

Final Presentation Group 5

BUS-211A: Foundations of Data Analytics

Presented by:
A Zun Mo
Tianyu Liu
Weixin Xu
Yijian Shen

Date Presented:
December 6th, 2022



MEET THE TEAM



A Zun Mo
(Momo)



Tianyu Liu
(Henry)



Weixin "Peter" Xu



Yijian Shen
(Oskar)

Agenda

- Introduction
- Our Interest
- Research Question
- Audience
- Data Management
- Are the datasets biased?
- Results of our Analysis
- Conclusion



Snacks and Non-Alcoholic Beverages

- How consumer behaviors changed during (post) COVID-19
- Behavior towards food that is not regarded as a requirement to survive in our everyday lives has changed



TARGET AUDIENCE

- INDUSTRY ANALYSTS



- COFFEEHOUSE OWNERS/ POTENTIAL COFFEEHOUSE OWNERS

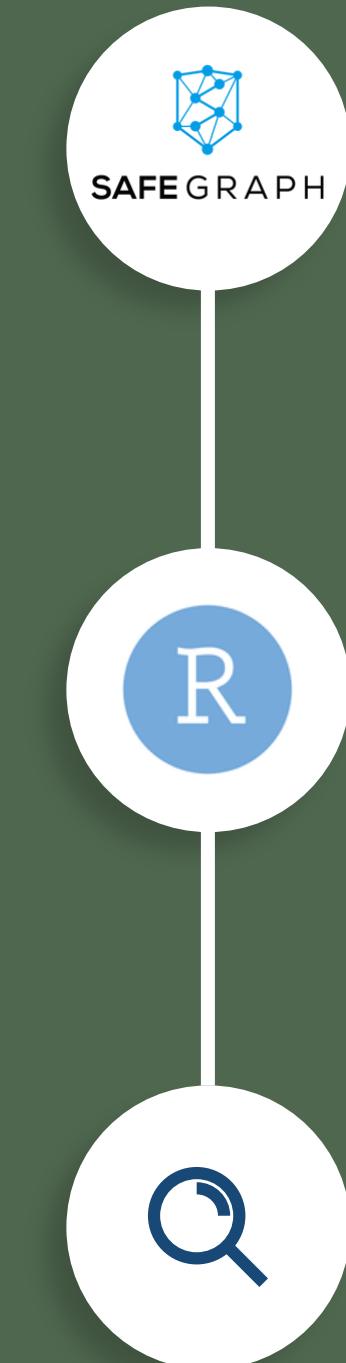


- ECONOMISTS



How does the weak
economy affect large
coffeehouse chains (more
than 10 stores) in the Boston
area
(Starbucks, Dunkin' Donuts,
Caffe Nero)?

DATA WRANGLING



Datasets
Patterns
Places

Patterns Places

LEFT JOIN
by = 'placekey'

FILTER()

Restaurants & Other Eating Places

Full Service Restaurants

Limited Service Restaurants

Snacks & Non-alcoholic Beverage Bars



Our Interest

```
# A tibble: 3 × 2
  sub_category     n
  <chr>        <int>
1 Full-Service Restaurants    1537
2 Limited-Service Restaurants  410
3 Snack and Nonalcoholic Beverage Bars 480
>
```

NAICS code

722515

groupby()

| | location_name | n |
|----|--------------------------|----|
| 1 | Dunkin' | 75 |
| 2 | Starbucks | 59 |
| 3 | Caffè Nero | 18 |
| 4 | Ben & Jerry's | 7 |
| 5 | Juice Press | 6 |
| 6 | Tatte Bakery & Cafe | 6 |
| 7 | Flour Bakery Cafe | 4 |
| 8 | Boston Common Coffee Co | 3 |
| 9 | Finagle A Bagel | 3 |
| 10 | Panera Bread | 3 |
| 11 | Peet's Coffee | 3 |
| 12 | Red Barn Coffee Roasters | 3 |
| 13 | WFM Coffee Bar | 3 |

Only 3 stores > 10 locations

```
```{r}
number_visits <- df %>%
 filter(naics_code == '722515') %>%
 group_by(location_name, street_address, date_range_start, date_range_end) %>%
 count(raw_visit_counts)
```

```{r}
number_visits_top3 <- df %>%
 filter(brands == "Dunkin'" | brands == "Starbucks" | brands == "Caffè Nero") %>%
 group_by(location_name, street_address, date_range_start, date_range_end) %>%
 count(raw_visit_counts)
```
```

It turns out that Starbucks and Dunkin received more than 3000 visits during January to September 2022, with Starbucks ranking first (3365).

