

## THE PERFORMANCE OF INDIAN EQUITY FUNDS IN THE ERA OF QUANTITATIVE EASING

*Ömer Faruk Tan*, (research assistant)

MEF University, Istanbul, Turkey

### Abstract:

*This study aims to evaluate the performance of Indian equity funds between January 2009 and October 2014. This study period coincides with the period of quantitative easing during which the developing economies in financial markets have been influenced. After the global financial crisis of 2008 came a period of quantitative easing (QE), creating an increase in the money supply and leading to a capital flow from developed countries to developing countries. During this 5-year 10-month period, in which the relevant quantitative easing continued, Indian CNX500 price index yielded approximately 21% compounded on average, per annum. In this study, Indian equity funds are examined in order to compare these funds' performance within this period. Within this scope, 12 Indian equity funds are chosen. In order to measure these funds' performances, the Sharpe ratio (1966), Treynor ratio (1965), Jensen's alpha (1968) methods are used. Jensen's alpha is also used in identifying selectivity skills of fund managers. Additionally, the Treynor & Mazuy (1966) regression analysis method is applied to show the market timing ability of fund managers.*

**Keywords:** *Equity funds; performance evaluation; quantitative easing; Jensen's alpha*

### 1. Introduction:

Mutual fund performance has always become one of the most researched areas of finance studies. Using different technical measurement methods, these types of studies analyze fund performances of various markets from different perspectives. Especially, after the period of liberalization of the financial markets, mutual funds have gained much more significance among investors, resulting in various studies that have been carried out on performance evaluations. Mutual funds bring investors who share a common goal together. According to Deepak (2011), investors invest their money into capital market instruments such as shares, debentures and other securities. The returns from investments are equally shared among shareholders according to their investment ratio. Hence, mutual funds are proper investment and provide the chance to invest different professionally managed financial instruments. According to Rao (2006), diversification of the risk is the main objective of investing in a mutual fund. Diversified portfolios are created by mutual fund investments and fund managers take different level of risk in order to get maximum value from their investments. Therefore, when comparing and evaluating the investments, returns are measured by taking into account the risks involved in achieving the returns.

The global crises appeared in America in 2008 and later spread to other countries, affecting mainly the economies of Europe and America and their financial markets dramatically. The American and European economies went into recession and some major financial investment banks collapsed, such as Lehman Brothers. Also, in Europe, banking crises happened in many countries led by Portugal, Ireland, Spain, Greece, and Italy. This situation caused to lose of credibility of America and Europe in the eyes of investors and making investors turn towards other stock markets for investment purposes. To minimize the influence of the recession, the FED applied quantitative easing policy between December 2008 and October 2014. The FED bought huge quantities of government bonds and bills from the markets to enhance the money supply for the sake of encouraging the revival of the economy. Quantitative easing policy separates four terms QE1 (December 2008- June 2010), QE2 (November 2010- June 2011), QE3 (September 2012- October 2014) and finally QE4 (January 2013- October 2014). (Useconomy, 2014). During the period, huge amount of money inflow from developed countries to

developing countries experienced. Hence, in this paper, Indian equity funds are tried to analyze over the period from January 2009 to 31 October 2014 during the quantitative easing era. India is known one of the emerging markets and over the study period of 5 years-10 months; Indian CNX500 price index grew by 20.9% compounded annually on average. In the sample period, developed market indices S&P500, DAX, FTSE 100, CAC 40 yielded 15.1%, 12.1, 6.8% and 4.1% respectively. Indian CNX500 price index performed better performance than developed markets.

## 2. Literature Review

Beginning from the 1960s, there have been several studies carried out on mutual fund performance. Treynor (1965), Sharpe (1966) and Jensen (1968) are among those who measure fund performance related to risk and return measurements. Sharpe (1966) measured 34 open-ended mutual funds between 1954-1963 using the Sharpe ratio and Treynor ratio. As the result of the study, it has been found out that while 11 funds out of 34 show a better performance than the index, 23 funds underperform their benchmarks. Jensen (1968) examined 115 mutual funds - which were active between 1945-1964 – by using an alpha indicator that he generated. His alpha indicator shows the selectivity skills of fund managers. Based on his results, funds could not outperform the market performance, revealing that mutual fund managers, in general, did not have selective ability.

McDonald (1973) computed mutual funds invested between 1964 and 1969 by using the Treynor, Sharpe and Jensen measures. The study showed that there was a positive correlation between risk and return. Malkiel (1995) used the Jensen method to calculate the performance of American funds between the years 1972 and 1990. He revealed that mutual funds could not show positive excess return.

Dahlquist, Engström and Söderlind (2000) evaluated 201 Swedish mutual funds – including only domestic funds - from the period between 1993 and 1997. They found that regular equity funds seemed to over perform while bond and money market funds performed less. Furthermore, actively managed funds demonstrated better performance than passively managed funds.

