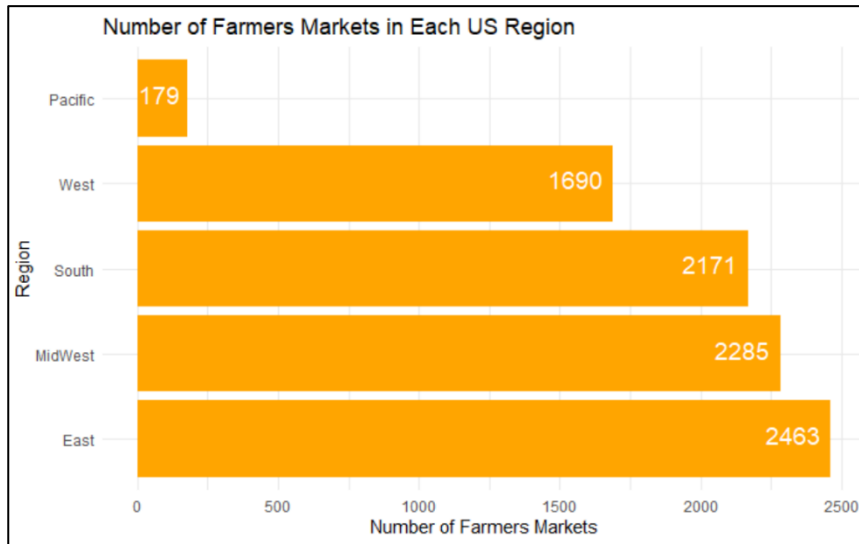**ANALYSIS OF FARMER'S MARKETS IN US: Analytical and Comparison Visualizations (Without relying on map plots)**

