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## A Study on Commodity Market Using Technical Analysis with Reference to Bullion, Energy and Metal Market on MCX at Ventura Securities Limited

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### ABSTRACT

This study investigates the utilization of technical analysis in the commodities market, specifically examining the bullion, energy, and metal areas of the Multi commodities Exchange (MCX). It analyses the effectiveness of technical indicators and chart patterns in forecasting price changes and developing trading strategies in these markets. The study evaluates multiple factors that impact commodity prices, including supply-demand dynamics, global economic conditions, and geopolitical events. The study intends to utilize historical price data and technical tools such as moving averages, RSI, and Bollinger Band, Stochastic oscillator to analyze patterns and trends. The objective is to provide traders and investors with valuable insights to make well-informed decisions. In essence, the research enhances our comprehension of the importance and efficacy of technical analysis in commodity trading. It provides valuable insights into market behavior and prospective opportunities for those involved in the market.

### INTRODUCTION

Investment is the act of allocating funds or assets into a particular opportunity with the intention of generating profits or benefits from it. The term "money or money's worth" refers to the surplus remaining after expenses, which is commonly known as savings. The primary purpose of doing so is to assure safety and mitigate the impact of inflation. Investing in different sorts of assets is a captivating pursuit that appeals to individuals from many backgrounds, regardless of their employment, economic standing, education, or family background.

Stocks are a distinctive investment vehicle since they provide the opportunity to acquire a fractional ownership stake in a firm. As a result, the prospective returns are larger and they have a track record of being a prudent investment. Investing in financial assets is both highly hazardous and very rewarding. Investors have a wide array of investment options at their disposal, including mutual funds, shares, and fixed income instruments such as bonds.

### INTRODUCTION OF TECHNICAL ANALYSIS

Technical analysis is examination of past price movements to forecast future price movements. A technical analysis believes with the help of charts it is possible to identify a trend, Invest or trade based on trend and make money as the trend unfolds. Objectives of technical analysis is to forecast the direction of the future price. It serves the purpose of a map. When we set out on a trip, if we venture into unknown terrain without a map, we can get lost. Same way without proper study if we invest or trade in market, it is like trying to aim by firing in dark. Short term traders can take advantage of Charts by knowing short term supports and resistances, and make the most of it.

Long term investors can use technical analysis to know the long-term trends, so that they can stay invested and cancel out the short-term volatilizes, which could make them, worry. On the otherhand short-term traders can use the same volatility to their advantage, and based on various support and resistances, they can trade various ranges.

If we take stock market as a battlefield, then technical analysis serves the purpose of weapons. If we enter into the battlefield without any weapons at hand, the result is evident to all. So without the knowledge of technical analysis, if you enter the stock market, it is like entering the battlefield bare handed. To do so is not courage, but foolishness. If you want to win in stock market, you have to acquire the necessary skills to win in it. By not doing this, whatever loss you make, you are responsible for it and not the market or anyone else.

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## ROLE OF TECHNICAL ANALYSIS

1. **Identifying Trends:** Technical analysis aids traders in seeing patterns in the price fluctuations of securities. Through the examination of charts and price patterns, traders can ascertain the direction of an asset's movement, whether it is ascending, descending, or moving horizontally.
2. **Support and Resistance Levels:** Technical analysis reveals support and resistance levels, which are specific price levels where securities typically encounter buying or selling pressure.
3. **Chart Patterns:** Technical analysis includes the examination of many chart patterns, including head and shoulders, triangles, flags, and pennants. These patterns can offer valuable insights into probable future price fluctuations by analyzing past pricing trends.

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## NEED OF THE STUDY

- Studying the commodity market through technical analysis on MCX is crucial for understanding market dynamics and making well-informed trading choices. This research endeavors to utilize historical price data, chart patterns, and technical indicators on the Multi Commodity Exchange (MCX) to uncover lucrative trading opportunities, predict price trends, and proficiently mitigate risks. Gaining insight into these market patterns through technical analysis improves traders' capacity to accurately time their entry and exit points, optimize their trading methods, and reduce possible losses.
- This study offers valuable insights for investors and policymakers regarding market patterns and volatility, which can assist in the development of strong commodity market policies. This study enhances our comprehension of the MCX commodity market and its fundamental elements, providing advantages to all parties engaged in commodity trading and investment.

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## OBJECTIVES OF THE STUDY

- To study the behaviour of commodity market for the period 01-01-2021 to 31-3-2024 using various technical indicators like Moving average and convergence divergence, Exponential Moving Average, Bollinger Band, Relative Strength Index, Stochastic oscillator.
- To analyze the price movement of Commodity market to interpret buy or sell decision by using technical indicators.
- To forecast the price movements of commodity market using ARIMA FORECASTING MODEL.
- To examine the techniques or the tools used to down size the dangers or the exposures which influences the commodity advertise.
- To assist the investors in making better investment decision.

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## SCOPE OF THE STUDY

- The scope of the study will aid the investors in their future investment plan in commodity market. The study also reveals price movements of the stock over the past which helps the investors in analysing the risk involved in future.
- The project does not extend to any other sector. The research was technical in nature.
- This analysis will help the investors to invest in commodity market with better understanding of statistical tools used. Secondary data on the subject was collected from journals, company prospectus, company annual reports and MCX websites.

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## REVIEW OF LITERATURE

**Martin T. Bohl, Alexander Pütz (2021) Speculation and the informational efficiency of commodity futures markets** This article examines the impact of speculative behavior on the level of informational efficiency in commodities futures markets. The findings are consistent and reliable regardless of the various window sizes used.

**Dr Paramjeet Singh (2023) a study of evolution and regulation of commodity market with benefits and current scenario in india** The report examined the advantages and current state of the market. India is a leading producer of numerous commodities and has a rich history of engaging in commodity trading and associated derivatives.

