# Arbitrage Opportunity For Exchange Traded Funds (ETFs) In The Indian Stock Market - An Empirical Analysis

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## INTRODUCTION

Exchange-traded funds (ETFs) are generally index-based funds that allow investors to buy or sell exposures to an index through a single financial instrument. Similar to equity securities, ETFs are traded on a stock exchange through a broker. As such, ETFs can be traded at any time during market hours, sold shortly. ETFs are shares of a portfolio and not an individual company. Thus, ETFs represent shares of ownership in either open-end funds or unit investment trusts that hold portfolios of stocks or bonds in custody and track the price and yield performance of their underlying indices - broad market, sector/industry, country, regional or fixed income.

ETFs have two distinguishing features. **First,** ETFs are traded, akin to equity securities, in a stock exchange continuously during the day at prices determined by supply and demand rather than at the net asset value (NAV), which is calculated at the end of the trading day. **Second,** the mechanism for creating and redeeming ETF units is completely different - ETF units are created and redeemed in-kind rather than in-cash (as in the case of a unit trust fund). The in-kind creation and redemption mechanism allows arbitrage opportunities whenever unit prices deviate from the value of the underlying portfolio. This ensures that ETF units do not trade at a significant premium or discount from the fair value of the portfolio.

## EMERGENCE OF ETFs

Globally, in the year 1989, the Toronto Stock Exchange (TSE) introduced the first Exchange Traded Fund called the Toronto Index Participations (TIPs) in Canada. In United States, the American Stock Exchange (AMEX) launched the first ETFs, namely Standard & Poor's Depository Receipts (SPDR) in 1993. Since 1993, after liberalization of the world economy, ETFs have been gaining new momentum in the global capital market. In Asia, the Hong Kong Stock Exchange created the Hong Kong Tracker Fund (TraHK), that tracks the Hang Seng Index, in 1999. Europe's first ETF, the Euro STOXX 50 made its debut in 2000. The most popular ETFs are QQQs (cubes) based on the NASDAQ - 100, SPDR (spiders) bases on the S& P 500 index, iSHARES based on MSCI indices and TRAHK (tracks) based on the Hang Seng Index. In India, the First ETF, Nifty BeES was launched by Benchmark Mutual Funds in 2002. Since then, the popularity of ETFs has grown so rapidly, and it has become one of the most successful financial products of the decade.

## STATEMENT OF THE PROBLEM

Growth of the ETFs has been motivated to undertake research in the field of ETFs. However, Rompotis (2002), Gallagher and Segara (2004), Rompotis (2006), Kuo and Mateus (2006) examined the performance of Exchange Traded Funds. Studies such as Lin and Chou (2006), Kayali (2007), DeFusco and et al (2007), and Madura and Ngo (2008) carried out the pricing behavior and premium / discount of the ETFs.

Chen and Huang (2008), Jaggi and et al (2009), Lin and Chiang (2005) analyzed volatility and forecasting ability of the Exchange Traded Funds. The above studies were carried out in developed countries. Research regarding ETFs in India is limited. Therefore, to fulfill this gap, the objective of the present study is to analyze the premium or discount of ETFs in India.

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## REVIEW OF LITERATURE

Extensive empirical research has been carried out to investigate the performance, pricing ability and volatility characteristics of the ETFs in developed and emerging countries. This section presents reviews of some of the studies that are related to emerging markets and developed countries.

❁ **Rompotis (2002)** empirically analyzed the Exchange Traded Funds by using daily closing price and Net Asset Value for a sample of 30 American ETFs during the period 3rd March 2001 to 8th July 2002. The study finds that ETFs are traded at a premium with regard to their Net Asset Value. The manager and investors can execute arbitrage opportunity between the primary and the secondary market.

❁ **Rompotis (2002)** in his research work compared the performance of Exchange Traded Funds and Index funds during 3rd April 2001 to 20th November 2002 for a sample of 16 ETFs and Index Funds by employing the regression model. He found that ETFs and Index Funds have similar performance with respect to return and risk.

