

Project 1- FBI Gun Data

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Cleaning Data - FBI Gun Data

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FWD Advanced Data Analysis nanodegree program

Abstract

FBI Gun Data has 2 files: [gun_data.xlsx](#) and [US.Census Data.csv](#)

Cleaning Data - FBI Gun Data

Analyzed FBI Gun Data. Did Data cleaning on the two files and chose the columns to work with from both data sheets. Analysis focused on 2016 as US Census data population includes data from 2010, and 2016. Determined capita per year, states with highest gun counts in 2017, 2016, 2015, and 2010. Showed the total gun trends in the mentioned states vs months-years.

Cleaning Data - FBI Gun Data

- 1- Cleaned the data removing the notes at the end of the csv file. Rows with index above index 65 were removed.
- 2- Replaced ['-', 'D', 'F', 'FN', 'NA', 'S', 'X', 'Z'] in df to prepare for next steps of cleaning data
- 3- Checked the data type of all columns of df_census "U.S. Census Data.csv" and df_fun from "gun_data"
- 4- Created functions to convert string columns to int and float.
- 5- The created function removed the \$, and % signs
- 5- Double checked if Data has an NA values.
- 6- Chose the rows / columns to include in my analysis.
- 7- change the column names in us_census data and gun data e.g state on both sheets are in lower case to merge easily.
- 8- Removed 5 colonies from gun data as it's not represented in US Census data

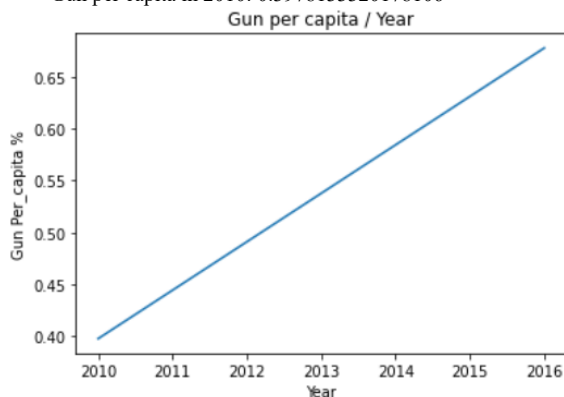
Questions to be answered:

- 1- What census data is most associated with high gun per capita?
- 2- Which states have had the highest growth in gun across 2010,2015,2016,2017?
- 3- What is the overall trend of gun purchases in the states mentioned in point 2?
- 4- Is there a relation between demographics (race/gender) and high total guns?

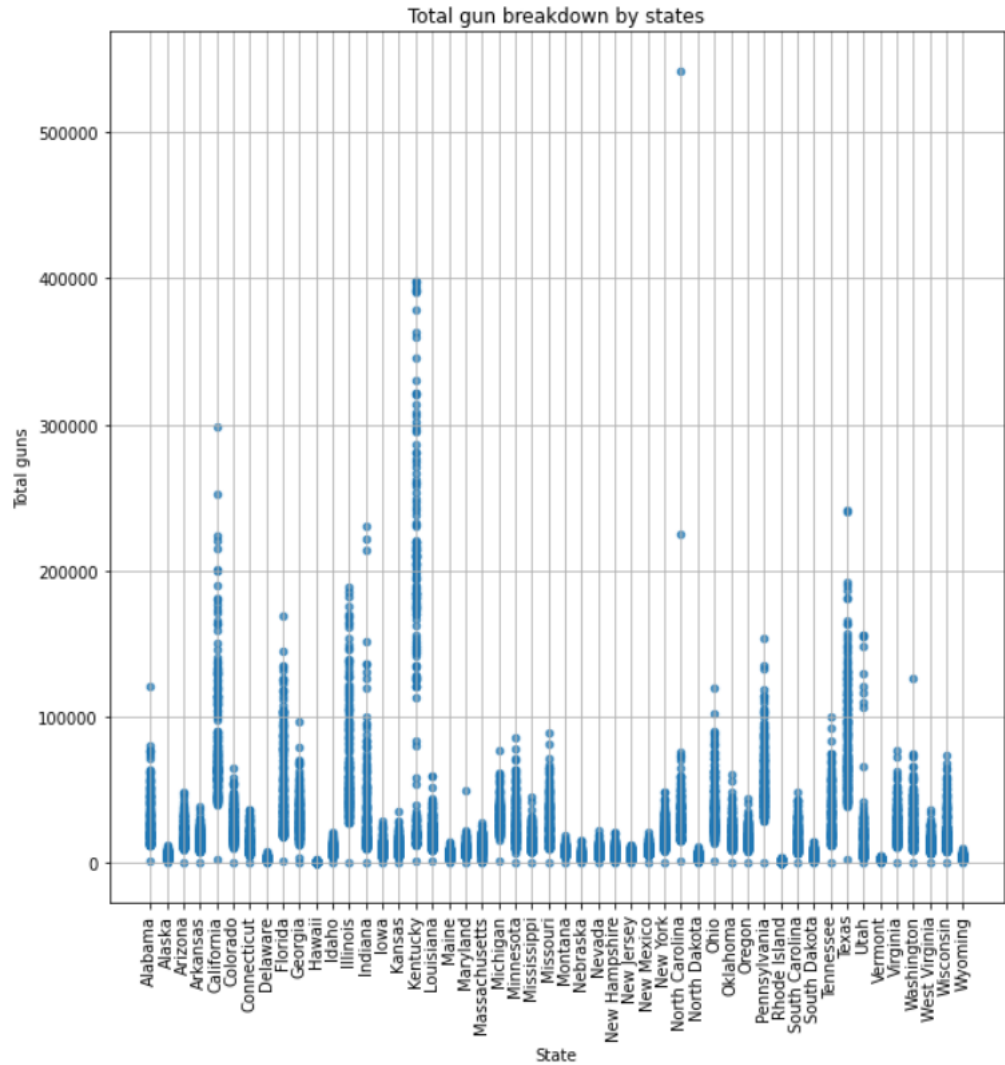
Answering questions:

1. Gun per capita:

- Gun per capita in 2016: 0.677793390263384
- Gun per capita in 2010: 0.3978133320178106