**T Satyanarayana Chary (2021) Performance of Commodity Derivatives Market in India** This article analyzes the performance of the Indian commodities derivatives market by assessing the growth of quantity of the permissible commodities for trading, as well as the volume and value of the traded commodity derivatives. It has been observed that the relationship between the growth rates of volume and value is non-linear, both in terms of estimated and actual growth.

**Lam Minh Trung (2022) Commodity dynamism in the COVID-19 crisis: Are gold, oil, and stock commodity prices, symmetrical?** The present study aims to investigate the correlation between the volatility of commodities and stock prices during the COVID-19 pandemic. The study objectives

were achieved by applying DCC-GARCH modeling to the data of Asian economies, specifically China, India, Sri Lanka, Bangladesh, and Pakistan. The study's findings revealed a substantial correlation between the prices of gold, stocks, and oil across all Asian stock markets.

**Paresh Kumar Narayan (2022) An analysis of commodity markets: What gain for investors?** This article examines the ability of the commodity futures market to forecast the commodity spot market. By analyzing historical daily data on four commodities—oil, gold, platinum, and silver—we have determined that they do exhibit the desired characteristics.

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## RESEARCH METHODOLOGY RESEARCH DESIGN

Analytical research design is a structured methodology employed to investigate and comprehend the intricate relationships between variables within a study. It serves as a blueprint for systematically analysing cause-and-effect relationships, shedding light on the underlying mechanisms at play. Central to this approach is the formulation of clear research objectives and hypotheses, guiding the direction of inquiry.

### SAMPLES

- GOLD
- NATURAL GAS
- LEAD

### DATA COLLECTION METHOD

The process of gathering and analysing accurate data from various sources to find answers to research problems, trends and probabilities, etc., to evaluate possible outcomes is Known as Data Collection. The data is purely based on Secondary data. Secondary data refers to information that has been collected and compiled by someone else for a purpose other than the one currently pursued by the researcher.

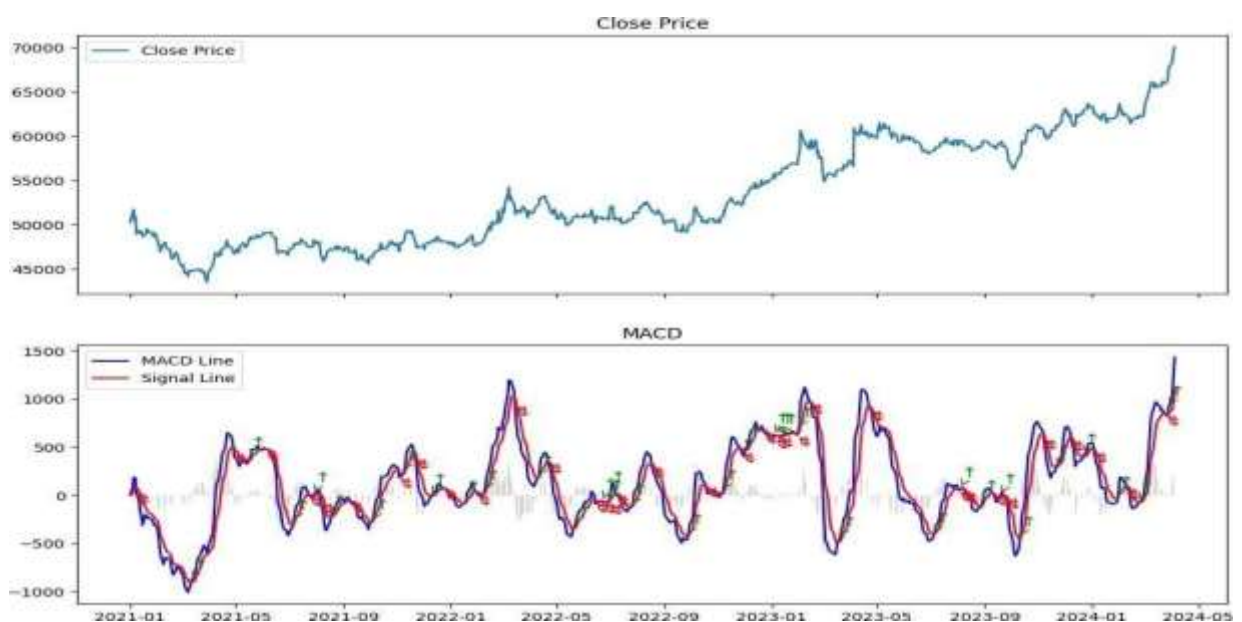
### SOURCES OF DATA

- Historical data of the commodity products like Open price, High Price, Low Price and Close Price.
- websites such as Money control, Yahoo finance.
- Google Colab software used for python code Analysis.
- Company Brochures.

