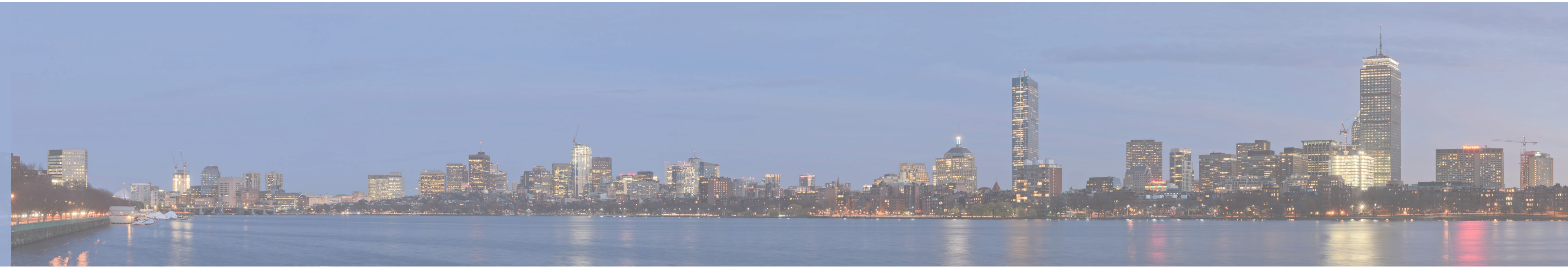


Changing Neighborhoods: Mapping the Distribution of Urban Hardship in Boston, MA 1990 to 2016



Introduction

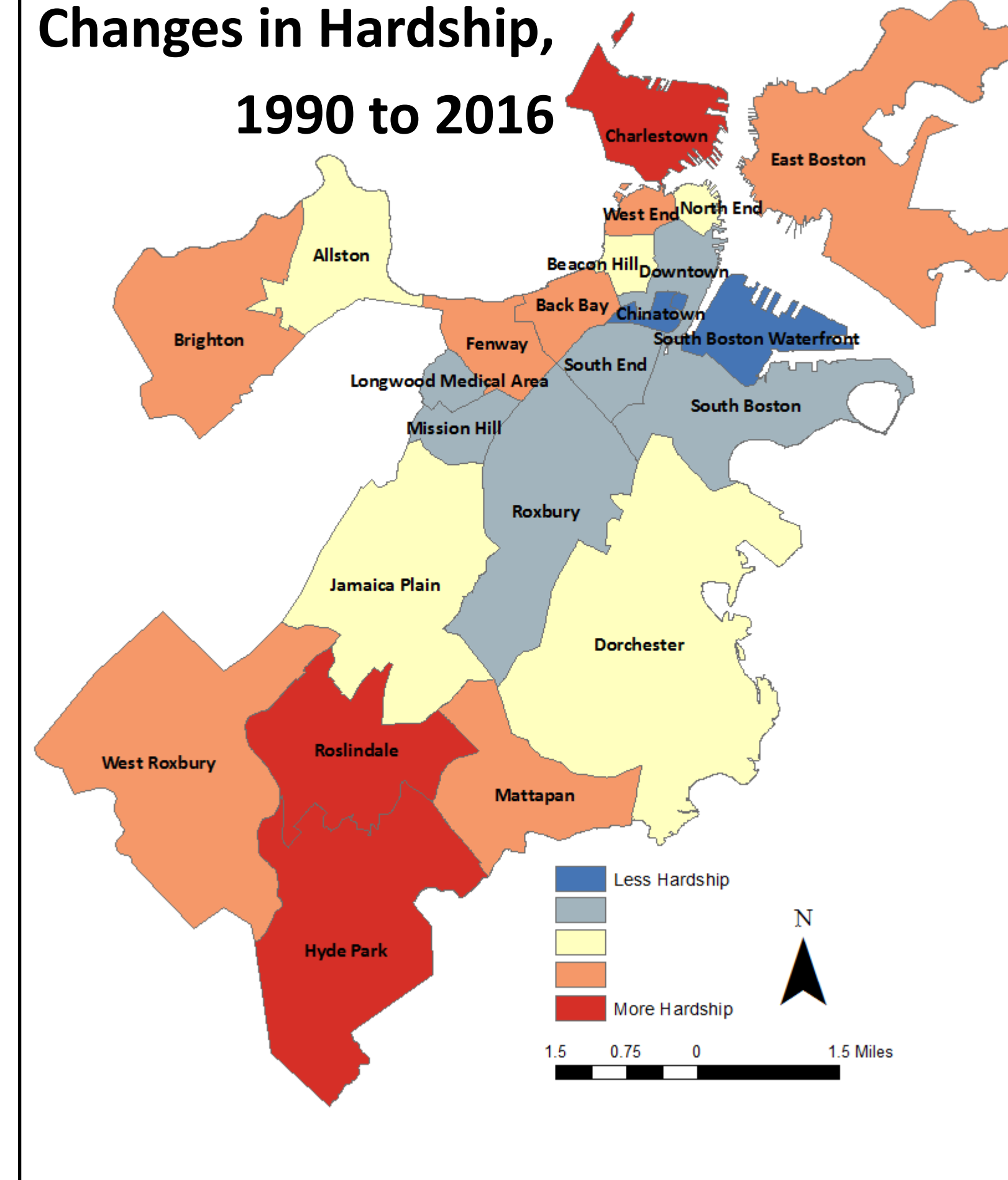
Boston is a highly diverse city comprising multiple unique and historic neighborhoods; however, the composition of many of these neighborhoods has shifted over the past 25 years. The evolution of Boston has created unique and unprecedented problems for many communities while also creating a widening gap of socioeconomic status among Boston residents, even within individual neighborhoods. One salient example of this divide is the community of Charlestown, which has one of the highest median per capita incomes of all Boston neighborhoods at \$61,545 but also a high child poverty rate of 38%¹. This analysis will examine how the composition of Boston has changed over time through the lens of a “hardship index” at both the census tract and neighborhood levels. The purpose of this analysis is twofold: first, to create a hardship index calculated from six socioeconomic indicators of hardship, adapted from a similar index created for Chicago²; and second, to examine how hardship in Boston has changed in distribution from the 1990 decennial census to the most recent 2012-2016 American Community Survey (ACS) estimates. The six variables included in this analysis are % of non-white population; % of crowded housing (more than one occupant per room); % of dependent population (defined as under 18 or over age 65); % of individuals living below the poverty line; % of the population over age 25 without a high school diploma (or equivalent); and % unemployment for the civilian population 16 and over.

