Power BI Inflation Analysis
Journeying Through Global Economic Terrain

Introduction

Project Overview

This project focuses on analyzing the global inflation trends from 1980 to 2024 using Power BI and Power Query. The analysis starts from the collection of the data to the dashboards making and reports. Dashboards are used to identify key inflation patterns, regional variations, and changes across time.

Objective

The objective is to make an interactive dashboard for making insightful decisions and strategic decision making. Transformation of raw data to dashboard is used to answer the business questions related to inflation, identify trends, inflation patterns throughout the years and inflation distribution. The slicers also aim to provide selective insights of a specific country.

Project Initialization and Planning Phase

Define Problem Statement

Inflation remains one of the most volatile and impactful economic indicators. A multinational corporation operates in a diverse market seeks to optimize the pricing strategies, mitigates risks and make the informed investment decisions. We need inflation data to offer tailored recommendations aligned with each market's economic condition. This project addresses the challenge of visualizing inflation data across countries and regions to derive meaningful trends.

Project Proposal

Project Overview	
Objective	Analyzing global inflation data to to optimize pricing strategies, mitigate risks, and make informed investment decisions.
Scope	It involves data sourcing, cleaning, integration, modeling, and the creation of interactive dashboards.
Problem Statement	
Description	The lack of standardized data integration, limited historical coverage, and complex economic interdependencies make it difficult to analyze and compare inflation trends effectively.
Impact	Solving the problem of fragmented, inconsistent, and limited inflation data.

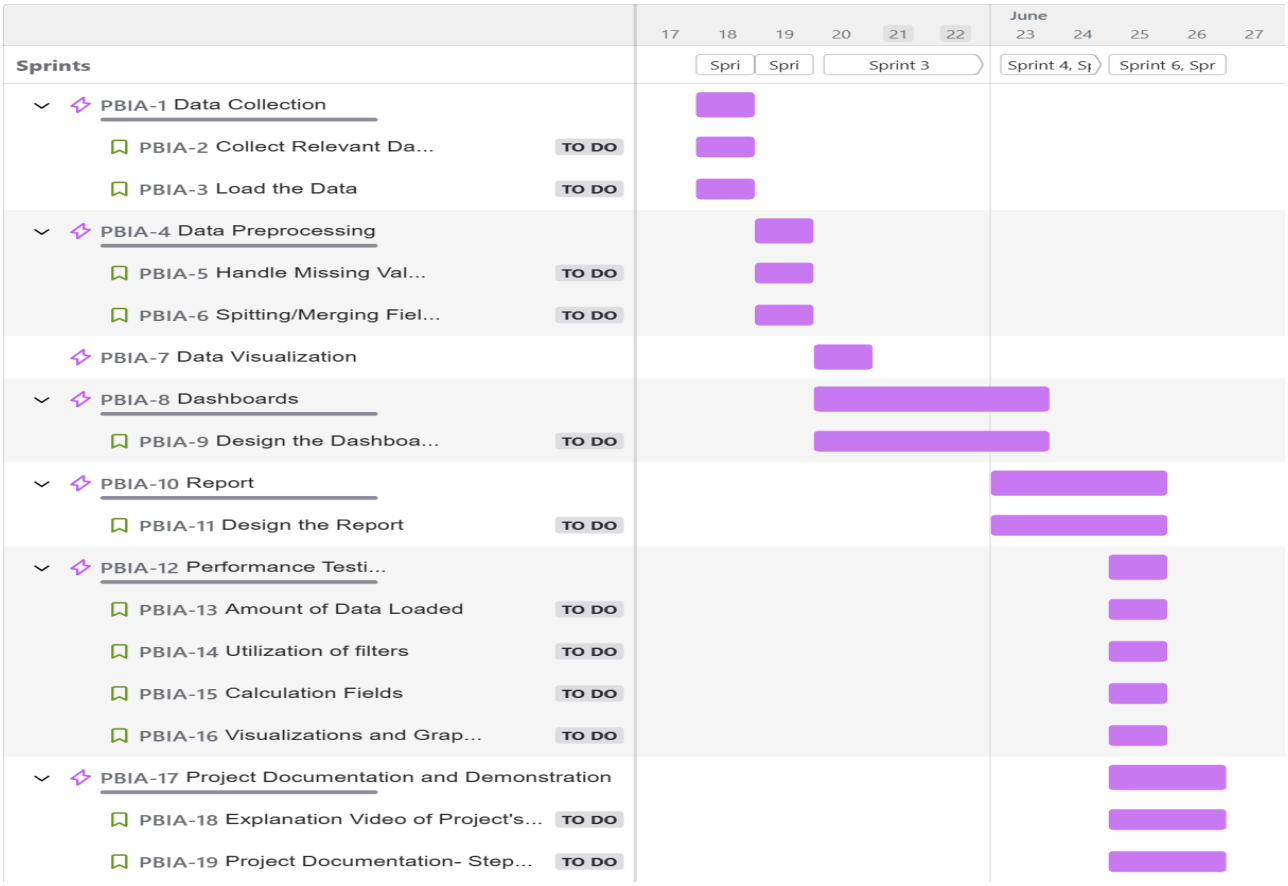
Proposed Solution	
Approach	The methodology begins with data collection from kaggle. This is followed by data preprocessing, including cleaning, transformation, and standardization. The data model is built within Power BI and insights are visualized through dashboards. The data is cleaned through the power query. The dashboards are created through Power BI and DAX calculations are used to measure the insights.
Key Features	Key findings reveal the highest sum of inflation rate of countries, Average Inflation Rate of All Countries, Top 3 Inflation Rate Countries, Inflation Rate Change Over Years, Inflation vs Adjusted Inflation trends, Distribution by Region, and category-based inflation spread. Dynamic slicers and drill-through filters enable focused, actionable exploration across regions and time.

