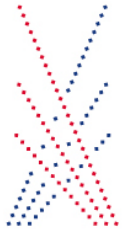


BRITISH ACADEMY
OF MANAGEMENT

BAM
CONFERENCE

3RD-5TH SEPTEMBER

ASTON UNIVERSITY BIRMINGHAM UNITED KINGDOM

This paper is from the BAM2019 Conference Proceedings

About BAM

The British Academy of Management (BAM) is the leading authority on the academic field of management in the UK, supporting and representing the community of scholars and engaging with international peers.

http://www.bam.ac.uk/

Does Active Return of Indian Mutual Funds Maximize Investor's Return?

Dr. Debaditya Mohanti
Assistant Professor

Management Development Institute (MDI) Murshidabad, India

Correspondence: MDI (Management Development Institute), Kulori, P.O. - Uttar Ramna, P.S. - Raghunathganj, Dist. – Murshidabad, West Bengal, India -742235

E-mail: debaditya_mohanti@yahoo.co.in

Contact Number: 9177541727, 9426162615

Does Active Return of Indian Mutual Funds Maximize Investor's Return?

Abstract

The purpose of the present study is to examine the investment style of the large-cap equity mutual funds in India using 'Style-Exposure' analysis proposed by Sharpe (1992). The study uses the constrained quadratic optimization factor model over a period from January 2011 to April 2015. To assess the dynamic drift in the style of a fund, a rolling-period exposure style analysis of the funds have been carried out by using a thirty six month rolling period window. The results of the study show that the fund managers exhibit some level of active management and also depicted a good selection capability.

Keywords: *Return-Based Style Analysis; Rolling-Period Exposure Analysis; Style Benchmarks; Large-cap Equity Mutual Funds.*

Extended Summary

While investing in mutual funds made it possible for retail investors to cherish the benefits of diversification and competencies of fund managers however, these benefits have not been without costs. Therefore, investors whether retail or institutional must scrutinize and evaluate the performances of various mutual funds particularly where the investments have been made in order to create the most effective asset mix. The purpose of the present study is to examine the investment style of the large-cap equity mutual funds in India using 'Style-Exposure' analysis proposed by Sharpe (1992). The study uses the constrained quadratic optimization factor model on the monthly returns of large-cap Indian equity mutual funds and their relevant style indices for analysing the investment style and stock picking ability of the fund managers over a period from January 2011 to April 2015. To capture the style of these funds, eighteen mutually exclusive domestic and international asset classes have been taken as the style benchmarks in the present study.

Further, to assess the dynamic drift in the style of a fund, a rolling-period exposure style analysis of the funds have been carried out by using a thirty six month rolling period window computed monthly. The study analyses the selection capability of each of the fund manager by computing a mean statistics of excess active return of the funds referred as 'Mean Selection Return'. The results of the study show that the fund managers exhibit some level of active management rather than passively tracking the style benchmarks and also depicted a good selection capability. However, results also portray that active management and good selection skills are in conjunction with the higher expense ratio of these funds. Further, the rolling-period exposure analysis displayed a good amount of style consistency among all these mutual funds over the given period of time.

I. Introduction

The past two decades of Indian capital market has seen a dramatic change in its functioning, one of the important is the surge in the investment by institutional bodies in the direct holdings of corporate equities and the corresponding decline in the direct investment by retail investors. The primary reason for such surge in the institutional holding is due to the rapid growth of mutual fund agencies. Compared to 1993 where Indian mutual funds held an asset under management of INR 470.04 billion, the mutual funds in 2014 held more than INR 8800 billion. The imposing growth of Indian mutual fund industry is mainly attributed to following factors; increase in the household savings, launching of innovative hybrid products, robust regulatory framework, effective campaigns of investors' education, aggressive distribution and encouraging tax policies. While investing in mutual funds made it possible for retail investors to cherish the benefits of diversification and competencies of fund managers however, these benefits have not been without costs. Therefore, investors whether retail or institutional must scrutinize and evaluate the performances of various mutual funds particularly where the investments have been made in order to create the most effective asset mix and this brings the unseen agency cost. The two important questions that arise while evaluating the performance of mutual funds are; first is the consistency of fund's asset allocations with its prescribed investment style and second is to know the ability of the fund manager to beat the benchmarks assigned by its investment style.

The investment style of a mutual fund refers to a certain combination of passive benchmark indexes that would have closely imitated the actual performance of the mutual fund over a particular phase. The investment style analysis (or 'style analysis') is used by many financial advisors as a criterion for selecting the mutual funds, fund managers also utilize style analysis

for classifying and constructing investment portfolios, further academicians also employ style analysis to evaluate the performance and observe the style drifts in various funds. Till date, there are two main approaches of style analysis. The first is Portfolio-based style analysis (PBSA), which is a 'bottom up approach' where the style of a fund is measured by aggregating the characteristics of assets it contains at various point in time over a specified period. Under this approach the securities held in the fund are examined and categorized into different styles across the concerned period. Once the securities are mapped over a sufficient period of time, an estimation of average fund's style can be measured. However this approach requires two sets of information (Kaplan 2003), the first is the categorized database of the securities where each category contains securities of similar characteristics. The second information that is required is about the security holdings in each fund at different points in time over the concerned period. As these data are difficult to obtained, therefore the PBSA is considered to be an expensive and time consuming approach. The second approach the Return-based style analysis (RBSA), which was first introduced by Sharpe (1992), has gained tremendous popularity in recent years. The RBSA helps in identifying the investment style of the fund by comparing the returns of the fund to the returns of asset mix style of the performance benchmark and thus, enable the investors to assess how well the fund has performed relative to its style benchmarks and how well it provides the diversification benefits to the investors. Although the investment style analysis is considered to be an important exercise, however the choice of measurement of style between PBSA and RBSA is always a matter of controversy.

Most of the academic studies on the performance evaluation of the mutual funds using investment style analysis have been done in the context of developed countries like, US and European countries (Daniel, Grinblatt, Titman and Wermers, 1997; Fung and Hsieh, 1997,

1998; Bogle, 1998; Chan, Chen and Lakonishok, 1999; Wermers, 2000; Dor and Jagannathan, 2002; Kaplan, 2003; Brown and Harlow, 2004; Swinkels and Tjong-A-Tjoe, 2007; Harlow, Brown and Zhang, 2011). The results of these studies, in general, support the value of active management of mutual funds and revealed that the investment styles of mutual funds are well in line with their defined investment objectives. However, such empirical studies are scarce in the context of Indian mutual funds (Guha Deb, Banerjee and Chakrabarti, 2007). Thus, the present study contributes to the literature by evaluating the performance of top five large-cap equity funds of different mutual fund agencies in India in terms of consistency in the investment style and the stock selection capability of the fund managers using RBSA approach proposed by Sharpe (1992). Further, the stock selection skills of fund managers are evaluated with respect to management expenses which give a new dimension to the evaluation of active performance of these funds.

The remaining portion of the research paper is organized into four main sections. In section II, review of literature along with a brief overview of the underlying theory behind portfolio-based and returns-based style analysis has been discussed. Section III, follows the description of the data and style benchmarks, and also, discusses the methodology to perform the style analysis. In section IV, results of style analysis and empirical evidences about the style consistency of the mutual funds over the period using the methodology of rolling-period exposure style analysis are presented and lastly, the paper concluded in section V.

