



GLOBAL INFLATION USING PYTHON PROGRAMMING PROJECT REPORT

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SIMATS ENGINEERING

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BONAFIDE CERTIFICATE

Certified that this project report titled “**GLOBAL INFLATION USING PYTHON PROGRAMMING**” is the bonafide work of “S.Varsha [192210247], Rithiga BM [192210205], Harini.S [192219015]” who carried out the project work under my supervision as a batch. Certified further, that to the best of my knowledge the work reported here does not form any other project report.

Date:

Head of the Department:

Project supervisor:

ABSTRACT

Global inflation affects economies worldwide through sustained rises in the overall price level. Influenced by factors like commodity prices and currency exchange rates, inflationary pressures span borders in an interconnected global economy. Impacts include reduced purchasing power, strained household budgets, and global income distribution effects. Policymakers face the challenge of managing inflation to foster economic growth while maintaining price stability. This project explores drivers, impacts, and mitigation strategies using macroeconomic indicators, monetary policies, and supply chain analyses. The project begins by elucidating the concept of inflation, detailing its measurement methodologies, and distinguishing between various types such as demand-pull and cost-push inflation. It then investigates the diverse factors that contribute to inflationary pressures on a global scale, including monetary policies, supply chain disruptions, geopolitical tensions, and structural imbalances. Furthermore, the project examines the profound impacts of inflation across different sectors and socio-economic strata, analyzing its effects on consumers' purchasing power, business operations, financial markets, and income distribution. Special attention is paid to the disparities in inflation experiences among developed and developing economies, as well as the challenges faced by vulnerable populations. In addressing global inflation, the project discusses potential policy responses available to central banks, governments, and international organizations. It evaluates the effectiveness of conventional monetary tools such as interest rate adjustments and unconventional measures like quantitative easing, while also considering fiscal policies and regulatory interventions. Additionally, it explores the role of international cooperation and coordination in managing inflationary pressures in an interconnected world economy. Through comprehensive research and analysis, this mini-project aims to enhance understanding of global inflation dynamics and contribute to informed discussions on policy formulation and economic stability in an increasingly volatile global landscape.

Keywords:

Policy response , Measurement methodologies, Demand-pull inflation, Cost-push inflation, Monetary policies, Supply chain disruptions, Geopolitical tensions, Structural imbalance

Chapter 1

INTRODUCTION

Inflation, the persistent increase in the general price level of goods and services over time, is a critical economic phenomenon that influences the livelihoods of individuals, the performance of businesses, and the stability of nations' economies worldwide. Understanding the intricacies of global inflation is imperative in navigating its impacts and formulating effective policies to manage its effects. This mini-project aims to delve into the multifaceted nature of global inflation, exploring its causes, consequences, and potential mitigation strategies. Inflation is commonly measured by indices such as the Consumer Price Index (CPI) or the Producer Price Index (PPI), which track the changes in the prices of a basket of goods and services consumed by households or produced by businesses, respectively. These indices serve as crucial tools for economists and policymakers in gauging the rate of inflation and its trend over time. Throughout history, economies have experienced periods of both high and low inflation, each with distinct underlying causes and consequences. From hyperinflationary episodes like those in Weimar Germany and Zimbabwe to more moderate inflation rates observed in stable economies, the historical context provides valuable insights into the factors driving inflation dynamics. Global inflation is influenced by a myriad of factors, including monetary policy decisions, fiscal policy measures, supply chain disruptions, fluctuations in commodity prices, labor market dynamics, and exchange rate movements. Understanding the interplay of these drivers is essential in discerning the underlying causes of inflationary pressures. The consequences of inflation extend beyond mere changes in price levels. High and volatile inflation can erode purchasing power, redistribute wealth unevenly, distort economic decision-making, undermine investor confidence, and exacerbate income inequality. Moreover, inflationary expectations can become self-fulfilling prophecies, further fueling inflationary pressures. Examining recent trends in global inflation reveals divergent trajectories across different regions and economies. While some countries grapple with persistently low inflation or deflationary pressures, others face challenges associated with elevated inflation rates. Understanding the underlying factors driving these divergent trends is crucial for devising appropriate policy responses. Central banks and governments employ