2. Scatter plot to show trends of total guns per states:



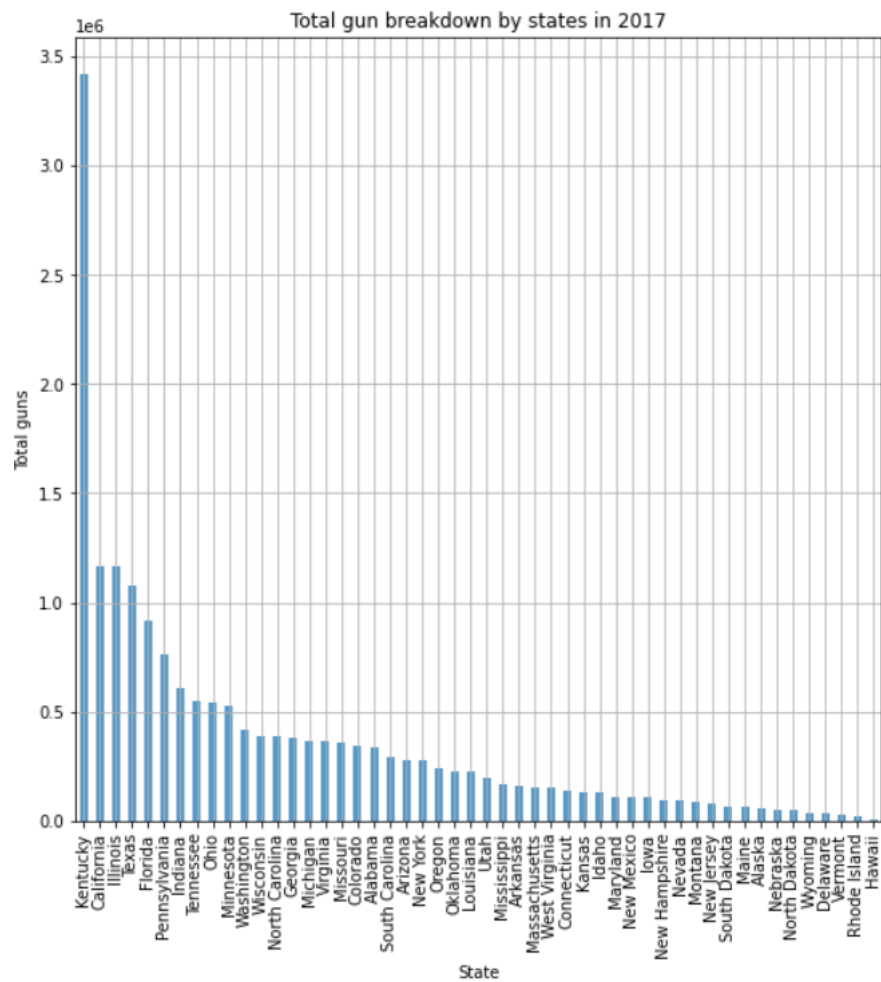
States with the top count of total guns in one month: 'North Carolina','Kentucky', 'California', 'Texas' 'Indiana'

	state	month	Total Guns
0	North Carolina	2014-03	541978
1	Kentucky	2017-09	398706
2	Kentucky	2017-03	397959
3	Kentucky	2016-12	397059
4	Kentucky	2017-08	394718

3. Following trends in 2010-2017:

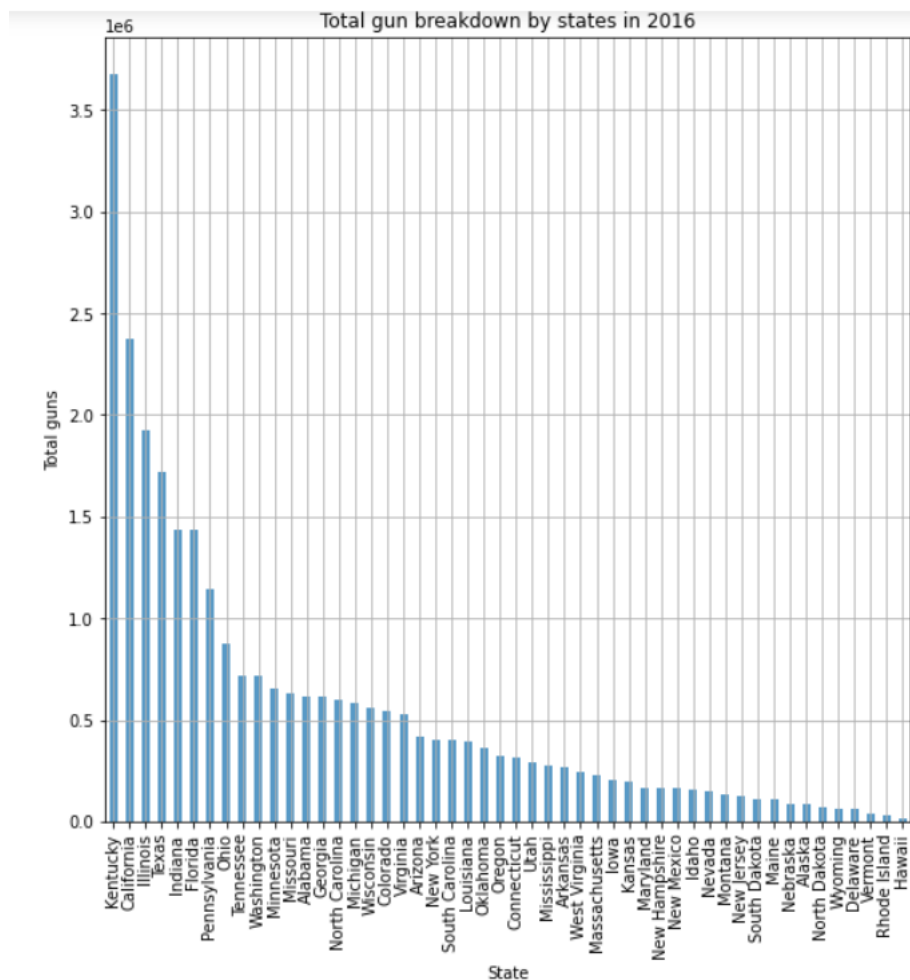
Note: Based on the data Kentucky, California, Illinois, and Texas are from the top states in the gun.

