Performance Evaluation of Growth Funds in India: A case of HDFC and Reliance

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Abstract
This paper is aimed at analyzing Reliance growth fund and HDFC growth fund and suggesting which fund would suit which kind of investor. The paper is also aimed at formulating Capital Asset Pricing Model (CAPM) and French and Fama (F&F) model for the securities of both Reliance growth fund and HDFC Growth fund. CAPM uses market volatility Beta to describe the variation of stock returns whereas F&F model uses Size of the firm, Book to market equity and risk premium to explain the variation in returns. These models are developed for securities of both Reliance growth fund and HDFC Growth fund during the period 2008-09 to 2011-12 (yearly) and results are compared with the actual returns. It is found that the three factor model gives better results that are closer to the actual returns than those obtained by CAPM in most of the cases. Portfolio performance measures such as Sharpe’s ratio, Treynor’s ratio, Sortino’s ratio, Jenson’s alpha and Fama’s measure are calculated. Comparison of these performance measures reveals that Reliance growth fund is more suited to the Risk takers whereas the Risk averse should prefer HDFC growth fund.

Introduction
Mutual funds industry in India was started with the establishment of Unit trust of India in 1964, and continued to remain the only player until 1987. In 1987, the government permitted public sector banks and financial institutions to join the fray. In 1993 the industry opened up for private sector and foreign sector have started setting up mutual funds in India. Mutual funds have emerged as a proxy for investing in avenues that are out of reach of most retail investors, particularly government securities and money markets. Performance evaluation of mutual funds has been done extensively by Sharpe (1966) Treynor’s (1965) Jenson’s (1968) Fama (1972). There has been a huge growth in the number of schemes being introduced with over 1000 schemes in India with assets under management of Rs 592250 crores as on March 2011. So it is imperative that the performance of each fund has to be closely monitored and evaluated for better results. The risk aspect has also increased, therefore it is essential to diversify this risk and hence sectoral analysis has been done.

Objectives
The major objective of this paper is to compare the Capital Asset Pricing Model and French and Fama model applicable to securities weighting more than 3% NAV in Reliance Growth fund and HDFC growth fund. Analyze the performance of the respective funds during the period 2008-09 to 2011-12.

Assumptions
1) Securities weighting more than 3% NAV in Reliance growth fund and HDFC growth fund are taken into consideration
2) The latest portfolio i.e. 2012-13, of Reliance and HDFC growth fund are taken into consideration
3) The securities weighting more than 3% NAV in Reliance growth fund and HDFC growth fund are considered to be constant for the whole period of study i.e. 2008-09 to 2011-12.
4) Treasury bill rates have been taken as a proxy for risk free interest rate.

**Literature Review:**

One of the earliest studies of mutual fund performance by Jensen (1967) laid the foundation of contemporary mutual fund performance studies. He documents that expense adjusted fund returns are significantly lower than randomly selected portfolio of equivalent risk. Carhart (1997) demonstrates that those common factors driving stock return also explain persistence in mutual fund performance. Elton et al. (1993) correct for benchmark error, while Malkiel (1995) considers both benchmark error and survivorship bias in concluding that the results of prior studies suggesting market inefficiency are contaminated by these factors. Wermers (2000) demonstrates a positive relationship between performance and turnover, suggesting that those funds engaged in more active trading may find underpriced securities.

Panwar and Madhumathi (2006) studied characteristics and performance of mutual funds. The study focuses on differences in characteristics of assets held, portfolio diversification and variable effects of portfolio diversification on the performance of mutual funds. Prather et al., (2004) measured the performance of mutual funds by analyzing a large set of mutual funds and fund attributes in order to link performance to fund specific characteristics. The results indicate that the hypothesized relationship between performance and the explanatory variables are generally upheld, and indicate that after taking into consideration general market conditions and fund investment objective, the characteristic variables that relate to fund popularity, growth, cost and management also explains the fund performance.

Capon et al. (1996) suggests that growth in mutual fund industry has not been matched by growth in its research on its purchase and selection. Most of the research on mutual fund performance is focused on two determinants i.e. risk and return; and their role in fund flows and performance.

