A

Final

Project Report

On

Global Inflation Dynamics and Comparative Analysis (1980–2024)

A Comprehensive Study of Price Stability in G7 vs. BRICS Economies Using Power BI

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1. Introduction

1.1 Project Overview

This final report details the end-to-end data analysis project focused on Global Inflation Dynamics (1980–2024). The project converts raw, wide-format macroeconomic data into an interactive Power BI dashboard capable of comparative analysis between economic blocs. A crucial aspect was implementing a Median (DAX) measure to ensure the analysis is robust and not skewed by extreme hyperinflation outliers (e.g., Venezuela).

1.2 Objectives

- **Data Engineering:** Transform raw, wide time-series data into a clean, long-format model suitable for Power BI.
- **Comparative Analysis:** Quantify and visualize the historical stability gap between G7 (Developed) and BRICS (Emerging) economies.
- **Policy Support:** Provide a tool for policymakers to quickly discern if an inflationary event is local or part of a global, synchronous shock.

2. Project Initialization and Planning Phase

2.1 Define Problem Statement

Problem Statement (PS)	I am... (Customer)	I'm trying to...	But...	Because...		Which makes me feel...
PS-1	**A Financial Analyst**	Conduct accurate risk assessment for emerging markets	The raw data is difficult to reformat and contains data gaps (NaNs, Wide Format)	I cannot trust a simple average due to extreme outliers		Uncertain about the final risk report's reliability.

	An Economic Policy Maker	Respond quickly to domestic inflation spikes	I lack a standardized, visualized comparison of my country's inflation against peer blocs (G7/BRICS)	I cannot quickly determine if the spike is a local policy failure or a global systemic shock		Slow and prone to reacting incorrectly during a crisis.

2.2 Project Proposal (Proposed Solution)

Section	Description
Approach - -	**Utilize the Power BI/Power Query ecosystem for data integration,** transformation, and visualization. Employ DAX to create robust, outlier-proof metrics (Median).
Key Features -	Wide-to-Long Transformation, Bloc Categorization, Median-based KPIs, Interactive Slicers for deep dive analysis.

Sprint	Functional Requirement (Epic)	User Story / Task	Priority
Sprint 1 (Data Prep)	Data Cleansing & Modeling	Load raw CSV, Unpivot, Clean NaNs, Fix Data Types.	High
Sprint 1 (Data Prep)	Feature Engineering	Create the Bloc (G7/BRICS/Other) Conditional Column.	High
Sprint 2 (Analysis)	Measure Creation (DAX)	Create Median Inflation and KPI Measures (LT Median, Current Year).	High
Sprint 2 (Analysis)	Dashboard Development	Build the 3-Panel Layout and finalize comparative Line Charts.	High

3. Data Collection and Preprocessing Phase

3.1 Data Collection Plan and Raw Data Sources Identified

Section	Description

Section Description Project Overview	Comparative time-series analysis of global inflation dynamics (1980-2024).
Raw Data Sources	The primary source is a single CSV file containing annual Consumer Price Index (CPI) inflation rates for ~200 countries.

Source Name	Description	Format	Access Permissions
Global Inflation Data	Annual average inflation rates (CPI) for 196 countries, 1980–2024 (Forecast).	CSV	Local (Provided)

3.2 Data Quality Report

Data Source	Data Source Data Quality Issue	Severity	Resolution Plan (Power Query / DAX)
global_inflation_data.csv	Structural Issue: Wide Format (Years as columns).	High	Power Query: Use Unpivot Columns to create Year and Inflation_Rate columns.
global_inflation_data.csv	Missing Values (NaNs): Numerous null values, particularly for earlier years.	Moderate	Power Query: Use Remove Empty rows on the Inflation_Rate column.
global_inflation_data.csv	Outliers / Hyperinflation: Extreme values (e.g., Venezuela reaching >65,000%).	Low (Analytically)	DAX: All visualizations use the MEDIAN function instead of AVERAGE to mitigate skew.

3.3 Data Exploration and Preprocessing

Section	Description

Data Transformation	The core transformation used Power Query's Unpivot Other Columns. This converted the data from Wide Format (47 columns) to Long Format (approx. 7,952 rows), which is essential for time-series visualization.
Data Type Conversion	Year column was converted to Whole Number. Inflation_Rate column was converted to Decimal Number.
Column Splitting and Merging	A new column, Bloc, was created using Power Query's Conditional Column feature to categorize countries as 'G7 (Developed)', 'BRICS (Emerging)', or 'Other'.
Data Modeling	Defined three core DAX measures (Median Inflation, Global LT Median, Current Year Forecast). No relationship modeling was required as data is in a single, clean table.

