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An Assessment of Impact of Domestic Price of Gold on NAV of Selected Gold Exchange Traded Funds

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Abstract

Study undertaken assesses the impact of behavior of domestic price of gold on selected gold exchange traded funds which were launched in the year 2010 at National Stock Exchange. The selected gold exchange traded funds constitute HDFC Gold Exchange Traded Fund, ICICI Prudential Gold Exchange Traded Fund and Religare Gold Exchange Traded Fund. Since, the investment objective of every selected scheme under research study is directly related to the domestic price of gold. So, the daily fluctuations of domestic price of gold are taken into account for assessing the impact on NAV prices of selected gold exchange traded funds. The study is aimed to meet objectives of (a) identifying whether NAV of all the selected three funds under research study is dependent upon Domestic Price of Gold. (b) Identifying in which respects NAV of the selected gold exchange traded funds differ from each other. Statistical calculation involves calculating arithmetic mean, standard deviation and standard error. The method for interpretation of data is application of Z-test that will assess the validity in results. This study helps investors to get a detailed insight in what respects NAV gets dependent upon domestic price of gold and the differentiating factors that differs NAV of the selected three Gold ETF mutual fund schemes under research study. This will prompt the investors to check the differentiating parameters of NAV while selecting the mutual fund house for investing in Gold ETF.

Key Words: Gold ETF, Domestic price of Gold, NAV, NSE, Arithmetic mean, Standard deviation, Standard error
JEL Code: JEL: G11

I. Introduction

Gold ETF provides investors a favorable chance to participate in the gold bullion market without the necessity of obtaining physical delivery of gold, and the mode of participation is through DEMAT account where One Gold ETF equals One gm of physical gold that is secured by physical gold of very high purity (99.5%). Gold ETF trades like a security or stock in the stock exchange. Gold ETF is considered to be a passive investment, so when gold prices shoots up, the ETF tends to surge and

when gold prices shows decline trend, the ETF loses value.

Gold ETF aims to constantly follow the pattern of domestic price of gold. Returns provided by Gold ETFs, before expenses, closely correlate the returns provided by physical gold. Since every unit of ETF approximately equals 1 gm of gold but there are certain Gold ETFs whose unit is approximately equals the price of 1/2 gm of gold. In our research study, HDFC Mutual Fund, ICICI Prudential Mutual Fund and Religare Mutual Fund were taken into consideration which is asset management companies which got listed with National Stock Exchange with symbols such as HDFCMFGETF, IPGETF, RELIGAREGO. Every unit of selected Gold ETFs are approximately equal to 1 gm of gold. The maximum expense ratio provided by the scheme of HDFC Gold ETF, ICICI Prudential Gold ETF and Religare Invesco Gold ETF are 1.00% annualized as mentioned in their Scheme Information Document.

Net Asset Value: Assets constituted under selected Gold ETF funds consists of Gold, debt and other liquid instruments and cash component in specified percentage in its portfolio. By combining all these assets and therefore, dividing it by the number of units in the HDFC Gold ETF, ICICI Prudential Gold ETF &Religare Gold ETF equals the net asset value of the exchange traded fund. To obtain the value of a unit of Gold ETF, net asset value needs to be considered which can be computed by deducting the scheme's expenses from the current price of gold.

Domestic Price of Gold: Domestic price of gold constitutes the physical gold bought by the scheme possesses to be of fine purity atleast of 995 parts per 1,000(99.5%) or higher. The physical gold will only be accepted by the custodian of the fund provided; it should also fulfill the standards of good delivery norms as prescribed by London Bullion Market Association. Every mutual fund house shall undertake activities of buying and selling of gold subject to deliveries and in many instances of purchases, obtain delivery of gold and in all instances of sale, deliver the gold as per the compliance of SEBI. The scheme will invest in physical gold. Since the valuation of physical gold and other permitted instruments are based on gold denominated in gold tonnage and the valuation stands to be dependent upon the market price of gold in the domestic market and will be marked to market on daily basis.