Methodology

Data from both the 1990 Census and the most recent 2016 ACS estimates were downloaded for Suffolk County with census tracts selected as the target geography. Both data sets were then merged by geographic ID to a map of census tracts and clipped to Boston neighborhood boundaries. From there, data was re-exported to Excel and census tracts with little to no population (<150) were removed from the analysis. To ensure each variable was weighted equally for analysis, the hardship index was calculated by standardizing the six selected variables (using the equation $z = (x - \mu) / \sigma$) and calculating the mean of the six variables for each census tract.

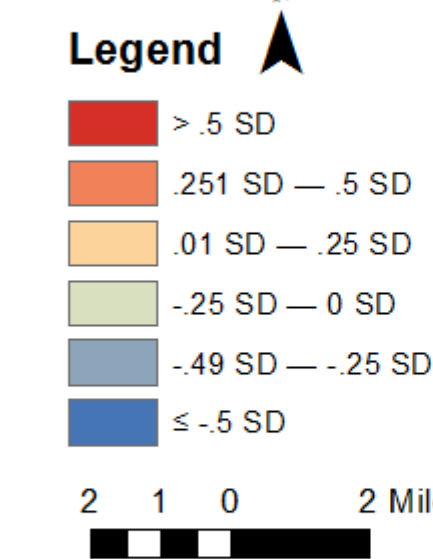
Data was then re-joined to the census tracts shapefile and clipped once more to Boston boundaries. In order to perform analysis at the neighborhood level, a spatial join was performed to find the average hardship index score for each neighborhood. Change in hardship was then calculated and symbolized by subtracting the mean score in 1990 from the mean score in 2016 for each neighborhood. Areas with a higher score (>0) experienced more hardship while areas with a lower score (<0) experienced less hardship overall.

