

Analysis of the volatility of the Commodity Market with specific reference to Gold as a commodity

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Abstract: Commodity market refers to markets that trade in primary rather than manufactured products. Soft commodities are agricultural products such as wheat, coffee, cocoa and sugar. Hard commodities are mined, such as gold, rubber and oil. Investors access about 50 major commodity markets worldwide with purely financial transactions increasingly outnumbering physical trades in which goods are delivered. Futures contracts are the oldest way of investing in commodities. Commodity markets can include physical trading and derivatives trading using spot prices, forwards, futures, and options on futures. Gold ETFs are based on "electronic gold" that does not entail the ownership of physical bullion, with its added costs of insurance and storage in repositories. The trading of commodities consists of direct physical trading and derivatives trading. Gold has been widely used throughout the world as money, for efficient indirect exchange, and to store wealth in hoards. For exchange purposes, mints produce standardized gold bullion coins, bars and other units of fixed weight and purity. It is also used a commodity in the market and traded for a profit. This study helps in understanding the volatility overflow and dynamics of commodity fluctuations with reference to gold.

Keywords: Gold, Commodity, Commodity market, Volatility, Bull and Bear, Derivatives, Futures, Investment

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I. INTRODUCTION

Commodity-based money and commodity markets in a crude early form are believed to have originated in Sumer between 4500 BC and 4000 BC. Sumerians first used clay tokens sealed in a clay vessel, then clay writing tablets to represent the amount. Early civilizations variously used pigs, rare seashells, or other items as commodity money. Since that time traders have sought ways to simplify and standardize trade contracts. Gold and silver markets evolved in classical civilizations. At first the precious metals for valued for their beauty and intrinsic worth and were associated with royalty. In time, they were used for trading and were exchanged for other goods and commodities, or for payments of labour. Gold, measured out, then became money. Gold's scarcity, unique density and the way it could be easily melted, shaped, and measured made it a natural trading asset.

The trading of commodities consists of direct physical trading and derivatives trading. Exchange traded commodities have seen an upturn in the volume of trading since the start of the decade. This was largely a result of the growing attraction of commodities as an asset class and a proliferation of investment options which has made it easier to access this market. The global volume of commodities contracts traded on exchanges increased by a fifth in 2010, and a half since 2008, to around 2.5 billion million contracts. During the three years up to the end of 2010, global physical exports of commodities fell by 2%, while the outstanding value of OTC commodities derivatives declined by two-thirds as investors reduced risk following a five-fold increase in value outstanding in the previous three years. Trading on exchanges in China and India has gained in importance in recent years due to their emergence as significant commodities consumers and producers. China accounted for more than 60% of exchange-traded commodities in 2009, up on its 40% share in the previous year.

Commodity trading in India has a long history. Commodity trading in India started much before it started in many other countries. However, years of foreign rule, droughts and periods of scarcity and Government policies caused the commodity trading in India to diminish. Commodity trading was, however, restarted in India recently. Multi Commodity Exchange (MCX), National Commodity and Derivatives Exchange (NCDEX), National Multi-Commodity Exchange (NMCE) and Indian Commodity Exchange (ICEX) are the commodity exchanges in India. The regulatory body is Forward Markets Commission (FMC).

India has a long history of trading commodities and considered the pioneer in some forms of derivatives trading. The first derivative market was set up in 1875 in Mumbai, where cotton was traded in futures. This was followed by establishment of futures markets in edible oilseeds complex, raw jute and jute goods and bullion. This

became an active industry with volumes reported to be large. However, in 1935 a law was passed allowing the government to in part restrict and directly control food production (Defence of India Act, 1935). This included the ability to restrict or ban the trading in derivatives on those food commodities. Post-independence, in the 1950s, India continued to struggle with feeding its population and the government increasingly restricting trading in food commodities. Just at the time the FMC was established, the government felt that derivative markets increased speculation which led to increased costs and price instabilities, and in 1953 finally prohibited options and futures trading altogether. The industry was pushed underground and the prohibition meant that development and expansion came to a halt. In the 1970s as futures and options markets began to develop in the rest of the world, Indian derivatives markets were left behind. The apprehensions about the role of speculation, particularly in the conditions of scarcity, prompted the Government to continue the prohibition well into the 1980s.

The result of the period of prohibition left India with a large number of small and isolated regional futures markets. The futures markets were dispersed and fragmented, with separate trading communities in different regions with little contact with one another. The exchanges had not yet embrace modern technology or modern business practices. Next to the officially approved exchanges, there were also many *havala* markets. Most of these unofficial commodity exchanges have operated for many decades. Some unofficial markets trade 20–30 times the volume of the "official" futures exchanges. They offer not only futures, but also option contracts. Transaction costs are low, and they attract many speculators and the smaller hedgers. Absence of regulation and proper clearing arrangements, however, meant that these markets were mostly "regulated" by the reputation of the main players.

Like every commodity, gold has its own ticker symbol, contract value and margin requirements. To successfully trade a commodity, one must be aware of these key components and understand how to use them to calculate the potential profits and loss. Commodities are traded based on margin, and the margin changes based on market volatility and the current face value of the contract.

Derivatives are financial evolved from simple commodity future contracts into a diverse group of financial instruments that apply to every kind of asset, including mortgages, insurance and many more. Futures contracts, Swaps (1970s), Exchange traded Commodities (ETC) (2003), forward contracts, etc. are examples. They can be traded through formal exchanges or through Over-the-counter (OTC). Commodity market derivatives unlike credit default derivatives for example, are secured by the physical assets or commodities. A commodities exchange is an exchange where various commodities and derivatives are traded. Most commodity markets across the world trade in agricultural products and other raw materials (like wheat, barley, sugar, maize, cotton, Cocoa bean or cocoa, coffee, milk products, pork bellies, oil, metals, etc.) and contracts based on them. These contracts can include spot prices, forwards, futures and options on futures. Other sophisticated products may include interest rates, environmental instruments, swaps or freight contracts.

Precious metals which are currently traded on the commodity market include gold, platinum, palladium and silver which are sold by the troy ounce. One of the main exchanges for these precious metals is COMEX. According to the World Gold Council, investments in gold are the primary driver of industry growth. Gold prices are highly volatile, driven by large flows of speculative money.

Gold is a unique asset based on few basic characteristics. First, it is primarily a monetary asset, and partly a commodity. As much as two thirds of gold's total accumulated holdings relate to "store of value" considerations. Holdings in this category include the central bank reserves, private investments, and high-carriage jewellery bought primarily in developing countries as a vehicle for savings. Thus, gold is primarily a monetary asset. Less than one third of gold's total accumulated holdings can be considered a commodity, the jewellery bought in Western markets for adornment, and gold used in industry. Gold has maintained its value in after-inflation terms over the long run. Some analysts like to think of gold as a "currency without a country". It is an internationally recognized asset that is not dependent upon any government's promise to pay. This is an important feature when comparing gold to conventional diversifiers like T-bills or bonds, which unlike gold, do have counterparty risk.

In finance, technical analysis is a security analysis methodology for forecasting the direction of prices through the study of past market data, primarily price and volume. Behavioural economics and quantitative analysis use many of the same tools of technical analysis, which, being an aspect of active management, stands in contradiction to much of modern portfolio theory. The efficacy of both technical and fundamental analysis is disputed by the efficient-market hypothesis which states that STOCK MARKET prices are essentially unpredictable.

Prices of the commodity prices move in trends and cycles and are never stable. An investor in the commodity market is interested in buying commodities at a low price and sells them at a high price, so that he can get good return on his investment. He therefore tries to analyse the movement of the share price of the commodities.

Gold has been widely used throughout the world as money, for efficient indirect exchange, and to store wealth in hoards. For exchange purposes, mints produce standardized gold bullion coins, bars and other units of fixed

weight and purity. It is also used as a commodity in the market and traded for a profit. The study has been conducted to explain the volatility of the commodity, trend analysis and performance of the gold as a commodity. The study analyses the various factors and helps in understanding Gold as a commodity better.

II. LITERATURE REVIEW

G.C.Rausser and C.Carter (1983) in their research examined the efficiency of the soybean, soybean oil, and soybean meal futures markets using semi strong form test via structurally based ARIMA models. They emphasized that “unless the forecast information from the models is sufficient to provide profitable trades, then superior forecasting performance in a statistical sense has no economic significance”.

Gopal Naik and Sudhir Kumar (2002) in their research paper “Efficiency and un-biasedness of Indian Commodity Futures Markets” emphasized that agricultural commodity futures market has not fully developed as competent mechanism of price discovery and risk management. The study found some aspects to blame for deficient market such as poor management, infrastructure and logistics. Dominance of spectators also dejects hedgers to participate in the market.

Narender L Ahuja (2006) in his research on “Commodity Derivatives market in India: Development, Regulation and Future Prospective”, concluded that Indian commodity market has made enormous progress since 2003 with increased number of modern commodity exchanges, transparency and trading activity. The volume and value of commodity trade has shown unpredicted mark. This had happened due to the role played by market forces and the active encouragement of Government by changing the policy concerning commodity derivative. He suggested the promotion of barrier free trading in the future market and freedom of market forces to determine the price.

Kamal Nayan Kabra (2007) in his research “Commodity Futures in India” concluded that in short span of time, the commodity futures market has achieved exponential growth in turnover. He found various factors that need to be consider for making commodity market as an efficient instrument for risk management and price discovery and suggested that policy makers should consider specific affairs related with agricultural commodities marketing, export and processing and the interests involved in their actual production.

K. Lakshmi (2007) in her research paper on “Institutional Investors in Indian Commodity Derivative Market- Prospective for the Futures” discussed the implications on the grant of permission to Foreign Institutional Investors, Mutual Funds and banks in commodity derivative markets. She found that participation of these institutions may boost the liquidity and volume of trade in commodity market and they could get more opportunities for their portfolio diversification.

Mukhopadhyay, Arup Ranjan, Pradhan, Biswabrata, and Gupta, Abhijit (2008) in their research paper “Developing an Index for Trading Through Multi Commodity Exchange in India”, researched to facilitate business development and to create market awareness, and conducted an index named MCX COMAX for different commodities viz. agricultural, metal and energy traded on Multi Commodity Exchange in India. By using weighted geometric mean of the price relatives as the index, weights were selected on the basis of percentage contribution of contracts and value of physical market. With weighted arithmetic mean of group indices the combined index had been calculated. It served the purpose of Multi Commodity Exchange to make association among between various MCX members and their associates along with creation of fair competitive environment. Commodity trading market had considered this index as an ideal investment tool for the protection of risk of both buyers and sellers.

Swami Prakash Srivastava and Bhawana Saini (2009) in their research paper “Commodity Futures Markets and its Role in Indian Economy” discussed that with the elimination of ban from commodities, Indian futures market has achieved sizeable growth. Commodity futures market proves to be the efficient market at the world level in terms of price risk management and price discovery. Study found a high potential for future growth of Indian commodity futures market as India is one of the top producers of agricultural commodities.

Gurbandani Kaur and D.N Rao (2010), under the research done by them titled “Efficiency of Indian Commodities Market: A Study of Agricultural Commodity Derivatives Traded on NCDEX have tested the market efficiency of agricultural commodities traded on National Commodity Derivative Exchange of India and pointed out that Indian commodity derivative market has witnessed phenomenal growth in few years by achieving almost 50 time expansion in market. By applying auto correlation and run tests on four commodities namely-Guar seed, Pepper, Malbar, refined Soya oil and Chana Gram the study observed the random walk hypothesis and tested the week form efficiency of these commodities. Indian agricultural commodity market is efficient in week form of efficient market hypothesis.

Dharmbeer and Mr. Barinder Singh (2011) in their research on “Indian Commodity Market: Growth and Prospects” summarizes theoretical and empirical research on the growth and prospects of emerging commodity markets and the resulting implication on policy and regulation. They found from the previous studies that derivatives

markets have supported the hedging role of emerging derivatives markets. All commodities are globally traded and the global demand-supply situation is widely known and available to anyone who reaches out for it. The commodity markets are nowhere as volatile as stock futures. Since commodity exchanges promote price transparency, he refuses to buy the story that commodity exchange fuel inflation.

Meenakshi Malhotra (2012) in her research paper “Commodities Derivatives Market in India: The Road Traveled and Challenges Ahead” examine that the commodity price very critical for the existence and growth of any industry and for the economy as a whole. Our government has brought about sweeping reforms in the commodities markets so that industry can efficiently manage the price risk they are faced with. They found the commodity price will continue to behave unpredictably. Risk management through commodity derivatives will give stability to the economic activities of the country.

Dr. G. Malyadriand B. Sudheer Kumar (2012) in their research paper “A Study on Commodity Market” recalls that commodity derivatives arrived in India as early as 1875, barely about decade after they arrived in Chicago. The commodity market in India has experience an unprecedented boom in terms of the number of modern exchanges, the number of commodities allowed for derivative trading as well as the values of futures trading in commodities. However there are several impediments to be overcome and issues to be settled for a sustained development of the market.

