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Subject: Applied Data Science 1

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

Repository Link: https://github.com/Zeeshan2232/Assignment_2_ADS1.git

Applied Data Science Assignment 2

Exploring Statistics and Trends in World Bank Data

Abstract - This report provides a comprehensive analysis of key economic and environmental indicators for various countries, including GDP growth, agriculture's contribution to GDP, correlation matrices, and trends in urban population growth, CO2 emissions, electricity production, and agricultural land use. The dataset spans from 2014 to 2022 and covers countries such as Brazil, Nigeria, Australia, Canada, and others. The analysis aims to provide insights into economic performance and potential correlations.

GDP Growth (Annual %):

The statistics for GDP growth reveal interesting trends across several countries. On average, Brazil and Nigeria exhibit higher volatility in their GDP growth, with mean values of 4.18% and 5.82%, respectively. Italy, Canada, and Germany show moderate growth patterns. The analysis suggests that economic stability varies among these nations, impacting overall global economic trends.

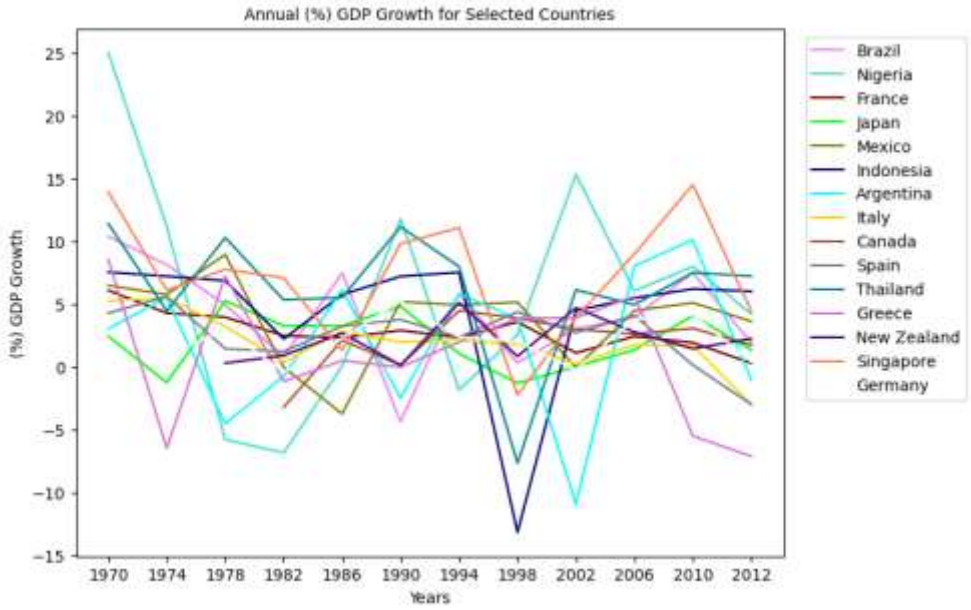

Figure 1: GDP Growth of Selected Economies

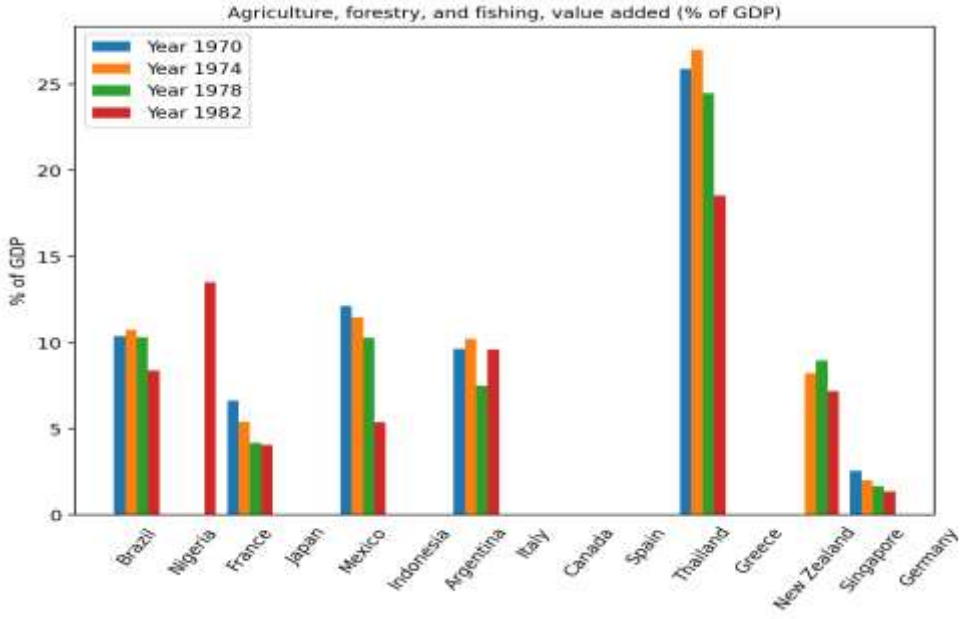

Figure 2: Analysis of Agriculture, Forestry, and Fishing Contribution to GDP (%)