By Sahar Tariq

1. Geographical
   a. Absolute number of markets by location

Comments:
The absolute number of markets in an area (city, state, or region) may not be a proper indication of popularity of markets in the area, as it does not take into consideration population or land area. Big areas and highly populated areas may by default have higher number of markets than smaller areas so those metrics should be factored in to determine the spread and density.
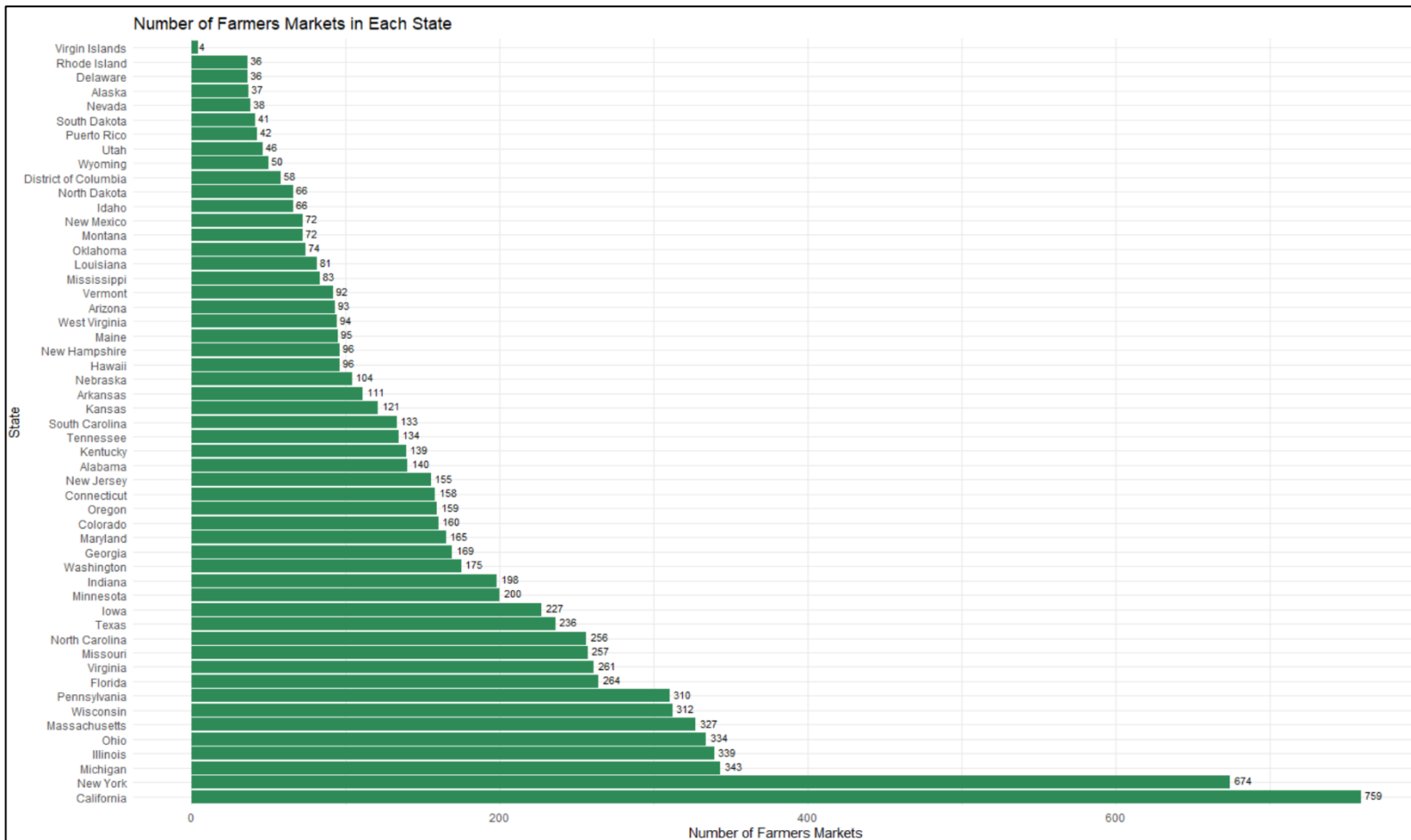
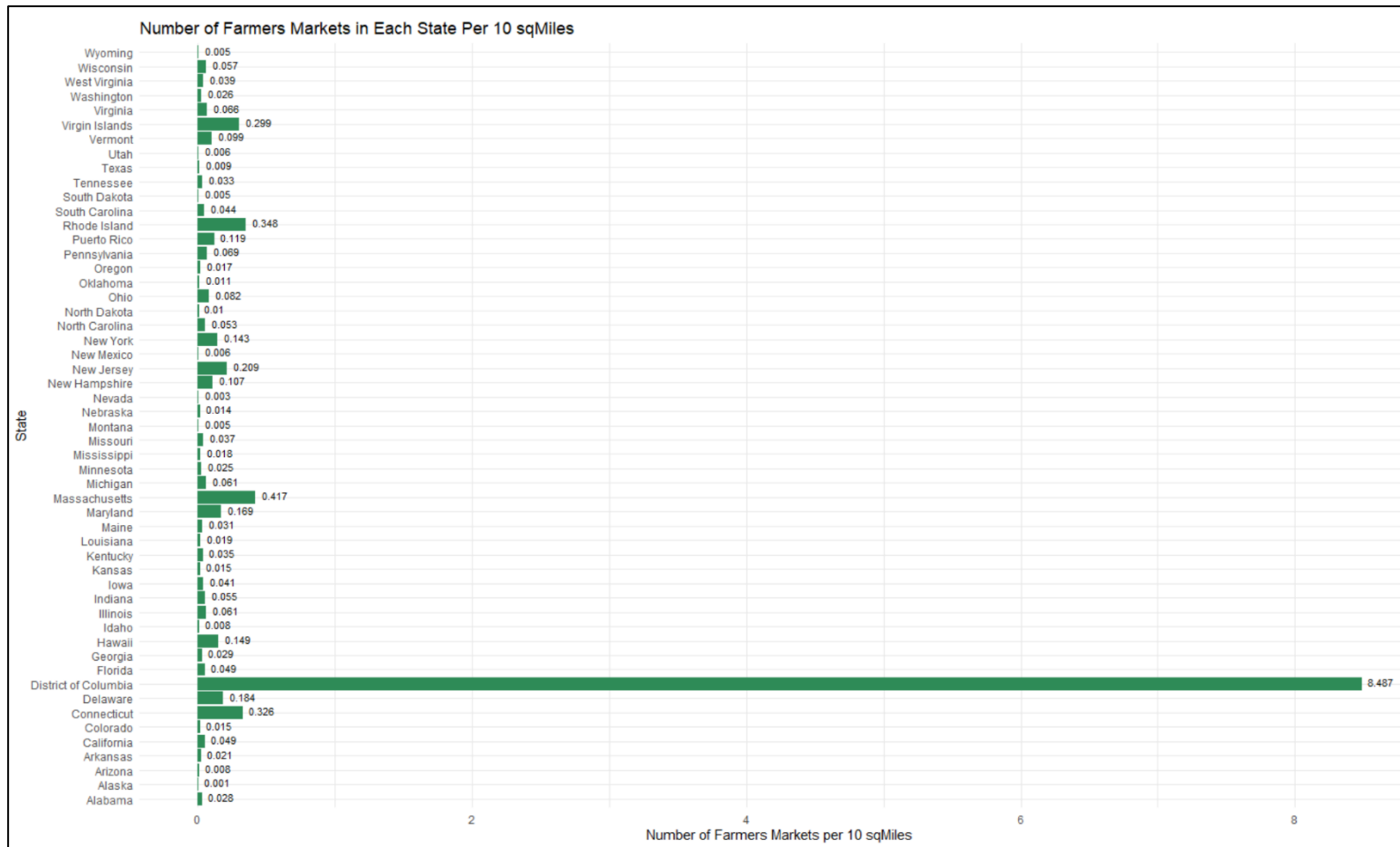b. Density of markets by location taking into consideration population

Comments:
This shows how many markets are there for every 10,000 people in a state, giving a proper
indication of popularity. Sort by values if interested in comparing by values.