❁ **Gallagher and Segara (2004)** examined the performance and trading characteristics of exchange-traded funds (ETFs) in Australia during 2nd January 2002 and 31st December 2003. They found that index-oriented ETFs closely track their respective benchmarks, but these instruments have not embraced to the same degree as in overseas markets and relative to off-market index managed funds.

❁ **Rompotis (2006)** examined the performance of Swiss Exchange Traded Funds by considering closing price for a sample of 32 Swiss ETFs during 2004. The study found that Swiss Exchange Traded Funds underperform to their benchmark index.

❁ **Lin and Chou (2006)** have observed the tracking error and Premium/Discount of Taiwan's First Exchange Traded Fund. They found that dividends and management expenses are main factors to determine the tracking error of the ETFs. The study finds that volatility and market return are determining the discount/premium of TTT and the performance of TTT, is highly correlated with the general stock market movements.

❁ **Kuo and Mateus (2006)** investigated the performance and persistence of 20 iShares MSCI country-specific exchange-traded funds (ETFs) in comparison with S&P 500 indexes over the period of July 2001 to June 2006. They employed risk-adjusted performance measures such as Sharpe, Treynor and Sortino ratios. To evaluate performance persistence and any relationship among past performance and future performance, they apply the Spearman Rank Correlation Coefficient and the Winner-loser Contingency Table. The study found that ETFs can beat the U.S. market index based on risk-adjusted performance measures and there is evidence of ETFs performance persistence based on an annual return.

❁ **Kayali (2007)** had analyzed the pricing efficiency of Dow Jones Istanbul 20 (first Turkey ETF) for 241 trading days by employing simple regression and multiple regression during 2005. The study found that ETFs are traded in discount in Turkey and premium or discount disappeared within two days.

❁ **Rompotis (2009)** carried out a cost - performance investigation of 74 domestic and global equity ishares during 2002 to 2006. The study employed regression and found that expenses were negatively related to the size of ETFs, aged ishares charged more from investors, and ishares performance was negatively influenced by expenses and was positively influenced by turnover.

❁ **Meric and et al (2009)** compared the performances of 38 ishares sector index funds using the Sharpe and Treynor portfolio performance measures during the October 9, 2007-March 9, 2009 bear market. The findings of the study indicate that the healthcare and consumer staples sector index funds have the best performance with relatively smaller losses and less return volatility, and the financials and home construction sector index funds had the worst performance with relatively larger losses and greater return volatility, compared with other funds, during the study period.

Numerous numbers of studies have tested the performance of ETFs in the international stock However, however, most of these studies focused on highly-developed stock markets or East Asian markets. In the current changing economic scenario of India, a comprehensive study to explore ETFs in India is limited. Therefore, the present study was conducted with the aim of analyzing the pricing pattern of ETFs in India.

## DATA AND METHODOLOGY

This paper is exclusively based on secondary data. The data variables chosen were closing prices and net asset values of each of the Exchange Traded Funds (ETFs). The closing prices of the Exchange traded funds have been collected from the National Stock Exchange of India's (NSE) Limited ETFs segments (www.nseindia.com) and Net Asset Value of the Exchange Traded funds were extracted from the Benchmark mutual funds website (www.benchmarkfunds.com), UTI mutual funds website (www.utimf.com) and Association of Indian Mutual Funds website (www.amfiindia.com). The study period for this study is from the inception of the ETFs in India to 31st December 2009.

