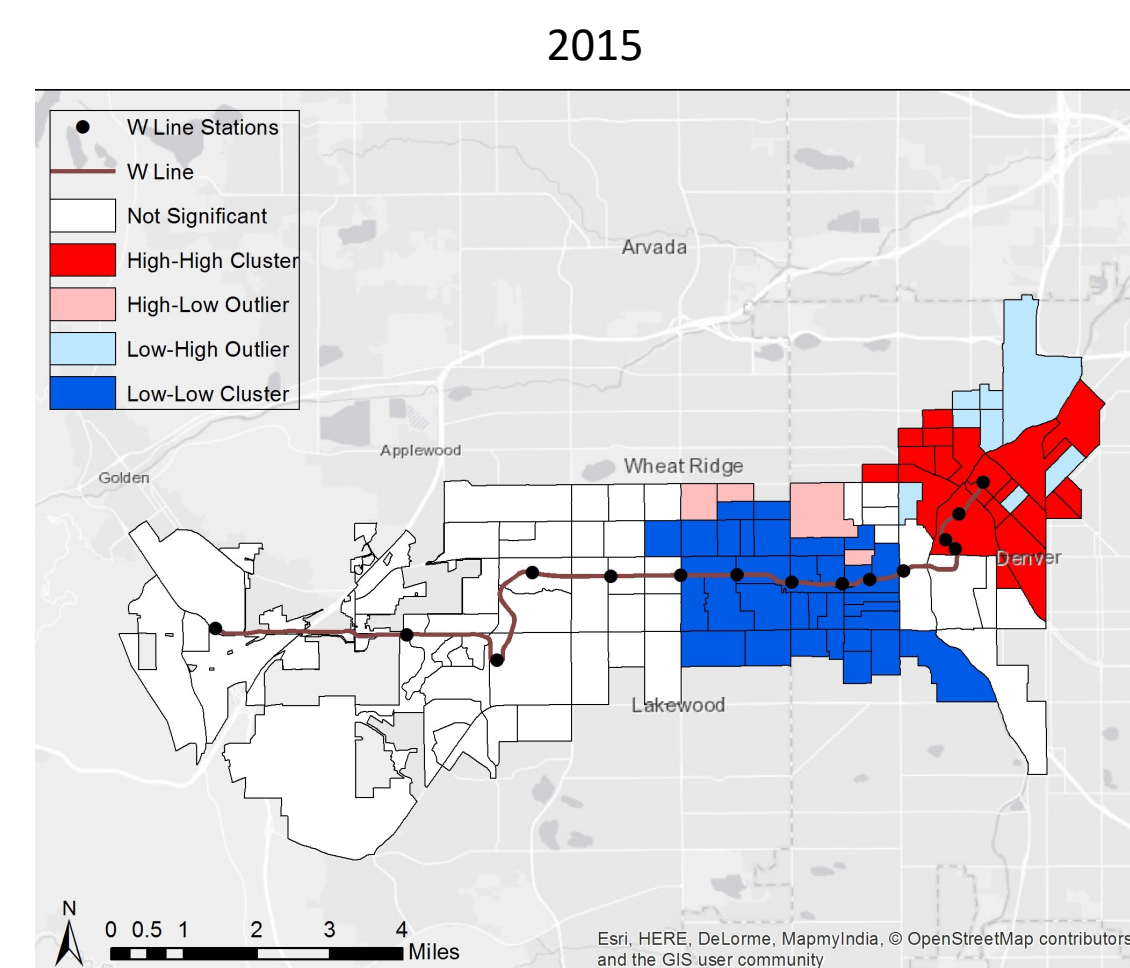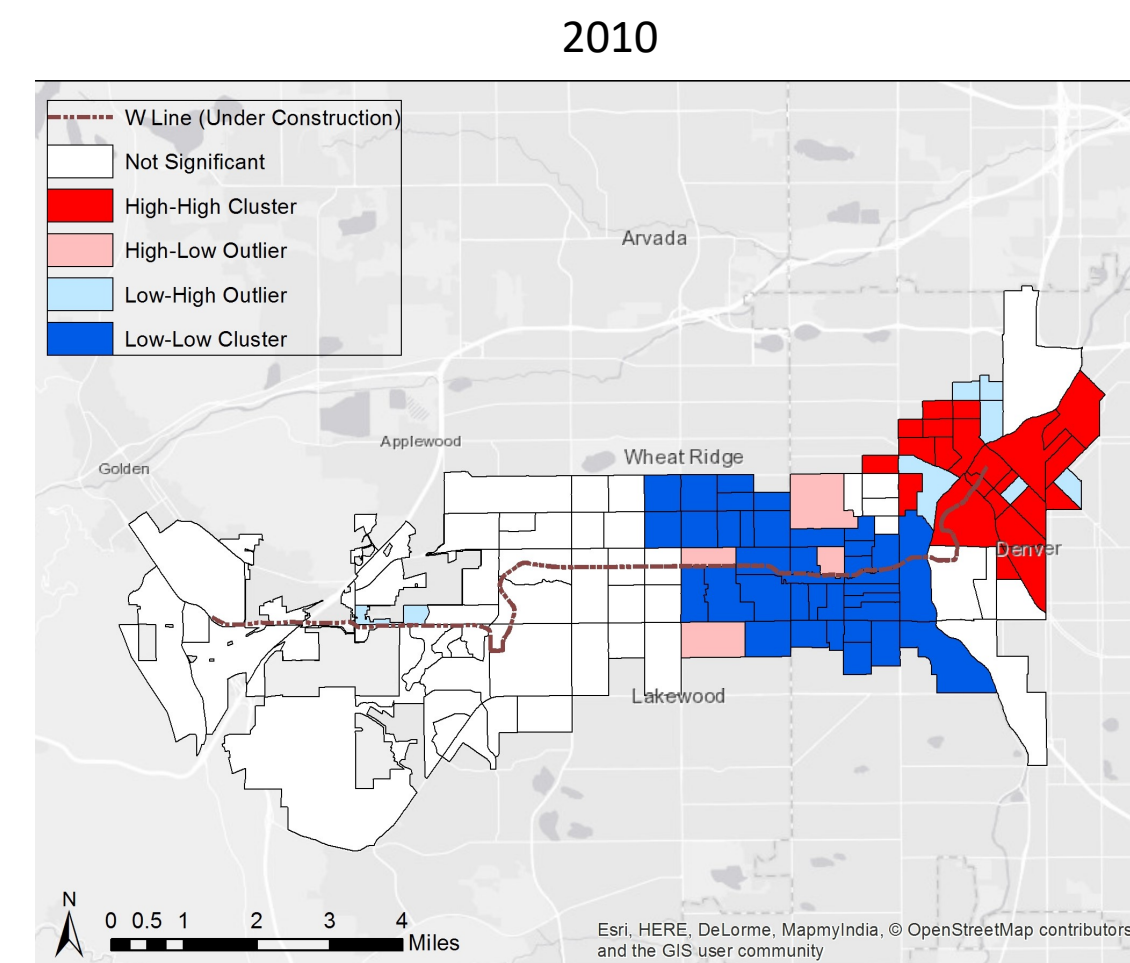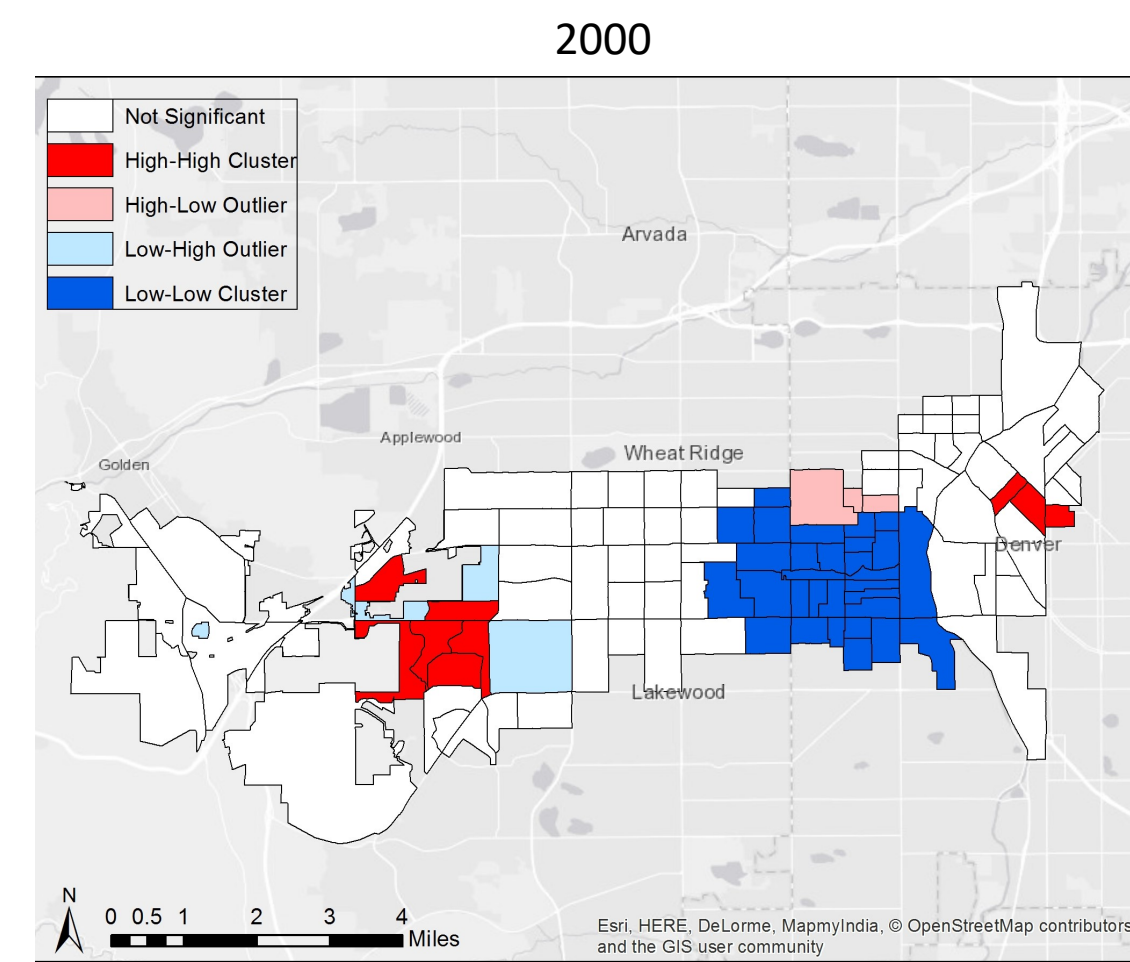
Results