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## DATAANALYSIS AND INTERPRETATION CALCULATION OF MACD

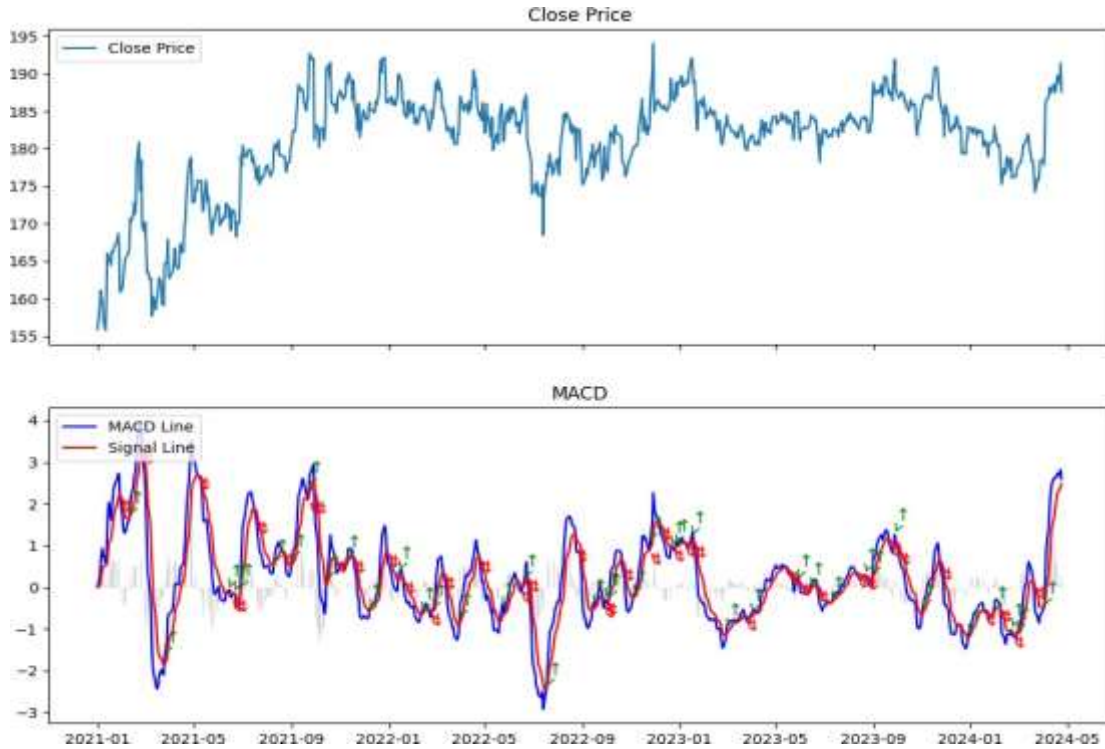
### Line chart showing MACD for the commodity GOLD



**INFERENCE**

For instance, From the above chart where at the period of 2021 -06 investors are advised to buy the product and the period 2023-06 investors are advised to sell the product for better return.

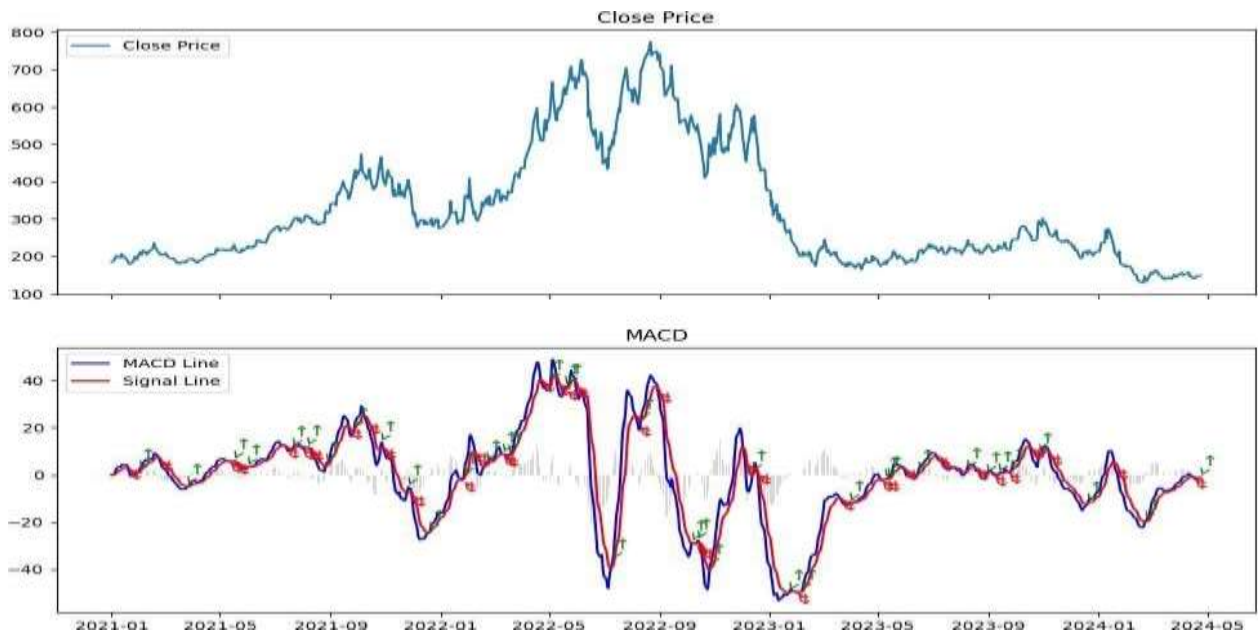
**Line chart showing buying and selling signal of MACD for the commodity LEAD**



**INFERENCE**

From the above chart where at the period of 2023 -06 investors are advised to buy the product and the period 2023-09 investors are advised to sell the product for better return.

**Line chart showing MACD for the commodity NATURAL GAS**



**INFERENCE**

From the above chart where at the period of 2021 -03and 2021-04 investors are advised to buy the product and the period 2022-09 investors are advised to sell the product for better return.

