

Economic Analysis of Government Spending

Executive Summary

Note: All the currency is denominated in current US \$.

- The United States boasts the highest GDP of approximately $\$2.546270e+13$, followed closely by China with a GDP of approximately $\$1.796317e+13$, all values are denominated in current US dollars.
- A 2023 GDP forecast using LSTM models indicates that the United States is expected to maintain its position as the world's largest economy, with China as the runner-up. India is anticipated to retain its position as the fifth-largest economy.
- In 2022, the European Union recorded the highest government spending among all G20 nations, totalling around $\$3.552254e+12$. In 2021, the largest global economy, the United States, had government spending amounting to approximately $\$3.353731e+12$.
- China leads the G20 nations in government spending for Agriculture, Forestry, and Fishing, Industry (Including Construction), and Manufacturing, Value Added, in the year 2022. In the Services sector, the United States tops the table among G20 nations based on data from 2021.
- Saudi Arabia experienced remarkable growth in GDP per capita in 2022, with a substantial increase of approximately 7.3750% on an annual basis.

Introduction

Government spending plays a pivotal role in shaping the economic landscape of nations across the globe. It not only reflects a government's fiscal policies and priorities but also exerts a profound influence on economic growth, social welfare, and overall stability. In this era of interconnected economies and dynamic financial markets, understanding the intricacies of government spending and its impact on national and global economies is of paramount importance.

This comprehensive economic analysis explores the complex landscape of government expenditures, with a specific emphasis on valuable insights derived from the world's major economies within the G20. Our investigation commences by directing attention to the economic powerhouses, namely the United States and China, which have established themselves as global leaders with GDP figures exceeding the \$1 trillion mark in current US dollars. In addition, our scrutiny extends to the impact of government spending on the overall societal well-being of the populace, underlining the intricate interplay between fiscal policies and individual quality of life. Furthermore, we conduct a detailed examination of government spending across various sectors, shedding light on how these allocations shape economic dynamics.

Methodology

1. Data Collection
 - Data Source: The primary data sources for this economic analysis include publicly available datasets from the World Bank.
 - Data Variables: The analysis focuses on economic indicators, including Gross Domestic Product (GDP), government spending, and GDP per capita, with a specific emphasis on sectors such as Agriculture, Industry (including construction), Manufacturing, and Services.

2. Data Preprocessing
 - Data Cleaning: The dataset underwent thorough cleaning, including handling missing values, and ensuring data consistency.
3. Exploratory Data Analysis
 - Time Series Analysis: Time series analysis was performed to identify trends, fluctuations, and anomalies in economic indicators over the years.
 - Cross-Sectional Analysis: Cross-sectional analysis was conducted to compare economic indicators among G20 nations.
4. Data Visualizations
 - Charts and Graphs: The findings were visually presented using charts and graphs. Time series plots, scatter plots, and other relevant visualizations were utilized to facilitate data interpretation.
5. Analysis and Interpretations
 - Findings: The results from the exploratory analysis and forecasting were analysed to draw meaningful conclusions about the economic trends and relationships.
 - Limitations: The study acknowledges the limitations and assumptions inherent in data analysis, including potential sampling variability.
6. Report Preparation
 - Documentation: Detailed documentation of data sources, preprocessing steps, model configurations, and statistical analyses was maintained.
 - Report Generation: The analysis findings, conclusions, and recommendations were organized into a comprehensive report.

Findings and Analysis

Note: For each analysis, we have carefully selected a handful of countries that have excelled in their respective categories.