Mr. Sharma KRS (2013) in his research paper “A Study of Commodity Futures in India” perception towards commodities futures trading in India with special reference to commodity futures exchanges. The growth of commodity derivative market in the country has been impressive. With institutional players prevented from participating in the commodity futures market, the retail investors, as a group, have emerged as major players in the said market. They also add that commodity futures are positively correlated with inflation, unexpected inflation and change in expected inflation.

Harvindaer pal Kaur and Dr. Bimal Anjum (2013) in his study titled “Commodity Derivatives Market in India” examined that the India is among the apex producers of a number of commodities and has a long history of trading in commodity derivatives. Commodity market has occupied imperative position in Indian economy since the establishment of Forward Market Commission in April 2003. There are 5 national and 21 regional commodity exchanges recognized and regulated by this commission. They found commodity futures reform two vital functions of the economy i.e. price discovery and management. Futures markets provide liquidity and facilities to hedge against future price risk. It helps buyers and sellers of agricultural products to quickly manage their trade at a fair price. Commodity trading also offers a chance for financial leverage to hedgers, speculators and other traders.

Dr. Sunitha Ravi (2013) in her research paper studied the “Price Discovery and Volatility Spillover in Indian Commodity Futures Markets Using Selected Commodities“. The results of the research study indicate that the future market of the commodities is more efficient as compared to spot market. The future market also helps spot market in the process of Price Discovery. She found that the derivative instruments are available for the underlying commodities significantly influence the volatility.

Sagar Suresh Dhole (2014) in his research paper “Commodity Futures Market in India: The Legal Aspect and its Rationale” investigated the antiquity of commodity futures market in India epoch back to the ancient times cited in Kautilya’s Arthashastra, and have been commodity heard in Indian markets for centuries, seems to be coined in 320 BC, referred in Forward Contracts (Regulation) Act, 1952. They found the markets have made enormous advancement in terms of technology, transparency and the trading activity. Interestingly, this has happened only after the Government protection was removed from a number of commodities, and market forces were allowed to play their role. Rational Government policies and the plinth of effective laws have benefited in many ways like Credit accessibility, improved product quality, predictable pricing, Import-export competitiveness, and price risk management and price discovery.

Dr. S. Rajamohan, G. Hudson Arul Vethamanikamand C. Vijay Kumar (2014) in his study titled “Commodity Futures Market in India” examined that the commodity trading has a long history and it has been modernized in the market. The commodities trading are occupied an important place in the economy it depends on the international trade A structural system has been created for commodity trades. It is creating awareness and the more opportunity to the investors and public. They found the market volatility is based on these commodities performance. However the commodity market has provided huge support to the Indian economy.

Rohit Bansl, Varsha Dadhich and Naveed Ahmad (2014) in his study titled “Indian Commodity Market-A Performance Review” investigated the Indian commodity markets have recently thrown open a new avenue for retail investor and traders to participate commodity derivatives. The study discusses the evolution and performance of the market, its present status and the future prospect. They found the different commodities (agriculture, metals, bullion, energy and other) show a positive trend in their volume and value of trade. The percentage share of agriculture

commodity in total commodity market has been declined in the year 2010-11 but bullion shows an increasing trend along with metal and energy. It all shows that the market has strong growth potential.

III. RESEARCH METHODOLOGY

Objectives of the study:

- To analyse volatility overflow on weekly, monthly and half yearly price movements using candlestick charts.
- To examine the dynamics of the commodity fluctuations for various periods using simple average and exponential average.
- To understand the factors responsible for bullish run of gold in long term.
- To understand the movement of the Indian commodities market
- To analyze the various factors and understand Gold as a commodity better.

Tools for analysis:

Financial tools used for the analysis are candle stick chart, simple average, moving average.

Data collection method:

Secondary data has been used for the research that has been collected from the financial websites, and company's reports available in periodicals, journals and books.

Plan of analysis:

The key focus of the analysis is to ascertain the volatility of markets, trend analysis and performance of gold as a commodity. The data collected from the above-mentioned secondary sources was processed and tabulated for easy interpretation. Wherever possible, the facts and figures were then represented in tabular and graphical form.

After data representation, analysis and interpretation has been done with regard to a few selected parameters, such as the candlestick charts, simple average and exponential average. Such data was then interpreted and generalizations and recommendations were developed further depending on it.

Reference period:

The information gathered from various sources is analysed and compiled in the project is based on 12 months, i.e. from 2014 to 2015.

Operational Definitions

➤ Candlestick Charts:

The candlestick chart is similar to a bar chart, but it differs in the formation of a wide bar on the vertical line, which illustrates the difference between the open and close. There are two colour constructs for days up and one for days that the price falls.

When the price of the stock is up and closes above the opening trade, the candlestick will usually be white or clear. If the stock has traded down for the period, then the candlestick will usually be black.

➤ Moving Averages (MA):

A moving average (MA) is a trend-following or lagging indicator because it is based on past prices. The two basic and commonly used MAs are the simple moving average (SMA), and the exponential moving average (EMA), along with these two we also use MACD which is comprised of convergence, divergence and signal.

➤ Simple Moving Average (SMA):

It simply takes the sum of all of the past closing prices over the time period and divides the result by the number of prices used in the calculation. Increasing the number of time periods in the calculation is one of the best ways to gauge the strength of the long-term trend and the likelihood that it will reverse.

➤ Exponential Moving Average (EMA):

This moving average calculation uses a smoothing factor to place a higher weight on recent data points and is regarded as much more efficient than the linear weighted average. Having an understanding of the calculation is not generally required for most traders because most charting packages do the calculation for you.

➤ Moving Average Convergence Divergence – MACD:

A trend-following momentum indicator that shows the relationship between two moving averages of prices. The MACD is calculated by subtracting the 26-day EMA from the 12-day EMA. A nine-day EMA of the MACD, called the "signal line", is then plotted on top of the MACD, functioning as a trigger for buy and sell signals.

➤ Doji:

The doji is a commonly found pattern in a candlestick chart of financially traded assets (stocks, bonds, futures, etc.) in technical analysis. It is characterized by being small in length—meaning a small trading range—with an opening and closing price that are virtually equal.

IV. Data Analysis and Interpretation

A. Candle stick chart Analysis

1. Half year data Analysis:

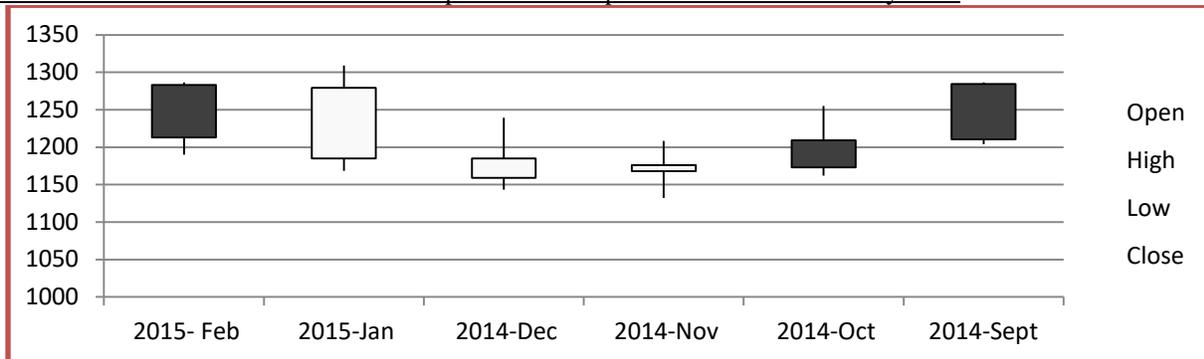
Data is analyzed for 6 months from September 2014 to February 2015 and is displayed in descending order along with each month's Open, High, Low, Close data.

Data	Open	High	Low	Close
2015- Feb	1283	1286.50	1190.00	1213.10
2015-Jan	1185.00	1308.80	1168.30	1279.20
2014-Dec	1159.20	1239.40	1143.40	1184.90
2014-Nov	1168.00	1208.10	1132.10	1176.00
2014-Oct	1209.20	1255.20	1162.20	1172.90
2014-Sept	1284.50	1286.40	1204.00	1210.50

Analysis:

- The above table gives us a clear indication that the gold prices have been fluctuating in the 6th months mentioned, the highest being 1308.80 and the lowest being 1132.10 respectively in the January, 2015 and November, 2014.
- The least opening price being 1159.20 in the month of December, 2014 as a result of a least closing price of 1172.90 in October, 2014.
- The highest closing price being 1279.20 in the January, 2015 and the average price 1206.1 for the 6 months data and the difference in high and low being 176.70.

Candle-stick chart of Gold for the 6 months period from September 2014 and February 2015



Interpretation:

The hollow candlesticks depict a bullish market i.e. the buyers are in control and the black signifies a bearish market i.e. the sellers are in control. If the close was less than the open, we get a filled candlestick and if the close was higher than the open we get a hollow (white) candlestick.

The first candlestick as in February is black because the close is less than the open, which means that the bears are in charge. The second in January is a long stick and a white body which signifies that the bulls and the bears were in a "tug of war" for a while and after which the bulls dominated the market. In December there is a short stick, candlestick along with a filled body which means that the market was in a tug of war for high and low prices but later the bulls dominated the market, the same pattern is seen in November. While, In October and September, the black body indicates that the market is bearish.

2. Monthly Data Analysis:

Data analyzed for 12 months from March 2014 to February 2015 and is displayed in descending order along with each month's Open, High, Low and Close.

Data	Open	High	Low	Close
2015- Feb	1283	1286.50	1190.00	1213.10
2015-Jan	1185.00	1308.80	1168.30	1279.20
2014-Dec	1159.20	1239.40	1143.40	1184.90
2014-Nov	1168.00	1208.10	1132.10	1176.00
2014-Oct	1209.20	1255.20	1162.20	1172.90
2014-Sept	1284.50	1286.40	1204.00	1210.50
2014-Aug	1284.10	1322.10	1272.00	1285.80
2014-July	1326.70	1343.70	1280.60	1281.30

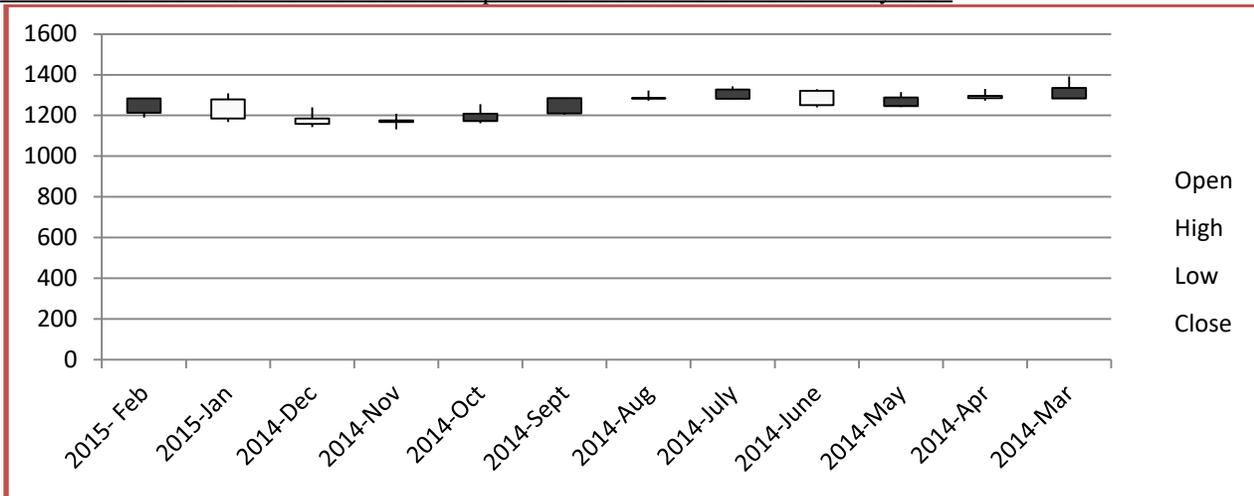
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2014-June	1250.00	1328.70	1240.50	1321.80
2014-May	1288.70	1314.20	1241.80	1245.60
2014-Apr	1285.10	1330.00	1272.40	1295.60
2014-Mar	1335.90	1391.40	1282.40	1283.40

Analysis:

- The opening price in March 2014 was 1335.90 and the opening price in February 2015 was 1283.00, the highest mark reached is 1391.40 in March, 2014 and the lowest being 1132.10 in November, 2014.
- The least open price being 1159.20 in the month of December, 2014 and the highest opening price 1335.90 in March, 2014.
- The least closing price of 1172.90 in October, 2014 and the highest being in 1321.80 in June 2014.
- The average price being 1245.84 for the 12 months analysed.

Candle-stick chart of Gold for the 12 months period from March 2014 and February 2015



Interpretation:

In February 2015, we see a black body which indicates a bearish market where the close is less than the open. While in January 2015, we see a long white body which shows that the close is higher than the open. The similar pattern is also visible in December, 2014.

3. Weekly Data Analysis:

Data is analyzed over few weeks i.e. the historical data gathered for a period of 1 year i.e.52 weeks from March 8th 2014 to March 16th 2015 and is displayed as in descending order according to the date along with each week's Open, High, Low and Close data.

Date	Close	Open	High	Low
March 8, 2015	1172.40	1169.20	1174.40	1166.70
March 1, 2015	1164.30	1213.80	1223.00	1162.90
Feb 22, 2015	1213.10	1203.50	1219.90	1190.00
Feb 15, 2015	1204.90	1227.50	1236.70	1197.20
Feb 8, 2015	1227.10	1235.90	1245.90	1216.50
Feb 1, 2015	1234.60	1283.00	1286.50	1228.20
Jan 25, 2015	1279.20	1294.00	1300.20	1252.10
Jan 18, 2015	1293.60	1280.70	1308.80	1273.70
Jan 11, 2015	1277.90	1224.30	1283.40	1218.50
Jan 4, 2015	1216.10	1187.80	1224.00	1177.80
Dec 28, 2014	1186.20	1194.90	1210.90	1167.30
Dec 21, 2014	1195.30	1196.00	1203.60	1170.70
Dec 14, 2014	1196.00	1222.00	1225.00	1182.00
Dec 7, 2014	1222.50	1191.20	1239.00	1187.30
Nov 30, 2014	1190.40	1159.40	1221.00	1141.70
Nov 23, 2014	1175.50	1200.70	1204.50	1163.90
Nov 16, 2014	1198.40	1186.30	1208.20	1174.70

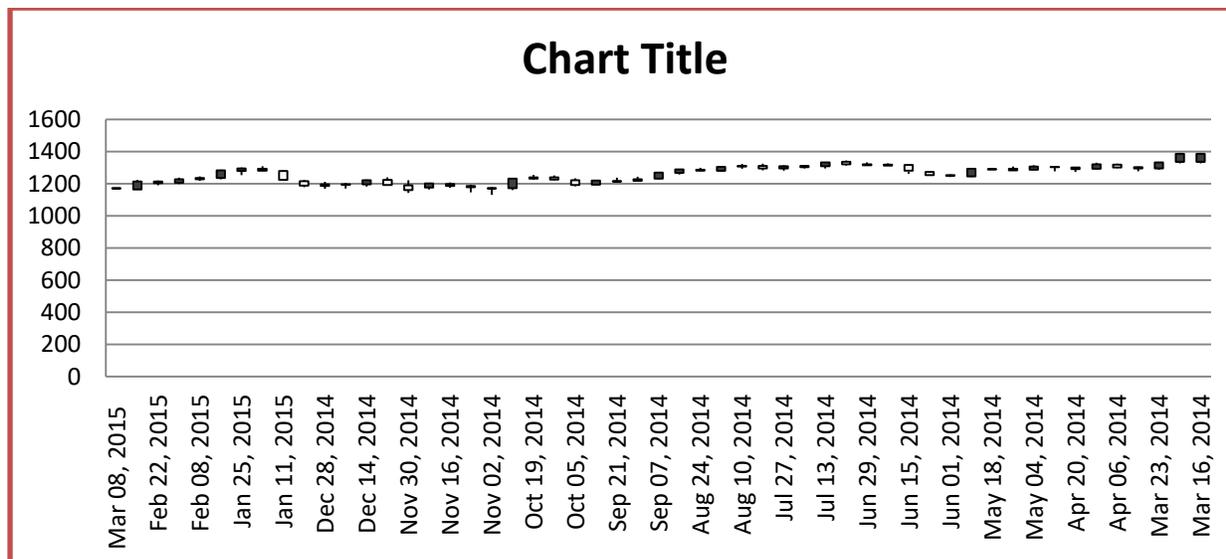
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Nov 2, 2014	1169.80	1171.10	1179.00	1130.40
Oct 26, 2014	1171.60	1230.60	1235.50	1160.50
Oct 19, 2014	1231.80	1239.10	1255.60	1226.30
Oct 12, 2014	1239.00	1224.80	1250.30	1222.00
Oct 5, 2014	1221.70	1192.00	1234.00	1183.30
Sep 28, 2014	1192.90	1219.10	1224.00	1190.30
Sep 21, 2014	1215.40	1216.40	1237.00	1206.60
Sep 14, 2014	1216.60	1228.30	1243.20	1214.20
Sep 7, 2014	1231.50	1269.50	1272.60	1228.10
Aug 31, 2014	1267.30	1288.50	1290.90	1258.00
Aug 24, 2014	1287.40	1280.80	1297.60	1275.00
Aug 17, 2014	1280.20	1304.20	1304.90	1273.40
Aug 10, 2014	1306.20	1310.40	1321.80	1293.00
Aug 3, 2014	1311.00	1295.40	1324.30	1283.30
July 27, 2014	1294.80	1309.20	1314.60	1281.00
July 20, 2014	1303.10	1311.00	1315.50	1294.80
July 13, 2014	1309.20	1332.80	1332.80	1294.10
July 6, 2014	1337.00	1319.60	1343.70	1313.20
Jun 29, 2014	1320.40	1315.30	1331.40	1311.80
Jun 22, 2014	1319.00	1312.30	1325.60	1312.00
Jun 15, 2014	1316.20	1279.80	1321.40	1260.90
Jun 8, 2014	1273.70	1252.70	1274.70	1251.00
Jun 1, 2014	1252.10	1250.00	1256.60	1240.50
May 25, 2014	1245.60	1291.90	1291.90	1241.80
May 18, 2014	1291.60	1290.70	1295.00	1287.40
May 11, 2014	1293.30	1282.10	1306.90	1281.20
May 4, 2014	1287.30	1305.60	1314.20	1285.50
April 27, 2014	1302.60	1305.40	1305.40	1276.70
April 20, 2014	1300.70	1290.00	1304.60	1272.40
April 13, 2014	1293.40	1320.10	1330.00	1291.50
April 6, 2014	1318.70	1301.40	1323.80	1296.30
Mar 30, 2014	1303.20	1294.30	1306.10	1277.30
March 23, 2014	1293.80	1333.00	1333.00	1285.90
March 16, 2014	1336.00	1386.10	1391.40	1325.80