With the aim of detecting the market timing ability of the fund managers, Treynor and Mazuy (1966) established the quadratic regression analysis method. They applied this method to 57 open-end mutual funds (25 growth funds and 32 balanced funds). They revealed only a single fund as having statistically significant market timing ability.

Henriksson and Merton (1981) and Henriksson (1984) developed both parametric and nonparametric statistical models to the test market timing ability of portfolios. Having been introduced by Henriksson and Merton (1981), the parametric and non-parametric tests in question were applied by Henriksson (1984) to evaluate the market timing ability of 116 open-end funds between 1968 and 1980 in the U.S. market. The results revealed that there wasn't any support for market timing ability. Moreover, Henriksson found an inverse relationship between selection ability and market timing ability.

Chang and Lewellen (1984) tested the market timing ability of 67 U.S. funds covering the period from 1971 to 1979 by using the Henriksson & Merton (1981) method. It was found that there were weak indications of fund manager market timing ability.

Gallo and Swanson (1996) tested 37 U.S. mutual funds by using the Treynor & Mazuy model for market timing, yet found no evidence of market timing of funds.

Christensen (2005) evaluated 47 Danish funds between January 1996 and June 2003. He found that fund managers did not have selectivity skills in general and, in terms of timing ability, the results were also negative, due to the fact that only two funds had significant timing ability.

In India, Sapar and Madava (2003) evaluated the performance of Indian Mutual Fund Schemes during the bear market between September 1998 – April 2002 using the Treynor, Sharpe, and Jensen methods, the Relative Performance Index (RPI), a risk-return analysis and Fama's measure. Of 269 schemes, 49 under performed, 102 were performed on par and 118 outperformed the market.

Sharad and Ranganatham (2005) evaluated Indian funds and separated them into public sector sponsored funds and private sector sponsored funds over a period between May 2002 and May 2005. They found that both funds did not differ statistically in terms of mean returns; whereas there were statistically significant differences between both funds in respect to average standard deviation, average variance, coefficient of variation (VAR) and residual variance (RV). Furthermore, RV had a direct impact on the Sharpe fund performance measure.

Rao (2006) computed 21 Growth plans and 21 Dividend plans in India during the period between April 2005 and March 2006. The study covered a 12-month period when the Indian stock market was generally bullish. The results showed that Growth funds were better than Dividend funds.

Duggimpudi, Abdou and Zaki (2010) evaluated the performance of 17 equity-diversified mutual funds in the Indian market over the last ten years. Two different overlapping period samples between 2000 and 2009 and between 2005 and 2009 were used. In this study, the Sharpe, Treynor and Jensen's alpha methods were applied and the results showed that 17 funds outperformed the markets.

Prajapati and Patel (2012) analyzed the mutual funds over the period from 2007 to 2011. According to their results, all funds demonstrate positive result during the period.

### 3. Methodology

#### 3.1. Methodology

In this study, it is tried to evaluate the performance of Indian equity funds. A total of 12 equity funds performances' are analyzed. In order to evaluate fund performance, the Sharpe (1966), Treynor (1965) and Jensen's alpha (1968) ratios are computed. Jensen's alpha method also shows the selectivity skills of fund managers. In order to test mutual fund managers' market timing ability, the Treynor & Mazuy (1966) is applied.

#### 3.2. Treynor Ratio

According to Kouris et al. (2011), the Treynor ratio is developed by Treynor in 1965 is the first measurement of mutual fund performances. It is calculated as the ratio of the excess return of the mutual fund divided by its beta (systematic risk) and is defined as:

$$T_i = (R_p - R_f) / \beta_p \quad (1)$$

where

$T_i$  = Treynor's performance index

$R_p$  = portfolio's return in a time period

$R_f$  = risk-free rate of return in a time period

$\beta_p$  = beta of the portfolio

### 3.3. Sharpe Ratio

According to Noulas & Lazaridis (2005), the Sharpe technique was settled in 1966 and is fairly similar to the Treynor technique. However instead of beta of the portfolio, Sharpe technique uses the standard deviation of the fund in its denominator. This technique computes the risk premium earned per unit of the total risk. The Sharpe value is calculated as below:

$$S_p = (R_p - R_f) / \sigma_p \quad (2)$$

where

$S_p$  = Sharpe Ratio

$R_p$  = the average rate of return for a fund

$R_f$  = the average risk-free return

$\sigma_p$  = the standard deviation of the fund.

The Sharpe ratio ( $S_p$ ) calculates the performance of its level of total risk. If the result of Sharpe ratio is higher, fund shows higher performance. (Duggimpudi, et. al., 2010).

