FBI GUN DATA

Showing a presentation for the FBI-Census firearms data analysis

INTRODUCTION

- The dataset used in this notebook is the FBI Gun Datasets, which include two dataset, one is a number of background checks from FBI upon any gun purchases, the other one is a Census Data including various census related variables.
- The FBI Gun data includes a range of different background check types, to name a few, 'permit', 'permit recheck', 'handgun', 'long gun', 'multiple'(purchasing more than one gun per background check). For each month, each state, there's a data point consisting all the above mentioned variables. Among all the variables, only the 'totals' variable will be used here, which means the total number of all the various background checks in each state and month.

WRANGLING

- After going throughout the data we identified the needs
- We assessed the main findings and the datasets issues
- Quality and tidiness issues:

1. We found that some unwanted data types
2. Some states are not found in both dataset
3. Some data was missing

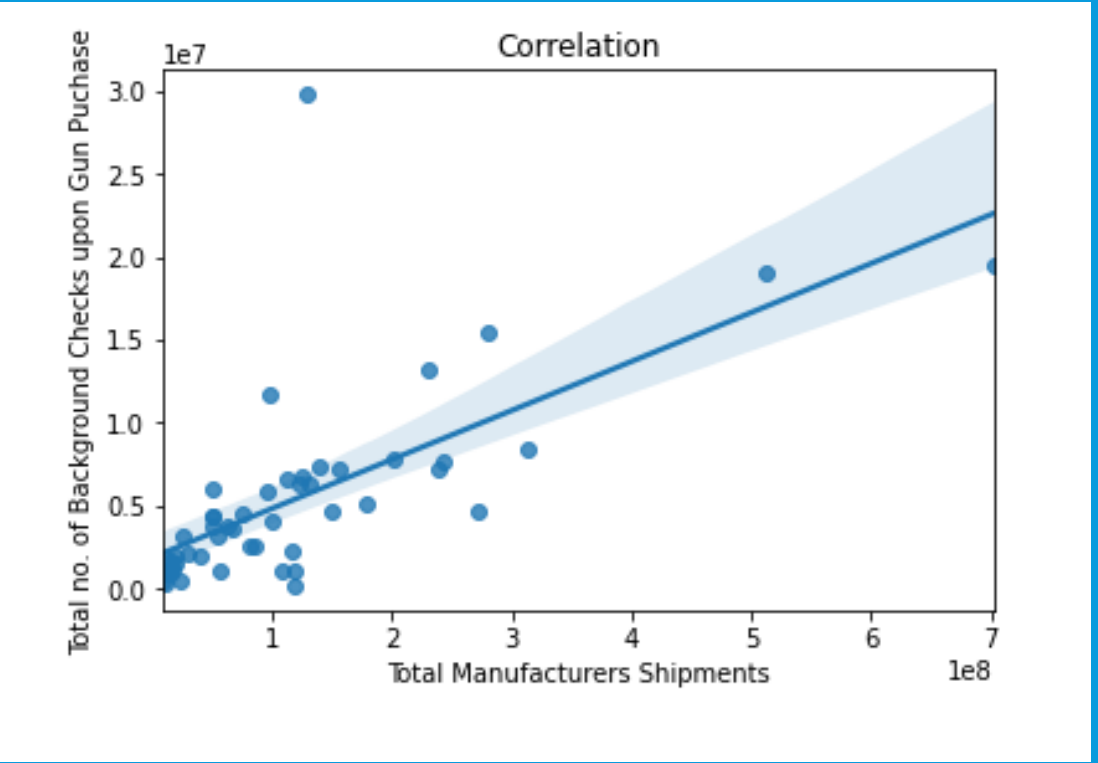
MAIN FINDINGS

- 1. What census data is most associated with high gun registration?
- 2. Is there a correlation between ethnic group proportion and gun registration?
- 3. what is the seasonal pattern for Shopping arms?
- 4. Which states had the highest and lowest growth rates in weapons registrations?

WHAT CENSUS DATA IS MOST ASSOCIATED WITH HIGH GUN REGISTRATION?

- We started by preparing the data
- Using Pearson's correlation we found the following:
- **The top three significant correlations are:**
- (42) 0.67445 Total Manufacturers Shipments
- (20) 0.67324 Veterans
- (30) 0.65733 Households

- And by display the correlation over states we get this plot



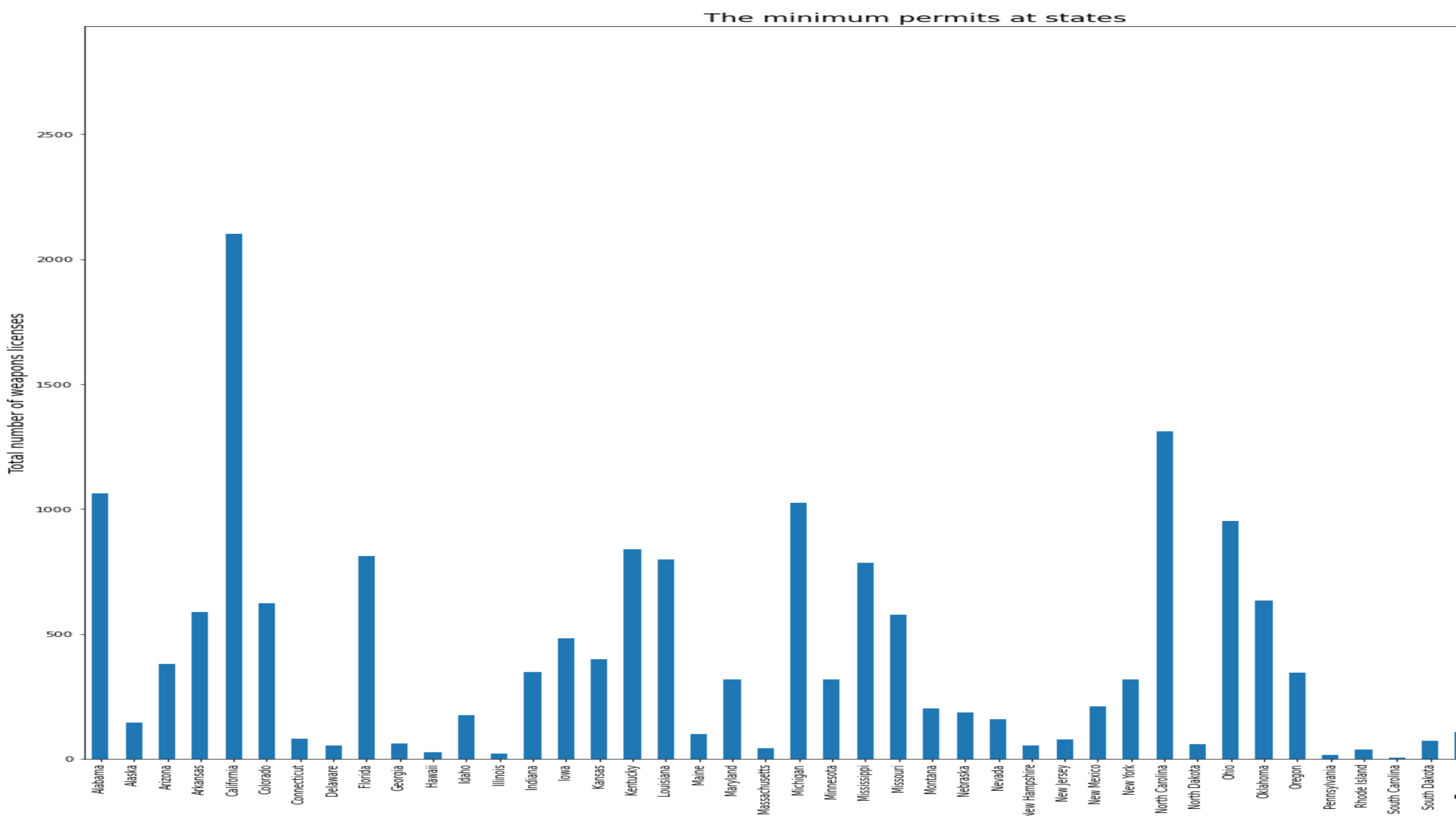
IS THERE A CORRELATION BETWEEN ETHNIC GROUP PROPORTION AND GUN REGISTRATION?

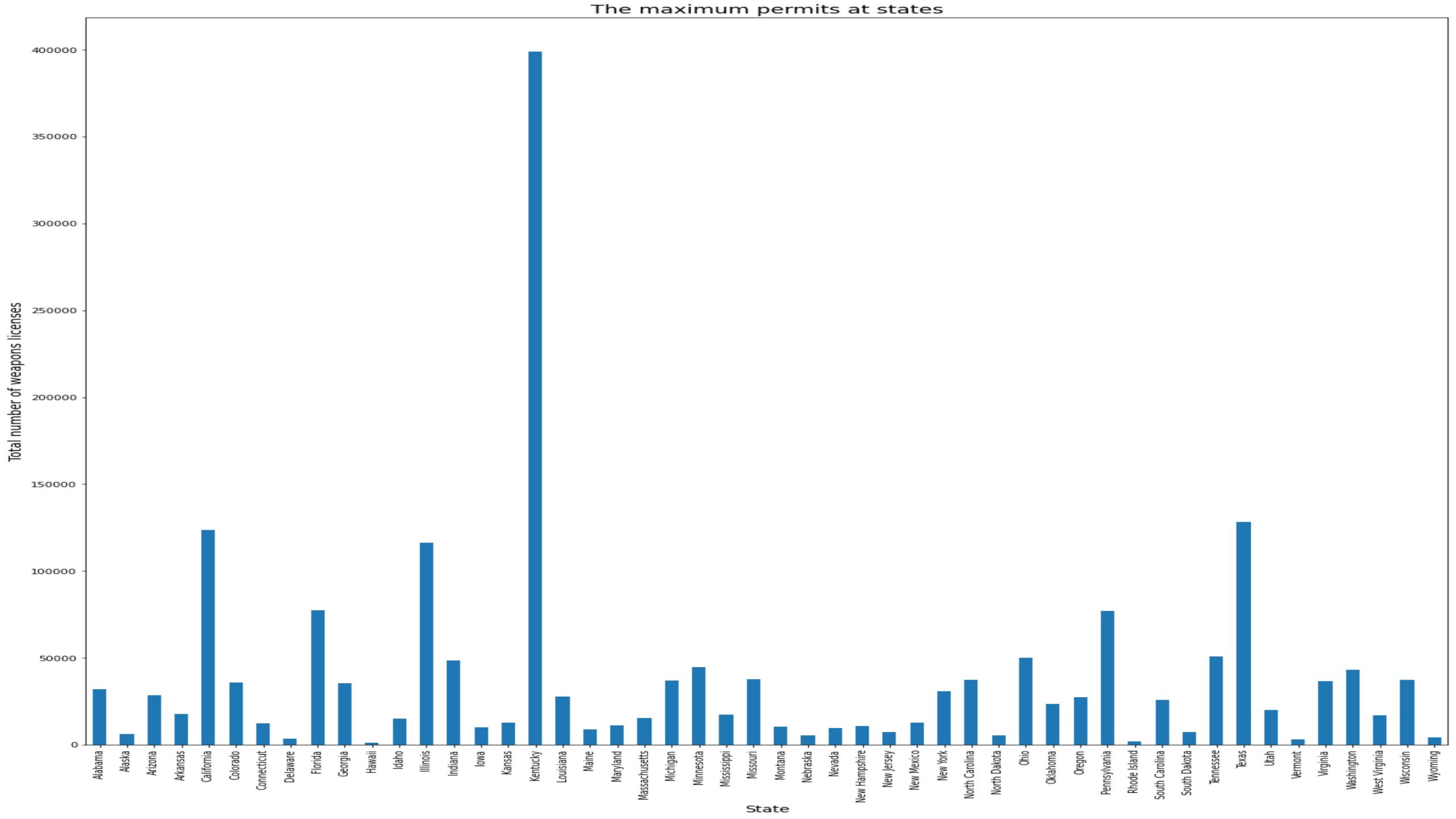
- Using the previous correlation we couldn't manage to find a strong correlation between the ethnic group and number of gun registration. We got those findings
- 0.01166 White alone
- 0.14433 Black or African American alone
- -0.22843 American Indian and Alaska Native alone
- -0.02228 Asian alone
- -0.15151 Native Hawaiian and Other Pacific Islander alone
- -0.16064 Two or More Races
- 0.22636 Hispanic or Latino
- -0.14671 White alone, not Hispanic or Latino,

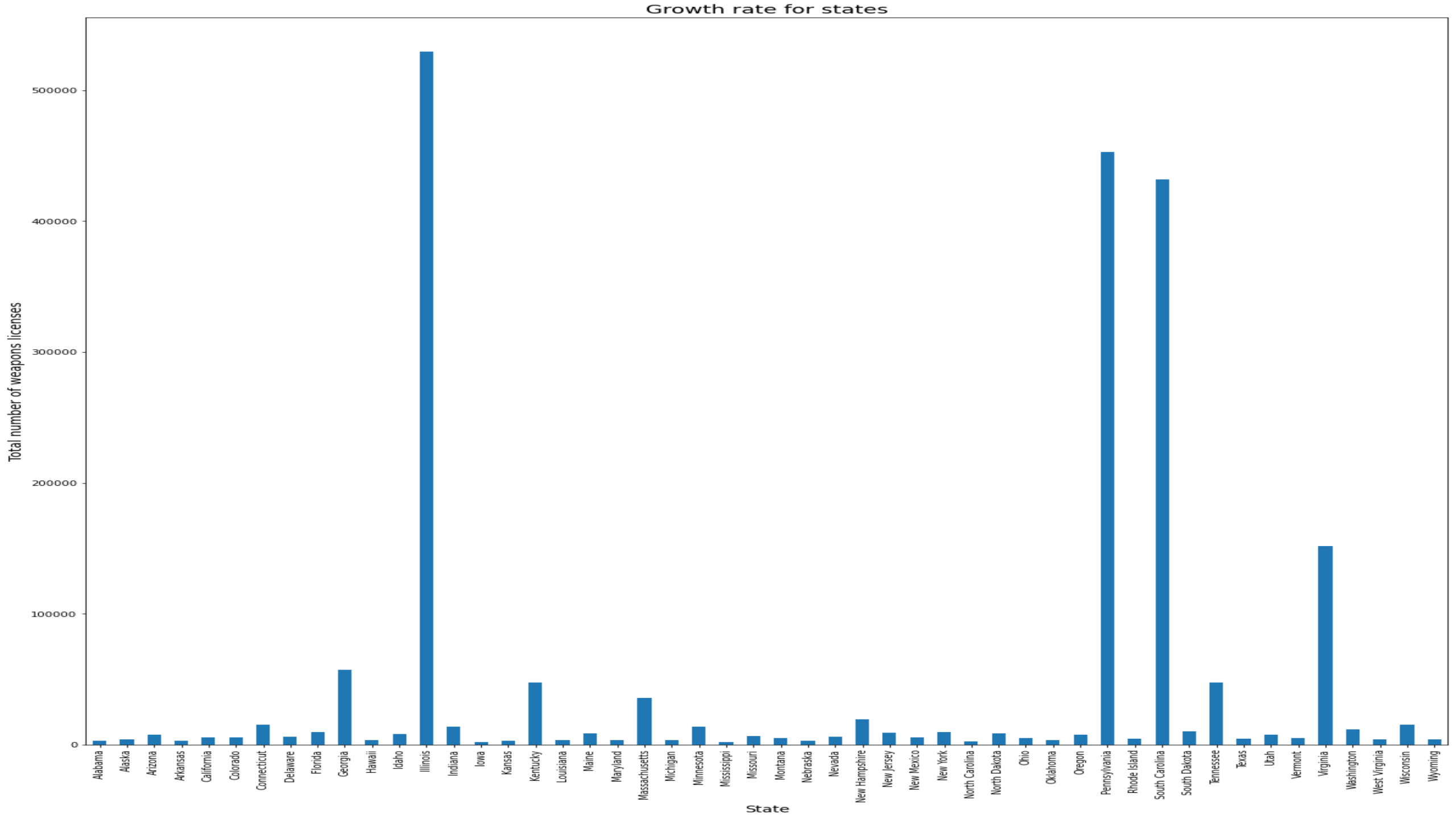
- From those findings we got that there is a weak correlation but it shows that significant number for the Hispanic or Latino in the gun registration

WHICH STATES HAD THE HIGHEST AND LOWEST GROWTH RATES IN WEAPONS REGISTRATIONS?

- We started by investigating the maximum and minimum number of permits
- **South Carolina was the state with the lowest registration of weapons and it was recorded around 6 at 01-11-1998**
- **Kentucky was the state with the Highest registration of weapons and it was recorded around 378384.0 at 2017-09-01**
- ***The highest growth rate in weapons registrations is (529213.6363636364) in Illinois state***
- ***The least growth rate in weapons registrations is (1969.5020746887967) in Iowa state***

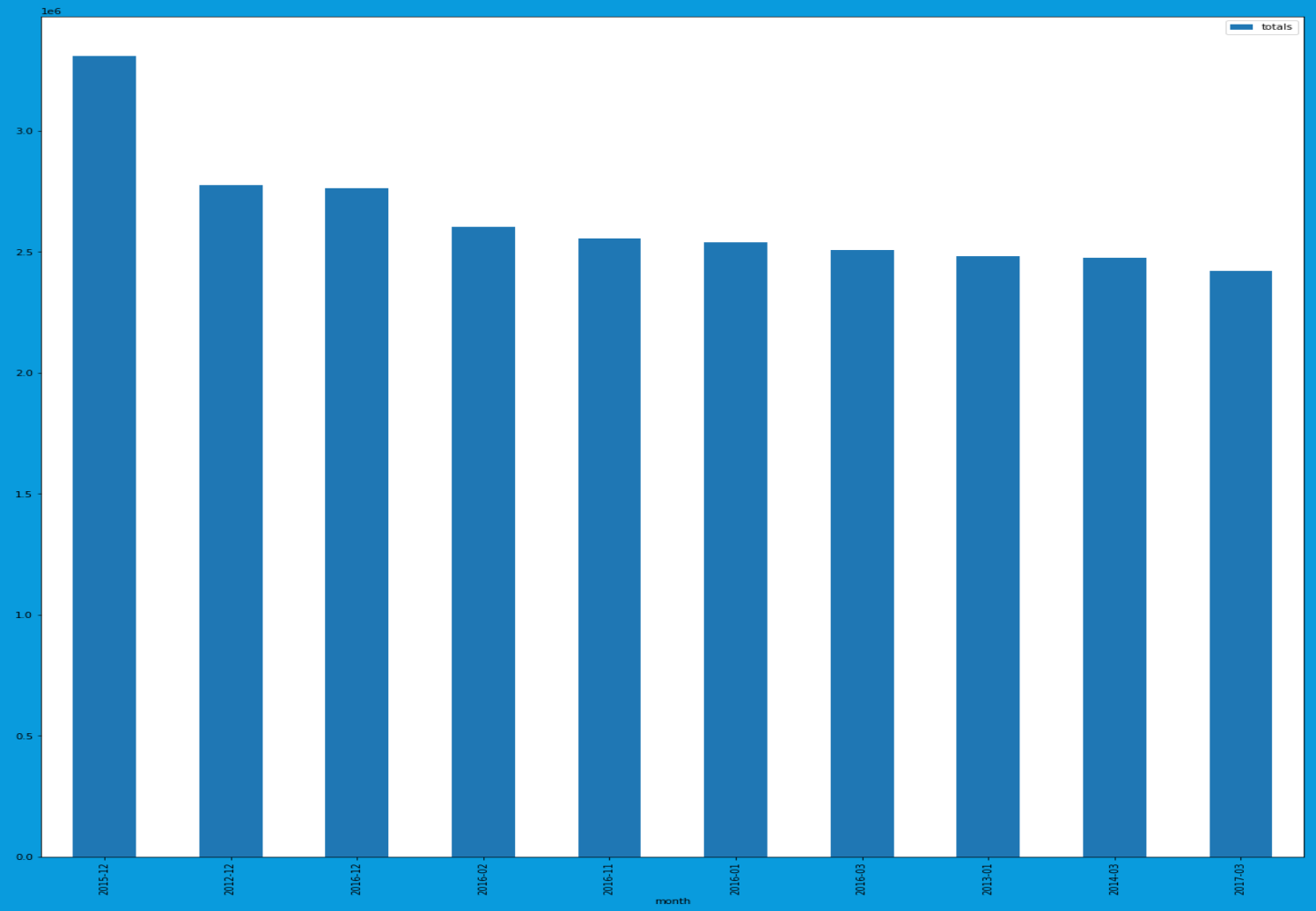

The minimum permits at states
Total number of weapons licenses
0
500
1000
1500
2000
2500
Alabama
Alaska
Arizona
Arkansas
California
Colorado
Connecticut
Delaware
Florida
Georgia
Hawaii
Idaho
Illinois
Indiana
Iowa
Kansas
Kentucky
Louisiana
Maine
Maryland
Massachusetts
Michigan
Minnesota
Mississippi
Missouri
Montana
Nebraska
Nevada
New Hampshire
New Jersey
New Mexico
New York
North Carolina
North Dakota
Ohio
Oklahoma
Oregon
Pennsylvania
Rhode Island
South Carolina
South Dakota


The maximum permits at states
Total number of weapons licenses
400000
350000
300000
250000
200000
150000
100000
50000
0
Alabama
Alaska
Arizona
Arkansas
California
Colorado
Connecticut
Delaware
Florida
Georgia
Hawaii
Idaho
Illinois
Indiana
Iowa
Kansas
Kentucky
Louisiana
Maine
Maryland
Massachusetts
Michigan
Minnesota
Mississippi
Missouri
Montana
Nebraska
Nevada
New Hampshire
New Jersey
New Mexico
New York
North Carolina
North Dakota
Ohio
Oklahoma
Oregon
Pennsylvania
Rhode Island
South Carolina
South Dakota
Tennessee
Texas
Utah
Vermont
Virginia
Washington
West Virginia
Wisconsin
Wyoming
State


Growth rate for states
Total number of weapons licenses
0
100000
200000
300000
400000
500000
State
Alabama
Alaska
Arizona
Arkansas
California
Colorado
Connecticut
Delaware
Florida
Georgia
Hawaii
Idaho
Illinois
Indiana
Iowa
Kansas
Kentucky
Louisiana
Maine
Maryland
Massachusetts
Michigan
Minnesota
Mississippi
Missouri
Montana
Nebraska
Nevada
New Hampshire
New Jersey
New Mexico
New York
North Carolina
North Dakota
Ohio
Oklahoma
Oregon
Pennsylvania
Rhode Island
South Carolina
South Dakota
Tennessee
Texas
Utah
Vermont
Virginia
Washington
West Virginia
Wisconsin
Wyoming

WHAT IS THE SEASONAL PATTERN FOR SHOPPING ARMS?

- Finding a seasonal Pattern we some good point to get to as we noticed a significant increase in firearms sales in winter rather than in summer
- As shown in this slide and the next we can deduce the increase in sales number



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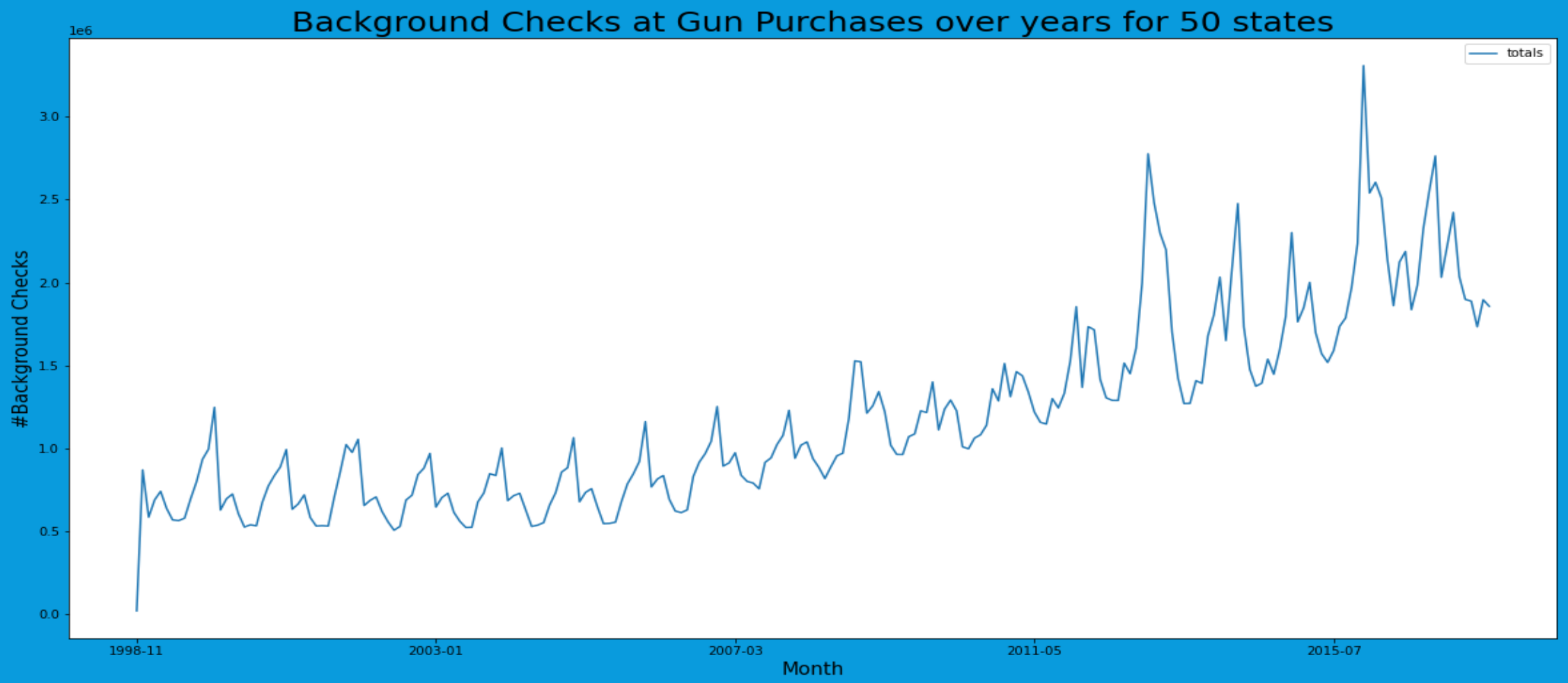