Analysis of Agriculture, Forestry, and Fishing Contribution to GDP (%):

The grouped bar plot analysis for the percentage contribution of agriculture, forestry, and fishing to GDP highlights the evolving nature of these sectors. Brazil consistently maintains a significant reliance on agriculture. The analysis emphasizes the shifting economic landscape, where some nations prioritize diversification over traditional sectors.

Urban Population Growth Trends Analysis

The urban population growth analysis reveals varying trends across countries. Brazil and Nigeria experience consistent growth, indicative of rapid urbanization. In contrast, Japan's urban population remains relatively stable, reflecting a matured urban landscape. The fluctuations in urban growth for Spain and Germany suggest nuanced socio-economic dynamics.

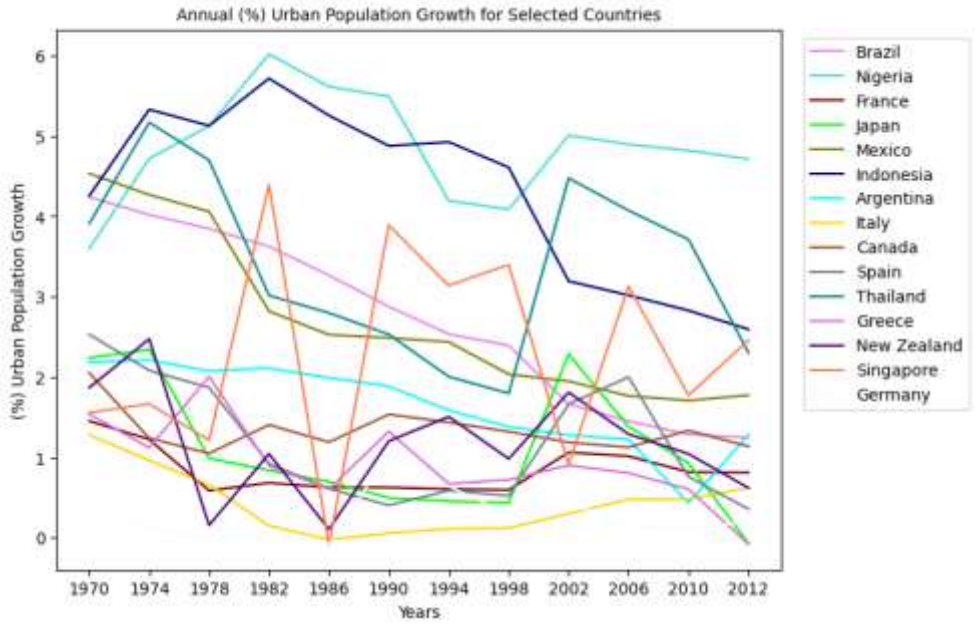

Figure 3: Urban population growth

Correlation of Spain Analysis

The correlation matrices for Spain reveal interesting relationships between different indicators. In Spain, strong positive correlations are observed between urban population growth and agriculture, forestry, and fisheries, suggesting a potential link between urbanization and agricultural activities. Additionally, a negative correlation between urban population growth and CO2 emissions indicates that urbanization might be associated with efforts to reduce carbon emissions.

