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Subject: Applied Data Science 1

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Data Source: https://data.worldbank.org/

Repository Link: https://github.com/Kinzaijaz29/Applied_Data_Science1_Assignment_2.git

Exploring Statistics and Trends in World Bank Data

Abstract - This synthesis of key indicators spanning seven countries (United Kingdom, United States, Afghanistan, Italy, China, Japan, Germany) from 2001 to 2013 provides valuable insights into their economic, environmental, and energy dynamics. Analysing CO2 emissions and GDP growth trends reveals variations among countries. The United Kingdom and the United States show distinct patterns in emissions reduction, while China and Germany exhibit increasing emissions.

Analysis of Annual GDP Growth (%) for Selected Countries (2001-2013)

I employ data from the World Bank API to analyze and visualize annual GDP growth (%) for seven countries over the period 2001-2013. Descriptive statistics and visualizations succinctly capture varied growth patterns, emphasizing China's economic vitality with consistently high growth rates, while showcasing stability in the United Kingdom and Italy, and fluctuations in Japan's economic performance.

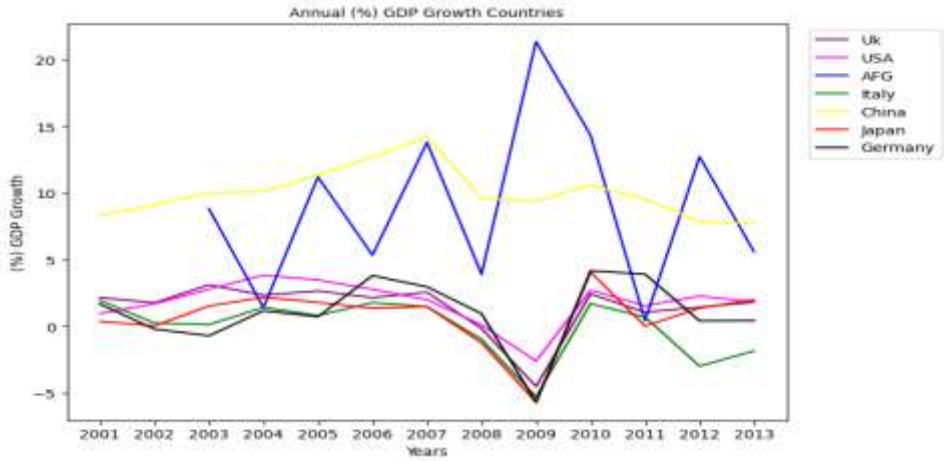

Figure 1: Annual GDP Growth of Selected Countries

Analysis Report: CO2 Emissions and GDP Growth (2001-2013)

The analysis of CO2 emissions (metric tons per capita) and GDP growth (%) for selected countries from 2001 to 2013 reveals interesting patterns and relationships. Examining specific countries, the United Kingdom and Japan display weaker correlations, highlighting potential disparities in their economic and environmental dynamics. These findings contribute to a nuanced understanding of the intricate relationship between economic development and environmental impact.

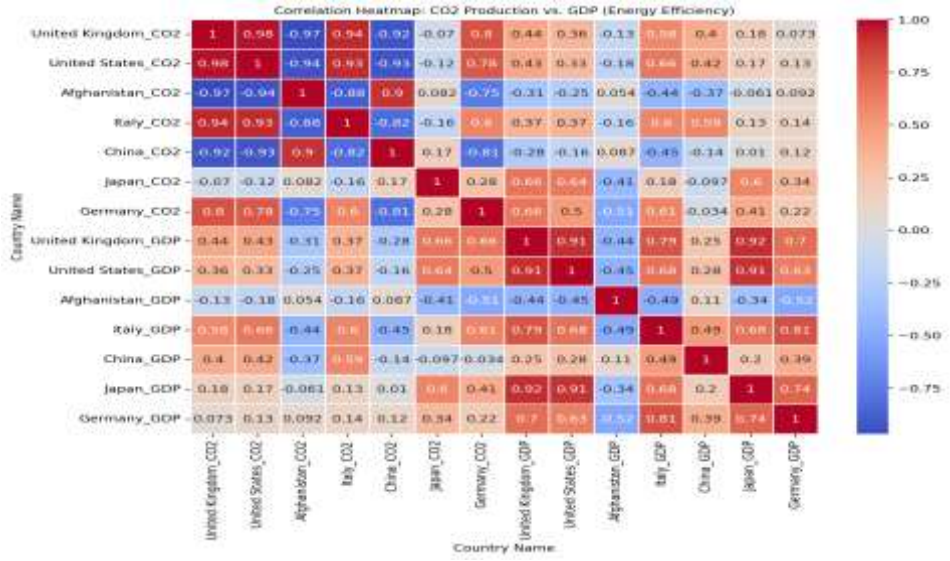

Figure 2: CO2 Emissions and GDP Growth (2001-2013)