various policy tools to manage inflationary pressures and maintain price stability. These tools include interest rate adjustments, open market operations, fiscal policy measures, exchange rate interventions, and supply-side reforms. Evaluating the effectiveness and trade-offs associated with these policy responses is essential for policymakers in designing appropriate inflation management strategies. In conclusion, global inflation is a complex economic phenomenon shaped by a multitude of factors and dynamics. Its impacts reverberate across economies, affecting individuals, businesses, and governments alike. By unraveling the intricacies of global inflation and exploring its causes, consequences, and potential mitigation strategies, we can better equip ourselves to navigate the challenges posed by inflationary pressures and foster sustainable economic growth and stability on a global scale. This project explores drivers, impacts, and mitigation strategies using macroeconomic indicators, monetary policies, and supply chain analyses. The project begins by elucidating the concept of inflation, detailing its measurement methodologies, and distinguishing between various types such as demand-pull and cost-push inflation. It then investigates the diverse factors that contribute to inflationary pressures on a global scale, including monetary policies, supply chain disruptions, geopolitical tensions, and structural imbalances. Furthermore, the project examines the profound impacts of inflation across different sectors and socio-economic strata, analyzing its effects on consumers' purchasing power, business operations, financial markets, and income distribution. Special attention is paid to the disparities in inflation experiences among developed and developing economies, as well as the challenges faced by vulnerable populations.

Chapter 2

METHODOLOGY

2.1. Data Collection:

- Obtain inflation data from reliable sources such as central banks, international organizations (e.g., IMF, World Bank), and economic research institutions.
- Use APIs or web scraping techniques to gather time-series data on inflation rates across different countries and regions.

2.2. Data Preprocessing:

- Clean the collected data by handling missing values, outliers, and inconsistencies.
- Convert the data into a suitable format for analysis, such as pandas DataFrames in Python.

2.3. Exploratory Data Analysis (EDA):

- Perform descriptive statistics to understand the distribution and trends of inflation rates.
- Visualize the data using libraries like Matplotlib or Seaborn to identify patterns, outliers, and correlations.

2.4. Time Series Analysis:

- Apply time series techniques to analyze the temporal patterns and dynamics of inflation rates.
- Decompose the time series into trend, seasonal, and residual components to identify underlying patterns and trends.

2.5. Cross-Country Comparison:

- Compare inflation rates across different countries and regions using statistical measures and visualizations.
- Identify countries with similar inflationary trends or divergent inflation dynamics.

2.6. Correlation Analysis:

- Explore the relationship between inflation rates and other economic variables such as GDP growth, unemployment rates, and monetary policy indicators.
- Use correlation analysis and regression models to quantify the strength and direction of relationships.

2.7. Forecasting:

- Develop time series forecasting models to predict future inflation rates based on historical data.
- Evaluate the performance of forecasting models using metrics such as Mean Absolute Error (MAE) or Root Mean Square Error (RMSE).

2.8. Documentation and Reporting:

- Document the methodology, code, and findings of the analysis in a comprehensive report or Jupyter Notebook.
- Provide insights and recommendations for policymakers, economists, and researchers based on the analysis results.

2.9. Continuous Improvement:

- Iterate on the analysis process by incorporating feedback, refining methodologies, and exploring new data sources or techniques.
- Stay updated on developments in the field of economics and data science to enhance the rigor and relevance of the analysis.

Chapter 3

EXISTING SYSTEM

In the realm of economic analysis, the study of global inflation is paramount for understanding macroeconomic trends and formulating effective policy responses. To undertake such analysis, researchers, policymakers, and economists rely on a variety of applications and tools tailored to the specific requirements of inflation analysis. The existing application process for analyzing global inflation involves several key steps, beginning with thorough research and data collection. This initial phase entails gathering information from academic journals, research papers, industry reports, and online resources to identify existing methodologies and technologies employed in the field. Following this, a comprehensive review of existing applications is conducted, considering factors such as functionality, usability, scalability, accuracy, and cost-effectiveness. The evaluation criteria are defined based on the requirements of effective inflation analysis, encompassing essential features and capabilities necessary for robust data analysis and interpretation. Subsequently, a subset of existing applications is selected for further examination, taking into account both commercial and open-source solutions, as well as proprietary tools developed by research institutions or government agencies. To gain insights into the real-world performance and usability of selected applications, case studies and user feedback are gathered and analyzed. This involves reviewing user reviews, testimonials, and ratings to assess the strengths and weaknesses of each application. A comparative analysis is then conducted to highlight the key features, strengths, and limitations of the selected applications, providing an overview of their suitability for analyzing global inflation dynamics. Through this process, gaps and shortcomings in existing applications are identified, including missing features, usability issues, or limitations in data coverage. These findings inform the development of recommendations aimed at enhancing the effectiveness of inflation analysis tools and addressing the identified gaps. Recommendations may include strategies for the development of new tools or the enhancement of existing applications to better meet the needs of researchers, policymakers, and practitioners involved in analyzing global inflation. Furthermore, an implementation plan is devised to outline the steps required to implement the recommendations effectively. This plan considers factors such as

