Governance Analytics Final Project: Researching the Possible Connection of District Revenues and Graduation Rates

Alex Woodward

3/16/2018

Governance Analytics - Professor Magallanes

Executive Summary:

For the purpose of this paper, I aim to determine if revenue sources, particularly local revenue sources, have a sizable effect on district graduation rates. Washington State School districts often struggle to acquire revenue sources that are large enough to provide the teacher salaries and quality of education needed throughout the state. Many districts rely on local levies to fund expenses. These levies can be difficult to pass and have expiration dates. While school districts receive revenues from both the State and Federal Governments, I aim to answer the question of how much of a difference local revenue sources have on the success of students. If local revenue sources are shown to have a large effect on success, additional data may prove useful in attempting to develop more permanent local revenue sources for public education.

Through my analysis, I hope to determine if there is a connection between Washington State School District graduation rates, school district revenue from state sources, school district revenue from local sources, and total school district revenue. Using statistical analysis through R, I will determine if there is a correlation between the aforementioned variables and will assess which school districts in Washington State have the highest rates of graduation. My analysis focuses on public school enrollment.

Getting the Data

For this research, I look at three forms of revenue: state, local and total revenue sources. The revenue information for this revenue source was taken from the US Census Annual Survey data. This survey was the 2015 Annual Survey of School System Finances, authorized by law under Title 13, United States Code, Sections 161 and 182. The most recent year available was 2015. The files were available in .cvs format.

I also used information from the April 2015 Graduation and Dropout Statistics Annual Report from the Washington State Office of Superintendent of Public Instruction in order to determine district level graduation rates.

Lastly, I used the 2015-2016 Enrollment rates from the Washington State Office of Superintendent of Public Instruction.

Here are descriptive statistics for graduation rate:

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.    NA's
##   38.89   81.08   86.54   85.46   92.03  100.00      18
```

And now for Local Revenue:

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##      74    1541    3850   16428   16189  169681
```

State Revenue:

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##     504    4841   12090   32659   36285  263848
```

And finally, Total Revenue:

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##    1694    7496   17644   52931   53008  415924
```

Next a look at some statistical information for Local Revene:

Standard deviation:

```
## [1] 29593.47
```

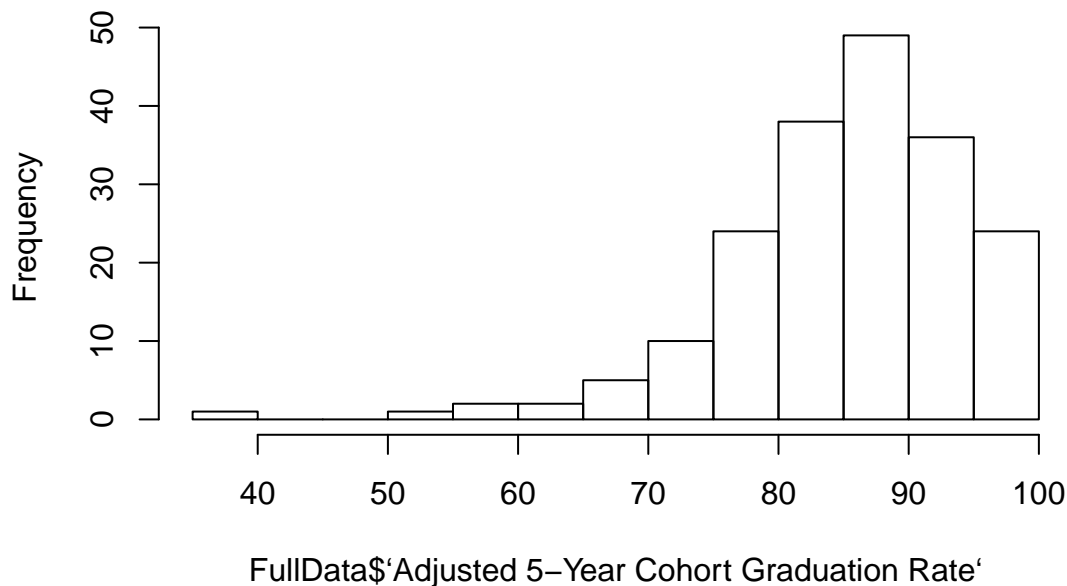Coefficient of Variation

```
## [1] 1.801435
```

Skewness

```
## [1] 2.913057
```

Kurtosis

```
## [1] 9.055112
```

Now let's look for a possible correlation.