1. GDP (Current US\$) over time from 1970 - 2022

Figure 1

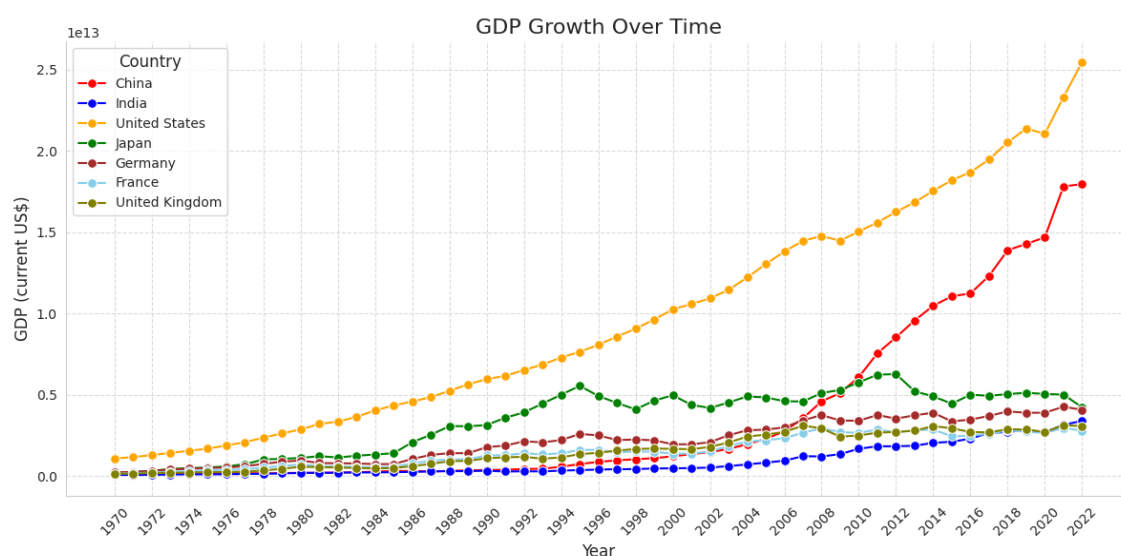
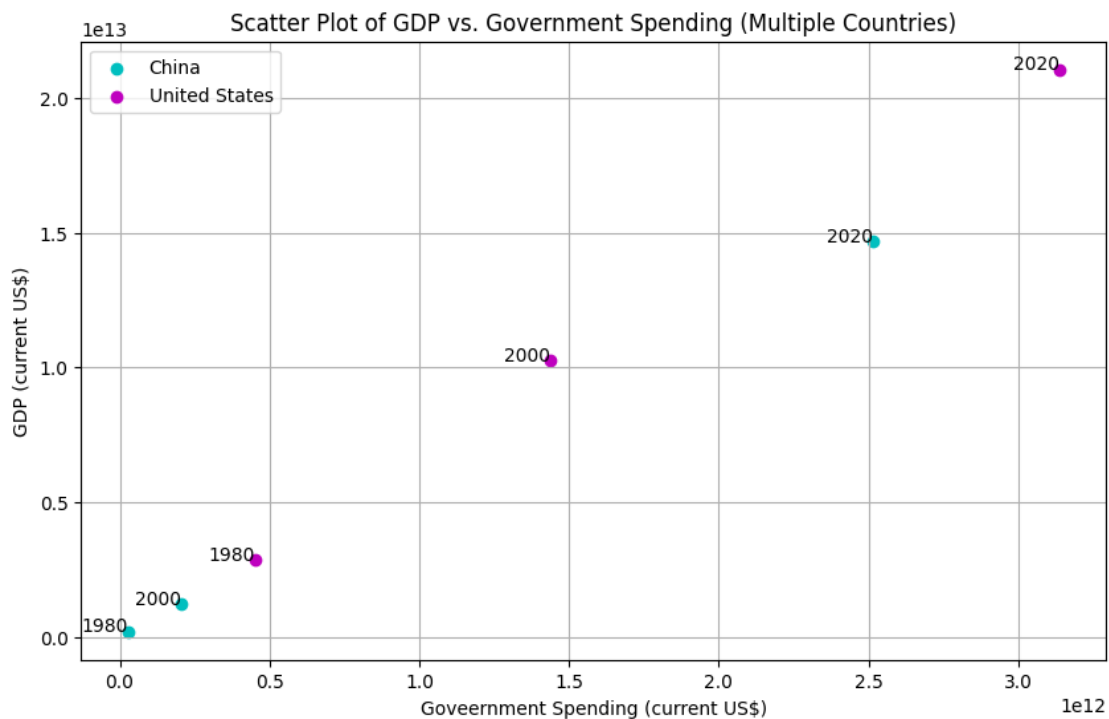


Figure 1 time series plot illustrates the GDP trends from year 1970 to 2022 for seven major economies: USA, China, Japan, Germany, India, UK, and France. Notably, the United States boasts the

highest GDP, followed by China. Japan and Germany also feature prominently, but as of 2022, India has established itself as the world's fifth-largest economy. This data highlights India's remarkable economic growth and its current position among the top global economies.