II. Review of Literature and Theoretical Framework

The performance evaluation of any investment mainly revolves around three important questions; first is how much return was earned on the investment, second is how the return was earned i.e., what was the average asset mix of the portfolio and third is the what risks were taken during the course of investment. Although, the performance evaluation is an ex-post approach i.e., backward looking, however, the results obtained from it is expected to facilitate the future decision making process (ex-ante approach). It is a well recognized fact that in the process of performance evaluation the return on the investment shall not be assessed in isolation, the return must be evaluated after adjusting for risk.

In case of mutual funds this can be done simply by comparing the returns of the fund with the returns of other funds with similar risk characteristics for example, comparing the returns of mutual funds within each category like, large-cap funds, small-cap funds, balanced funds, money market funds and so on. However, such peer group comparisons are not free from biasness. Bailey (1992) and Ankrim (1998) have recognized several limitations that undermine the performance evaluation technique using peer group comparison, some of these are classification bias, composition bias and survivorship bias. Classification bias arises from classifying each fund under pre-specified categories like growth or balanced, however, it is commonly seen among the fund managers that they use different mix of styles while investing and therefore, there are high chances that the funds may be incorrectly classified under pre-specified category. Composition bias results from higher or lower concentration of specific type of funds in the database which may bias the evaluation process by either lifting up or down the bar of evaluation. Survivorship bias is created because of the fact that the poorly performed funds generally tend to either merged with other funds or get eliminated

and therefore, no longer available in database. Elton, Gruber and Blake (1996) in their study on performance evaluation of mutual funds in US found that survivorship bias is greater in small size mutual funds rather than larger funds because of higher chances of failure of small size funds. In their study they defined survivorship bias as an average alpha of surviving funds minus average alphas of all the funds, where, alpha is the risk adjusted return of the funds over the benchmark index of S&P 500.

In order to overcome the above problems particularly, the classification bias, many quantitative approaches of risk adjusted performance evaluation were introduced using mean-variance criteria. William Sharpe (1966) proposed Sharpe's ratio of reward to risk for the performance evaluation of the portfolio, where, reward is measured by taking the excess return over risk-free rate of return and risk is estimated by taking the standard deviation of the portfolio returns. However, over the years of research it has been seen that Sharpe's ratio has few shortcomings. Miller and Gehr (1978) recorded an upward bias of 9.6 percent for a sample size of ten and found that Sharpe's ratio does faces a problem of sample size bias. Lehmann and Timmerman (2007) proposed that a portfolio shall not be compared with other portfolio simply on the basis of higher Sharpe's ratio because a portfolios' efficiency is dependent on the portfolios' alpha, residual variances and covariance rather than mean-variance ratio of portfolios' return. Further, it has been seen that the differences in the value of Sharpe's ratio cannot be economically explained. Treynor (1965) suggested another variant of reward to risk ratio which is known as Treynor's measure. The Treynor's measure is very similar to Sharpe's ratio except the risk is estimated by measuring the beta of the portfolio return. Another popular measure of performance evaluation which is proposed by Michael Jensen (1968) is Jensen's measure. Jensen's measure is the intercept obtained by regressing excess return of the portfolio on the excess return of the benchmark index. Roll

(1978) found that the main shortcoming of Jensen's measure is the choice of benchmark index. Roll showed that a poor choice of index would hamper the process of performance evaluation and create a bias in the assessment. Eugene Fama (1972) has provided an analytical framework that allows a detailed breakdown of a fund's performance into the source or components of performance. This is known as Fama decomposition of total return. Fama decomposed the total return on a portfolio into four components namely; (i) Riskless rate, (ii) Return from market risk, (iii) Return from diversifiable risk and, (iv) Return from pure selectivity. The return from pure selectivity is really the additional return obtained by a portfolio manager for his superior stock selection ability. It is the return earned over and above the return mandate by the total risk of the portfolio as measured by standard deviation. Mathematically, this can be calculated as the difference between the actual return on a portfolio and the return mandate by its total risk. This is known as *Fama's net selectivity measure*. The decomposition of total return is useful in identifying the different skills involved in active portfolio management. A portfolio manager who attempts to earn a higher return than the market return assumes higher risk and depends on his superior stock selection ability to achieve the higher return. If he is successful, the return due to pure selectivity would be positive.

The major issue with the above traditional methods is none of these techniques require the information about the composition of the portfolio for the purpose of performance evaluation. To resolve the problem of portfolio composition bias, one of the widely used methods is Portfolio-based style analysis (PBSA). Under this approach the securities held in the fund are examined and categorized into different styles across the concerned period. Once the securities are mapped over a sufficient period of time, an estimation of average fund's style can be measured. However, as mentioned earlier the Portfolio-based style analysis requires

the information about the portfolio composition of the managed portfolio and also, the information about the performance benchmark during the period of evaluation, which may be difficult to obtain.

There are several reasons for why the information required for PBSA is expensive. Firstly, it requires substantial amount of judgement to categorize individual securities in different classes based on certain attributes, for example a conglomerate firm which operates in numerous sectors of economy is difficult to categorize under specific sector. Secondly, the composition of the portfolio might change over a period of time. Such drift in the composition will give no meaningful comparison of the point in time classification over a long term period. However, one solution for this is adopting the method of Performance change measure proposed by Grinblatt and Titman (1989). According to this method the characteristics of the managed portfolio are measured at different points in time and thereby considering the managed portfolio as a bunch of portfolios. Although, the performance change measure method removes the biases of PBSA, but, it is difficult to implement in the case of performance evaluation of mutual funds. The reason being, as only quarterly information is available about the holdings of mutual funds, therefore, the drift in the composition of the portfolio within the period of each quarter are ignored and this creates noise in the process of performance evaluation. Lastly, the problem of choice of performance benchmarks arises, if they are decided simply on the basis of portfolio characteristics. For example, the performance of a mutual fund investing in domestic equities may get influence by foreign economies, if the domestic equities are having sales exposure in foreign markets. Thus, the mutual fund although domestic, shall also keep foreign economies as performance benchmarks with other characterized benchmarks.

Although, a fund's investment style can be determined by an exhaustive analysis of the assets it held, however, a much simpler approach return-based style analysis (RBSA) was proposed by William Sharpe (1992) that uses only realized returns of the fund. The RBSA was based on a premise that 95 percent of the variance in the returns of a typically managed fund can be attributed to the asset mix of the fund. RBSA asserts that the investment style of a fund can be determined by statistically comparing the fund's return with the returns of selected style indices. RBSA is regression based statistical technique where the fund's historical returns are regressed on a set of passively constructed mutually exclusive style indices; each style indices representing an asset class or an investment style. The coefficients of the passive style indices are constrained to add up to one and also to be kept non-negative, so that these coefficients represent the portfolio weights and assumed to take long positions in the selected asset classes. As the historic returns of the fund concerned and the passively constructed mutually exclusive style benchmarks are easily available, hence, the RBSA does not bear the problems of PBSA.