Neighborhood-Level Changes in Hardship, 1990 to 2016

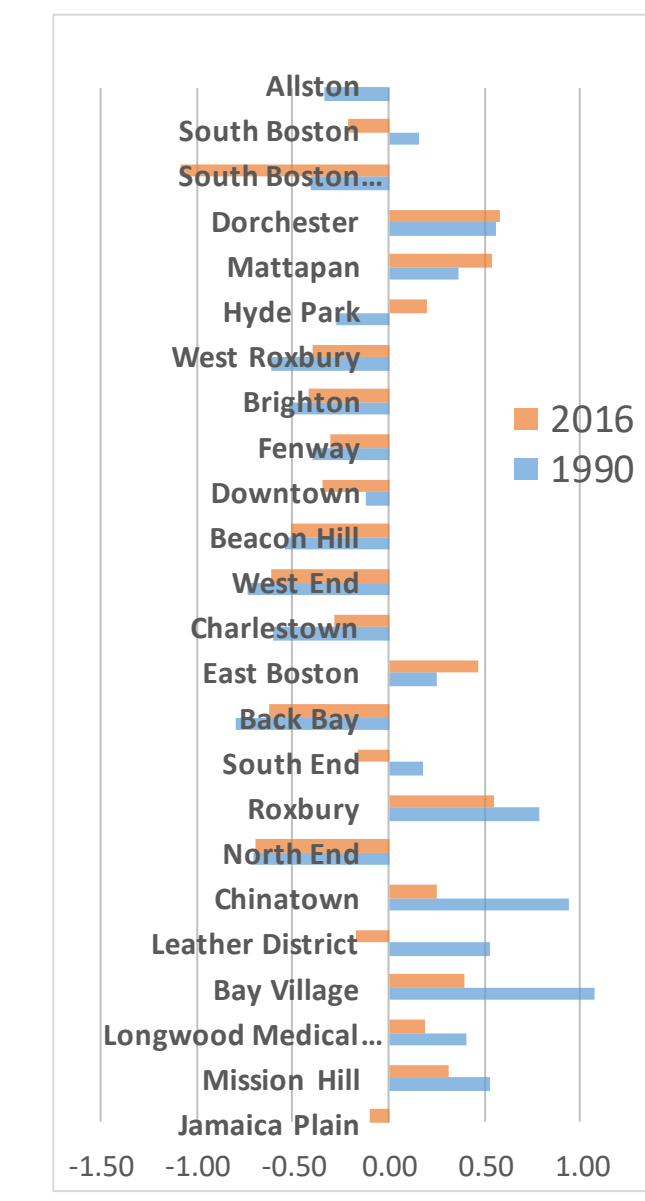


1990

2016



Results



The results in this analysis show many neighborhood level shifts in hardship from 1990 to 2016, with some neighborhoods – such as Roslindale, Hyde Park and Charlestown – experiencing a more dramatic shift in hardship while others – such as Chinatown and the South Boston Waterfront – experienced a shift amounting to less hardship. Other communities, such as Dorchester and Jamaica Plain, remained relatively stable from 1990 to 2016. A visual comparison of the final indices from 1990 to 2016 shows that there are fewer tracts in 2016 with high hardship. In 1990, 21 out of 171 tracts experienced high hardship (>1 SD) compared to 15 in 2016. There are also some areas that experienced high levels of hardship in 1990 and now experience lower levels in 2016, or vice-versa; for instance, some tracts in East Boston with less hardship in 1990 now show a higher level of hardship in 2016. East Boston also shows a dramatic shift in crowded housing from 1990 to 2016, with much of East Boston scoring much higher than the rest of Boston (>1.5 SD) on this variable.

