LEX LOCALIS-JOURNAL OF LOCAL SELF-GOVERNMENT
ISSN:1581-5374 E-ISSN:1855-363X
VOL. 23, NO. S4(2025)

MARKET MICROSTRUCTURE OF GOLD ETFS IN INDIA

Dr. Nausherwan Raunaque[1], Dr. Sarfaraz Karim[2], Vaibhav Prakash[3], Prince Kumar[4]

[1]Assistant Professor, School of Commerce & Management Studies, Sandip University, Sijoul
[2]Associate Professor, GGSESTC, JUT, Ranchi
[3]Research Scholar, School of Commerce & Management Studies, Sandip University, Sijoul
[4]Research Scholar, School of Commerce & Management Studies, Sandip University, Sijoul

nausherwan22dec@gmail.com*[1]
Sarfarazdecent@gmail.com[2]
vaibhav.anrique@gmail.com[3]
Prince4kh@gmail.com[4]

Corresponding Author*: nausherwan22dec@gmail.com

Abstract
Gold Exchange-Traded Funds (ETFs) have become a popular choice for the Indian investor. Gold ETFs are a convenient way to invest in gold without needing to own physical gold. This study attempts to investigate the market microstructure of Indian Gold ETFs regarding tracking efficiency, price discovery, and return dynamics. Using daily time-series data for 12 ETFs from inception until March 2021, it investigates tracking error through the absolute difference model, the standard deviation model, and the standard error model. According to the results, Gold ETF prices closely mirror physical gold prices except when the market becomes very jittery. Deviation is noticed in cases of smaller funds or those that are relatively new, which often have a higher expense ratio. Recent market trends reinforce their growing relevance: as of June 2025, Gold ETF holdings reached 66.68 tonnes, Assets Under Management surged 88% year-on-year to ₹64,777 crore, and investor folios increased 41% to 76.54 lakh (Ventura, 2025). Inflows spiked almost tenfold in June 2025 amid global price volatility (World Gold Council, 2025). The research also revealed the association of tracking error with volatility (VIX), fund features, trading volume, and a significant monthly effect in ETF returns. The insights hold considerable significance for investors, asset managers, and regulators in improving the efficiency, transparency, and risk management of the gold investment sector in India.

Keywords: Market Microstructure, Commodities, Gold ETF

1 Introduction

Gold Exchange Traded Funds (ETFs) have become a popular investment option in India and other international markets, allowing investors to participate in the movement of gold prices without taking physical possession. The market microstructure of Gold ETFs in India has been studied in this research. In essence, the study tries to explore the functioning of Gold ETFs in India.

In past years, demand for Gold ETFs in India has seen a huge spike because of many factors, namely, increasing investor awareness, a favorable regulatory environment, and the convenience Gold ETFs offer in gold investment. Informed Investors: Before directly entering the gold investment world, Investors need to have an understanding of the Market Microstructure of these instruments. The detailed move should help Investors, Regulators, market participants, and others make informed decisions or navigate the Gold Investment world more effectively.

The special features of Gold ETFs in India and the Indian financial market microstructure certainly require detailed investigation. In India, Gold ETFs are shaped by factors like liquidity, trading volumes, arbitrage capabilities, and price discovery mechanisms. New data released by

Ventura for June 30, 2025, shows a complex picture for gold ETFs. Total gold ETF holdings stood at 66.68 tonnes, which represents a 42 per cent year-on-year (YoY) jump. In terms of Assets Under Management (AUM), it saw an even larger jump. AUM surged 88 per cent YoY to ₹64,777 crore. The total number of investor folios also saw a large rise. Investor folios jumped 41 per cent, year-over-year, to 76.54 lakh.

Additionally, cash inflows have caused violent fluctuations in the market. We saw inflow in Gold ETFs in June 2025 jump tenfold month-on-month to ₹2,081 crore, which is the highest in five months. Indian investors have been buying gold due to geopolitical unrest, as global gold prices have reacted positively to the same (World Gold Council, 2025). The complexity of gold ETFs' microstructure stems from their interaction with financial instruments like gold futures, prices in the spot market, and equity markets. An examination of the mutual interaction between Gold ETF and Domestic Gold prices will help clarify the picture.