Further, the constrained weights of the style indices are optimized using a quadratic programming in order to maximize the R^2 of the constrained regression model considered in RBSA. This optimum combination of style indices is referred as the 'style benchmarks' of the fund and any excess return achieved over its style benchmarks is referred as the 'active return' of the fund. According to Sharpe (1992) and Kahn & Rudd (2003), an active fund manager provides an investments style and 'active skill' in order to generate an excess return over its style benchmark while passive fund manager only provides an investment style. The active skill of a fund manager is divided into two main components; stock selection and market timing. The stock selection skills are the ability of a fund manager to indentify individual stocks that are under or overvalued and forecasting the price movements of the

individual stocks in order to achieve abnormal returns whereas, the market timing skills involve the forecasting ability of the market direction, whether bull or bear. From the investors' point of view it is important to understand that one does not invest in active funds and pay active management fees to earn returns equivalent to passive style benchmarks, those can be achieved through investing in passive funds that replicates the style benchmarks and has minimal management fees. Thus, an investor should invest in active funds and pay active management fees only if, the fund manager has the active skills to earn excess return over its style benchmarks.

Although the investment style analysis is considered to be an important exercise, however the choice of measurement of style between PBSA and RBSA is always a matter of controversy among practitioner and academicians. Hardy (2003), Trizcinka (1995) and Lobosco (1999) defended RBSA because of its simplistic approach, however, Christopherson (1997) and Di Bartolomeo D. Witkowski (1997) revealed that the major limitation of RBSA is that the estimates of style analysis are backward looking as they are purely based on historical data. They also suggested that as the estimates of RBSA is purely based on statistical technique therefore; it may suffer from the problem of multicollinearity among the asset classes and may not capture the style drift properly when there is a change in the investment strategy. However, in spite of such criticisms, the problem of data availability for PBSA has made RBSA a popular instrument for style analysis.

The previous academic researches revealed that there have been extensive empirical studies done on the investment performance of the mutual funds mainly in the context of developed countries like, US and European countries. Some of the important studies were done by Jensen (1968), Ippolito (1989), Elton, Gruber, Das and Hlavka (1993), and Malkiel (1995).

The other studies evaluated the consistency in the performance of the mutual funds (Grinblatt and Titman, 1989 & 1992; Hendricks, Patel and Zeckhauser, 1993; Goetzmann and Ibbotson, 1994; Brown and Goetzmann, 1995; Malkiel, 1995; Gruber, 1996; Cahart, 1997; Grunbichler and Pleschiutschnig, 1999). The majority of these studies revealed that the actively managed funds as a group, on average, do not seem to outperform their passively managed counterparts. For instance, Gruber (1996) during the study period from 1985 to 1994 found that the actively managed mutual funds on average underperform their passive benchmarks by about 65 basis points per annum. Carhart (1997) found that more actively managed mutual funds provide lower benchmark adjusted return to the investors. However, the results of some of the other studies, to some extent, give a different perspective. For instance, Grinblatt and Titman (1989, 1992) and Wermers (1997) concluded that actively traded fund managers posses significant stock selection capabilities that outperform the benchmarks before incorporating expenses. From the Indian context most of the studies measure the performance of mutual funds in terms of benchmark adjusted returns and risk adjusted returns like, Sharpe's ratio, Treynor's ratio and Jensen's alpha. Some of the important studies were done by Barua and Verma (1991), Sarkar and Majumdar (1995), Jaydev (1996), Gupta and Sehgal (1997), Mishra (2001), Narayan and Ravindran (2003), Sondhi (2004). The results of these studies depict a mixed performance of Indian funds. For instance, Barua and Verma (1991) and Gupta and Sehgal (1997), concluded that the mutual funds during their period of study performed satisfactory. However, Sarkar and Majumdar (1995), Jaydev (1996) and Mishra (2001) revealed a below average performance of the Indian funds. During the past few years investment style analysis and the evaluation of active performance of fund managers in terms of selection capability is gaining importance and many empirical studies have been done in US and European countries, some of them have been discussed in previous section. The results of these studies, in general, support the active skills of mutual fund managers and

revealed that the investment styles of mutual funds are well in line with their defined investment objectives. Contrary to this, a limited literature exists on the performance evaluation of Indian mutual funds using investment style analysis (Guha Deb, Banerjee and Chakrabarti, 2007). Thus, the present study attempts to unearth the performance of Indian mutual funds using the investment style analysis.

III. Data and Methodology

The data collected in this study consists of monthly returns of large-cap equity mutual funds in India and their relevant style indices over a period from January 2011 to April 2015. The monthly return data of large-cap equity mutual funds has been computed from the NAV (Net asset Value) data taken from the website of Association of Mutual Fund India (AMFI) and that of the relevant style indices has been computed from the index values obtained from their respective websites.[1]

The present study considered the top five large-cap equity growth funds of different mutual agencies in India based on the asset under management criterion namely; HDFC Top 200 fund, ICICI Prudential Focused Bluechip Equity Fund, Birla Sun Life Frontline Equity Fund, Franklin India Bluechip Fund, UTI Opportunities Fund and together these funds constitute to

[1] The monthly returns of the large-cap equity mutual funds and the style indices are computed using the following formula:

$R_{i,t} = ((V_t / V_{t-1}) - 1)*100$, where V_t is the NAV (Net Asset Value) of large-cap equity mutual funds or the value of style index at time t, which is the closing price of last trading day of each month and t-1 represents the previous month.

more than 55 percent share of the total asset under management of large-cap equity growth funds in India as on 30 April, 2015. For the purpose of style analysis the study included eighteen mutually exclusive asset classes in which eight are domestic asset classes and ten are international asset classes.

The domestic asset classes comprises of Government of India (GOI) treasury bills (TB), GOI bonds with one to three years of maturity (GOI 1-3), GOI bonds with three to eight years of maturity (GOI 3-8), GOI bonds with greater than eight years of maturity (GOI 8), the corresponding indices for these respective GOI bonds have been taken from the NSE-Government Securities Index (NSE-GSI) from the website of National Stock Exchange (NSE). The four indices of Indian equities that include large-cap value index, large-cap growth index, mid-cap index and small-cap index have also been taken from the website of National Stock Exchange (NSE). However, in the absence of the direct availability of large-cap value index and large-cap growth index in the Indian equity market, these were constructed from the S&P CNX Nifty index using a methodology prescribed by Sharpe (1992) which is based on the Price to Book (P/B) ratio. First the fifty large-cap stocks of S&P CNX Nifty index are sorted into two equal groups on the basis of their Price to Book (P/B) ratio. The first twenty five stocks with highest P/B ratio constitute the large-cap growth group whereas the remaining twenty five stocks with relatively lower P/B ratio constitute the large-cap value group. The next step is to compute the total market capitalization of each group as on January 2011 and is considered to be 1000 as base value. Further, on the basis of weighted market capitalization method, subsequent monthly index values are calculated for both the group to construct large-cap value index and large-cap growth index. The CNX Mid-cap index and CNX Small-cap index represents the domestic mid-cap and small-cap index.

