Who Donated to Bernie Sanders?

Exploring Determining Factors with Location-based Information

URP4273 Final Project

Group 3

James Reinders, Brandon Escalante, Eduard Tora-Bueno, and Jake de Leon

Background

The Bernie Sanders campaign was a historic one. Millions of contributors collectively donated over two hundred million dollars to his campaign, making it one of the most successful grassroots fundraisers of all time. Using the Bernie Sanders fundraising data, our group set out to explore what factors influenced people to donate.

Study Area

The Bernie Sanders donation data was organized by zip code. Within each zip code, the average donation amount, the number of donations, and the total amount donated were provided. Our study area includes two states: Alabama and Oregon. These states were chosen due to their contrasting political environments. Alabama is historically a conservative state. In the 2016 presidential election, 62.1% of Alabama votes were made to Donald Trump. On the other hand, Oregon has favored the Democrat in every presidential election since 1988. By choosing a republican state and a democratic state, our group was able to explore factors in both political environments.

	Alabama	Oregon
Population (2014)	4.8 million	4.0 million
Area (mi^2)	52,419	98,466
# of Zip Codes	811	481

Sources: United States Census Bureau

Economic Measure

Our group chose two economic indicators to explore the relation between a zip code's economic status and its donation data. Our group reasoned that a zip code's economic status could influence its contributions to Bernie Sanders' campaign in a number of ways. First, a person's willingness to donate could be dependent upon the amount of disposable income they have. Someone who has a low income may want to donate to Bernie Sanders, but does not have the financial means to do so. Alternatively, someone with a high income is more likely to be able to afford a donation. With this logic, our group hypothesized that as a zip code's average income increases, its average donation amount increases at a proportional rate. To measure this, our group created a ratio of average income to average donation. We expected this ratio to be uniform through the zip codes. However, the results

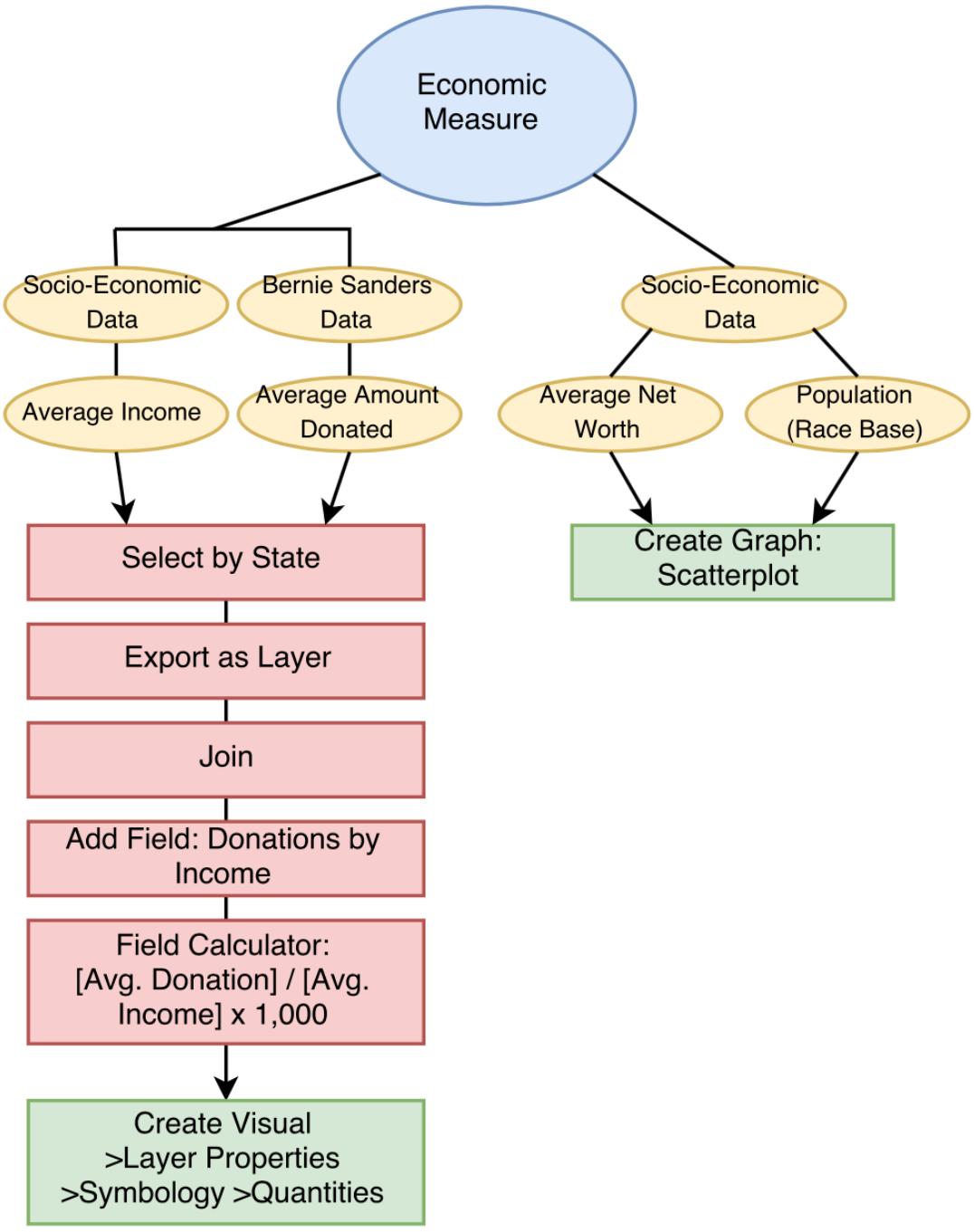
showed that the ratio varied significantly across the states of Alabama and Oregon with no clear pattern. We wondered if a zip codes population was responsible for our results. Zip codes with low populations are more susceptible to skewed data, especially when working with averages. To explore this, we created scatterplots that compared our income/donation ratio to population.