Histogram of FullData$'Adjusted 5-Year Cohort Graduation Rat

FullData$'Adjusted 5-Year Cohort Graduation Rate'

```
## [1] "Pearson: NA  - Is significative? NA"
## [1] "Pearson: -0.0304517916739964  - Is significative? FALSE"
## [1] "Pearson: -0.980426774306284  - Is significative? TRUE"
```

```
##                      Year Total Revenue Cohort dropout rate
## Year                    1            NA                  NA
## Total Revenue          NA             1                  NA
## Cohort dropout rate    NA            NA                   1
```

Let's run a linear regression to see if there are any correlations. We see a correlation between Local Revenue and Graduation Rate is true.

```
##                     Coefficient Significant
## (Intercept)       86.1761797589        TRUE
## `Total Revenue`   -0.0003387524       FALSE
## `State Revenue`    0.0003605731       FALSE
## `Local Revenue`    0.0005006454        TRUE
## `K-12 Total`       -0.0006479249       FALSE

## [1] 0.0564482
```
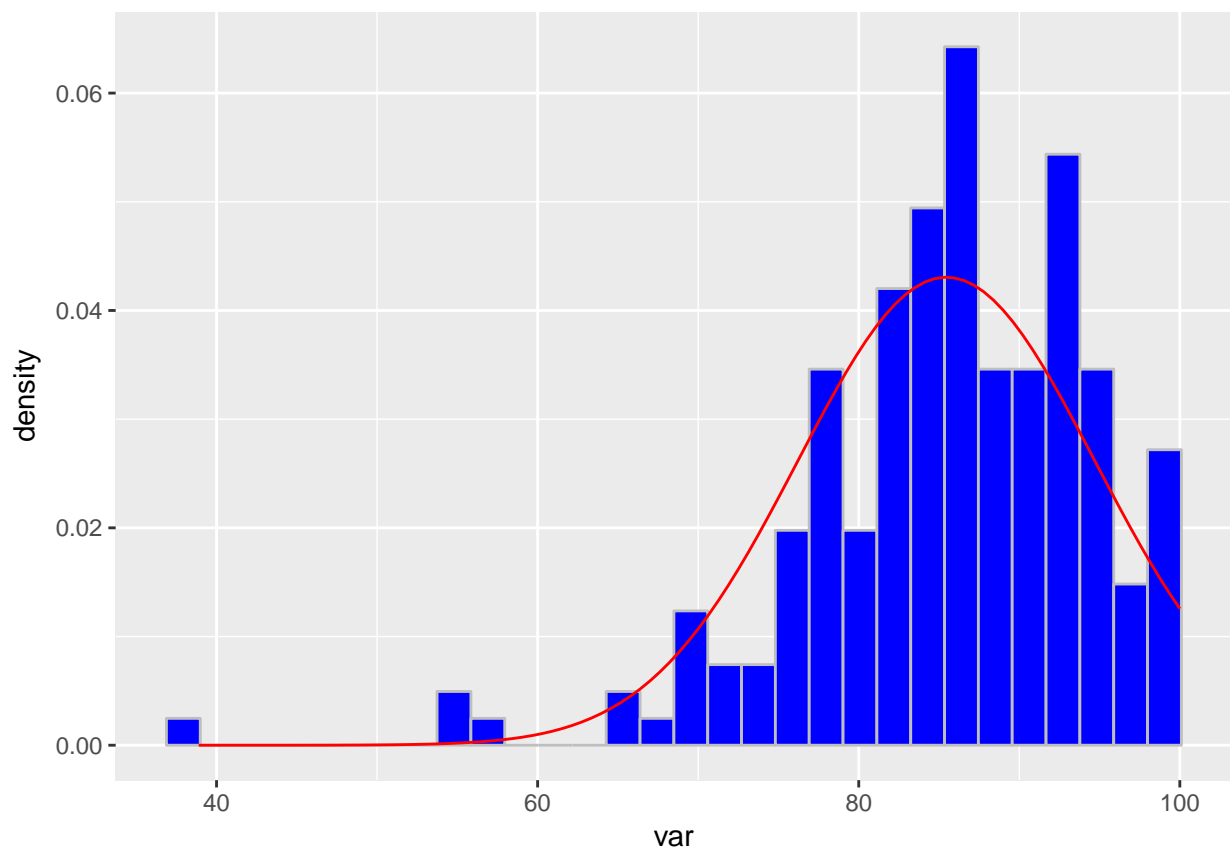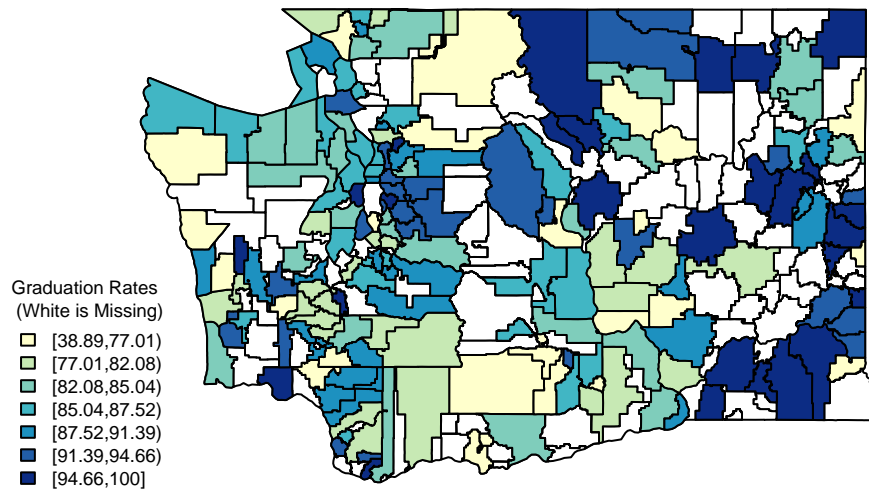
Next look at scatter plots of the data.
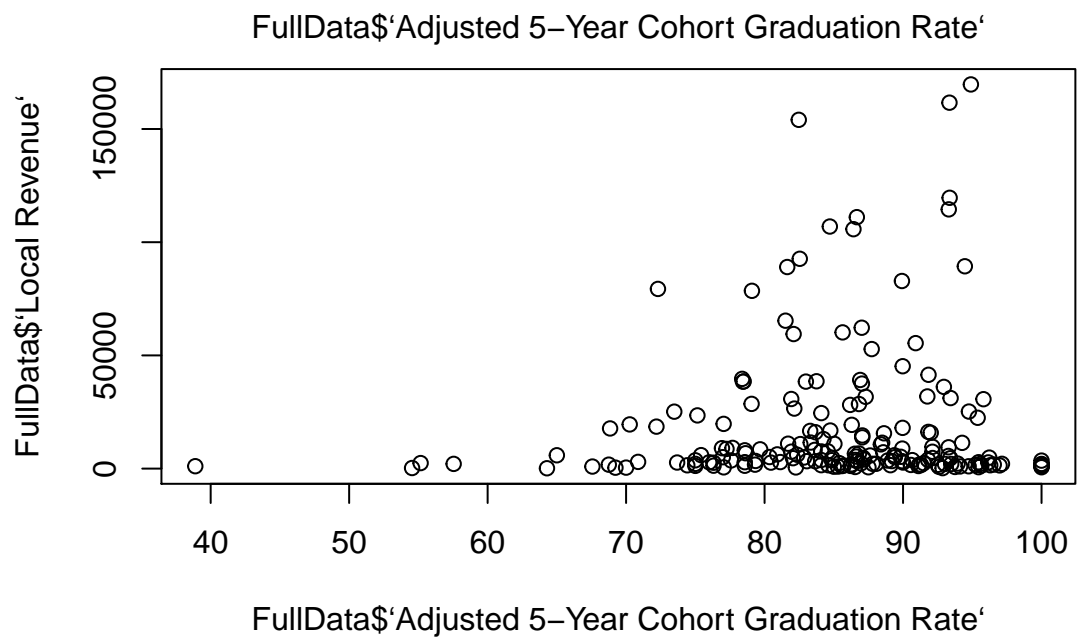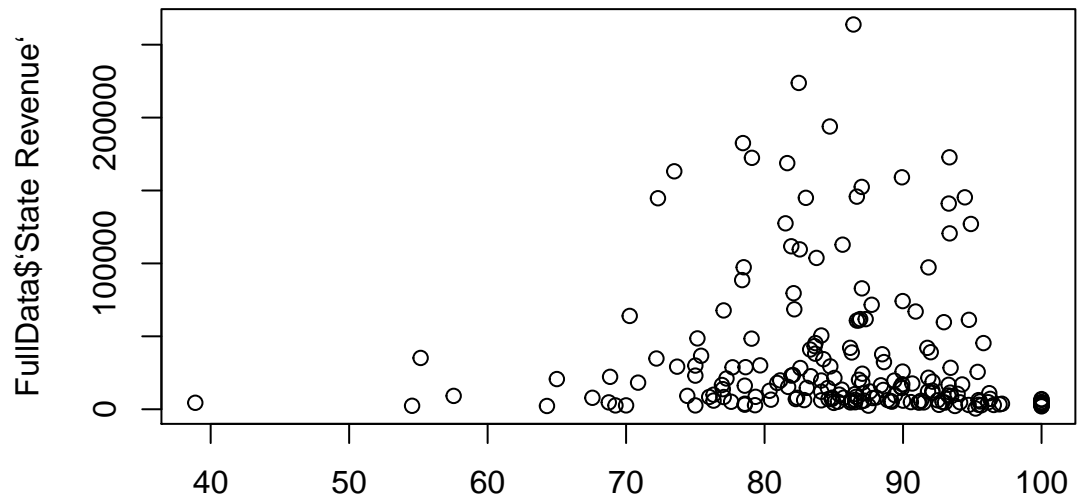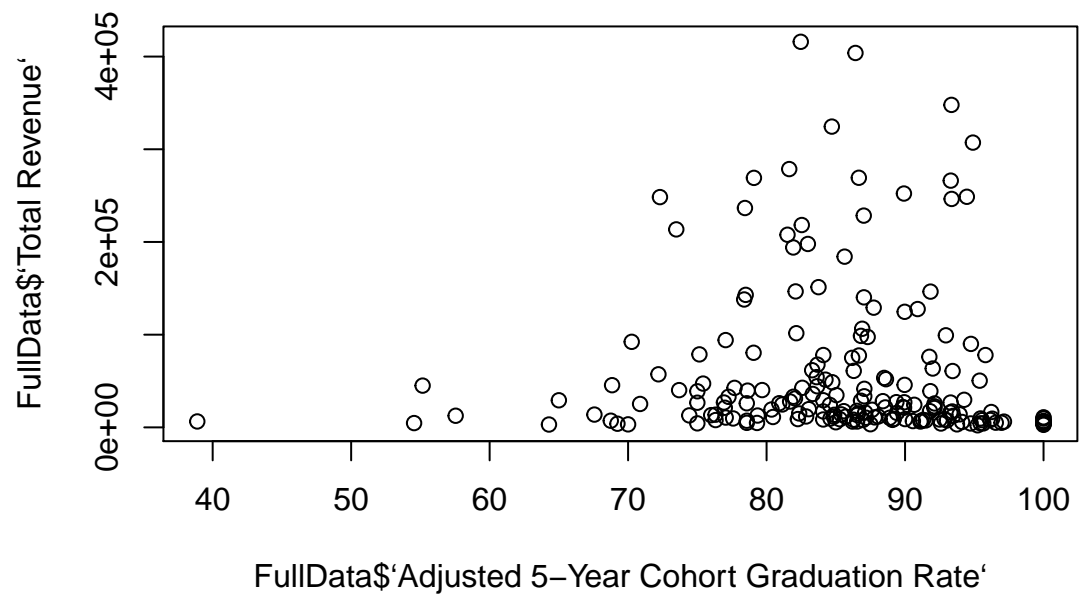
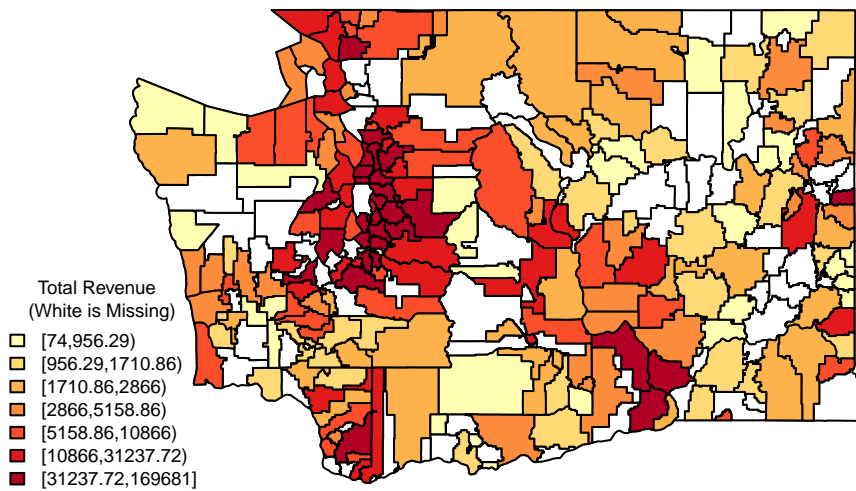Now plot a histogram of Graduation Rates.