Resource Requirements

Resource Type	**Description**	**Specification/Allocation**
Hardware		
Computing Resources	CPU/GPU specifications, number of cores	AMD Ryzen 5 3500U with Radeon Vega Mobile Gfx 2.10 GHz
Memory	RAM specifications	8 GB
Storage	Disk space for data, models, and logs	477 GB
Software		
Frameworks	Python frameworks	NA
Libraries	Additional libraries	NA
Development Environment	IDE, version control	Power BI and Power Query
Data		
Data	Source, size, format	Kaggle dataset, 63.8 Kb

Initial Project Planning

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members	Sprint Start Date	Sprint End Date (Planned)
Sprint-1	Data Collection	USN-1, 2	Collection of Data	1	High	Swetha P	18 June 2025	18 June 2025
Sprint-1		USN-3	Loading the Data	1	High	Swetha P	18 June 2025	18 June 2025
Sprint-2	Data Preprocessing	USN- 4, 5	Handling the Missing Value	2	Low	Swetha P	19 June 2025	19 June 2025
Sprint- 2		USN- 6	Splitting and Merging Fields	2	Medium	Swetha P	19 June 2025	19 June 2025
Sprint-3	Data Visualization	USN-7	Creating Visualization and Graphs	1	High	Swetha P	20 June 2025	20 June 2025
Sprint- 4	Dashboard	USN- 8, 9	Designing the Dashboard	5	High	Swetha P	20 June 2025	23 June 2025
Sprint- 5	Report	USN-10 , 11	Designing the Report	5	High	Swetha P	23 June 2025	25 June 2025
Sprint- 6	Performance Testing	USN-12, 13	Amount of Data Loaded	4	High	Swetha P	25 June 2025	25 June 2025
Sprint- 6		USN-14	Utilization of Filters	4	Moderate	Swetha P	25 June 2025	25 June 2025
Sprint- 6		USN-15	Calculation Fields	4	Moderate	Swetha P	25 June 2025	25 June 2025
Sprint- 6		USN-16	Visualizations and Graphs	4	Moderate	Swetha P	25 June 2025	25 June 2025
Sprint- 7	Project Documentation and Demonstrations	USN-17,18	Explanation Video of Project Development	5	High	Swetha P	25 June 2025	26 June 2025
Sprint- 7		USN-19	Project Documentation	5	High	Swetha P	25 June 2025	26 June 2025



Data Collection and Preprocessing Phase

Data Collection Plan & Raw Data Sources Identification

The Data Collection plan and the Raw Data Sources report, ensures meticulous data curation and integrity for informed decision-making in every analysis and decision-making endeavor. The data is collected from kaggle, a reliable repository of curated datasets.

Data Collection Plan

Section	Description
Project Overview	The analysis of global inflation patterns to support the decision-making. The objective is to create insightful visualizations

	and strategic recommendations to equip stakeholders with actionable insights.
Data Collection Plan	Global inflation data and region data will be collected from the kaggle.
Raw Data Sources Identified	Global Inflation Dataset contains Annual Inflation Rate of 196 Countries from 1980 to 2024 and Country Mapping - ISO, Continent, Region dataset which has Country ISO details and region information of the world data.

Raw Data Sources

Source Name	Description	Location/URL	Format	Size	Access Permissions
Dataset 1	Global inflation dataset	https://www.kaggle.com/datasets/sazidthe1/global-inflation-data?select=global_inflation_data.csv	CSV	19.2 KB	Public
Dataset 2	Country Mapping - ISO, Continent, Region dataset	https://www.kaggle.com/datasets/andradaolteanu/country-mapping-iso-continent-region?select=continents2.csv	CSV	44.6 KB	Public

Data Quality Report

The Data Quality Report will summarize data quality issues from the selected source, including severity levels and resolution plans. It will aid in systematically identifying and rectifying data discrepancies.

Data Source	Data Quality Issue	Severity	Resolution Plan
Global Inflation Dataset	Missing values for certain countries/years	Moderate	Removed blank rows using Power Query.
Global Inflation Dataset	Inconsistent data types (Eg: year as text, inflation as string)	Low	Converted all column types appropriately using the “Change Type” function in Power Query.
Global Inflation Dataset	Inflation category for insight (High, Moderate, Low)	Moderate	Created a custom column using conditional logic to classify inflation rate.
Country Mapping - ISO, Continent, Region dataset	Unnecessary columns (e.g., ISO codes, subregion IDs) included.	Low	Removed irrelevant columns using Power Query's column selection step.

Merged Dataset	Regional insights unavailable without integrating region data.	Moderate	Merged Global Inflation data with Country Mapping dataset on country to enable region-based analysis.

Data Exploration and Preprocessing
Identifies data sources, assesses quality issues like missing values and duplicates, and implements resolution plans to ensure accurate and reliable analysis.