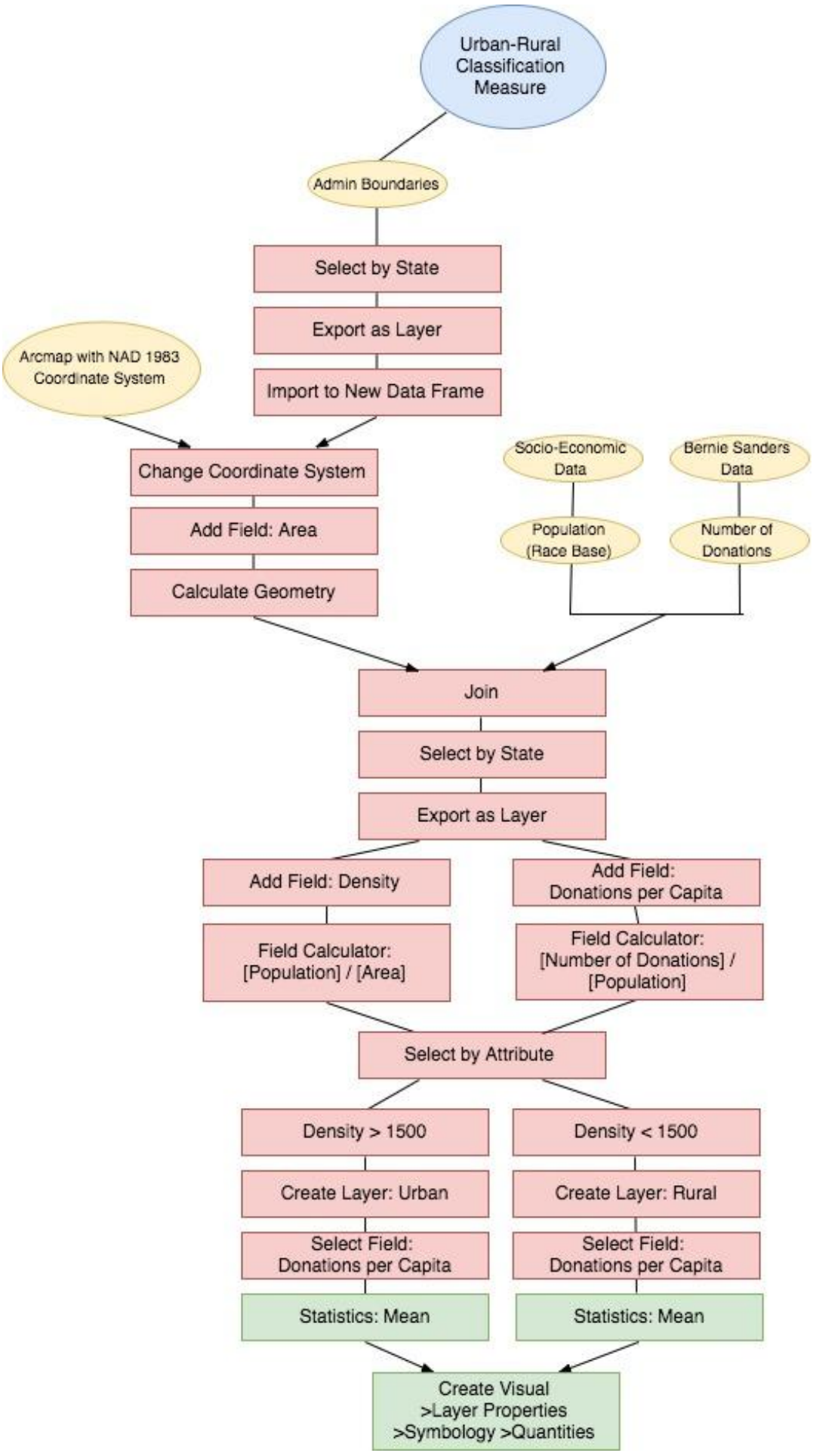
The second economic indicator we chose was average net worth by zip code. Our last hypothesis failed to acknowledge any political factors. Bernie Sanders was a proponent of "Democratic Socialism". He ran a campaign against the extreme upper class and promised benefits to the lower class. Considering this, we hypothesized that there would be a negative correlation between average net worth and average donation size. Our findings for Alabama support this hypothesis. The highest donation size averages are from zip codes with relatively low average net worth, and zip codes with very high net worth do not tend to donate more. The results for Oregon were less conclusive; this could be due to Oregon's democratic preference.

Urban-Rural Classification Measure

Political interests can differ greatly between people living in rural areas to those living in urban areas. The livelihood of rural dwellers is typically agriculturally based. They are typically generalized as conservative and religious. Bernie Sanders may run contrary to their traditional views. For these reasons, we wanted to compare the donation data from urban and rural areas. Our hypothesis was that people living in rural areas are less likely to donate than those loving inside urban areas. Using the Census Bureau-defined urbanized area, which is any block or block group having a population density of at least 1000 people per square mile, we were able to identify and sort the zip codes as either urban or rural. To exclude any economic indicators in this measure, we divided a zip code's number of donations to its population; this quotient equals the number of donations per person. If it is assumed that individuals only donate once, then the quotient also equals the percentage of people that voted in each zip code. This measure is not concerned with how much was donated, just the number of donations. Our team calculated the average number of donations per person among all zip codes in each classification for each state. Our hypothesis was supported by the data; the results showed that zip codes in rural areas on average had a much lower rate of donations per person. We believe this to be a clear indicator of a zip codes support for Bernie Sanders.