2. Shows association between government spending and broader economic activity.

Figure 2



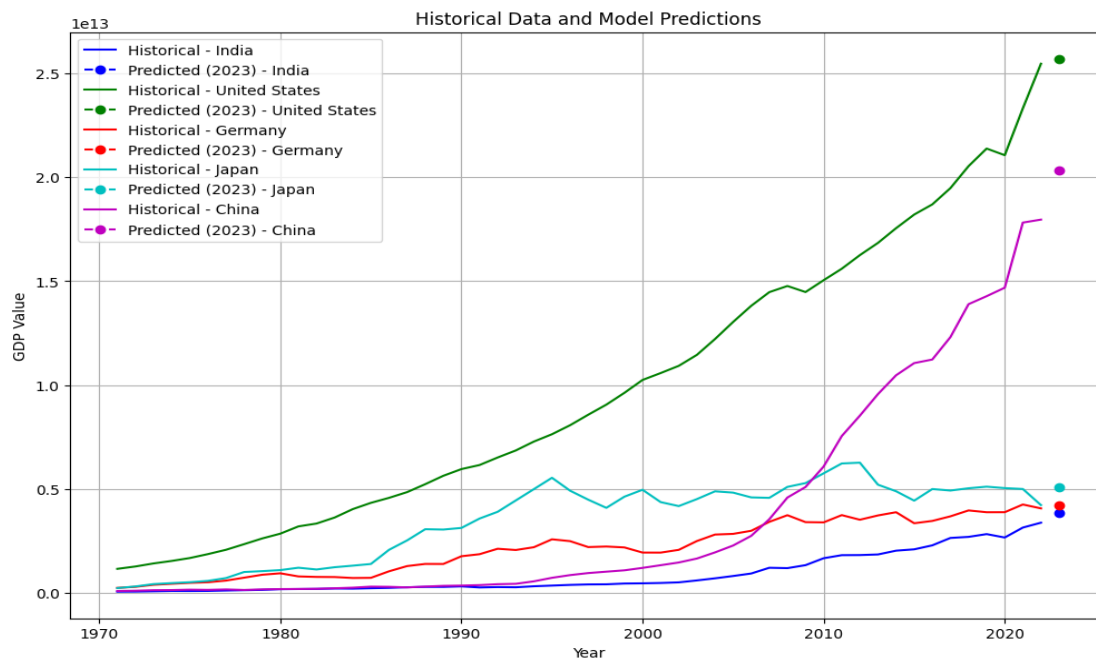
We have conducted an analysis focusing on the two largest economies, the United States and China, to examine the connection between government spending and overall economic well-being. In Figure 2, we present a visual representation of the relationship between government spending and Gross Domestic Product (GDP) for the years 1980, 2000, and 2020.

Upon inspection of the scatter plot, we see a positive correlation emerges between government spending and GDP. This implies that when government spending increases, there is a corresponding rise in the country's GDP. However, it is essential to consider the potential influence of sampling variability. To establish the robustness of this positive correlation, the application of inferential statistical tools is imperative.

3. Forecasting GDP – 2023

In Figure 3, we present the GDP forecast for the year 2023 for five major countries: India, United States, Germany, Japan, and China. These forecasts were generated using an LSTM model. The results indicate that the United States is projected to maintain its position as the world's largest economy, with a forecasted GDP of approximately 2.5696682e+13. China closely follows as the second-largest economy, with a forecasted GDP of around 2.0330318e+13.