Section	**Description**
Data Overview	There are two datasets from Kaggle. Global inflation dataset contains Annual Inflation Rate of 196 Countries from 1980 to 2024 and Country Mapping - ISO, Continent, Region dataset which has Country ISO details and region information of the world data.
Data Cleaning	Promoted headers, removed empty and irrelevant rows, renamed columns for clarity, filtered null values, added an index column and created a custom column to categorize inflation rates into High, Moderate, and Low.
Data Transformation	Used Power Query to promote headers, unpivot year-wise inflation columns, rename columns, and add a custom inflation category column.
Data Type Conversion	Corrected data types such as converting year to numeric and inflation rates to decimal formats for accurate modeling.
Column Splitting and Merging	Removed unneeded region dataset columns; aligned and merged country columns from both datasets to establish a unified model.
Data Modeling	Established relationships between the cleaned global inflation and region datasets using the country field. Implemented custom DAX calculations such as InflationRateChange, which measures the percentage change in inflation from the previous year using LOOKUPVALUE; and Adjustedinflation, which scales the inflation rate by a factor of 0.01 for standardized visualization. These calculated fields empower advanced comparative analysis and dynamic reporting across countries and time periods.

Save Processed Data	Final cleaned and merged dataset was saved and loaded into Power BI for dashboard development and analysis.

Data Visualization

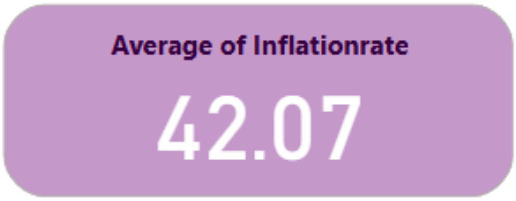
Framing Business Questions and Developing Visualizations

Visualization development refers to the process of creating graphical representations of data to facilitate understanding, analysis, and decision-making. The goal is to transform complex datasets into visual formats that are easy to interpret, enabling users to gain insights and make informed decisions.

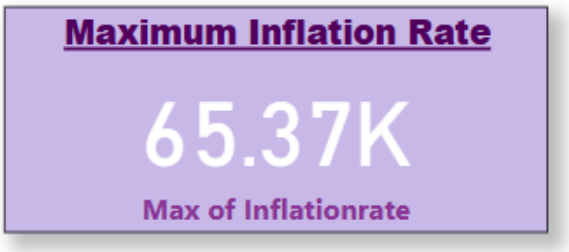
Business Questions and Visualisation

The process involves defining specific business questions to guide the creation of meaningful and actionable visualizations in Power BI. Well-framed questions help in identifying key metrics, selecting relevant data, and building visualisation that provide insights.

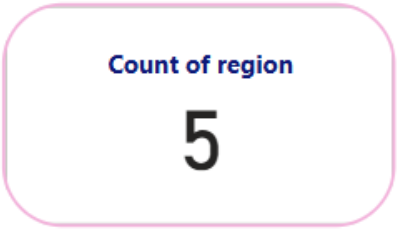
1. **What is the average inflation rate across all countries?**
    - *Visualization*: Card showing average inflation rate.



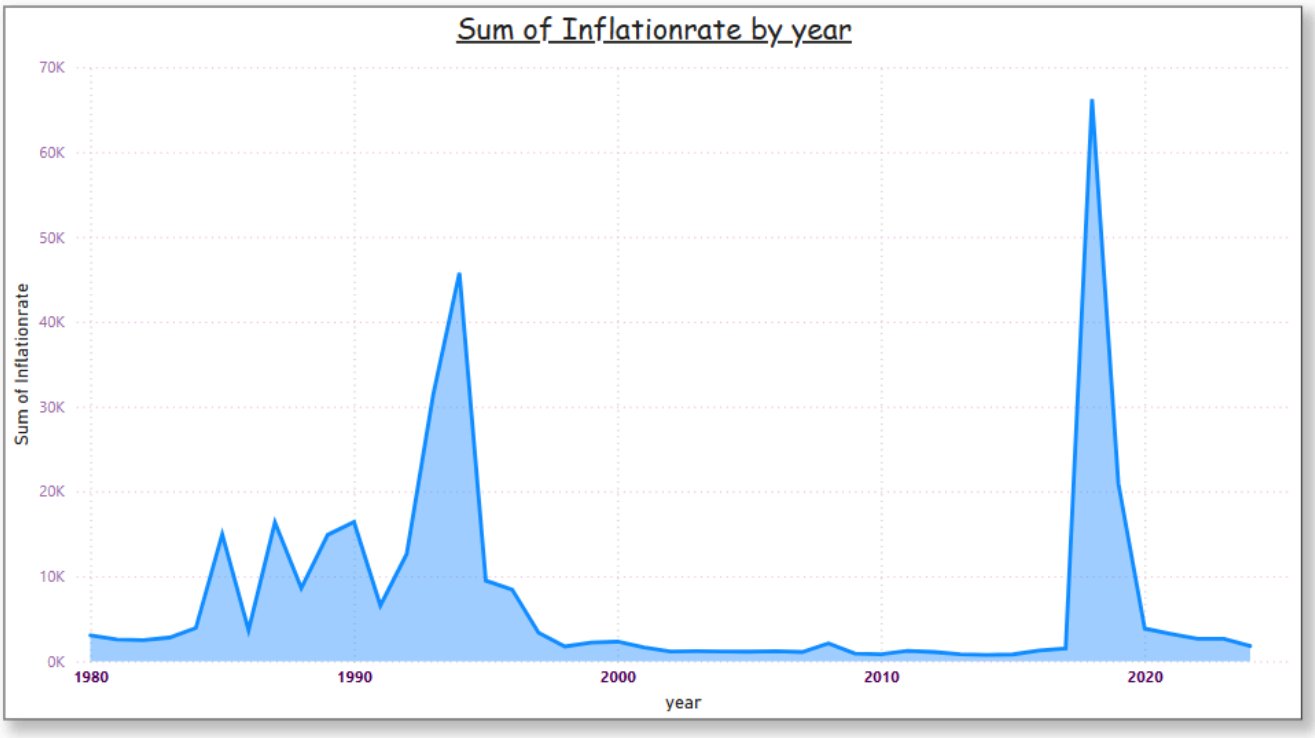
2. **What is the maximum inflation rate recorded in the dataset?**
    - *Visualization*: Card Chart indicating the Maximum Inflation Rate