Number of Farmers Markets in Each State Per 10,000 People
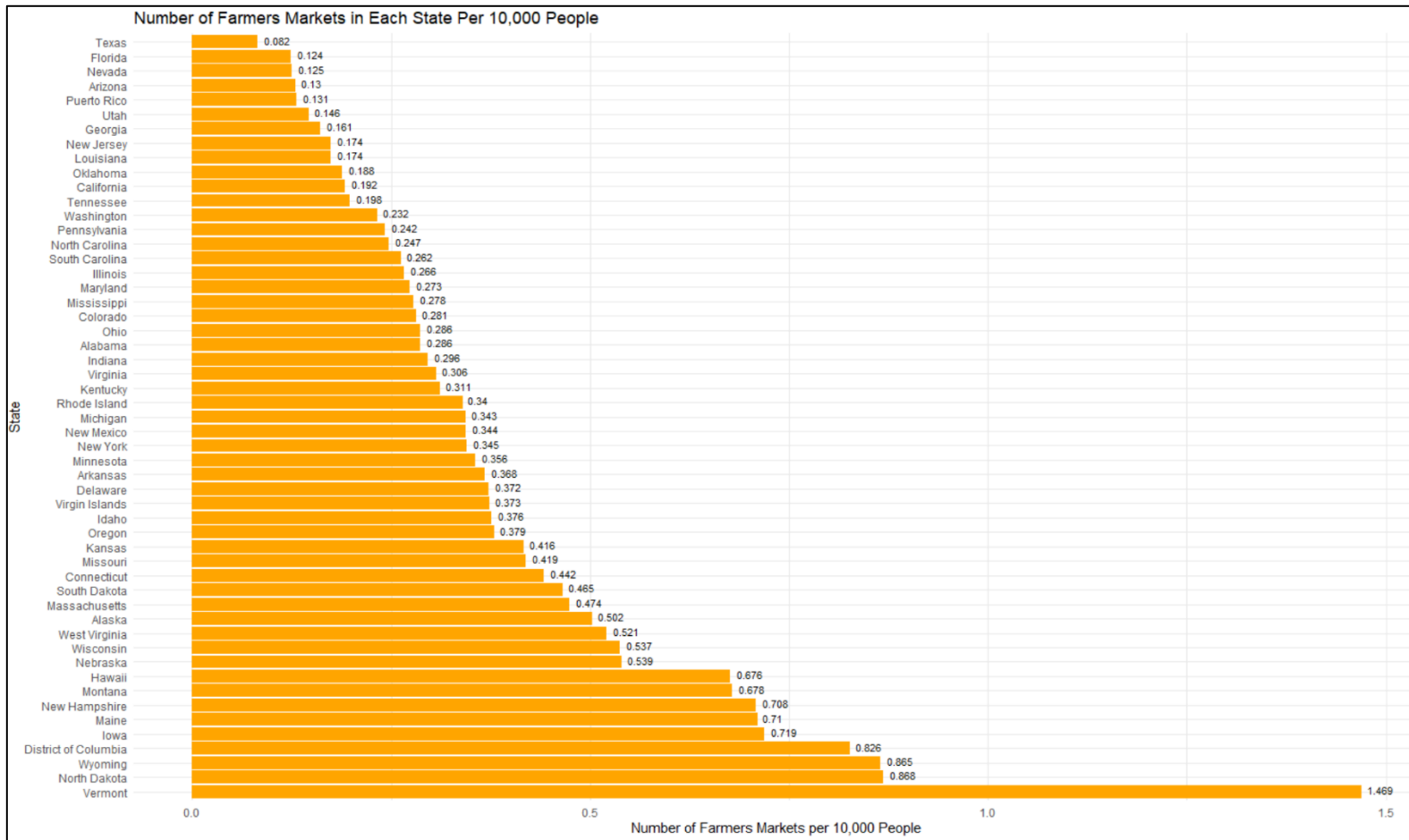
c. Density of markets by location taking into consideration land area

Comments:

This shows how many markets are there in every 10 square miles in a state, giving a proper indication of density. Sort by y axis alphabetical order if interested in finding each state easily and the looking at the values of that.