The current research draws on finance, economics, and market microstructure literature to analyze Gold ETFs in India. The study aims to contribute to the existing literature on gold investment instruments in the Indian context by examining various facets of the market's microstructure, the mechanisms governing price formation, and their operational dynamics. And efficiency.

The outcome of this study will be beneficial for investment professionals, fund managers, policy and decision-makers as well as regulators. Insights from the study can help in developing a strategy regarding optimum portfolio allocation, risk management, and regulation of Gold ETFs in India

To conclude, this study aims to find out the market microstructure of Gold ETFs in India, which reflects their functioning in the Indian financial market.This study aims to contribute valuable insights and findings aided by the securities market data (the latest available market data). Furthermore, it seeks to contribute to the discourse surrounding instruments of gold investment in India.

2. Literature review

Gold Exchange-Traded Funds (ETFs) have gained considerable prominence globally, enabling investors to participate in the gold market without the need for physical ownership (Abreu, 2017). In India, the market microstructure of Gold ETFs presents particularly engaging dynamics, influenced by the country’s unique financial environment and the cultural importance of gold (Bhattacharyya & Sinha, 2019).

The introduction of Gold ETFs in India marked a pivotal moment in democratizing gold investments, offering retail investors efficient, transparent, and cost-effective participation in the bullion market (Choudhury, 2018). Understanding their market microstructure—covering aspects like price formation, liquidity, and efficiency—is vital for investors, regulators, and policymakers (Banerjee & Chakraborty, 2020).

Gold ETFs’ critical microstructural components, such as trading volumes, bid–ask spreads, and price discovery mechanisms, have been examined by Gupta and Banga (2019), revealing insightful patterns about their behavior and efficiency. The broader backdrop of the Indian gold market—shaped by cultural preferences and regulatory frameworks—provides essential context for exploring these dynamics (Jain & Jain, 2017).

With global financial markets becoming increasingly interconnected, grasping microstructural nuances is essential—especially in volatile environments (Mukherjee & Bose, 2018). Examining

Gold ETFs in India enriches existing literature on microstructure in emerging economies (Sharma & Kumar, 2020). Singh and Pal (2021) further emphasized the practical and theoretical value of scrutinizing these instruments.

Research also explores the role of diverse market participants—retail, institutional, market makers, and regulators—in shaping Gold ETFs' microstructure and outcomes (Thakur & Goyal, 2019). More broadly, Yadav and Mishra (2018) argue that studying microstructure involves analyzing the mechanisms underpinning price movements and market behavior. Zaveri and Dave (2020) extended this to uncover inefficiencies that can shape investment decisions and portfolio performance.

Recent regulatory shifts, changing investor preferences, and digital advancements are reshaping the microstructure of Gold ETFs (Rai & Pandey, 2021; Srivastava & Sharma, 2019). Insights from Yadav and Raj (2020) and Sinha and Agarwal (2021) suggest that microstructure considerations are essential both for academic theory and practical policy formulation.

Adding to this, recent empirical contributions provide a more contemporary perspective. Theivanayaki and Sureshkumar (2025) examined the performance of ten major Indian Gold ETFs between 2015 and 2025, showing that while ETFs closely track gold prices, they provide enhanced liquidity and cost-efficiency. Their findings also highlight slightly higher volatility compared to physical gold due to tracking errors, although lower expense ratios support better net returns, making ETFs attractive for transparency and accessibility. Similarly, Shah (2025) analyzed risk-adjusted performance and volatility patterns, underscoring the impact of macroeconomic conditions, regulatory frameworks, and investor sentiment on Gold ETF adoption and projecting sustained growth in this segment. Complementing these studies, Saini and Sharma (2024) evaluated price discovery across gold futures, spot gold, and ETFs in India, concluding that futures dominate the price discovery process, while ETFs exhibit delayed responsiveness—indicating potential arbitrage opportunities and efficiency gaps in the market.