Methodology




Urban-Rural Classification Measure
Admin Boundaries
Select by State
Export as Layer
Import to New Data Frame
Arcmap with NAD 1983 Coordinate System
Change Coordinate System
Add Field: Area
Calculate Geometry
Socio-Economic Data
Bernie Sanders Data
Population (Race Base)
Number of Donations
Join
Select by State
Export as Layer
Add Field: Density
Add Field: Donations per Capita
Field Calculator: [Population] / [Area]
Field Calculator: [Number of Donations] / [Population]
Select by Attribute
Density > 1500
Density < 1500
Create Layer: Urban
Create Layer: Rural
Select Field: Donations per Capita
Select Field: Donations per Capita
Statistics: Mean
Statistics: Mean
Create Visual >Layer Properties >Symbology >Quantities

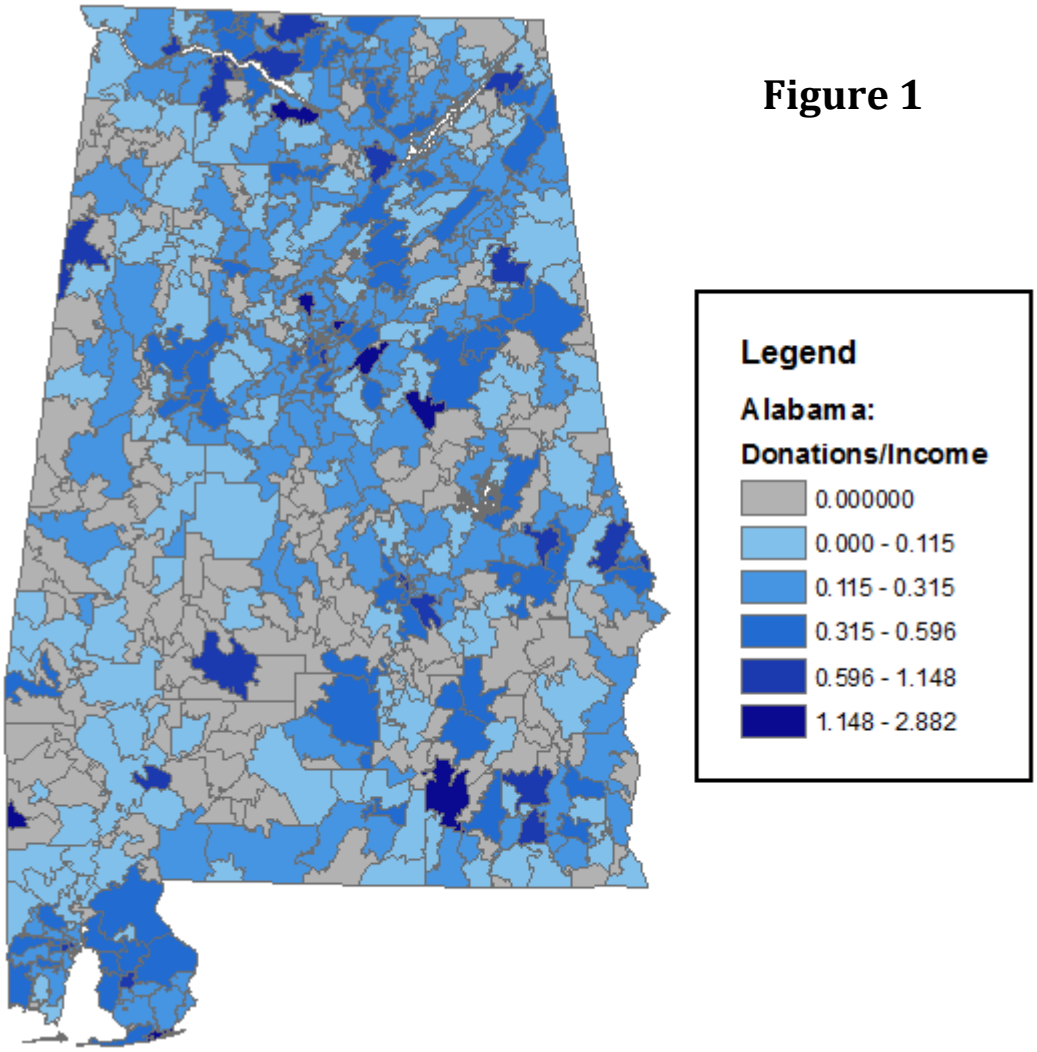


Figure 1: *Average dollars donated per one thousand dollars of average annual income. Ratio varied between $0 and $2.88 throughout the state of Alabama. Results inconclusive.*