Analysis Report: Electricity Production from Oil, Gas, and Coal Sources (2001-2013)

Examining electricity production from oil, gas, and coal sources (% of total) for selected countries (United Kingdom, United States, Afghanistan, Italy, China, Japan, Germany) from 2001 to 2013 provides valuable insights into their energy composition. The United Kingdom and Italy show a decreasing reliance on fossil fuels, contrasting with the United States' stable proportion. China and Germany maintain a diverse energy mix, reflecting strategic power generation approaches.

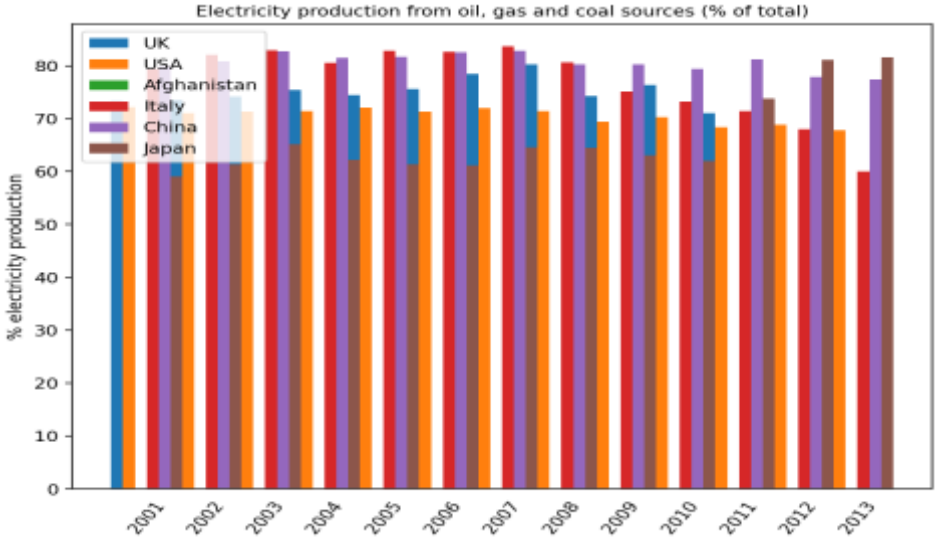

Figure 3: Annual Electricity Production from Oil, Gas, and Coal Sources (2001-2013)

Analysis of Key Indicators for the United States (2001-2013)

The analysis of US socio-economic and environmental indicators from 2001 to 2013 reveals consistent urban population growth, a shift in electricity production sources, and fluctuating contributions of agriculture to GDP. CO2 emissions closely correlate with electricity production, underscoring the environmental implications of energy generation, while forest area experiences a slight decline.

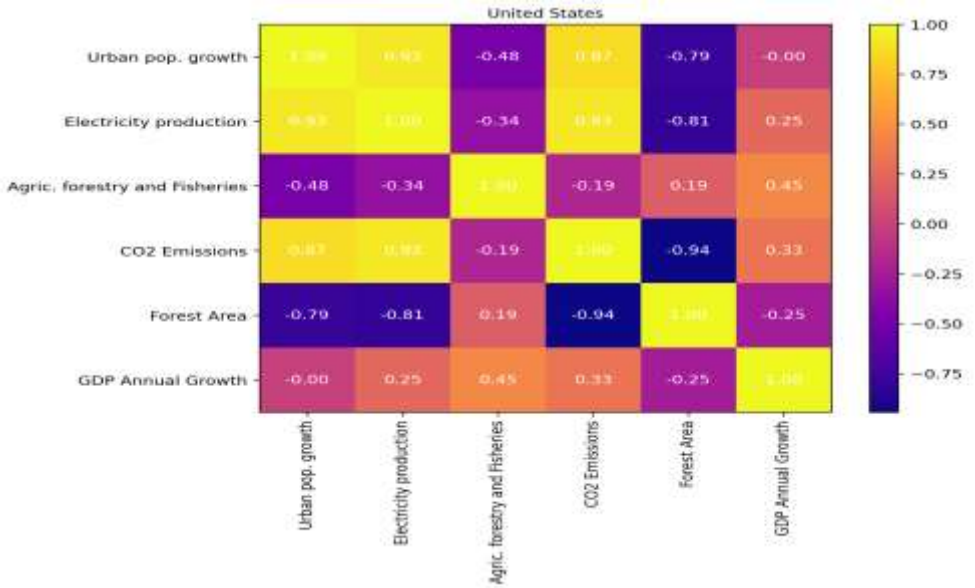

Figure 4: Analysis of Key Indicators for the United States (2001-2013)

Analysis of Key Indicators for the Italy (2001-2013)

Italy experiences a decline in GDP growth alongside a decrease in CO2 emissions, emphasizing a potential decoupling of economic growth and carbon emissions.