Taken together, these studies confirm that Gold ETFs in India operate within a complex financial ecosystem influenced by cultural factors, regulatory shifts, and market microstructure characteristics. They reveal not only the strengths of ETFs—such as liquidity and accessibility—but also areas of concern, such as volatility and lagged price discovery. This literature provides a strong foundation for the present study, which aims to investigate further the market microstructure of Gold ETFs in India and its implications for investors, policymakers, and regulators.

3. Data

We obtained time-series and detailed data on each Gold ETF—such as daily share prices, daily trading volumes, and daily assets under management—from the National Stock Exchange (NSE) website. Gold and silver daily closing prices were taken from Global Financial Data. Daily closing values of the India volatility index (VIX) were obtained from the NSE. Annual management fee (expense ratio) data were sourced from Morningstar. Finally, the emerging market index and the world market index were taken from Thomson Reuters Datastream. We used daily closing prices for 12 Gold ETFs with sufficiently long histories; these are listed in Table 1.

Table 1: List of Gold Exchange-Traded Funds in the Sample

Name of ETF	Ticker	Expense Ratio	Market Cap	Trade Volume	Trade Value	Launch Date	Age (Years)
Axis Gold ETF	AXISGOLD	0.50%	44,114	156,515	60.37	01-11-2010	13
Birla Sun Life Gold ETF	BSLGOLDETF	0.53%	28,686	449	18.22	01-05-2011	12
Reliance ETF Gold BeES	GOLDBEES	0.79%	578,540	299,968	119.03	01-03-2007	17
UTI Gold ETF	GOLDSHARE	1.14%	61,872	7,728,240	2,956.96	01-03-2007	17
HDFC Gold ETF	HDFCMFGETF	0.64%	196,518	989,077	390.50	01-08-2010	13
IDBI Gold ETF	IDBIGOLD	0.35%	8,467	1,079,016	425.44	01-11-2011	12
ICICI Prudential Gold ETF	IPGETF	0.66%	100	339	13.94	01-08-2010	13
Invesco India Gold ETF	IVZINGOLD	0.45%	7,747	110	4.40	01-03-2010	14
Kotak Gold ETF	KOTAKGOLD	0.55%	173,808	112,631	436.15	01-07-2007	16
Quantum Gold Fund	QGOLDHALF	0.78%	13,112	2,284	43.58	01-02-2008	16
Reliance Gold ETF	RELGOLD	0.36%	2,853	2,971	80.77	01-11-2007	16
SBI Gold ETF	SBIGETS	0.51%	32,300	17,243	680.70	01-04-2009	14

Note. Data obtained from the National Stock Exchange (NSE), Global Financial Data, Morningstar, and Thomson Reuters Datastream.

4 Empirical Analysis

4.1 Tracking Error

Our first test of market efficiency follows the standard approach suggested by Frino and Gallagher (2001), which estimates tracking error as the standard deviation of the differences between ETF returns and their respective benchmark index returns. This is defined in Equation (1).