II. Review Literature

1. Athma, Prashanta, & K, Suchitra (2011), undertook the study which endeavors to fill the research gap with an emphasis on focusing towards the Gold ETF as a strong asset class. The second objective is to stress the importance on

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incorporating Gold ETF in a portfolio for risk diversification and thirdly, to help the investors in the selection of the best Gold ETF option and its tax implications. Findings state that gold prices are less volatile as compared to the equities market which instills confidence in the minds of investors to possess gold, hence, justifying it to be a strong asset class. By including some units of Gold ETF in a portfolio would help diversify the portfolio risk.

2. Athma, Prashanta & Mamatha, B.(2012), examined the secondary data which covers a period of 14 years for Index Funds i.e. 1998 to 2011 since their inception. As opposed to ETF's, the study constitutes for a period of 10 years i.e. 2002 to 2011, from the year of existence of ETFs. A comparative growth rate of the Number and NAV per share for IFs and ETFs discloses that the CAGR during the period in terms of number of funds and NAV per share is higher than in case of ETF with 34.93% and 74.88% respectively in contrast to Index Funds with 25.85% and 31.57% respectively. Though there is a good growth related to both the funds in terms of Number of Funds and NAV per share specifying that future of these funds is bright in India, ETFs are a good investment sufficient enough to the individual investors and professionals as they are of low cost and more liquid.

3. Goyal, Alok, & Joshi Amit (2011), undertook the study of financial performance of selected Gold ETFs, their variations and assesses the risk behavior as compared to NSE.

4. Bose, Suchismita (2012), provide a broad picture of trends in the changes in asset base of distinctive categories of funds comprising of Gold ETF from 2008 to December 2011. Further, it provides hints to the behavior of asset inflows/outflows from different types of funds (which cover Gold ETF) under several economic and financial market conditions.

5. Sindhu (2013), studies and assesses the impact of factors like exchange rate of US dollar with INR, crude oil prices, repo rate and inflation rate individually on gold prices. The findings revealed that there exists an inverse relation between the US $ and gold prices. The crude oil prices have a consequential impact on the gold prices. Gold prices and repo rate are interdependent. Gold prices and inflation rates are also dependent and positively correlated

6. Garg and Singh (2013) in their paper evaluated the performance of two competitive financial instruments i.e. ETF and Index Funds over the period June 2006 to December 2009. The study disclosed that ETFs perform better in terms of their replication strategy, tracking ability as well long term performance.

7. Goyal M.M. (2013) studied the performance of Gold ETFs in India as compared to the market indices (NSE 500), saving bank deposits, fixed deposits, PPF from period 2007-2014. The

findings suggested that Gold ETFs are providing higher average returns at a lower risk as compared to the market. Also the systematic risk for the Gold ETFs are negative which means that constituting the gold stocks in an investor's portfolio will make it more diversified and riskless. Investment in gold can be beneficial to both retail and the institutional investors.

Research Gap

The previous research studies haven't revealed the parameters for NAV to get dependent upon domestic price of gold. Further, on what basis NAV differs from rest of the Gold ETF fund selected under study.

III. Objectives of the Study

1. To identify whether NAV of all the selected three funds under research study is dependent upon Domestic Price of Gold.
2. To identify in which respects NAV of the selected gold exchange traded funds differ from each other.

IV. Research Methodology

The research study comprises of secondary data collection, which have been primitivelycollected from the company's website, HDFC Mutual Fund, ICICI Prudential Mutual Fund and Religare Mutual Fund as under following categories:

1. Historical Net Asset Value prices for the period 2010-2015.
2. Historical domestic price of Gold i.e benchmark of Gold exchange traded fund for the period 2010-2015.

Hypothesis

The null hypothesis has been used for all the selected three funds i.e. HDFC Gold ETF, ICICI Prudential Gold ETF and Religare Invesco Gold ETF as under:

Hypothesis Assumed (H_0): Net Asset value price is not dependent upon domestic price of gold.

V. Statistical Tools and Techniques

The statistical tools used for calculation are: arithmetic mean, standard deviation and standard error.