Figure 2

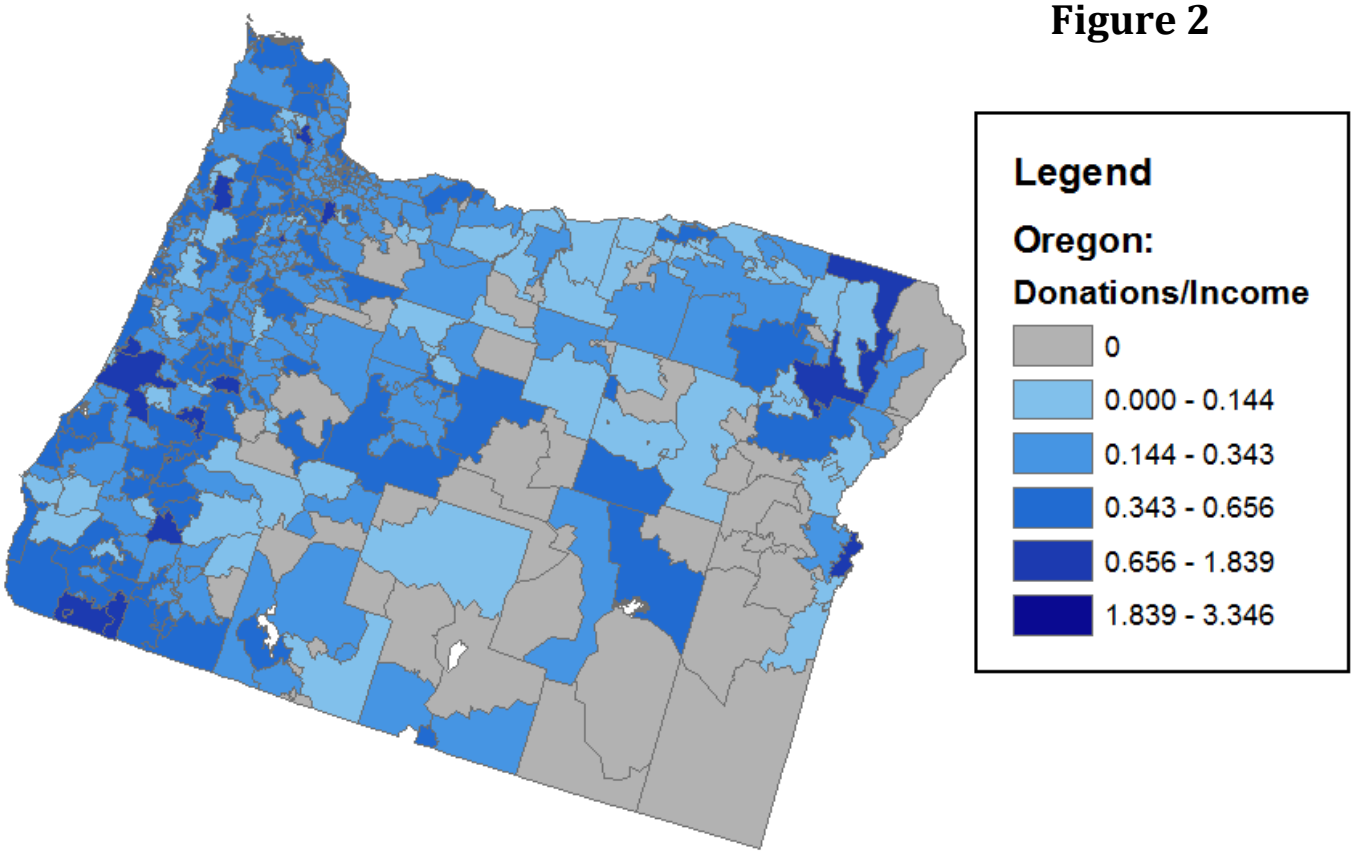


Figure 2: *Average dollars donated per one thousand dollars of average annual income. Ratio varied between $0 and $3.35 throughout the state of Oregon. Results inconclusive.*

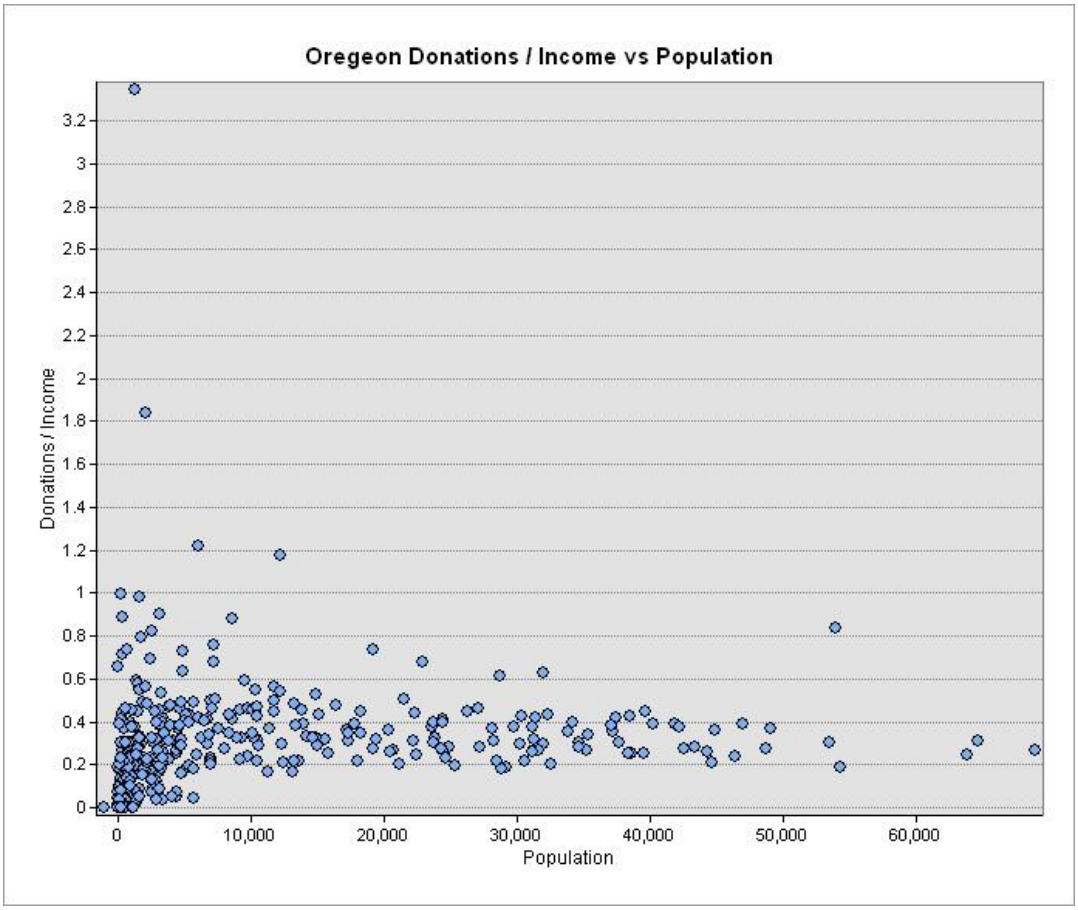


Figure 3: *Donation per income ratio compared to population by zip code for the state of Oregon. The majority of zip codes fell within a standard range between $0.20 and $0.40. Major outliers appeared in zip codes with low populations; zip codes with the 9 highest ratios had populations under 15,000.*