It has been seen that Indian fund managers keep considerable amount of reservation in investing in international assets. This may because of the fact that mutual funds in India can invest in international assets to the limit of ten percent of their total net assets. However, this does not imply that the Indian mutual funds are not exposed to the fluctuations of foreign economies. The reason being most of the large-cap companies in India generates their substantial part of revenue from international market and thereby will get influenced from factors of foreign economies. Therefore, for the purpose of the style analysis a comprehensive list of major ten international asset classes have been taken for the study, this is because of the fact that the world financial market is getting liberalized rapidly. These international asset classes include S&P 500 (US stock index), DAX (German stock index), FTSE 100 (London stock index), CAC (French stock index), Nikkei 225 (Japanese stock index), Shanghai (Chinese stock index), Hang Seng (Hong Kong stock index), Taiwan Weighted (Taiwan stock index), KOSPI (Korean stock index), Straits Times (Singapore stock index). The monthly values of these indices have been taken from their respective websites in order to compute the monthly returns of these indices during the period of study.

The present study attempts to do the style analysis and performance attribution of top five large-cap equity funds of different mutual agencies in India using RBSA approach proposed by Sharpe (1992). The purpose is to find the relative performance of these funds over the style benchmarks, so that any active return generated over its style benchmarks will be attributed to fund manager’s selection or stock picking ability. RBSA approach proposed by Sharpe (1992) is based on asset class factor model whose generic representation is shown in equation (1).

$$R_{i,t} = \alpha_i + [\ b_{i1} F_{1,t} + b_{i2} F_{2,t} + \dots + b_{iN} F_{N,t}\ ] + e_i \quad \dots\dots (1)$$

Where, $R_{i,t}$ represents the return on security i at time t, $F_{1,t}$, $F_{2,t}$,.... $F_{N,t}$ represents the value of factor 1 till N^{th}, b_{i1}, b_{i2},...b_{iN} represents the coefficient or the sensitivities of security i with respect to N factors, α_i and e_i represents the intercept and error term of the multifactor model respectively.

Sharpe's RBSA model is considered to be a special case of generic asset class factor model. In RBSA the performance of the fund is replicated as best as possible over a specified period of time by the returns on passively managed style indices portfolios. The two fundamental differences found in Sharpe's RBSA is; first, every factor or the asset class is a return on suitable style index portfolio and second, the weights assigned to factors will sum up to unity. Thus, in order to perform the style analysis the equation (1) has been rearranged and shown in equation (2).

$\varepsilon_{p,t} = R_{p,t} - [\ \delta_{i1} R_{1,t} + \delta_{i2} R_{2,t} + ... + \delta_{iN} R_{N,t}\ ]$ ....(2)

$[\delta_{i1} + \delta_{i2} + ... + \delta_{in}\ ] = 1$ ....2(a)

$\delta_{in} \geq 0$ ....2(b)

Where, $R_{p,t}$ represents the return on the managed portfolio or the concerned fund i at time t, $R_{1,t}$, $R_{2,t}$,.... $R_{N,t}$ represents the return on N suitable index for each asset classes (N = 1,2,......18), δ_{iN} represents sensitivities of the return on the fund with respect to N asset classes and $\varepsilon_{p,t}$ represents the combination of intercept and error term of the multifactor model.

The square bracket $[\ \delta_{i1} R_{1,t} + \delta_{i2} R_{2,t} + ... + \delta_{in} R_{N,t}\ ]$ in equation (2) represents that part of managed fund's return which is explained by its exposure to the different style benchmarks and is termed as 'style benchmark return' or simply the style of the fund manager. While the

residual component $\varepsilon_{p,t}$ in equation (2) reflects the manager's capability to deviate from style benchmark return in order to give excess active return over its style benchmark. This part of the managed fund's return is attributed to the stock picking or selection ability of the fund manager and has been termed as 'selection'.

Finally, in order to perform the Sharpe's RBSA the optimal solution to equation (2) is computed by minimizing the variance of error term with given constraint shown in equation 2(a) and 2(b). The optimization is done with a process known as "Constrained Quadratic Programming". To perform the constrained quadratic programming we have used the optimization function provided by Microsoft Excel Solver Package. The use of Excel Solver has been commonly seen in previous researches for performing RBSA (Mayes et al, 2000 and Karatepe et al 2006). Further, the optimisation process will maximize the R^2 value of the RBSA model shown in equation (3) which indicates the proportion of variance of $R_{p,t}$ explained by the N asset class or style benchmarks.

$$R^2 = 1 - Var(\varepsilon_{p,t}) / Var(R_{p,t}) \quad \text{.....(3)}$$

The fund which is passively managed doesn't do much of research analysis and provides a portfolio only with style benchmarks thereby maintains a low transaction cost. Thus, passively managed funds are expected to have a high R^2 value. On the other hand, in an actively managed fund the fund manager can actively mix different securities within each asset class in an aspiration to achieve higher returns over style benchmarks. This may lead to a deviation in the performance of the active fund from its style benchmarks and the style of an active fund manager may no longer be same as the style of a passively managed fund. Therefore, a larger 'excess active return' (positive or negative) of an actively managed fund is in the conjunction with a lower R^2 value. Thus, the unexplained proportion of variance of $R_{p,t}$ given by $(1-R^2)$ is often consider to be a measure of active management of the fund or the

'selection' ability of the fund manager. Quantitatively the 'selection' ability of a fund manager is defined as the excess active return generated over its style benchmark represented by $R_{selection}$ and is computed by taking the arithmetic difference between the total return on the managed fund (R_{fund}) and the return on the style benchmark ($R_{stylebenchmark}$) shown in equation (4).

$$R_{selection} = R_{fund} - R_{stylebenchmark} \quad \text{.....(4)}$$

So far the style identified in the RBSA is effectively the average of potentially changing styles used over the estimation period. To find the dynamic changes in the style of a fund, an additional form of analysis where a number of style analyses covering a succession of periods is to carry out in order to see how consistent the estimated style is over time. This 'rolling-period' form of style analysis is sometimes known as exposure analysis. In the present study a rolling-period window of thirty six months computed monthly has been used to perform the style-exposure analysis for each fund for seventeen months from December 2013 to April 2015. For the next month the style-exposure analysis is again forecasted on the basis of lagging thirty six months data. The process is continued and a time series of the style exposure for the fund is obtained.

IV. Data Analysis and Empirical Evidences

The Tale-1 provides a summary of the results of the estimated average style exposures of the mutual funds considered for the study. It is important to note that the style exposures of these five large-cap equity mutual funds have been identified over a period from January 2011 through April 2015. From the results, it can be observed that the large-cap value index, large-cap growth index and Nifty midcap are the dominant components explaining on an average of

more than 90 percent of the style exposures in all the mutual funds under the study. Out of the three the large-cap value index is by far the most dominant component with an average style weight of more than 40 percent across all the large-cap equity mutual funds. This indicates that fund managers of these funds allocate on an average of forty percent of the total fund to the large-cap value stocks. The next dominant component is the large-cap growth index with an average style weight of more than 30 percent. Thus, together these style components on an average comprises of more than 70 percent weight in each of these large-cap equity funds which is pretty much in accordance with category these funds belong to.

