

Carbon Emissions and Social Statistics

Executive Summary by Philip Bliese & Aaron Jing

Purpose (motivation/goal): Human sources of carbon dioxide emissions have been growing ever since the Industrial Revolution, and time is running out to implement a solution. People often think about the industrial factors that result in the increase of CO₂ emissions. This project instead approaches the issue from a different angle, analyzing the relationship between demographic variables and emission rates.

Data: This project makes use of carbon emissions data, minimum wage amounts, poverty and unemployment rates, high school graduation rates, percent population in urban areas, total population, household income, and political affiliation, all at the state level (including DC) for the United States.

Methods: This study uses carbon emissions and emissions per person as the dependent variables, and compares them to several independent variables (population, minimum wage, poverty, unemployment, high school graduation rate, urban population, per capita personal income, and political leanings) to see if there are any relationships between them. This will be accomplished through the use of linear regression for numeric variables and chi-squares (for the categorical variable political leanings), comparing emission totals and emissions per person to the various independent variables. After performing the analysis with LRMs and chi-square tables, variables with statistically significant relationships can be identified as impacting carbon emissions.

Summary of the results: Surprisingly, the only significant correlation observed is between the amount of CO₂ emissions and population, which was 0.845. Numerous variables were found to have significant relationships with emissions based on the regression models. Population, poverty, high school graduation rates, unemployment, and urbanization were all found to have 95% or higher confidence levels for a relationship, indicating that improving these variables would affect emissions. Finally, political affiliation was also significant at 99%, with Republican states generally having higher emissions per person.