### 3.4. Jensen's Alpha

As Jensen explained, "a portfolio manager's *predictive ability* – that is, his ability to earn returns through the successful forecast of security prices that are higher than those which we could presume given the level of his riskiness of his portfolio" (Jensen, 1968, p. 389)

Jensen's model can be written as:

$$R_{pt} - R_{ft} = \alpha_p + \beta_p (R_{mt} - R_{ft}) + e_{pt} \quad (3)$$

$\alpha_p$  = the excess return on the portfolio after adjusting for the market

$R_{pt}$  = the return on the portfolio  $p$  at time  $t$

$R_{ft}$  = the return on a riskless asset at time  $t$

$R_{mt}$  = the return on the market portfolio at time  $t$

$\beta_p$  = the sensitivity of the excess return on the portfolio  $t$  with the excess return on the market.

The sign of the alpha displays whether the portfolio manager are superior to the market after adjusting for risk. A positive alpha denotes better performance relative to the market, and a negative alpha designates poorer performance. (Mayo, 2011).

### 3.5. Treynor & Mazuy Regression Analysis

Investment managers may well beat the market, if they are able to adjust the composition of their portfolios in time when the general stock market is going up or down. That is, if fund managers believe the market is going to drop, they alter the composition of the portfolios they manage from more to less volatile securities. If they think the market is going to climb, they shift in the opposite direction. (Treynor & Mazuy, 1966).

Mutual fund managers may hold a higher proportion of the market portfolio if they are qualified to predict future market conditions and envisage the stock market as a bull market. On the other hand, mutual fund managers may hold a lower proportion of the market portfolio if they expect the market to underperform in the future. Treynor and Mazuy (1966) developed the following model to evaluate market-timing performance:

$$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,0}(R_{m,t} - R_{f,t}) + \beta_{i,1}(R_{m,t} - R_{f,t})^2 + \varepsilon \quad (4)$$

where  $\alpha_i$  is the timing-adjusted alpha, which represents the timing-adjusted selective ability of mutual fund managers. The quadratic term in equation (4) is the market timing factor and the coefficient of the market timing factor,  $\beta_{i,1}$ , represents mutual fund managers' market timing ability. If  $\beta_{i,1}$  is positive, mutual fund managers have superior market timing ability i.e., the investment portfolios of mutual funds are adjusted actively to well-anticipated changes in market conditions. A negative  $\beta_{i,1}$  implies that mutual fund managers do not exhibit market timing ability. (Chen et al., 2013).

### 3.5. Statistical Properties

In order to get reliable result; we need to check whether the model satisfies OLS assumptions. It is important to find to be best linear assumptions, which shows the lowest possible mean squared error, when applying OLS with the aim of estimating parameters. If tests show autocorrelation or heteroskedasticity within the regression, as a consequence the results will no longer be considered BLUE. Therefore, adjustments of data will be needed in order to obtain efficient and reliable estimators. In this study, Breusch-Pagan test is applied for heteroscedasticity and Breusch-Godfrey test is applied for autocorrelation .

### 3.6. Heteroscedasticity Test

When the variance of the errors are not constant and finite,  $\text{var}(e_t) \neq \sigma^2$  this will be of concern in the application of regression analysis, as the presence will make the statistical tests invalid. The case with heteroskedasticity will as a fact not imply biased OLS estimators, but will involve biased residuals. Consequently, the data will provide deceiving standard errors and our inferences might not be a correct. (Kolobaric&Khatabakhsh, 2012). In this study, it is applied Breusch-Pagan test. The Breusch-Pagan test is designed to detect any linear form of heteroskedasticity. In order to test whether this assumption holds, the following hypothesis should be tested:

Null Hypothesis: There is no heteroskedasticity (homoscedasticity)

Alternative Hypothesis: There is heteroscedasticity

### 3.7. Autocorrelation Test

There are several test for autocorrelation, but the most commonly are used the Durbin-Watson and the Breusch Godfrey test. In this study, it is used the Breusch Godfrey test instead of the Durbin-Watson test, because the Durbin-Watson test is used for the first order serial correlation, whereas the Breusch-Godfrey test is used for higher order serial correlation. Autocorrelation represents the similarity of a time series and a lagged version of itself. This assumption states that the errors should be uncorrelated in the time series regression. In statistical terms the model states that:  $\text{Corr}(u_t, u_s | X) = 0$ , for all  $t \neq s$ . In order to test whether this assumption holds, the following hypothesis should be tested:

Null Hypothesis: No serial correlation

Alternative Hypothesis: Serial correlation (autocorrelation)

### 3.8.Data

In this study, the mutual fund performances of 12 Indian equity funds are analyzed using the Sharpe (1966), Treynor (1965) and Jensen's alpha (1968) ratios. Jensen's alpha also displays the selectivity skills of fund managers. In order to test mutual fund managers' market timing ability, the Treynor&Mazuy (1966) method is applied. The time period is between January 2009 and October 2014. Weekly returns of funds are used and 304 weeks are observed for this study. All data are taken from the Thomson Reuters DataStream.