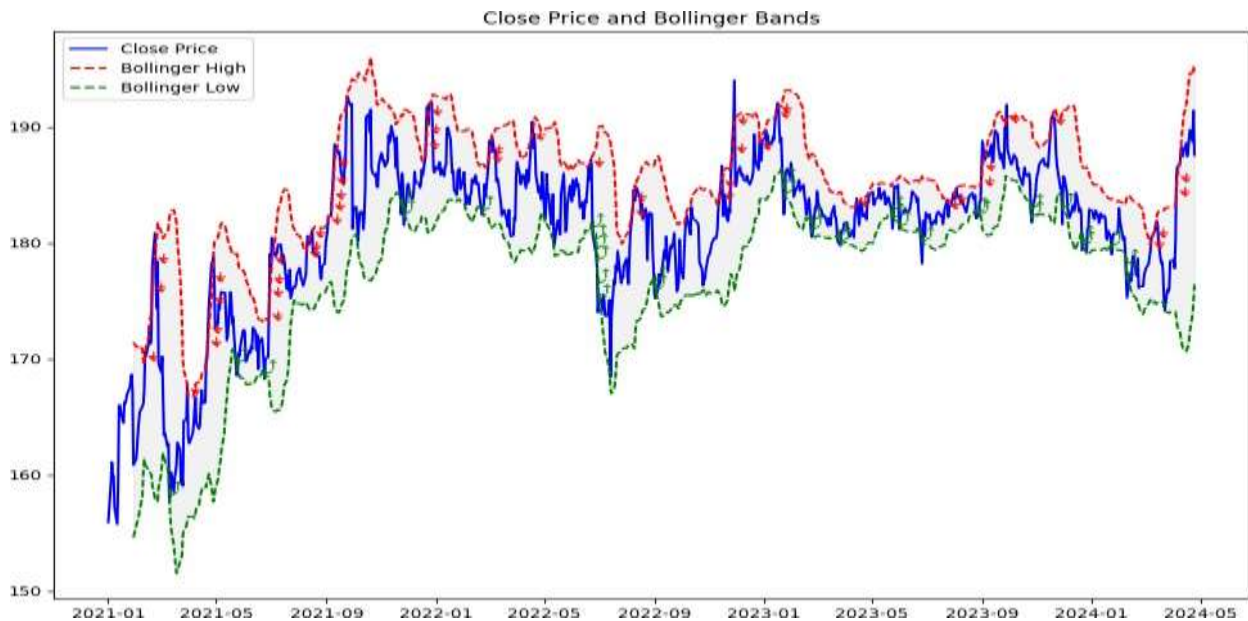
**CALCULATION OF BOLLINGER BAND**

Line chart showing BOLLINGER BAND for the commodity GOLD



From the above chart it is clearly visible that at the time period of 2021-01 to 2021-03 shows BUY SIGNAL as it looks like W shape known as W BOTTOM. At the period of 2021-04 to 2022-08 shows SELL SIGNAL as it looks like M shape known as M TOP.

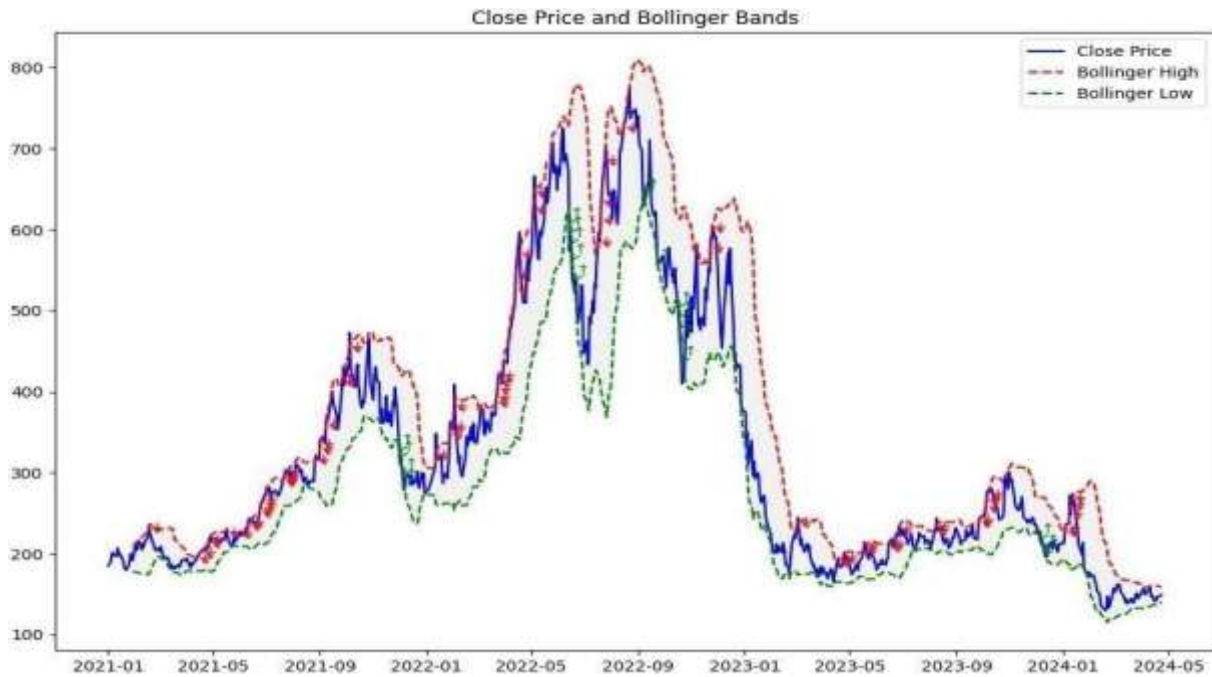
Line chart showing BOLLINGER BAND for the commodity LEAD



**INFERENCE**

From the above chart it is clearly visible that at the time period of 2021-06 to 2021-09 shows BUY SIGNAL as it looks like W shape known as W BOTTOM. At the period of 2022-01 to 2022-05 shows SELL SIGNAL as it looks like M shape known as M TOP.