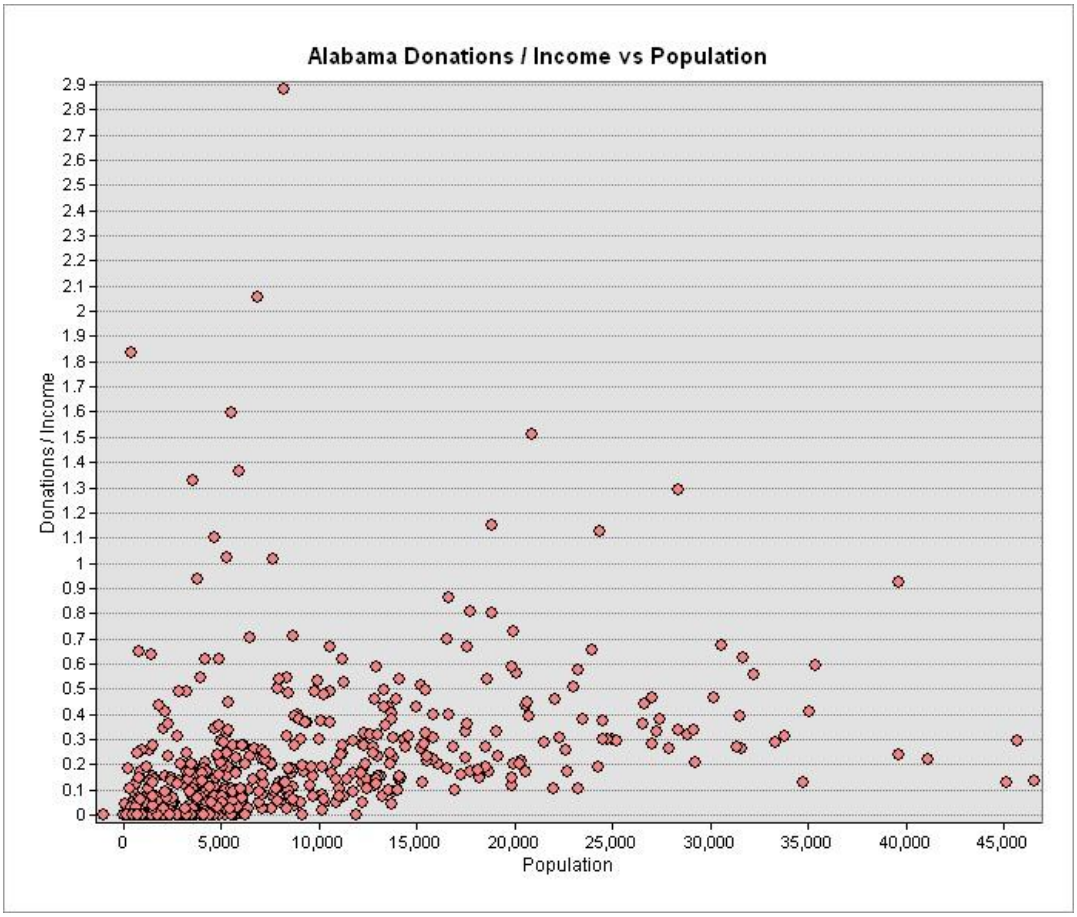


Figure 4: *Donation per income ratio compared to population by zip code for the state of Alabama. Ratios varied significantly regardless of population. Results less conclusive.*