Number of Farmers Markets in Each State Per 10 sqMiles

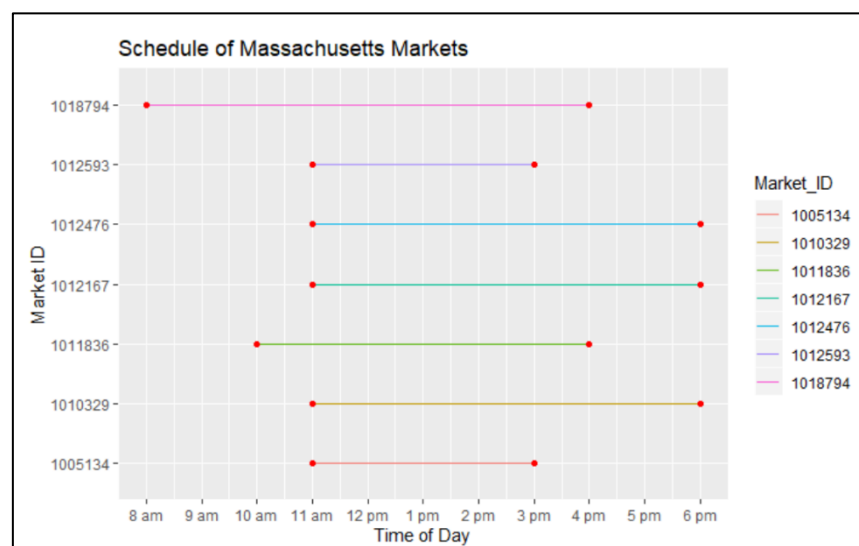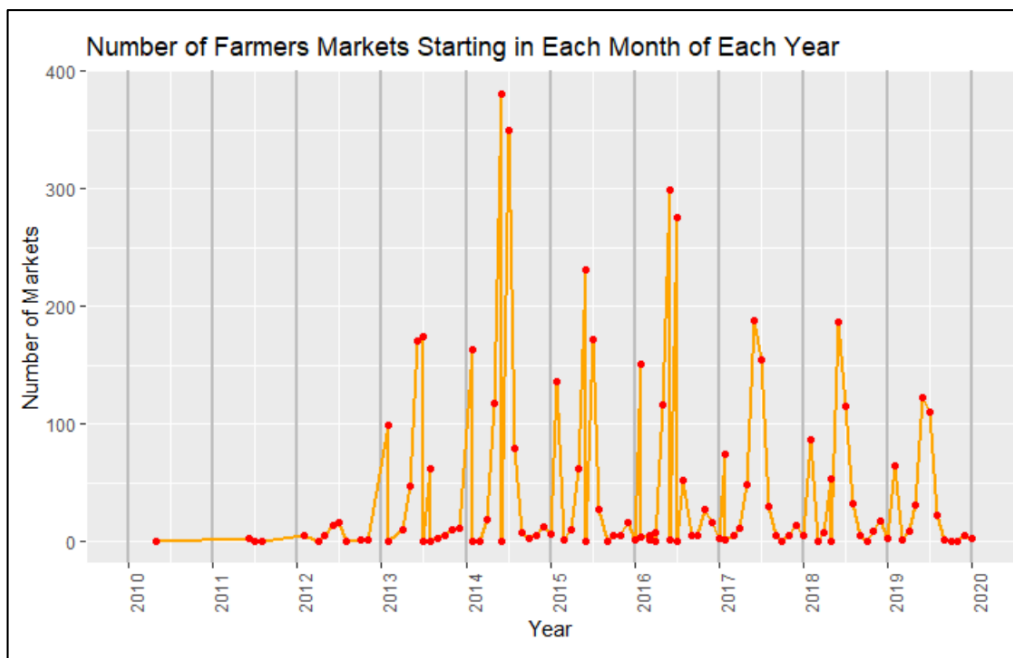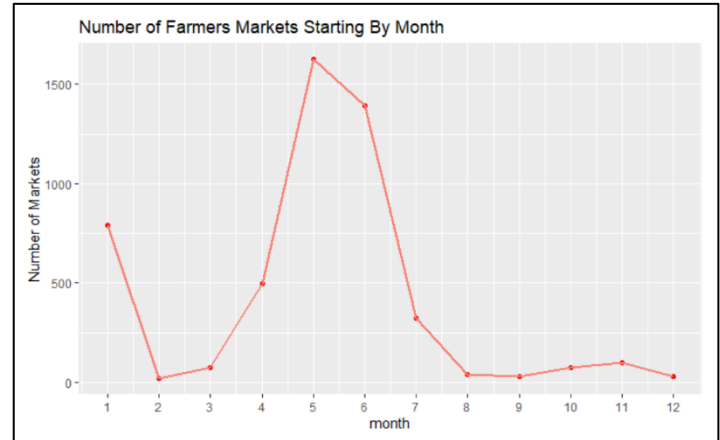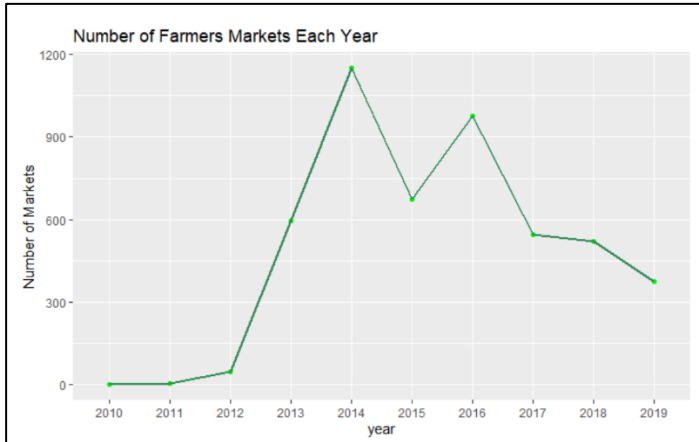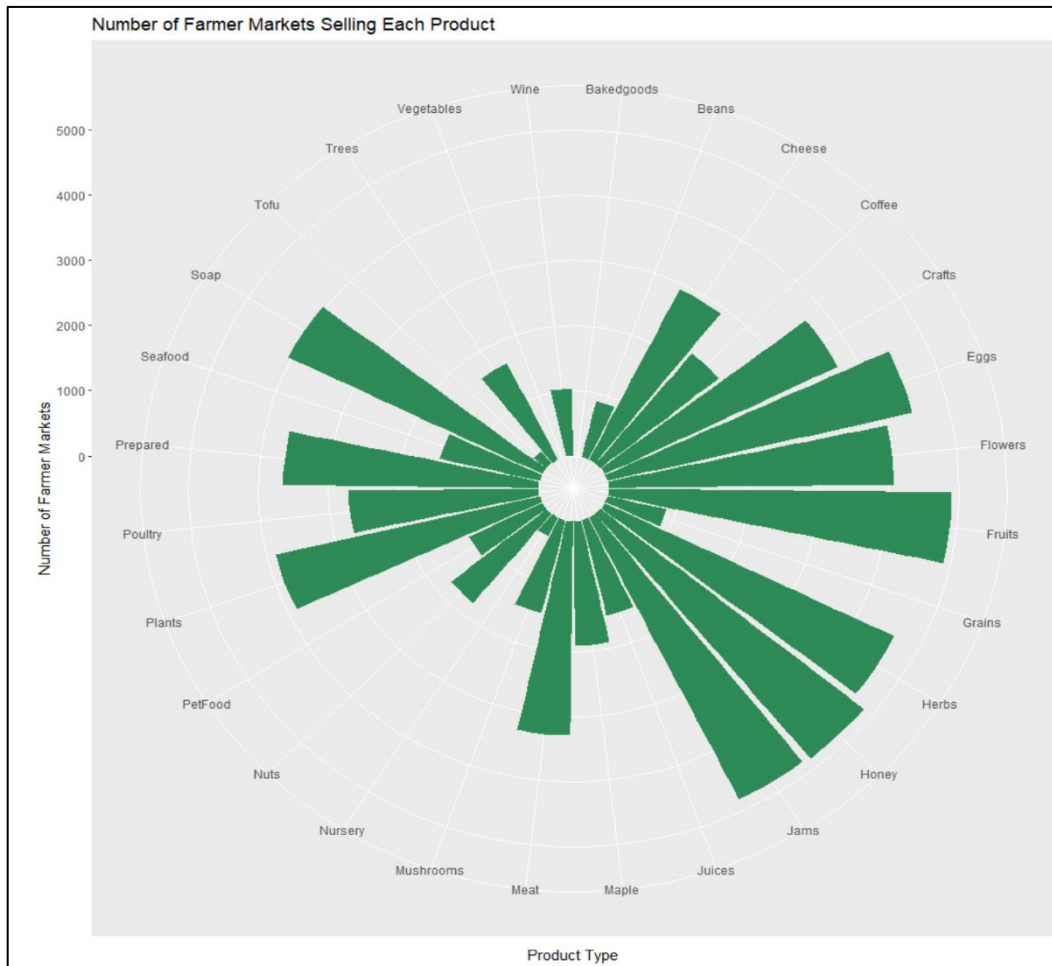| State	Number of Farmers Markets per 10 sqMiles
Wyoming	0.005
Wisconsin	0.057
West Virginia	0.039
Washington	0.026
Virginia	0.066
Virgin Islands	0.299
Vermont	0.099
Utah	0.006
Texas	0.009
Tennessee	0.033
South Dakota	0.005
South Carolina	0.044
Rhode Island	0.348
Puerto Rico	0.119
Pennsylvania	0.069
Oregon	0.017
Oklahoma	0.011
Ohio	0.082
North Dakota	0.01
North Carolina	0.053
New York	0.143
New Mexico	0.006
New Jersey	0.209
New Hampshire	0.107
Nevada	0.003
Nebraska	0.014
Montana	0.005
Missouri	0.037
Mississippi	0.018
Minnesota	0.025
Michigan	0.061
Massachusetts	0.417
Maryland	0.169
Maine	0.031
Louisiana	0.019
Kentucky	0.035
Kansas	0.015
Iowa	0.041
Indiana	0.055
Illinois	0.061
Idaho	0.008
Hawaii	0.149
Georgia	0.029
Florida	0.049
District of Columbia	8.487
Delaware	0.184
Connecticut	0.326
Colorado	0.015
California	0.049
Arkansas	0.021
Arizona	0.008
Alaska	0.001
Alabama	0.028

