



NSE GOLD
DERIVATIVES
Performance Review
2022-23

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Performance Review of Commodity Products for FY 2022-23

Gold Futures, Gold Mini Futures & Options (On Goods) and Gold 1G Futures

1. Background

a. Brief about the commodity such as sample picture, lifecycle and various varieties/grade of the commodity found in India

Gold is the oldest precious metal known to man and for thousands of years it has been valued as a global currency, a commodity, an investment and simply an object of beauty. Due to its chemical and physical properties it finds application in a variety of uses. Gold is relatively easy to accumulate, transact and sell. Also, it is one of the assets widely held by women in India.

In the Indian context, gold ownership provides an indirect exposure to the US dollar, as India imports almost all of its gold from the international market priced in US dollars. Gold is a classic hedge tool against inflation or other economic disruptions. Many owners of gold store it in the form of bullion bars or coins specifically for this purpose.

However, the recent financial crisis has convinced some economists not to believe gold serves as a secure hedge tool. Bullion coins of today's age are typically minted with fine gold at 24k. The South African Krugerrand, the American Gold Eagle and the British Gold Sovereign are still minted in 22k metal in a historical tradition. The Canadian Gold Maple Leaf is the coin with the highest purity gold of any bullion coin at 99,999%.

Gold in contrast to other commodities is not affected by consumption. Nearly all the gold mined in the world is still accessible today. Therefore, the demand has a far greater impact on the price than the supply. The global economy is a strong indicator for future gold prices. In times of international financial crisis, investors tend to purchase gold, which has proven to thrive during economic crises and provides more security for investors.

b. Commodity fundamentals and balance sheet as per the following format (to be prepared based on publicly available information on best effort basis):

Table – Fundamentals & Balance Sheet

World Balance Sheet

Gold World Balance Sheet (In metric tons)

Global Scenario	2021	2022
SUPPLY		
Mine Supply	3568.9	3611.9
Recycling	1136.2	1144.1
Net Hedging	-22.7	-1.5

Total Supply	4682.4	4754.5
DEMAND		
Jewellery Fabrication	2230.6	2189.8
Technology	330.2	308.5
Investment	1001.9	1106.8
Central Banks & others	450.1	1135.7
OTC	669.6	13.8
Total Demand	4682.4	4754.5

Source: World Gold Council & Metals Focus

India balance sheet (in metric tons)

India Scenario	2021	2022
SUPPLY		
Net Bullion Imports	924.6	673.3
Recycling	75.2	97.6
Other Sources	6.9	11.8
Total Supply	1,006.7	782.7
DEMAND		
Jewellery Fabrication/Consumption	610.9	600.4
Bar & Coin/Physical Investment	186.5	173.6
Total Demand	797.4	774

Source: World Gold Council & Metals Focus

Top 10 Major producing countries (in metric tons)

Country	2021	2022
China	332.0	375.0
Russia	330.9	324.7
Australia	307.2	313.9
Canada	192.9	194.5
USA	186.8	172.7
Ghana	124.7	127.0

Peru	127.3	125.7
Indonesia	116.4	124.9
Mexico	124.8	124.0
Mali	99.3	101.7

Source: Metals Focus

Top 10 major gold consuming (Consumer Demand) countries (in metric tons)

Country	2021	2022
Greater China	993.7	824.8
India	797.3	774.1
United States	264.9	251.6
Germany	173.7	196.5
Turkey	95.3	121.7
Iran	51.8	71.7
Russian Federation	46.8	60.7
Vietnam	43.0	59.1
Indonesia	46.8	49.7
Switzerland	43.8	48.7

Source: World Gold Council & Metals Focus

Top 10 Major Gold exporting countries (in US \$ billion)

Country	2021	2022
Switzerland	86.8	NA
United Kingdoms	41.4	NA
Hong Kong	30.8	NA
UAE	28.7	NA
United States	27.7	NA
Australia	17.5	NA
Russia	17.4	NA
Canada	15.0	NA
Singapore	15.0	NA
Peru	7.7	NA

Source: Worldstopexports.com, NA: Data for 2022 is not available in public domain