**Line chart showing BOLLINGER BAND for the commodity NATURAL GAS**

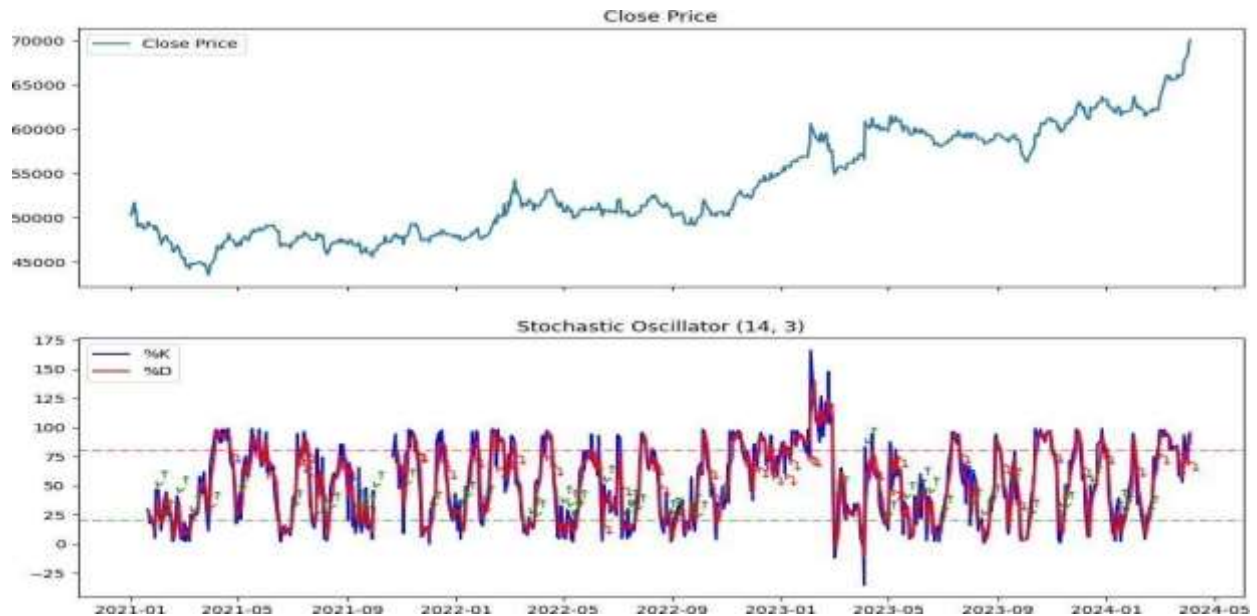


**INFERENCE**

From the above chart it is clearly visible that at the time period of 2022-07 shows BUY SIGNAL as it looks like W shape known as W BOTTOM. At the period of 2021-02 to 2021-04 shows SELL SIGNAL as it looks like M shape known as M TOP.

**CALCULATION OF STOCHASTIC OSCILLATOR**

**Line chart showing STOCHASTIC OSCILLATOR for the commodity GOLD**

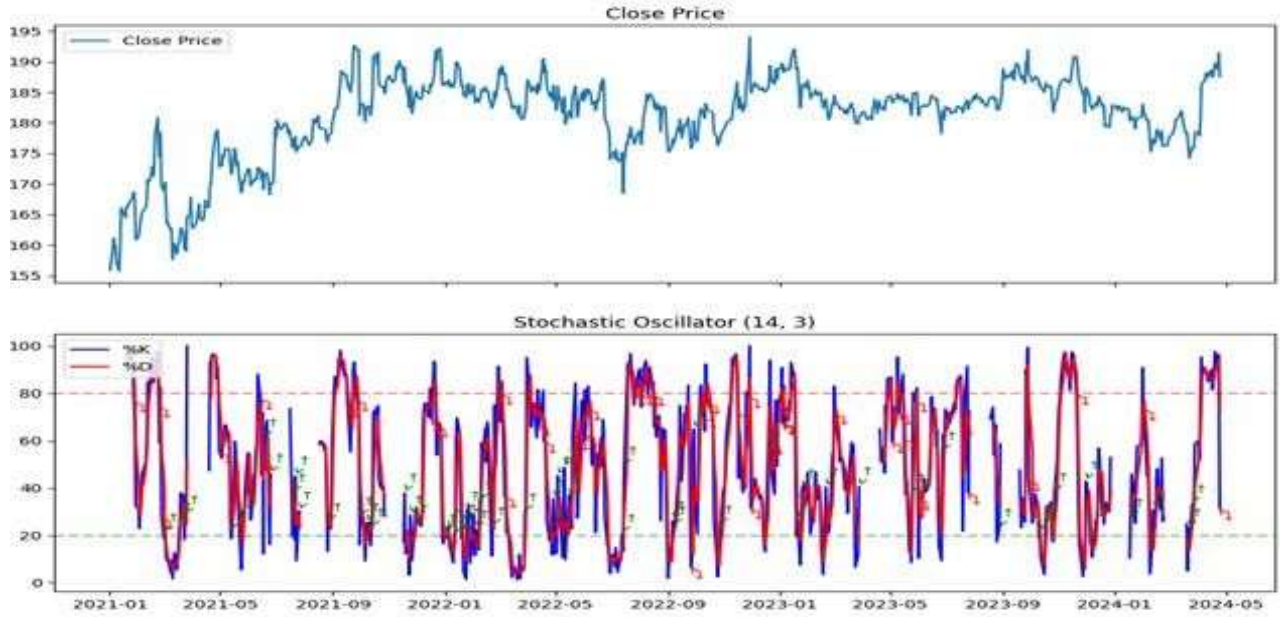


**INFERENCE**

From the above chart it is clearly shown that at the period of 2021-01 to 2021-03 indicates buy signal as it is below the range 20 and at the period of 2021-05 and 2021-06 and 2021-08 indicates sell signal as it crosses the range 80.