1. **Arithmetic Mean:** Arithmetic mean is a mathematical computation of the distinctive value of a series of numbers, calculated as the sum of all numbers in a series divided by countable number of observations in a series. In other words, sum of daily NAV prices divided by number of NAV's on daily basis. Similarly, sum of domestic price of gold divided by number of domestic price of gold on daily basis. It is calculated arithmetically as : For a data

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containing the values $a_1, \ldots, a_n$. The arithmetic mean A is prescribed by the formula:

$$A = \frac{1}{n} \sum_{i=1}^{n} a_i.$$

where,

A = Arithmetic mean

n = number of observations in a series (both for NAV series and domestic price of gold i.e. DPG series calculated separately)

α_i = sum of all observations in a series (both for NAV series and domestic price of gold i.e. DPG series calculated separately)

2. **Standard Deviation:** Standard deviation is a statistical measure that throws light on historical volatility. It is calculated as the square root of the variance.

$$s = \sqrt{\frac{\sum(X - \bar{X})^2}{n-1}}$$

where,

s= standard deviation

$\bar{X}$ = Sample mean(for both NAV and domestic price of gold calculated separately)

n= number of observations in series i.e. both for NAV and domestic price of gold

3. **Standard Error:** Standard error is a statistical term that estimates the accuracy with which a sample represents a population. In statistics, a sample mean deviates from the actual averages of a population; this deviation is the standard error. It is calculated by taking sample estimates of the population standard deviation (sample standard deviation) divided by the square root of the sample size (assuming statistical independence of the values in the sample):

$$SE_{\bar{x}} = \frac{s}{\sqrt{n}}$$

Where,

$SE_{\bar{x}}$ = Standard Error of the Mean

s = Standard Deviation of the Mean i.e. separately for NAV and Domestic Price of Gold calculated under research study)

n =Number of Observations in the Sample (i.e. separately for NAV and Domestic Price of Gold calculated under research study)

The sample becomes representative of the overall population when there is smaller standard error. The standard error is also inversely proportional to the sample size; the larger the sample size, the smaller the standard error because the statistic will consider the actual value.

4. **Statistical Test: Z-test:** A Z-test is a statistical test used to ascertain the difference between two population means when the variances are known and the sample size is large. In other words, Z-test for two population proportions is used to ascertain that two population or groups differ significantly on single characteristic i.e NAV and domestic price of gold differs on the basis of hidden expense ratio which is to be incurred while at the time for purchasing Gold ETF units. Z-test is calculated as the sum of the sample mean minus the population mean and then divided by the standard error.

$$Z = \frac{\overline{X} - \mu}{\sigma_{\bar{x}}}$$

Where,

Z=Z-test

$\overline{X}$ = Sample mean i.e. Mean Value of NAV

μ = Population mean i.e. Mean Value of Domestic Price of Gold

$\sigma_{\bar{x}}$ = Standard Error

VI. Analysis and Interpretation

Analysis and interpretation has been done on the basis of application of Z-test. It reveals the variances between two population means i.e. differences between NAV and domestic price of gold with respect to standard error. Following calculations have been performed separately for all the selected three funds under research study as under.

HDFC Gold ETF						
Years	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Mean of NAV	1967.09	2364.55	2901.12	2767.20	2632.42	2506.68
Mean of DPG	1987.51	2505.64	26930.64	2850.76	2740.18	2635.51
Standard Dev	1371.60	24244.26	4060952.16	14297.70	18440.12	22135.18
Standard Error	140.72	1555.27	262681.16	919.091	1185.38	1419.97
Z-Test	**-0.145095**	**-0.090722**	**-0.091478**	**-0.090909**	**-0.090909**	**-0.090722**

ICICI Prudential Gold ETF						
Years	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Mean of NAV	1969.32	2380.68	2919.34	2796.89	2662.44	2535.78
Mean of DPG	1969.97	2409.72	2990.32	2891.18	2777.37	2670.15
Standard Dev	30.86	5050.12	12295.98	16201.07	19260.47	22899.48
Standard Error	3.77	321.98	785.56	1039.30	1251.10	1475.09
Z-Test	**-0.172774**	**-0.090167**	**-0.090351**	**-0.090722**	**-0.091863**	**-0.091098**