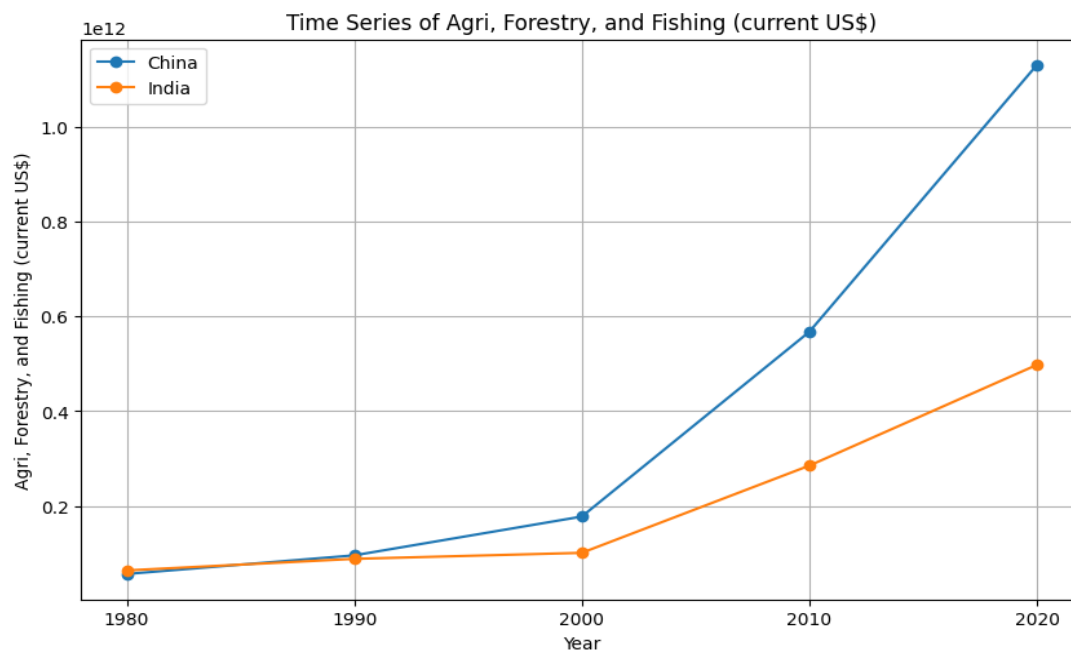
Figure 3



4. Sector-wise government spending (Current US\$)

- Agriculture, fishing and forestry (Current US\$)

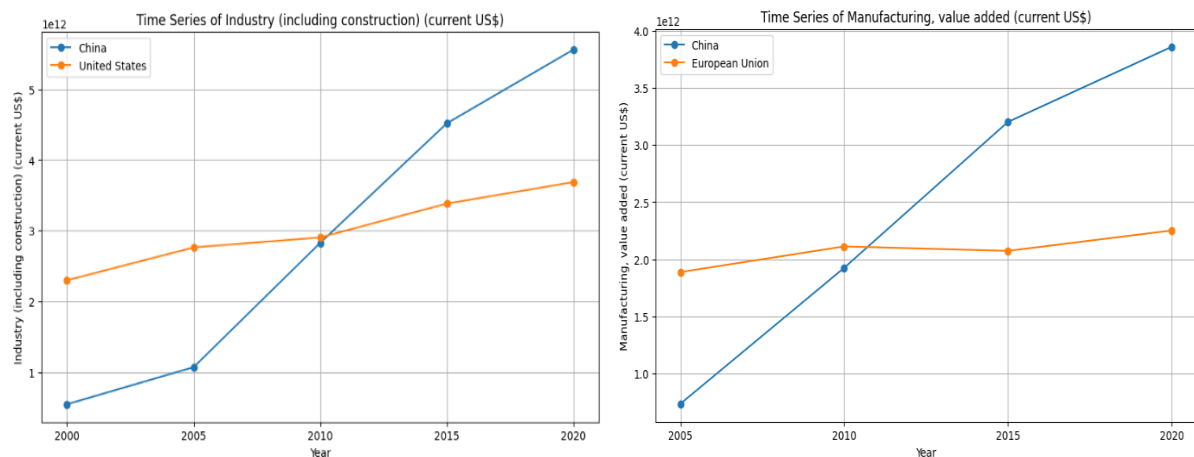
Figure 4



Based on the data, it is evident that China allocates the highest government expenditure to the Agriculture, Fishing, and Forestry sector as of the year 2020 among the G20 economies, with India closely following suit.

- Industry (including construction) and Manufacturing (Current US\$)

Figure 5



As depicted in Figure 5, it is evident that in the year 2020, China leads the G20 nations in terms of government expenditure, particularly in the Industry and Manufacturing sectors.

- Services, Value added (current US\$)