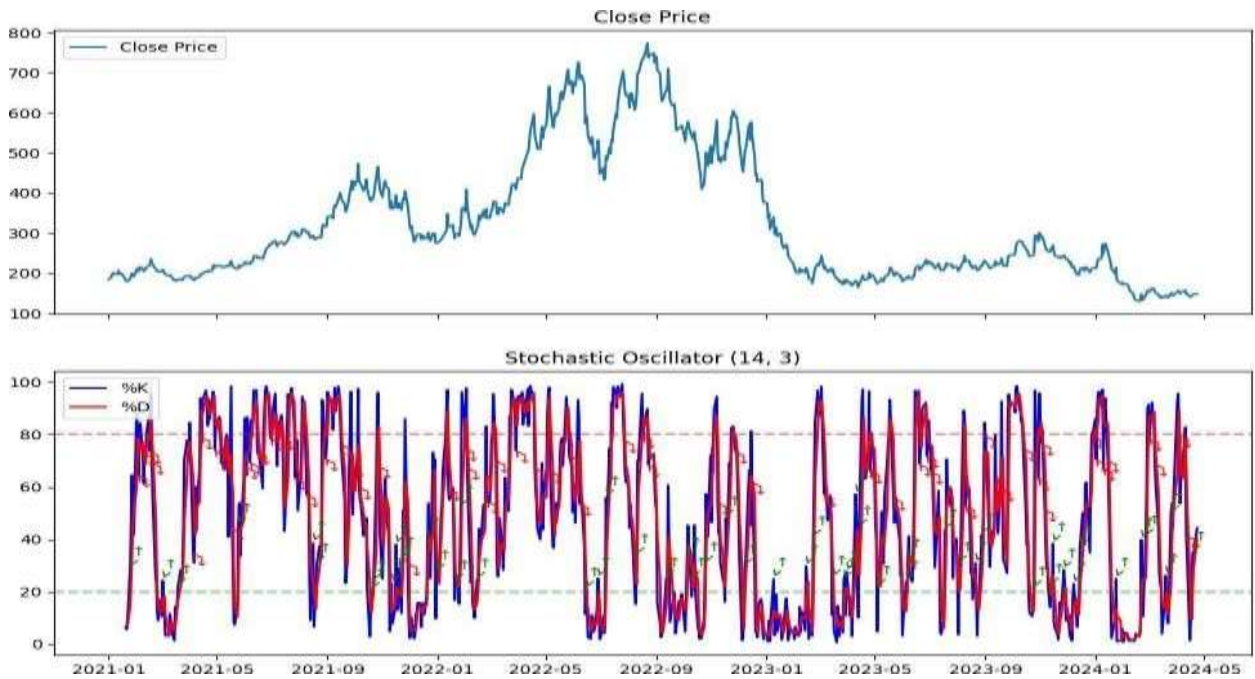
**Line chart showing STOCHASTIC OSCILLATOR for the commodity LEAD**

**INFERENCE**



From the above chart it is clearly shown that at the period of 2021-07 indicates buy signal as it is below the range 20 and at the period of 2023-05 and 2023-06 indicates sell signal as it crosses the range 80.

**Line chart showing STOCHASTIC MODEL for the commodity NATURAL GAS**



**INFERENCE**

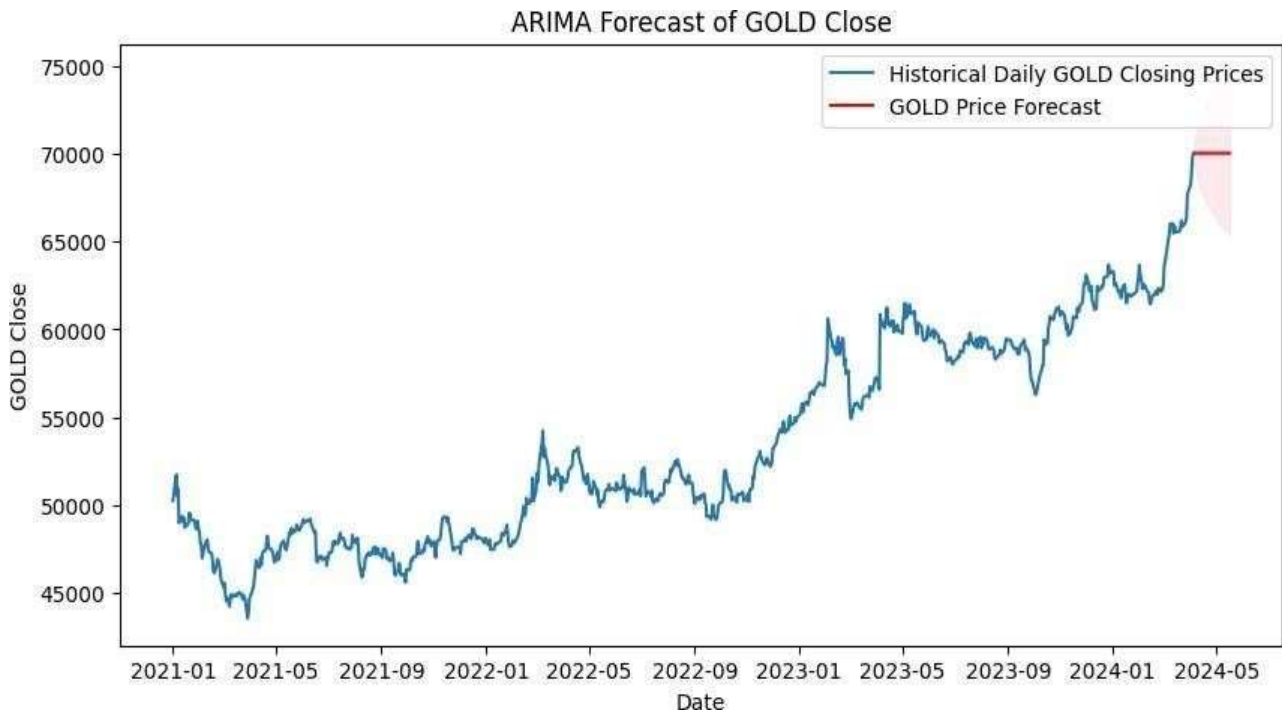
From the above chart it is clearly shown that at the period of 2023-01 indicates buy signal as it is below the range 20 and at the period of 2022-09 indicates sell signal as it crosses the range 80.