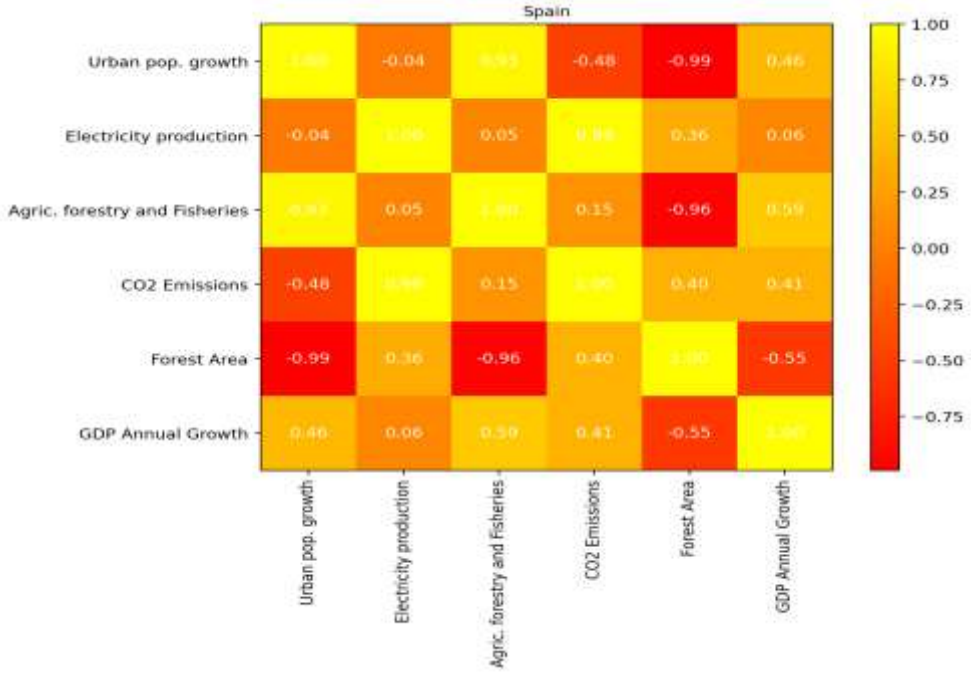

Figure 4: Analysis of Key Indicators for Spain

Corelation of Germany Analysis

The correlation matrices for Germany reveal interesting relationships between different indicators. In Germany, a strong positive correlation between electricity production and CO2 emissions highlights the reliance on carbon-intensive energy sources. The negative correlation between electricity production and forest area implies a potential environmental impact of energy production.

