*U*nveiling the Scars of Conflict: A Data-Driven Look at Gaza's Economic Future

Anshu Vivek[1] & Jay Choudhary[2]

Overview

This project delves into the economic repercussions of the October 2023 conflict on Gaza's economy, offering a thorough analysis based on historical GDP data. The study visualizes economic trends and predicts future GDP trajectories using R programming for data preparation, visualization, and forecasting.

Data Preparation

Initially, the GDP data for Gaza and the West Bank from 2023 and 2024 was collected and organized in CSV and Excel formats. This dataset encompassed various economic indicators, including GDP values, growth rates, private sector losses, displacement figures, housing and infrastructure damage, food insecurity levels, and public salaries paid. Ensuring the dataset was clean and well-structured was crucial for accurate analysis, involving handling missing values, maintaining data format consistency, and verifying data accuracy.

[1] *M.A. Economics, Delhi Technological University*

[2] *M.A. Economics, Delhi Technological University*

Data Loading and Summary

The prepared data was then loaded into R using the `readr` and `readxl` packages. Summary statistics were generated to grasp the dataset's structure and key attributes, helping to identify any missing values or anomalies. These summaries provided insights into the range, mean, and distribution of variables, paving the way for detailed exploratory data analysis.

Data Visualization

Visualization played a key role in understanding the data and uncovering trends and patterns. Several plots were created to illustrate the economic conditions and conflict impact on Gaza:

1. GDP Over Time: A line plot displaying GDP trends for Gaza and the West Bank, providing a comparative view of their economic trajectories.
2. GDP Growth Over Time: A line plot showing GDP growth rates for Gaza and the West Bank, highlighting economic fluctuations in response to events.
3. Private Sector Losses: A bar plot depicting the private sector losses due to the conflict, emphasizing the financial damage to businesses.

These visualizations were crafted using the `ggplot2` package in R, known for its ability to create high-quality plots that communicate complex data intuitively.

Forecasting Gaza's GDP

To predict Gaza's GDP, the project simulated a declining trend to reflect ongoing economic challenges. The steps involved were:

1. Simulating a Declining Trend: Adjusting GDP values to simulate a 10% annual decline starting from 2024, based on the assumption of continued adverse effects from the conflict.
2. Time Series Conversion: Converting the adjusted GDP data into a time series format for forecasting.
3. Model Fitting: Fitting an ARIMA model to the time series data using the `forecast` package in R, chosen for its robustness in handling time series data.

4. *Forecasting*: Generating five-year forecasts with the ARIMA model to project GDP under continued economic decline.

5. *Visualization of Forecast*: Plotting the forecasted GDP values to visualize the anticipated downward trend over the next five years.

The ARIMA model was selected for its effectiveness in modeling time-dependent data and providing accurate forecasts based on historical data.

Conclusion

The analysis reveals a stark downturn in Gaza's economy due to the conflict.
Key insights include:

- *Severe GDP Decline*: An 80% drop in GDP in Q4 2023, underscoring the conflict's devastating economic impact.
- *Forecasted Continued Decline*: Continued GDP decline projected over the next five years, indicating prolonged economic challenges.
- *Massive Private Sector Losses*: Estimated $1.5 billion losses in the private sector within the conflict's first two months, highlighting extensive business damage.
- *Humanitarian Crisis*: Severe displacement of 1.7 million people, destruction of 50,000 housing units, and numerous damaged health and educational facilities, complicating economic recovery.

Immediate measures are necessary to address the humanitarian crises and rebuild the economy. The forecasted GDP decline underscores the need for substantial economic and infrastructural support from local and international stakeholders. The visualizations and forecasts offer valuable insights to policymakers for effective recovery and support strategies.

Final Thoughts

This project underscores the urgent need for coordinated efforts to mitigate the conflict's economic and humanitarian impacts on Gaza. The comprehensive analysis and forecasts provide a foundation for informed decision-making and strategic planning, aiming to restore stability and foster long-term economic growth in the region.