Conclusion & Limitations

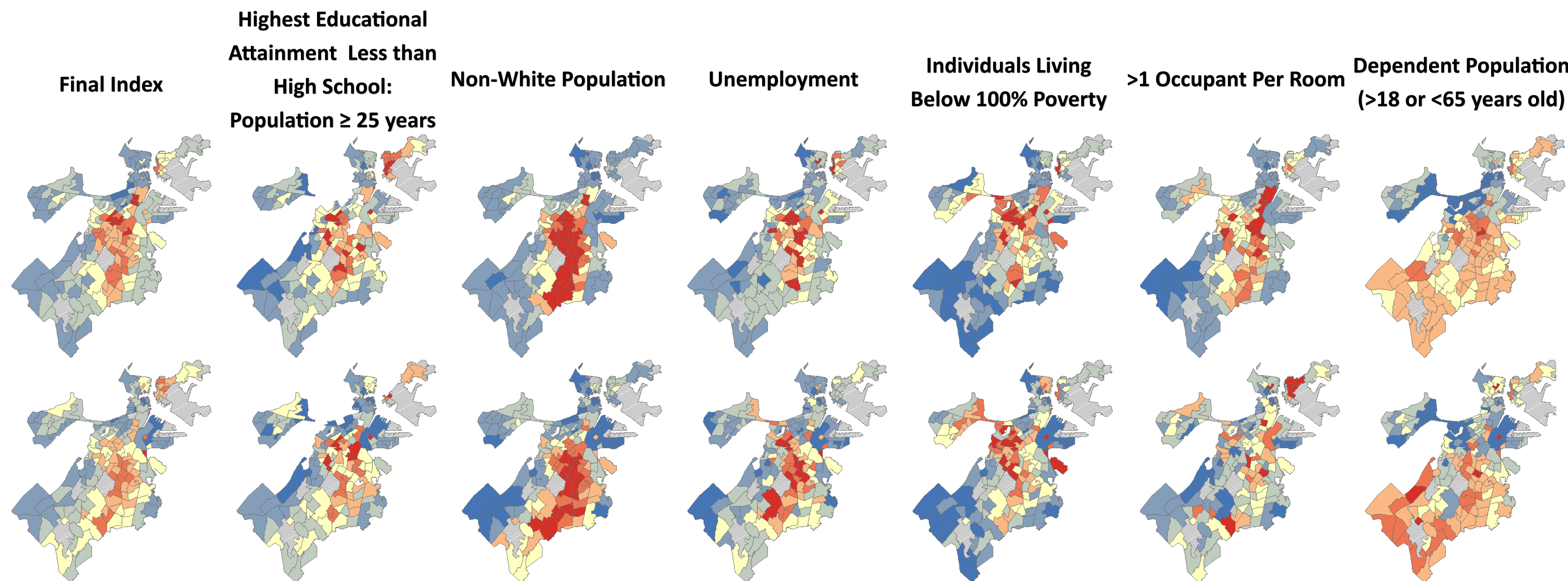
The results reveal a shift in the socioeconomic composition of some Boston neighborhoods over the past 25 years using “hardship” as the primary indicator. Even neighborhoods which scored lower on the hardship index (<0 SD) across 1990 and 2016 such as Charlestown are trending towards increasing hardship, with a change of .32 in final scores. This analysis does not, however, indicate causation; thus, further research and analysis is needed to examine what factors may have contributed to the aforementioned shifts in the distribution of hardship across Boston neighborhoods. Although we can see how these neighborhoods have changed over time, we cannot infer from the results any internal or external forces which may have contributed to this shift.

“Hardship” is an abstract concept difficult to quantify, and many variables beyond the six selected for this analysis may contribute to overall hardship; thus, such a limited analysis fails to capture all of the factors that may contribute to hardship for Boston residents. Furthermore, joining the census tracts to the Boston neighborhoods to find the mean hardship index score makes the assumption that all census tracts are weighted equally and some census tracts may be double-counted across neighborhoods. A more accurate way of performing the neighborhood level analysis would have been to assign each census tract a neighborhood and calculating percentages used to create the final index for each neighborhood.

Socioeconomic Indicators of Hardship

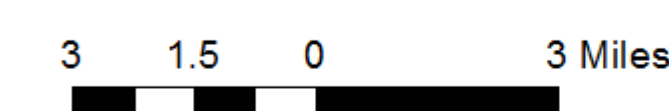
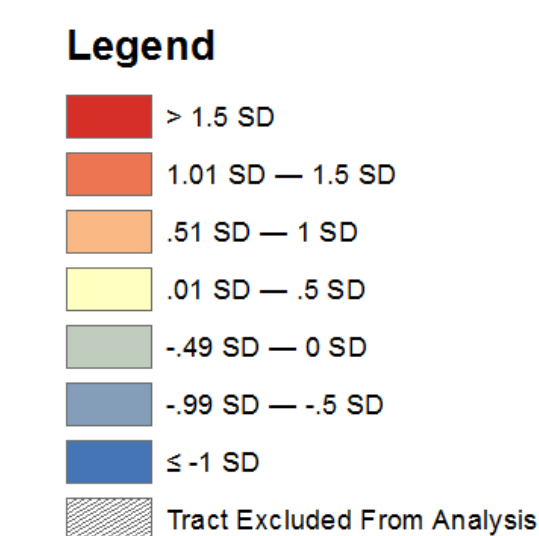
1990

2016



Projection & Data Sources

Coordinate System: MA State Plane, US Feet, NAD 1983
Projection: Lambert Conformal Conic
Data sources: American Community Survey Estimates 2012-2016 and US Census 1990 from Social Explorer, Boston Neighborhood Boundaries from Analyze Boston



References

- ¹ US Census Bureau. *American Community Survey 2012-2016, zip code 02129*. American Factfinder.
- ² Epidemiology and Public Health Informatics, Chicago Department of Public Health (CDPH). *Selected socioeconomic indicators in Chicago, 2006 – 2010*. City of Boston skyline photo courtesy of Wikimedia Commons.

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