Figure 6

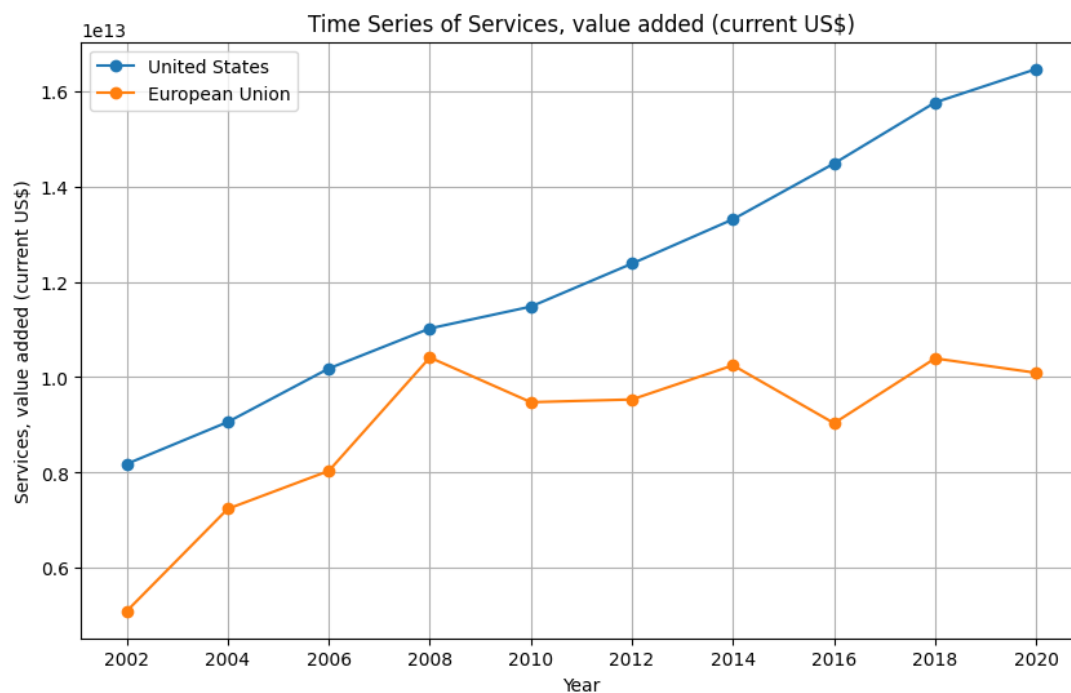
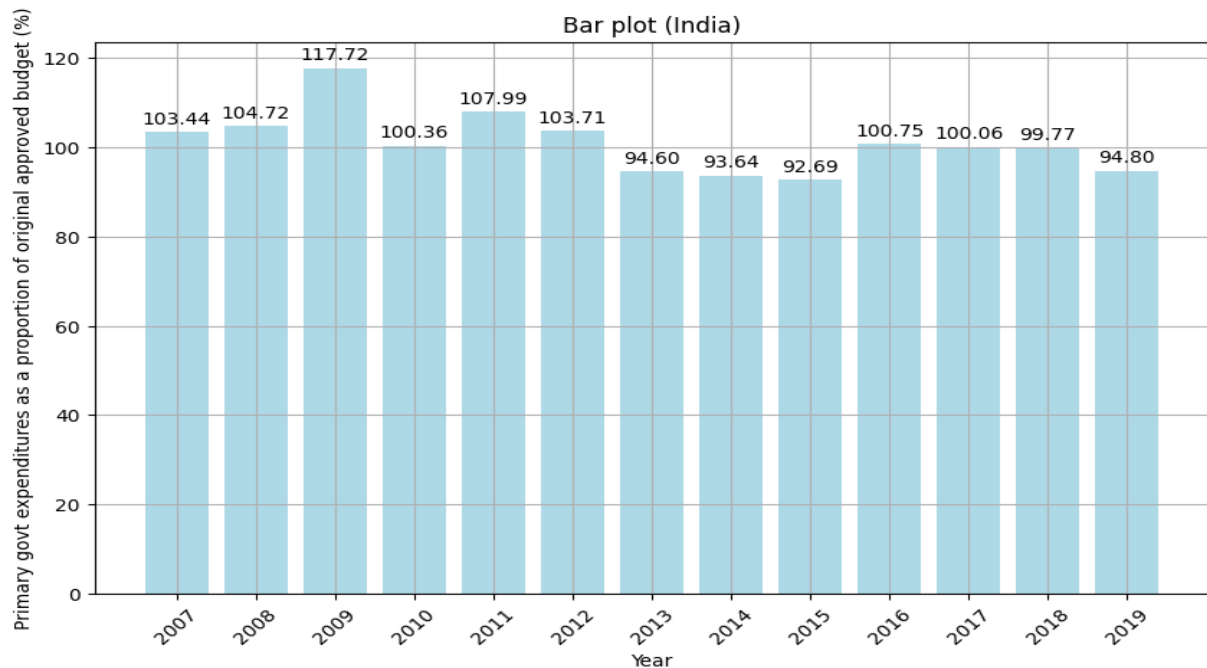


Figure 6 underscores the clear dominance of the United States in government spending within the Services sector among the G20 nations.