**CALCULATION OF ARIMA FORECAST MODEL**

Table showing ARIMA forecast for commodity GOLD

Dep. Variable:	GOLD Close		No. Observations:	839		
Model:	ARIMA(1, 1, 1)		Log Likelihood	-6265.157		
Date:	Tue, 30 Apr 2024		AIC	12536.314		
Time:	15:39:39		BIC	12550.507		
Sample:	0		HQIC	12541.754		
	- 839					
Covariance Type:	opg					
=====						
	coef	std err	z	P> z	[0.025	0.975]
-----						
ar.L1	-0.1647	0.782	-0.211	0.833	-1.697	1.368
ma.L1	0.1955	0.779	0.251	0.802	-1.332	1.723
sigma2	1.796e+05	3072.575	58.455	0.000	1.74e+05	1.86e+05
-----						
Ljung-Box (L1) (Q):			2.12	Jarque-Bera (JB):	6902.68	
Prob(Q):			0.15	Prob(JB):	0.00	
Heteroskedasticity (H):			1.43	Skew:	1.09	
Prob(H) (two-sided):			0.00	Kurtosis:	16.89	

Chart showing ARIMA forecast for commodity GOLD



**INFERENCE**

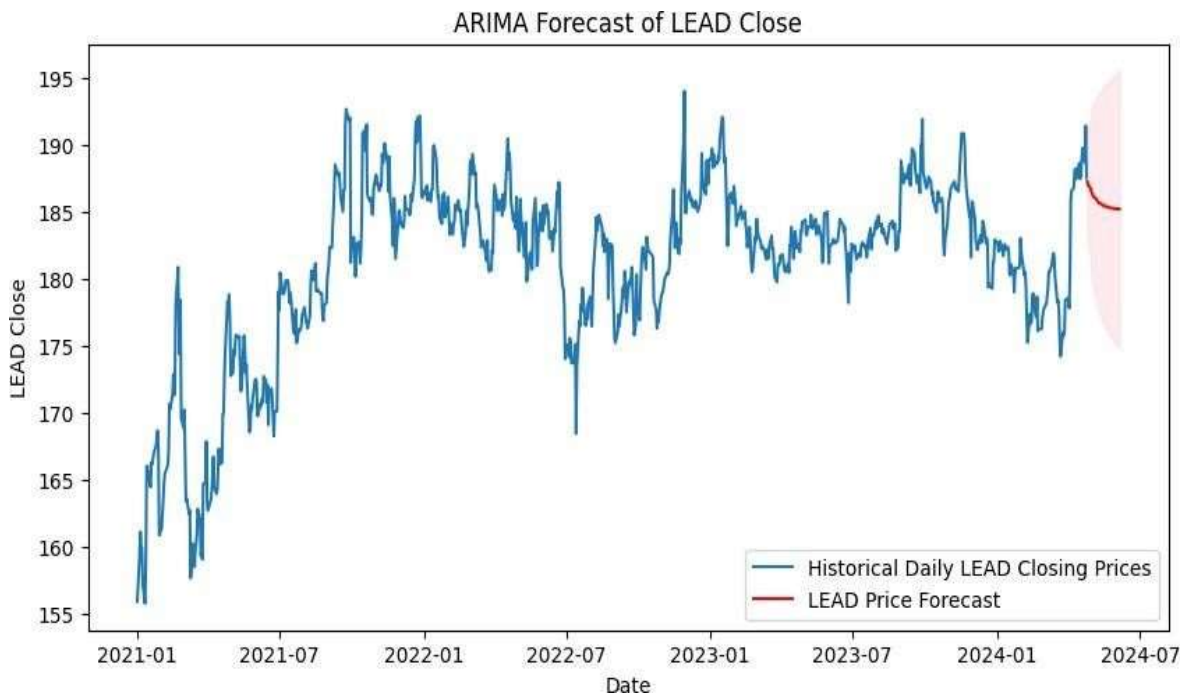
The lack of significance in the autoregressive and moving average terms suggests that the model may not adequately capture the dynamics of gold price movements. The insignificant p-values (greater than 0.05) indicate that these terms may not contribute meaningfully to the model.

Table showing ARIMA forecast for commodity LEAD



Dep. Variable:	LEAD Close	No. Observations:	852			
Model:	ARIMA(1, 1, 1)	Log Likelihood	-1634.488			
Date:	Tue, 30 Apr 2024	AIC	3274.977			
Time:	16:03:59	BIC	3289.216			
Sample:	0	HQIC	3280.431			
	- 852					
Covariance Type:	opg					
=====						
	coef	std err	z	P> z	[0.025	0.975]
-----				-----		
ar.L1	0.8772	0.035	25.393	0.000	0.809	0.945
ma.L1	-0.9509	0.023	-41.326	0.000	-0.996	-0.906
sigma2	2.7270	0.077	35.416	0.000	2.576	2.878
=====				=====		
Ljung-Box (L1) (Q):		0.02	Jarque-Bera (JB):		875.88	
Prob(Q):		0.88	Prob(JB):		0.00	
Heteroskedasticity (H):		0.35	Skew:		-0.48	
Prob(H) (two-sided):		0.00	Kurtosis:		7.88	

