Macroeconomic impact on Commodity Prices					
Responsible	Nurbolat Balginbayev	**Date Started**	**Estimated Date End**	**Actual Date End**	**Status**
SM/TL/Other	Batyrkhan Shutenov	9/24/2024	10/02/2024	??/??/2024	

Project Description (Problems)

This project will focus on a range of commodities, including but not limited to oil, gold, and agricultural products. The analysis will cover key macroeconomic indicators such as GDP growth, inflation rates, interest rates, and unemployment rates. The time frame for the data analysis will span the last 20 years to ensure comprehensive insights.

Methodology

Data Collection: Gather historical data on commodity prices and macroeconomic indicators from reliable sources.
Data Cleaning: Process and clean the data to ensure accuracy and consistency.
Statistical Analysis: Use statistical methods and econometric models to identify correlations and patterns.
Visualization: Create visual representations of the data to highlight key findings.
Reporting: Compile the results into a detailed report with actionable insights.

Key Deliverables

A comprehensive dataset of commodity prices and macroeconomic indicators
Statistical analysis and econometric models showing the relationships between variables.
Visualizations such as graphs and charts to illustrate key patterns.
A final report summarizing the findings.

Acceptance Criteria (Determining the completion of the project)

The local system allows for real-time updates and interactive data exploration.
An own database has been created to store all relevant data, including historical commodity prices and macroeconomic indicators.

Project Artefacts	Project Members (dev, business, experts)
Data Collection Plan: Outlines the sources, methods, and schedule for gathering the necessary data. **Data Dictionary:** Provides definitions and descriptions of the data elements used in the project. **Database Schema:** Details the structure of the database, including tables, fields, and relationships. **Statistical Analysis Plan:** Specifies the statistical methods and models to be used for analyzing the data. **Visualization Mockups:** Preliminary designs of the visual representations (graphs, charts, etc.) to be created. **Progress Reports:** Regular updates on the project's status, including milestones achieved and any issues encountered. **Final Report:** A comprehensive document summarizing the findings, analysis, and recommendations. **User Manual:** Instructions for using the local system and accessing the database. **Project Closure Document:** A formal document that signifies the completion of the project, including lessons learned and future recommendations.	Nurbolat Balginbayev – data scientist

Project status

Identify key data elements and create a data dictionary.
Identify reliable data sources for collection historical data on commodity prices and macroeconomic indicators.
Create data structure of the database, including tables, fields, and relationships.
Create visualization desc to identify patterns and trends which are impact to moving commodity prices.

Use these questions to test hypothesis regarding the macroeconomic impact on commodity prices:
Economic Activity:
How do changes in GDP growth rates affect commodity prices?
What is the relationship between industrial production indices and commodity prices?
Monetary Policy:
How do changes in real interest rates influence commodity prices?

What is the impact of central bank policies (e.g., quantitative easing) on commodity prices?

Inflation:

How do inflation rates correlate with changes in commodity prices?

What is the effect of unexpected inflation on commodity prices?

Exchange Rates:

How do fluctuations in exchange rates impact commodity prices?

What is the relationship between the strength of the U.S. dollar and global commodity prices?

Global Demand and Supply Shocks:

How do global demand shocks (e.g., economic booms or recessions) affect commodity prices?

What is the impact of global supply shocks (e.g., natural disasters, geopolitical events) on commodity prices?

Inventories:

How do changes in commodity inventories influence their prices?

What is the role of strategic reserves in stabilizing commodity prices?

Speculation and Market Sentiment:

How does speculative trading in commodity futures markets affect spot prices?

What is the impact of market sentiment and investor behavior on commodity prices?

Government Policies and Regulations:

How do changes in trade policies (e.g., tariffs, export bans) impact commodity prices?

What is the effect of environmental regulations on the prices of commodities like oil and metals?

Risks & Challenges

Model Risk:

Incorrect model selection or specification can lead to misleading results.

Overfitting or underfitting the model to the data can affect the reliability of predictions.

Market Volatility:

High volatility in commodity markets can obscure underlying trends.

Sudden market shocks (e.g., geopolitical events) can disrupt analysis.

Economic Uncertainty:

Unpredictable economic conditions (e.g., recessions, booms) can impact commodity prices in unexpected ways.

Changes in government policies or regulations can introduce additional uncertainty.

Speculative Behavior:

Speculative trading can cause price fluctuations that are not driven by fundamental economic factors.

Market sentiment can significantly influence commodity prices, complicating the analysis.

Challenges

Complex Interdependencies:

Macroeconomic factors often interact in complex ways, making it difficult to isolate their individual impacts on commodity prices.

Understanding the causal relationships between variables requires sophisticated analytical techniques.

Data Integration:

Combining data from multiple sources (e.g., economic indicators, market data) can be challenging.

Ensuring data consistency and compatibility is crucial for accurate analysis.

Time Lag Effects:

The impact of macroeconomic factors on commodity prices may not be immediate, requiring consideration of time lags in the analysis.

Identifying the appropriate time lag for each factor can be complex.

Global Influences:

Commodity prices are influenced by global events and trends, requiring a comprehensive, international perspective.

Accounting for regional differences and global interconnections adds complexity to the analysis.

Regulatory Changes:

Frequent changes in regulations can affect commodity markets, requiring continuous monitoring and adaptation of the analysis.

Understanding the implications of new policies on commodity prices is essential.

Mitigation plan

Model Risk:

Action: Use robust statistical and econometric models that are well-documented and validated.

Action: Perform sensitivity analysis to understand the impact of different model assumptions.

Action: Regularly update and recalibrate models based on new data and insights.

Market Volatility:

Action: Incorporate volatility measures (e.g., VIX) into the analysis to account for market fluctuations.

Action: Use rolling windows or moving averages to smooth out short-term volatility and identify long-term trends.

Economic Uncertainty:

Action: Develop scenario analysis to explore the impact of different economic conditions on commodity prices.

Action: Monitor leading economic indicators to anticipate potential changes in the economic environment.

Speculative Behavior:

Action: Include measures of speculative activity (e.g., trading volumes, open interest) in the analysis.

Action: Use sentiment analysis tools to gauge market sentiment and its potential impact on prices.

Complex Interdependencies:
Global Influences:
Action: Incorporate global economic indicators and events into the analysis to capture international influences.
Action: Use geographic diversification to understand regional differences and their impact on commodity prices.
Regulatory Changes:
Action: Stay informed about regulatory developments and assess their potential impact on commodity markets.
Action: Engage with industry experts and policymakers to understand the implications of new regulations.
Monitoring and Review
Regular Reviews: Conduct regular reviews of the mitigation plan to ensure its effectiveness and make necessary adjustments.
Continuous Improvement: Foster a culture of continuous improvement by encouraging feedback and learning from past experiences.

Business Alignment			**Legend**
Approver	**Initial Review Date**	**Last Review Date**	Project is in progress as planned
			Project has manageable delays, monitored
			Project has significant delays, support required
Comments/Feedback/Recommendations			