Das and Pattanayak (2013) also identify the critical fundamental factors that have significant effect on stock price movements mirrored by indices Sensex and Nifty. Reinganum (1981) found that size and P/E ratios could explain variations in returns; Banz (1981) discusses the size effect on stock returns. Fama and French (1992) suggest that stock risks can be proxied by size and book-to-market equity. Davis (1994) and Davis et al. (2000) confirmed the influence of B/M ratio and size. Connor and Sehgal (2001) studied the Fama and French three factor model and found that the proxies for market, size, and value factors could explain the cross-sectional dispersion of their mean returns.

Modern capital theory, Capital Asset Pricing Model (CAPM), as developed by Sharpe (1964), Lintner (1965) and Black (1972) constitute a simplified model of asset pricing; the model incorporates sensitivity beta in analyzing the return. Fama and French (1992, 1993) find that three variables, market equity, ratio of market equity to book equity, and leverage variables capture much of the cross section of average stock returns. In the presence of these three variables, market beta does not have any explaining power.

The empirical evidence against CAPM by Fama and French has generated a lot of debate and has called for major re-examination of the CAPM. Studies by Marisetty and Vedpuriswar (2002), Connor and Sehgal (2001), and Mohanti (2002) have supported the three factor model. Ansari (2000) has opined that the studies of CAPM in the Indian markets are scanty and no robust conclusions exist on this model. Dash and Sumanjeet (2008) support Fama and French hypothesis. The result suggests that in multivariate analysis, B/M equity and leverage have significant power; however, market beta has insignificant explanatory power.

**Definition of Variables**

1) **Beta:** It measures the systematic risk of a security that cannot be avoided through diversification. In other words also known as non-diversifiable risk. It is used to measure the volatility of a fund w.r.t to the market.
2) **Sharpe’s Ratio**: Sharpe’s ratio helps in comparing returns given by a fund with the risk the fund has taken. It measures the excess return per unit of total risk.

\[ \text{Sharpe Ratio} = \frac{r_p - r_f}{\sigma_p} \]

Where:
- \( r_p \) = Expected portfolio return
- \( r_f \) = Risk free rate
- \( \sigma_p \) = Portfolio standard deviation

3) **Treynor’s Ratio**: Treynor’s ratio is used to measure excess return per unit of systematic risk. It is used as a measure of risk adjusted return.

\[ \text{Treynor’s Ratio} = \frac{(r_p - r_f)}{\beta_p} \]

Where:
- \( r_p \) = returns of the portfolio
- \( r_f \) = return of risk free instrument
- \( \beta_p \) = beta of the portfolio

4) **Sortino’s Ratio**: It is a modification of Sharpe’s ratio. It considers only the downside volatility, whereas Sharpe’s ratio considers both upside and downside volatility.

\[ \text{Sortino Ratio} = \frac{R_p - R_f}{\sigma_p} \]

5) **Jenson’s Alpha**: Jenson’s alpha measures the excess return generated by the fund in relation to its risk. It measures the average return on the portfolio over and above that predicted by CAPM.

\[ \alpha_p = \left( r_p - [r_f + \beta_p (r_m - r_f)] \right) \]

Where:
- \( r_p \) = Expected total portfolio return
- \( r_f \) = Risk free rate
- \( \beta_p \) = Beta of the portfolio
- \( r_m \) = Expected market return

6) **Fama’s Measure**: This takes into account the standard deviation of the stock returns as well as the standard deviation of the market returns.

Fama’s measure = \( R_p - \left[ r_f + (\sigma_p/\sigma_m) (R_m - R_f) \right] \)

7) **SMB**: SMB accounts for the spread in returns between small- and large-sized firms, which is based on the company’s market capitalization.