Chart showing ARIMA forecast for commodity LEAD



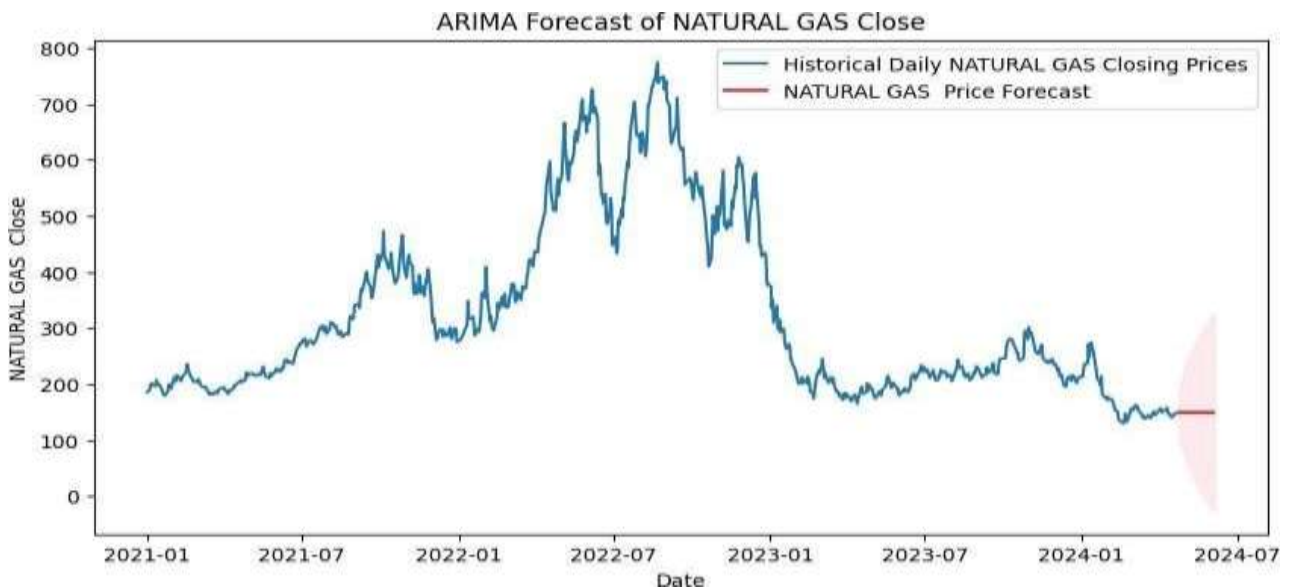
**INFERENCE**

The significant coefficients for both the autoregressive and moving average terms suggest that the ARIMA (1, 1, 1) model effectively captures the dynamics of lead price movements.

Table showing ARIMA forecast for commodity NATURAL GAS

Dep. Variable:	NATURAL GAS Close	No. Observations:	852			
Model:	ARIMA(1, 1, 1)	Log Likelihood	-3589.007			
Date:	Tue, 30 Apr 2024	AIC	7184.014			
Time:	15:53:21	BIC	7198.254			
Sample:	0	HQIC	7189.468			
	- 852					
Covariance Type:	opg					
=====						
	coef	std err	z	P> z	[0.025	0.975]
-----						
ar.L1	0.0007	18.143	3.74e-05	1.000	-35.559	35.561
ma.L1	0.0007	18.142	3.84e-05	1.000	-35.557	35.559
sigma2	269.4310	7.561	35.636	0.000	254.613	284.249
=====						
Ljung-Box (L1) (Q):		0.00	Jarque-Bera (JB):		593.24	
Prob(Q):		1.00	Prob(JB):		0.00	
Heteroskedasticity (H):		0.42	Skew:		-0.37	
Prob(H) (two-sided):		0.00	Kurtosis:		7.02	

Chart showing ARIMA forecast for commodity NATURAL GAS



## INFERENCE

The ARIMA (1, 1, 1) coefficients for both the autoregressive and moving average terms are statistically insignificant, and their extremely large standard errors relative to the coefficients suggest instability or issues in the estimation process. This might be indicative of a poor model specification or potential underlying issues with the data itself.

## SUMMARY OF FINDINGS

### MOVING AVERAGE CONVERGENCE/DIVERGENCE

- In Moving Average Convergence/Divergence it is found that Gold, Natural gas, Crude oil, Aluminium, Lead, Zinc, Copper having equal BUY and SELL percentage.
- Conversely, Silver has greater BUY percentage (4.7%) than its SELL percentage (4.5%).

### BOLLINGER BAND

- In Bollinger band it is found that all the commodities are having greater SELL percentage than BUY percentage.
- Compared to all other Commodities Gold has high difference between SELL and BUY. It shows BUY percentage (0.4%) and SELL percentage (9%).

### STOCHASTICS OSCILLATOR

- In Relative Strength Index it is found that Gold, Lead, Zinc these Commodities are having greater BUY percentage than SELL percentage.
- Conversely, Silver, Natural gas, Crude oil, Aluminium and Copper has greater SELL percentage than BUY percentage.

### ARIMA FORECAST

- **GOLD:** The lack of significance in the autoregressive and moving average terms suggests that the model may not adequately capture the dynamics of gold price movements.
- **LEAD:** The significant coefficients for both the autoregressive and moving average terms suggest that the ARIMA (1, 1, 1) model effectively captures the dynamics of lead price movements.
- **NATURAL GAS:** The ARIMA (1, 1, 1) coefficients for both the autoregressive and moving average terms are statistically insignificant, and their extremely large standard errors relative to the coefficients suggest instability or issues in the estimation process. This might be indicative of a poor model specification or potential underlying issues with the data itself (e.g., nonstationarity not resolved by a single differencing).

### SUGGESTIONS

- From this study Silver, Zinc, Aluminium these Commodities perform well in all the indicators indicates positive response for these Commodities. so the investors are advised to consider these commodities for their investments.
- From the above findings, it is clearly shown that the model (ARIMA) effectively captures the dynamics of ALUMINIUM, LEAD, ZINC and COPPER price movements.
- Examine the predictions made by the ARIMA model closely. Determine whether the projected trend for the interest investment points to growth, stability, or decline. Your investment plan will be guided by this understanding. Data seasonality can be captured by ARIMA models. Take note of any seasonal trends that the model's predictions may indicate. To take advantage of these trends, modify your investment approach appropriately.
- Encouraging investors to conduct thorough research before making investment decisions is essential. This includes analyzing financial statements, understanding market trends, and evaluating the performance of investment products.
- Diversification, consider diversifying your portfolio across commodities to balance out risks associated with varying market sentiments.
- Monitor Trends, continuously track these indicators to stay updated on changing market sentiments for each commodity.
- Risk Management, adjust your trading strategies and risk management techniques based on the specific trends and signals from each commodity.

### CONCLUSION

In conclusion, the application of technical analysis in studying commodity markets, specifically bullion, energy, and metal markets, has provided valuable insights into price movements and trends. Through the examination of historical price data, chart patterns, and technical indicators, several important conclusions can be drawn. Firstly, technical analysis has demonstrated its effectiveness in identifying trends and patterns within these markets. Whether it's the identification of bullish or bearish trends, the recognition of support and resistance levels, or the detection of reversal patterns, technical analysis tools have proven instrumental in understanding market dynamics. Secondly, the study revealed the significance of key technical indicators such as moving averages, relative strength index (RSI), and MACD (Moving Average Convergence Divergence) in predicting price movements and assessing market momentum. These indicators have provided valuable signals for traders and investors, aiding them in making informed decisions regarding entry and exit points.

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