2. Time
   a. Behavior over time

Comments:
Trend of number of markets starting each month. Since every year the number of markets is changing, combined plot of month and year shows the trend over the years and also over each month in those years. Trendlines is best to see behavior over time.


Number of Farmers Markets Each Year

Number of Farmers Markets Starting By Month

Number of Farmers Markets Starting in Each Month of Each Year

Schedule of Massachusetts Markets

3. Product
   a. Absolute number of markets selling each product

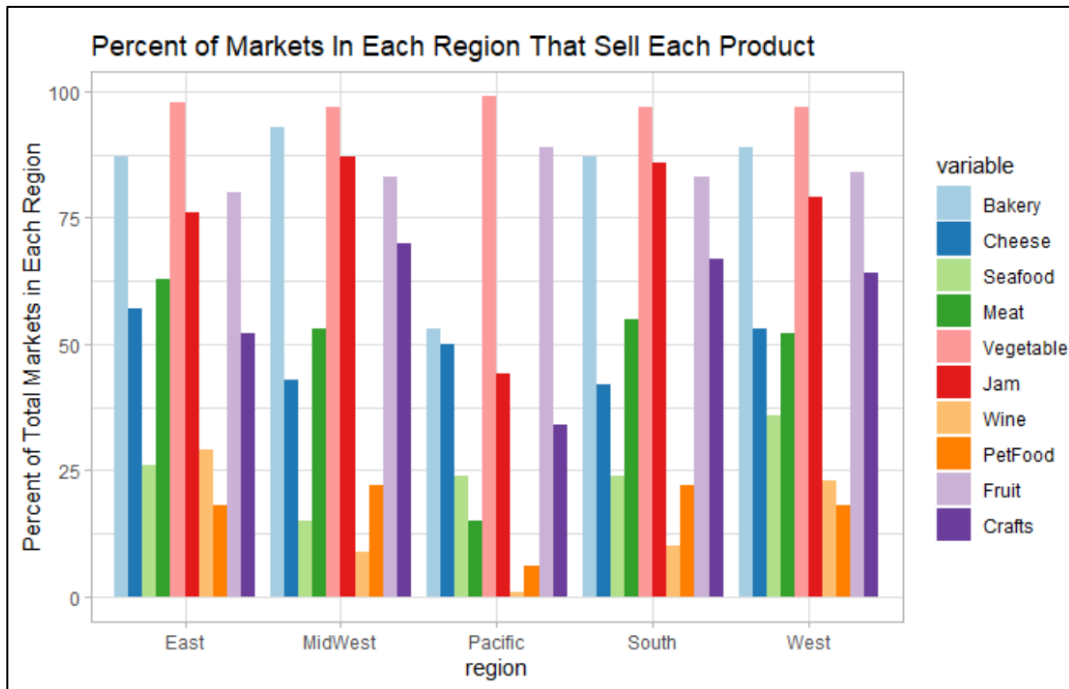**Number of Farmer Markets Selling Each Product**

Comments:
2 types of plots showing total number of markets selling each product. Absolute number is okay when comparing the data for all areas and years together to get a quick view of most popular products at markets all over US.
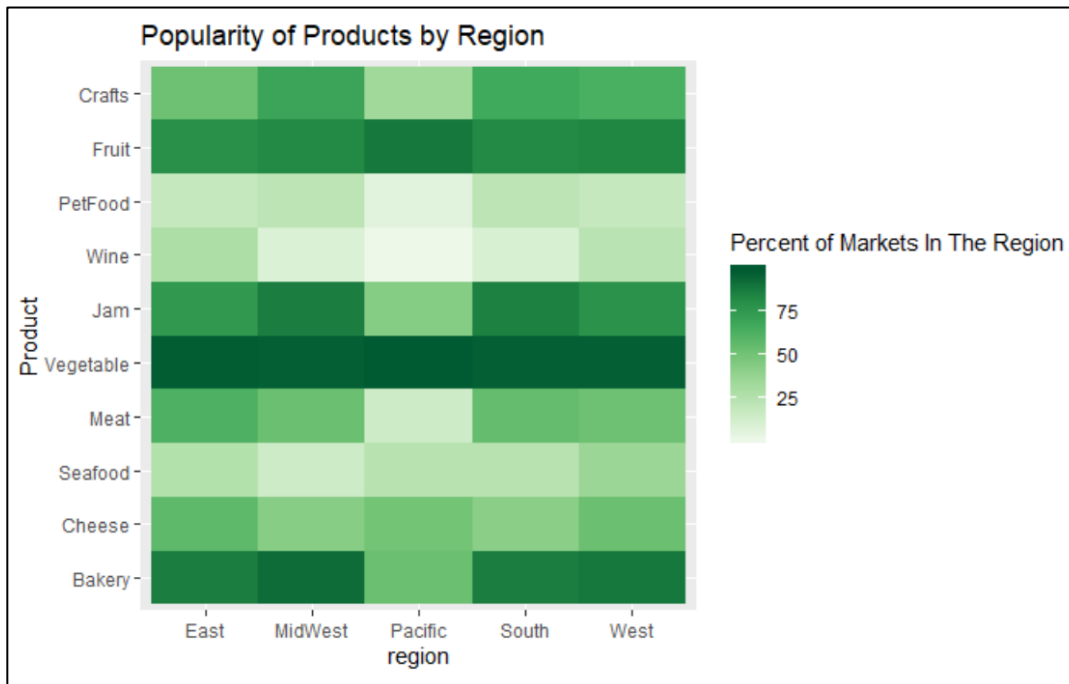
Number of Markets Selling Each Product Type
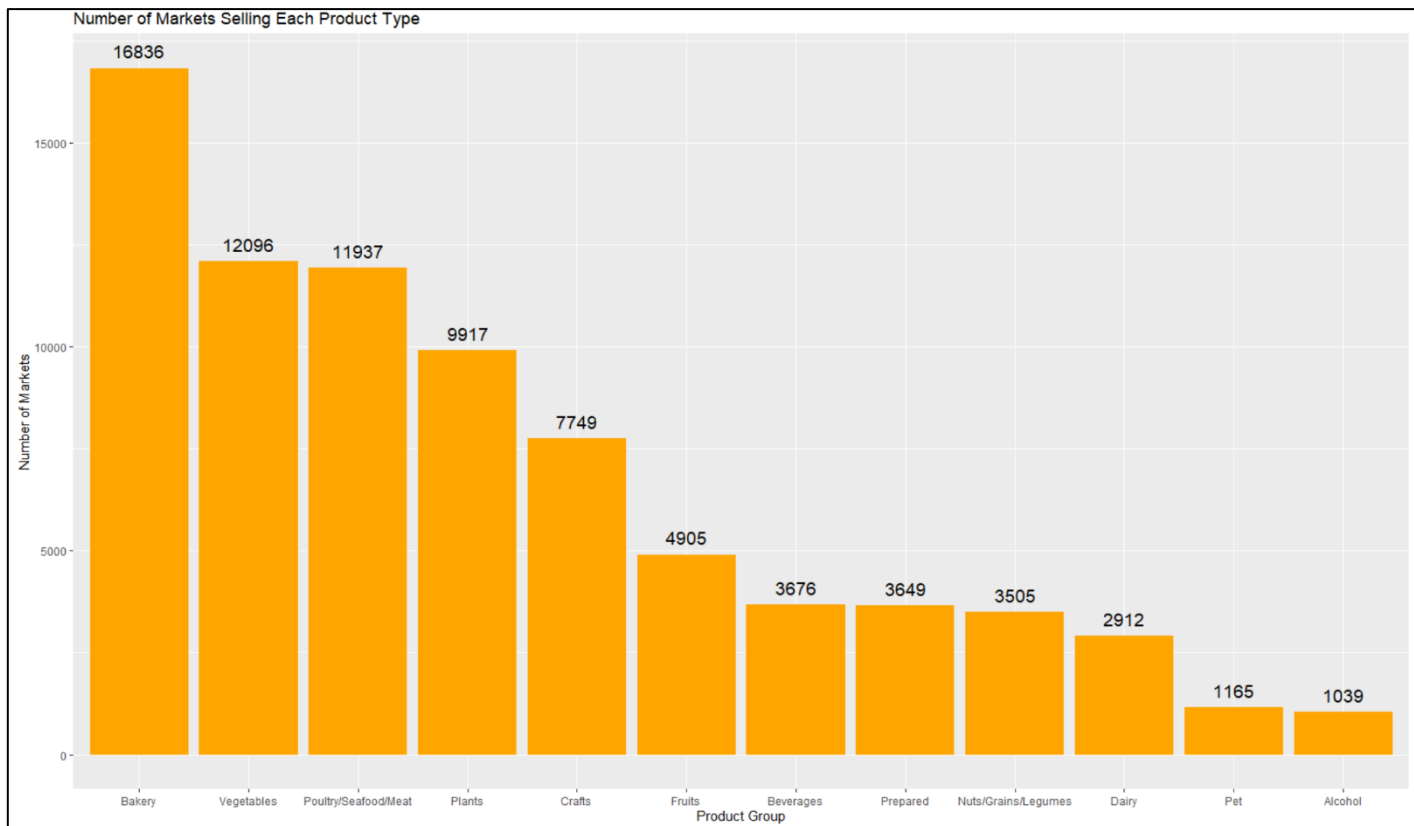
b. Proportion of markets selling each product in each region– taking into consideration each region has a different number of markets
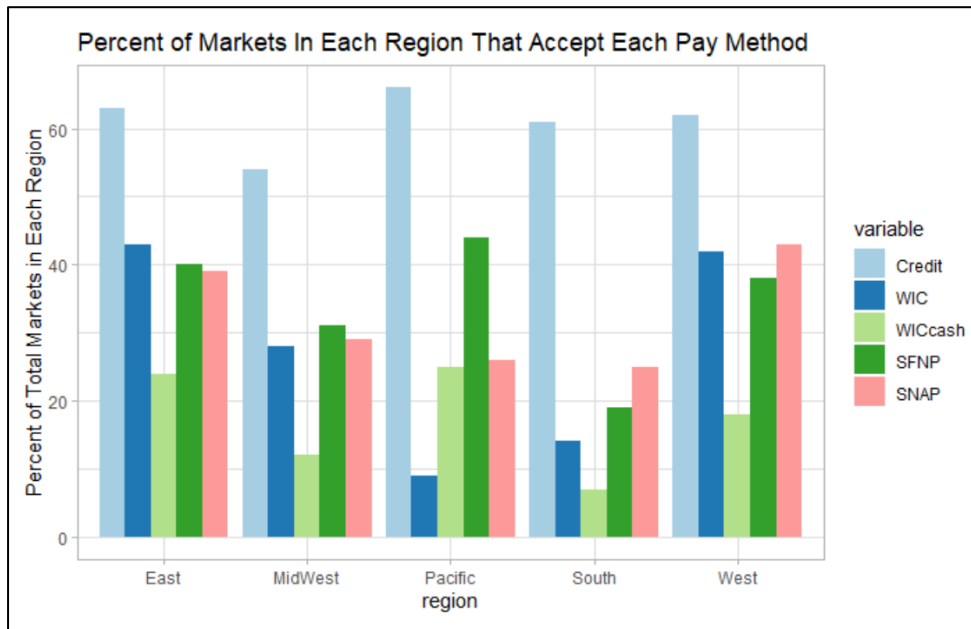