Insert Table 1 here

However, it is surprising to note that none of these funds have a direct exposure to international markets nor do they invest in domestic stocks that generates their majority of the revenue from the international markets as the style weights of all the international indices scores zero. Further, the result shows some traces of exposure to the GOI securities index, particularly UTI opportunities fund shows a total exposure of 13 percent style weights together to GOI Treasury bills and GOI bonds with greater than eight years of maturity and Franklin India Bluechip funds shows an exposure of 8 percent only to GOI bonds with three to eight years of maturity. This implies that although the funds are categorized under large-cap equity funds, most of them keep some amount of investments in fixed income asset classes.

Insert Table 2 here

The Table-2 reported the R-Squared value and the residuals (1 – R-Squared) of each of the mutual funds obtained from the 'Constrained Quadratic Programming'. From the results it can be observed that all the large-cap equity mutual funds present a high R-Squared value with an average of more than 96 percent which implies that each of the fund's returns could be attributed to the concurrent returns obtained on a passively managed portfolio with a style weights shown in Table-1. However, it cannot be denied that the residuals (1 – R-Squared) of each of the mutual funds are pretty significant with an average of all the residuals is coming around 3.8 percent ((0.0204 + 0.0668 + 0.0285 + 0.0357 + 0.0389)/5). One may also recall the fact that the R-square value is attributed to the style of the mutual fund whereas the residual (1 – R-Squared) value to selection ability of the fund manager. Thus, in order to analyse the selection capability of each of the fund manager, a mean statistics of excess active return of the funds have been computed for each of the funds referred as 'Mean Selection Return' shown in Table-2. To check whether these positive mean selection returns of the funds are statistically significant, Student's t-Test will be applied at 95 percent confidence level. From the results of the Student's t-Test shown in Table-2, it can be validated that the mean selection returns of each of the large-cap funds are significant at 95 percent confidence level which exhibits some level of active management with good selection capability of the fund managers rather than passively tracking the style benchmarks.

From the Table-2 one can observe that Birla SL frontline Fund has highest mean selection return of 0.45 percent monthly whereas UTI opportunities fund has the lowest mean selection return of 0.30 percent monthly among the lot. The next immediate question that arise is should investors select a fund for investment on the basis of highest mean selection return? The answer is no, the reason being one cannot look at the mean selection return as the only criteria for selecting a fund. One must compare the selection ability of the fund manager with

the expenses charged by the fund agency. The expense incurred by an investment agency to operate a mutual fund is commonly referred as 'expense ratio' of a mutual fund. The expense ratio is the fund's operating expenses reported annually divided by the average rupee value of its asset under management. The data of the expense ratio for each of these large-cap equity mutual funds have been taken from the website of Morningstar India. Thus, a relationship is established between mean selection return of the Mutual fund with respect to its expense ratio which is exhibited in Figure-1. The figure shows a positive linear relationship between the mean selection return of the Mutual fund and its expense ratio. This implies that to achieve a higher selection return an investor must be ready to bear the higher expenses.

Insert Figure 1 here

It is important to keep in mind that so far the style weights identified in each of these large-cap equity mutual funds is an average of potentially changing styles over the period of study. As the style of a fund can substantially change over a period of time, therefore, it is pretty important to understand how the exposures to various style benchmarks evolve. Thus, to find the dynamic changes in the style exposure of the funds to various style benchmarks, a 'rolling period' form of style analysis where a number of style analyses covering a succession of periods is carried out in order to see how consistent the estimated style is over a time. The style-exposure analysis of each of the large-cap equity mutual funds has been exhibited in the Figure 2.1 to 2.5. The rolling-period window of thirty six months has been used to perform the style-exposure analysis for each fund for seventeen months from December 2013 to April 2015.

Figure 2.1 through 2.5 depicts the evolution of style for each of the funds covered in the study using a 36 month rolling-period window from January 2011 through April 2015. The

point at the extreme left of the figures portrays the fund style when the 36 month rolling-period analysis gets done for the month of December 2013. For the next month the style-exposure analysis is again forecasted on the basis of lagging thirty six months data. The process is continued and a time series of the style exposure for the fund is obtained till April 2015. Note that each rolling-period has thirty four months common with its preceding roll. The exposure analysis depicts that the fund's exposure is pretty much in accordance with the large-cap category fund, distributing its investments majorly between large-cap value stocks and growth stocks.

The rolling-period exposure analysis portrays a good amount of style consistency among all the concerned mutual funds over the given period of time. However, there are some peculiarities which have been observed in each of these funds. HDFC Top 200 fund although falls under the category of large-cap equity funds shows a significant amount of exposure in small-cap stocks during the month of December 2013, however, as the time progresses the style shifted gradually from small-cap stocks to large-cap stocks. In case of UTI opportunities fund there is a substantial amount of style exposure to the GOI securities during December 2013 particularly, the GOI Treasury bills that later diminishes to almost zero and replaced by large-cap value stocks, growth stocks and mid-cap stocks. Birla Sun Life Frontline Equity Fund also follows the same pattern where it starts with some amount of exposure to small-cap stocks but later it gradually diminishes. ICICI Prudential Focused Bluechip Equity Fund depicts a lot of consistency in the style space of around 85 percent however, it can be seen that there is a lot of style drifts has been made from small cap to mid cap, from Asian stocks to European stocks in the remaining style space of around 15 percent. Franklin India Bluechip Fund portrays the same patterns of frequent style drifts as other funds but in a very narrow range of around five percent. In terms of exposure to foreign stocks Franklin India

Bluechip Fund and ICICI Prudential Focused Bluechip Equity Fund shows some exposure to multiple foreign indices during the course whereas, rest of the funds under the study portrays negligible exposure to foreign markets.

Insert	**Figure**	**2.1**	**here**
Insert	**Figure**	**2.2**	**here**
Insert	**Figure**	**2.3**	**here**
Insert	**Figure**	**2.4**	**here**
Insert	**Figure**	**2.5**	**here**

V. Conclusions

From the results of the returns-based style analysis, it can be depicted that the investment style of large-cap equity funds in India are well in line with their defined investment objectives, as more than 90 percent of the style exposure in these funds is explained by the large-cap value index, large-cap growth index and Nifty midcap index. Further, out of these three major style indices the large-cap value index is by far the most dominant component with an average style weight of more than 40 percent across all the large-cap equity mutual funds. This implies that the Indian fund managers, in general, endorses the theory of 'value-growth effect' proposed by Fama and French (1992) in a breakthrough paper entitled "The cross-section of Expected Stock Returns" that the value stocks with a low ratio of price to

book exhibit better performance than growth stocks with high P/B ratio. One surprising factor found in an estimated average style exposures is none of these funds have a direct exposure to international markets nor do they invest in domestic stocks that generates their majority of revenue from international market as the style weights of all the international indices scores zero.

The study analyses the selection capability of each of the fund manager by computing a mean statistics of excess active return of the funds referred as 'Mean Selection Return' and found that the fund managers exhibit some level of active management rather than passively tracking the style benchmarks and also depicted a good selection capability. The finding that the fund managers depict a good selection capability is consistent with that of Daniel, Grinblatt, Titman and Wermers (1997); Swinkels and Tjong-A-Tjoe (2007); Guha Deb, Banerjee and Chakrabarti (2007). Further, a positive linear relationship is established between the mean selection return of the mutual funds with respect to its expense ratio which contradicts the result of Carhart (1997) that shows a negative correlation between the net returns and the expense levels in context of mutual funds in US. This implies that to achieve a higher selection return an investor must be ready to bear the higher expenses. The rolling-period exposure analysis portrays a good amount of style consistency among all the concerned mutual funds over the given period of time which is line with the results of the studies conducted by Chan, Chen and Lakonishok (1999); Dor and Jagannathan (2002); Brown and Harlow (2004). However, there are some peculiarities in terms of style deviation has been observed in each of these mutual funds.