Total gun breakdown by states in 2017:



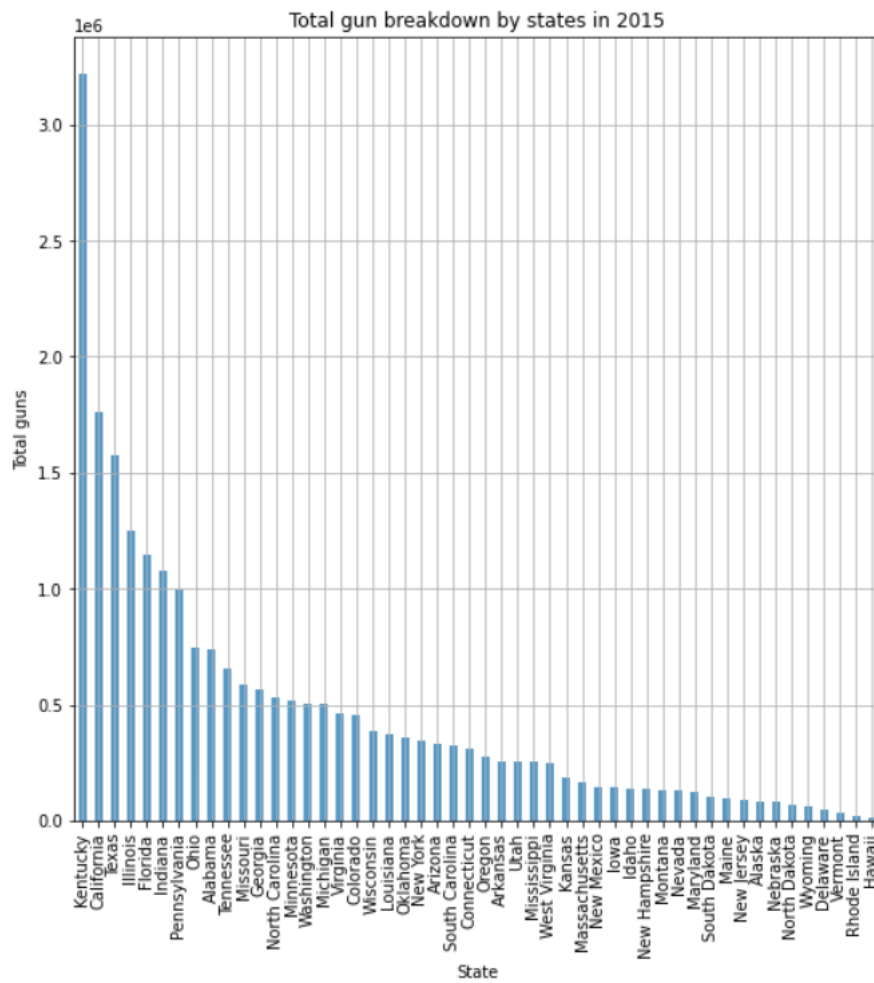
state	
Kentucky	3417976
California	1167528
Illinois	1163945
Texas	1074971
Florida	912765
Pennsylvania	763378
Indiana	606881
Tennessee	549639
Ohio	540654
Minnesota	529302

Total guns in 2016:



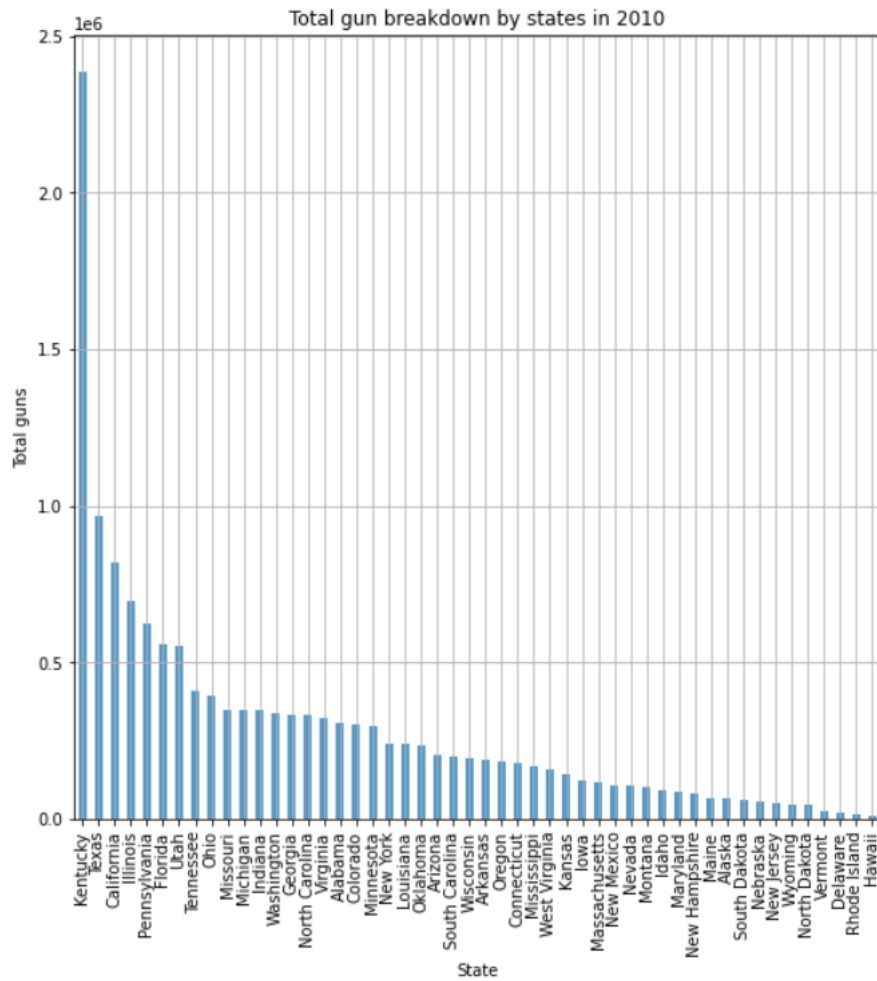
state	
Kentucky	3676847
California	2377167
Illinois	1924070
Texas	1721726
Indiana	1436725
Florida	1435340
Pennsylvania	1143220
Ohio	875724
Tennessee	714774
Washington	713996