Religare Gold ETF						
Years	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Mean of NAV	1886.42	2381.75	2923.83	2809.31	2722.87	27047.95
Mean of DPG	1893493.77	2412098.00	2990361.42	2898033.07	2837188.48	2601043.40
Standard Dev	262163404.12	414054264.07	509097408.00	507713623.00	479020496.00	391319272.40
Standard Error	18725957.44	26561593.42	32793846.90	32239847.34	30985260.08	26687752.87
Z-Test	**-0.101015**	**-0.090722**	**-0.091098**	**-0.089803**	**-0.091478**	**-0.096449**

Testing the level of significance for Z-test at 5% (in two decimal places)							
Years	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**For $\alpha_{0.05}$=1.96**
HDFC Gold ETF	-0.15	-0.09	-0.09	-0.09	-0.09	-0.09	**Not Accepted**
ICICI Pru Gold ETF	-0.17	-0.09	-0.09	-0.09	-0.09	-0.09	**Not Accepted**
Religare Gold ETF	-0.10	-0.09	-0.09	-0.09	-0.09	-0.10	**Not Accepted**

Since the values obtained from calculating Z-test comes out to be negative across years which means the standardized difference lies outside the acceptance region of the normal distribution curve, we reject the null hypothesis and conclude that the sample means differ i.e NAV is dependent upon domestic price of gold at the end of each trading day and always strive to achieve a close proximity to domestic price of gold. NAV of the selected mutual fund houses under research study owns different composition of assets in its portfolio that accounts to NAV i.e. holding of debt instruments and varying proportions of cash on liquidity apart from gold bars across five years i.e. from 2010 to 2015 becomes an underlying determinant for the differing NAV's of the different ETFs.

Physical gold is dependent upon the market forces of the price of gold on the basis of its demand and supply and on that basis investor opts to trade in during stock exchange hours. Valuation of domestic price of gold is dependent upon the number of subscriptions made for the purchase of Gold ETF units excluding redemptions made from the scheme. This ascertains the last traded price of Gold ETF throughout the trading day. Closing price for opting the Unit of Gold ETF is a signaling factor upon which NAV prices is ascertained at the end of the day. Expenses made for holding Gold ETF units over a period of time becomes another factor which is widely considered for purchase of ETF units at NAV prices. If an investor has incurred higher expenses for purchasing Gold ETF units, it means that it

would have fetched lower returns from the investment made. However, a lower expense gives higher returns and is always considered to be a preferred option for investors. It becomes necessary to become updated that expenses consume the NAV of various ETFs and thus, affect the prices.

The prices of gold possess by every selected scheme under research study during its trading hours are also a determinant to buy or sell Gold ETF units on a trading platform of National Stock Exchange. Since, Gold ETFs are actively traded and so there are chances of varying prices due to the trading till the last few minutes of closure of market. During the last trading minutes to subscribe for Gold ETF units forces NAV price to come down as there stands chances to purchase ETF at lower applicable prices even at discounted rates or vice versa depending on the market demand and number of investors currently trading during that duration. Arbitrageurs are always on a look out to get actively involved in trading of Gold ETF so as to bring the market price closer to NAV and gain from arbitrage opportunities if available.

VII. Conclusion

Gold ETF is a profitable avenue for investment provided, an investor should look for certain essentials applicable on NAV. Since NAV price is a determining factor for an investor when it comes to purchasing of Gold ETF units. An investor should ascertain whether NAV is perfectly correlated in reaching out the returns of domestic price of gold.

It becomes crucial for an investor to understand that the last traded price of Gold ETF need not be same as of NAV. So, it's better to check out NAV prices separately and look for buying those Gold ETF units in which lower expense ratio is incurred. If an investor is getting an opportunity to opt for Gold ETF units on a discounted NAV then, such opportunity should be undertaken immediately. From the above research study, it has been observed that the selected three funds i.e. HDFC Gold ETF, ICICI Prudential Gold ETF and Religare Gold ETF are dependent upon domestic price of gold. The domestic price of gold is dependent upon the physical price of gold which is based upon the market forces of demand and supply. However, an investor should remember that NAV's of different Gold ETFs differ on account of its different composition of assets in its portfolio i.e. holding of debt instruments and varying proportions of cash on liquidity apart from gold bars.

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