Comments:

Using total number of markets selling each product in an area is not appropriate to compare popularity of each product **between** the areas, since different areas have different number of markets. To properly compare popularity, need to take into consideration the number of markets in each area, and find the proportion of markets in each area selling that product.

Here are 2 graphs types showing the percent of markets in a region that sell each product, so popularity between the regions can be properly compared.
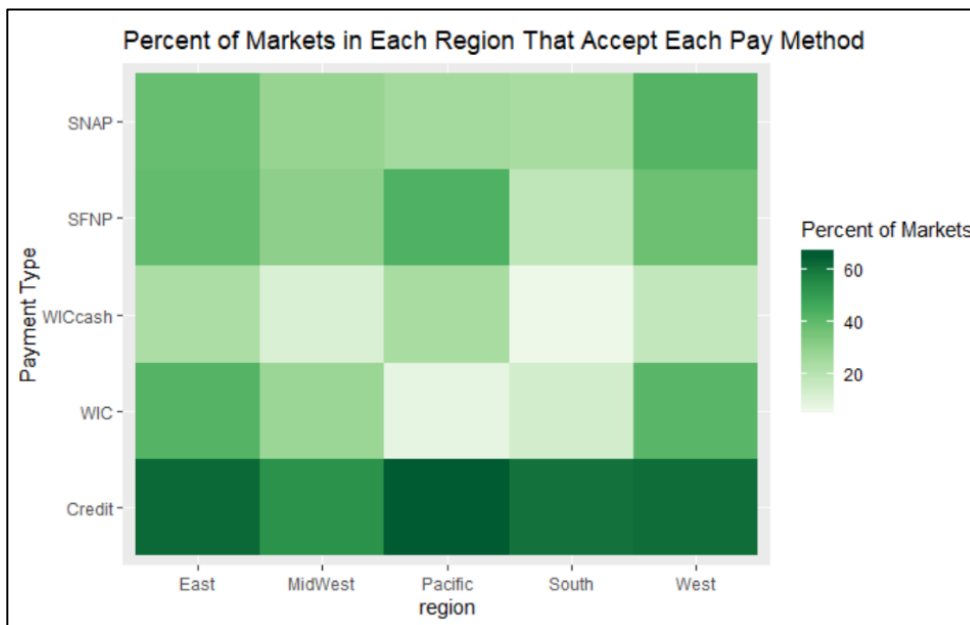
4. Payment
   a. Proportion of markets in each region that have each payment type