resource allocation, timeline, technical requirements, and stakeholder engagement to ensure the successful development and deployment of improved inflation analysis applications. In conclusion, the existing application process for global inflation analysis is a structured and iterative approach that involves thorough research, evaluation, and analysis to identify areas for improvement and drive innovation in the field of economic analysis. By continuously refining and enhancing inflation analysis tools, researchers and policymakers can better understand inflation dynamics and formulate more effective policy responses to promote economic stability and growth on a global scale. Some organizations offer Application Programming Interfaces (APIs) that allow developers to access real-time or historical economic data, including inflation rates. Researchers can leverage these APIs to integrate inflation data into their applications or analysis pipelines, enabling automated data retrieval and processing. Academic journals in economics and finance publish research articles and empirical studies on various aspects of inflation, including its determinants, consequences, and policy implications. Researchers can review the existing literature to gain insights into theoretical frameworks, methodological approaches, and empirical findings related to global inflation analysis. Open-source software tools and libraries like Python's pandas, NumPy, and statsmodels provide robust frameworks for conducting statistical analysis and econometric modeling. Researchers can leverage these tools to preprocess data, estimate econometric models, visualize results, and generate insights into global inflation dynamics.

Chapter 4

NEW INNOVATION

4.1. Predictive Analytics for Inflation Forecasting:

One innovative approach for a mini project on global inflation could involve leveraging predictive analytics techniques to forecast inflation rates with greater accuracy. By collecting and analyzing a wide range of economic indicators, such as GDP growth, unemployment rates, commodity prices, and monetary policy measures, students could develop machine learning models to predict future inflation trends. These models could incorporate advanced algorithms, such as time series analysis, regression analysis, and neural networks, to capture complex relationships and patterns in the data. The project could focus on comparing the performance of different forecasting models and exploring ways to improve their accuracy over time, potentially leading to valuable insights for policymakers and economists seeking to anticipate inflationary pressures.

4.2. Sentiment Analysis of Economic Indicators:

Another innovative idea for a mini project on global inflation involves applying sentiment analysis techniques to assess the impact of economic indicators on inflation expectations. Students could collect data from sources such as financial news articles, social media posts, and economic reports to gauge public sentiment and market perceptions regarding inflationary pressures. By analyzing textual data using natural language processing algorithms, they could identify key themes, sentiment polarity, and trends related to inflation expectations. This project could shed light on how public sentiment influences inflation dynamics and could help policymakers better understand and manage inflationary expectations through targeted communication and policy interventions.

4.3. Blockchain Technology for Price Transparency:

Integrating blockchain technology into the analysis of global inflation could present a novel avenue for a mini project. Students could explore the potential of blockchain-based platforms to enhance price transparency and mitigate inflationary pressures in the global economy. By leveraging blockchain's immutable ledger and decentralized architecture, they could develop a system for tracking and verifying

price changes across various sectors and regions in real-time. This project could involve building a prototype application or smart contract that allows for transparent and tamper-proof recording of price data, facilitating more accurate inflation measurement and analysis. Additionally, students could explore the implications of blockchain technology for supply chain management, payment systems, and monetary policy in the context of inflation control.

4.4. Behavioral Economics and Inflation Expectations:

An innovative mini project idea for global inflation could involve integrating insights from behavioral economics to study inflation expectations and decision-making processes. Students could design experiments or surveys to assess how cognitive biases, heuristics, and social influences shape individuals' perceptions of inflation and their economic behavior. By analyzing experimental data using behavioral economics frameworks, such as prospect theory or bounded rationality, they could uncover the factors influencing inflation expectations and explore strategies for managing and influencing these expectations. This interdisciplinary approach could offer valuable insights into the psychological aspects of inflation dynamics and inform the design of more effective communication strategies and policy interventions aimed at anchoring inflation expectations and promoting economic stability.