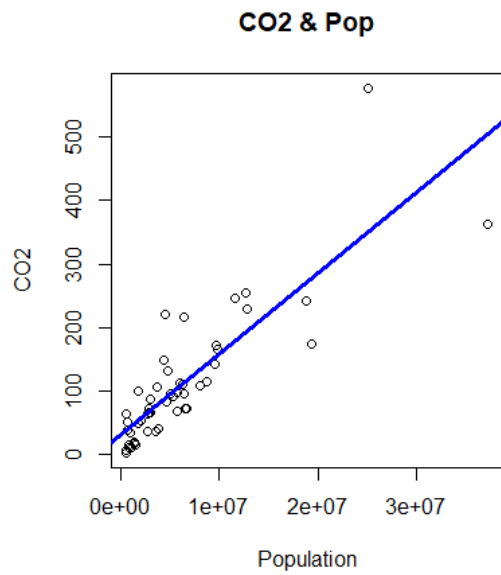


Figure 5- CO₂ (M Tons) & Population Linear Model

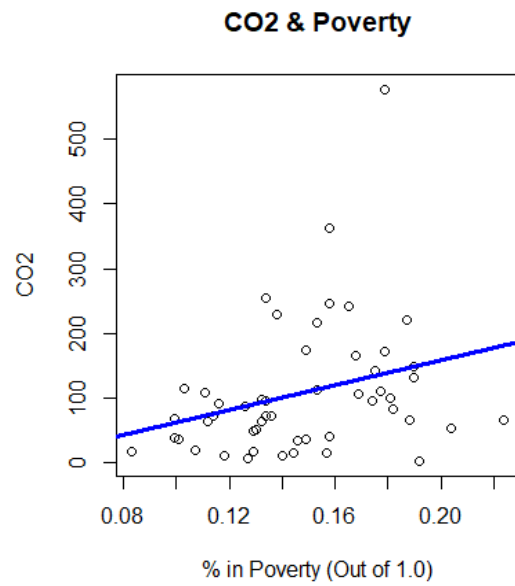


Figure 6- CO₂ (M Tons & % Poverty out of 1.0)
Linear Model

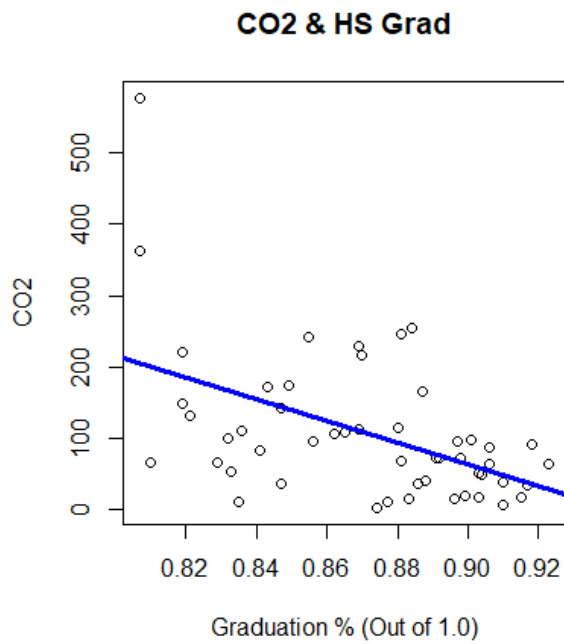


Figure 7- CO₂ & High School Graduation % (Out of 1.0) Linear Model

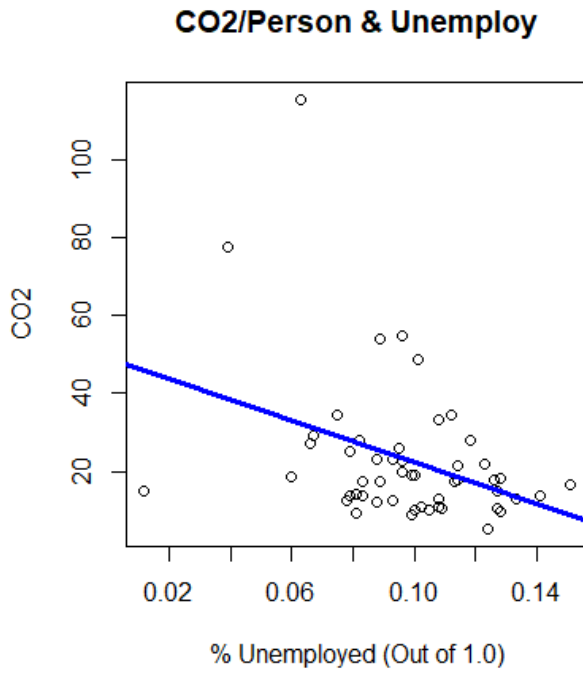


Figure 8- CO₂ Produced per Person & % Unemployed (Out of 1.0) Linear Mode

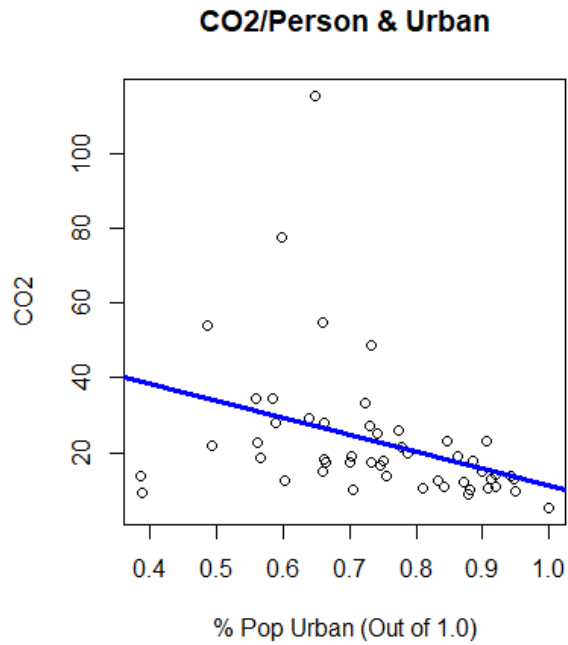


Figure 9- CO₂ Produced per Person & % Population in Urban Areas (Out of 1.0) Linear Model