First, this study tries to find out the relationship between closing price and Net Asset Value of the Exchange Traded Funds in India. The simple regression model is employed to examine the relationship between both values.

$$\mathbf{ETFPRICE_t = \alpha + \beta\, ETFNAV_t + \varepsilon} \qquad \mathbf{(1)}$$

Where, $ETFPRICE_t$ and $ETFNAV_t$ represent closing price and net asset value of Exchange Traded Funds respectively. The α, β and ε are treated as constant, slope and stochastic error in the regression model. According to Rompotis (2002), Kayali (2007), the coefficient of $NAV_t$ is expected to be unity and significant. If the β coefficient is close to unity, the significant would imply that there is a close pricing relationship between the respective price series, and that they move in the same direction. Further, if the β coefficient is greater than unity, it indicates that the ETFs are traded at a premium to NAV, whereas the less than unity would point out that the ETFs are traded at a discount on average.

Next, this study has examined whether Exchange Traded Funds (ETFs) are being traded at a premium or a discount in the Indian stock market. The premium or discount of the ETFs has been measured by employing the equation (2).

$$\mathbf{PREMDISC_t = (PRICE_t - NAV_t)} \qquad \mathbf{(2)}$$

Where, $PREMDISC_t$ represents the premium / discount of the ETFs on day t, $PRICE_t$ reveals the closing price of the ETFs on day t and $NAV_t$ portrays the Net Asset Value of the ETFs on day t.

The premium / discount for each day has been computed for the entire study period. If the daily closing price is greater than the net asset value, then the ETFs are said to be trading at a premium to their net asset value on that day. On the other hand, if the daily closing price is smaller than the net asset value, then the ETFs are said to be trading at discount from its net asset value on that day.

In this study, the daily premium / discount has been averaged. If the average daily premiums / discounts are positive, this means that the ETFs trade at a premium to its NAV, on average. In contrast, if the average daily premiums / discounts are negative, this implies that the ETFs traded at discount from its NAV, on average.

Further, the study has analyzed the persistence of the premium / discount of the ETFs by running regression equation (3).

$$\mathbf{PREMDISC_t = \alpha + \beta\, PREMDISC_{t-1} + e} \qquad \mathbf{(3)}$$

Where, $PREMDISC_t$ and $PREMDISC_{t-1}$ represents the premium / discount of the ETFs on day t and on day t-1 respectively. This study presumed that the coefficient of the one day lagged premium / discount to be zero and not significant. If the β coefficient is insignificant, that would be taken as the premium or discounts are not persistent, and they disappear within a day. On the other hand, a significant β coefficient would be interpreted as there is persistence in the premium or discount. In that case, this study has further checked the persistence up to two days by adding the two days lagged premium / discount as the second independent variable.

$$\mathbf{PREMDISC_t = \alpha + \beta\, PREMDISC_{t-1} + \beta\, PREMDISC_{t-2} + e_t} \qquad \mathbf{(4)}$$

## EMPIRICAL RESULTS

This paper vividly presented the empirical results based on the methodology. First, the relationship between closing price and Net asset Value (NAV) of the Exchange Traded Funds has been identified, and the results are shown in Table 1.

The Table 1 shows that when Net Asset Value of the Exchange Traded funds are zero, the price of the Nifty BeES, Bank BeES, Shariah BeES and Q Nifty are almost equal to zero and the price of Nifty Junior BeES, PSU Bank BeES, Kodak PSU Bank ETF, Reliance Bank ETF and UTI SUNDER are traded at 7.57, 1.397, 0.571, 28.03, and 13.693 respectively. Beta for all ETFs except Kodak PSU Bank ETF is less than one and indicates that Kodak PSU Bank ETF is trading at a premium and rest of the ETFs are trading at a discount in the Indian stock market. R square indicates that

**Table 1: Relationship Between Price And NAV of the ETFs In India**

| ETFs | Alpha | Beta | R Square | Obs. |
|---|---|---|---|---|
| Nifty BeES | -0.127 | 0.999 | 0.999 | 1975 |
| Nifty Junior BeES | 7.57 | 0.894 | 0.878 | 1494 |
| Bank BeES | -0.271 | 0.999 | 0.988 | 1029 |
| PSU Bank BeES | 1.397 | 0.996 | 0.997 | 517 |
| Shariah BeES | -1.67 | 0.999 | 0.981 | 179 |
| Kodak PSU Bank ETF | 0.571 | 1.01 | 0.993 | 483 |
| Reliance Bank ETF | 28.03 | 0.903 | 0.977 | 363 |
| Q Nifty | -0.887 | 0.996 | 0.992 | 337 |
| UTI SUNDER | 13.693 | 0.929 | 0.973 | 1089 |

Source: Compiled from the Closing price and NAV of the ETFs in India.