Block Group Clustering for Median Value of Owner-Occupied Housing Units

2000
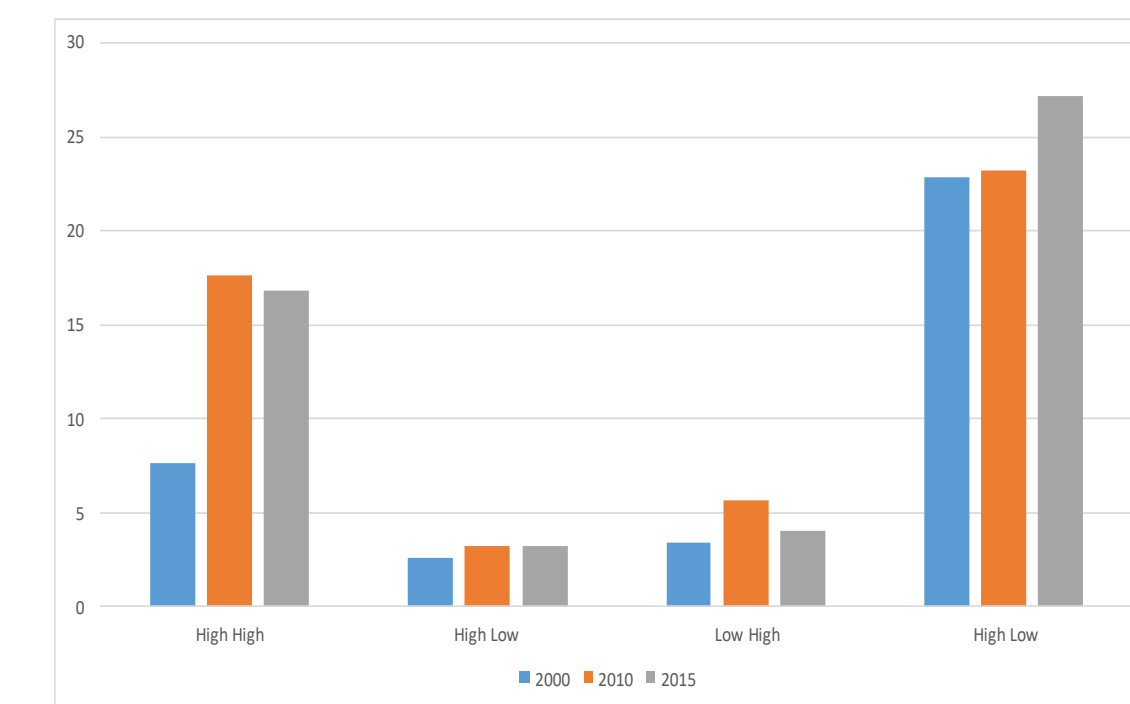

2010

2015

Block Group Clustering for Percentage of Residents Age 25 and Older with a Bachelors Degree

