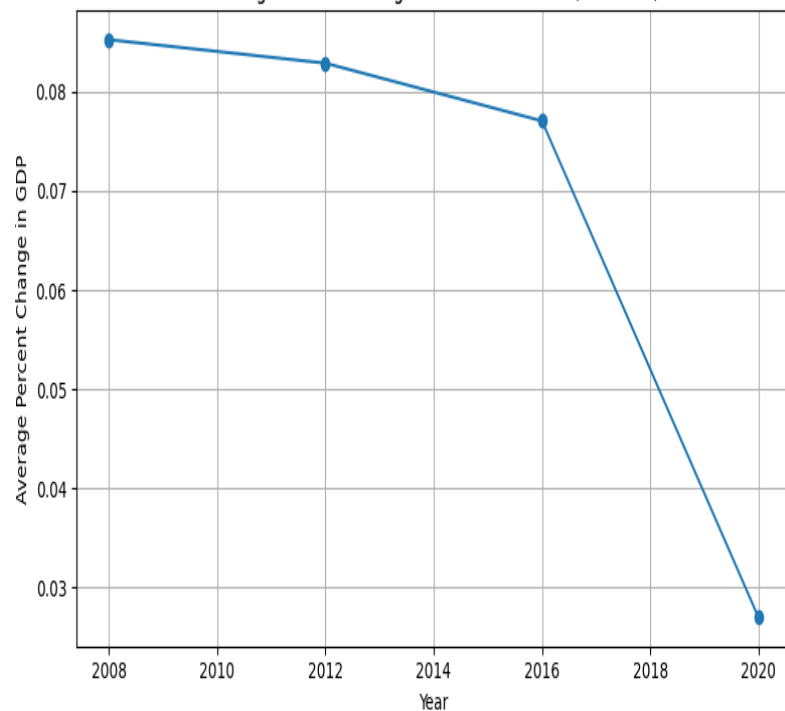## Intro

My research question aims to find out whether or not GDP has an effect on voter turnout. I find this question to be relevant because voting is the most important way that we as citizens can shape the direction that our country heads in. So, by analyzing data and trying to find an answer to this question, I am looking for possible ways that voter turnout could be increased in the future. The more people that we have voting, the more likely it is that we can elect better candidates who help guide us in a way that most people want.
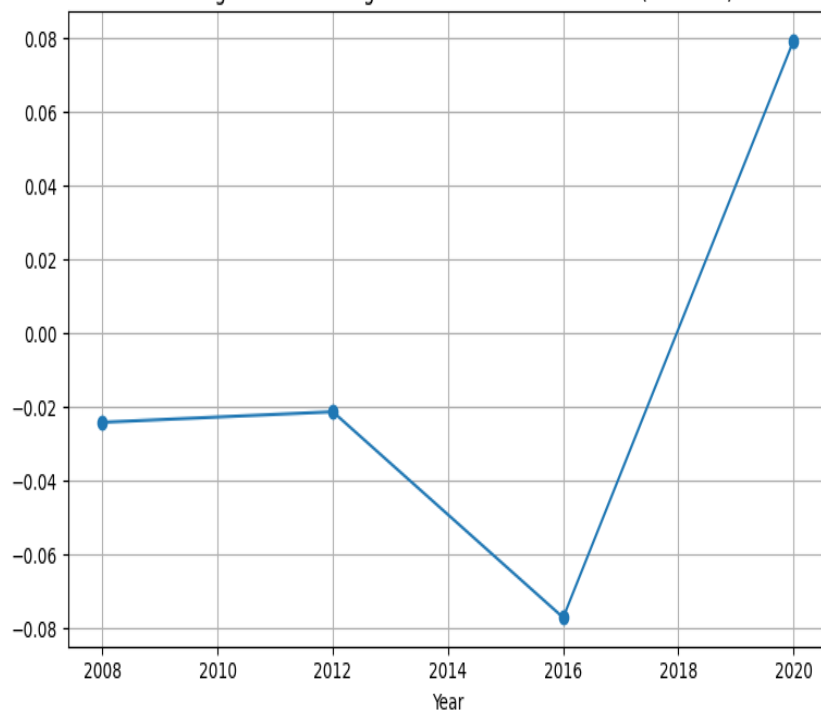
Data

My data for this project comes from two major sources. The first source is GDP data by county since 2000; and comes from the Bureau of Economic Analysis. This dataset included a breakdown of GDP by industry and by county. I ended up transforming this data so that it would show me the % change in GDP from election year to election year. All GDP totals were listed in 2017 chained dollars, so that all numbers would be consistent against inflation and time. My second source showcases voting data from 2000-2020; and comes from the Inter-University Consortium for Political and Social Research. This dataset broke down US voting records by county, showing the number of registered voters, number of ballots cast, as well as a breakdown of vote share for republicans and democrats in presidential and midterm elections.