These findings have important implications for the mutual fund companies, retail investors and policy makers. The consistency in the investment style with good selection capability in

Indian fund managers might augment the confidence of domestic retail investors in the equity mutual funds, which in return might enhance the participation of domestic investors into equity markets through mutual funds that account for only 2.4 percent of the total household savings (survey conducted by NCAER, 2011). Further, no stringency might be required in the policy formulation from the regulators for monitoring the Indian mutual funds in terms of designated investment objectives, as the study shows that the funds are well in line with their defined investment objectives. The study also shows that the expense ratio of mutual funds is a monotonic increasing function of selection capability of fund managers and therefore, investors might show indifference in selecting a particular mutual fund because the excess active return over its style benchmark after incorporating the management expenses fee will be almost similar among all the mutual funds. Finally, the study attempts to contribute to the limited body of literature on return-based style analysis of mutual funds in India, which might augment the existing framework of performance evaluation used in India.

References

Ankrim, Ernest. M. (1998). Peer-Relative Active Portfolio Performance: It's Even Worse Than We Thought. The Journal of Portfolio Measurement, 2(4), 6-11.

Bailey, Jeffrey. V. (1992). Are Manager universes Acceptable Performance Benchmarks? The Journal of Portfolio Management, 18(3), 9-13.

Christopherson, J. (1997). Equity Style Classifications. Journal of Portfolio Management, 21(3), 32-43.

Dibartololeo, D. Witkowski. E. (1997). Mutual Fund Misclassification: Evidence Based On Style Analysis. Financial Analysts Journal, 53 (5), 32-43.

Elton, Edwin. J., Gruber, Martin. J., & Blake, Christopher. R. (1996). Survivorship Bias and Mutual Fund Performance. The Review of Financial Studies, 9(4), 1097-1120.

Fama, E. (1972). Components of Investment Performance. Journal of Finance, 27(3), 551-567.

Grinblatt, Mark., & Titman, Sheridan. (1989). Mutual Fund Performance: An Analysis of Quarterly Portfolio Holdings. Journal of Business, 62(3), 393-416.

Hardy, Stephen. R. (2003). A Ten-Year Retrospective and Commentary. The Handbook of Equity Style management, 3rd ed. edited by Daniel T. Coggin and Frank J.Fabozzi, (John Wiley & Sons, Inc.), 109-130.

Jensen, Michael. C. (1968). The Performance of Mutual Funds in the Period 1945-1964. Journal of Finance, 23(2), 389-416.

Kahn, Ronald. N., & Rudd. A. (2003). The persistence of Equity Style performance: Evidence from Mutual Fund Data. The Handbook of Equity Style management, 3rd ed. edited by Daniel T. Coggin and Frank J.Fabozzi, (John Wiley & Sons, Inc.), 259-269.

Kaplan, Paul. D. (2003). Holdings-Based and Returns-Based Style Models. Morningstar Research paper available at http://corporate.morningstar.com/de/documents

Karatepe, Y., & Gokgoz, F. (2006). Style Analysis of Turkish equity Mutual Funds. International Research Journal of Finance and Economics, 1(2), 88-105.

Lehmann, Bruce., & Timmermann, Allan. (2007). Performance Measurement and Evaluation. FMG Discussion Papers, Financial Markets Group, dp604.

Lobosco, A. (1999). Style/Risk Adjusted Performance. Journal of Portfolio Management, 25(3), 65-69.

Mayes, T. R., Nancy, R. Jay., & Thurston, Robin. (2000). A Return-Based Style Analysis Examination of Asset Classes. Journal of Financial Planning, 18(8), 94 -104.

Miller, Robert. E., & Gehr, Adam. K. (1978). Sample size bias and Sharpe's Performance Measure: A Note. Journal of Financial & Quantitative Analysis, 13(5), 943-946.

Roll, Richard. (1978). Ambiguity when performance is measured by the Securities Market Line. Journal of Finance, 33(4), 1051-69.

Sharpe, William. F. (1966). Mutual Fund Performance. Journal of Business, 39(1), 119-138.

Sharpe, William. F. (1992). Asset Allocation: Management Style and Performance Measurement. Journal of Portfolio Management, 18(2), 7-19.

Treynor, Jack. L. (1965). How to rate Management Investment Funds. Harvard Business Review, 43(1), 63-75.

Trizcinka, Charles. A. (1995). Equity Style Classifications: Comment. Journal of Portfolio Management, 21 (3), 44-46.

www.nseindia.com
www.amfiindia.com
www.morningstar.in

LIST OF TABLES AND FIGURES

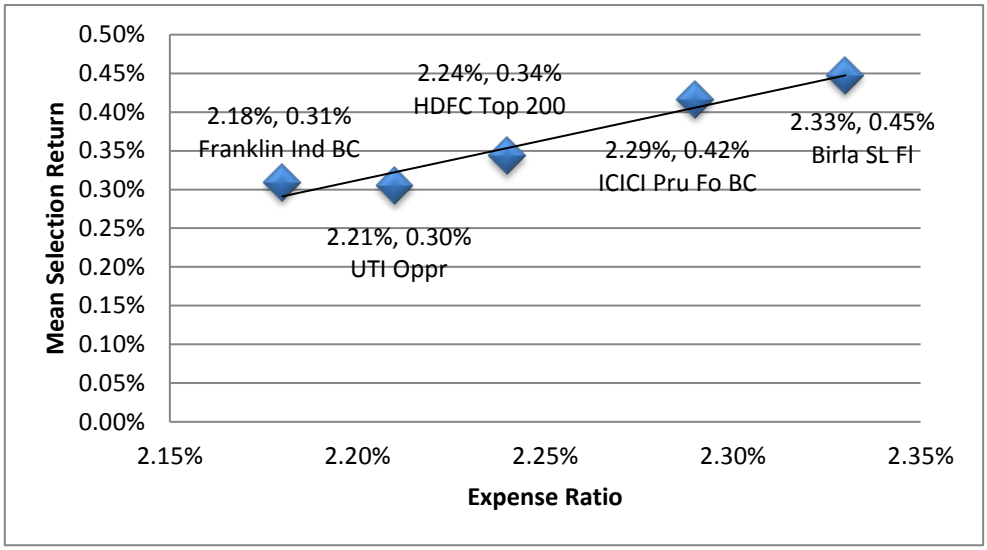
Table 1: Average Style Exposures of the Mutual Funds

