

Economic Progress and Environmental Concerns: Analyzing CO2 Emissions and GDP Trends in the United States and United Kingdom

Abstract

This study uses K-Means clustering to look at how CO2 pollution and GDP per capita are spread out around the world using statistics from the World Bank. There are different groups of countries, and the United States and the United Kingdom are both in Cluster One. Then, specific prediction modeling is done on these countries. We predict what the future values will be for CO2 emissions per capita and GDP per capita by using strict fitting methods. This helps us understand the complicated connection between economic growth and environmental sustainability.

Introduction

Big businesses and companies around the world are changing the climate. The amount of carbon dioxide (CO2) released can be used to measure this effect. Our main goal with this study is to find out how CO2 emissions are related to country wealth. The US, which is fully developed, and the UK, which is also fully developed, are the only countries that this study looks at. By studying these factors, we hope to learn how different economic conditions in different parts of the world affect changes in the global environment.

Clustering results

By grouping CO2 emissions per capita and GDP per capita, we may identify three distinct groups that represent three different sorts of nations. Low-income nations, lower-middle income countries, and high-income countries.

CO2 Emissions Metric Tons Per Capita in United Kingdom Forecast Until 2030 10 data Forecast 8 2 2 2

The amount of CO2 released into the air has been going down since 1990 and is expected to keep going down until 2030. It's because of the UK's plan to fight climate change, use green energy sources, and start a "Green Revolution."

Years

2015

2020

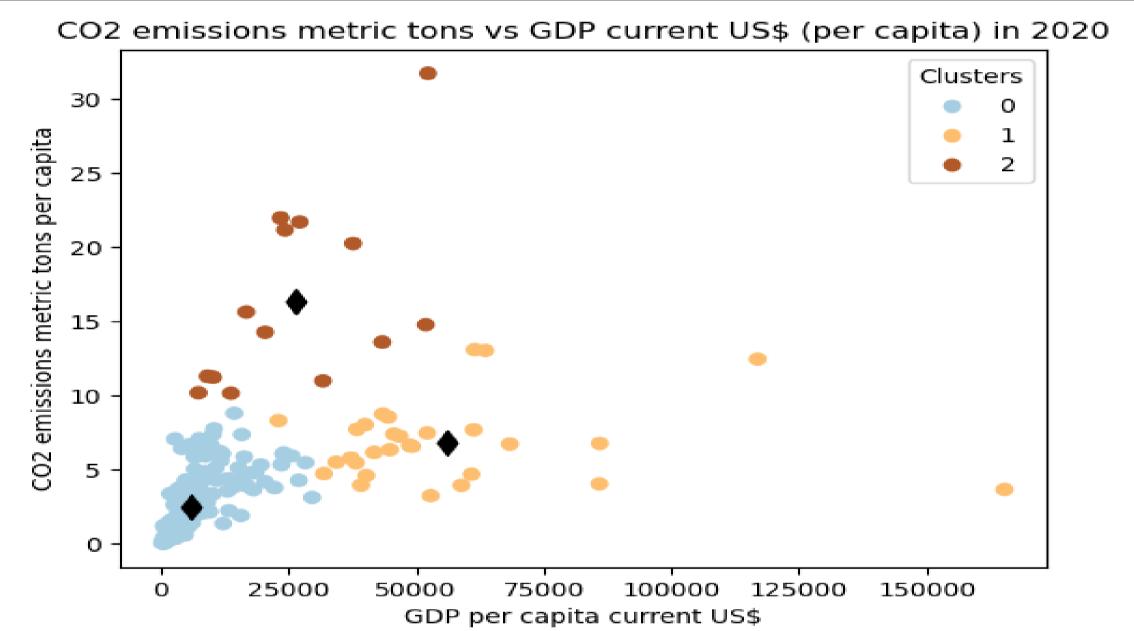
2000

25000

20000

2005

CO2 Emission VS GDP in 2020



There exists a direct relationship between CO2 emissions and GDP per capita. The first cluster consists of nations with low emissions and low GDP. The second cluster comprises high-income countries. The third cluster includes lower-middle income countries with a GDP per capita of less than \$50,000 and CO2 emissions above 10 metric tons.

GDP Per Capita in United Kingdom GDP per Capita Current US\$ in United Kingdom Forecast Until 2030 50000 45000 45000 35000 35000

The UK's GDP per person goes up and down a little bit over time. Because of changes in economic tactics and refuges, but overall, it's gone up, and predictions say it will stay that way until 2030.