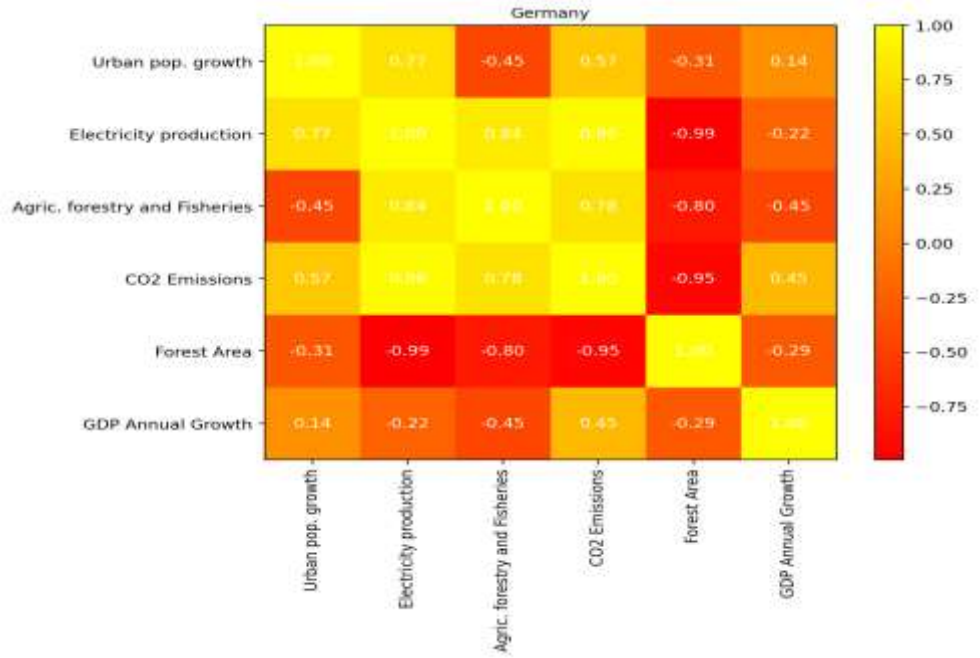

Figure 5: Analysis of Key Indicators for Germany

Electricity Production Trends:

The multiple line plots depict the evolution of electricity production over time for different countries. Brazil and Germany show substantial growth, with Brazil diversifying its energy mix, while Germany's growth is accompanied by a shift towards renewable energy sources. In contrast, countries like Japan and France maintain relatively stable electricity production, emphasizing the unique energy landscapes and policies in each region.

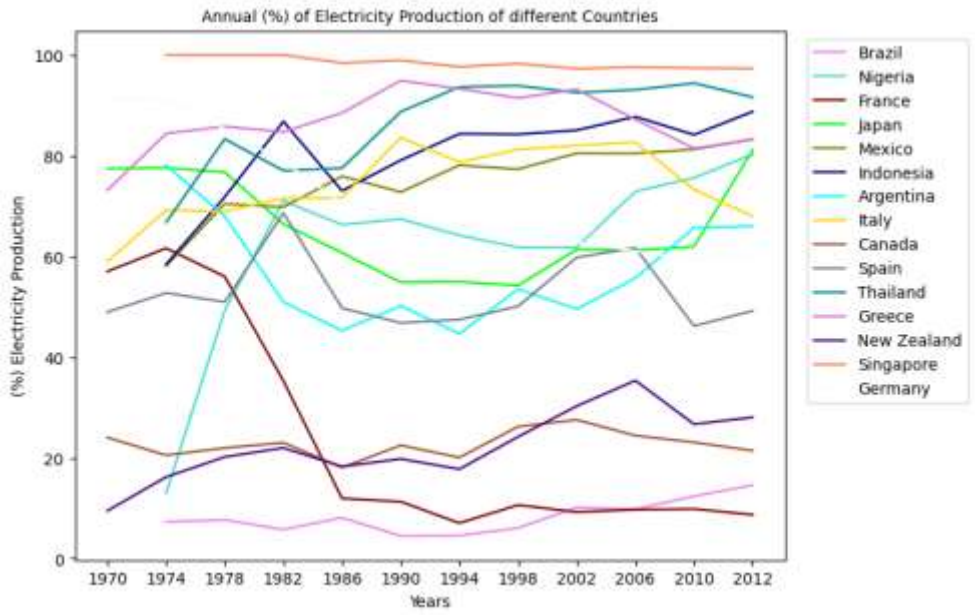

Figure 6: Electricity Production Insights

Greenhouse CO2 Emissions:

The CO2 emissions analysis demonstrates the efforts of different countries to manage carbon emissions. Brazil exhibits a rising trend, signalling potential challenges in balancing economic growth and environmental sustainability. Germany's declining emissions align with its commitment to renewable energy. The divergence in emission trajectories among nations emphasizes the importance of tailored environmental policies to address unique socio-economic contexts.