3. **How many distinct regions are represented in the data?**
    - *Visualization*: Card Chart showing Number of Regions

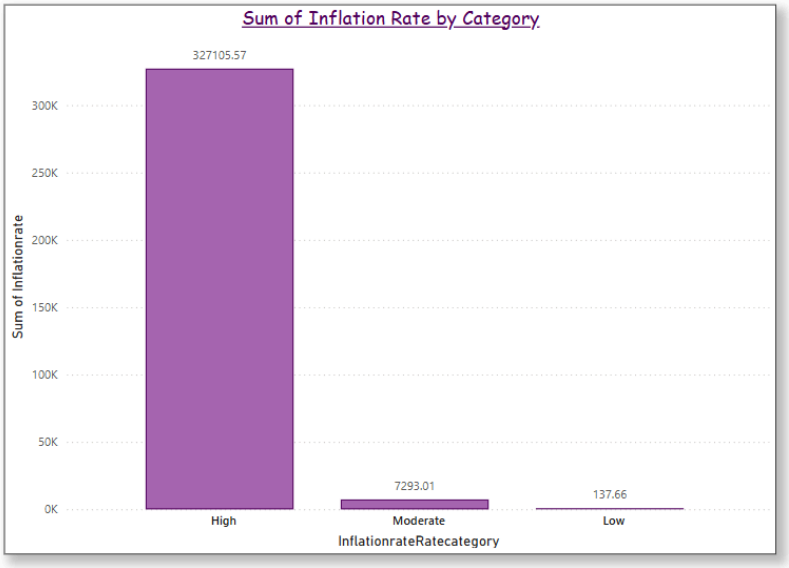


4. **How has the total inflation rate evolved over time globally?**
    - *Visualization*: Area chart showing Sum of Inflation Rate by Year



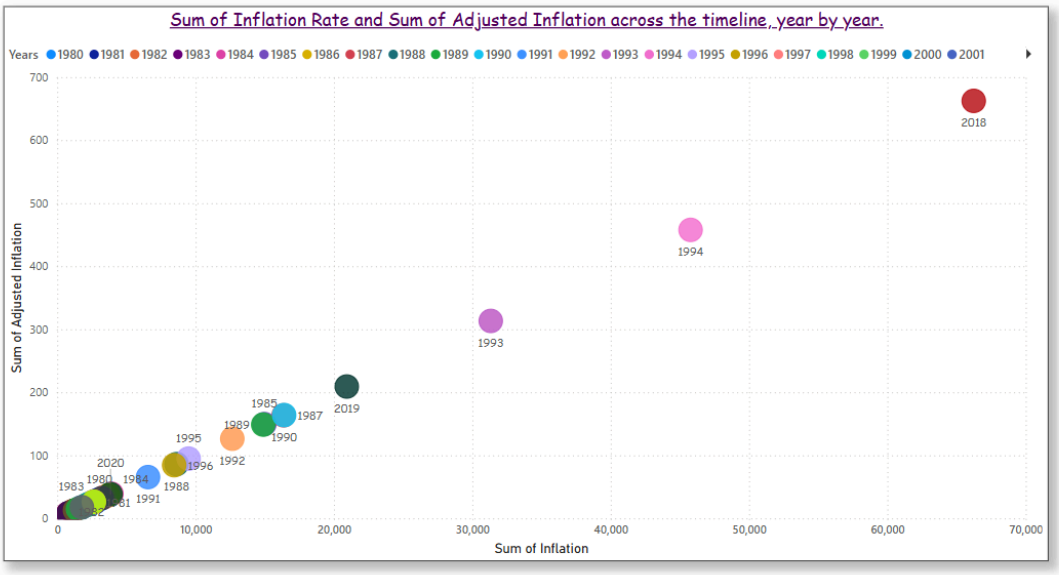
5. **How are inflation rates distributed across defined categories (High, Moderate, Low)?**

    - *Visualization*: Clustered Column Chart illustrating the Sum of Inflation Rate by Category.



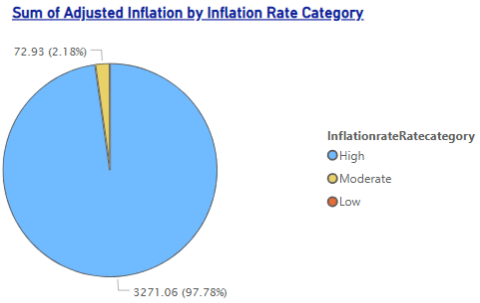
6. **How do Inflation and Adjusted Inflation values compare over the years?**

    - *Visualization*: Scatter chart comparing Sum of Inflation Rate and Sum of Adjusted Inflation across the timeline, year by year.

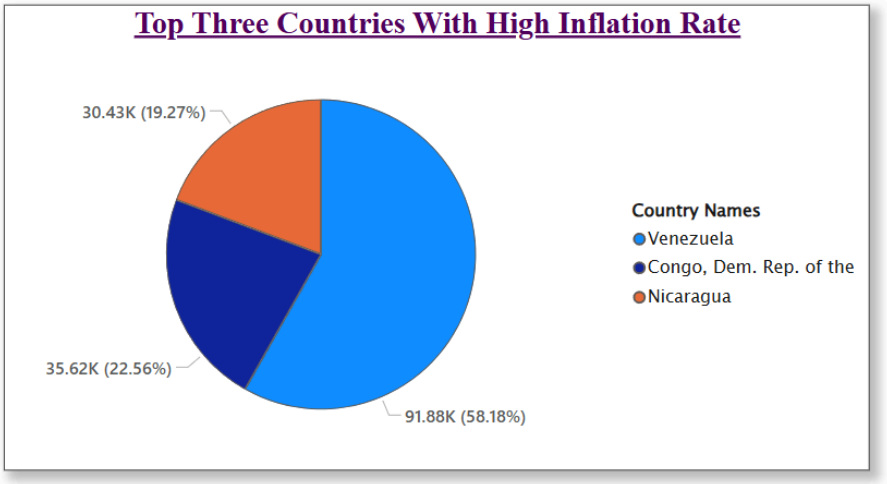


7. **What insights can be derived by filtering the dashboard by country?**
    - *Visualization*: Slicer applied on the Country Name column which displays country-specific inflation trends and metrics across the dashboard

8. **How is Adjusted Inflation distributed across inflation categories?**
    - *Visualization*: Pie chart showing the proportion of Adjusted Inflation grouped by the categories High, Moderate, and Low.

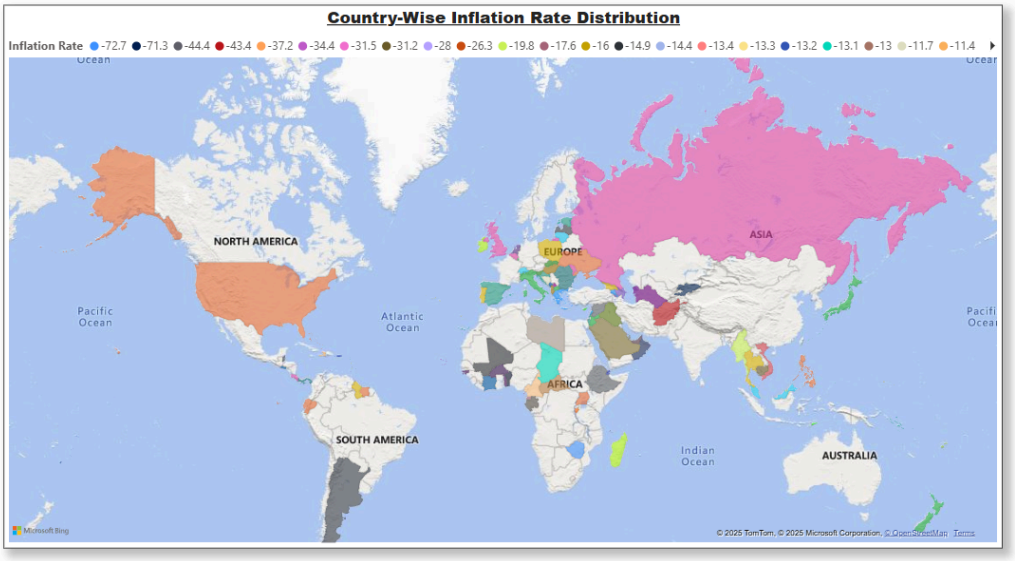


9. **Which are the top 3 countries with the highest inflation rates?**
    - *Visualization*: Pie chart highlighting the top three countries with the greatest inflation rate totals.



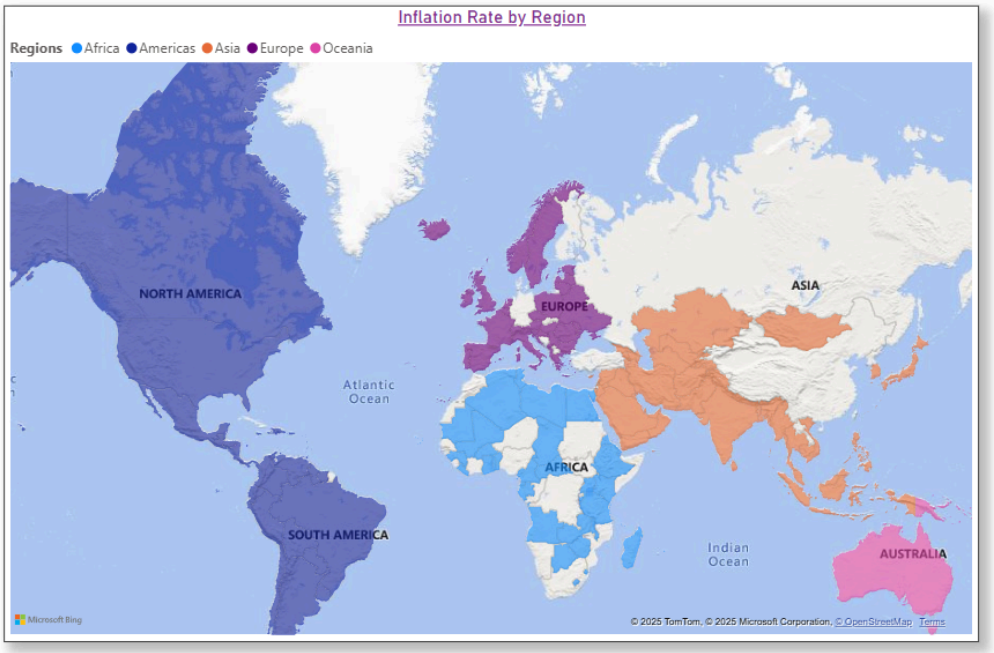
10. **How are inflation rates distributed across countries worldwide?**

- *Visualization*: Filled Map showing countries shaded based on their individual inflation rates, using gradient intensity to indicate higher or lower inflation values.



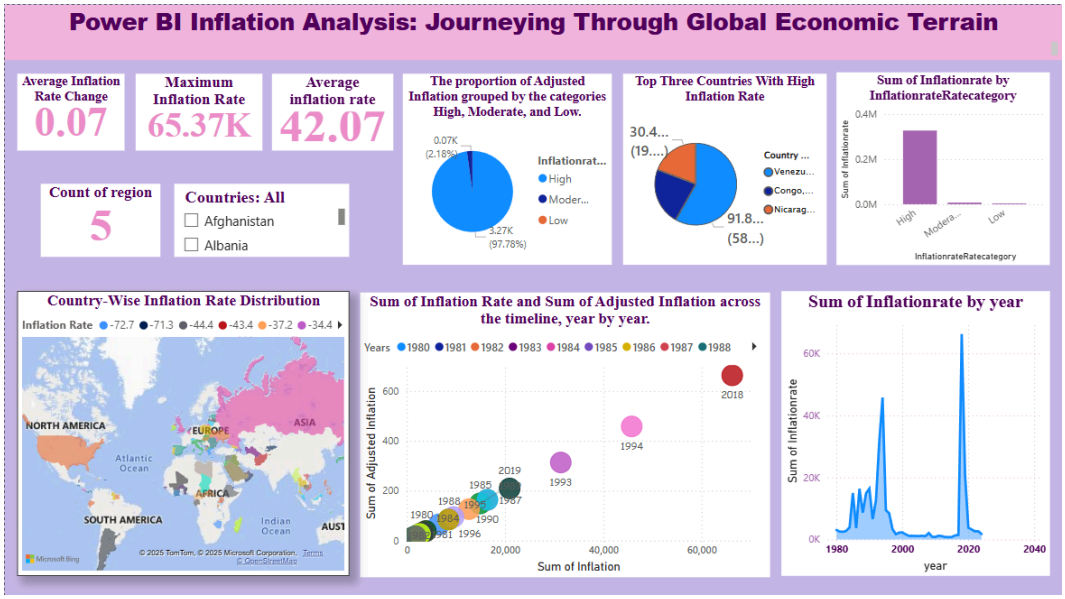
11. **How is inflation rate distributed across global regions visually?**

- *Visualization*: Filled Map showing regions shaded based on their aggregated inflation rate values.



Dashboard

Dashboard Design



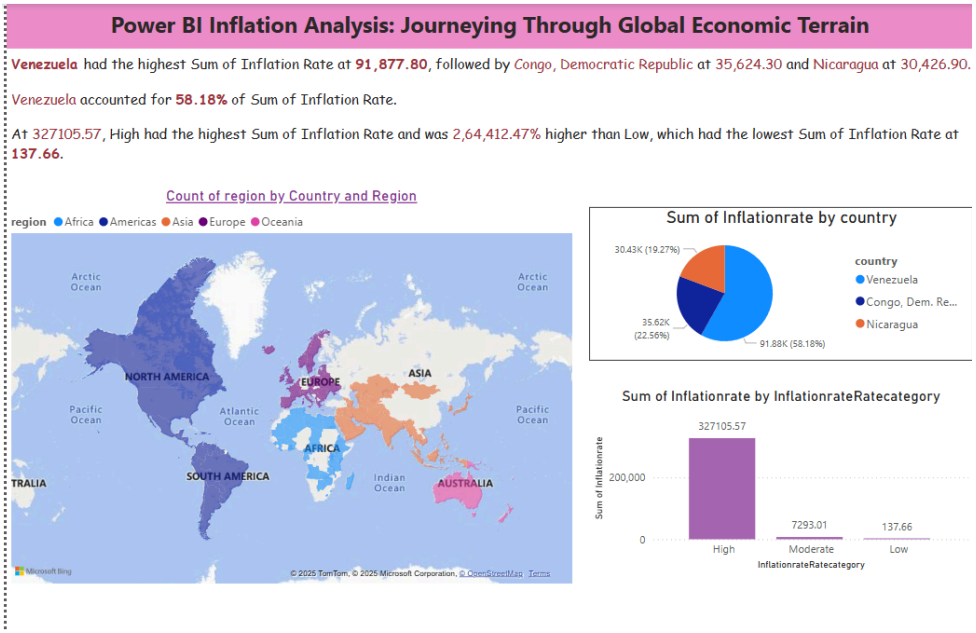
Dashboard

Here are seven potential outcomes from the dashboard image provided:

- **Top Three Countries with Highest Inflation Rate:** Venezuela, Congo, and Nicaragua lead inflation rates, with Venezuela peaking at **91.88K**.
- **Inflation Category Breakdown:** A significant **97.78%** of adjusted inflation falls under the *High* category.
- **Temporal Analysis:** Inflation rates spiked notably around **1994** and again in **2018**, as shown in the timeline visuals.
- **Global Inflation Trends:** The average inflation rate across countries is **42.07**, while the highest recorded inflation is **65.37K.**
- **Inflation Rate by Category:** The *High* category contributes the majority of total inflation, nearing **0.4M** in summed values.
- **Adjusted Inflation Analysis:** A dedicated pie chart and scatter plot track how adjusted inflation behaves alongside raw rates **year by year**.
- **Filter Effectiveness:** Selecting a specific country like *India* personalizes insights across all visuals.

Report

A report is a comprehensive document that provides a detailed and structured account of data analysis, findings, and insights.