Comments:
Similar to product popularity, the payment type popularity also needs to consider that different areas have different number of markets, so need to use the proportion of markets that use each payment instead of absolute number of markets.
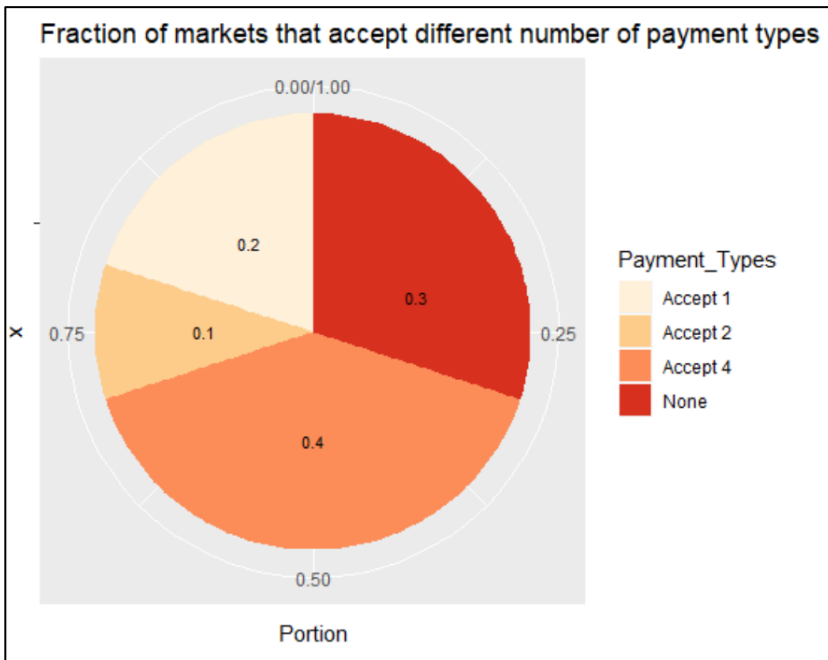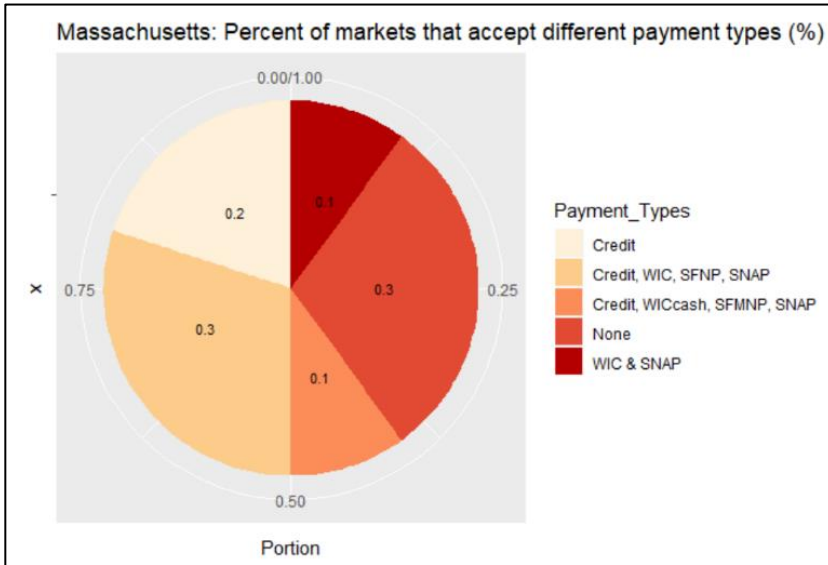
Here are 2 graphs types showing the percent of markets in a region that have each payment type, so popularity can be properly compared.
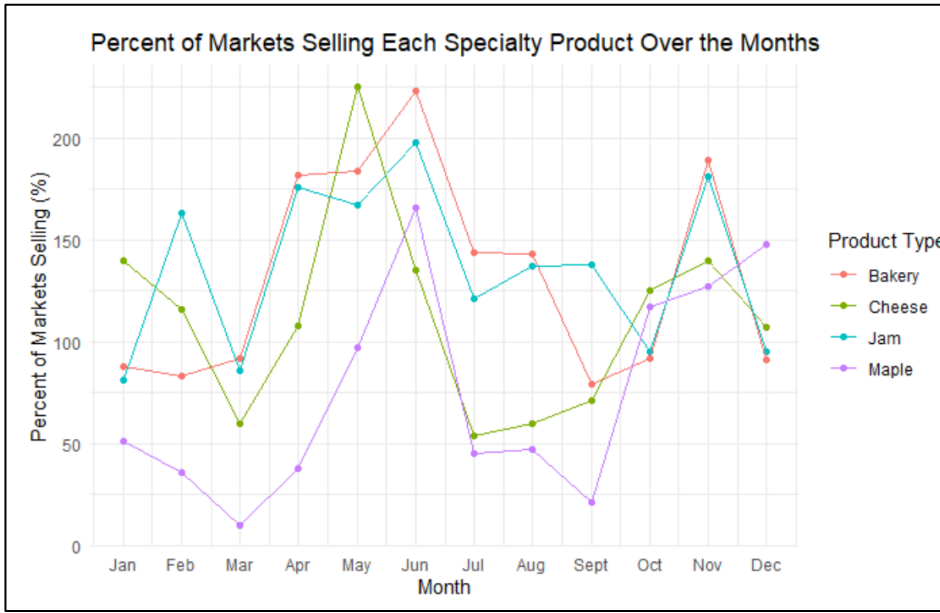
b. What proportion of markets accept different payment methods

Comments:
Since there is an overlap between markets accepting different payment types, it is not correct to count each payment type's proportion distinctly. Instead must find the proportion of the total markets.

Massachusetts: Percent of markets that accept different payment types (%)

Fraction of markets that accept different number of payment types

5. Combined Metrics

Percent of Markets Selling Each Specialty Product Over the Months

Percent of Markets Selling Each Specialty Product Over the Years

Percent of Markets Selling Each Product Over The Years By Region

Comments:
Over the years, the number of markets change, as seen in the time graphs. Therefore, when comparing the popularity of a product over time, it is not appropriate to take the absolute number of markets. Need to find the proportion of markets selling the product to properly gauge popularity over time.

Can further compare the trend of a product over time in each area by isolating the regions and placing the plots of each region in a grid together.