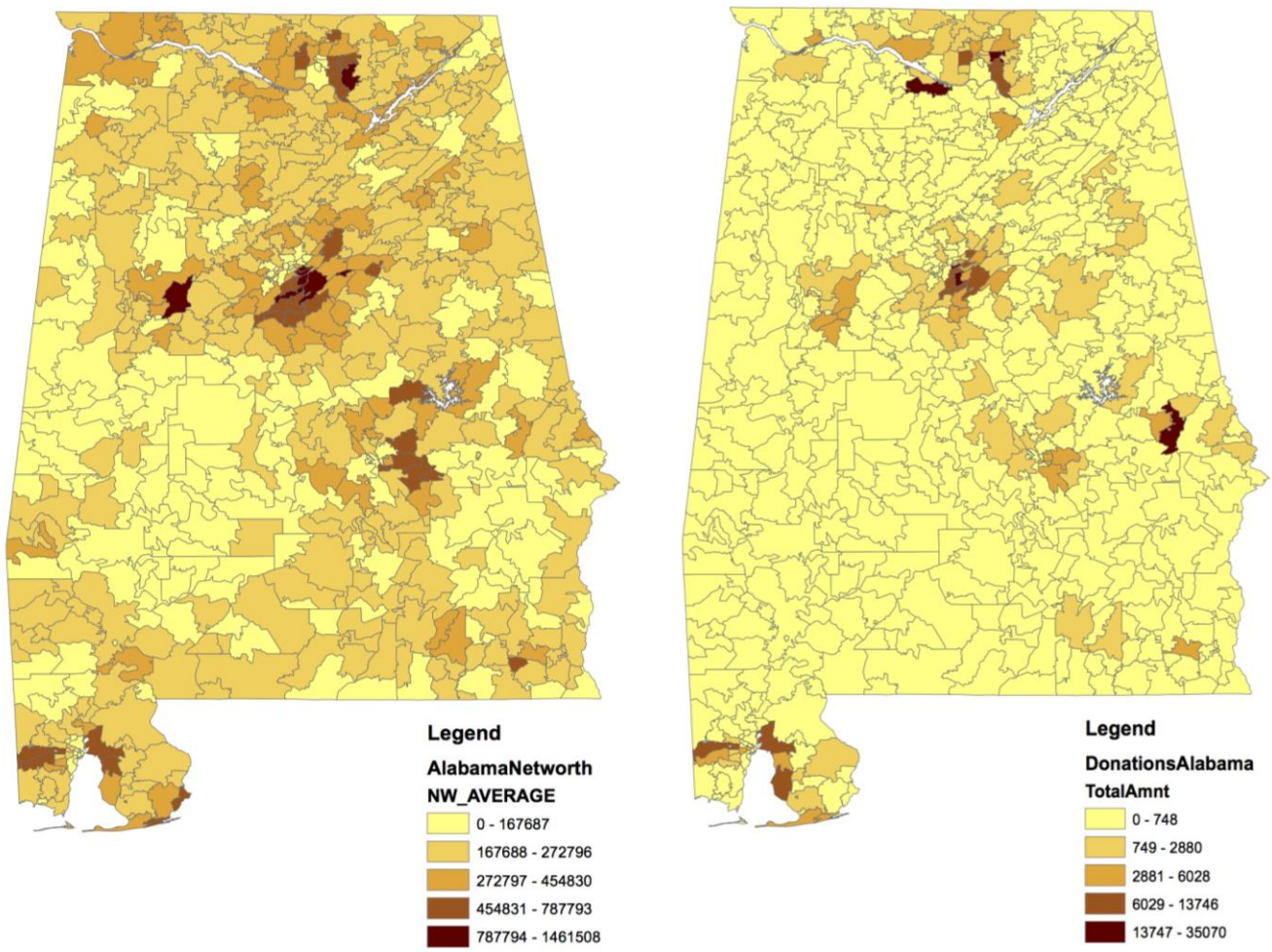


Figure 5: *Preliminary study. Provided a quick comparison between Alabama's average net worth by zip code (left) and each zip codes total donation amount (right). The comparison seems to reveal a positive correlation between the two variables; the zip codes with the highest average net worth donated the most.*

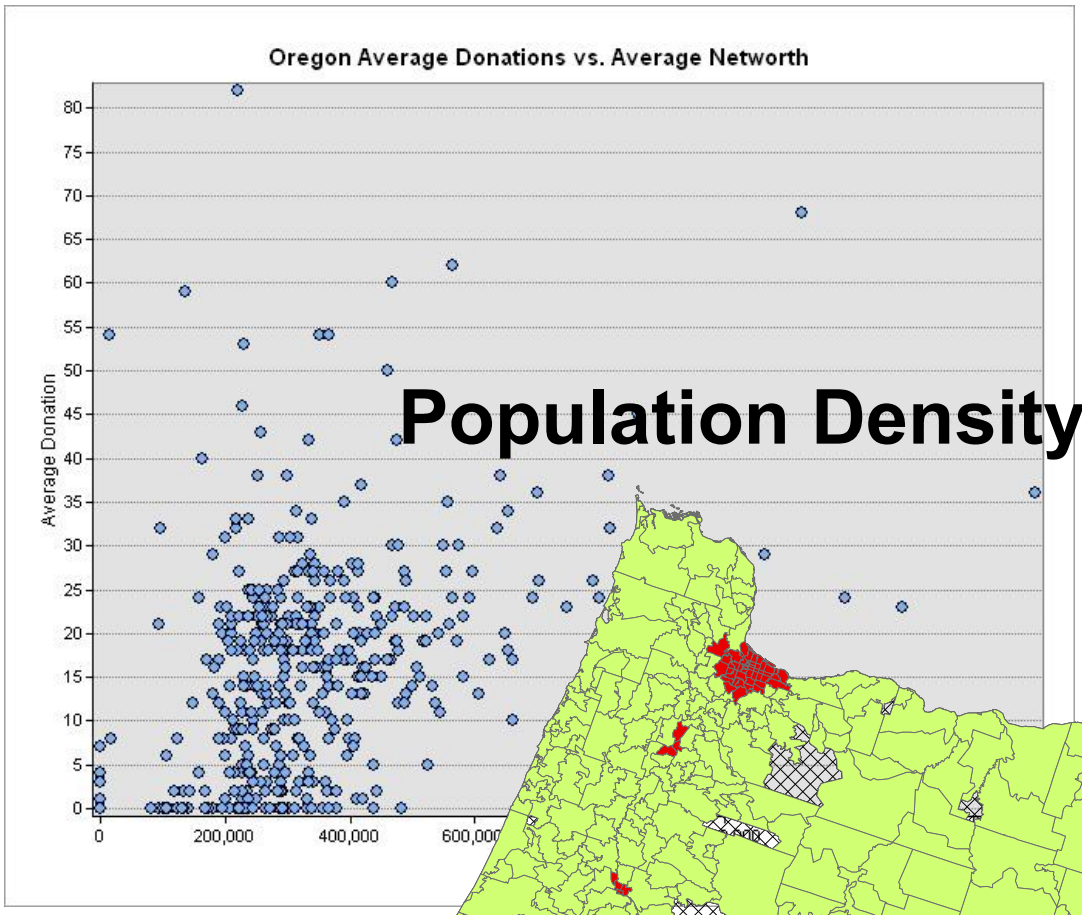
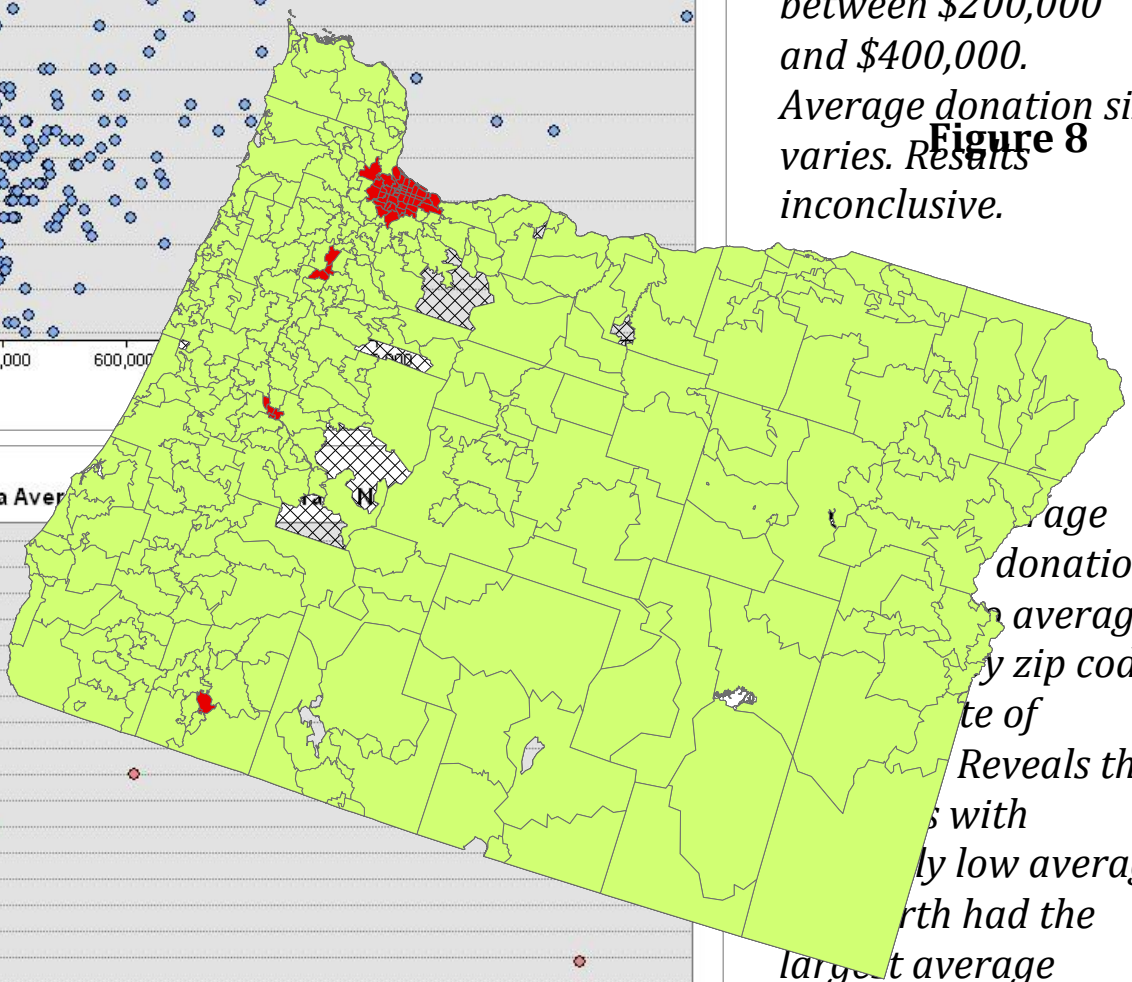