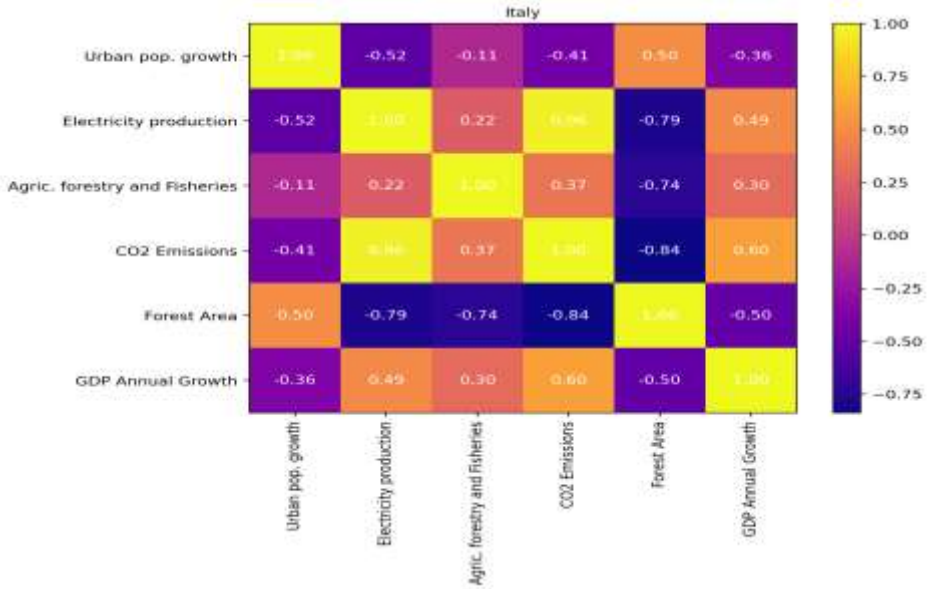

Figure 5: Analysis of Key Indicators for the Italy (2001-2013)

Agriculture, forestry, and fishing in GDP (2001-2013)

Agriculture, forestry, and fishing value added to GDP are examined through grouped bar plots for selected countries. Afghanistan stands out with a significant contribution from these sectors, highlighting the

importance of these industries in its economic structure.

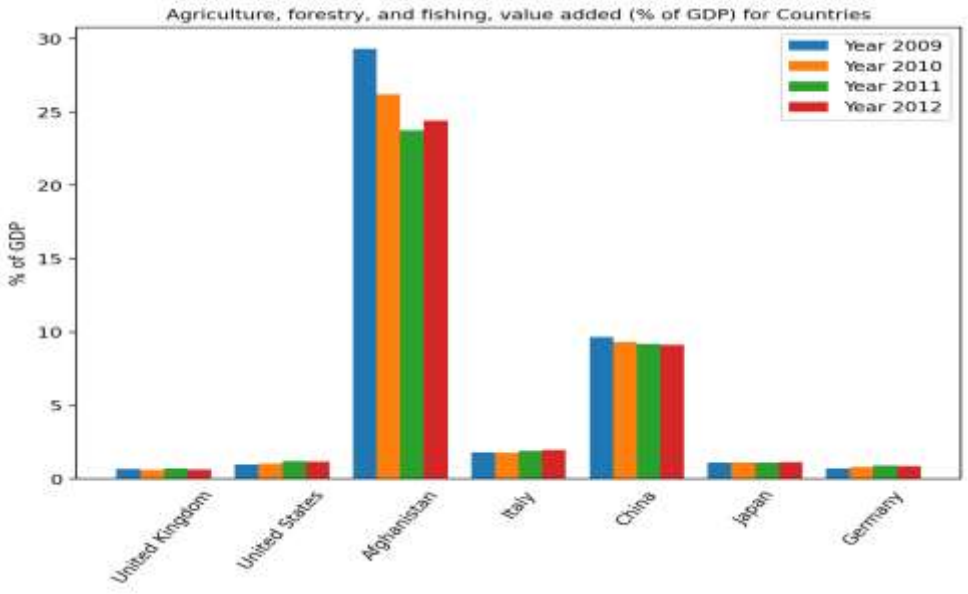

Figure 6: Agriculture, forestry, and fishing in GDP (2001-2013)

Forest Area Trends: (2001-2013)

Finally, we analyse forest area trends as a percentage of land area for the selected countries. Germany maintains a consistently high forest area, while China and the United Kingdom show fluctuations, indicating potential challenges in sustainable forestry practices.