Totals guns in 2015:



state	
Kentucky	3218371
California	1761079
Texas	1574266
Illinois	1247398
Florida	1147082
Indiana	1076917
Pennsylvania	993429
Ohio	748502
Alabama	737509
Tennessee	654192

Total guns in 2010:



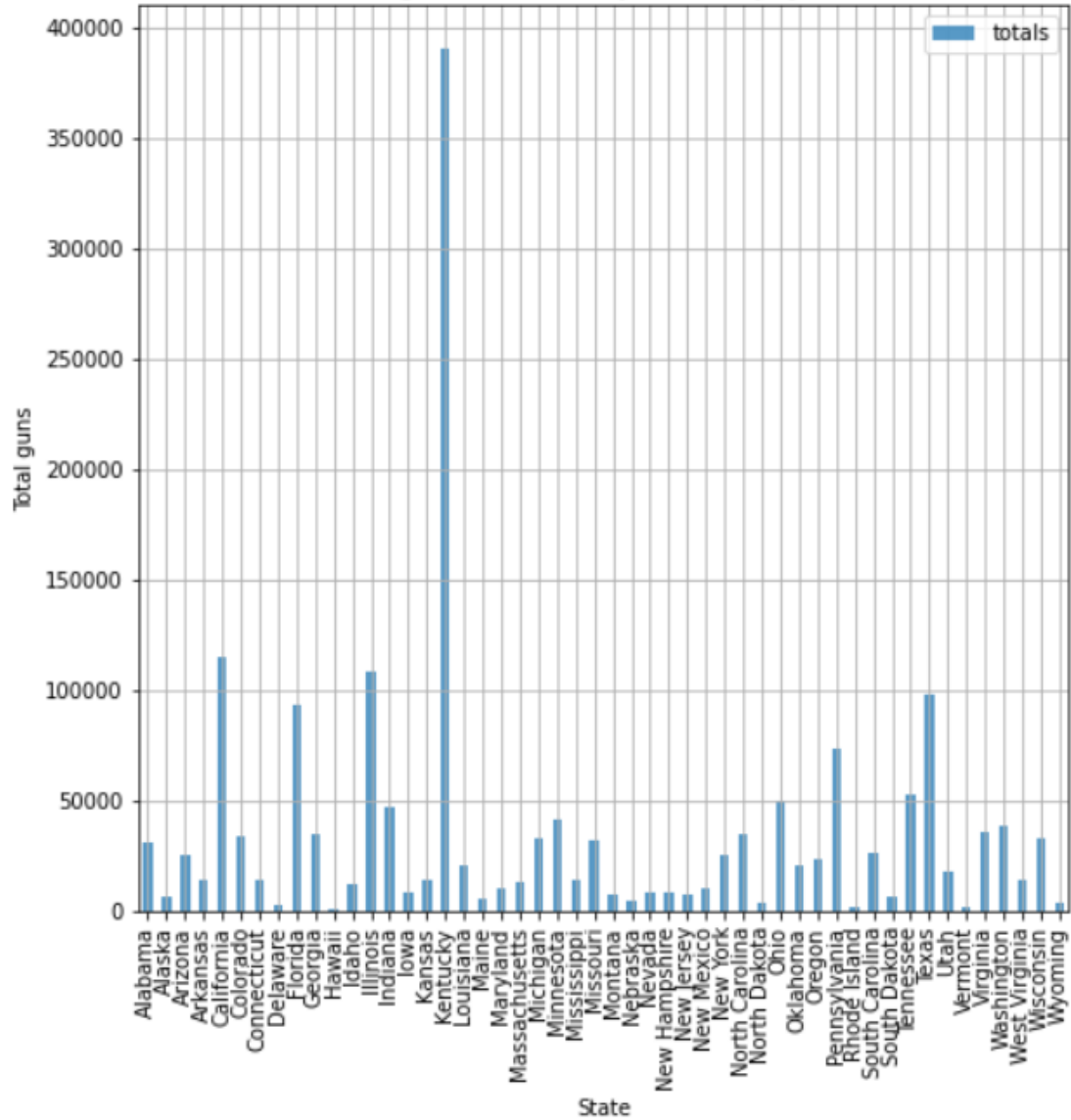
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state
Kentucky      2385579
Texas         968071
California    816399
Illinois      695300
Pennsylvania  626677
Florida       559347
Utah          553134
Tennessee     411024
Ohio          393250
Missouri      349672
Name: totals, dtype: int64

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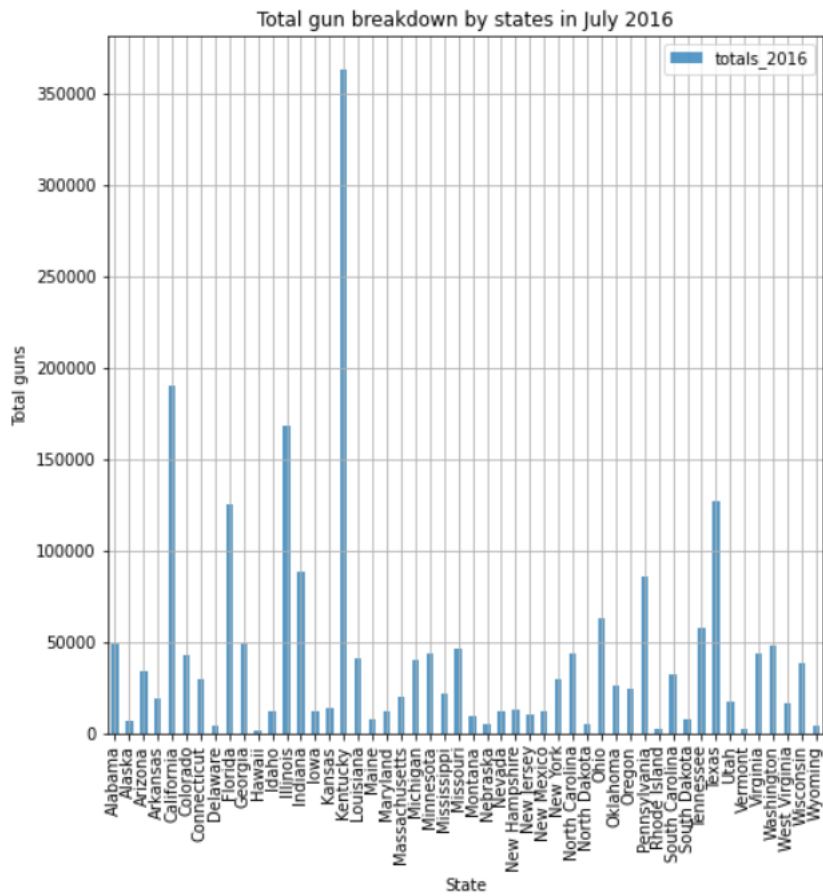
Total gun break-down in July 2017:

Total gun breakdown by states in July 2017



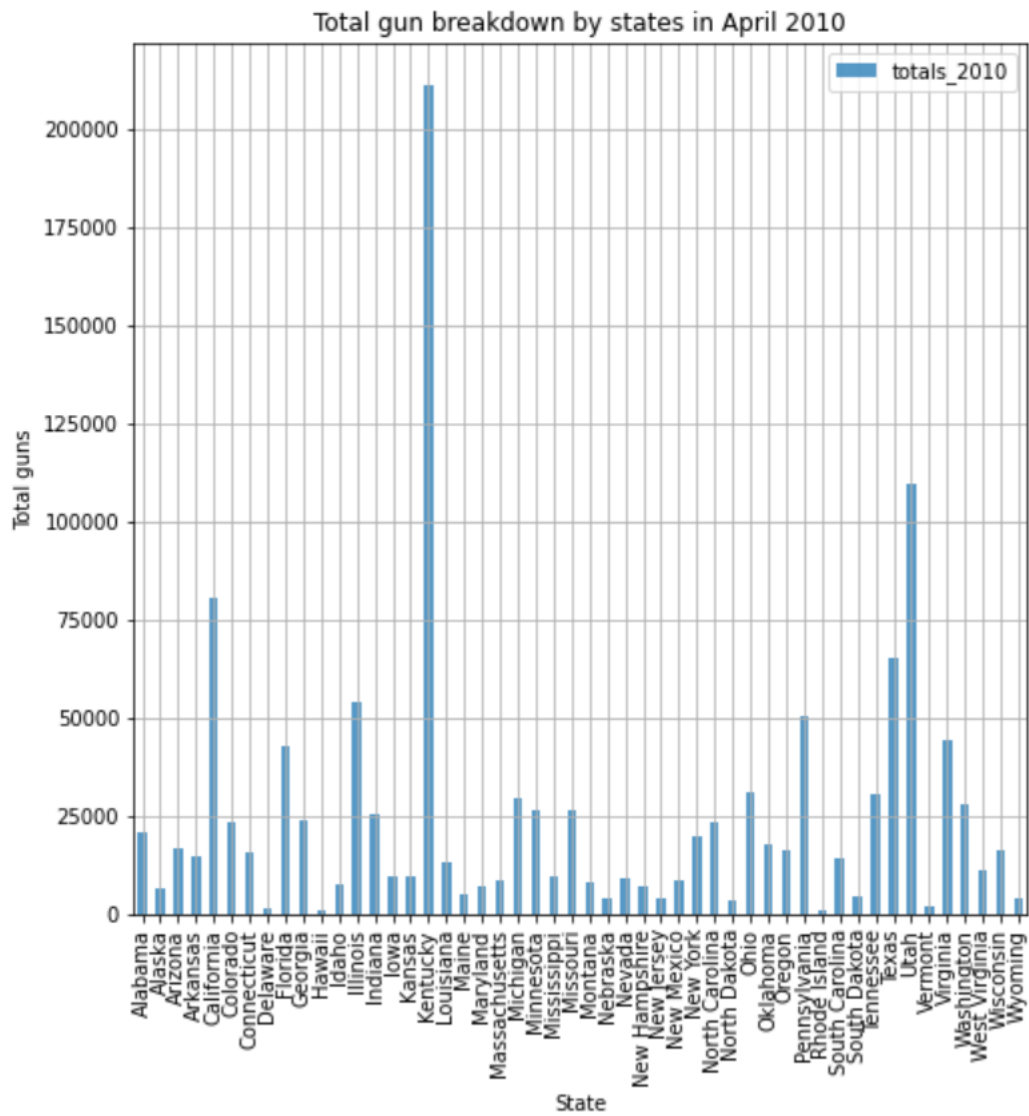
	state	month	totals
128	Kentucky	2017-07	390494
114	California	2017-07	114595
124	Illinois	2017-07	108000
156	Texas	2017-07	98338
119	Florida	2017-07	92822
150	Pennsylvania	2017-07	73654
155	Tennessee	2017-07	52643
147	Ohio	2017-07	49432
125	Indiana	2017-07	47145
135	Minnesota	2017-07	41186

Total gun data in July 2016



	state	month_2016	totals_2016
16	Kentucky	2016-07-01	363085
4	California	2016-07-01	190218
12	Illinois	2016-07-01	168227
42	Texas	2016-07-01	127207
8	Florida	2016-07-01	125208
13	Indiana	2016-07-01	88340
37	Pennsylvania	2016-07-01	86137
34	Ohio	2016-07-01	63148
41	Tennessee	2016-07-01	57653
9	Georgia	2016-07-01	49183