### 3.9.Selection of Equity Funds

According to the Investment Institute Database (2014:Q3), there are 728 mutual funds in India. "Indian mutual funds have different types of mutual fund schemes such as open-ended, close ended, interval (based on structure), growth/equity, income, balanced and money market schemes (based on investment objectives). There are also other schemes such as tax saving schemes, special schemes that provide the needs of the financial position, risk tolerance and return expectations." (Duggimpudi et al., 2010, p.77). In this study, only growth/equity funds are considered because they carry risk and should be invested with at least 65% equity or equity-related securities. Of these funds, only equity funds that are managed by the largest asset management companies and have a net asset value of more than 1 billion rupees are analyzed. In the study period, it was disregarded if a fund was closed, newly established or had merged with another fund. Funds that had less than 65% equity shares in their portfolio were also not considered. In total, 12 equity funds were left to work with. Tables 1 and 2 indicate the net asset value of investment fund companies and the equity shares of the selected funds, respectively.

Table 1. Net Asset Value of Investment Fund Companies in India

Mutual Fund Company	Assets Under Management (rupee)
HDFC Mutual Fund	14.183.476.070
ICICI Prudential Mutual Fund	12.776.072.850
Reliance Mutual Fund	12.338.634.120
Birla Sun Life Mutual Fund	10.269.015.040
UTI Mutual Fund	8.324.991.040
SBI Mutual Fund	7.353.032.480
IDFC Mutual Fund	4.585.077.130
DSP BlackRock	3.865.156.590
Tata Mutual Fund	2.454.383.580
L & T Mutual Fund	2.067.270.560
Sundaram Mutual	1.894.355.510
Religare Invesco Mutual Fund	1.766.735.330

This table is taken from [https://www.baanmoney.com/mutual\\_funds/rankings](https://www.baanmoney.com/mutual_funds/rankings) and

<https://www.amfindia.com/net-asset-value>

Table 2. Indian Equity Funds

Fund Name
ICICI Prudential Dynamic Plan Growth
UTI Equity Growth Fund
Religare Invesco Growth Fund
L&T Equity Growth
HDFC Equity Growth
DSP Blackrock Equity Growth
SBI Magnum Equity Growth
Reliance Growth Fund
Tata Pure Equity Growth
Birla Sun Life Equity Growth
IDFC Equity Fund
Sundaram Growth Fund

### 3.10. Returns on Funds

Logarithmic returns of funds were computed over weekly price indices of funds. For the study, 304 weeks of data between January 9, 2009 and October 31, 2014 are used.

$$R_p = \ln (P_t / P_{t-1}) \quad (6)$$

where

$R_p$  = return on the fund

$P_t$  = price of the fund at week  $t$

$P_{t-1}$  = price of the fund at week  $t-1$

### 3.11. Benchmark

In this study, the CNX500<sup>1</sup> price index is used as a benchmark. A weekly return of the CNX500 is used.

$$R_m = \ln (P_{mt} / P_{m,t-1})$$

where

$R_m$  = returns on the JSE

$P_{mt}$  = value of the CNX500 Price Index on week  $t$

$P_{m,t-1}$  = value of the CNX500 Price Index on week  $t-1$

### 3.12. Risk-free Rate

In this study, 364-Day T-bills are used as a risk-free rate and are sourced from the Thomson Reuters DataStream. Prajapati & Patel (2012) used the same measures in their studies.

<sup>1</sup> The CNX Index represents about 96.42% of the free float market capitalization of the stocks listed on the National Stock Exchange on June 30, 2014. <http://www.nse-india.com>

## 4. Empirical Results

### 4.1. Descriptive Statistics of Indian Funds

Descriptive statistics of Indian equity funds, benchmarks and risk-free rates are given in Table 3. The average column indicates returns on funds, benchmarks and risk-free rates. Other than the Sundaram Growth Fund and the Indian 1-Year T-Bill, the average returns of all funds are higher than the CNX500 price index. The Skew column displays the skew of equity funds and the corresponding value of their benchmarks. All funds and benchmark are negatively skewed which denotes a distribution with an asymmetric tail extending toward more negative values. Only the 1-Year T-Bill is skewed positively, which indicates a distribution with an asymmetric tail extending toward more positive values. All funds and benchmarks have positive kurtosis, which infers typical heavy tailed financial distributions and risk-free rate has negative kurtosis, which implies a relatively flat distribution. The R column depicts the correlation between funds and their benchmarks. The average correlation of funds and their benchmarks is 0.95925, which means that there is a strong positive correlation. The L & T Equity Growth Fund has the highest correlation (0.98080) and the Religare Invesco Growth Fund has the lowest correlation (0.90691). The Standard Deviation column shows volatility of equity funds, benchmarks and risk-free rates. Standard deviation of the HDFC Equity Growth Fund, the Sundaram Growth Fund and the Birla Sun Life Equity Growth Fund are higher than the CNX500, which makes them more volatile than their benchmark. The last column exhibits betas of equity funds, which measure the systematic risks of the funds. All funds' betas are less than 1, implying that all 12 funds carry less risk compared to the benchmark CNX500 index.