I want to use a map to visualize the district graduation rates and revenue levels.

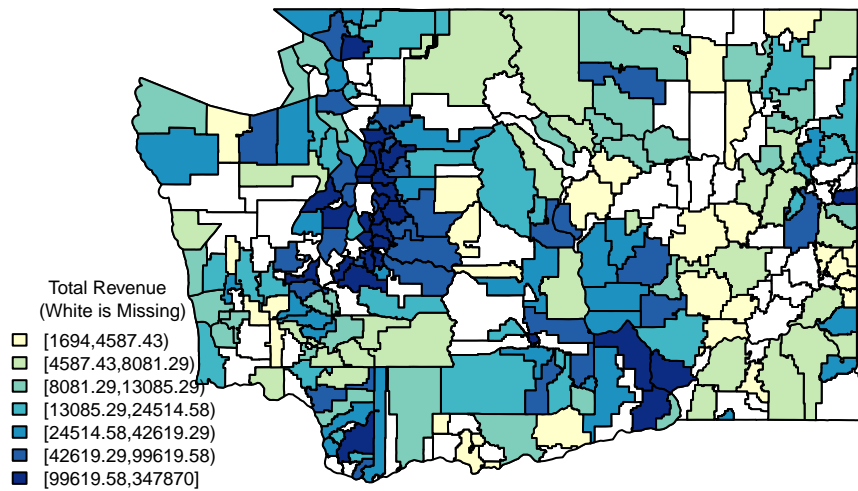# Graduation Rates Via School District in Washington State 2015

**Graduation Rates
(White is Missing)**
- [38.89,77.01)
- [77.01,82.08)
- [82.08,85.04)
- [85.04,87.52)
- [87.52,91.39)
- [91.39,94.66)
- [94.66,100]

Now I want to see a map of Local Revenue.

Local Revenue Via School District in Washington State 2015

**Total Revenue
(White is Missing)**
- [74,956.29)
- [956.29,1710.86)
- [1710.86,2866)
- [2866,5158.86)
- [5158.86,10866)
- [10866,31237.72)
- [31237.72,169681]

Lastly, I wanted to see a map of Total Revenue.

Total Revenue Via School District in Washington State 2015

Total Revenue
(White is Missing)
- [1694,4587.43)
- [4587.43,8081.29)
- [8081.29,13085.29)
- [13085.29,24514.58)
- [24514.58,42619.29)
- [42619.29,99619.58)
- [99619.58,347870]

While this analysis has given us some insight as to whether there is a connection between revenue sources and graduation rates, the next step would be to determine possible correlations between graduation rates and other variables. Some of these variables may include: school size, town income levels, family status, gender, etc. It would be interesting to see what other elements may be effecting graduation rates.