

Analysis of Potential Restaurant Venues in Boston

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1. Introduction

1.1 Background

With an estimated population of 692,600, Boston, Massachusetts is the most populous city in New England, and one largest cities in the United States northeast region. Additionally, with an economy encompassing \$363 billion, and with a large portion of that coming from tourism, the Greater Boston metropolitan area is a prime location to own a business, specifically a restaurant.

1.2 Problem

Suppose we want to open a restaurant somewhere in the Boston metropolitan area, and need to determine what would likely be the most successful venture. What type of restaurant would be the most successful in the Boston area?

1.3 Interest

The parties that would be most interested understanding what kind of restaurant would be successful would be either those looking to invest in the restaurant business, and those looking to start a restaurant themselves. Understanding existing trends and data is key to long term success.

2. Data acquisition and cleaning

2.1 Data sources

- Wikipedia: “Boston”, <https://en.wikipedia.org/wiki/Boston#Demographics>. The Wikipedia entry on Boston provides more information than is necessary for our purposes, but the Demographic subsection contains a table titled *Demographic breakdown by ZIP Code* which provides information such as neighborhoods, zip codes, population, and income. This will give a basic idea of the appeal of each neighborhood; a neighborhood with a higher median income and a larger population would most likely be a more ideal location.
- Foursquare API. Data about existing venues in each neighborhood will be extracted and analyzed through Foursquare’s API. This will show the feasibility of types of restaurants based on popularity, while helping us avoid oversaturating an area with a large number of one type of restaurant. Low popularity could indicate that a particular type of venue is not popular in that area, which would make it a less appealing choice of restaurant. Likewise, having too many of one type of restaurant in one area means more competition, which would in turn mean less potential revenue.

2.2 Data cleaning

Data scraped from websites were processed to be easily read at a glance in order to best see which neighborhoods in Boston would be the most lucrative.

3. Methodology

As mentioned previously, data scraping was utilized to extract the information used within this report. By using the Python function for Wikipedia, we are able to search for the page on Boston and convert it into a Pandas dataframe before cleaning it.

Much of the exploratory analysis was done through the use of Foursquare API, as the scraped data was directly extracted from Wikipedia. Once a particular neighborhood was identified, Foursquare was able to display the types of venues within that neighborhood as well as the number of those venues.

4. Results

The results of the scraped Wikipedia page demonstrated that Boston has 34 neighborhoods, and that the most populated neighborhoods tended to have a similar per capita income, population, and number of households. In descending order of per capita income, neighborhoods such as West Roxbury, Jamaica Plain, and Roslindale would have incomes ranging from \$25,000 to \$56,000.

Neighborhoods such as the Financial District and Prudential Center sported much higher per capita income with \$152,007 and \$151,060, respectively. However, when compared to the population, these neighborhoods were actually among the lowest. The Financial District, for example only has a population of 1,486 people, despite being ranked highest in per capita income. Obviously these are not necessarily correlated, but these two neighborhoods were treated as outliers.

The Harvard Business School was another neighborhood that was a clear outlier in terms of population. Other neighborhoods with a similar per capita income would have populations ranging from 20,000 to 30,000. However, this neighborhood only has a population of 1,842, owing to the fact it is primarily a college campus.

The Back Bay neighborhood was the most interesting result. Neighborhoods with a lower population tended to have a higher income, and inversely neighborhoods with high populations would have middling income. Back Bay has a population of 21,318, yet it defied the trend and had an average per capita income of \$81,458, making it the 5th highest in income.

As Back Bay did not seem to be an outlier and had a large income and population, I elected to explore it using Foursquare API. This data demonstrated that the most popular venues in this area tended to be shops and restaurants, with clothing stores being the most popular. See below for the most common venues in the area:

| Neighborhood | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4th Most Common Venue | 5th Most Common Venue | 6th Most Common Venue | 7th Most Common Venue | 8th Most Common Venue | 9th Most Common Venue | 10th Most Common Venue |
|--------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|
| 0 Back Bay | Clothing Store | Coffee Shop | American Restaurant | Seafood Restaurant | Hotel | Ice Cream Shop | Italian Restaurant | Cosmetics Shop | Shopping Mall | Juice Bar |

5. Discussion

When looking for a location to either invest in or to establish a restaurant, three important factors come to mind: income, population, and competition. Income is the most obvious, as a higher per capita income implies the average person has more money and, by extension, would probably be more willing to spend that money eating at a restaurant.

Population is the next biggest factor as the outliers and trends discussed in the Results category demonstrate; an area may have a high income, but this may mean there is not a lot of people. This may

be due to these areas being largely commercial, but without residents nearby, a restaurant relies mostly on tourism and business people eating meals during working hours, which is counter initiative.

Competition is the third factor to consider when choosing what type of restaurant one wishes to establish. More of the same type of restaurant in the same area means more businesses one must compete against, which in turn makes it harder to make a profit.

This is why the Back Bay neighborhood appeared to stand out, and why it is the most appealing neighborhood. It's high per capita income implies that people tend to have more money to spend, and thus would be the demographic of people that would be more likely to eat at restaurants more frequently. The high population and number of households (shown below) additionally demonstrate that there are a considerable number of potential customers, and that the neighborhood is not just a commercial area.

| | ZIP Code | Neighborhood | Per capitaincome | Population | Number ofhouseholds |
|---|----------|------------------------|------------------|------------|---------------------|
| 0 | 02110 | (Financial District) | \$152,007 | 1486 | 981 |
| 1 | 02199 | (Prudential Center) | \$151,060 | 1290 | 823 |
| 2 | 02210 | (Fort Point) | \$93,078 | 1905 | 1088 |
| 3 | 02109 | (North End) | \$88,921 | 4277 | 2190 |
| 4 | 02116 | (Back Bay/Bay Village) | \$81,458 | 21318 | 10938 |

From there, the best type of restaurant if one were want to establish one would most likely be an Italian restaurant. This is because 4 of the most common venues are not restaurants regardless, being things like hotels and shopping malls. Out of the remaining 6, we deliberately avoided coffee shops as well as American and seafood restaurants; These restaurants proved to be too populous in the area, meaning competition would be fierce. And of the remaining 3 restaurants (ice cream, Italian, and juice bars), ice cream parlours and juice bars tend to be seasonal in nature; demand for these venues fall drastically in the winter months. Therefore, the most logical venue would be an Italian restaurant.

6. Conclusion

In conclusion, the findings presented demonstrate that, of all the neighborhoods in Boston, the Back Bay area would be the most appealing location to create a new restaurant venue, and more specifically that an Italian restaurant would be the best fit given Back Bay's current venues.