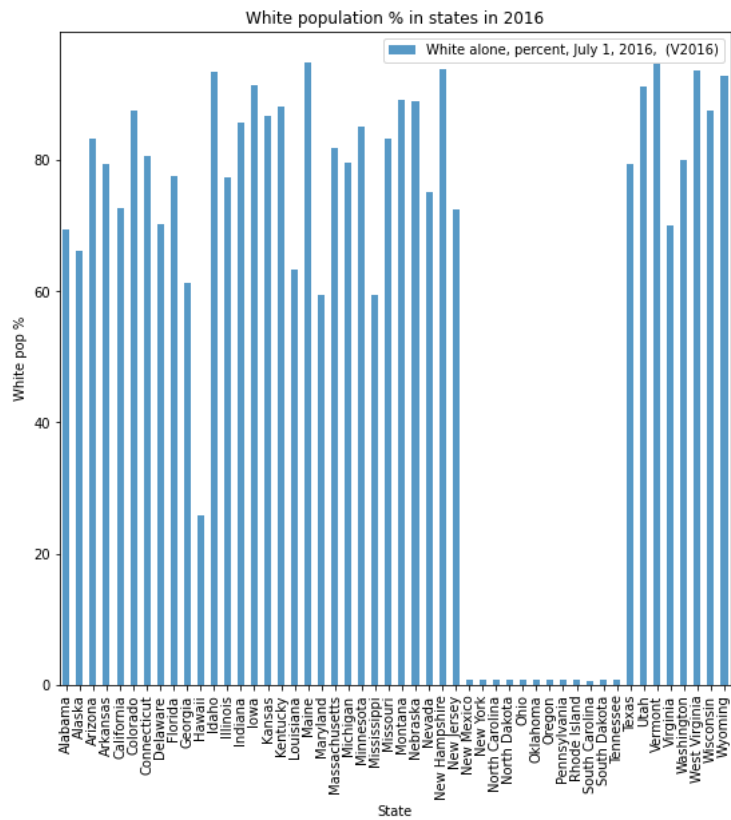
Total gun break-down in April 2010:



	state	month_2010	totals_2010
16	Kentucky	2010-04-01	211261
43	Utah	2010-04-01	109391
4	California	2010-04-01	80750
42	Texas	2010-04-01	65012
12	Illinois	2010-04-01	53929
37	Pennsylvania	2010-04-01	50249
45	Virginia	2010-04-01	44137
8	Florida	2010-04-01	42794
34	Ohio	2010-04-01	31312
41	Tennessee	2010-04-01	30453

Relation between Gender / Race and States with high gun totals:

1. The states with high gun totals has a majority of white population



Fact state White alone, percent, July 1, 2016, (V2016)

16 Kentucky 88.0

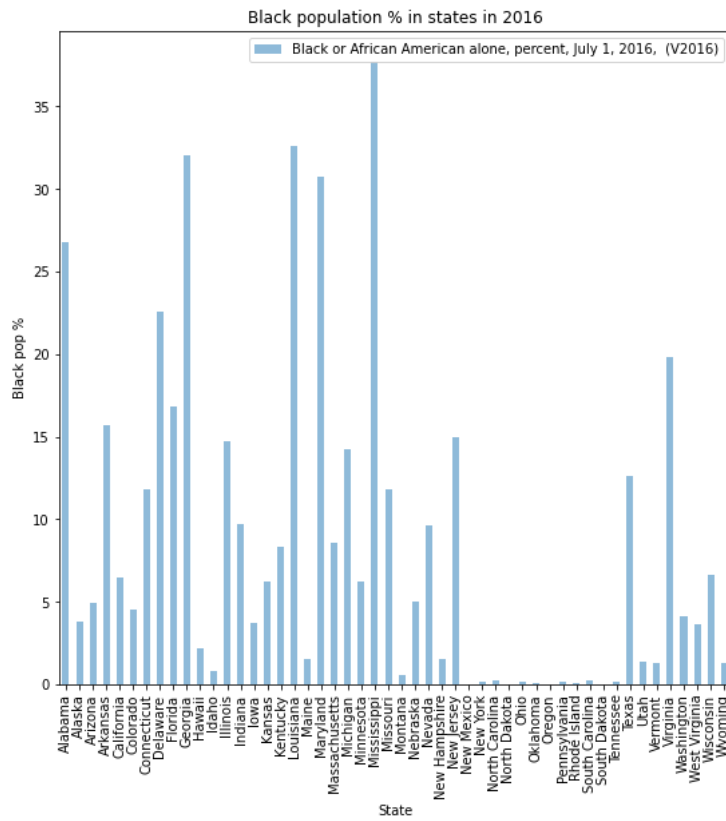
42 Texas 79.4

8 Florida 77.6

12 Illinois 77.2

4 California 72.7

2. Black/African-American population in the states with high gun counts:



Fact state Black or African American alone, percent, July 1, 2016, (V2016)

8 Florida 16.8

12 Illinois 14.7

42 Texas 12.6

16 Kentucky 8.3

4 California 6.5

3. Latino population in the states with high gun counts:

Fact state Hispanic or Latino, percent, July 1, 2016, (V2016)