Analysis:

- The above table gives us a clear indication that the gold prices have been fluctuating in the time period taken of 52 weeks as the opening price on March 16th, 2014 being 1336.00 and on March 8th, 2015 being 1172.40.
- The highest mark reached is 1391.40 on March 16th, 2014 and the lowest being 1130.40 in November 02nd, 2014.
- The least open price being 1159.40 on November 30th 2014 and the highest opening price 1386.10 on March 16th, 2014.
- The highest of the high price and the lowest of the high price being 1391.40 on March 16th, 2014 and 1174.40 on March 08th, 2015 respectively.
- The highest of the low price achieved by the market was 1325.80 on March 16th 2014 and the lowest of the low price on 1130.40 on November 2nd, 2014.
- The least closing price of 1164.30 on March 01, 2015 and the highest being 1337.00 on July 06th, 2014.
- The average price being 1253.23 for the 52 weeks which were analysed and the difference in high and low being 261.00.

Candle-stick chart of Gold for the 52 weeks period from March 16, 2014 and March 8, 2015



Interpretation:

If the close value is lower than the open value then the real body is black. The real body is white if the close is higher than the open. The thin lines between the bodies are called shadows. The peak of upper shadow is the high of the session and the bottom of the lower shadow is the low of the session. The colour and length of the body reveals whether the bulls or bears are in charge. The long white real body is visually displays the bulls are in charge. A long black body signifies the bears are in control. A small real body indicates a period in which the bulls and bears are in a “tug of war” and warns the market’s trend may be losing momentum. As the real body gets smaller we ultimately wind up with a “doji” which is a candlestick line which has an equal open-close and thus some or real body. From the above Candlestick chart we can interpret that the commodity mostly was taken charge by bears in the market and not the bulls as there are a number of black bodies seen in the candlestick chart. We can also see a lot of white bodies which tells that over the weeks bulls were also taking charge of the session but not as much as the bears.

We also see a few “doji’s” which remark that there was a tough competition going on between the bulls and the bears which means that the market was losing its momentum while being in motion. Most of the “doji” which are seen tells us that the market was rejecting the lower prices and thus the prices tend to remain higher as a result of the “tug of war” which was going on between the bulls and the bears.

While the real body is considered the most important segment of the candlestick, there is also substantial information from the length and position of the shadows and thus sometimes the candlestick chart has at some time provided with the reversal signals which are not even available in the traditional charting techniques. The above candlestick chart shows that gold as a commodity in the market is falling as the candle’s alignment is in a decline trend.

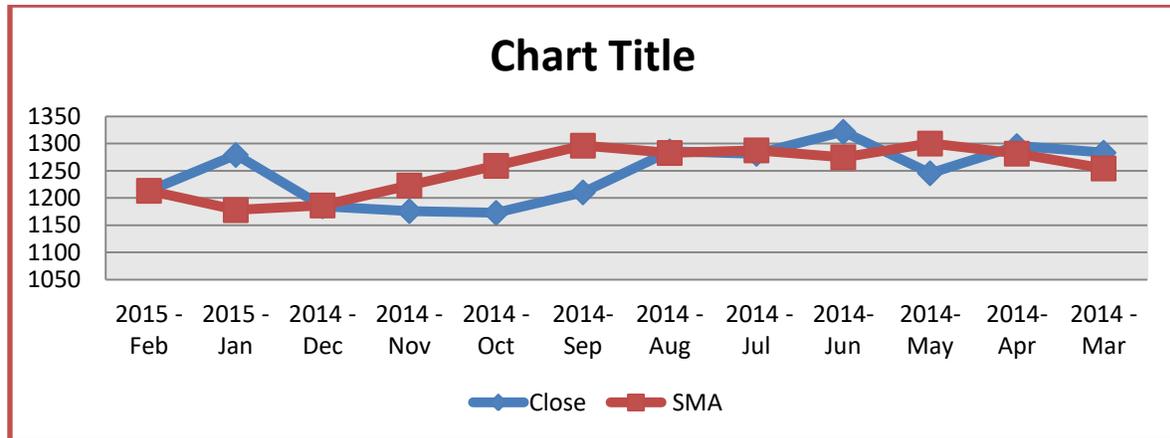
B. Simple Moving average (SMA) Analysis:

1. 12 Month Data Analysis:

Data is analyzed for 12 months from March 2014 to February 2015 and is displayed in descending order according to the month and with each month’s Close, Simple Moving Average along with the Difference between Close and SMA.

Date	Close	SMA	Difference
Feb 2015	1213.10	1213.37	-0.27
Jan 2015	1279.20	1177.93	101.27
Dec 2014	1184.90	1186.47	-1.57
Nov 2014	1176.00	1223.07	-47.07
Oct 2014	1172.90	1259.2	-86.3
Sep 2014	1210.50	1296.3	-85.8
Aug 2014	1285.80	1282.9	2.9
July 2014	1281.30	1287.67	-6.37
June 2014	1321.80	1274.87	46.93
May 2014	1245.60	1300.13	-54.53
April 2014	1295.60	1281.63	13.97
March 2014	1283.40	1254.47	28.93

SMA vs. Actual close values for the 12 months from March 2014 to February 2015



Analysis:

In the data gathered and the SMA calculated there's a certain extent of differences seen. As we can see the chart clearly shows us that in the month of March 2014, the actual closing values which is 1283.40 exceed the SMA calculated which is 1254.47 and thereby giving a positive difference of 28.93. While in May 2014, the achieved point is 1245.60 and the SMA calculated for the same is 1300.13, the gold should have reached that mark but it didn't as a result there is a difference -54.53. The highest achieved was in Jan 2015 being 10.27 while the lowest achieved was in October 2015 being -86.3. The market remained favourable during the month of March, April and August 2014 while it remained adverse during the rest for the investors as they didn't get the expected return.

2. 13 weeks data analysis:

Data is analyzed for 13 weeks from November 30, 2014 to February 22, 2015 and is displayed in descending order according to the week and with each week's Date, Week no, Close, SMA and the Difference.