Observations Drawn from the Global Inflation Report in Power BI

1. Trends Over Time:

- **Inflation Rate Over Years:** The Inflation rate has notable peaks in 1994 and 2018, suggesting key economic events during those periods.
- **Adjusted Inflation Trends:** The scatter chart reveals that both inflation and adjusted inflation rates followed similar patterns, underscoring the effectiveness of the adjustment formula.

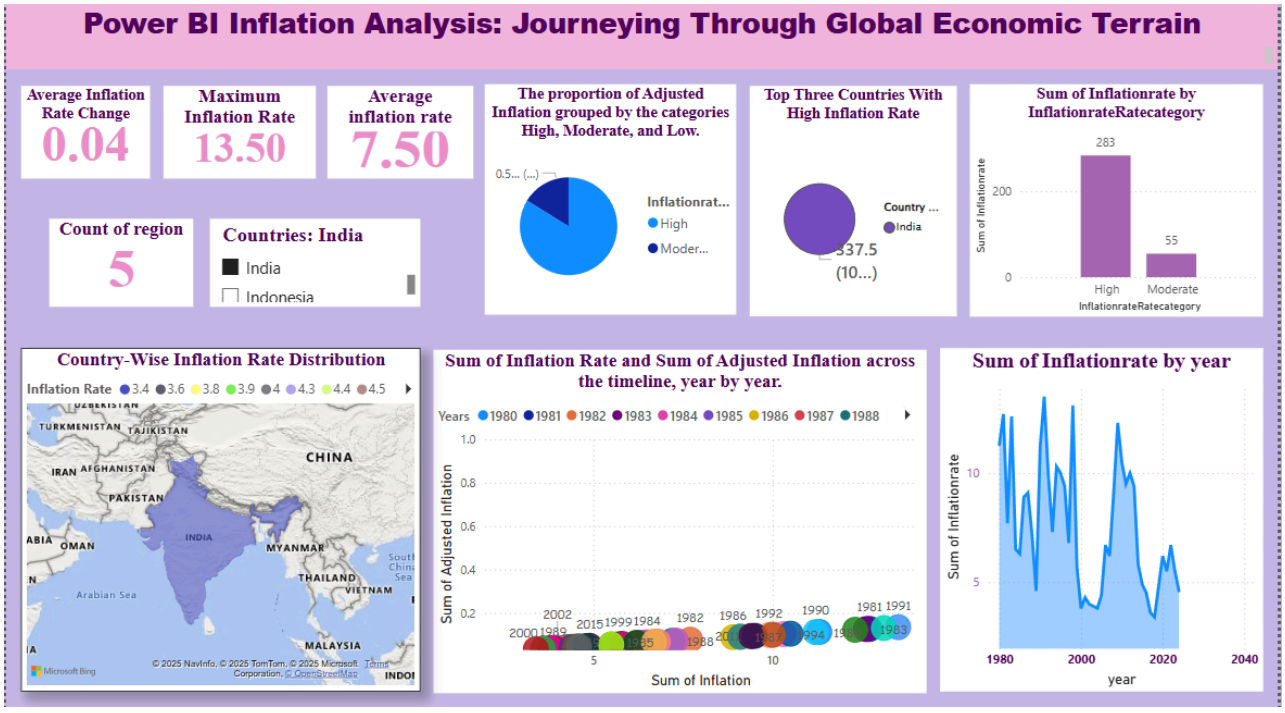
2. Performance Comparisons:

- **Inflation Rate by Category:** A clustered column chart shows that the **High category** dominates global inflation, contributing the highest total inflation values.
- **Top 3 Inflation Rate Countries:** A pie chart identifies **Venezuela, Congo,** and **Nicaragua** as the most inflation-stricken nations.
- **Regional Breakdown:** A column chart and slicer reveal that **Asia** consistently reflect stronger inflation intensities than other regions.

3. Country Specific Insights (Segmentation):

The slicer function allows users to conduct **country-level comparisons** and explore **regional economic behavior** in greater detail. By applying the slicer to select India, the dashboard dynamically updates all visuals to present:

- **India**'s inflation position relative to other countries.
- Year-wise changes in India's inflation metrics.
- Its classification within the High, Moderate and Low inflation categories.



4. Goal Achievement:

Key KPIs are displayed at the top of the report using card visuals:

- Average Global Inflation Rate: **42.07**
- Maximum Inflation Rate Recorded: **65.37K**
- Number of Regions Covered: **5**
- Average Inflation Rate Change: **0.07**