	TB	GOI 1-3	GOI 3-8	GOI 8	Large cap Value	Large cap Growth
HDFC Top 200 Fund	0.00	0.00	0.00	0.00	0.49	0.13
UTI Opportunities Fund	0.05	0.00	0.00	0.08	0.23	0.39
Birla SL Frontline Equity Fund	0.00	0.01	0.00	0.00	0.40	0.34
ICICI Pru Focused Bluechip Fund	0.04	0.00	0.00	0.00	0.44	0.41
Franklin India Bluechip Fund	0.00	0.00	0.11	0.00	0.45	0.25
	CNX Mid	**CNX Small**	**S&P**	**DAX**	**FTSE**	**CAC**
HDFC Top 200 Fund	0.32	0.06	0.00	0.00	0.00	0.00
UTI Opportunities Fund	0.25	0.00	0.00	0.00	0.00	0.00
Birla SL Frontline Equity Fund	0.23	0.00	0.00	0.01	0.00	0.00
ICICI Pru Focused Bluechip Fund	0.11	0.00	0.00	0.00	0.00	0.00
Franklin India Bluechip Fund	0.17	0.00	0.00	0.01	0.00	0.00
	Nikkei	**Shanghai**	**Hang Seng**	**Taiwan**	**KOSPI**	**Straits Times**
HDFC Top 200 Fund	0.00	0.00	0.00	0.00	0.00	0.00
UTI Opportunities Fund	0.00	0.00	0.00	0.00	0.00	0.00
Birla SL Frontline Equity Fund	0.00	0.00	0.00	0.00	0.00	0.00
ICICI Pru Focused Bluechip Fund	0.00	0.00	0.00	0.01	0.00	0.00
Franklin India Bluechip Fund	0.00	0.00	0.00	0.00	0.00	0.00

Table 2: Summary of Mean 'Selection Return' and Student's t-test Statistics of the Mutual Funds

	R-Square	Residual	Mean Selection Return (Monthly)	T-test
HDFC Top 200 Fund	0.9796	0.0204	0.0034	3.0256*
UTI Opportunities Fund	0.9332	0.0668	0.0030	1.9606*
Birla SL Frontline Equity Fund	0.9715	0.0285	0.0045	3.8823*
ICICI Pru Focused Bluechip Fund	0.9643	0.0357	0.0042	3.4239*
Franklin India Bluechip Fund	0.9611	0.0389	0.0031	2.4663*

Figure 1: Relation of Mean Selection Return of the Mutual Funds with respect to its Expense ratio



Source: Expense ratio - Morningstar India; Data as of April 2015

Figure 2.1: Style Exposure Analysis of HDFC Top 200 Fund, 36-Month Rolling-Period, Computed Monthly

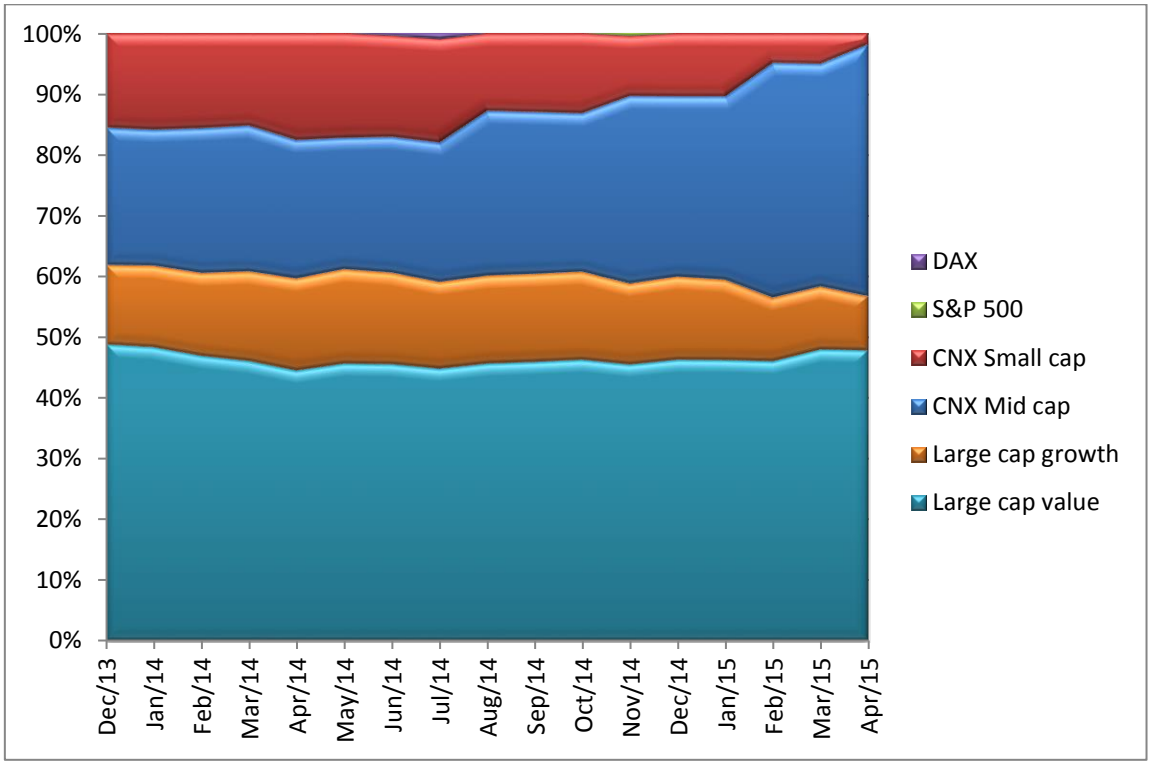


Figure 2.2: Style Exposure Analysis of UTI Opportunities Fund, 36-Month Rolling-Period, Computed Monthly