Table 3: Descriptive Statistics of Indian Funds

Fund Name	Average	Skew	Kurtosis	R	Std, dev,	Beta
Birla Sun Life Equity Growth	0,00386	0,5152	4,41315	0,97728	0,02849	0,98023
DSP Blackrock Equity Growth	0,00394	0,67331	4,38487	0,94923	0,02626	0,87807
HDFC Equity Growth	0,00455	0,43879	3,74740	0,96286	0,02907	0,9857
ICICI Prudential Dynamic Plan Growth	0,00411	0,20379	1,70031	0,95479	0,02149	0,72296
IDFC Equity Fund	0,00346	0,55093	3,17477	0,93411	0,0282	0,92766
L & T Equity Growth	0,00411	0,37458	2,39007	0,9808	0,0244	0,84316
Reliance Growth Fund	0,00393	0,53665	4,62021	0,95508	0,02804	0,94332
Religare Invesco Growth Fund	0,00358	0,44458	2,33631	0,90691	0,01884	0,6023
SBI Magnum Equity Growth	0,00392	0,90585	6,72613	0,96966	0,0261	0,89136
Sundaram Growth Fund	0,0029	0,12332	2,50491	0,97365	0,02857	0,97924
Tata Pure Equity Growth	0,00358	0,49361	4,08968	0,97107	0,02448	0,83726
UTI Equity Fund-Growth	0,00421	0,3432	1,55537	0,97558	0,02297	0,78954
CNX 500	0,0034	0,495	3,75628		0,0284	
Indian T-Bill 1 year	0,00134	-0,80741	-0,7711		0,00031	

#### 4.2. Results of the Sharpe Ratio for India

Table 4 shows the performance of the Sharpe ratio. A higher Sharpe ratio implies that funds have a better performance. The ICICI Prudential Dynamic Plan Growth, the UTI Equity Fund Growth and the Religare Invesco Growth Fund have the highest Sharpe ratios. The Sundaram Growth Fund, the IDFC Equity Fund and the Birla Sun Life Equity Growth have the lowest Sharpe ratios.

Table 4. Results of the Sharpe Ratio for India

Fund Name	Sharpe	Rank
ICICI Prudential Dynamic Plan Growth	0.12902	1
UTI Equity Growth Fund	0.12477	2
Religare Invesco Growth Fund	0.11899	3
L&T Equity Growth	0.11353	4
HDFC Equity Growth	0.11031	5
DSP Blackrock Equity Growth	0.09891	6
SBI Magnum Equity Growth	0.09866	7
Reliance Growth Fund	0.09249	8
Tata Pure Equity Growth	0.09139	9
Birla Sun Life Equity Growth	0.08827	10
IDFC Equity Fund	0.07528	11
Sundaram Growth Fund	0.05465	12

#### 4.3. Results of Treynor Ratio for India

Table 5 displays the performance of the Treynor ratio. A fund with a higher Treynor ratio indicates that the fund has a better risk-adjusted return compared to a fund with a lower Treynor ratio. A higher Treynor ratio implies that funds have better performances. The ICICI Prudential Dynamic Plan Growth, the UTI Equity Fund Growth and the Religare Invesco Growth Fund have the highest Treynor ratios. The IDFC Equity Fund, the Birla Sun Life Equity Growth and the Sundaram Growth Fund have the lowest Treynor ratios.

Table 5. Results of the Treynor Ratio for India

Fund Name	Treynor	Rank
ICICI Prudential Dynamic Plan Growth	0.00384	1
Religare Invesco Growth Fund	0.00372	2
UTI Equity Fund-Growth	0.00363	3
L&T Equity Growth	0.00329	4
HDFC Equity Growth	0.00325	5

Table 5. Continue

DSP Blackrock Equity Growth	0.00296	6
SBI Magnum Equity Growth	0.00289	7
Reliance Growth Fund	0.00275	8
Tata Pure Equity Growth	0.00267	9
Birla Sun Life Equity Growth	0.00257	10
IDFC Equity Fund	0.00229	11
Sundaram Growth Fund	0.00159	12

#### 4.4. Results of Jensen's alpha for India

Table 6 shows the results of Jensen's alpha measure that indicates the selectivity skills of fund managers. Fund managers have either a higher performance or a lower performance relative to the market. Eleven of the 12 funds have positive alphas and among them 7 are statistically significant. The DSP Blackrock Equity Growth is statistically significant at the 10% level; the Religare Invesco Growth Fund and SBI Magnum Equity Fund are statistically significant at the 5% level; the ICICI Prudential Dynamic Plan Growth, the UTI Equity Fund Growth, the Religare Invesco Growth Fund and the L & T Equity Growth Fund are statistically significant at the 1% level. Only the Sundaram Growth Fund has a negative alpha. It can be interpreted that Indian fund managers, in general, had selectivity skills during the quantitative easing era term. Test results of heteroskedasticity and autocorrelation are available on Table 7.