Date	Week	Close	SMA	Difference
Feb 22, 2015	1	1213.10	1222.2	-9.1
Feb 15, 2015	2	1204.90	1246.97	-42.97
Feb 8, 2015	3	1227.10	1269.13	-42.03
Feb 1, 2015	4	1234.60	1283.57	-48.97
Jan 25, 2015	5	1279.20	1262.53	16.67
Jan 18, 2015	6	1293.60	1226.73	66.87
Jan 11, 2015	7	1277.90	1199.2	78.7
Jan 4, 2015	8	1216.10	1192.5	23.6
Dec 28, 2014	9	1186.20	1204.6	-18.4
Dec 21, 2014	10	1195.30	1202.97	-7.67
Dec 14, 2014	11	1196.00	1196.13	-0.13
Dec 7, 2014	12	1222.50	1188.1	34.4
Nov 30, 2014	13	1190.40	1186.73	3.67

13 Weeks SMA vs. Actual close values



Analysis of the volatility of the Commodity Market with specific reference to Gold as a commodity

Analysis:

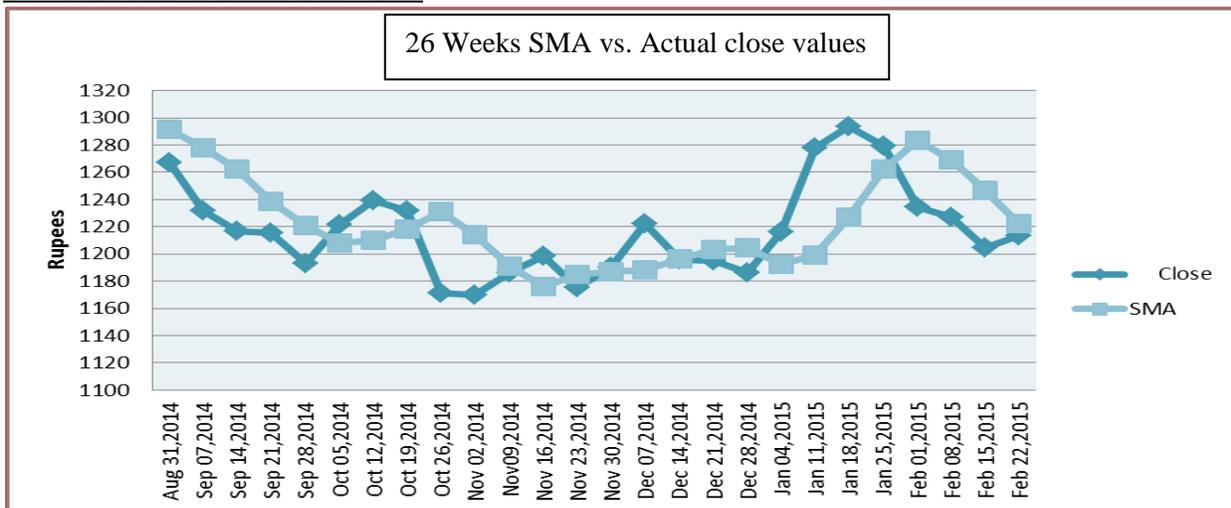
- The chart and the table above both tells us that there was a momentum in the market and it was favourable to invest as the investors were getting favourable return on their investments during weeks 5, 6, 7, 8, 12, 13 and were not getting favourable return during 1, 2, 3, 4, 9, 10, 11 weeks.
- The highest achieved during this period 1279.2 was on January 25,2015 with the difference from the SMA calculated being 16.67. The lowest achieved during the 13 weeks was 1186.2 on December 28,2014 and the difference with calculated SMA being -18.4.

3. 26 weeks data analysis:

Data is analyzed for 26 weeks from August 31, 2014 to February 22, 2015 and is displayed in descending order according to the week and with each week's Date, Week No, Close, SMA and the Difference.

Date	Week	Close	SMA	Difference
Feb 22,2015	1	1213.10	1222.2	-9.1
Feb 15,2015	2	1204.90	1246.97	-42.97
Feb 08,2015	3	1227.10	1269.13	-42.03
Feb 01,2015	4	1234.60	1283.57	-48.97
Jan 25,2015	5	1279.20	1262.53	16.67
Jan 18,2015	6	1293.60	1226.73	66.87
Jan 11,2015	7	1277.90	1199.2	78.7
Jan 04,2015	8	1216.10	1192.5	23.6
Dec 28,2014	9	1186.20	1204.6	-18.4
Dec 21,2014	10	1195.30	1202.97	-7.67
Dec 14,2014	11	1196.00	1196.13	-0.13
Dec 07,2014	12	1222.50	1188.1	34.4
Nov 30,2014	13	1190.40	1186.73	3.67
Nov 23,2014	14	1175.50	1184.83	-9.33
Nov 16,2014	15	1198.40	1175.9	22.5
Nov 09,2014	16	1186.30	1191.07	-4.77
Nov 02,2014	17	1169.80	1214.13	-44.33
Oct 26,2014	18	1171.60	1230.83	-59.23
Oct 19,2014	19	1231.80	1217.87	13.93
Oct 12,2014	20	1239.00	1210	29
Oct 05,2014	21	1221.70	1208.3	13.4
Sep 28,2014	22	1192.90	1221.17	-28.27
Sep 21,2014	23	1215.40	1238.47	-23.07
Sep 14,2014	24	1216.60	1262.07	-45.47
Sep 07,2014	25	1231.50	1278.3	-46.8
Aug 31,2014	26	1267.30	1291.27	-23.97

26 Weeks SMA vs. Actual close values



Analysis:

- From the chart we can see that mostly the close values are not near or above the calculated SMA which means that the market mostly never achieved its calculated average which makes the commodity very volatile and risky.
- From the chart we can see that during the 5,6,7,8,12,13,15,19,20,21 week the close values are above the calculated SMA. During these weeks the market has achieved its target above the calculated SMA.
- While during the rest of the week the close values are below the calculated SMA. The highest achieved during this period 1293.60 was on January 18, 2015. The lowest achieved during the 26 weeks was on Nov 2nd 2014 i.e. 1169.80.

C. Exponential Moving Average-Moving Average Convergence and Divergence (MACD) Analysis:

1. 52 Weeks Data Analysis by using Moving Average Convergence and Divergence

Data is analyzed for 12 days, 26 days, 9 days and 52 weeks from March 2014 to February 2015 and is displayed in an ascending order according to month and with each month's Close, Exponential Moving Average, Convergence, Divergence, and Signal below in a tabulated form.

Date	Close	12 days	26 days	MACD	Signal
Feb16,2014	1323.9	1273.91	1285.41	-11.50	-35.21
Feb23,2014	1321.4	1281.22	1282.54	-1.32	-31.00
Mar02,2014	1338.1	1289.97	1280.67	9.29	-25.13
Mar09,2014	1379	1303.66	1283.39	20.27	-18.00
Mar16,2014	1336	1308.64	1283.52	25.11	-10.47
Mar23,2014	1293.8	1306.36	1281.81	24.54	-3.42
Mar30,2014	1303.2	1305.87	1281.56	24.31	3.57
Apr06,2014	1318.7	1307.84	1283.51	24.33	10.19
Apr13,2014	1293.4	1305.62	1282.70	22.92	15.33
Apr20,2014	1300.7	1304.86	1280.71	24.15	19.29
Apr27,2014	1302.6	1304.51	1280.31	24.20	22.12
May04,2014	1287.3	1301.86	1280.41	21.44	23.47
May11,2014	1293.3	1300.55	1280.65	19.90	23.43
May18,2014	1291.6	1299.17	1282.48	16.69	22.50
May25,2014	1245.6	1290.93	1282.28	8.64	20.73
Jun 01,2014	1252.1	1284.95	1283.12	1.83	18.23
Jun 08,2014	1273.7	1283.22	1284.58	-1.36	15.38
Jun 15,2014	1316.2	1288.29	1288.86	-0.56	12.77
Jun 22,2014	1319	1293.02	1292.81	0.20	10.11
Jun 29,2014	1320.4	1297.23	1295.97	1.26	7.561
Jul 06,2014	1337	1303.35	1299.44	3.90	5.61
Jul 13,2014	1309.2	1304.25	1301.65	2.59	3.68
Jul 20,2014	1303.1	1304.07	1303.14	0.93	1.93
Jul 27,2014	1294.8	1302.64	1305.24	-2.59	0.68
Aug03,2014	1311	1303.93	1307.08	-3.14	0.135
Aug10,2014	1306.2	1304.28	1306.58	-2.30	0.030
Aug17,2014	1280.2	1300.57	1304.90	-4.33	-0.38
Aug24,2014	1287.4	1298.54	1303.6	-5.05	-0.97
Aug31,2014	1267.3	1293.74	1300.87	-7.13	-1.90
Sep 07,2014	1231.5	1284.16	1295.20	-11.03	-3.56
Sep14,2014	1216.6	1273.77	1290.61	-16.84	-5.72
Sep 21,2014	1215.4	1264.79	1287.59	-22.80	-8.36
Sep 28,2014	1192.9	1253.73	1283.35	-29.62	-11.36
Oct 05,2014	1221.7	1248.80	1279.62	-30.81	-14.43
Oct 12,2014	1239	1247.29	1277.53	-30.23	-17.54
Oct 19,2014	1231.8	1244.91	1274.88	-29.96	-20.39
Oct 26,2014	1171.6	1233.63	1269.84	-36.20	-23.85
Nov02,2014	1169.8	1223.81	1265.32	-41.51	-27.67
Nov09,2014	1186.3	1218.04	1261.20	-43.16	-31.24
Nov16,2014	1198.4	1215.019	1257.62	-42.60	-34.10
Nov23,2014	1175.5	1208.93	1254.92	-45.98	-36.68
Nov30,2014	1190.4	1206.08	1252.55	-46.46	-38.55
Dec07,2014	1222.5	1208.61	1250.58	-41.97	-39.79
Dec14,2014	1196	1206.67	1245.96	-39.28	-40.79
Dec21,2014	1195.3	1204.92	1241.20	-36.28	-41.49
Dec28,2014	1186.2	1202.04	1236.04	-34.00	-41.25

Jan 04,2015	1216.1	1204.20	1231.39	-27.18	-39.66
Jan 11,2015	1277.9	1215.54	1230.18	-14.64	-36.49
Jan 18,2015	1293.6	1227.55	1229.82	-2.27	-32.01
Jan 25,2015	1279.2	1235.49	1229.22	6.27	-26.20
Feb 01,2015	1234.6	1235.35	1226.28	9.074	-20.03
Feb 08,2015	1227.1	1234.08	1223.24	10.84	-14.16
Feb 15,2015	1204.9	1229.59	1220.34	9.25	-8.77
Feb 22,2015	1213.1	1227.05	1217.48	9.57	-3.67

52 Weeks Moving Average Convergence and Divergence vs. Signal



Analysis:

- MACD definition against signal definition is below the market. Below zero is bullish. Above zero is bearish. So it is a bullish market for investments. The investors can trade their commodities only if value in histogram is more than 0 and if it's below than 0 then it's not viable to trade.
- The above indicators explains that the market is bullish and in a very good condition to invest in and there is a very high chances of getting high returns on the investments after 27th week.

IV. RECOMMENDATIONS

From the above research and analysis, the following recommendations are drawn from an investor perspective:

- Investors along with stocks, mutual funds, can also include commodities which will diversify their risk and give them more returns, especially gold in that case. The company could suggest the investors to do so and organize their portfolios in such a way.
- The company can use certain Simple Moving Average, Exponential Moving Average, Candlestick charts along with this the company can use tools like, and fundamental tools to gauge the market trend so that the investors can know when to buy and when to sell.
- RSI, ROC, Ultimate Oscillator, ATR, ADX, these indicators can be used by the company to get the clear picture while buying and selling the commodities for better returns and also to understand the buy / sell pattern better.
- Apart from investing in hard or soft commodities the company can suggest its consumers ETFs in gold and Mutual fund in Gold which is comparatively a better option in terms of returns and lessens the risks of the investor as well.
- As the market is the bullish it's a good time to invest and so the company should explain it to the investors as it's a good time to buy the commodities.

V. CONCLUSION

Gold is valued in India as a savings and investment vehicle and is the second preferred investment behind bank deposits. India is the world's largest consumer of gold in jewellery. The hoarding tendency is well ingrained in Indian society, not least because inheritance laws in the middle of the twentieth century lent a great desirability to anonymity. Indian people are renowned for saving for the future and the financial savings ratio is strong, with a ratio of financial assets-to-GDP of 93%. Gold circulates within the system and roughly 30% of gold jewellery fabrication is from recycled pieces. India is typically also the largest purchaser of coins and bars for investment.

The research done by using a past one year data and analysing them for weekly, monthly, half yearly using tools like candlestick charts, simple moving average, exponential moving average and moving average convergence

and divergence tells that the market is in a bullish run and thus it's a good time for the investors to invest in the market and get favourable returns in the future.

As viewed during the research that the markets did not reach the average most of the times but tend to give good returns when the investments were made for long term purpose than short term or medium term. Which, the company should also advise it's consumers that they should include gold in their portfolio as it's a risk diversifier and yields better returns on the investments made by the investors.

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