BACKGROUND

In a recent study by the Cleveland Federal Reserve, Boston was identified as the city that has experienced the greatest amount of gentrification since 2000. As the cost of living in the city becomes more expensive, residents are forced to suburban fringe areas in search of affordability. The Greater Boston Metropolitan Region, consisting of 101 distinct towns, falls under the planning jurisdiction of the Metropolitan Area Planning Commission. According to principles of smart growth, metropolitan fringe areas should emphasize car-free accessibility and transit-oriented development.

In this analysis, these principles were the framework to examine the relationship between two factors: the adequacy of Boston’s public transportation system to connect residents in the Greater Boston Metropolitan Region to the urban center, and housing prices throughout the region. Through the integration of these features, the analysis uses GIS to address spatial questions about the existence of accessible, affordable zones for commuters in the Metro Boston region.

METHODS

The first part of the analysis consisted of determining accessibility zones for each of the MBTA Commuter Rail, Subway, and Bus Stops. A buffer of 3 miles was used for each in order to represent the reasonable distance someone could reach a station without a car (by bike or on foot). Each buffer was given the fare value of the distinct MBTA zone to determine monthly transportation cost. Additionally, the percentage of the population living within the buffer was determined using the total population estimate and calculating the portion of each unit of area within the buffer.

U.S. Census data for Median Home Values and Monthly Housing Costs were used as indicators for housing affordability. These values are represented in the map at the scale of census block groups, the smallest possible unit of analysis. The census data was then combined with the transportation cost data to determine an aggregate cost based on monthly housing expenditures and the price of an MBTA monthly pass. To model cost over a period of time, the monthly transportation cost was extrapolated into a fifteen-year cost and depicted as a portion of median home value.

Each of these factors was then analyzed for each individual town. The three resultant analyses consisted of: percentage of town within a 3 mile radius of an MBTA rail/bus stop, monthly transportation costs based on commuter rail zone, and median home values. The three resulting maps were then combined into one map showing the desirability of each town based on the aforementioned factors.

RESULTS

The results of the initial analysis at the block group level showed few strong trends in housing prices, except for three notably higher priced areas: directly to the west of Boston, and on the north and south coasts of Massachusetts Bay (see maps at bottom, center). Factoring in transit costs on the block group level resulted in a significant difference between long term and short-term cost, with the impact of higher transit costs much greater in the long term than as a monthly expense (shown in maps at right).

In the next step of the analysis, the combination of the three criteria (accessibility, transit cost, and home values) was calculated for each town. This created a map depicting a range of desirability for the region (depicted at left). The results of this analysis show that the most affordable towns for commuters are the suburbs closely bordering Boston, far enough to avoid the urban housing bubble and close enough to be within affordable commuting distance.

FURTHER ANALYSIS

Further analysis could incorporate existing bike paths and roads to find the actual distance from each station along a network rather than distance as the crow flies. Additionally, looking at characteristics of the region’s population, affordability could be measured as a function of income and cost burden. It would also be valuable to do a comparison of different types of housing tenure, such as rental and owner-occupied. The metric developed, as well as the possible unexplored factors, could be applied to any city in order to assess its commuter suitability.

SOURCES

Massachusetts Office of Geographic Information
American FactFinder: 2013 ACS 5-Year Estimates
Massachusetts Bay Transportation Authority