Insight Highlights

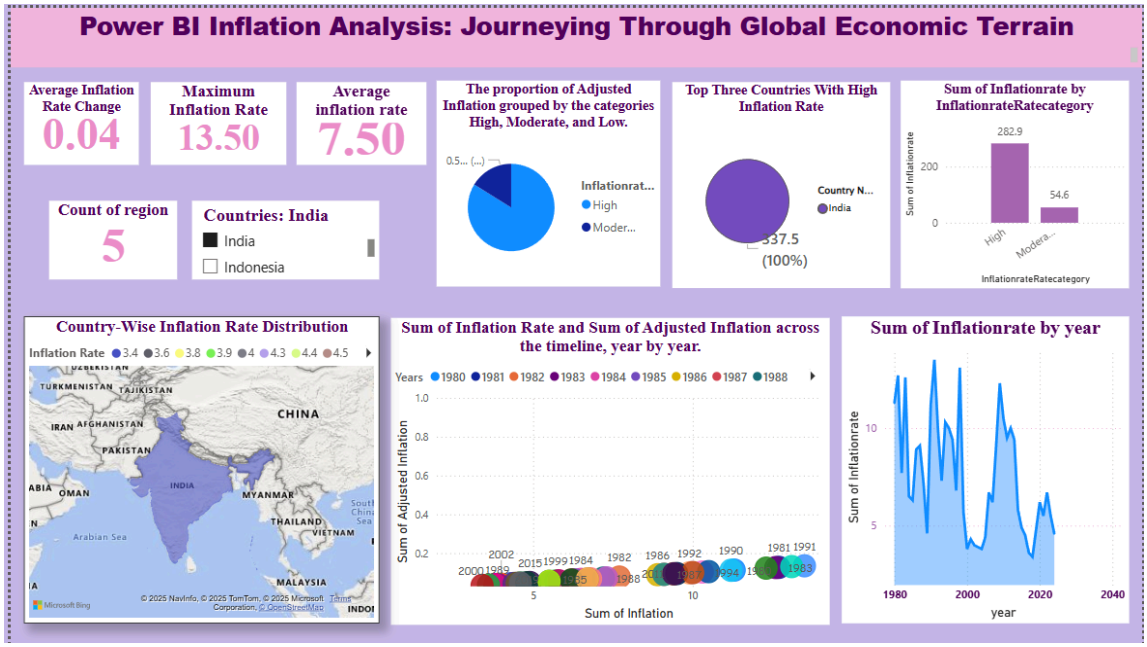
- **Venezuela** leads with the highest inflation rate at **91.88K**, making it a critical outlier.
- The **High Inflation** category accounts for over 97% of adjusted inflation, indicating widespread global inflationary pressure.
- Only a small portion of countries fall under the Moderate or Low categories, highlighting global instability during key timeframes.
- **Asia** exhibits the densest concentration of **high-inflation countries**.
- **Interactive filtering** using country slicers empowers users to draw personalized insights for any nation in the dataset.

Performance Testing

Utilization of Data filters

"Utilization of Filters" refers to the application or use of filters within a system, software application, or data processing pipeline to **selectively extract, manipulate, or analyze** data based on specified criteria or conditions. Filters are used to narrow down the scope of data, focusing only on the relevant information that meets certain predefined criteria.

Selected country India



(Note: Aland island is not available due to lack of data)

No of Calculation Field

Conditional Columns

A custom column named Inflation Rate Category was created to classify countries based on their inflation rate.

- Rates below 2% are labeled Low,
- Between 2% and 5% as Moderate,
- And above 5% as High.

This categorization helps simplify analysis and visualization by grouping inflation values into meaningful ranges.

```
= Table.AddColumn(#"Reordered Columns", "InflationrateRatecategory", each if
    [Inflationrate] < 2 then "Low" else if [Inflationrate] < 5 then
    "Moderate" else "High")
```

Measure

In Power BI, a measure is a calculation based on data in dataset. Inflation Rate Change was calculated using a DAX measure that compares each country's inflation rate to its previous year's value. If the previous year's rate is missing or zero, the result returns blank to avoid errors. Otherwise, it calculates the year-over-year percentage change using:

(Current Year Inflation – Previous Year Inflation) ÷ Previous Year Inflation

This dynamic measure helps track how inflation is rising or falling over time for each country.

```
1  InflationRateChange =
2  VAR CurrentCountry = global_inflation_data[country_name]
3  VAR CurrentYear = global_inflation_data[year]
4  VAR PrevYearRate =
5      LOOKUPVALUE(
6          global_inflation_data[Inflationrate],
7          global_inflation_data[country_name], CurrentCountry,
8          global_inflation_data[year], CurrentYear - 1
9      )
10 RETURN
11     IF(
12         ISBLANK(PrevYearRate) || PrevYearRate = 0,
13         BLANK(),
14         DIVIDE(global_inflation_data[Inflationrate] - PrevYearRate, PrevYearRate)
```

No of Visualization

- Average InflationRate of All Countries.
- Maximum Inflation Rate.
- Number of regions.
- Inflation Rate Change Over years.
- Distribution Of Inflation Rate category.
- Filter applied On Country Column.
- Average Inflation Rate Change by Country.
- Inflation And AdjustedInflation rates change over years.
- Inflation rate Distribution.
- Inflation rate Distribution of regions by Country.
- Top 3 InflationRate Countries

Conclusion

This project provided a detailed visualization of global inflation trends from 1980 to 2024. By transforming complex data into intuitive visuals, it revealed that most countries fall under the high inflation category, with regions like Asia and Africa showing especially elevated rates. The interactive features of the dashboard, including slicers and dynamic visuals, enabled deeper exploration of country-specific patterns and supported data-driven observations on inflation behavior over time.

Observation

- High inflation is heavily concentrated in specific countries like **Venezuela and Congo**.
- **Asia** emerged as a high-inflation region.
- Most inflation falls into the **High category** based on calculated adjustments.
- The dashboard supports policymakers and analysts in exploring regional inflation dynamics interactively.

Future Scope

The current dashboard can be expanded in several impactful ways:

- Integrate additional economic indicators such as GDP growth and unemployment for richer analysis.
- Enable drill-through reports for regional or category-level forecasting.
- Incorporate real-time data sources and automatic data refresh via Power BI Service.
- Embed predictive modeling to forecast inflation trends using AI or regression analysis.

Appendix

Source Code

InflationRateCategory (Power Query): Categorizes inflation as Low, Moderate, or High based on thresholds.

InflationRateChange (DAX): Calculates year-over-year change in inflation for each country using LOOKUPVALUE and DIVIDE.

GitHub & Project Demo Link

GitHub link: GitHub

Project Demo Link: Demo Link