5. Primary government expenditure as a proportion of original approved budget (%)

Note: This dataset does not contain values before the year 2005. Also no data is available for countries such as United States and China. So, we'll be restricting our attention to India.

Figure 7



In Figure 7, we present the percentage of government funds spent in relation to the initial allocation. The data reveals that the Indian government effectively utilized most of the allocated funds, although there were instances, such as in 2019, when government spending fell below the allocated budget.

6. GDP per capita growth (Current US\$) overtime

Figure 8

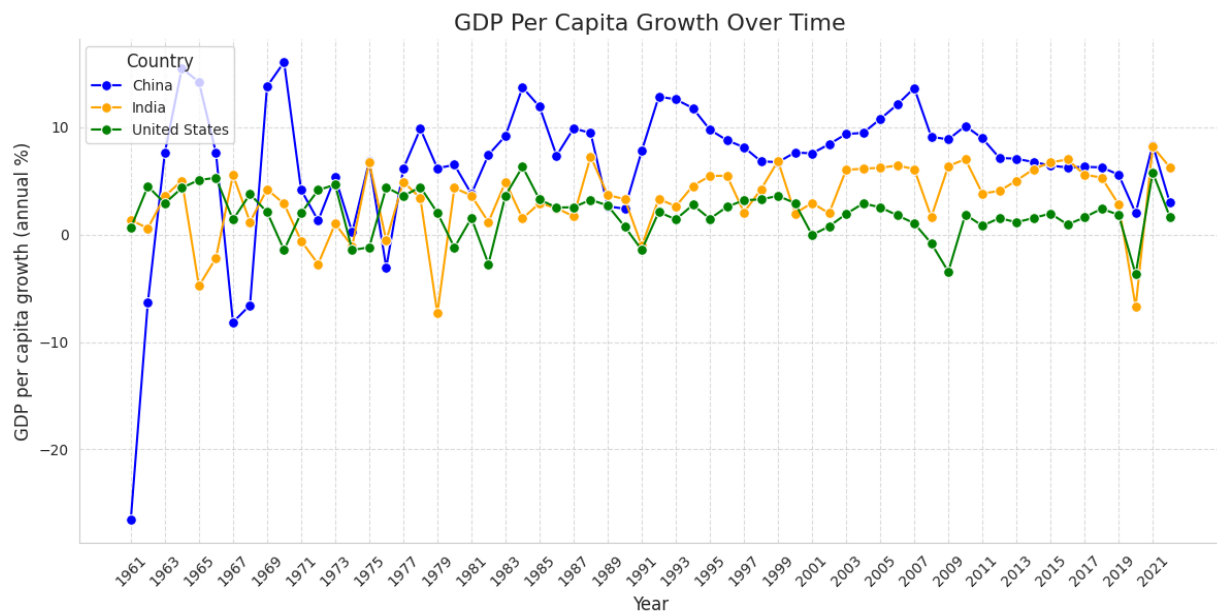


Figure 8 illustrates that among India, China, and the United States, India exhibited the highest GDP per capita growth in 2022. Notably, Saudi Arabia outperformed all G20 nations with the highest annual GDP per capita growth of 7.3750% in 2022.

Conclusion and Recommendations

In our comprehensive analysis of government spending and economic indicators across G20 nations, we have gained valuable insights into the global economic landscape. Here are the key findings and conclusions from our study:

- The data underscores the economic dominance of the United States and China, with the United States maintaining the highest GDP of approximately $\$2.54627\text{e}+13$ in 2022.
- In 2022, the European Union led the G20 nations in government spending, allocating a substantial $\$3.552254\text{e}+12$.
- Saudi Arabia recorded the highest GDP per capita growth in 2022, with an annual increase of approximately 7.375%.

Recommendations based on the findings from the economic analysis:

- Governments should continue to optimize their spending, ensuring that funds are allocated efficiently across sectors. As evident from our analysis, prudent spending can positively impact economic growth.
- While our analysis reveals a positive correlation between government spending and GDP, future research should delve deeper into this relationship. Employing rigorous inferential statistical tools can provide more robust insights into causation and the nuances of this connection.
- Governments and international organizations should encourage transparency in data reporting. High-quality and readily accessible data are vital for accurate economic analysis.

Appendices

Dataset: <https://github.com/KansaraT/Economic-Analysis-of-Government-Spending>