Is Time Actually Money?: An Analysis of Building Value and Age

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Introduction

By 2050, the urban population is expected to gain an additional 2.5 billion people, which will raise the proportion of city dwellers to two-thirds of all people on the planet (United Nations). This is particularly problematic, as new growth is also associated with the demolition of current infrastructure (Thompson et. al 2011). The potential result of such demolition, and rapidly changing building demands, is the loss of culturally significant buildings, which has already begun to occur. Presently there are number of historic preservation laws at the federal and state level that can protect historic buildings. The most notable laws however occur at the local level, which for Boston is the Historic Districts Act of 1960 (HDA). The HDA allows for the creation of historic districts, which ensures that development and façade changes are closely monitored in these areas.

Currently there are 23 districts in Boston. However, it's possible that there should be more. ***The following spatial analysis not only identifies where new districts should be created, should there need to be more, but (hopefully) also provides an argument that supports the proliferation of historic preservation as a whole.***

From past conducted research it was found that older buildings are more subconsciously fascinating to humans than newer buildings and contained a higher number of fixation points (OleJarczyk et al. 2014). A higher number of fixation points is associated with increased memorability. Therefore, a building with many red regions is more likely to be remembered than a building with fewer red regions. However, no research has been conducted to determine if subconscious fixations are associated with building value. Presumably a building that is more memorable would be valued more than one that is less memorable. ***It is therefore hypothesized that old buildings, which have more fixation points than new buildings, are more expensive than new buildings with fewer fixation points. It is also hypothesized that regardless of building age, buildings with a higher number of fixation points, indicated by the number of red regions from the VAS Analysis, will also be more expensive than buildings with fewer fixation points.***

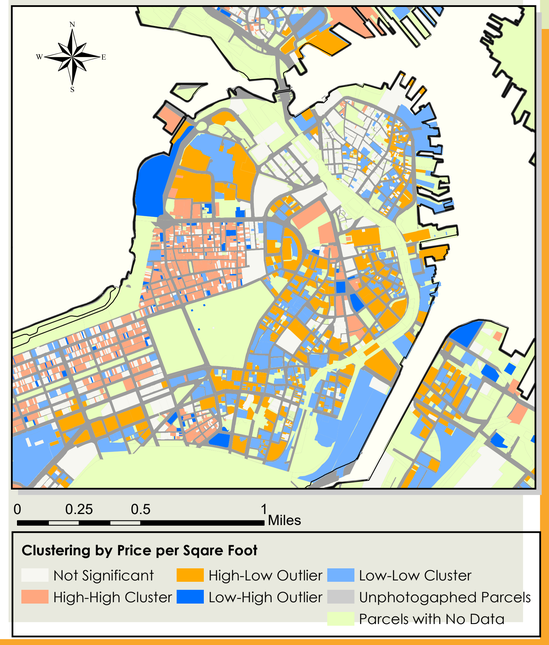
Spatial Distribution of...

Photographed Buildings and Photographed Buildings Weighted by Price Per Square Foot

Photographed Buildings Weighted by Fixation Points and Photographed Buildings Weighted by Price Per Square Foot

Photographed Buildings Weighted by Age and Photographed Buildings Weighted by Price Per Square Foot

Clustering by Building Age

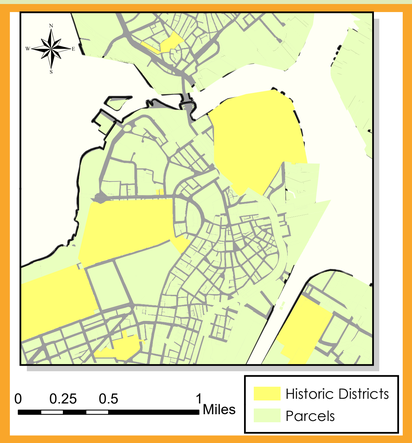


Methodology:

First, to determine where historic districts should be placed, a Local Moran's I comparing the ages of buildings was performed. Areas with L-L clusters show where newer development has occurred. Areas with H-H clusters indicate an area with a high concentration of older buildings, and thus an area that would might require a historic district designation. A map showing the clustering of buildings by age can be found to the left and a map of the current historic districts can be ound to the right.

The Local Moran's I analysis provides another function as well. It allows researchers to infer a causal relationship between building age and price per square foot. By placing the two Local Moran's I maps directly next to each other, researchers can casually infer if older buildings also have a higher price per square foot. As previously mentioned historic buildings are hypothesized to be valued higher than modern buildings. If the hypothesis holds the two maps should look similar. H-H regions on the "Clustering by Building Age" map should also match the H-H clusters of the "Clustering by Price per Square Foot", which indicates buildings that have a high dollar per square foot value. L-L's, H-L's and L-H's should also ideally match as well.

The second set of maps (shown above) directly compares red regions to building value. Prior conducted research has resulted in the evaluation of 19 different buildings shown by the blue points in the spatial distribution maps. Each building has a number of fixation points associated with it. These points were spatially joined to their respective parcels which were used to derive mean location and 1 standard deviation ellipsoid weighted by price per square foot, age, and fixation points. Each map shows a comparison of different weights. The first map shows how price affects the mean location sans any weighting. The second and third map compare mean location weighted by fixation points and building age to dollar per square foot respectively. These maps should not only show how these factors influence the average location, but also show whether fixation points potentially factors into building price.



Results

From the Local Moran's I of building age it is seen that the H-H clusters are covered by the historic districts, showing that Boston has successfully addressed the buildings that are oldest. The most obvious H-H districts shown in the building age map appear near Beacon Hill, the Back Bay and Bay Village. These locations all have historic districts. The historic districts map even covers places unidentified as having old clusters; the Seaport area and parts of Charlestown. The Seaport area has a cluster of outliers (shown in bright orange), indicating that there are a number of historic buildings interspersed with newer ones, which would explain the need for a historic district. Charlestown has less consistent clustering. The presence of the historic district here may be explained by missing data. A number of parcels had no age listed. Therefore the buildings in this area may be older, but the lack of information may have skewed the results.

From the mean distribution analyses we know that expensive buildings (buildings with a high price per square foot) are concentrated north east of the average building location. It was also found that both building age and fixation point means are south east of the price per square foot mean. This would indicate that likely neither building age nor fixation points strongly influence building price per square foot, if at all. Because fixation point mean is so much further south east than the price per square foot this mean buildings with high fixation points would tend not to be in the same area as buildings with the highest dollar per square foot value. The same can be said of building age. Overall it seems that building value does not correspond to building age or fixation points. Therefore, it seems that the façade of the building, and human's subconscious preference for older facades does not heavily factor a buildings worth. Perhaps people even prefer the amenities that come with newer buildings, which drives the price of the building. Even though the subconscious design value of buildings has not been reflected in the building's price, it seems as though the local government has recognized its value. Historic buildings have more fixation points which is positively correlated with memorability. It is therefore notable that there are so many historic districts in Boston. In creating so many historic districts Boston has acknowledged the importance of old buildings and also preserved some of the more subconsciously fascinating buildings in the area in the process.

Work Cited

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Data Sources:
Analyze Boston: Boston Landmarks Commission (BLC) Historic Districts, Parcels 2016 Data Full

Projection: Lambert Conformal Conic
Coordinate System: NAD 1983 2011 StatePlane Massachusetts Mnld FIPS 2001 FtUS

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Clustering by Dollar per Square Foot