Table 6. Results of Jensen's alpha for India

Fund Name	Jensen's alpha	t-stat	p-value
ICICI Prudential Dynamic Plan Growth***	0,00129	3,49453	0,00055
UTI Equity Growth Fund***	0,00124	4,27385	0,00003
HDFC Equity Growth***	0,00118	2,60977	0,00951
L & T Equity Growth***	0,00104	3,77797	0,00019
Religare Invesco Growth Fund**	0,001	2,19174	0,02916
DSP Blackrock Equity Growth*	0,00079	1,66388	0,09717
SBI Magnum Equity Growth**	0,00074	2,01898	0,04437
Reliance Growth Fund	0,00065	1,36660	0,17277
Tata Pure Equity Growth	0,00052	1,53034	0,12698
Birla Sun Life Equity Growth	0,0005	1,43494	0,15234
IDFC Equity Fund	0,00022	0,37198	0,71017
Sundaram Growth Fund	-0,00045	-1,20616	0,2287

Significance levels: \* indicates 10%, \*\* indicates 5%, \*\*\* indicates 1%

Table 7 indicates the results of heteroskedasticity test (Breusch-Pagan), autocorrelation test (Breusch Pagan Serial Correlation) and normality test (Breusch Pagan. Heteroscedasticity test assumption means that there is no constant variance. If the p-value is smaller than %5 level; then we reject the null hypothesis and there is heteroscedasticity. P-values of DSP Blackrock Equity Growth, HDFC Equity Growth, Reliance Growth Fund and SBI Magnum Equity Growth are smaller than %5 levels. For autocorrelation test, this test indicates that the errors should be uncorrelated in the time series regression. If the p-value is smaller than %5 level; then we reject the null hypothesis and there is serial correlation. P-values of Birla Sun Life Equity Growth, IDFC Equity Fund and Tata Pure Equity Growth are smaller than %5 levels.

	Heteroskedasticity Test	Autocorrelation Test
	Breusch-Pagan	Breusch-Godfrey Serial Correlation
	<b>p-value</b>	<b>p-value</b>
<b>Birla Sun Life Equity Growth</b>	0,6362	0,0363*
<b>DSP Blackrock Equity Growth</b>	0,0150*	0,1352
<b>HDFC Equity Growth</b>	0,0283*	0,3353
<b>ICICI Prudential Dynamic Plan Growth</b>	0,4045	0,0329
<b>IDFC Equity Fund</b>	0,1134	0,0000*
<b>L&amp;T Equity Growth</b>	0,0508	0,4656
<b>Reliance Growth Fund</b>	0,0123*	0,3095
<b>Religare Invesco Growth Fund</b>	0,2561	0,5208
<b>SBI Magnum Equity Growth</b>	0,0001*	0,0802
<b>Sundaram Growth Fund</b>	0,9202	0,0617
<b>Tata Pure Equity Growth</b>	0,1461	0,0282*
<b>UTI Equity Growth Fund</b>	0,2729	0,2137
Significance levels: * indicates %5 level		

#### 4.5. Results of the Treynor & Mazuy Regression Analysis for India

The Treynor & Mazuy (1966) analyzes the market timing ability of fund managers. If fund managers believe that the market is going up, they change their portfolio composition from less volatile to high volatile securities. When the market is going down, they shift their portfolio composition from high volatile to less volatile securities. If fund managers have market timing ability, they create their portfolios according to their estimates of the tendency of the markets. Table 7 denotes the results of the Treynor & Mazuy (1966) method. Eight out of the 12 funds have positive results, but only the SBI Magnum Equity Growth is both positive and statistically significant at the 1% level. The ICICI Prudential Dynamic Plan Growth is statistically significant at the 10% level and the Sundaram Growth Fund is statistically significant at the 1% level. Consequently, fund managers did not have market timing ability during the quantitative easing policy era. Four funds have a negative market timing ability. Test results of heteroskedasticity and autocorrelation are available on Table 9.