Top 10 Major gold importing countries (in US \$ billion)

Country	2021	2022
Switzerland	92.3	NA
India	55.8	NA
United Kingdom	53.7	NA
China	43.7	NA
Hong Kong	29.1	NA
Singapore	14.5	NA
United States	13.9	NA
Germany	11.02	NA
UAE	10.6	NA
Thailand	8.4	NA

Source: Worldstopexports.com, NA: Data for 2022 is not available in public domain

Top producing states

India's gold production is very negligible at less than 2 tons per year. At present, it is coming from Karnataka. Other sources of own production are through secondary refining of copper cathode. However, many states such as Andhra, Chhattisgarh, Odisha and Jharkhand have auctioned gold mine sites in the last few years.

c. Major changes in the policies governing trade in the spot markets of the commodity

Precious metals witnessed some structural duty changes as import duty on silver dore, bars and articles were increased to align them with that on gold and platinum. Existing incidence of import duty on dore and bar of gold and platinum is maintained after being enhanced in June and October 2022 respectively though the Basic customs duty (BCD) rate and agriculture infrastructure and development cess (AIDC) rates have been recalibrated.

BCD on gold bars, Gold dore and platinum, all have been reduced to 10% from 12.5%, 11.85% and 12.5% respectively. While AIDC has been revised to maintain the total duty as earlier. Markets were expecting a cut in gold import duty in order to support domestic gems and jewellery industry but fears of a wider current account deficit, as indicated in economic survey, may have prompted the authorities to stay put.

d. Geopolitical issues in the commodity and its impact on Indian scenario

Colossal central bank purchases, aided by vigorous retail investor buying and slower ETF outflows, lifted annual demand to an 11-year high. Annual gold demand (excluding OTC) jumped 18% to 4,741t, almost on a par with 2011 – a time of exceptional investment demand. The strong full-year total was aided by record Q4 demand of 1,337t.

Jewellery consumption softened a fraction in 2022, down by 3% at 2,086t. Much of the weakness came through in the fourth quarter as the gold price surged.

Investment demand (excluding OTC) reached 1,107t (+10%) in 2022. Demand for gold bars and coins grew 2% to 1,217t, while holdings of gold ETFs fell by a smaller amount than in 2021 (-110t vs. -189t), which further contributed to total investment growth. Quarterly fluctuations in OTC demand largely netted out over the year.

A second consecutive quarter of huge central bank demand (417t) took annual buying in the sector to a high of 1,136t, the majority of which was unreported.

Demand for gold in technology saw a sharp Q4 drop, resulting in a full-year decline of 7%. Deteriorating global economic conditions hampered demand for consumer electronics.

Total annual gold supply increased by 2% in 2022, to 4,755t. Mine production inched up to a four-year high of 3,612t.

Indian gold demand remained robust compared with longer-term pre-pandemic levels. Despite a fairly soft start to the year, Indian consumer demand recovered and only just fell shy of the strong levels of demand seen during 2021. Continued recovery from COVID-19 boosted yearly comparisons, although the sharp local price rally choked off demand in the closing weeks of December.

2. Trading related parameter

a. Monthly and Annual traded volume (quantity in appropriate units)

Month	Kgs	100 Grams	100 Grams	Grams
	Gold Futures	Gold Mini Futures	Gold Mini Options	Gold 1G Futures
April 2022	NIL	20	31604	NIL
May 2022	NIL	23	28169	NIL
June 2022	NIL	24	28116	NIL
July 2022	NIL	22	34138	NIL
Aug 2022	NIL	22	32140	NIL
Sep 2022	NIL	22	41379	NIL
Oct 2022	NIL	21	21805	NIL
Nov 2022	NIL	22	20740	NIL
Dec 2022	NIL	23	26815	NIL
Jan 2023	NIL	22	18717	NIL
Feb 2023	NIL	21	17935	NIL
Mar 2023	NIL	25	32986	NIL
FY 2022-23	NIL	267	334544	NIL

b. Annual traded volume as proportion of total deliverable supply (quantity in appropriate units)