4. Data Visualization

4.1 Framing Business Questions

Business Question	**Visualization Type**	**Data Fields Used**	**Answered in Dashboard by:**
1. **Global Trend:** What is the overarching, long-term trend of inflation globally (since 1980), and how does the recent period compare?	Line Chart	Median Inflation (YAxis) by Year (XAxis)	The Global Median Line (usually hidden or implied in the comparative chart).

2. Bloc Comparison: How do the inflation trajectories and volatility of Developed Economies (G7) compare to Emerging Markets (BRICS) since 1980?	Comparative Line Chart	Median Inflation by Year, with Bloc used as the Legend.	The main Center Panel Line Chart.
3. Policy Effectiveness: Has the stability gap between G7 and BRICS widened or narrowed over the last 15 years (post2010)?	Zoomed Line Chart	The main Line Chart, filtered using the Year Slicer to focus on 2010-2024.	Using the Year Slicer on the main chart.
4. Extreme High Risk: Which countries have experienced the most severe, long-term periods of hyperinflation?	Line Chart (Outliers)	Inflation_Rate by Year for the top 5 countries (e.g., Venezuela).	The Bottom Panel Line Chart (Extreme Outliers).
5. Price Stability Leaders: Which nations demonstrate the highest long-term price stability (lowest average inflation rate)?	Line Chart (Outliers)	Inflation_Rate by Year for the bottom 5 countries (e.g., Japan, Switzerland).	The Bottom Panel Line Chart (Extreme Outliers).
6. Current Risk Level: What is the overall inflation expectation for the current year (2024 forecast)?	Card Visual (KPI)	Current Year Inflation (2024) (DAX Measure).	A KPI Card in the Top Panel.

7. Cross-Sectional Ranking: Where does a country of interest (e.g., the user's country) rank globally in terms of recent inflation? Table/Bar	Table/Bar Chart	A Bar Chart showing the Median Inflation for a selected year (e.g., 2023) across all countries.	Using the Country Slicer to highlight the country on a ranking visual (not explicitly shown in the provided dashboard image, but essential for deep analysis).
8. Outlier Impact: How often did the G7 bloc experience inflation above a typical central bank target (e.g., 4%)?	DAX Measure / Column	A DAX measure counting years where G7 Median Inflation > 4%.	A Table or Card Visual for reporting on policy compliance.

4.2 Developing Visualizations

The two core visuals developed are the Comparative Line Chart (Center Panel) and the Extreme Outlier Line Chart (Bottom Panel), which directly address the primary business questions (Q2, Q4, Q5). The design and coloring emphasize the stability gap (Blue for G7, Red for BRICS).