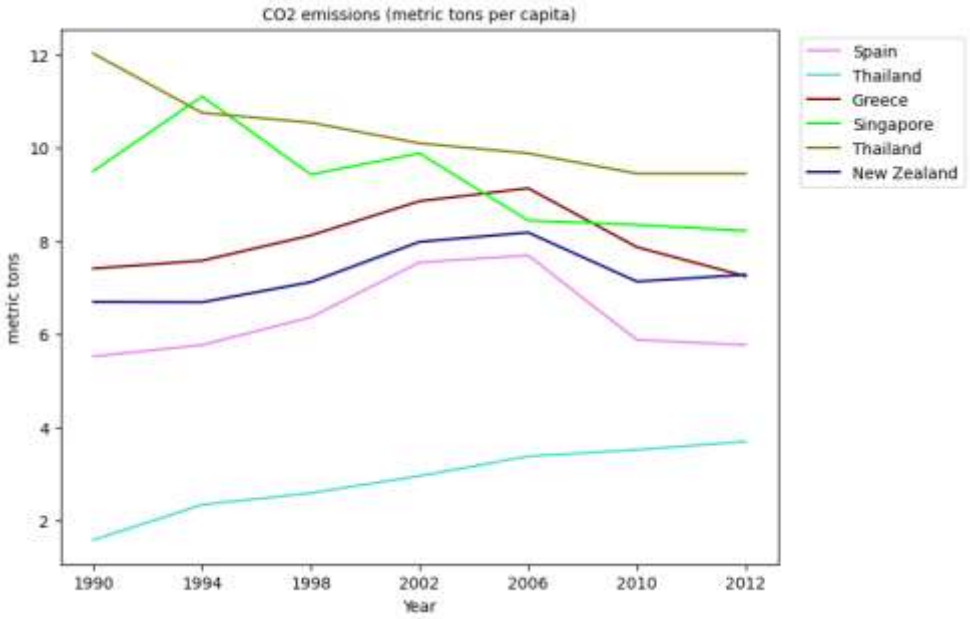

Figure 7: Greenhouse Gas Emissions by Countries

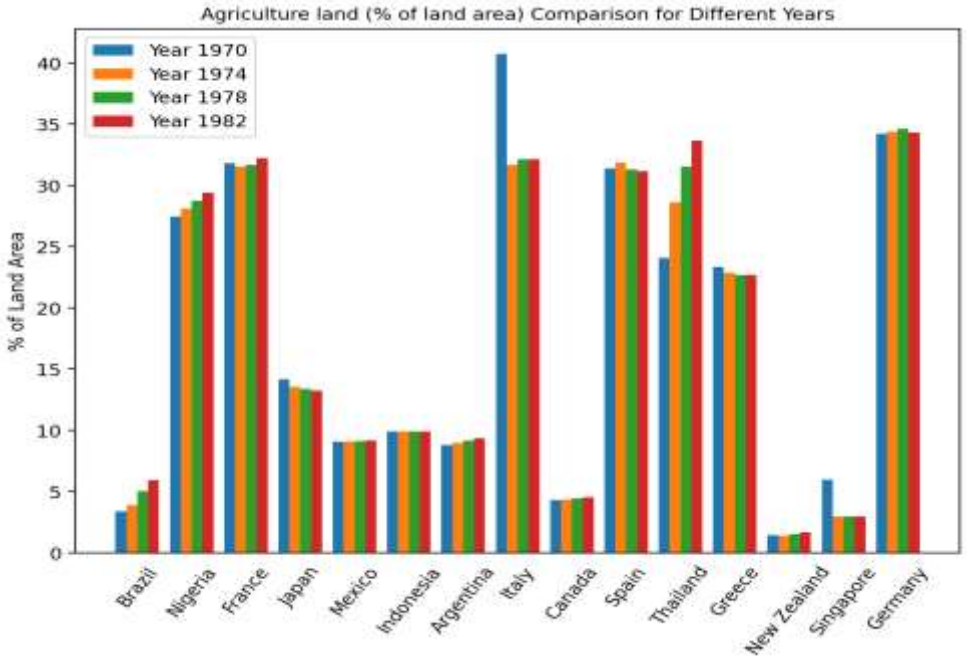

Figure 8: Agriculture Land Analysis

Agriculture Land Analysis:

This analysis provides a snapshot of the changes in agriculture land as a percentage of total land area for various countries over time. Spain exhibits a decreasing trend, reflecting a shift away from agriculture, while Germany's agriculture land remains relatively stable. Brazil and Nigeria show consistent growth, indicating a sustained reliance on agriculture. This analysis highlights the diverse approaches to land use and economic development among the selected countries.