Data Bias

1

Sample vs.
population

2

Distribution of
Branches

3

Traffic Pattern

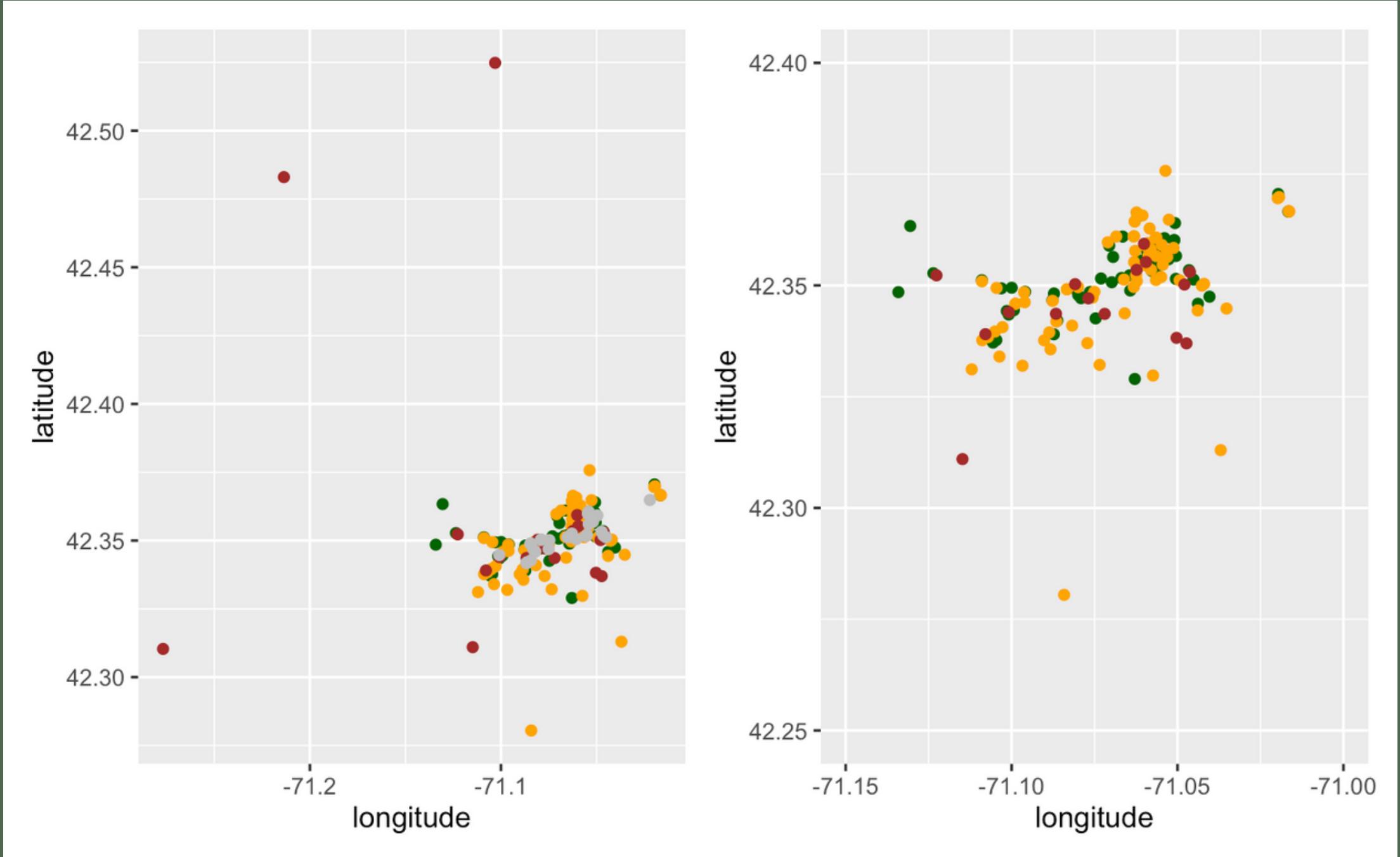
Sample VS. Population

| location_name | n |
|---------------|-------|
| | <int> |
| Caffè Nero | 18 |
| Dunkin' | 75 |
| Starbucks | 59 |

- Focus on the brands with **10+ branches**
- **Population wised:**
 - Caffe Nero 18
 - Dunkin' 57
 - Starbucks 55
- Shut Down or Closure
- Store Does not Show on Map

Distribution of Branches

- Use **Geographic coordinate system** to plot the **exact location** for each branch
- Three outliers for Caffe Nero
- Distributed Evenly



Traffic Patterns

Raw Visit Counts

- Heavily Left Skewed
- Large Numbers on Tail
- Test on **Median**

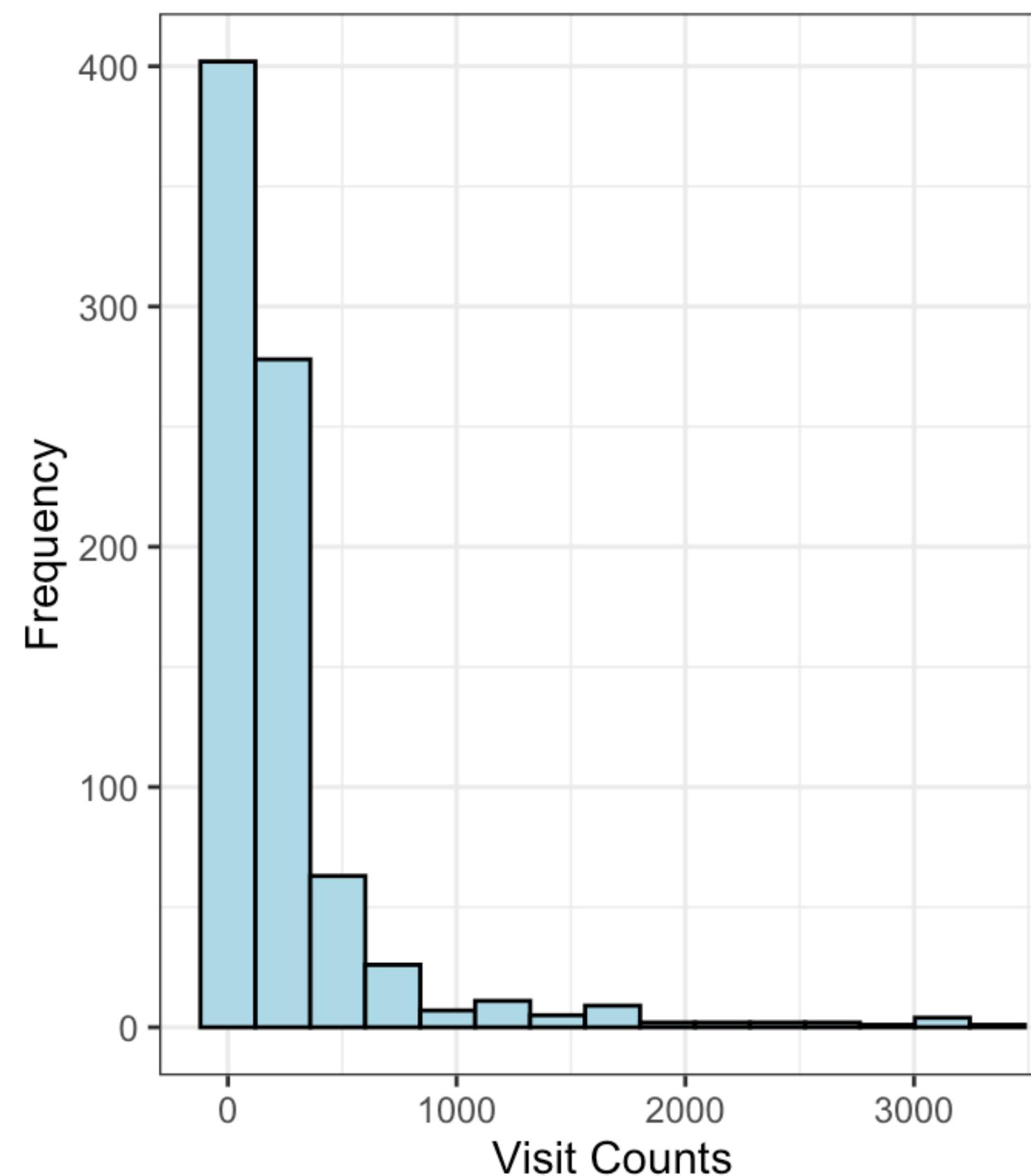
Bootstrapping

- Bootstrap **50,000** Times
- Bootstrap Sampling Distribution **Centered at 123**
- **95% Bootstrap Confidence Interval for Population Median: (113, 134)**
- Real Population Median: 500 - 750 per day