Table 9 indicates the results of heteroskedasticity test (Breusch-Pagan), autocorrelation test (Breusch Pagan Serial Correlation) and normality test (Breusch Pagan. Heteroscedasticity test assumption means that there is no constant variance. If the p-value is smaller than %5 level; then we reject the null hypothesis and there is heteroscedasticity. P-values of Birla Sun Life, DSP Blackrock, HDFC Equity Growth, ICICI Prudential Dynamic, L&T Equity Growth, Reliance, Religare Invesco, SBI Magnum, Sundaram and UTI Equity are smaller than %5 levels. For autocorrelation test, this test indicates that the errors should be uncorrelated in the time series regression. If the p-value is smaller

than %5 level; then we reject the null hypothesis and there is serial correlation. P-values of Birla Sun Life, ICICI Prudential, IDFC Equity, L&T Equity, SBI Magnum and Tata Pure Equity are less than %5 levels.

Table 8. Results of the Treynor & Mazuy Regression Analysis for India

Fund Name	T&M	t-stat	p-value
SBI Magnum Equity Growth***	0,72864	3,97980	0,00009
DSP Blackrock Equity Growth	0,31648	1,30499	0,19289
Tata Pure Equity Growth	0,12662	0,73637	0,46208
IDFC Equity Fund	0,10798	0,36448	0,71575
Birla Sun Life Equity Growth	0,09274	0,52213	0,60196
Reliance Growth Fund	0,08542	0,3493	0,72711
HDFC Equity Growth	0,07225	0,31284	0,75462
Religare Invesco Growth Fund	0,02882	0,12324	0,902
L & T Equity Growth	-0,21318	-1,52602	0,12805
UTI Equity Fund Growth	-0,23444	-1,58402	0,11424
ICICI Prudential Dynamic Plan Growth*	-0,34777	-1,85942	0,06394
Sundaram Growth Fund***	-0,68809	-3,66860	0,00029

Significance levels: \* indicates 10%, \*\* indicates 5%, \*\*\* indicates 1%

Table 9: Test Results for Treynor&Mazuy Regression Analysis

	Heteroskedasticity Test	Autocorrelation Test:
	Breusch-Pagan	Breusch-Godfrey Serial Correlation
	p-value	p-value
Birla Sun Life Equity Growth	0,0045*	0,0433*
DSP Blackrock Equity Growth	0,0004*	0,5946
HDFC Equity Growth	0,0362*	0,4851
ICICI Prudential Dynamic Plan Growth	0,0078*	0,0142*
IDFC Equity Fund	0,113	0,0000*
L&T Equity Growth	0,0000*	0,0194*
Reliance Growth Fund	0,0000*	0,3253
Religare Invesco Growth Fund	0,0000*	0,633
SBI Magnum Equity Growth	0,0025*	0,0448*
Sundaram Growth Fund	0,0144*	0,0604
Tata Pure Equity Growth	0,0833	0,0273*
UTI Equity Growth Fund	0,0000*	0,3069
Significance level: * denotes %5 level		

## 5. Conclusion

In this study, Indian equity funds performances' are analyzed over the period from 09 January 2009 to 31 October 2014. During this quantitative easing policy term, Fed increased money supply in order to lower the interest rates and

<http://ijcf.ticaret.edu.tr>

this excess of money in financial markets made a significant contribution to capital influx from developed countries to developing countries. The study period coincides with the QE era when stock market sizes have improved extremely. India is considered as one of the developing markets and during the study period 5 years-10 months, Indian CNX500 price index stock market surpassed developed stock market indices. Indian equity funds' performances were analyzed in this study by using Sharpe ratio (1966), Treynor ratio (1965), Jensen alpha (1968) and Treynor&Mazuy (1966) regression analysis method. In order to find fund performances, it has been utilized Sharpe (1966) and Treynor (1965) ratio. Higher Sharpe and Treynor ratio imply funds have better performances. In general, these risk-adjusted performance ratios give similar rankings of mutual funds. ICICI Prudential Dynamic Plan Growth, UTI Equity Growth Fund, Religare Invesco Growth Fund have the highest ratios for both. Jensen's alpha (1968), Treynor&Mazuy (1966) regression analysis method is used for determining selectivity skills and market timing ability of fund managers, respectively. In this work, it is revealed that in the era of quantitative easing, Indian fund managers had selectivity skills, because 7 of the 12 funds are positively statistically significant. On the other hand, Furthermore, Treynor&Mazuy (1966) regression analysis shows that over the same period fund managers did not also have market timing ability. For Treynor&Mazuy regression analysis (1966), solely SBI Magnum Equity Growth Fund is statistically significant. It can be deduced that although Indian fund managers had selectivity skills, but they did not have market ability in the era of quantitative easing. In future, this study can be developed using persistence analysis. To the best of knowledge this is the first study that considers how Indian funds performed in the recent quantitative easing era.