**Table 2: Descriptive Statistics For Price Deviations Of The Exchange Traded Funds**

| ETFs | Mean | S.D. | Mini | Maxi | + days | - days |
|---|---|---|---|---|---|---|
| Nifty BeES | -0.295 | 2.11 | -51.41 | 19.52 | 785 | 1190 |
| Nifty Junior BeES | -1.476 | 22.17 | -328.22 | 16.32 | 829 | 665 |
| Bank BeES | -0.219 | 20.82 | -376.55 | 75.33 | 572 | 457 |
| PSU Bank BeES | 0.336 | 3.267 | -20.59 | 23.35 | 288 | 229 |
| Shariah BeES | -0.459 | 1.748 | -14.51 | 6.335 | 67 | 112 |
| Kodak PSU Bank ETF | -0.358 | 5.135 | -28.053 | 31.73 | 215 | 268 |
| Reliance Bank ETF | -33.14 | 29.564 | -131.74 | 125.53 | 40 | 323 |
| Q Nifty | -2.355 | 7.725 | -50.265 | 54.473 | 99 | 238 |
| UTI SUNDER | -10.17 | 23.88 | -76.34 | 154.18 | 187 | 902 |

Source: Compiled from the Closing price and NAV of the Exchange Traded Funds in India.
Note: + Days show the premium days for the sample period.
- Days represent the discount days for the sample period.

there is a strong association between closing price and NAV of the Exchange Traded Funds in the National Stock Exchange of India.

Further, the difference between closing price and NAV of the ETFs is called as premium or discount or price deviation. If the average of the price deviation from NAV is positive, Exchange Traded Funds are traded at a premium and while the mean value of the price deviation from NAV is negative, ETFs are said to be traded at a discount. The Table 2 reveals descriptive statistics of ETFs.

The Table 2 explained that the average of price deviation of PSU Bank BeES is positive and also maximum and the remaining ETFs are negative. That means that the PSU Bank BeES were traded at a premium and the remaining ETFs were traded at a discount in NSE. Reliance Bank ETF has provided the minimum average price deviation and maximum standard deviation from the mean among the sample ETFs. Nifty Junior BeES traded at a premium for the maximum number of days i.e. 829 days and then Nifty BeES was at the second place, as it traded for a premium for 785 days. According to the Table 1 and Table 2, investors buy the Nifty BeES, Nifty Junior BeES, Bank BeES, Shariah BeES, Kodak PSU Bank ETF, Reliance Bank ETF, Q Nifty and UTI SUNDER from the stock exchange and sell these in the fund house. Investors could buy the PSU Bank BeES from the fund house and sell it to the secondary market. From the empirical results, the study generalizes that ETFs are the best financial product to gain profit advantage through price differences and hence, have an arbitrage opportunity in the stock market.

Then, the Table 3 and Table 4 represented the persistence of premium or discount of ETFs. According to the Table 3, if theclosing price and NAV of the ETFs are equal on the previous day i.e. the price deviation between both the variables is zero, then the closing price of the PSU Bank BeES is greater than the NAV and remaining are less than the NAV on the current day. That is, on the current day, the PSU Bank BeES is traded at statistically significant premium and Nifty