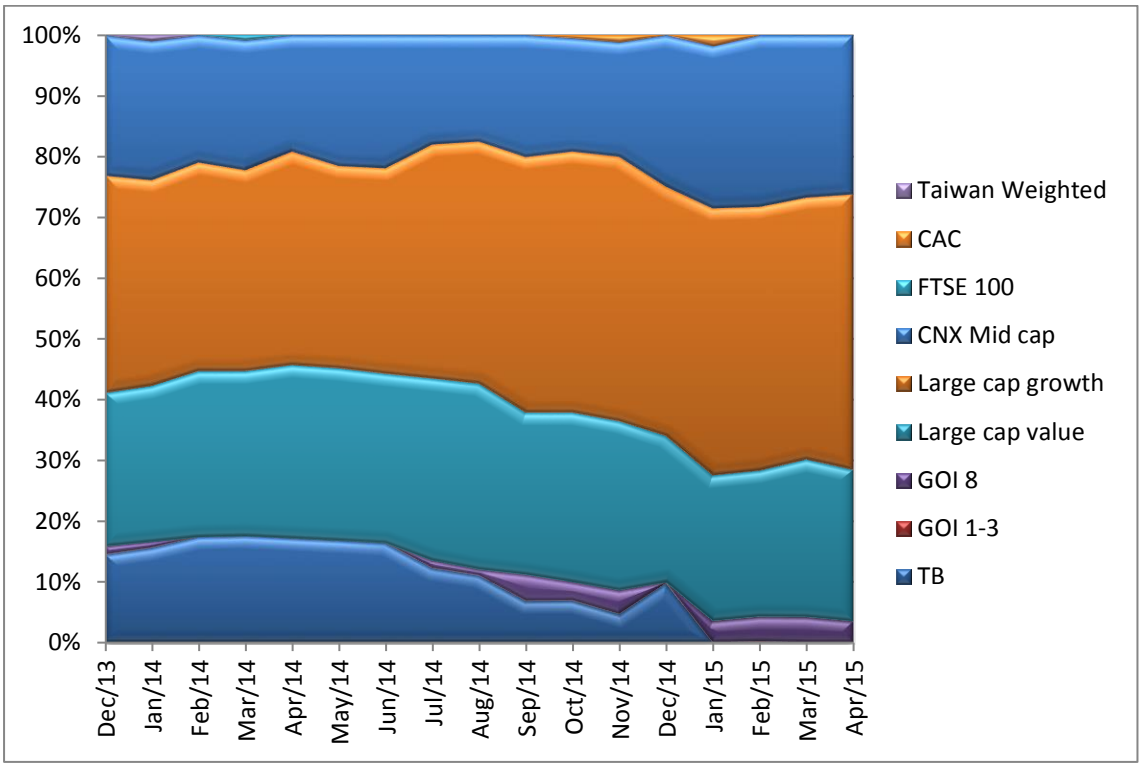


Figure 2.3: Style Exposure Analysis of Birla Sun Life Frontline Equity Fund, 36-Month Rolling-Period, Computed Monthly

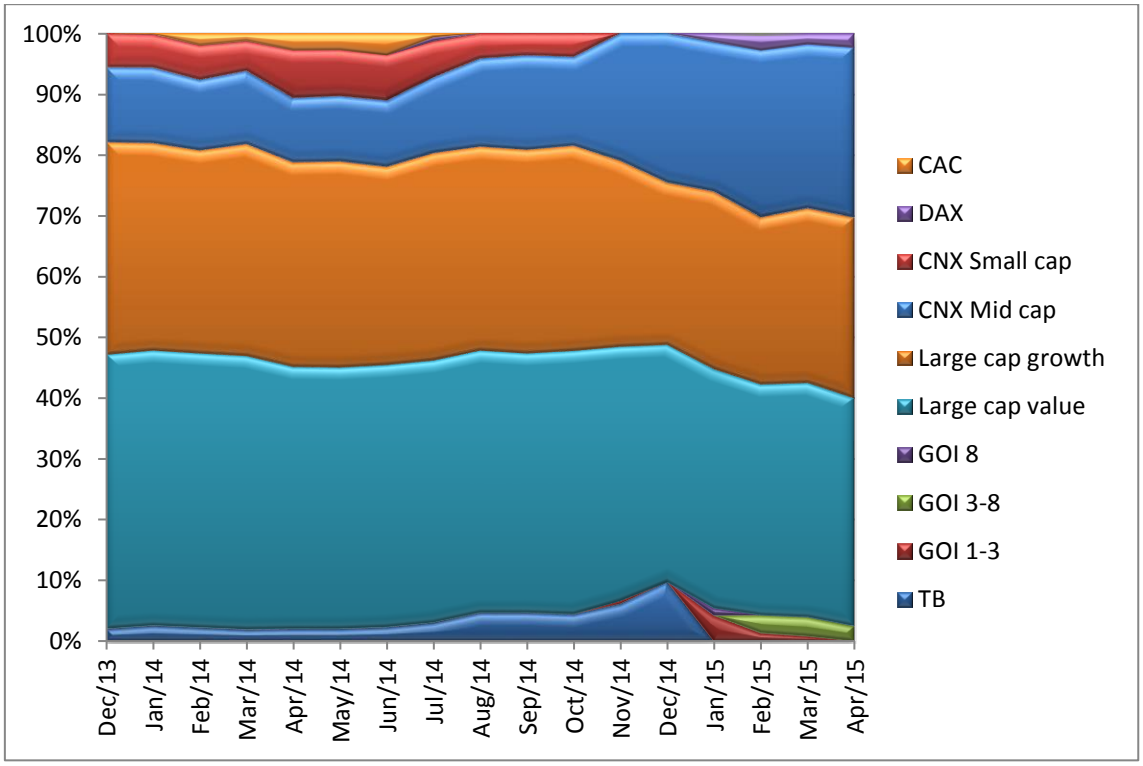


Figure 2.4: Style Exposure Analysis of ICICI Prudential Focused Bluechip Equity Fund, 36-Month Rolling-Period, Computed Monthly

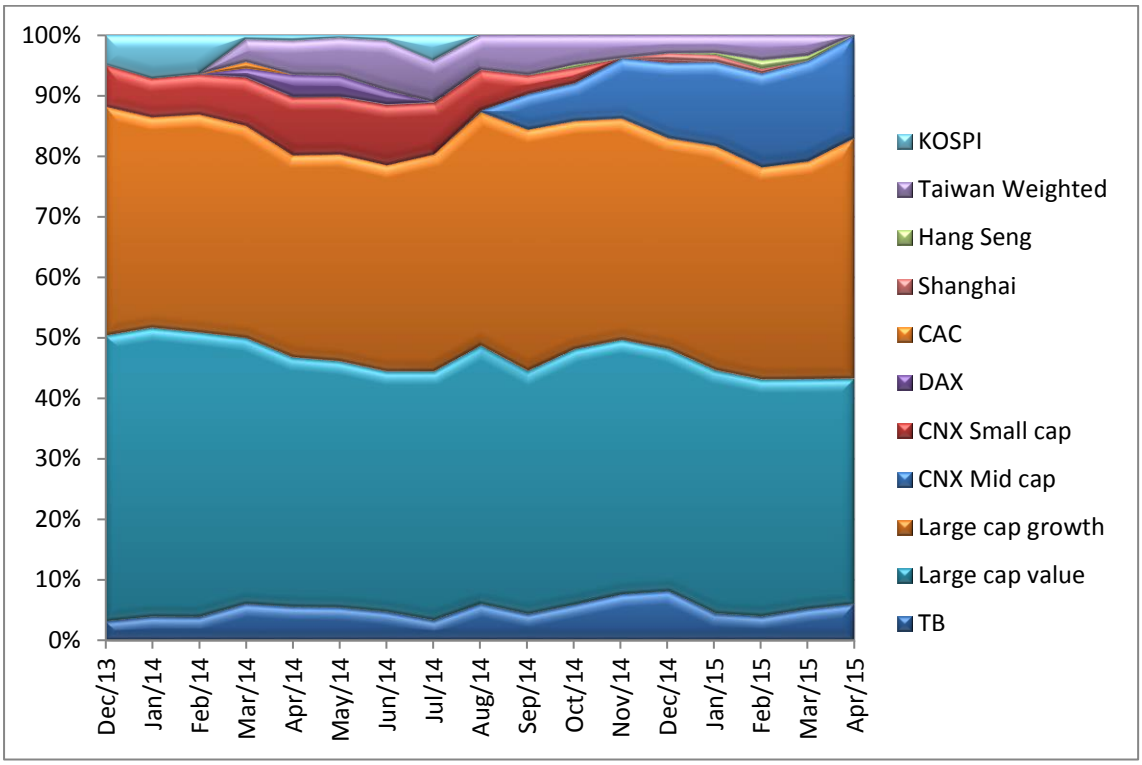


Figure 2.5: Style Exposure Analysis of Franklin India Bluechip Fund, 36-Month Rolling-Period, Computed Monthly