## References

- Association of mutual funds in India. (2014), "Net asset value of Indian mutual funds", available at <https://www.amfindia.com/net-asset-value> (accessed 22 October 2014).
- Baan Money. (2014), "Mutual fund rankings" available at [https://www.baanmoney.com/mutual\\_funds/rankings](https://www.baanmoney.com/mutual_funds/rankings) (accessed 21 October 2014).
- Cesari, R., & Panetta, F. (2002). "The performance of Italian equity funds", *Journal of Banking and Finance*, 26(1), 99-126.
- Chang, E., & Lewellen, W. (1984), "Market timing and mutual funds investment performance", *Journal of Business*, 57, 57-72.
- Chen, D., Gan, C., & Hu, B. (2013), "An empirical study of mutual funds performances in China", available at <http://ssrn.com/abstract=2220323> (accessed 15 November 2014)
- Christensen, M. (2005), "Danish mutual fund performance: Selectivity, market timing and persistence", Working Paper, Department of Accounting, Finance and Logistics, Aarhus School of Business, 1-37.
- Dahlquist, M., Engström, S., & Söderlind, P. (2000), "Performance and characteristic of Swedish mutual funds. *Journal of Financial and Quantitative Analysis*, 35, 409-423.
- Deepak, A. (2011), "Measuring Performance of Indian Mutual Funds", available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1311761](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1311761) (accessed 15 November 2014).
- Duggimpudi, R. R., Abdou, H. A., & Zaki, M. (2010), "An investigation of equity diversified mutual funds: The case of Indian market", *Investment Management and Financial Innovations*, 7(4), 77-84.
- Gallo, J. G., & Swanson, P. E. (1966), "Comparative measures of performances for U.S. – based internationally equity mutual funds. *Journal of Banking and Finance*," 20, 1636-1650.
- Henriksson, R. D. (1984), "Market timing and mutual fund performance: An empirical investigation". *The Journal of Business*, 57(1), 73-96.
- Henriksson, R.D., & Merton, R.C. (1981), "On market timing and investment performance. II. Statistical procedures for evaluating forecasting skills", *The Journal of Business*, 54(4), 513-533.
- Investment company institute (ICI) (2015), "Unit investment data", <http://www.ici.org/research/stats> (accessed 15 February 2015).
- Jensen, M.C. (1968), "The performance of mutual funds in the period 1945-1964", *The Journal of Finance*, 23(2), 389-416.
- Kolobaric, A. & Khatabakhsh, P. (2012), "Performance of hedge funds in the European market". Unpublished master's thesis. Lund University School of Management, Sweden, Lund.

- Kouris, A., Beneki, C., Adam, M., & Botsaris, C. (2011), "An assessment of the performance of Greek mutual equity funds selectivity and market timing", *Applied Mathematics Sciences*, 5(4), 159-171.
- Malkiel, B. G. (1995), "Returns from investing in equity funds: 1971-1991", *Journal of Finance*, 50, 549-572.
- Mayo, H. B. (2011), *Introduction to Investments* (10<sup>th</sup>. edition), Southwestern Cengage, Mason, USA.
- McDonald, J.G. (1973), "French mutual fund performance: Evaluation of internationally-well diversified portfolios", *The Journal of Finance*, 28(5), 1161-1180.
- Noulas, G., Papanastation, J. A., & Lazaridis, J. (2005), "Performance of mutual funds", *Managerial Finance*, 3(12), 101-112.
- Prajapati, K. P., & Patel, M. K. (2012), "Comparative study on performance evaluation of mutual fund schemes of Indian companies", *Journal of Arts, Sciences & Commerce*, 3(3), 47-59.
- Rao, D. N. (2006), "Investment Styles and Performance of Equity Mutual Funds in India", available at <http://ssrn.com/abstract=922595> (accessed 15 November 2014).
- Sapar, N. R. & Madava, R. (2003), "Performance evaluation of Indian mutual funds, available at <http://ssrn.com/abstract=433100> or <http://dx.doi.org/10.2130/ssrn.433100>. (accessed 12 January 2015).
- Sharad, P. & Ranganatham, M. (2005), "Characteristics and performance evaluation of selected mutual funds in India", available at <http://ssrn.com/abstract=876402> or <http://dx.doi.org/10.2139/ssrn.876402> (accessed 16 November 2014).
- Sharpe, W.F. (1966), "Mutual fund performance", *Journal of Business*, 34, 119-138.
- The National Stock Exchange. (2014), "CNX500 Price Index", available at [http://www.nseindia.com/products/content/equities/indices/cnx\\_500.htm](http://www.nseindia.com/products/content/equities/indices/cnx_500.htm) (accessed 25 October 2015).
- Treynor, J.L. (1965), "How to rate management of investment funds", *Harvard Business Review*, 43(1), 63-75.
- Treynor, J.L., & Mazuy, K.K. (1966), "Can mutual funds outguess the market?", *Harvard Business Review*, 44, 131-136.
- "What is quantitative easing? Definition and explanation", available at <http://useconomy.about.com/od/glossary/g/Quantitative-Easing.htm> (accessed 23 January 2015).