Contract	Annual Traded Volume (MT)	Deliverable Supply (MT)	Annual traded volume as proportion of total deliverable supply (%)
Gold Futures	NIL	782.7	NA

Gold Mini Futures	0.0267	782.7	0.003
Gold Mini Options	33.45	782.7	4.274
Gold 1G Futures	NIL	782.7	NA

c. Annual traded volume as proportion of total annual production (quantity in appropriate units)

Contract	Annual Traded Volume (MT)	Production (MT)	Annual traded volume as proportion of Production (%)
Gold Futures	NIL	109.4	NA
Gold Mini Futures	0.0267	109.4	0.024
Gold Mini Options	33.45	109.4	30.576
Gold 1G Futures	NIL	109.4	NA

Production: Recycling + Other Sources is considered

d. Annual average Open interest as proportion of total production

Contract	Annual average OI (MT)	Production (MT)	Annual average OI as proportion of Production (%)
Gold Futures	NIL	109.4	NA
Gold Mini Futures	0.000057	109.4	0.0001
Gold Mini Options	0.271864	109.4	0.249
Gold 1G Futures	NIL	109.4	NA

Production: Recycling + Other Sources is considered

e. Annual average Open interest as proportion of total deliverable supply

Contract	Annual average OI (MT)	Deliverable Supply (MT)	Annual average OI as proportion of deliverable supply (%)
Gold Futures	NIL	782.7	NA
Gold Mini Futures	0.000057	782.7	0.00001
Gold Mini Options	0.271864	782.7	0.0347
Gold 1G Futures	NIL	782.7	NA

f. Monthly and Annual value of trade (in Rs. Crores)

Month	Rs Crores			
	Gold Futures	Gold Mini Futures	Gold Mini Options	Gold 1G Futures
April 2022	NIL	1.03	9.62	NIL
May 2022	NIL	1.16	7.91	NIL
June 2022	NIL	1.21	6.76	NIL
July 2022	NIL	1.11	9.35	NIL
Aug 2022	NIL	1.13	8.91	NIL
Sep 2022	NIL	1.09	13.85	NIL
Oct 2022	NIL	1.06	7.42	NIL
Nov 2022	NIL	1.14	7.19	NIL
Dec 2022	NIL	1.24	9.00	NIL
Jan 2023	NIL	1.23	8.77	NIL
Feb 2023	NIL	1.18	6.58	NIL
Mar 2023	NIL	1.43	16.88	NIL
FY 2022-23	NIL	14.08	112.30	NIL

Options turnover is premium based turnover

g. Monthly and Annual quantity of delivery (in appropriate units)

Month	Kgs	Grams	Grams	Grams
	Gold Futures	Gold Mini Futures	Gold Mini Options	Gold 1G Futures
April 2022	NIL	NIL	NIL	NIL
May 2022	NIL	NIL	NIL	NIL
June 2022	NIL	NIL	NIL	NIL
July 2022	NIL	NIL	NIL	NIL
Aug 2022	NIL	NIL	NIL	NIL
Sep 2022	NIL	NIL	3000	NIL
Oct 2022	NIL	NIL	NIL	NIL
Nov 2022	NIL	NIL	NIL	NIL
Dec 2022	NIL	NIL	NIL	NIL
Jan 2023	NIL	100	NIL	NIL
Feb 2023	NIL	NIL	NIL	NIL
Mar 2023	NIL	NIL	NIL	NIL
FY 2022-23	NIL	100	3000	NIL

h. Monthly and Annual value of delivery (in Rs. Crores)

Month	Rs Crores			
	Gold Futures	Gold Mini Futures	Gold Mini Options	Gold 1G Futures
April 2022	NIL	NIL	NIL	NIL
May 2022	NIL	NIL	NIL	NIL
June 2022	NIL	NIL	NIL	NIL
July 2022	NIL	NIL	NIL	NIL
Aug 2022	NIL	NIL	NIL	NIL
Sep 2022	NIL	NIL	1.53	NIL