42 Texas 39.1

4 California 38.9

8 Florida 24.9

12 Illinois 17.0

16 Kentucky 3.5

4. States with high count of gun control has slightly above 50% female population:

Fact state Female persons, percent, April 1, 2010

8 Florida 51.1

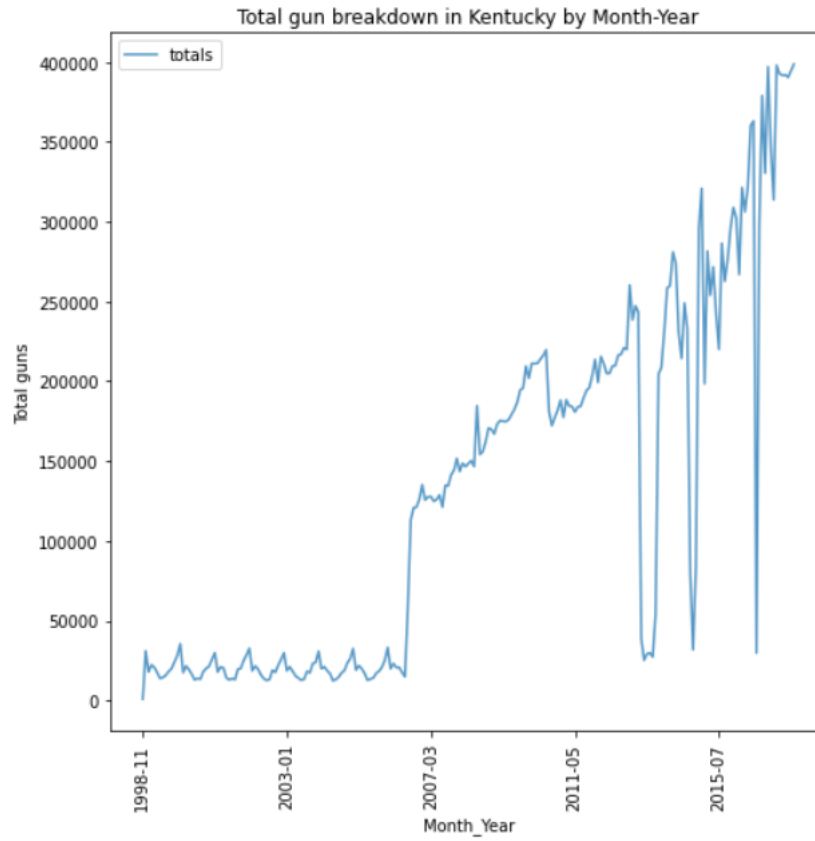
12 Illinois 51.0

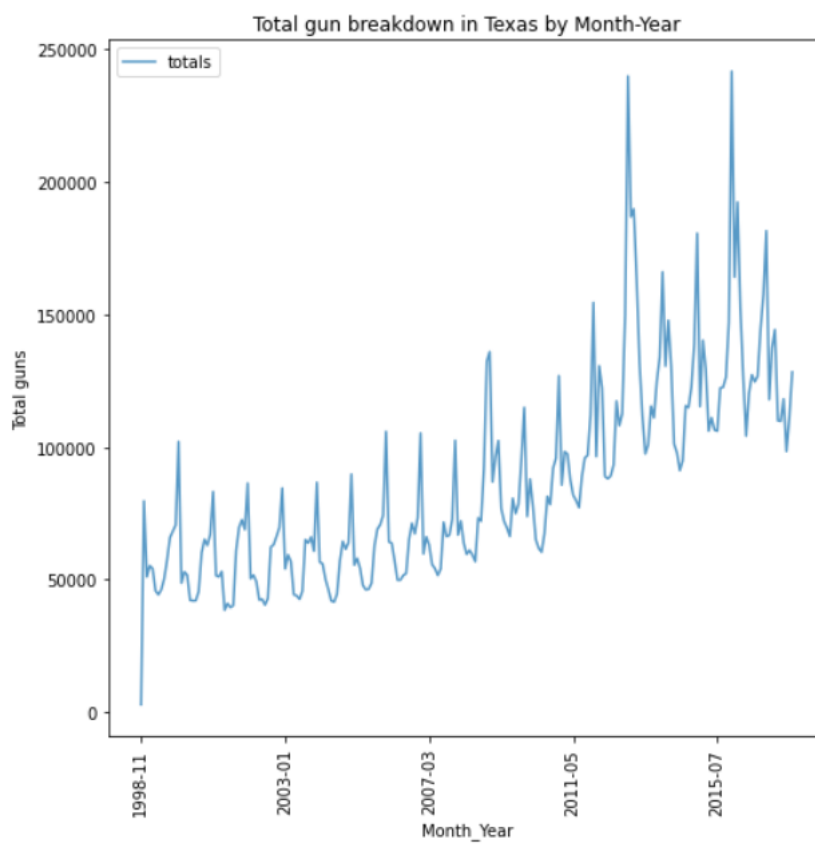
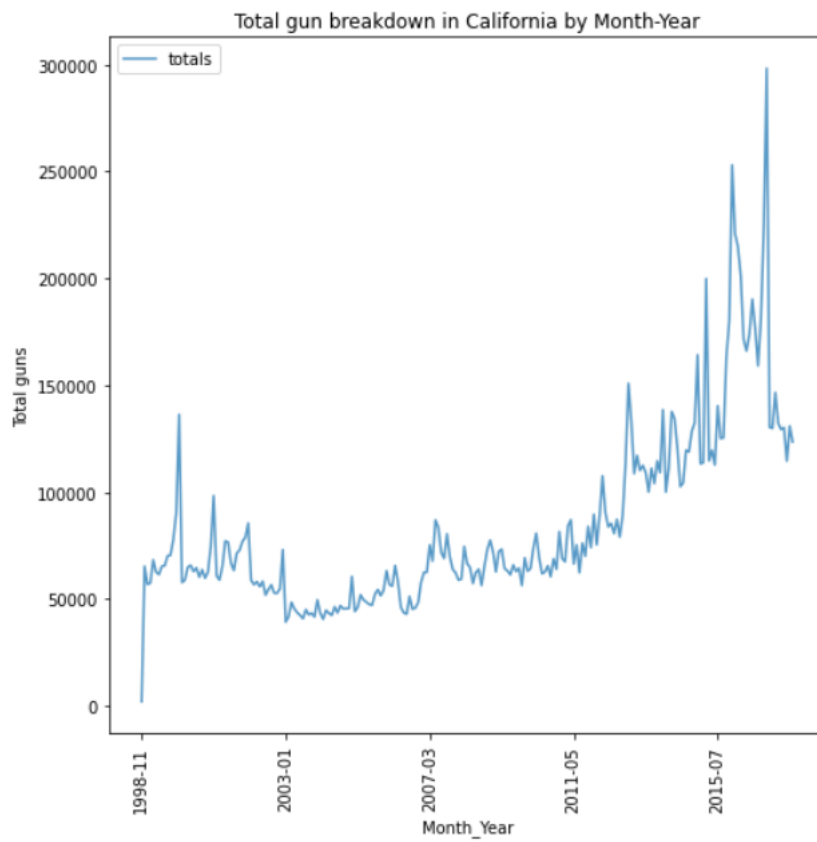
16 Kentucky 50.8