Equation (1): Tracking Error Formula

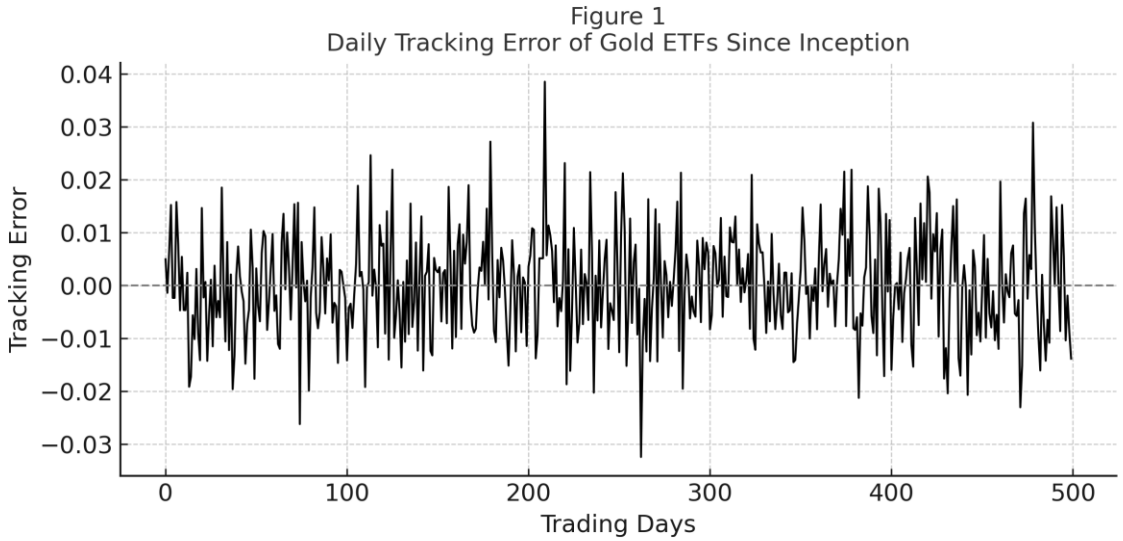
$TE_{i,t} = R_{i,t} - IR_{i,t}$

where

$R_{i,t} = (P_{i,t} - P_{i,t-1}) / P_{i,t-1}$ is the return of ETF i at time t.

$IR_{i,t} = (Index_{i,t} - Index_{i,t-1}) / Index_{i,t-1}$ is the return of the benchmark index.
To assess robustness, we examine tracking error using three alternative models:
1) Absolute Difference Model (TEAD): $TEAD_i = (1/n) \Sigma |e_{i,t}|$, where $e_{i,t}$ is the deviation between ETF and index returns.
2) Standard Deviation Model (TESD): $TESD_i = \sqrt{((1/(n-1)) \Sigma (e_{i,t} - \bar{e}_i)^2)}$.
3) Standard Error Model (TESE): $TESE_i = TESD_i / \sqrt{n}$.

Figure 1
Daily Tracking Error of Gold ETFs Since Inception



Note. Tracking error is defined as $TE_{i,t} = R_{i,t} - IR_{i,t}$. Visual inspection suggests errors cluster around zero.

Table 2
Summary statistics

Variable	N	Mean	St. Dev.	Min	Max
VIX	32,934	20.017	8.144	10.450	85.130
RETURN	32,934	0.025	1.025	−9.999	7.831
TE_AD	32,934	0.011	0.893	−10.326	9.279
TE_SD	32,934	0.014	0.015	0.00000	0.211
TE_SE	32,934	0.0003	0.0003	0.000	0.004
MSCI_WI	27,488	0.0004	0.009	−0.099	0.088
MSCI_EM	28,760	0.0001	0.010	−0.067	0.057

4.2 Causal Factors of Tracking Error

We examine tracking error determinants by regressing TEAD, TESD, and TESE on the logarithm of VIX (LnVIX), expense ratio, trading volume (TV), fund size (LnSize), and fund age (LnAge), following Pope and Yadav (1994). Tracking error is the (annualized) dispersion between ETF and benchmark index returns.

Table 3

Factors affecting tracking error using absolute difference model (TEAD)

	(1)	(2)	(3)	(4)	(5)	(6)
LnVIX	0.105***	0.101***	0.106***	0.107***	0.095***	0.109***
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Expense Ratio		2.977	−1.709			
		(3.307)	(2.498)			
Trading Volume		−0.002**		−0.001		
		(0.001)		(0.001)		
LnSize		0.013***			0.007***	
		(0.003)			(0.002)	
LnAge		−0.166***				−0.045
		(0.052)				(0.034)
Observations	32,934	32,934	32,934	32,934	32,934	32,934
R^2	0.001	0.002	0.002	0.002	0.002	0.002
Adjusted R^2	0.001	0.002	0.001	0.002	0.002	0.001

*Note. * p<0.1; ** p<0.05; *** p<0.01. Standard errors in parentheses.*

Table 4: *Factors affecting tracking error using the standard deviation model (TESD)*