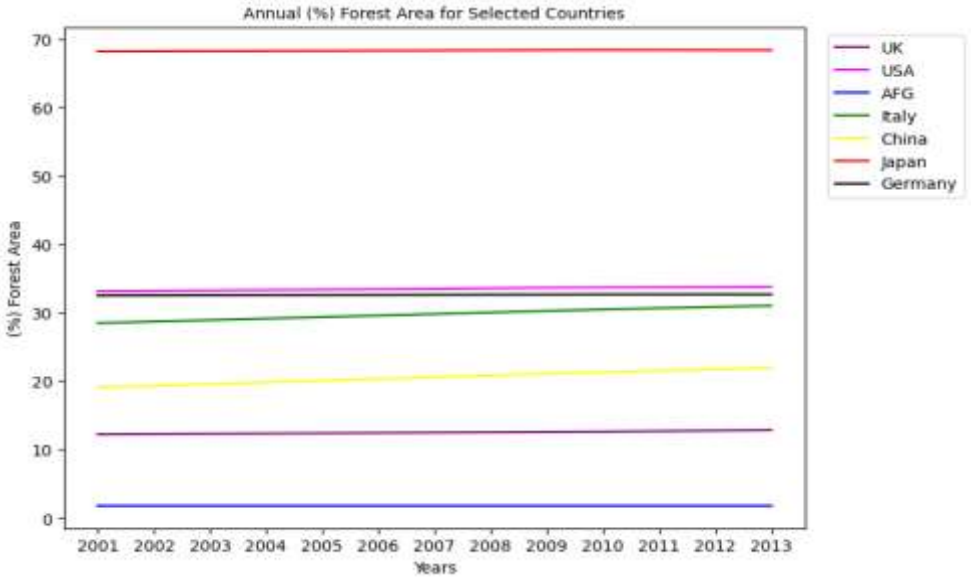

Figure 7: Forest Area Trends: (2001-2013)

Correlation Analysis of Electricity Production and GDP Growth

In the correlation matrix, China exhibits a robust positive correlation (0.775) between electricity production and GDP growth. This suggests a synchronous relationship where increased electricity production aligns with higher economic growth. While correlations for other countries vary, it's crucial to conduct further investigations to comprehend the nuanced dynamics between these economic indicators.

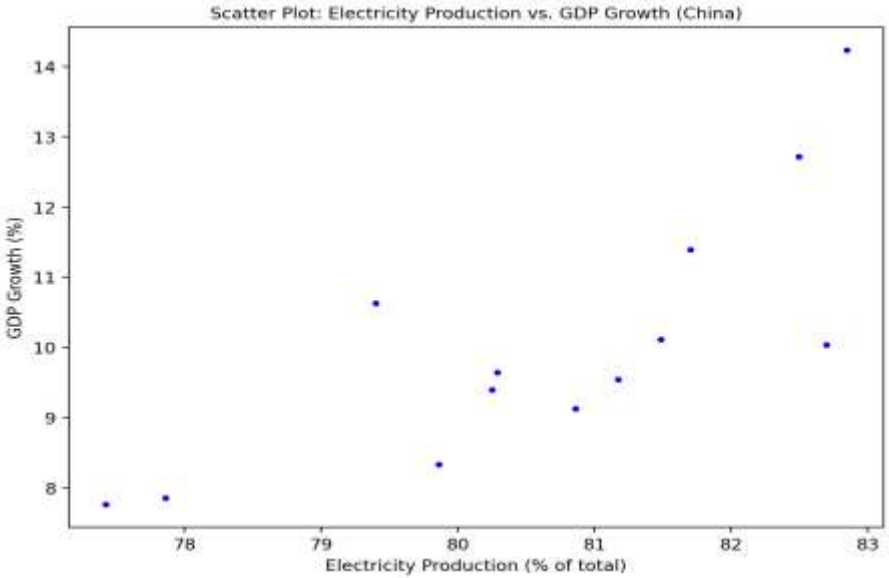

Figure 8: Electricity Production vs. GDP Growth China