8) **HML**: HML accounts for the spread in returns between value and growth stocks. HML argues that companies with high book-to-market ratios (value stocks) outperform those with low ones (growth stocks).
Data collected & sources for the data:
- Sample for survey: Random sample (online publishing, interviews)
- Securities in HDFC Growth fund and Reliance Growth Fund: Respective Websites
- Share prices of securities in HDFC Growth fund and Reliance Growth fund: BSE website
- SENSEX closing prices: BSE website
- Indian Govt. Treasury bill rates: RBI database
- Financial statements: Respective company websites

Capital Assets Pricing Model (CAPM),
A. Obtain the daily closing prices of the selected companies for the assigned period
B. Natural Log is applied to the values to normalize the data and the change on this is calculated as \((P1-P0)/P0\).
C. At the end of every year, Average Annual daily Return, Risk, Holding Period Return (HPR) of BSE Sensex and the selected companies are calculated
D. \(\beta\) for every year is calculated by running a single regression between market returns taken as the independent variable and company returns taken as the dependent variable.
E. STANDARD DEVIATION function gives the Risk and SUM function gives Holding Period Return (stastical).
F. But in this case, Financial HPR is used by calculating the percentage change between first vale and last value of percentage daily change for the year.
G. Then CAPM is calculated by using formula

\[ R_a = R_f + (R_m - R_f)\beta \]

Where \(R_m\) is Market return, \(\beta\) is Slope and \(R_f\) value is Risk Free Return.

Calculating Expected returns using Fama and French approach

To calculate expected return with Fama and French Model, we need to calculate betas and values of three independent variables.

The equation used for calculating expected return in in Fama and French is as under:

\[ E(R) = R_f + \beta_1(R_m - R_f) + \beta_2(SMB) + \beta_3(HML) \]

\((Rm-Rf)*\) This is the annual risk premium on market portfolio. Simply add up all the monthly Rm-Rf value and you will get the annual Rm-Rf.

\((SMB)\) ** This is the annual size premium which you can obtain by adding up all the SMB values in all of the 12 months.

\((HML)\) *** This is B/M ratio premium and can be obtained by adding up the HML values of all of the twelve months.

Step1: Calculate Ri-Rf
A. Obtain the closing share prices of the required companies on a daily basis for the period of study
B. Calculate the return using \(Ri = (P1-Po)/Po\), for the companies individually
C. Calculate Ri-Rf, wherein \(Rf\) is the risk free rate for that particular period.

Step2: Calculate Rm-Rf
A. Obtain the closing Sensex prices on a daily basis
B. Calculate the market return using \(Rm = (P1-Po)/Po\).
C. Calculate Rm-Rf, wherein \(Rf\) is the risk free rate for that particular period.

Step3: Calculate SMB
A. Obtain the total assets of the selected companies for the assigned period
B. Sort the companies based on size i.e. total assets
C. Divide the companies into three groups i.e. Small, Medium and Big
D. Obtain monthly (end-of-month) closing share prices for 12 months for the BIG companies
E. Calculate monthly returns for each company in the BIG group
F. Calculate monthly average return of the companies constituting the Big group.
G. Repeat the same process for SMALL group to calculate average monthly return
H. Subtract the average returns of BIG from the average returns of SMALL in each of the 12 months. These monthly differences are the SMB values.

**Step 4: Calculate HML**
A. Calculate the Book value per share of the selected companies for the assigned period.
B. Book per share = Total Equity / No. of Shares outstanding.
C. Obtain the Market value per share of the selected Companies for the assigned period.
D. Market value per share = Share price at the end of the given year
E. Calculate B/M ratio = Book value / Share price
F. Sort the companies based on B/M ratio from HIGH to LOW B/M ratio.
G. Divide the companies into three groups i.e. High, Medium and Low
H. Obtain monthly (end-of-month) closing share prices for 12 months for the HIGH companies
I. Calculate monthly returns for each company in the HIGH group
J. Calculate average return for the HIGH in each month by averaging the returns
K. Repeat the same process for LOW group to calculate average monthly return
L. Subtract the average returns of LOW from the average returns of HIGH in each of the 12 months. These monthly differences are the HML values

**Step 5: Running Regression**
We make use of multiple regression where in \((Ri-Rf)\) is the dependent variable and \((Rm-Rf)\), SMB, and HML values are the independent variables. Obtain corresponding coefficients for the independent variables and the intercept value along with their significance level \(p\) value.
The model is valid if \(p\) value of the intercept is \(\geq 0.05\) as the model is tested at 95% confidence level. In case the model is not valid comparison of CAPM and F&F is not applicable.