Similarly to GDP I computed my voter turnout data as a percent change, so that it could be interpreted easier. Attached above I have two different graphs, one shows percent change in GDP over time, while the other shows percent change in voter turnout over time. For the graph on the left we can see consistent GDP growth across the years until 2020(Covid). With the

graph on the right we can see a consistent decline in the voter turnout percentage with a larger dip in 2016, until we see a large rise for the 2020 election. My final dataset was for the predictor value of unemployment rate. This data set included the number of unemployed, number of unemployed, and unemployment rate for any given year. I removed all rows except for the ones containing unemployment rate, I then merged it based on the FIPS code with the other two datasets.
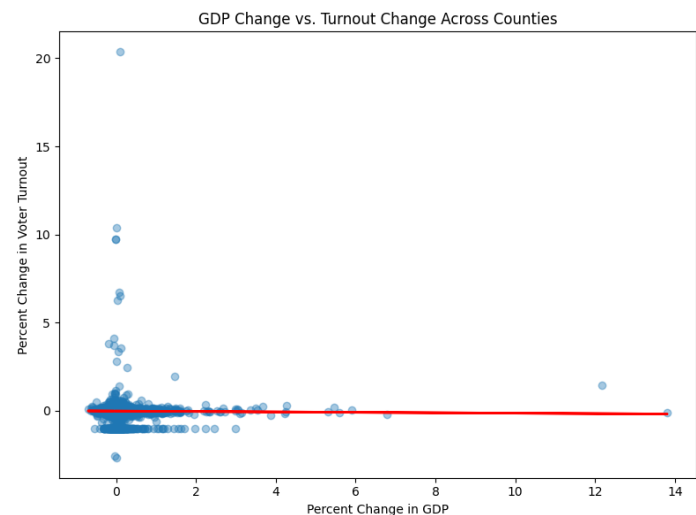
Method

To answer this question I chose to run an OLS regression model using percent change in voter turnout as my dependent variable. My main predictor value was percent change in GDP, while controlling for unemployment rates and differences across election years.


```
                          OLS Regression Results
==============================================================================
Dep. Variable:     pct_change_turnout   R-squared:                       0.026
Model:                            OLS   Adj. R-squared:                  0.026
Method:                 Least Squares   F-statistic:                     62.00
Date:                Thu, 11 Dec 2025   Prob (F-statistic):           5.13e-64
Time:                        21:10:38   Log-Likelihood:                -4279.1
No. Observations:               11654   AIC:                             8570.
Df Residuals:                   11648   BIC:                             8614.
Df Model:                           5
Covariance Type:            nonrobust
==============================================================================
                       coef    std err          t      P>|t|      [0.025      0.975]
------------------------------------------------------------------------------
Intercept            -0.0553      0.011     -5.121      0.000      -0.077      -0.034
YEAR_2012[T.True]    -0.0072      0.010     -0.761      0.447      -0.026       0.011
YEAR_2016[T.True]    -0.0494      0.009     -5.415      0.000      -0.067      -0.031
YEAR_2020[T.True]     0.0984      0.009     10.454      0.000       0.080       0.117
pct_change_gdp        0.0054      0.010      0.520      0.603      -0.015       0.026
unemployment_rate     0.0053      0.001      3.638      0.000       0.002       0.008
==============================================================================
Omnibus:                    28071.020   Durbin-Watson:                   2.139
Prob(Omnibus):                  0.000   Jarque-Bera (JB):       700879054.417
Skew:                          24.530   Prob(JB):                         0.00
Kurtosis:                    1203.404   Cond. No.                         31.0
==============================================================================
```


Results

Based on this regression I found that percent change in GDP does not have a statistical significance(p-value = 0.603) on percentage change in voter turnout. However, I did find that the unemployment rate did have a slightly positive statistical significance(p-value of < 0.001 and coefficient of 0.005). The year controls adjusted for nationwide turnout patterns that are unique to each presidential election. In addition, the scatter plot of percent change in GDP vs. percent change in voter turnout shows no correlation, with a very large dump of data in the bottom lefthand corner and a fit line that is basically flat. My R^2 value of 0.026 tells us that only 2.6% of variation in voter turnout can be explained by the model; which suggests that there are other looming factors that play into this percentage.

Conclusion

In conclusion, I found that there is no statistically significant correlation between percent change in GDP and percent change in voter turnout. My control variables, as well as the R^2 statistic, indicate that national election conditions, not county level GDP growth, were the main reason for the change in turnout percentage in individual counties.