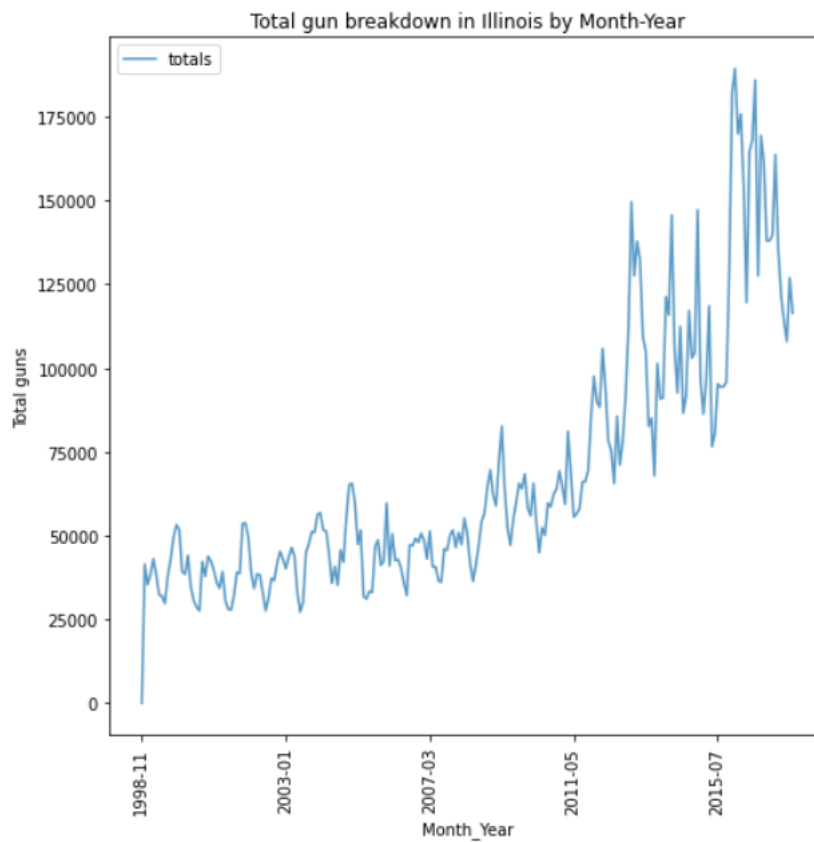
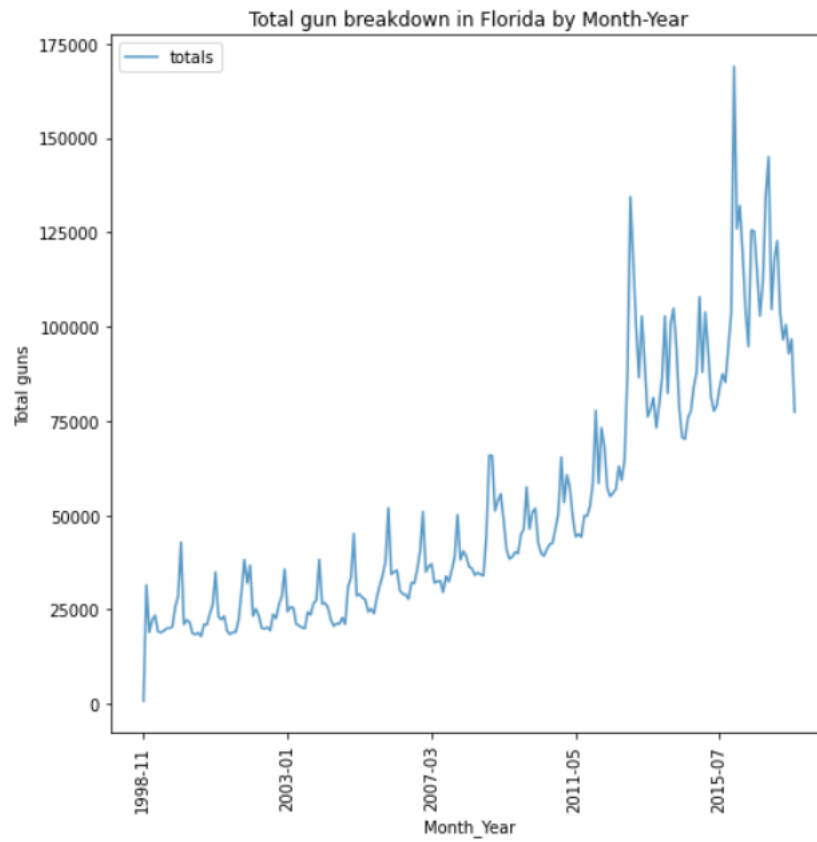
42 Texas 50.4

4 California 50.3

Trends of gun totals States with high gun totals:







Conclusion

Checked US census and gun data, and noticed that gun data includes the five colonies e.g Porto Rico, ..etc., while US census data doesn't include the colonies, so I had to remove all rows of the five colonies from gun data. Data comparison was done focusing on 2010 and 2016, as the census data covers these two years. However my analysis included total guns in 2017, 2016, 2015, and 2010.

Calculated Gun per capita in 2016: 0.68% (~0.677793390263384), and Gun per capita in 2010: 0.39% (~0.3978133320178106).

States with highest total gun counts annually are: Kentucky, California, Texas, Illinois, and Florida.

North Carolina has the most total guns in one month: 2014-03

States with highest total guns in a single month: North Carolina, Kentucky, California, Texas, and Indiana.

Accordingly Kentucky is the key state in the gun trends in 2010, 2015, 2016, and 2017.

Tried to verify if demographics (race/gender) plays a role. All states - with the exception of North Carolina- are white majority with average female population. I suspect that US census data needs doublechecking as North Carolina doesn't show reasonable numbers in terms of race and female population. A part from the analysis, I've also noticed that North Dakota has 0.49% female population.

Resources checked:

<https://stackoverflow.com/questions/3411771/best-way-to-replace-multiple-characters-in-a-string>

<https://stackoverflow.com/questions/38516481/trying-to-remove-commas-and-dollars-signs-with-pandas-in-python/46430853>

<https://stackoverflow.com/questions/39922986/pandas-group-by-and-sum>

<https://stackoverflow.com/questions/20625582/how-to-deal-with-settingwithcopywarning-in-pandas>

<https://www.dataquest.io/blog/settingwithcopywarning/>