2000

2010

2015

Percentage of Block Groups in Cluster Types: Median Value for Owner Occupied Housing Units

Percentage of Block Groups in Cluster Types: Percentage of Residents Age 25 and Older with a Bachelors Degree

In the year 2000, the future W Line Corridor contained a higher percentage of block groups with low median house value surrounded by block groups with low median house value than block groups with high median household value surrounded by block groups with high median house value. Over time, both percentages increased, though the change in percentage of high-high groups (at just over 15%) was greater than the change in percentage of low-low groups (just over 5%). The same trend holds roughly true for the percentage of residents age 25 and older with bachelors degrees (except for a slight decrease in high-high groups between 2010 and 2015). Moreover, high-high and low-low block groups for each demographic variable became more spatially clustered in particular areas as time progressed: the high-high areas clustered in the top right of the Corridor, and the low-low areas clustered just below them in the center right of the Corridor yet appeared to move slowly left as time progressed.

Conclusion

The increase in the percentage of high-high block groups for each variable during the planning and construction of the W Line, sometimes in areas that started as non significant or even as low-high, suggests that conditions giving rise to gentrification have manifested in the corridor. However, is this change due to the construction of the light rail? As Young points out, the presence of light rail itself does not necessarily cause gentrification, but it is often correlated with community change (2009). Thus, when looking for the cause of the demographic change around the Corridor, it may well be that that the W Line could be one of an array of complex contributing factors. This study has established the presence of a demographic shift that appears to show gentrification in the corridor, but more research is needed to determine the precise mix of causes.

Downtown Denver. Photo Courtesy of Wikipedia Commons

The demographic variables did not change evenly in all areas. The upper right section of the corridor corresponds to the downtown area of Denver. Here, the amount of high-high clusters for both variables increased the most from 2000-2015. This influx of educated residents and increase in property values likely signifies an increase in the desirability of the area, perhaps aided by its increased accessibility brought by the W Line. At the same time, the large cluster of low-low block groups located just to the left of Downtown has steadily moved further left as time has progressed, away from the commercial core. This perhaps suggests a ripple effect, in which higher property values downtown spread outward, slowly causing the values of surrounding areas to rise.

Limitations

The main spatial unit in this project was the census block group, which contains several households within it, and is thus more general than smaller units. A more accurate portrayal of the demographic change in the area might have been accomplished using a smaller spatial unit, such as the parcel (however, demographic data at the parcel-level was unavailable). Moreover, the polygon containing all Colorado block groups was clipped to fit the boundaries of all Colorado municipalities. This excluded block groups on the left side of the map from the analysis that may have been close to the W Line, yet were part of unincorporated land or census-designated places rather than official municipalities.

References

Data sources:
RTD Denver, Colorado State Demography Office, Social Explorer, IPUMS NHGIS
Literature Sources:
City of Portland Bureau of Planning and Sustainability. "Gentrification and Displacement Study Overview." City of Portland, Oregon (2013). Retrieved from: https://www.portlandoregon.gov/bps/article/452087
Chapple, Karen "Mapping Susceptibility to Gentrification: The Early Warning Toolkit." University of California, Berkeley Center for Community Innovation (2012). Retrieved from: https://communityinnovation.berkeley.edu/reports/Gentrification-Report.pdf
Halstrom, Loren "On the Wrong Track: Light Rail's Introduction to the Rainier Valley Systematically Excludes Minorities and the Poor" The Modern American 9, no. 1 (2013): 54-58. Retrieved from: http://digitalcommons.wcl.american.edu/cgi/viewcontent.cgi?article=1160&context=tma
Lin, Jane. "Gentrification and Transit in Northwest Chicago." Journal of the Transportation Research Forum 54, no. 4 (2002): 175-191. Retrieved from: https://trid.trb.org/view.aspx?id=728134
Regional Transportation District (RTD). "2016 Fact Sheet" Regional Transportation District of Denver (2016). Retrieved from: http://www.rtd-fastracks.com/media/uploads/wc/West_Rail_Fact_Sheet_2015_FINAL.pdf
Regional Transportation District of Denver (RTD). "Project History" Regional Transportation District of Denver (2016). Retrieved from http://www.rtd-fastracks.com/wc_3
Young, Kelcie. "Equity, Gentrification, Light Rail." The University of Minnesota Center for Urban and Regional Affairs (2009). Retrieved from: https://www.portlandoregon.gov/bps/article/452087