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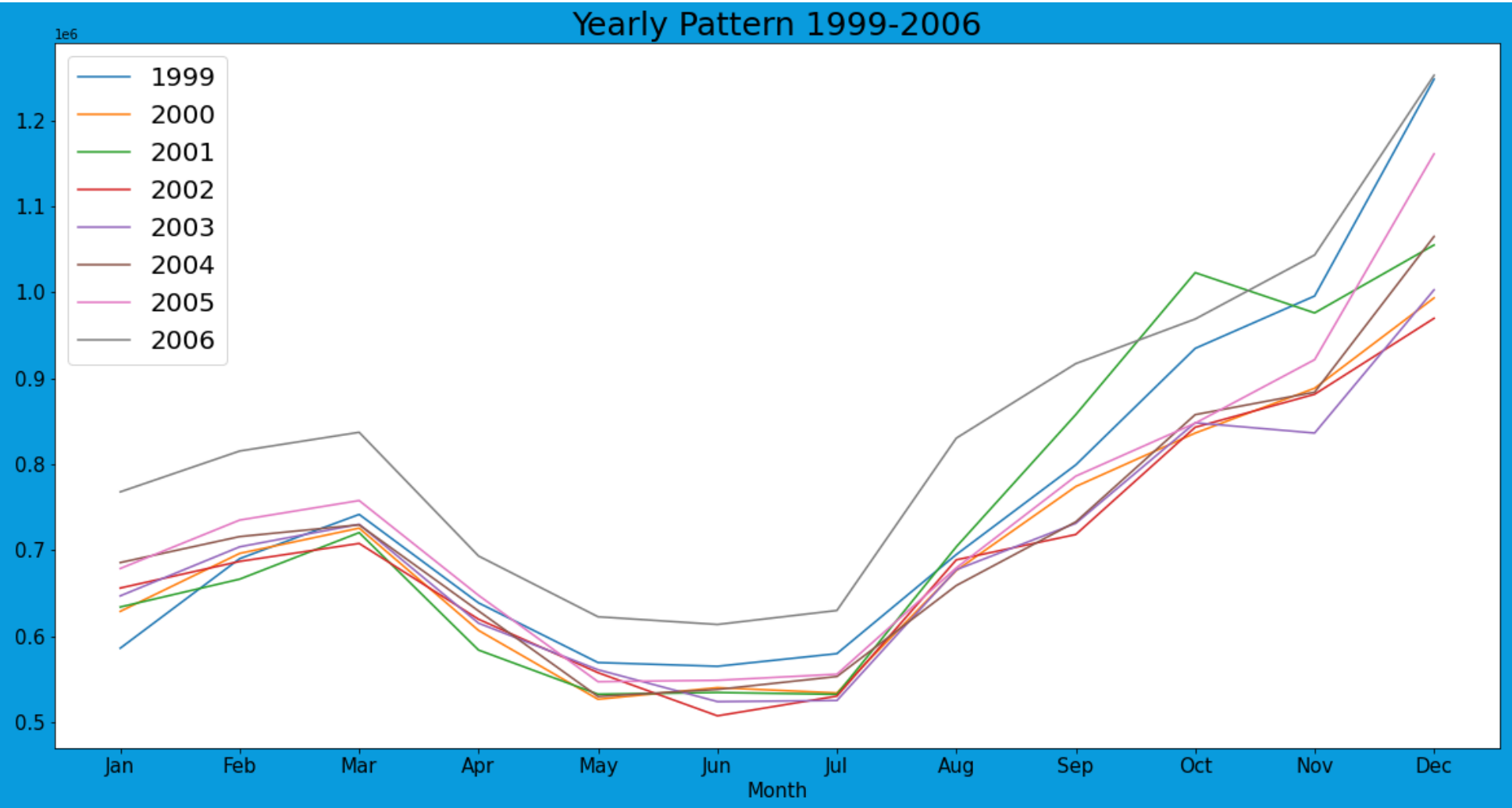

CONCLUSION

- With the exploration and statistical tests performed above, we can answer the questions raised at the beginning of this notebook, with limitation :

- 1 - What census data is most associated with high background check with gun sales?
- The most associated census data with gun data is 'Total Manufacturers Shipments' with a Pearson's Correlation Coefficient 0.67445. It doesn't seem to have any relation with gun registration number, however, that's the beauty of correlation. It doesn't provide causation but provide a way to find a relation(correlation).
- The second and third most associated census data are the number of Veterans in each state(corr coef: 0.67324) and the number of Households in each state(corr coef:0.65733). These two make more sense, but still we cannot conclude their causation from the correlation.
- 2 - Is there a correlation between ethnic group proportion and gun registration?
- No. From the Pearson's Correlation Coefficient formula, the correlations are too weak.

- 3- Which states had the highest and lowest growth rates in weapons registrations?
- From the states growth rates we concluded that Illinois has the highest growth rate of registrations is (529213.6363636364) in state,where the least growth rate in weapons registrations is (1969.5020746887967) in Iowa state.

- 4 - what is the seasonal pattern for Shopping arms?
- From the year-to-year analysis from 1999 and 2016 of all the states, there's a clear pattern that the number stays low in the summer and peaks in the winter. There's a little inconsistency during the summer of 2016, which we need to research further into what happened before or during that summer.