

International Debt Statistics Visualization Project

1 Problem Understanding

Objective:

To analyze international debt statistics of selected countries from 2018 to 2021 and provide actionable insights using data visualizations.

Problem Statement:

- Debt levels across different countries are rising, influencing both national economies and global financial stability.
- The goal is to explore how debt trends have evolved over time, which sectors are primarily responsible for the debt, and how these debts compare to the countries' GDP.

Importance:

Understanding debt patterns is crucial for:

- Policymakers to make informed economic decisions.
- Researchers to perform comparative analysis.
- Investors and analysts to assess financial risks.

2 Implementation

Tools & Technologies Used

- Python (Jupyter Notebook) for data analysis and visualization
- Pandas for data manipulation
- Matplotlib & Seaborn for static visualizations
- Plotly for interactive charts
- **Power BI** for advanced dashboard visualizations
- GitHub for version control and project hosting

Dataset Description

File Used: international_debt_data.csv

Dataset includes:

- Country
- Year (2018-2021)
- GDP (Billion USD)
- Debt (Billion USD)
- Debt as % of GDP
- Sector (Public/Private)

Charts Created

1. Line Chart: Debt Trend by Country (2018–2021)
2. Bar Chart: Average Debt % of GDP by Country
3. Pie Chart: Debt Sector Distribution
4. Bubble Chart (Animated): GDP vs Debt by Country (over time)
5. Power BI Dashboard: Interactive exploration of Debt % vs GDP and sector breakdown

Steps Performed:

1. Data cleaning & validation
2. Handling missing values (if any)
3. Handling outliers in GDP and Debt %
4. Generation of static and interactive visualizations
5. Interpretation of results and storytelling

Results & Findings

- The USA and Japan consistently maintain high debt-to-GDP ratios (>100%).
- Emerging economies such as India and Brazil show rising debt trends but comparatively lower debt-to-GDP ratios.
- Public sector is responsible for the majority of debt in all analyzed countries.
- The animated Bubble Chart helps correlate GDP growth with increasing debt burdens.
- Power BI Dashboard provides interactive exploration for policymakers and stakeholders.

Key Insights:

- High debt-to-GDP ratios indicate potential financial risk.
- Countries with growing GDP can sustain slightly higher debts without immediate risk.
- Public sector reforms may be required to manage national debts effectively.

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