Oct 2022	NIL	NIL	NIL	NIL
Nov 2022	NIL	NIL	NIL	NIL
Dec 2022	NIL	NIL	NIL	NIL
Jan 2023	NIL	0.06	NIL	NIL
Feb 2023	NIL	NIL	NIL	NIL
Mar 2023	NIL	NIL	NIL	NIL
FY 2022-23	NIL	0.06	1.53	NIL

i. Monthly and Annual Average Open Interest (OI) (in appropriate units)

Month	Kgs	100 Grams	100 Grams	Grams
	Gold Futures	Gold Mini Futures	Gold Mini Options	Gold 1G Futures
April 2022	NIL	0.50	4096.75	NIL
May 2022	NIL	0.50	1786.13	NIL
June 2022	NIL	0.54	2182.40	NIL
July 2022	NIL	0.57	3084.00	NIL
Aug 2022	NIL	0.50	4034.45	NIL
Sep 2022	NIL	0.50	4064.95	NIL
Oct 2022	NIL	0.57	4250.95	NIL
Nov 2022	NIL	0.50	2936.95	NIL
Dec 2022	NIL	0.95	2601.81	NIL
Jan 2023	NIL	0.71	1372.71	NIL
Feb 2023	NIL	0.50	980.50	NIL
Mar 2023	NIL	0.56	1289.39	NIL
FY 2022-23	NIL	0.57	2718.64	NIL

j. Annual average volume to open interest ratio

Contract	Unit	Annual Average Traded Volume	Annual Average Open Interest	Annual average traded volume as proportion of Annual average Open Interest (%)
Gold Futures	Kgs	NIL	NIL	NA
Gold Mini Futures	Grams	103	57	180.7
Gold Mini Options	Grams	129668	271864	47.7
Gold 1G Futures	Grams	NIL	NIL	NIL

k. Total number of unique members and clients who have traded during the financial year

Commodity	Unique Member Count	Unique Client Count
Gold Futures	NA	NA
Gold Mini Futures	2	4

Gold Mini Options	42	365
Gold 1G Futures	NA	NA

I. Ratio of open interest by FPOs/farmers/Hedge/VCP positions to total open interest (Annual average as well as maximum daily value)

Contract	Ratio of OI by FPOs / farmers and VCPs/hedgers to total OI*	
	Annualized Average ratio	Maximum daily Ratio
Gold Futures		
Gold Mini Futures		
Gold Mini Options		
Gold 1G Futures		

* Based on the self-declaration available for the categorization of clients/members

m. Number of unique FPOs / farmers and VCPs/hedgers who traded in the financial year

Contract	Unique FPOs / farmers and VCPs/hedgers*
Gold Futures	0
Gold Mini Futures	0
Gold Mini Options	1
Gold 1G Futures	0

* Based on the self-declaration available for the categorization of clients/members

n. Algorithmic trading as percentage of total trading

Commodity	Algorithmic trading as percentage of total trading (%)
Gold Futures	NA
Gold Mini Futures	0
Gold Mini Options	69.87
Gold 1G Futures	NA