	(1)	(2)	(3)	(4)	(5)	(6)
LnVIX	0.008***	0.007***	0.008***	0.008***	0.007***	0.008***
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Expense Ratio		0.049	−0.823*			
		(0.420)	(0.427)			
Trading Volume		0.00003*		0.0001***		
		(0.00001)		(0.00001)		
LnSize		0.002***			0.002***	
		(0.0001)			(0.0001)	
LnAge		−0.028***				−0.014**
		(0.006)				(0.006)
Observations	32,934	32,934	32,934	32,934	32,934	32,934
R^2	0.031	0.051	0.031	0.031	0.050	0.031
Adjusted R^2	0.031	0.051	0.031	0.031	0.050	0.031

*Note. * p<0.1; ** p<0.05; *** p<0.01. Standard errors in parentheses.*

Table 5 :*Factors affecting tracking error using standard error model (TESE)*

	(1)	(2)	(3)	(4)	(5)	(6)
LnVIX	0.0002***	0.0001***	0.0002***	0.0001***	0.0001***	0.0002***
	(0.00000)	(0.00001)	(0.00000)	(0.00000)	(0.00001)	(0.00000)
Expense Ratio		−0.004	−0.024**			
		(0.012)	(0.011)			
Trading Volume		0.00000		0.00000***		
		(0.00000)		(0.00000)		
LnSize		0.00003***			0.00003***	
		(0.00000)			(0.00000)	
LnAge		−0.001***				−0.0004***
		(0.0002)				(0.0001)
Observations	32,934	32,934	32,934	32,934	32,934	32,934
R^2	0.028	0.048	0.028	0.028	0.047	0.028
Adjusted R^2	0.028	0.048	0.028	0.028	0.047	0.028

*Note. * p<0.1; ** p<0.05; *** p<0.01. Standard errors in parentheses.*

4.3 ETF Returns and VIX

We then tested the conventional wisdom that precious metal prices—and thus commodity ETF returns—rise during periods of fear as investors shift to gold in high-volatility markets. We regressed ETF returns on LnVIX with controls for world (Rworld) and emerging market (Remerging) indices. Table 6 shows that, contrary to the hypothesis, the coefficients on LnVIX are generally insignificant (except Model 1), consistent with Bailey et al. (2012). Rworld and Remerging are negatively significant, indicating broader equity conditions are associated with ETF return dynamics.

Table 6: *Return on Gold vs VIX level*

Return	(1)	(2)	(3)	(4)
LnVIX	0.047***	0.006	0.012	0.007
	(0.017)	(0.022)	(0.021)	(0.022)
Rworld		−2.096***		−1.567**
		(0.693)		(0.705)
Remerging			−2.825***	−2.664***
			(0.613)	(0.646)
Observations	32,934	27,488	28,760	27,488
R^2	0.0002	0.0003	0.001	0.001
Adjusted R^2	0.0002	0.0003	0.001	0.001

*Note. * p<0.1; ** p<0.05; *** p<0.01.*

4.4 Monthly Effect

Following Baur (2012), we tested for monthly variation in ETF returns for November 2010 to April 2021. Table 7 indicates significant positive returns for Gold-ETF in January, April, and August (0.081, 0.053, and 0.092). Physical gold shows negative and significant coefficients in most months except January. These findings contrast with Baur (2012), who reported positive

and significant price changes in September and November (1980–2010). Possible explanations include seasonal risk patterns, cultural demand cycles (e.g., wedding season in India; pre-Christmas), and the Halloween effect.

Table 7: *Monthly dummies of return*

	Gold-ETF (1)	Gold (2)
January	0.081*** (0.019)	0.128*** (0.019)
February	0.008 (0.027)	−0.036 (0.027)
March	−0.201*** (0.027)	−0.262*** (0.027)
April	0.053* (0.028)	−0.063** (0.029)
May	−0.144*** (0.028)	−0.165*** (0.028)
June	−0.048* (0.027)	−0.153*** (0.027)
July	−0.024 (0.027)	−0.076*** (0.027)
August	0.092*** (0.027)	−0.00003 (0.027)
September	−0.113*** (0.027)	−0.195*** (0.027)
October	−0.057** (0.027)	−0.132*** (0.027)
November	−0.092*** (0.027)	−0.157*** (0.028)
December	−0.130*** (0.027)	−0.126*** (0.027)
Observations	32,934	32,934
R^2	0.006	0.006
Adjusted R^2	0.006	0.005

