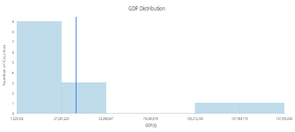
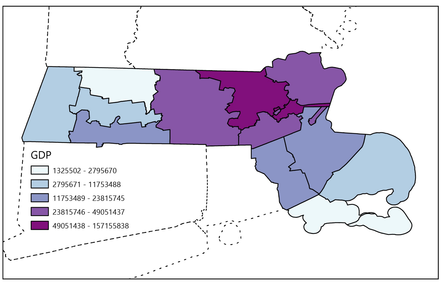
Relationship Between GDP and Potential Relative Variables in Massachusetts.

The Commonwealth of Massachusetts is known for its vibrant economy; and the Gross Domestic Product(GDP) is a primary factor to determine its economic flourish. There are several potential relative factor of GDP awaits for verification: population, employment and employment rate.

GDP Overview:

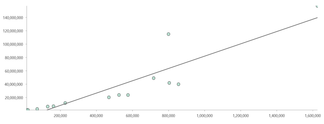


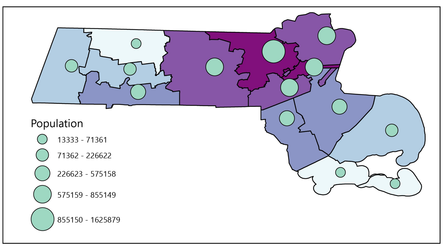
The average GDP is $358,246.26. However the distribution is unbalanced.
Suffolk County and Middlesex County, where Boston metropolitan area located in, recorded much higher GDP value than average level.



Population - GDP Relationship:

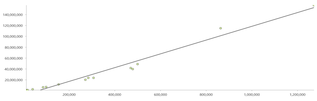
Referring to map, counties with low GDP usually have small population.
The scatterplot model recorded R2 value = 0.81, which indicates a strong positive relationship between population and GDP.

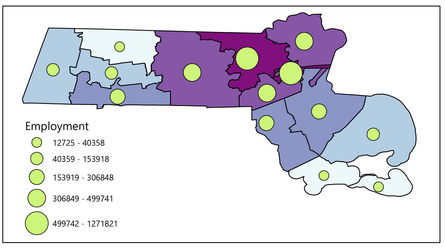




Employment - GDP Relationship:

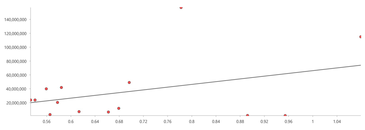
Employment refers to number of jobs. According to the map, Suffolk County and Middlesex County displays higher employment record.
The scatterplot model recorded R2 value = 0.97, which indicates an extreme positive relationship between employment and GDP.

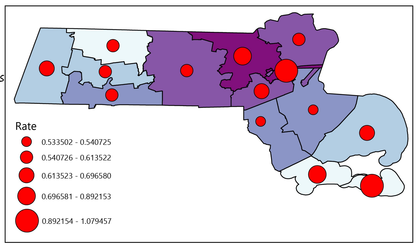




Employment Rate - GDP Relationship:

Employment rate refers to the ratio of employed population among all population. According to map, county with high employment rate are not always have high GDP.
The scatterplot model also records R2 = 0.14. Which indicates employment rate is not a relative factor in this case.





Why Employment Rate Not Fit in This Case?

A possible reason is the significant difference in population. A county with small population and high employment rate is unlikely to have higher GDP compare to another county with much higher population although lower employment rate.

Open Question:
In which scenario, employment rate could become a primary factor of GDP?

According to above analysis, population and employment are proved as primary factors of GDP. Yet the employment rate is not a relative factor in this specific case since significant population difference among counties.

Dataset source: https://www.bea.gov/data/gdp/gdp-county-metro-and-other-areas
Basemap shapefile: https://www.census.gov/cgi-bin/geo/shapefiles/index.php
Note: All data year as of 2019. Map scale 1:2,400,000.
Infographic created by Jianjin Chen, Jun.24, 2023.