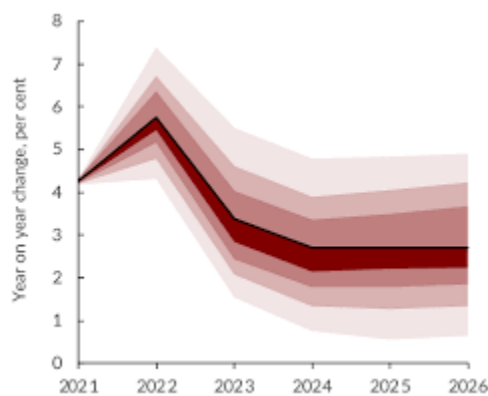


Fig.1

Existing system cost variation

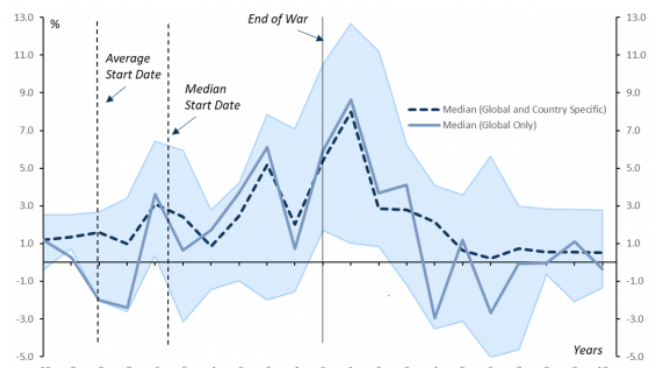


Fig.2

Innovative system graph cost variation

CODE

```
import requests
import pandas as pd
import matplotlib.pyplot as plt

# Function to fetch Nigeria's inflation data from World Bank API
def fetch_nigeria_inflation():
    url = 'https://api.worldbank.org/v2/en/country/NGA/indicator/FP.CPI.TOTL.ZG?downloadformat=excel'
    response = requests.get(url)
    with open('nigeria_inflation.xlsx', 'wb') as file:
        file.write(response.content)

# Call the function to fetch data
fetch_nigeria_inflation()

# Read the downloaded Excel file
df = pd.read_excel('nigeria_inflation.xlsx', sheet_name='Data', skiprows=3)

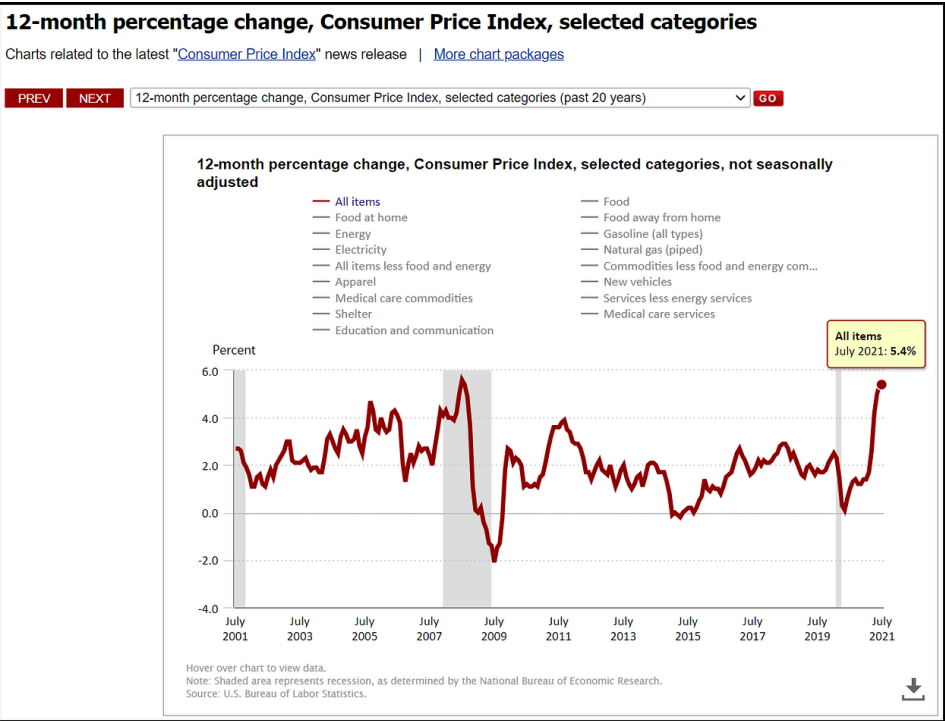
# Drop missing values
df.dropna(inplace=True)

# Extract year and inflation rate
years = df['Country Name']
inflation_rates = df['1960 [YR 1960]': '2022 [YR2022]'].iloc[0]

# Plotting the data
plt.figure(figsize=(10, 6))
plt.plot(years, inflation_rates, marker='o', color='b', linestyle='-')
plt.title('Inflation Rate in Nigeria (1960-2022)')
plt.xlabel('Year')
plt.ylabel('Inflation Rate (%)')
plt.xticks(rotation=45)
plt.grid(True)
plt.tight_layout()

# Show plot
plt.show()
```