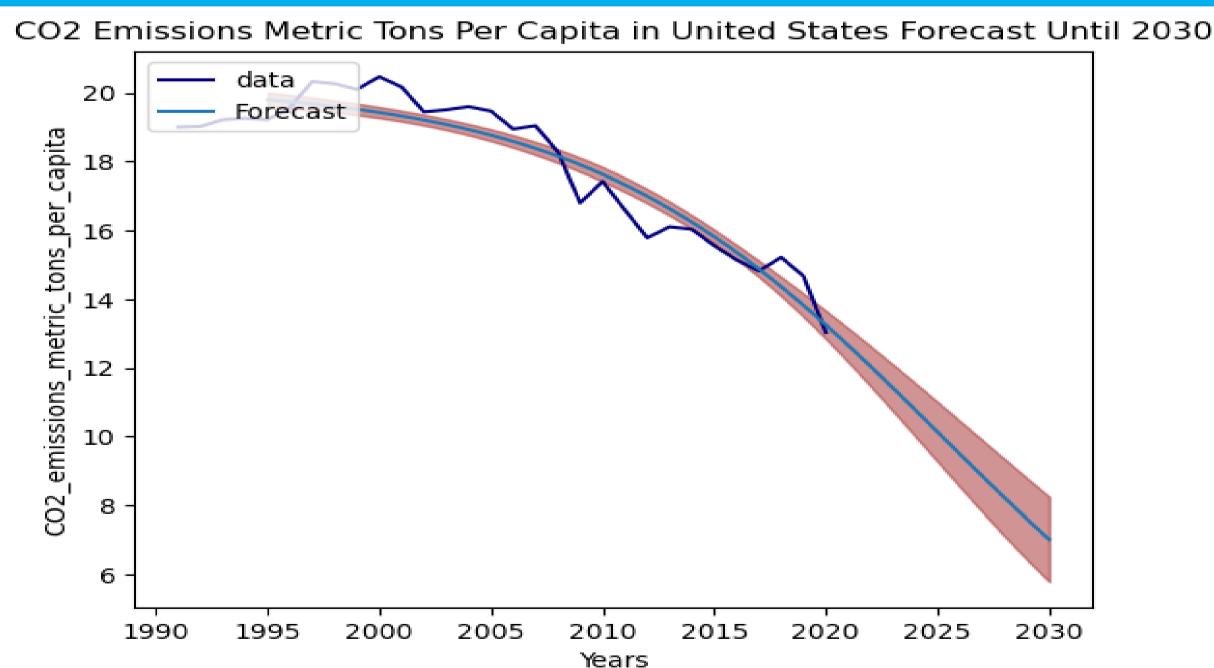
Years

2015

2020

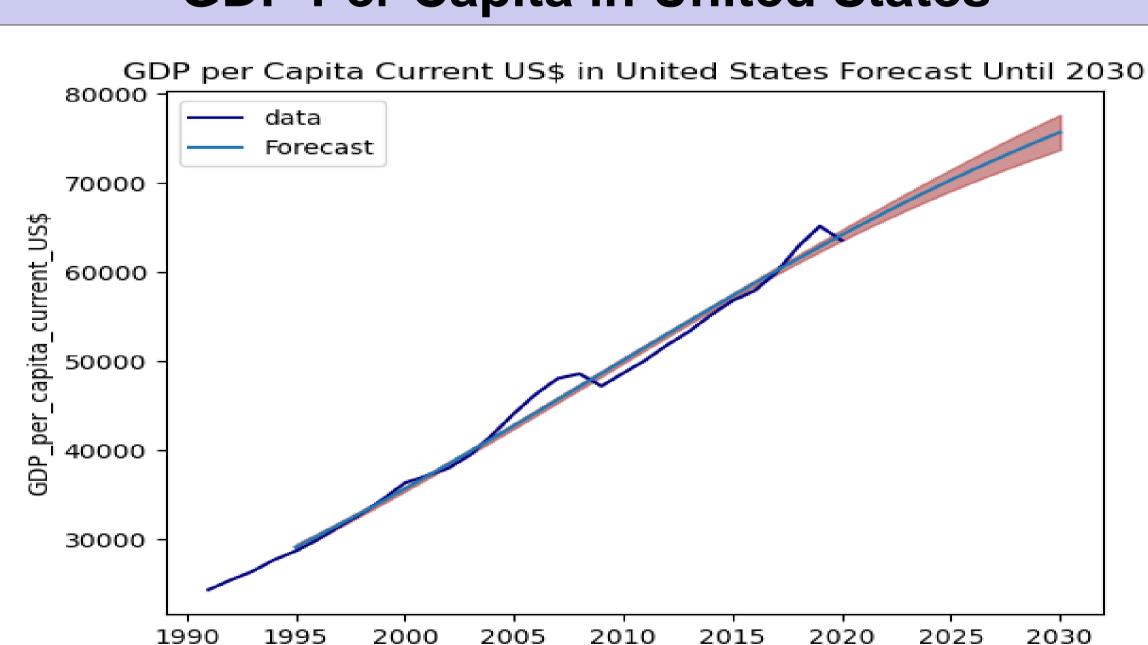
2025

CO2 Emission Per Capita in United States



The graph shows a consistent decline in CO2 emissions per capita in the United States from 1990, with projections indicating a continuation of this trend through 2030.

GDP Per Capita in United States



The graph shows a steady rise in the United States' GDP per capita, with continued growth expected through 2030 according to projections

Conclusions

The K-Means grouping shows clear world trends connecting CO2 pollution and GDP per capita, putting countries into three economic groups. Considering the US's strong economic growth and big drop in CO2 emissions, the prediction points to a positive trend of separating economic wins from environmental impacts. In the meantime, the UK is also on the right track, showing how to effectively lower CO2 emissions while keeping the economy stable. This is possible thanks to stricter environmental laws, more use of green energy, and a strong dedication to environmentally friendly practices. This shows how important focused policies and actions are for leading countries to a better and more sustainable future.