**Results and Interpretation**

|   | A |   | B |   | C |   | D |   | E |   | F |   | G |   | H |   | I |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Factors |    | 2008-09 |    | 2009-10 |    | 2010-11 |    | 2011-12 |    |
| 2 |   | Reliance | HDFC | Reliance | HDFC | Reliance | HDFC | Reliance | HDFC |
| 3 | Return | -8.79% | -5.05% | 10.42% | 6.57% | -1.09% | 1.83% | -0.92% | -2.53% |
| 4 | Risk | 0.073 | 0.60 | 0.044 | 0.036 | 0.028 | 0.041 | 0.043 | 0.038 |
| 5 | Beta | 1.467 | 1.250 | 1.381 | 1.172 | 1.104 | 1.460 | 1.436 | 1.584 |
| 6 | Sharpe's Ratio | -2.178 | -2.029 | 1.551 | 0.834 | -2.614 | -1.072 | -2.185 | -2.564 |
| 8 | Treynor's Ratio | -0.108 | -0.098 | 0.050 | 0.026 | -0.066 | -0.030 | -0.065 | -0.069 |
| 9 | Jenson's Alpha | -0.002 | 0.001 | 0.003 | 0.001 | -0.001 | 0.001 | -0.009 | -0.001 |
| 10 | Fama's Measure | 0.025 | 0.029 | 0.048 | 0.013 | 0.009 | 0.075 | 0.055 | 0.059 |

Returns for both the portfolios were negative during the financial year 2008-09, comparatively HDFC yielded better return. Reliance was a more risky portfolio during this financial year as compared to HDFC. This is signified by the risk and Beta factors of the reliance portfolio. Higher Sharpe’s ratio,
Sortino’s ratio, Treynor’s ratio, Jenson’s alpha and Fama’s measure of HDFC fund suggests that its performance was better as compared to Reliance fund.

As the market saw a huge boom in 2009-10 the fortunes of both the companies changed drastically and Reliance outperformed HDFC. Again in the financial year 2010-11 HDFC was performing better than Reliance.

Financial year 2011-12 saw an improvement in performance of Reliance over HDFC as suggested by higher ratios of Reliance fund.

<table>
<thead>
<tr>
<th>Sector</th>
<th>2008-09</th>
<th>2009-10</th>
<th>2010-11</th>
<th>2011-12</th>
</tr>
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<tbody>
<tr>
<td>HDFC</td>
<td>NAV</td>
<td>NAV</td>
<td>NAV</td>
<td>NAV</td>
</tr>
<tr>
<td>Reliance</td>
<td>-16.21%</td>
<td>-27.82%</td>
<td>4.31%</td>
<td>5.75%</td>
</tr>
<tr>
<td>3 Banks</td>
<td>14.98%</td>
<td>21.34%</td>
<td>9.33%</td>
<td>-5.10%</td>
</tr>
<tr>
<td>4 Consumer Non Durable</td>
<td>3.90%</td>
<td>4.17%</td>
<td>1.88%</td>
<td>-4.86%</td>
</tr>
<tr>
<td>5 Pharmaceuticals</td>
<td>12.76%</td>
<td>4.28%</td>
<td>33.44%</td>
<td>-1.76%</td>
</tr>
<tr>
<td>6 Software</td>
<td>9.43%</td>
<td>4.28%</td>
<td>-22.79%</td>
<td>13.71%</td>
</tr>
<tr>
<td>9.31%</td>
<td>24.61%</td>
<td>-5.58%</td>
<td>8.72%</td>
<td>1.49%</td>
</tr>
</tbody>
</table>

Reliance has focused more on Pharmaceuticals and software sector as compared to HDFC which laid more focus on Banking and consumer non durables.