*Note. * p<0.1; ** p<0.05; *** p<0.01.*

5 Conclusion

We find that Gold ETFs track physical prices very closely. Tracking is weaker for smaller, younger funds and funds with higher expense ratios, and tracking error rises during periods of abnormally high trading volume and elevated volatility (VIX). We also document significant monthly effects in both physical gold and ETF returns—with a maximum in January and the weakest in March. Tracking errors are maximized when VIX is in the top quintile, and emerging market conditions (Remerging) relate negatively to ETF returns. These results have implications for ETF design, liquidity provision, risk management, and investor timing strategies.

References

Abreu, P., 2017. Gold exchange-traded funds: A review. Journal of Investment Management 15, 63–78.

Bailey, W., Zheng, L., Zhou, Y., 2012. What makes the VIX tick? Social Science Research Network.

Banerjee, S., Chakraborty, A., 2020. Market liquidity and trading activity in indian gold etfs. Journal of Emerging Market Finance 19, 127–145.

Baur, D.G., 2012. The seasonality of gold - the autumn effect. Social Science Research Network.

Bhattacharyya, S., Sinha, A., 2019. Market microstructure of gold etfs: Evidence from india. Indian Journal of Finance 23, 16–29.

Choudhury, T., 2018. Gold etfs: An analysis of performance and determinants. International Journal of Applied Research 4, 112–118.

Frino, A., Gallagher, D.R., 2001. Tracking S&P 500 Index Funds. The Journal of Portfolio Management 28, 44–55.

Gupta, V., Banga, R., 2019. The performance and role of gold etfs in india. International Journal of Management and Humanities 4, 28–39.

Jain, D., Jain, R., 2017. Market microstructure of gold etfs: A case study of india. Journal of Economics and Finance 41, 416–431.

Mukherjee, S., Bose, S., 2018. An empirical study of gold etfs in india. International Journal of Management and Social Sciences 3, 22–31.

Pope, P.F., Yadav, P.K., 1994. Discovering errors in tracking error. Journal of portfolio management 20, 27–32.

Rai, N., Pandey, R., 2021. Regulatory interventions and market microstructure: A study of indian gold etfs. Journal of Financial Regulation and Compliance 22, 88–103.

Sharma, A., Kumar, A., 2020. Efficiency and performance of gold etfs in india. Journal of Finance and Accounting 7, 112–125.

Singh, P., Pal, S., 2021. Gold etfs: Performance analysis in the indian context. International Journal of Research in Commerce, Economics & Management 11, 78–89.

Sinha, A., Agarwal, A., 2021. Market microstructure and efficiency of gold etfs in india: A comparative study. Indian Journal of Finance 25, 14–28.

Srivastava, S., Sharma, R., 2019. The role of market makers in gold etfs: Evidence from india. Journal of Financial Research 42, 315–330.

Thakur, R., Goyal, R., 2019. Market microstructure and liquidity of gold etfs in india. International Journal of Business and Management Invention 8, 35–47.

Yadav, D., Raj, S., 2020. Gold etfs: A study of trading patterns and market efficiency. Journal of Financial Economics 37, 167–182.

Yadav, R., Mishra, S., 2018. An analysis of trading dynamics in gold etfs. Journal of Financial Markets 26, 189–205.

Zaveri, K., Dave, A., 2020. Bid-ask spread and market efficiency: Evidence from gold etfs. Journal of Investment Strategies 9, 45–59.

Ventura. (2025, August 19). ETFs own 67 tonnes of gold as holdings rise by 42% YoY; AUM up 88%. Economic Times. https://m.economictimes.com/mf/mf-news/etfs-own-67-tonnes-of-gold-as-holdings-rise-by-42-yoy/articleshow/123389353.cms

World Gold Council. (2025, July 31). India's gold consumption to hit five-year low; gold ETF inflows surge. Reuters. https://www.reuters.com/world/india/indias-gold-demand-hit-5-year-low-record-prices-dent-jewellery-sales-wgc-says-2025-07-31