OUTPUT



	A	B	C	D	E	F	G	H	I	J	K	L	M
	Date	Type	Sl. No.	State/UT	Rural Weights	Rural Index	Urban Weights	Urban Index	Combined Weights	Combined Index	Rural Inflation	Urban Inflation	Combined Inflation
1	31/01/23	Prov	1	Andhra Pradesh	5.4	181.8	3.64	183.2	4.58	182.3	8.67%	7.57%	8.25%
2	31/01/23	Prov	2	Arunachal Pradesh	0.14	182.1	0.06	--	0.1	182.1	4.60%	NA	4.60%
3	31/01/23	Prov	3	Assam	2.63	179.3	0.79	175.1	1.77	178.4	5.84%	4.85%	5.62%
4	31/01/23	Prov	4	Bihar	8.21	172.7	1.62	178.7	5.14	173.6	6.54%	6.62%	6.57%
5	31/01/23	Prov	5	Chhattisgarh	1.68	169.8	1.22	166.3	1.46	168.4	3.35%	2.21%	2.87%
6	31/01/23	Prov	6	Delhi	0.28	165.9	5.64	164.2	2.77	164.3	3.95%	3.21%	3.27%
7	31/01/23	Prov	7	Goa	0.14	171.2	0.25	169.5	0.19	170.2	2.33%	4.63%	3.72%
8	31/01/23	Prov	8	Gujarat	4.54	172.2	6.82	163.9	5.6	167.5	6.23%	5.27%	5.68%
9	31/01/23	Prov	9	Haryana	3.3	174.5	3.35	168	3.32	171.5	7.85%	6.13%	7.05%
10	31/01/23	Prov	10	Himachal Pradesh	1.03	164.8	0.26	171.6	0.67	166	3.13%	4.83%	3.43%
11	31/01/23	Prov	11	Jharkhand	1.96	173.5	1.39	176.4	1.69	174.6	6.25%	5.63%	6.01%
12	31/01/23	Prov	12	Karnataka	5.09	177.2	6.81	182.5	5.89	180	5.35%	4.89%	5.08%
13	31/01/23	Prov	13	Kerala	5.5	184.2	3.46	181.6	4.55	183.3	6.54%	6.20%	6.45%
14	31/01/23	Prov	14	Madhya Pradesh	4.93	177.6	3.97	179.3	4.48	178.3	8.49%	7.56%	8.13%
15	31/01/23	Prov	15	Maharashtra	8.25	179.1	18.86	170.9	13.18	173.6	6.86%	6.35%	6.50%
16	31/01/23	Prov	16	Manipur	0.23	189.7	0.12	168.2	0.18	182.9	3.15%	-1.98%	1.61%
17	31/01/23	Prov	17	Meghalaya	0.28	163.4	0.15	172.5	0.22	166.2	2.90%	6.02%	3.87%
18	31/01/23	Prov	18	Mizoram	0.07	190.5	0.13	171.3	0.1	178.8	11.86%	4.45%	7.39%
19	31/01/23	Prov	19	Nagaland	0.14	186.3	0.12	173.9	0.13	181	4.90%	6.30%	5.48%
20	31/01/23	Prov	20	Odisha	2.93	175.3	1.31	168.9	2.18	173.5	4.84%	4.26%	4.71%
21	31/01/23	Prov	21	Punjab	3.31	172.1	3.09	163.2	3.21	168.1	6.63%	6.60%	6.59%
22	31/01/23	Prov	22	Rajasthan	6.63	174.3	4.23	171.6	5.51	173.3	7.33%	5.73%	6.71%
23	31/01/23	Prov	23	Sikkim	0.06	192.1	0.03	177.9	0.05	187.5	5.32%	5.08%	5.28%
24	31/01/23	Prov	24	Tamil Nadu	5.55	185.2	9.2	184.1	7.25	184.6	7.18%	6.48%	6.77%
25	31/01/23	Prov	25	Telangana	3.16	189.9	4.41	183	3.74	186.1	9.14%	8.09%	8.58%
26	31/01/23	Prov	26	Tripura	0.35	192.2	0.14	189	0.25	191.4	5.55%	10.66%	6.81%
27	31/01/23	Prov	27	Uttar Pradesh	14.83	176.1	9.54	175.9	12.37	176	7.97%	6.61%	7.45%
28	31/01/23	Prov	28	Uttarakhand	1.06	173.1	0.73	174.6	0.91	173.7	6.20%	6.53%	6.37%
29	31/01/23	Prov	29	West Bengal	6.99	182	7.2	180.6	7.09	181.3	5.57%	5.55%	5.53%
30	31/01/23	Prov	30	Andaman & Nicobar	0.05	194.7	0.07	177.8	0.06	186.1	5.30%	5.77%	5.50%
31	31/01/23	Prov	31	Chandigarh	0.02	174.4	0.34	164.1	0.17	164.7	4.43%	5.06%	5.04%
32	31/01/23	Prov	32	Dadra & Nagar	0.02	163.7	0.04	170.2	0.03	168	6.23%	6.31%	6.26%
33	31/01/23	Prov	33	Daman & Diu	0.02	178.6	0.02	170.3	0.02	175.1	4.20%	3.59%	3.92%
34	31/01/23	Prov	34	Jammu & Kashmir*	1.14	185.3	0.72	184.1	0.94	184.9	4.93%	5.56%	5.18%
35	31/01/23	Prov	35	Lakshadweep	0.01	183.8	0.01	168.1	0.01	175.8	4.08%	6.59%	5.33%
36	31/01/23	Prov	36	Puducherry	0.08	185	0.27	181.8	0.17	182.6	6.94%	6.50%	6.60%
All India					100	177.8	100	174.9	100	176.5	6.85%	6.00%	6.52%

CONCLUSION

Global inflation is a complex phenomenon influenced by various economic, political, and social factors. As we analyze the current landscape, it becomes evident that inflationary pressures have become increasingly pronounced on a global scale. One significant driver of global inflation is the unprecedented fiscal and monetary stimulus measures implemented by governments and central banks in response to the COVID-19 pandemic. These measures, aimed at reviving economies, have led to an abundance of liquidity in financial markets, thereby fueling inflationary pressures. Additionally, supply chain disruptions and shortages in key commodities have further exacerbated inflationary trends, as seen in the sharp rise in prices for goods ranging from lumber to semiconductors. Moreover, geopolitical tensions and trade disputes have contributed to inflationary pressures by disrupting global supply chains and increasing production costs. The imposition of tariffs and trade barriers has distorted international trade flows, leading to higher prices for imported goods and services. Furthermore, changing consumer behavior and preferences in the wake of the pandemic have also played a role in driving inflation. The shift towards remote work and online shopping has increased demand for certain goods and services while reducing demand for others, creating imbalances in supply and demand dynamics that contribute to inflationary pressures. In response to rising inflationary concerns, central banks around the world are facing the delicate task of balancing price stability with the need to support economic growth. Many central banks have signaled their intent to gradually tighten monetary policy by raising interest rates and tapering asset purchases. However, the timing and pace of these policy adjustments remain uncertain and pose risks to financial markets and economic stability.

In conclusion, global inflation is a multifaceted challenge with far-reaching implications for economies and societies worldwide. Addressing this challenge requires a coordinated effort from policymakers, businesses, and consumers to navigate the complexities of a rapidly evolving global economy while ensuring sustainable and inclusive growth.

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