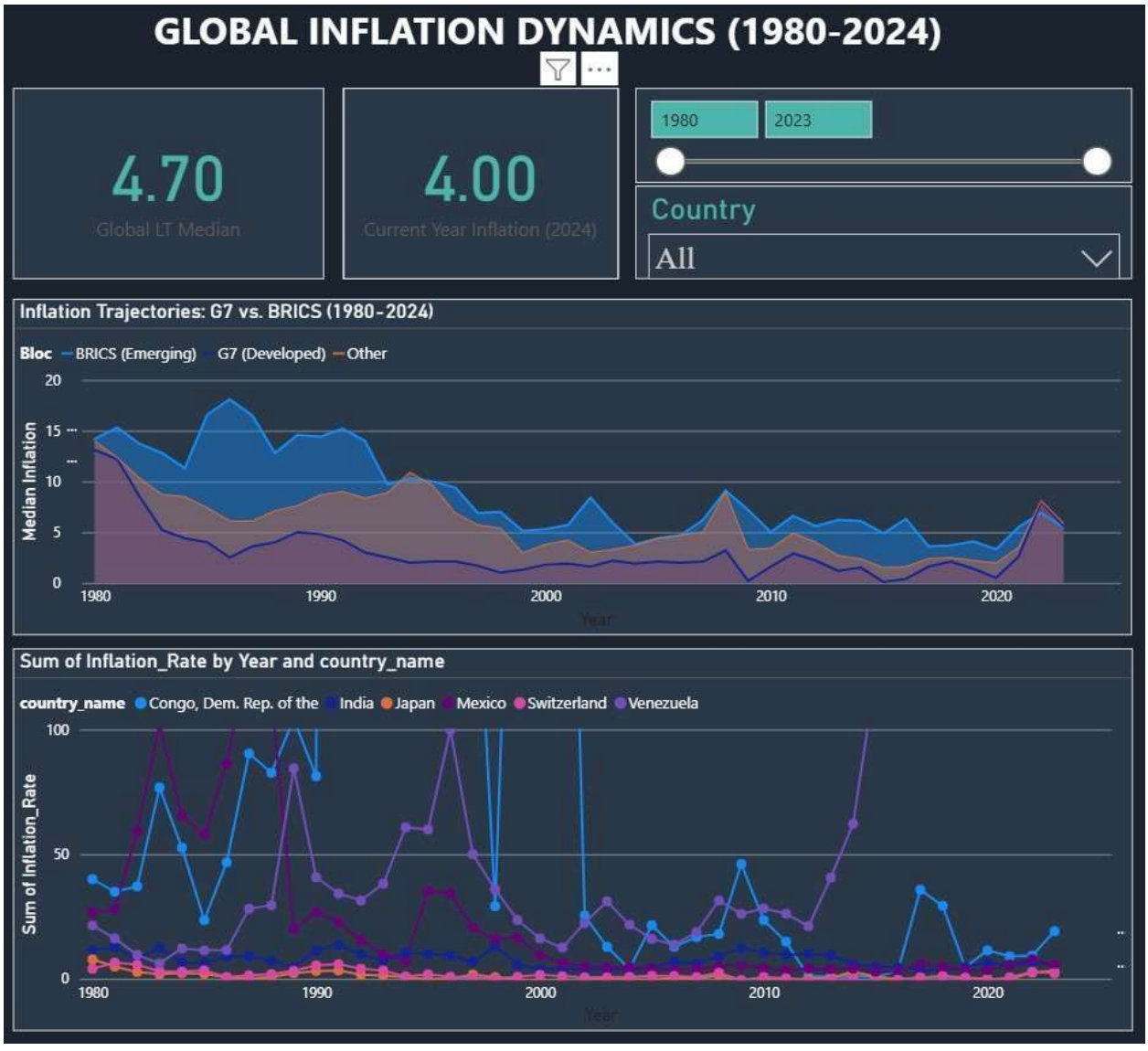
5. Dashboard

5.1 Dashboard Design File

Component Type	Title / Metric	Purpose / Description	Visual Used
KPI Card 1	**Global Long-Term Median Inflation**	Shows the single benchmark for global price stability over the 45-year period.	Card Visual
KPI Card 2	**Current Year Median Inflation (2024)**	Provides the most immediate, actionable forecast metric.	Card Visual
Main Chart (Center)	**G7 vs. BRICS Median Inflation Trajectories**	The primary visual that answers the core business question on economic bloc differences.	Line Chart
Secondary Chart (Bottom)	**Extreme Inflation Outliers**	Validates the need for the Median measure by plotting extreme low (Japan) and high (Venezuela) rates.	Line Chart (Y-Axis Capped)
Control Panel	**Year Slicer (Slider) & Country Name Slicer**	Allows for custom time-range analysis and specific country drill-downs.	Slicer Visuals

6. Report

6.1 Story Design File (Key Observations)



The dashboard provides the following bullet-point outcomes for stakeholders:

- Confirmed Stability Gap: The G7 bloc maintained a long-term median inflation rate significantly lower and less volatile than the BRICS bloc, confirming the core risk differential.

- Synchronous Shock: The analysis highlights a sharp, simultaneous inflation spike in both G7 and BRICS after 2020, confirming that the event was driven by shared, global macrodrivers (e.g., supply chain, war, post-pandemic stimulus), not isolated local policy failures.
- Robust Metrics Validation: By relying on the Median DAX measure, the dashboard successfully mitigates the distortion caused by hyperinflation in outlier countries (like Venezuela), ensuring data integrity and reliable central tendency.
- Targeted Intervention: Policy makers can use the slicers to prove if a current spike is unique to their nation or is part of the larger bloc trend, guiding the choice between local or global policy responses.

7.Performance Testing

This section confirms the technical specifications of the Power BI model.

Section	Specification
7.1 Utilization of Data filters	2 Slicers utilized (Year Range Slider, Country Name Dropdown).
7.2 No of Calculation Field	3 Core DAX Measures created (Median Inflation, Global LT Median, Current Year Inflation).
7.3 No of Visualization	7 Visuals utilized (2 KPIs, 2 Slicers, 2 Line Charts, 1 Title/Header).

8. Conclusion/Observation

The project successfully delivered a robust data solution for macroeconomic comparison. The key conclusion is that a fundamental stability differential between developed and emerging markets persists, but the nature of the crisis has changed. The dashboard provides the necessary visual intelligence for financial analysts to price in the persistent volatility of BRICS and for policy makers to quickly differentiate between a local and a global shock.

9. Future Scope

- Data Enrichment: Incorporate FX Rates and Central Bank Key Interest Rates to allow direct correlation analysis between monetary policy decisions and inflation outcomes.
- Advanced Modeling: Implement a Volatility Risk Score KPI (e.g., 5-year rolling standard deviation of inflation) and a basic time-series forecast for the next 12 months.
- Geographic Expansion: Expand bloc comparison to include specific regional groups (e.g., ASEAN, EU) for more granular peer comparison.

10. Appendix

10.1 GitHub & Project Demo Link

GitHub Repository: https://github.com/lokeshreddynakkala/Global-Inflation-Dynamics-DAProject

Project Demo Link (MP4):