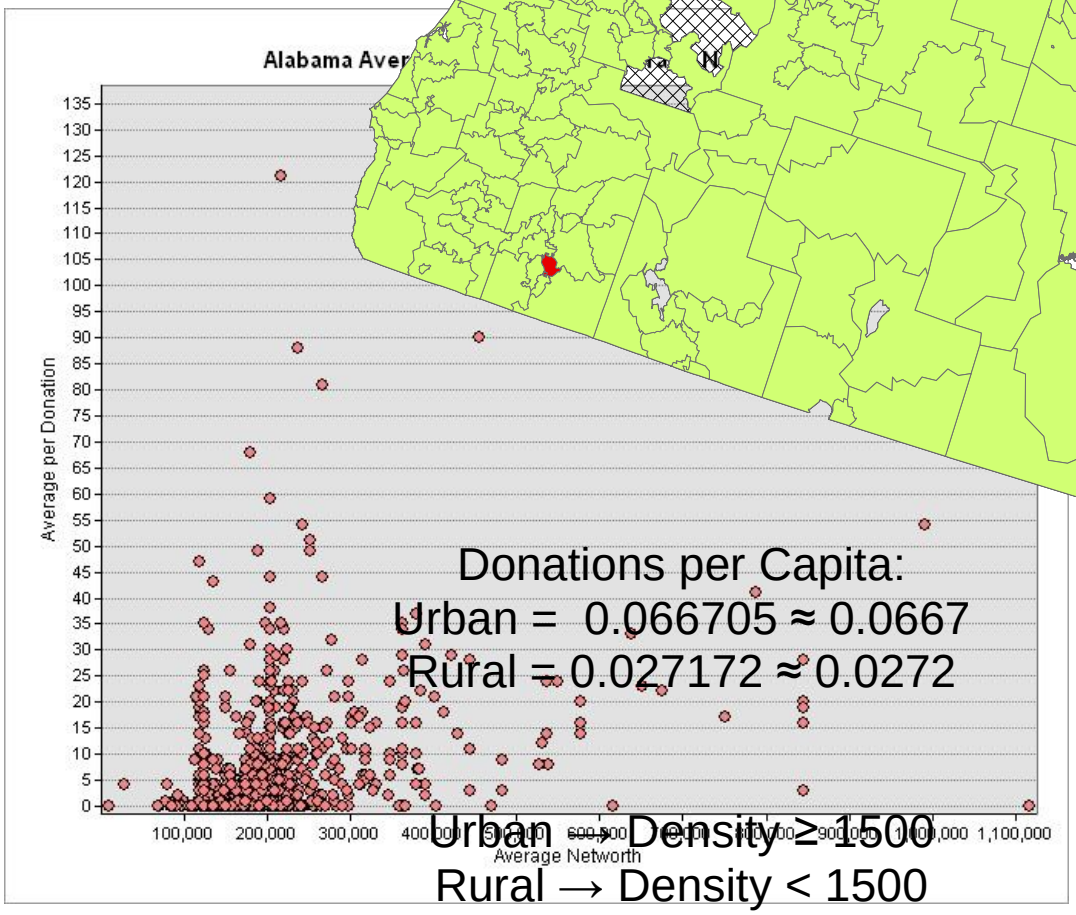
Figure 6: *Average amount per donation compared to average net worth by zip code for the state of Oregon. The majority of zip codes have an average net worth between $200,000 and $400,000. Average donation size varies. Results inconclusive.*