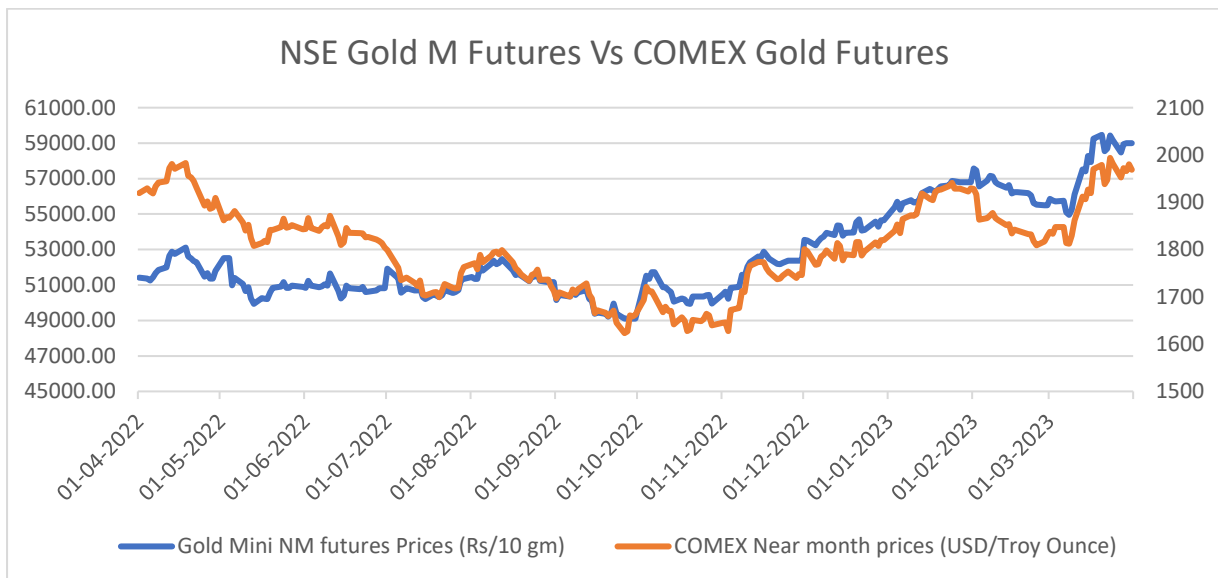
o. Delivery defaults

- i. Number of instances**
- ii. Quantity involved**
- iii. Value involved**

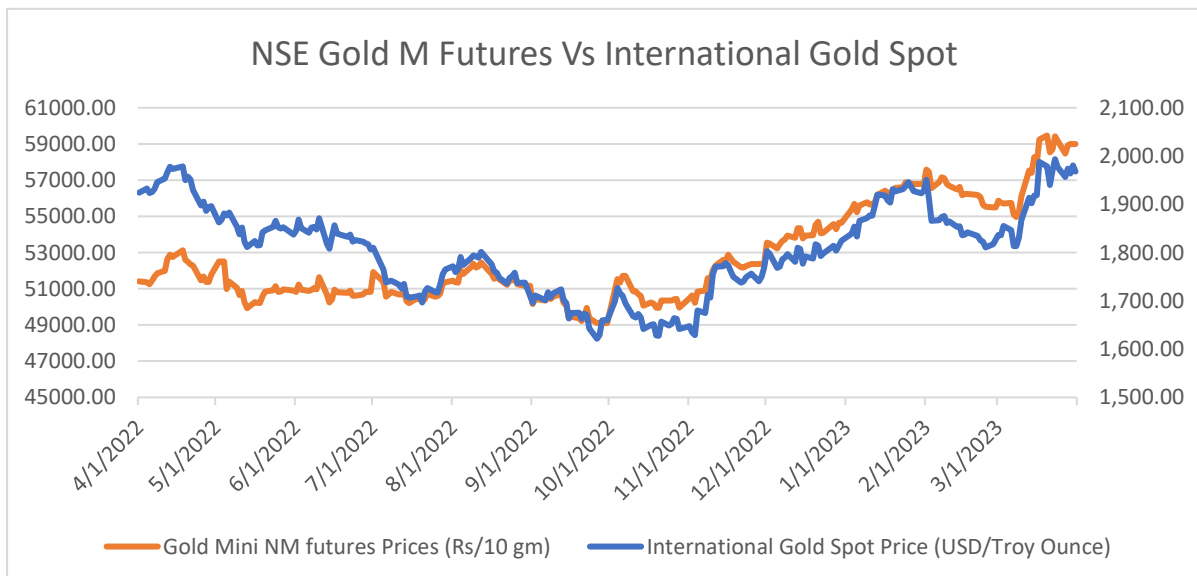
There were no instances of delivery default in Gold contracts in FY 2022-23.

3. Price movements

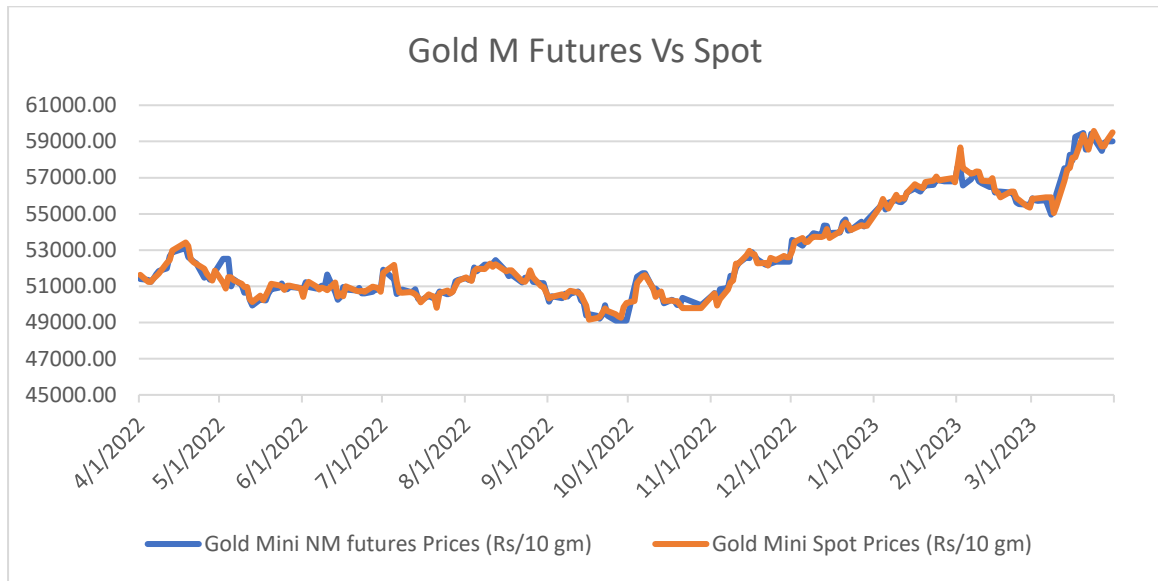
a. Comparison, correlation and ratio of standard deviation of Exchange futures price vis-à-vis international futures price (wherever relevant comparable are available)



b. Comparison, correlation and ratio of standard deviation of Exchange futures price vis-à-vis international spot price (wherever relevant comparable are available) and domestic spot price (exchange polled price).

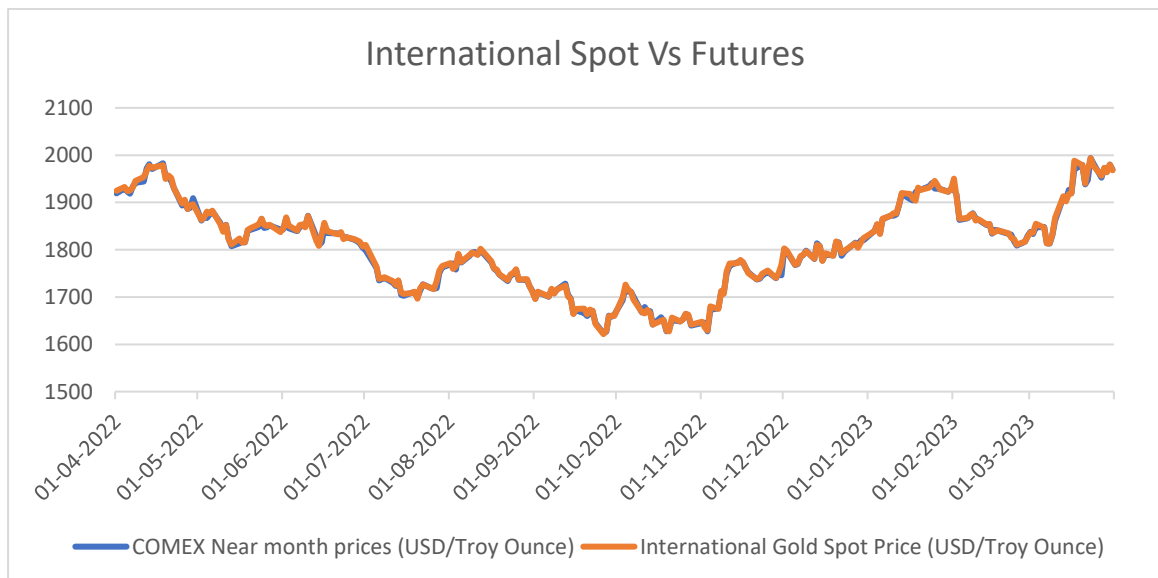


c. Correlation between exchange futures & domestic spot prices along with ratio of standard deviation.



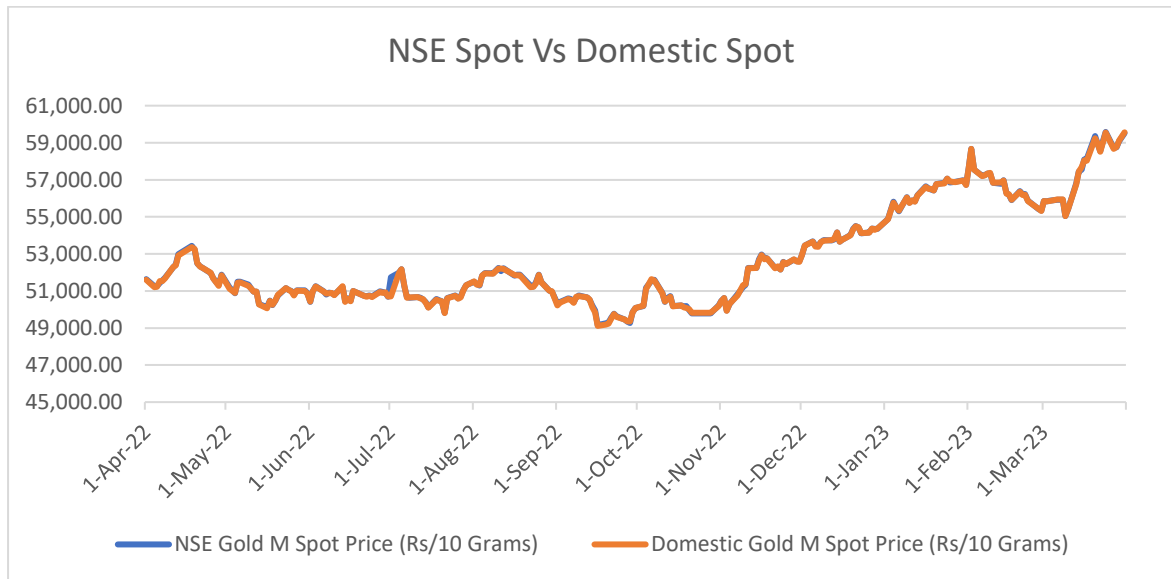
Correlation: 99%
Ratio of Std Deviation: 0.99

d. Correlation between international futures & international spot prices along with ratio of standard deviation (wherever relevant comparable are available).



Correlation: 99%
Ratio of Std Deviation: 0.99

- e. Comparison of Exchange polled price and mandi price (in case of agricultural commodities) / other relevant price (in case non-agricultural commodities) at basis centre.



- f. Maximum & Minimum value of daily futures price volatility and spot price volatility along with disclosure of methodology adopted for computing the volatility.

Contract	Max Volatility in Futures Prices (%)	Min Volatility in Futures Prices (%)	Max Volatility in Spot Prices (%)	Min Volatility in Spot Prices (%)
Gold Futures	NA	NA	2.46	0.001
Gold Mini Futures	3.76	0.001	2.46	0.001
Gold 1G Futures	NA	NA	2.46	0.001

Volatility calculation: $(\text{Day} - \text{Previous day's price}) / \text{Previous day's price}$

- g. Number of times the futures contract was in backwardation/contango by more than 4% for the near month contract in the period under review.

No instance has been observed where the backwardation or contango exceed 4% for the near month contract.

4. Other parameters

- a. Qualitative and quantitative measure for Hedge effectiveness ratio and basis Risk (Volatility of Basis) along with disclosure of methodology adopted for such calculations.

Hedge Effectiveness using Dollar Offset Method

Date	Price		Price Change		Hedge Effectiveness
	NSE GOLDM Spot Price	NSE GOLDM Futures	NSE GOLDM Spot Price	NSE GOLDM Futures	
4/8/2022	51706	51851	144	176	18.18
5/13/2022	50131	49930	-161	-316	49.05
6/6/2022	50985	50881	-263	-79	232.91
7/20/2022	50439	50323	-51	-77	33.77
8/12/2022	52222	52455	147	210	30.00
9/6/2022	50557	50350	147	-93	258.06
10/14/2022	50183	50066	-531	-539	1.48
11/14/2022	52708	52605	459	330	39.09
12/9/2022	53742	53935	121	200	39.50
1/24/2023	57061	56875	231	265	12.83
2/15/2023	56276	56170	-698	-465	50.11
3/13/2023	56807	57524	1364	1410	3.26
			Overall Average		64.02

The Dollar Offset Method of determining Hedge Effectiveness is one of the quantitative methods used extensively. It involves comparing the ratio of the change in fair value or present value of future expected cash flows of the hedging instrument (NSE Gold Futures) with the change in the fair value or present value of future cash flows of the hedged item (Gold Spot Price) attributable to the hedged risk.

Methodology

To examine the hedge effectiveness twelve random dates were chosen with minimum gap between the period as 15 days and maximum being 3 months period (matching various operating cycles of the bullion value chain participants). For each of these chosen dates, Spot Gold Price and Futures closing rates were recorded. The change in value of Spot rates as well as Futures closing rates for two consecutive periods was recorded. Hedge effectiveness is the ratio of change in the value of Spot prices to the change in Futures value

Values between 80% to 125% indicate the hedge effectiveness is good. Values below 80% indicate that the hedge effective is not good. Based on the observations, it can be noticed that overall hedge effectiveness is over 64%.

Longer period hedge tends to be less effective. It could be due to roll-over and related contango issues or liquidity issues. Second aspect is when there is a disruptive change in the underlying market, hedge effectiveness declines.

Basis risk:

Basis is the difference between the spot price and the futures price at a particular point in time. Basis is usually very small and tends to decrease as futures contract moves towards expiry.

The basis risk arises due to price, location, product or timing difference. When it comes to gold, after the GST introduction, location-based premiums and discounts have been more or less resolved. However, the most important source of basis risk for gold is price. Seasonality in demand, high customs duty and consequently, high parallel trade result in markets going into discounts more often in the last few years breaking the parity. This could result in non-convergence of futures price and spot price upon delivery.

b. Details about major physical markets of the commodity vis-à-vis market reach in terms of availability of delivery centers (information to be provided state-wise and UT-wise).

Gold demand in India can be broadly categorized into jewelry fabrication demands and investment demand, with the former accounting for around 80%. The domestic jewelry demand is primarily on account of wedding demand and festival demands (Akshaya Tritiya, Dhanteras etc.). This demand which comes from across the country stays throughout the year and is serviced from important gold centres like Delhi, Mumbai, Ahmedabad, Bangalore, Chennai, Kochi, Jaipur, Kolkata, and Hyderabad.

The below table provides a list of Top 5 major Bullion trading centres vis-à-vis NSE delivery centres

Major cities based on Gold import and consumption	NSE's delivery centre
Delhi	Additional Delivery Center
Kochi	NIL
Chennai	Additional Delivery Center
Ahmedabad	Primary Delivery Center
Kolkata	NIL

c. Details about major physical markets of the commodity and average Open Interest for each month generated from those regions.

Major physical markets data provided in the point 4b. The region wise OI data is not available.

d. Details, such as number and target audience, of stakeholders' awareness programs carried out by the exchange.

For education initiatives the exchange has conducted 583 Investor Awareness campaigns across INDIA covering all the commodities available on the NSE platform from April 2022 till Mar 2023.

e. Steps taken / to be undertaken to improve hedging effectiveness of the contracts as well as to improve the performance of illiquid contracts

NSE is constantly striving to encourage hedgers to participate in the Gold contracts. We have value chain participants and associations such as IBJA, All India Gem & Jewelry Domestic Council, WGC, Metals Focus, RSBL, etc. as part of our Bullion PAC, who guide us on how to get more participation from physical market participants.

5. Any other information to be disclosed as deemed important by the exchange or as suggested by the PAC.