**Time Series Analysis – GDP & Inflation Trends (2021-2023)**

**Objective:**

To analyze the trends in **GDP (PPP constant 2021 $)** and **Inflation (Consumer Prices Annual %)** over the years **2021-2023** to understand economic stability and inflationary pressures.

**Findings:**

* **GDP Growth:** The trend shows a **steady increase** in global GDP, indicating economic recovery or expansion.
* **Inflation Trends:** Inflation peaked significantly in **2022**, reflecting post-pandemic economic challenges, before stabilizing in **2023**.

**Python Code & Visualization:**

A screenshot of a computer program

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A graph showing the growth of the gdp and inflation trends

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**Hypothesis Testing – Inflation in High vs. Low Trade Countries**

**Objective:**

To examine if inflation levels significantly differ between countries with **high** and **low trade openness** using a **T-Test**.

**Findings:**

* The **T-Test results** show a **statistically significant difference** in inflation rates between **high-trade** and **low-trade** countries (**T-Statistic: 23.91, P-Value: 0.000**).
* **Interpretation:** Countries engaged in higher trade tend to experience different inflation dynamics than those with lower trade openness.

**Python Code & Visualization:**

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A graph of a distribution of inflation

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**Multiple Linear Regression – Predicting GDP Growth**

**Objective:**

To assess the impact of **Inflation, Trade (% of GDP), and Government Spending (% of GDP)** on **GDP growth** using a **Multiple Linear Regression model**.

**Findings:**

* **Negative impact** of **Inflation, Trade, and Government Spending** on **GDP Growth**.
* **R² Score: 0.045** → The model explains only a **small fraction** of GDP variations, indicating that GDP is influenced by other factors beyond these three variables.

**Python Code & Visualization:**

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A graph with lines and dots

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**Clustering – Identifying Economic Patterns**

**Objective:**

To categorize countries into distinct economic groups based on **Inflation and Trade (% of GDP)** using **K-Means Clustering**.

**Findings:**

* The **K-Means algorithm** successfully segmented countries into **3 distinct clusters** based on **Inflation & Trade**.
* **Interpretation:** Countries with **similar economic structures** cluster together, helping policymakers identify patterns in global economic trends.

**Python Code & Visualization:**

A screenshot of a computer code

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A graph showing the amount of inflation

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