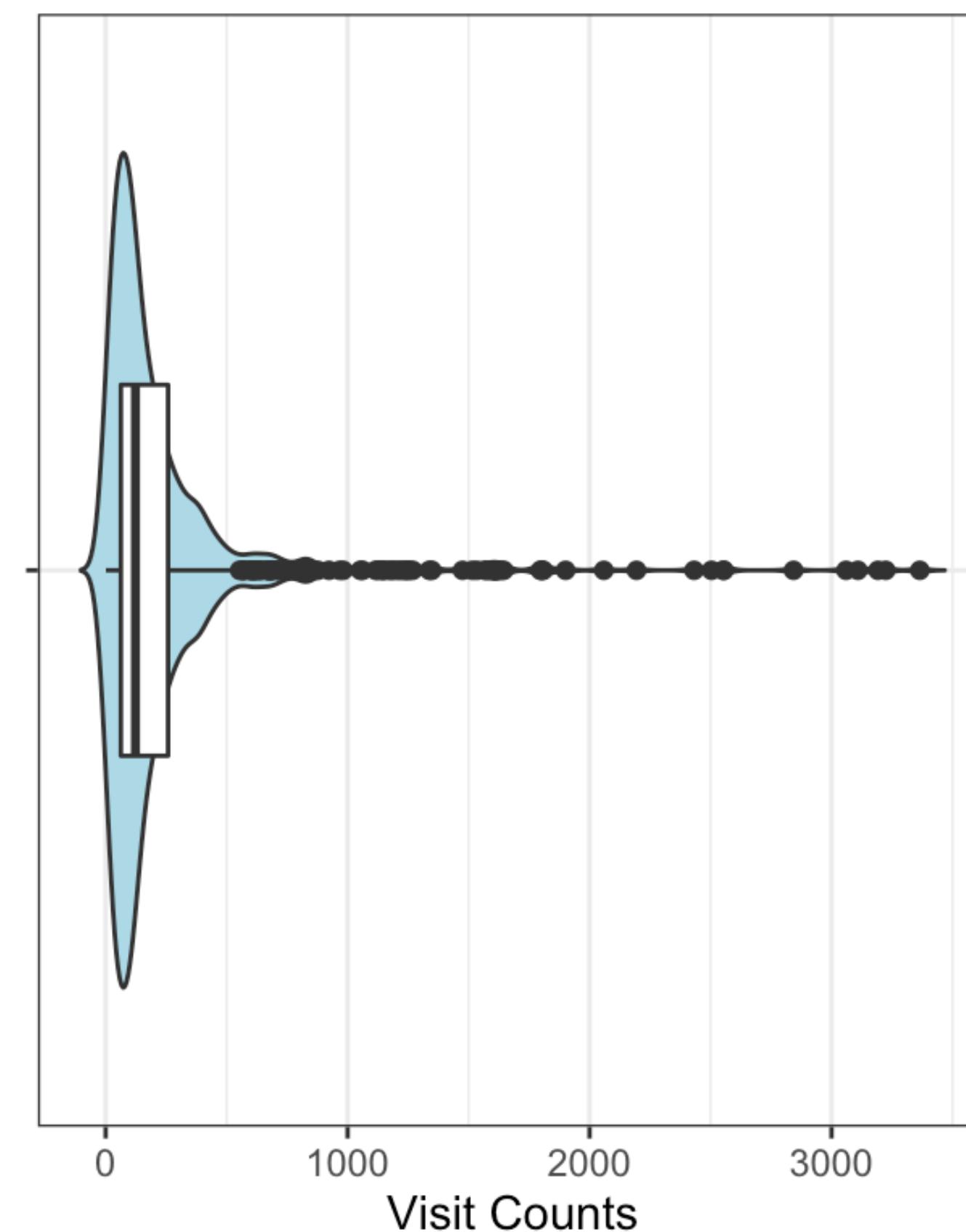
Visit Pattern

- Visits over Times
- Cross Validation with Regression

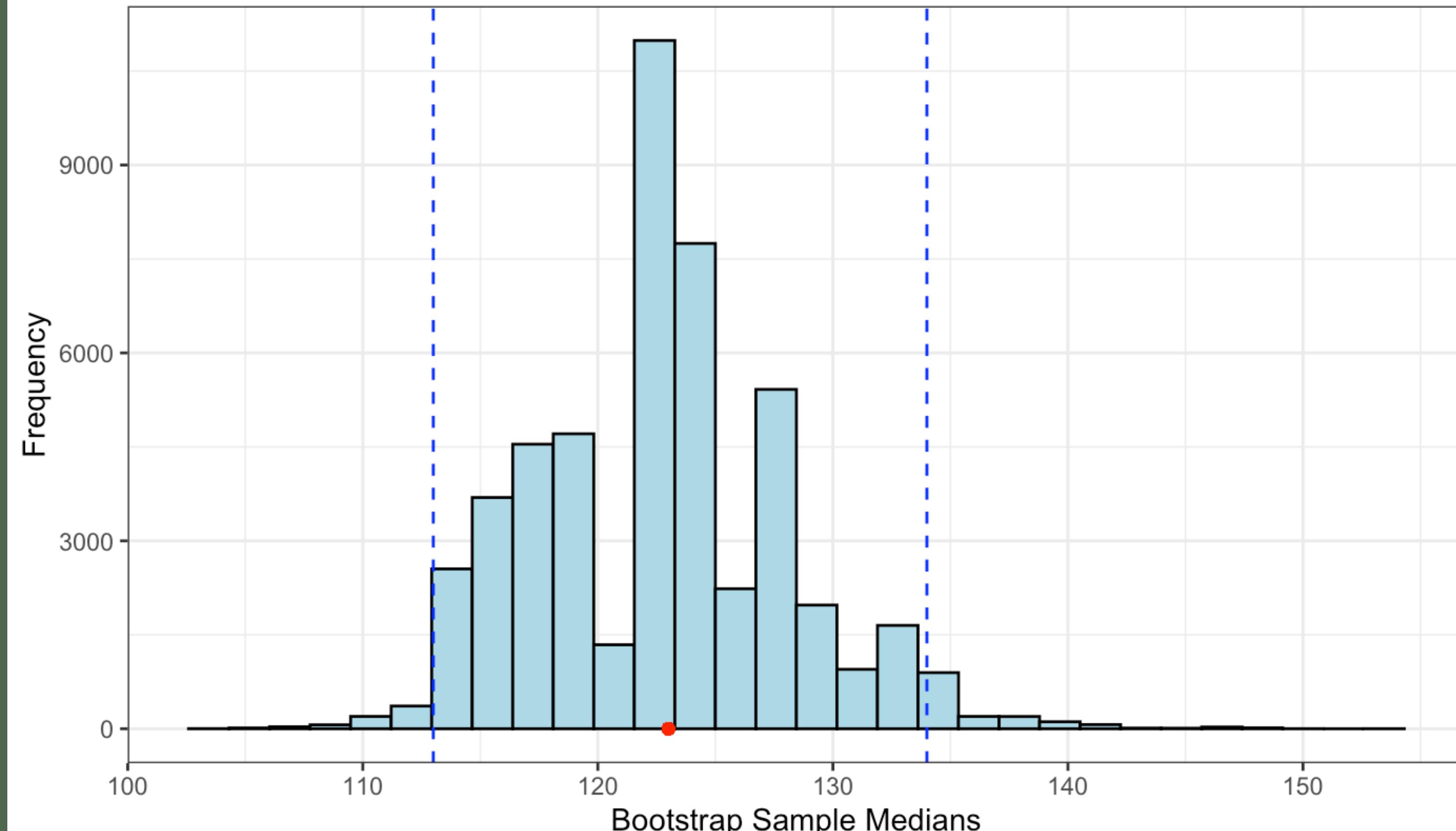
Frequencies of Visit Counts



Frequencies of Visit Counts



Bootstrap Sampling Distribution



Analysis and Conclusion

| brands | n |
|---------------------------|-------|
| <chr> | <int> |
| NA | 301 |
| Dunkin' | 75 |
| Starbucks | 59 |
| Caffè Nero | 18 |
| Ben & Jerry's | 7 |
| Juice Press | 6 |
| Panera Bread | 3 |
| Auntie Anne's | 2 |
| Emack & Bolio's Ice Cream | 2 |
| Kung Fu Tea | 2 |

- 301 null values
- Locally owned stores
- Not included in any of the brands
- No way to verify whether these stores actually exist.

Starbucks



Starbucks at
Brandeis

Not found on the dataset

A tibble: 13 × 22

| placekey | parent_placekey | location_name |
|---------------------|-----------------|---------------|
| 222-22c@62j-shz-3nq | NA | Starbucks |
| zzy-222@62j-qp7-mff | NA | Starbucks |
| 222-222@62j-shy-r8v | NA | Starbucks |
| 268-222@62j-sj4-66k | NA | Starbucks |
| 22f-222@62j-shx-brk | NA | Starbucks |
| 222-225@62j-shz-tgk | NA | Starbucks |
| zzy-224@62j-sj4-n3q | NA | Starbucks |
| 224-226@62j-shz-435 | NA | Starbucks |
| zzw-223@62j-sgg-d35 | NA | Starbucks |
| zzy-225@62j-sj4-8d9 | NA | Starbucks |

CLOSED

1-10 of 13 rows | 1-3 of 22 columns

Previous 1 2

13 closed stores still have visit data

Suggests that these locations may still be open for business.

THANK YOU

ANY QUESTIONS?