Urban, Rural Visuals & Calculations

Population Density of Oregon

Figure 8





donation average zip code te of Reveals that s with ly low average rth had the larg t average donations. Supports hypothesis that the lower-middle class were dedicated contri s to Bernie Sanders

Donations per Capita:
Urban = 0.066705 ≈ 0.0667
Rural = 0.027172 ≈ 0.0272

Urban → Density ≥ 1500
Rural → Density < 1500

(Density = People per 1000 acres)

Legend
- Rural
- Urban
- No Data

Population Density of Alabama

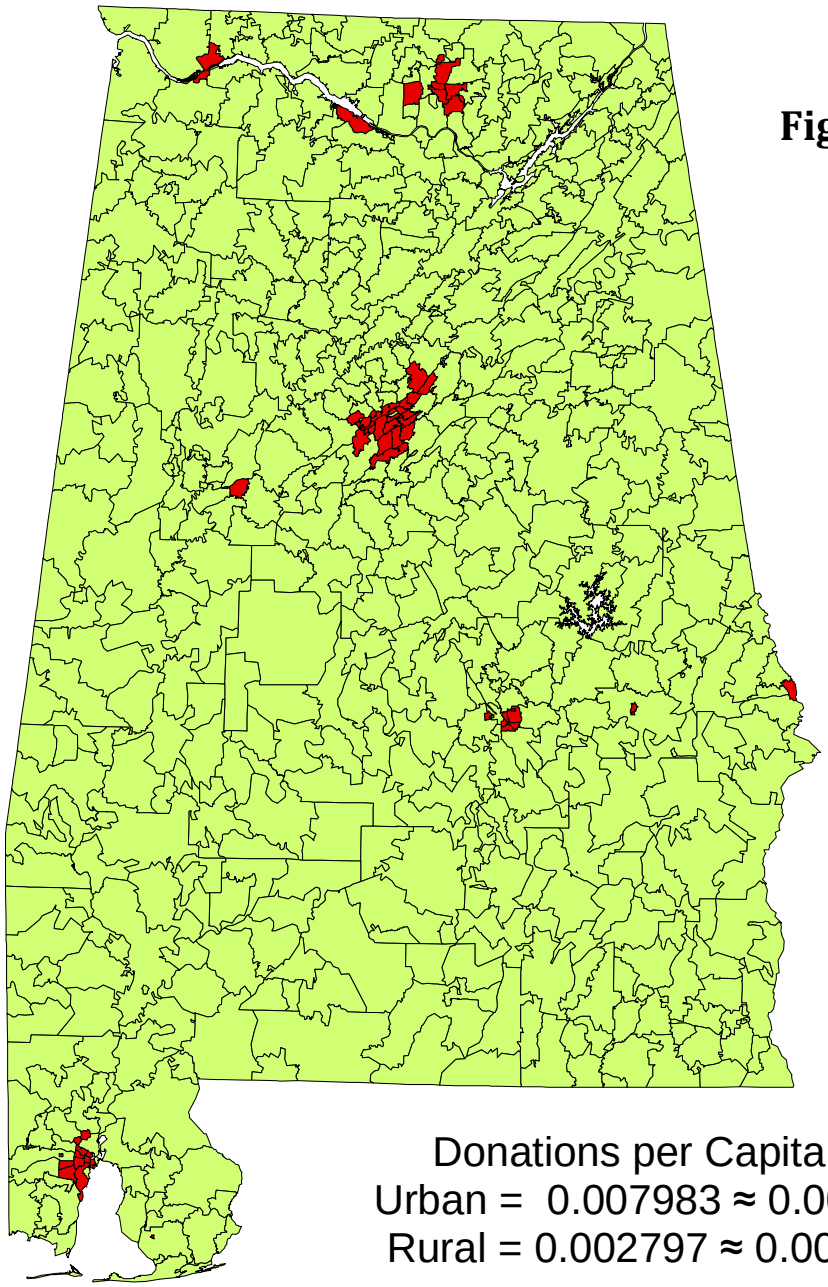


Figure 9

Donations per Capita:
Urban = 0.007983 ≈ 0.0080
Rural = 0.002797 ≈ 0.0028

Legend

Rural

Urban

Urban → Density ≥ 1500
Rural → Density < 1500

(Density = People per 1000 acres)

Conclusion

Our hypothesis for our economic measure was that as the average income for a zip code increases, there will be a proportional increase in the average donation. Our data did not fully support this hypothesis; there wasn't a uniform ratio achieved by most zip codes. However, Figure 3 does reveal a rather consistent ratio range that captures most data points. In figures 1 & 2, a uniform color range was desired, that would mean the ratio of average donation size to average income is equivalent throughout all of the zip codes. From the wide range of values our ratios generated, we concluded that average donation size is not proportional to average income.
Our other hypothesis concerning our economic measure involved the average net worth of a zip code and the average donation size. We predicted that as the average net worth increased, the average donation size would decrease, making them inversely proportional. Our results were varied as can be seen in figures 6 & 7. Our group limited our understanding of our scatterplots by failing to include a line of best fit and measuring the R-squared value.
The best indicator of Bernie Sanders contributions is whether a zip code is rural or urban. Our group was pleased with the clear results and our supported hypothesis. In both states, urban zip codes had nearly three times more donations per person than their rural counterparts.