**Table 3: Persistence of Premium or Discount Of ETFs With One Day Lag Value**

| ETFs | Alpha | β (PREDIS$_{t-1}$) | R Square |
|---|---|---|---|
| Nifty BeES | -0.242 (-5.14) | 0.178 (8.06) | 0.032 |
| Nifty Junior BeES | -0.21 (-0.71) | 0.857(64.31) | 0.73 |
| Bank BeES | -0.21(-0.327) | 0.023(0.75) | 0.000 |
| PSU Bank BeES | 0.30(2.09) | 0.098(2.23) | 0.009 |
| Shariah BeES | -0.44(-3.27) | 0.05(0.668) | 0.002 |
| Kodak PSU Bank ETF | -0.337(-1.44) | 0.049(1.09) | 0.002 |
| Reliance Bank ETF | -4.09(-3.03) | 0.86(28.10) | 0.687 |
| Q Nifty | -1.49(-3.62) | 0.36(7.01) | 0.128 |
| UTI SUNDER | -2.49(-4.86) | 0.76(38.18) | 0.573 |

Source: Compiled from the Closing price and NAV of the Exchange Traded Funds in India.

**Table 4: Persistence of Premium or Discount of ETFs With Two Day Lags Value**

| ETFs | Alpha | β (PREDIS$_{t-1}$) | β (PREDIS$_{t-2}$) | R Square |
|---|---|---|---|---|
| Nifty BeES | -0.21(-4.55) | 0.158 (7.09) | 0.11(4.97) | 0.044 |
| Nifty Junior BeES | -0.23(-0.77) | 0.92(35.69) | -0.07(-2.93) | 0.736 |
| Bank BeES | -0.21(-0.32) | 0.023(0.74) | 0.014(0.451) | 0.000 |
| PSU Bank BeES | 0.34(2.38) | 0.11(2.54) | -0.14(-3.20) | 0.029 |
| Shariah BeES | -0.42(-3.00) | 0.048(0.634) | 0.049(0.648) | 0.005 |
| Kodak PSU Bank ETF | -0.348(-1.47) | 0.051(1.12) | -0.027(-0.59) | 0.003 |
| Reliance Bank ETF | -3.04(-2.18) | 0.749(14.13) | 0.143(2.63) | 0.692 |
| Q Nifty | -1.16(-2.80) | 0.28(5.23) | 0.22(4.04) | 0.169 |
| UTI SUNDER | -1.78(-3.58) | 0.535(18.45) | 0.295(10.15) | 0.610 |

Source: Compiled from the Closing price and NAV of the Exchange Traded Funds in India.

BeES, Shariah BeES, Reliance Bank ETF, Q Nifty, and UTI SUNDER are traded at significant discount level. And also, the closing price and NAV of the Nifty Junior BeES, Bank BeES, and Kodak PSU Bank ETF are statistically equal to zero on the current day. While considering the Beta in the Table 3 and Table 4, the results indicate that premium or discount of the Bank BeES, Shariah BeES, and Kodak PSU Bank ETF vanished within a day and premium or discount of the remaining of the ETFs persisted for the coming days .

## SUMMARY AND CONCLUSION

Thus, this research paper, by analyzing the premium or discount of the Exchange traded Funds in India found out that the ETFs are offering an arbitrage opportunity for the retail and institutional investors. Further, by applying simple regression, multiple regression and auto regression, the study elicited that the sample ETFs (except Kodak PSU Bank ETF) are traded at a discount in the Indian stock market.

This result instructs the retail and institutional investors to buy the Nifty BeES, Nifty Junior BeES, Bank BeES, Shariah BeES, Kodak PSU Bank ETF, Reliance Bank ETF, Q Nifty and UTI SUNDER from the stock exchange and sell them in the fund house. They may also buy the PSU Bank BeES from the fund house and sell it to the secondary market. As regards to the persistence of premium or discount, the premium or discount of the Bank BeES, Shariah BeES, and Kodak PSU Bank ETF vanished within a day and the premium or discount of the remaining ETFs existed for the coming days . This clearly highlights the arbitrage opportunity for ETFs and hence, the retail and institutional investors could evince interest in trading with ETFs and play a safe investment game.

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