<table>
<thead>
<tr>
<th>Company</th>
<th>Return</th>
<th>Model</th>
<th>Return</th>
<th>Model</th>
<th>Return</th>
<th>Model</th>
<th>Return</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICICI Bank LTD</td>
<td>-0.1050</td>
<td>F&amp;F</td>
<td>0.1339</td>
<td>F&amp;F</td>
<td>0.0070</td>
<td>F&amp;F</td>
<td>-0.0276</td>
<td>F&amp;F</td>
</tr>
<tr>
<td>Infosys LTD</td>
<td>-0.0151</td>
<td>F&amp;F</td>
<td>0.0677</td>
<td>F&amp;F</td>
<td>0.0188</td>
<td>F&amp;F</td>
<td>-0.0173</td>
<td>CAPM</td>
</tr>
<tr>
<td>Strides Arcolab LTD</td>
<td>-0.1362</td>
<td>F&amp;F</td>
<td>0.2478</td>
<td>N/A</td>
<td>-0.0320</td>
<td>F&amp;F</td>
<td>0.0900</td>
<td>F&amp;F</td>
</tr>
<tr>
<td>HCL Technologies LTD</td>
<td>-0.1916</td>
<td>F&amp;F</td>
<td>0.2097</td>
<td>F&amp;F</td>
<td>0.0435</td>
<td>F&amp;F</td>
<td>0.0048</td>
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</tr>
<tr>
<td>Divis Laboratories LTD</td>
<td>-0.0363</td>
<td>F&amp;F</td>
<td>-0.0345</td>
<td>F&amp;F</td>
<td>-0.0101</td>
<td>F&amp;F</td>
<td>0.0069</td>
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</tr>
<tr>
<td>State Bank Of India</td>
<td>-0.0571</td>
<td>F&amp;F</td>
<td>0.0795</td>
<td>N/A</td>
<td>0.0277</td>
<td>CAPM</td>
<td>-0.0340</td>
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<tr>
<td>United Spirits LTD</td>
<td>-0.0987</td>
<td>F&amp;F</td>
<td>0.0803</td>
<td>CAPM</td>
<td>-0.0500</td>
<td>CAPM</td>
<td>-0.0500</td>
<td>F&amp;F</td>
</tr>
<tr>
<td>Lupins LTD</td>
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<td>CAPM</td>
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<td>-0.1858</td>
<td>CAPM</td>
<td>0.0402</td>
<td>F&amp;F</td>
</tr>
<tr>
<td>The Federal Bank LTD</td>
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<td>F&amp;F</td>
<td>0.1252</td>
<td>F&amp;F</td>
<td>0.0585</td>
<td>F&amp;F</td>
<td>0.0106</td>
<td>F&amp;F</td>
</tr>
<tr>
<td>Aditya Birla Nuvo LTD</td>
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<td>F&amp;F</td>
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<td>F&amp;F</td>
<td>-0.0327</td>
<td>F&amp;F</td>
<td>0.0128</td>
<td>F&amp;F</td>
</tr>
<tr>
<td>Satyam computer Services LTD</td>
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<td>F&amp;F</td>
<td>-0.0313</td>
<td>F&amp;F</td>
<td>0.0249</td>
<td>F&amp;F</td>
<td>-0.1472</td>
<td>CAPM</td>
</tr>
</tbody>
</table>
The above results are for Reliance mutual fund and HDFC mutual fund respectively. We can see that F&F estimates the actual returns in a more effective manner as compared to CAPM. In about 70% of the cases F&F has found to be more effective in predicting the returns. HDFC growth fund has heavily

Conclusions:
From the above results it can be seen that French and Fama model estimates the returns more effectively than Capital Asset Pricing Model. It has been a see-saw battle between Reliance and HDFC mutual fund, there is not much of a difference in the performance of Reliance growth fund and HDFC growth fund. Reliance growth fund is highly volatile as compared to HDFC growth fund; this can be observed from the sectoral analysis, whenever the market is on an upswing Reliance has outperformed HDFC but lacked to limit its losses whenever the market has gone through the downswing. Reliance growth fund is more suited to the Risk takers whereas the Risk averse should prefer HDFC growth fund.

References: